Chapter 18
Cultural Resources

Cultural Resources are defined in this chapter as prehistoric and historic archaeological resources, architectural/built-environment resources, places important to Native Americans and other ethnic groups, and human remains. This chapter assesses potential effects of the action alternatives on cultural resources and identifies mitigation measures to reduce or eliminate effects on those resources in the study area (the area in which impacts may occur), which is limited to the Plan Area (the area covered by the BDCP). This includes portions of the Sacramento-San Joaquin Delta (Delta), Suisun Marsh, and Yolo Bypass. As necessary, additional site-specific studies and analyses will be conducted pursuant to CEQA, NEPA, and Section 106 of the National Historic Preservation Act (NHPA) as part of the second tier environmental review for the program-level components of the selected alternative pursuant to mitigation measures identified in this chapter.

This chapter first provides an overview of the methods used to identify the kind and density of cultural resources in the Plan Area (i.e., the statutory Delta, the Suisun Marsh, and the Yolo Bypass). Following the methods discussion is a description of the environmental setting/affected environment as it pertains to the types of cultural resources that occur in the Delta region, including a subsection that describes sensitivity for previously unidentified archaeological resources in the Plan Area. The chapter then describes the regulatory framework that governs cultural resources in the context of BDCP implementation and the analysis of effects, and describes the anticipated effects of the BDCP. Where specific effects associated with alternatives are analyzed in detail, the chapter refers to the "study area;" i.e., the area in which discrete effects on cultural resources associated with the alternatives may occur.

18.1 Environmental Setting/Affected Environment

18.1.1 Methods for Resource Identification

A number of standard methods such as record searches and site visits were used to determine the types and location of known cultural resources that could be affected by BDCP alternatives. Record searches were conducted and aerial photography was used for the entire study area. In addition, surveys were conducted in accessible areas. More specifically, the following methods were used to assess the kind and number of cultural resources that could be affected by the action alternatives and conservation measures:

- Archival map research to identify overall sensitivity for historic-era resources as well as locations of built resources of at least 45 years of age (resources 45-years old are being identified to avoid duplicative efforts if some project elements are not implemented within the next 5 years).
- Field surveys for built-environment resources that were accessible from the public right of way (approximately 67% of the right of way was covered), designed to evaluate identified and previously unidentified built-environment resources.

- Records searches to identify recorded cultural resources (including searches of NRHP and CRHR eligibility).
- A sensitivity analysis for unidentified resources historic-era and prehistoric archaeological resources (based on the density of recorded resources, geology and geological processes, and historic activity, included in Appendix 18A, *Archaeological Resources Sensitivity Assessment*).
- Archaeological surveys designed to confirm known resource locations for parcels that were legally accessible (approximately 5 percent of the right-of-way was covered—less than the percentage of the footprint covered in the built environment field studies because in some instances, visible built-environment resources such as structures and residences can be photographed from public roads or viewed from aerial sources).
- Review of built-environment resources using aerial photography sources such as Google Earth and Google Maps.
- Correspondence with Native American contacts provided by the Native American Heritage Commission (NAHC) and a search of the sacred lands database maintained by the NAHC.

These data were compiled to provide an overview of the potential for the alternatives to result in significant effects on cultural resources. These data, as well as the prehistoric, ethnographic, and historic setting for the region, were used to identify the suite of cultural resource property types that may be affected by the alternatives. Specific effects associated with the alternatives and conservation measures are described below under Section 18.3.3, *Effects and Mitigation Approaches.*

For numerous practical reasons, however, not all potential cultural resources in the study area could be identified. A primary reason is the fact that, in order to evaluate whether particular sites were "historical resources" for "unique archeological resources," invasive and even destructive techniques would have had to be used. Another factor was the sheer size of the study area, which made it impossible to evaluate every potential resource within any reasonable timeframe and at any reasonable cost. Moreover, the professional cultural resource specialists concluded that reasonable samples, combined with record searches and analyses of aerial photographs, would allow them to sufficiently characterize the nature of the resources and the likely effect within the footprint of the BDCP alternatives. In addition, every effort is made to avoid and minimize effects on significant cultural resources, including historic properties and historical resources. Finally, much of the Plan Area—particularly portions that could be affected by BDCP alternatives—was not legally accessible.[1] (For a detailed discussion of DWR's efforts to obtain legal access to inaccessible portions of the Plan Area, see Appendix 4A, *Summary of Survey Data Collection by Department of Water Resources to Obtain Information Regarding Baseline Conditions in Areas That Could Be Affected by BDCP*).

18.1.1.1 Archival and Map Research

Historic map research was conducted at the Earth Sciences and Map Library at the University of California, Berkeley, October 10–12, 2011, and copies of all historic topographic maps within the boundaries of the Plan Area were obtained. Features identified on these maps have been compared with the footprint of action alternatives to identify the sensitivity of each alignment for historic-era cultural resources.

[1] (*In Re Department of Water Resources Cases, JCCP Action No. 4594, Final Order April 8, 2011*).

In addition, the records of identified shipwrecks retained by the California State Lands Commission were compared with the footprint of all alternatives. Two plotted shipwrecks coincide with proposed project features. The latitude and longitude on record place the resources on dry land rather than within water features, therefore the locations of these resources are likely incorrect and it is not likely that the action alternatives will affect these resources.

18.1.1.2 Records Searches

Records searches were conducted through the relevant information centers of the California Historical Resources Information System (CHRIS). These searches revealed that a wide variety of prehistoric- and historic-era sites, features, and artifacts have been documented in the Plan Area. These cultural resources include early Native American burial, habitation, and mound sites; gold rush–era residences; ranches; agricultural work camps and landscapes; railroads; water conveyance systems; levees; rural residences; rural communities; small and medium cities; rural historic landscapes; and bridges.

Some of these resources have been evaluated for the NRHP and CRHR eligibility criteria, but the majority remains unevaluated either because they are inaccessible or because destructive test excavation is not currently feasible. Based on available records, many of these resources appear likely to qualify as historical resources and historic properties. While the CRHR and NRHP were checked during the record search because many of these sites are very old and have not been revisited after initial documentation, they have not been previously evaluated for the NRHP or CRHR in earlier studies.

Identified resources were mapped with geographic information systems (GIS), and their locations were compared to the footprint of the alternatives.

18.1.1.3 Field Surveys

Initial Site Visits

Where access was available, cultural resource site visits were first conducted in 2009 to confirm the location of known resources. Site visits were conducted over 6 days: May 19–21, September 21, October 27, and December 7, 2009 to confirm the location of previously documented resources. Documentation focused on photographing previously identified resources and recording locations using global positioning system (GPS) units. This effort focused on archaeological resources that were legally accessible. In addition, cultural resources surveys were conducted from May to August 2011 to confirm additional archaeological resources where access became available. Attempts were made to verify the location of previously recorded sites in the Plan Area. Surveys of some of the recorded sites were completed. However, litigation in 2010 restricted DWR's ability to access all sites that could have been relevant to this analysis. This prohibition remains in effect for numerous properties as of the time of this Draft EIR/EIS. The majority of the sites revisited in 2009 and 2011 were in the southern and western portions of the Plan Area.

Field Surveys for Built-Environment Resources

Appendix 18B enumerates identified built environment resources affected by the BDCP alternatives. Field surveys were performed in May and June of 2012 for those portions of the conveyance facility alternative alignments that could be viewed from pubic roads and accessible rights-of-way locations. Prior to surveys, background research was conducted for built-environment resources that required

inventory and evaluation using records of previously recorded resources, topographic maps, aerial photographs, and the date of construction. Where access to a given resource was available and sufficient data could be collected, its eligibility for listing in the National Register of Historic Places and California Register of Historical Resources was assessed. Where dense tree cover, recent structures, or landscaping obscured built environment resources, they were not evaluated. In addition, some large rural properties that contain many built resources were not evaluated because contributing structures that form part of the setting, and thus integrity of the resource could not be accessed for documentation. Appendix 18B summarizes identified built-environment resources and effect mechanisms (such as specific BDCP project features or activities that may potentially affect existing built-environment resources). In addition effect mechanisms are described in Section 18.3.2,.

Field Surveys for Archaeological Resources

Appendix 18B enumerates identified archaeological resources affected by the BDCP alternatives. Following initial site visits, archaeological sites were visited where legally accessible, to update the site record forms and confirm the general nature and boundaries of the resource in June of 2012. Archaeological sites were not individually evaluated based on field survey data because such evaluation typically requires subsurface test excavation to retrieve a suitable sample of material, which is potentially damaging. Excavation of samples from archaeological sites is typically necessary for evaluation because the surface distribution of material provides only some indication of the nature and boundaries of the deposit. Layered deposits may have material from different time periods that are not visible from the surface. Test excavation retrieves a sample of such material to characterize the site and to demonstrate why the site does or does not have significance within the meaning of CRHR and National Register of Historic Places (NRHP) eligibility criteria described below in the regulatory setting. In addition, where a deposit has been disturbed through natural or human processes, the site may not have sufficient integrity to convey this significance. Subsurface testing or excavation may be needed to further assess the significance of a cultural resource for eligibility or listing on the NRHP or CRHR.

Subsurface test excavation is considered potentially damaging both within the professional practice of archaeology and among the Native American community. Professional archaeologists consider test excavation destructive because it can only be performed once. After a portion of a deposit has been disturbed, the original spatial relationships between buried artifacts can never be perfectly restored for re-examination. In addition, because science improves over time, archaeologists assume that some data is always irretrievably lost during current excavations. Relative to future advances in science; current excavations destroy the possibility of retrieving information that cannot currently be analyzed based on available technology. In addition, the Native American community typically objects to excavation of prehistoric sites because many sites in the study area contain human remains that embody cultural and religious values. Test excavation may damage these remains, with the potential for inadvertent damage.

For the analysis of effects under CEQA and NEPA, the potential damage to archaeological resources associated with test excavation does not sufficiently justify the information gained prior to the selection of an alternative for construction, as noted earlier. Test excavation of all resources for all alternatives would result in potential damage and disturbance before project-related effects are certain to occur. While individual archaeological sites cannot be completely evaluated without test excavation, suitable proxy measures offer means of assessing the potential of the various conveyance alignments to result in significant impacts on CRHR and NRHP eligible resources as well

as unique archaeological sites. These proxy measures consist of analyzing the density and distribution of recorded resources, and estimating the nature and size of identified sites based surface observations. This approach allows for subsequent assessment of the potential of the alternatives to result in adverse effects on archaeological resources that are likely to qualify for the CRHR or NRHP without physical destruction of the sites.

All parcels that were legally accessible were surveyed for archaeological resources. Of the 49,224 acres of the constructability footprint (including the PTO, West, East, and SCO options), 2,231 acres were surveyed (4.53%). Parcels were walked in traditional transects, with archaeologists spaced no more than 20 meters apart at any time. Visibility of the ground surface varied significantly, from excellent visibility to near zero where high grasses made visibility difficult. Identified resources were recorded on California Department of Parks and Recreation forms and surface boundaries were mapped.

18.1.1.4 Native American Correspondence

The NAHC was contacted on May 21, 2009, and May 5, 2011, for information about the location of known heritage or sacred sites in the Plan Area. The NAHC responded and provided a list of Native American individuals and organizations that may have knowledge of cultural resources in the Plan Area. DWR Staff archaeologists sent letters to the parties identified by the NAHC on June 15 and 22, 2009, requesting information regarding resources that may occur in the Plan Area. Updated letters were sent on January 28, 2012 and follow-up phone calls were placed on July 26, 2012.

The NAHC indicated that the sacred lands file does not contain any mapped resources in the Plan Area. In addition, representatives of the following Native American organizations also responded and indicated that there were no objections or concerns about the BDCP at that time, but wished to be kept apprised of future progress on the project: Wintun Environmental Protection Agency; Cortina Indian Rancheria (CIR); Rumsey Indian Rancheria; and the United Auburn Indian Community of Auburn Rancheria. No additional comments have been received to date.

18.1.1.5 Geomorphology

Archaeologists analyzed the geomorphology of the landscapes associated with the action alternatives as a means of identifying relatively level and stable geomorphic surfaces that are particularly sensitive for habitation. Such surfaces include alluvial fans and stream terraces located near water, which are attractive places for habitation and subsistence activity, and may contain both buried and surface archaeological sites. This information was used to assess the sensitivity of the Plan Area for unidentified and buried cultural resources. This analysis indicates that the Plan Area contains numerous landforms where buried prehistoric archaeological sites may be preserved. This analysis is summarized in Appendix 18A, *Archaeological Resources Sensitivity Assessment*.

18.1.2 Prehistoric Archaeological Setting

The Plan Area is located in the Central Valley, which is divided into two major physiographic provinces separated by the Delta. The Sacramento Valley, drained by the southward-flowing Sacramento River, lies to the north, and the San Joaquin Valley, drained by the northward-flowing San Joaquin River, lies to the south. The presence of this fresh water created one of the most diverse and productive environmental zones in California (Rosenthal et al. 2007: 147).

Although various peoples dwelled in the area now known as the Central Valley (to be discussed further in Section 18.1.4, *Ethnographic Setting*) and spoke a variety of languages, common linguistic roots indicate that these groups had a related history and regular interaction (Rosenthal et al. 2007: 149), A shared heritage is also indicated by common technological, economic, ceremonial, and sociopolitical characteristics described by twentieth-century anthropologists who identified the Central Valley as the core of the California Culture area (Kroeber 1936, 1939).

Early inhabitants of the Central Valley used the various habitats found throughout the valley, including riparian forest, marsh, alkali basins, oak savanna, and foothill woodland communities. They created a sophisticated material culture and established a trade system involving a wide range of manufactured goods from distant and neighboring regions, and their population and villages prospered in the centuries prior to historic contact (Rosenthal et al. 2007:147, 149).

Over time, however, the majority of surface sites in the Central Valley, many mounds, have been destroyed by agricultural development, levee construction, and river erosion. Many excavations of Central Valley sites in the early twentieth century were performed by untrained individuals as well as professionals with rudimentary methods, who focused on artifact and burial recovery but paid little attention to other artifacts such as dietary remains and technological features, thus hampering modern attempts at reanalysis. Early professional efforts emphasized culture history rather than processes that drive culture change. Additionally, the Central Valley's archaeological record has been affected by the natural processes of landscape evolution: surface sites are embedded in young sediments set within a massive and dynamic alluvial basin, while most older archaeological deposits have been obliterated or buried by ongoing alluvial processes. Consequently, archaeologists are challenged to identify and explain long-term culture change in portions of the Central Valley where the majority of the available evidence spans only the past 2,500 years (or, in rare cases, the past 5,500 years) (Rosenthal et al. 2007:150).

There is no single cultural-historical framework that accommodates the entire prehistoric record of the Central Valley. Moratto's (1984) well-regarded synthesis of Central Valley archaeology was based on works from Bennyhoff and Fredrickson (Elsasser 1978; Fredrickson 1973, 1974). The comparative frameworks established by Bennyhoff and Fredrickson (1994) incorporated a wide range of local and regional traditions but has not been systematically applied outside of the Sacramento Valley. For this reason, the following discussion uses a simple classification based on the three basic periods proposed by Fredrickson: the Paleo-Indian, Archaic, and Emergent (Fredrickson 1973, 1974). The Archaic period has been further divided into the Lower, Middle, and Upper Archaic based on newer radiocarbon dates, adjusted with modern calibration curves (Rosenthal et al. 2007: 150). The discussion that follows is based on these divisions.

18.1.2.1 Paleo-Indian

The earliest accepted evidence of human occupation in the Central Valley during the Paleo-Indian Period (11,550–8500 BC) comes from the discovery of basally thinned and fluted projectile points at three separate locations in the southern portion of the basin (Rosenthal et al. 2007:151). Recent geoarchaeological studies have shown that periodic episodes of erosion and deposition during the Holocene have removed or buried large segments of the Late Pleistocene landscape (Rosenthal and Meyer 2004; White 2003a). Archaeological deposits associated with these ancient landforms either have been destroyed or lie buried beneath more recent alluvial deposits (Rosenthal et al. 2007:151).

18.1.2.2 Lower Archaic

As with the Paleo-Indian Period, the Lower Archaic Period (8000–5550 BC) is characterized by mostly isolated finds, including stemmed points, chipped stone crescents, and early concave base points. Typical examples of these artifact types have been found on the ancient shore of Tulare Lake (Wallace and Riddell 1991).

18.1.2.3 Middle Archaic

The beginning of the Middle Archaic (5550–550 BC) brought about significant climate changes to the Central Valley: warmer, drier conditions; the development of the Delta as sea levels rose; and the stabilization of fans and floodplains around 5550 BC calibrated (written as cal BC or cal AD; calibration is used to convert the laboratory determination of carbon-dated materials to calendar years) (Rosenthal et al. 2007:152). Around this time, there appeared to be two distinct settlement-subsistence adaptations operating in central California—one centering on the foothills and the other on the valley floor (Fredrickson 1994: 102–103; Rosenthal and McGuire 2004: 161–163). Late Middle Archaic sites appear to be increasingly sedentary, as indicated by refined and specialized tool assemblages and features, a wide range of non-utilitarian artifacts, abundant trade objects, and plant and animal remains indicative of year-round occupation (Moratto 1984; Ragir 1972; Schulz 1970, 1981; White 2003a, 2003b).

18.1.2.4 Upper Archaic

The Upper Archaic (550 BC–AD 1100) is characterized by another change in climate conditions—this time, to a cooler, wetter, and more stable climate. These changes resulted in renewed fan and floodplain deposition and soil formation in the Central Valley (Rosenthal et al. 2007:156). New technologies were developed during this period, including new types of bone tools and bone implements and widespread manufactured goods such as *Haliotis* ornaments and ceremonial blades (Bennyhoff and Fredrickson 1994; Fredrickson 1974; Moratto 1984). The Berkeley Pattern (Fredrickson 1973, 1974) typically contains large quantities of habitation debris and features (such as fire-cracked rock heaps, shallow hearths, house floors, and flexed burials) that reflected long-term residential occupation.

18.1.2.5 Emergent

The archaeological record for the Emergent/Historic Period (AD 1000) is more substantial and comprehensive than those of earlier periods in the Central Valley, and the artifact assemblages are the most diverse (Bennyhoff 1977; Fredrickson 1974; Kowta 1988; Sundahl 1982, 1992). The Emergent Period, which enjoyed a relatively stable climate as opposed to the earlier periods, is associated with the use of the bow and arrow over the dart and atlatl (Bennyhoff 1994). Other characteristics of this period include a regionally variable economy, changes in manufacturing residues at Emergent Period sites, and the decentralization of shell bead production (Rosenthal et al. 2007:159). The Emergent Period matches behavior typically associated with ethnographic populations.

18.1.3 Prehistoric Archaeological Property Types

This section describes the typical prehistoric archaeological property types that are expected in the Plan Area. These property type descriptions are based on the prehistoric archaeological setting

presented above. The term *property type* refers to a grouping of properties that share similar important characteristics. For this setting, property types have been broadly categorized into groups based on their cultural and historical associations. These two groups are subdivided as discussed below. It should be noted that these "types" represent idealized and typical types; individual resources may have characteristics associated with multiple types or may be unique. Sites that combine the characteristics of multiple types and that contain deposits from different time periods may be informally called "multi-component" or "multi-occupation" sites.

Identified property types provide reasonable expectations of the range of prehistoric archaeological resources that may be affected by the action alternatives. These property types are classified here in terms of constituents and features. Seven prehistoric archaeological property types have potential to be present in the Plan Area: midden/mound sites, multiple-occupation sites, human burials, lithic scatters, bedrock milling features, baked clay deposits, and isolated artifacts. Each prehistoric property type is described under a separate heading below.

18.1.3.1 Midden/Mound Sites

Midden is an organically-rich soil generated during human habitation, and is typically darker than surrounding native soils that were not used as a living surface. Many sites containing midden in the Plan Area are referred to informally as "mound" sites because the site is elevated about the surrounding land and appears as a low mound. Mound sites almost always contain midden, but other site types contain midden as well. Midden and mound sites are anticipated to be the most structurally complex and to have the greatest artifact diversity of all the prehistoric property types. Midden deposits can vary greatly in size, and are found where people ate shellfish and other invertebrates, fish, birds, sea mammals, ungulates, small mammals, acorns, seeds, tubers, and other food resources. These food sources leave a large amount of debris, which customarily was piled up where the food was processed, eaten, and discarded.

Midden deposits in the Plan Area were generally occupation sites, although some may have been used only on a seasonal basis. When deaths occurred midden sites were sometimes were used as burial sites. Constituents may include stone flakes (byproducts of stone-tool manufacture), bedrock mortars, ground-stone tools, marine shell, bone remains, charcoal, baked clay, charred floral remains, and fire-affected rock. Non-utilitarian artifacts also may include charmstones, shell ornaments, and beads. Discrete features, including house floors, hearths, and human burials, also may be located within these deposits.

Village sites typically contain midden. It should be noted that while ethnographic sources often identify villages, villages are not discussed as a discrete site type because village locations typically manifest archaeologically as midden sites while combined with other archaeological components such as burials. Midden sites are thus a cross-cutting category that may be associated with different functional uses. It should be noted that some soils in the Plan Area are rich in organic matter from natural rather than human sources and thus may appear similar to midden.

18.1.3.2 Multiple-Occupation Sites

These sites are archaeological deposits that contain material associated with two-or more distinct occupational periods. The cultural remains may be of the same kind (i.e. midden from two distinct periods), or may be functionally unrelated.

18.1.3.3 Human Burials

Burial features can range in complexity from a simple isolated inhumation (burial or cremation) to more elaborate interments containing numerous bodies. These features may represent specially designated interment areas or remnants of larger archaeological sites. Burial associations often include shell beads and ornaments and ground and polished stone artifacts, such as charmstones and plummets. In the Plan Area, human burials are expected to be found in raised earthen mounds and midden sites, but burials may also be associated with lithic scatters, and have been found in isolation in the archaeological record.

18.1.3.4 Lithic Scatters

Lithic scatters are accumulations of stone artifacts, including finished tools and debitage (all the waste material produced during lithic reduction and the production of chipped stone tools). These sites may or may not contain chronological information, depending on the presence and quantity of temporally diagnostic items such as projectile points and other or dateable materials such as obsidian. Lithic scatters can be simple, containing only flaked-stone debitage and tools, or complex, having primarily flaked-stone debris but some ground stone as well.

18.1.3.5 Bedrock Milling Features

Bedrock milling features are typically bedrock mortars (oval or circular depressions worked into rock) and/or millingslicks (flat grinding surfaces). These features were used for processing vegetal resources such as acorns and other seeds. Because of a dearth of exposed bedrock in the Central Valley, milling features are typically associated with the Sierra Nevada foothills, where exposed bedrock is much more common. These features often have associated artifacts such as pestles and handstones. Flotation analysis (a method of separating light organic material such as fine plant remains from the deposit, in order to identify plant species pursued by prehistoric populations) of adjacent soils often can identify plant types that were processed at these sites. An overview of this resource type is provided by White (2011).

18.1.3.6 Baked Clay Deposits

One baked clay deposit has been identified in the Plan Area. Baked clay artifacts and detritus emerged in the Plan Area in response to the stone tool-impoverished environment of the Delta and surrounding alluvial plains. Accordingly, artifacts of this sort include utilitarian implements, such as grinding tools and net weights for fishing. Bowls and decorative items were made of fired clay as well.

18.1.3.7 Isolated Artifacts

Isolated finds are three or fewer artifacts that occur within a restricted area, generally within an area 30 feet in diameter. Information potential usually is limited to location, material type, style, and function of the individual artifact. Isolated artifacts are not typically able to qualify as historical resources, historic properties, or unique archaeological sites, because they contain very little useful information for prehistoric research.

18.1.4 Ethnographic Setting

During the recent prehistory and historic era at least four main Native American cultural groups inhabited portions of the Plan Area. These groups are the Nisenan, Miwok, Northern Valley Yokuts, and southern Patwin.

18.1.4.1 Nisenan

According to Kroeber (1932), the west side of the Sacramento River is within or near the southern limits of the Nisenan. Several ethnographic Nisenan villages have been documented along the western bank of the river (see Heizer and Hester [1970] and Johnson and Johnson [1974]). Along with Maidu and Konkow, the languages of the Nisenan people's northern neighbors, the Nisenan language forms the Maiduan language family of the Penutian linguistic stock (Shipley 1978: 83).

Wilson and Towne (1978) defined three main subgroups within the Nisenan tribe: Northern Hill Nisenan, Southern Hill Nisenan, and Valley Nisenan. The Valley Nisenan resided adjacent to the northernmost extent of the Plan Area before Euroamerican contact.

Valley Nisenan located their permanent settlements along the riverbanks on elevated natural levees near an adequate food and water supply, in fairly open terrain, with southern exposure preferred (Johnson and Johnson 1974; Beals 1933). Villages ranged from "tribelets" of small extended families consisting of 15 to 25 individuals to larger communities with more than 100 people (Kroeber 1925).

Village sizes ranged from 3 houses up to 40 or 50. Houses were domed structures covered with earth and tule or grass. Brush shelters were used in the summer and at temporary camps during food-gathering rounds (Kroeber 1925:407–408). Larger villages often had semi-subterranean dance houses, which were covered in earth and tule or brush and had a central smoke hole at the top. Other common village structures were the sweathouse, used for curing and purification, and the granary, used for storing acorns (Wilson and Towne 1978: 388–389).

The smallest Nisenan social and political unit was the family. Each extended family was represented by a family leader, who was called to council by a headman. The headman of the dominant village in a cluster of villages (tribelet) had the authority to call upon the aid of surrounding villages in social and political situations. The headman also served as village adviser, directed special festivities, arbitrated disputes, and acted as an official host (Wilson and Towne 1978: 393; Beals 1933: 360).

Early Nisenan contact with Europeans appears to have been limited to the southern reaches of their territory, beginning in the early 1800s. Unlike the Valley Nisenan, the groups in the foothills remained relatively unaffected by the European presence until the discovery of gold at Coloma in 1848. In the years following the gold discovery, Nisenan territory was overrun by settlers. Gold seekers and the settlements that sprang up to support them were nearly fatal to the native inhabitants. Survivors worked as wage laborers and domestic help and lived on the edges of foothill towns. Despite severe depredations, descendants of the Nisenan still live in the northern Central Valley and maintain their cultural identity (Wilson and Towne 1978: 396–397).

18.1.4.2 Plains Miwok

The eastern Miwok, and more specifically the Plains Miwok, inhabited the lower reaches of the Mokelumne and Cosumnes Rivers, and the banks of the Sacramento River from Rio Vista to Freeport (Levy 1978: 398).

Although the Plains Miwok shared a common language and cultural background, they comprised several separate, politically independent nations, or tribelets (the primary political unit). The tribelet represented an independent, sovereign nation that defined and defended a territory. The tribelet chief, usually a hereditary position, served as the voice of legal and political authority in the tribelet (Levy 1978: 410).

The eastern Miwok village comprised various structures. For houses, conical structures of bark were used in the mountains, and conical structures of tule matting were used in the lower elevations of the central Sierra. Semi-subterranean, earth-covered dwellings served as winter homes. Also within the Miwok settlement were assembly houses, sweathouses, acorn granaries, menstrual huts, and conical grinding huts over bedrock mortars (Levy 1978: 408–409).

With the arrival of trappers, gold miners, and other settlers to California, the Miwok suffered exposure to introduced diseases. While some hostilities occurred between the Sierra Miwok and miners, other Miwok groups became involved in agricultural operations on the newly developing large land grants. The Spanish mission system forcibly assimilated many Plains Miwok circa 1811 to 1836 (Bennyhoff 1977). After California was annexed by the United States, some Miwok were displaced to Central Valley locations, yet many remained on the rancherias established in the Sierra Nevada foothills. During the late nineteenth and early twentieth centuries, the Miwok living on the foothill rancherias adapted to new lifestyles, such as seasonal wage labor on ranches and farms, to augment subsistence through hunting and gathering (Levy 1978: 400–401). Since the early twentieth century, many persons of Miwok descent survive and maintain strong communities and action-oriented organizations (see also Bennyhoff 1977).

18.1.4.3 Northern Valley Yokuts

The Northern Valley Yokuts were the historical occupants of the central and northern San Joaquin Valley. *Yokuts* is a term applied to a large and diverse number of people inhabiting the San Joaquin Valley and Sierra Nevada foothills of central California. The Northern Valley Yokuts' territory extended from near where the San Joaquin River makes a big bend northward to a line midway between the Calaveras and Mokelumne Rivers (Wallace 1978: 462).

For the Northern Valley Yokuts, the San Joaquin River and its main tributaries served as a lifeline to the valley, and their villages congregated around these main water sources. They gained much of their livelihood through fishing (in particular, salmon fishing) and varied their diet with waterfowl and the harvesting of wild plant food, such as acorns, tule root, and seeds (Wallace 1978: 464).

Most settlements, or at least the principal ones, were built atop low mounds, on or near the banks of large watercourses, for protection against spring flooding (Schenck 1926:132; Schenck and Dawson 1929: 308; Cook 1960: 242, 259, 285). Settlements were stable and occupied over multiple generations. However, flooding posed the primary threat to a fully stationary existence, and the local rivers, swollen from melting Sierra Nevada snows and heavy rains, periodically overflowed their banks and drove the villagers to even higher ground (Wallace 1978: 466).

A headman guided each tribe, and village populations averaged around 300 people. Family houses were round or oval, with a cone-shaped pole frame sunk into the ground and covered with tule mats. Each village also had a community lodge for dances and community functions, as well as a sweathouse (Wallace 1978: 465).

The Northern Valley Yokuts suffered great population decline and cultural breakdown when they were drawn into the mission system. Following the mission period, Northern Valley Yokuts continued to clash with the white settlers, and as a result, many villages were burned. The population decline continued through the early American period, as the rich soils of the Delta and valley attracted former miners and other settlers to farming. As they filled up the district, the remaining Yokuts were driven off their hunting and food-gathering lands (Wallace 1978: 468–469). As with the Miwok and the Nisenan, however, tribal population has surged in the latter decades of the twentieth century, along with a renewed interest in traditional Yokuts culture. Today, the descendants of the Yokuts live primarily on the Tule River Indian Reservation near Porterville, established in 1873, and the Santa Rosa Rancheria near Lemoore, established in 1921 (World Culture Encyclopedia 2008).

18.1.4.4 Southern Patwin

The southern Patwin were a series of linguistically and culturally related tribelets that occupied a portion of the lower Sacramento Valley west of the Sacramento River and north of Suisun Bay. They resided adjacent to the Plan Area and probably used lands within its boundaries. These groups had no common name, but spoke dialects of a single historically related language that extended southward to the Delta. Patwin tribelets maintained their own autonomy and sense of territoriality and typically consisted of one primary and several satellite villages. Villages were located along waterways, often near the junction with another major topographic feature, such as foothills or another waterway. The ethnographically documented villages nearest to the Plan Area were *Aguasto* and *Tolenas*, both situated immediately north of San Pablo Bay to the west-northwest (Kroeber 1925, 1932).

The largest political unit for the Patwin was the tribelet, which consisted of one primary and several satellite villages. Each tribelet had a discrete territory as well as autonomy relative to other social units. While a common language unified these social units, tribelets each had subtle cultural differences relative to one another. Within the tribelet were several political and social distinctions, including a chief who oversaw village activities; this position was passed through inheritance from father to son (Johnson 1978:354).

Patwin villages contained four main types of permanent structures: the dwelling or family house; the ceremonial dance house, which was usually built at a short distance to the north or south end of a village; the sudatory (sweathouse), which was positioned at either the east or the west of the dance house; and the menstrual hut, which was placed on the edge of the village, farthest from the dance house. All of these were earth-covered, semi-subterranean structures with either an elliptical or circular shape (Johnson 1978: 357–358).

The principal subsistence activities of the Patwin were hunting, fishing, and the gathering of wild plants. Along with the acorn, the primary staple, the Patwin gathered buckeye, pine nuts, berries, wild grapes, and other plants. Each village had its own location for these food sources, and the village chief oversaw the procurement of food for the village (Johnson 1978: 355).

Population estimates for Patwin groups, from pre-contact until 1833, are more than 15,000 (Kroeber 1932; Cook 1955). The Patwin were in contact with the Spanish missions by the late eighteenth century, and some of the earliest historic records of the Patwin are found among mission registers of baptisms, marriage, and deaths of Native American neophytes. Mission San Jose, established in 1797, along with Mission Dolores, actively proselytized Patwin from their southern

villages, and Mission Sonoma, built in 1823, also baptized neophytes, until the secularization of all missions by the Mexican government in 1832–1836. Afterward, many tribal territories were divided into individual land grants (Johnson 1978: 351).

The U.S. conquest of California (1846–1848) was followed by a massive influx of American settlers into Patwin territory. To facilitate the development of ranching, agriculture, mining, and large settlements, the Patwin were usually moved to reservations. However, some Patwin assimilated themselves, at least partially, into white culture by working as ranch laborers (Johnson 1978: 351). Today, some Patwin descendants live on the Colusa, Cortina, and Rumsey Rancherias; although many of the people living on these rancherias are of general Wintun descent.

18.1.5 Traditional Cultural Properties and Native American Property Types (Including Sacred Sites)

A traditional cultural property (TCP) is defined generally as a property that is associated with cultural practices or beliefs of a living community that (a) are rooted in that community's history for at least 50 years and (b) are important in maintaining the continuing cultural identity of the community (National Park Service 1998:1). Examples of TCPs range from expansive geographic areas such as the Sutter Buttes and Mt. Diablo to individual locations associated with beliefs or practices that are of traditional cultural significance. Examples of TCP types are described under separate headings below. Individual TCPs can qualify for listing in the NRHP if they meet the criteria described in *National Register Bulletin 38* (National Park Service 1998). In order to qualify, the TCP must retain the characteristics associated with its traditional use (integrity of condition) and still perform the traditional cultural function for which it is significant (integrity of relationship) (National Park Service 1998: 11–12), and must meet the criteria for listing in the NRHP (National Park Service 1998:12). TCPs may be associated with indigenous cultures or other communities.

Some Native American property types within the study area are typically associated with resource procurement activities along the waterways of the Central Valley, Delta, and adjacent foothills. Such Native American properties derive their significance not from the property itself, but from the role the property plays in the cultural practices or beliefs of an extant community or identifiable social group. Such properties have not been identified within the study area; however, there is a possibility that plant-gathering, fishing, and ceremonial and sacred sites that may occur in the study area qualify as TCPs. Native American property types that are not TPCs within the narrow criteria of *National Register Bulletin 38* may still be important cultural resources.

Sacred sites, as defined under Executive Order 13007 are also protected under federal law. This order recognized sacred sites as religious and ceremonial sites. When such sites are identified by authoritative Native American representatives, federal land managers must accommodate access to such sites and avoid adversely affecting their physical integrity.

18.1.5.1 Plant-Gathering Areas

Many Native American groups gather the same plant resources that have been used by their ancestors for centuries. Some gathered resources are used for subsistence or medicine, but Native Americans who currently practice traditional plant gathering focus more on materials for producing baskets and other items. Typical resources gathered for food include acorns, buckeye nuts, wild onion, and wild sweet potato. Resources gathered for materials include tule, willow, and various native grasses.

18.1.5.2 Fishing Locations

Fishing played an important role in the lives of Native Americans within the Plan Area. Some Native American groups still procure fish (particularly salmon) using traditional methods, including weirs, nets, harpoons, and traps. There may be areas where Native American groups still practice these traditional procurement methods within the Plan Area.

18.1.5.3 Ceremonial and Sacred Sites

Some areas regarded as sacred by Native American groups are still used for ceremonial purposes. These areas are typically associated with an event or a viewshed of particular importance. Often, these are ancient village sites or meeting sites where tribal leaders from the region would gather, or sites with views of areas important to their religious beliefs. Reclamation is required under EO 13007 to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. There are no known federal lands with Indian sacred sites nor access to any sacred sites in the proposed Plan Area. Should any sacred sites be identified through later consultations the federal lead agencies will follow EO 13007 in accordance with the Section 106 programmatic agreement.

18.1.5.4 Historic-Era Traditional Cultural Properties

Historic-era built-environment resources may qualify as TCPs as well; examples of historic-era TCPs include some community gathering halls and neighborhoods associated with discrete and identifiable living communities. Like all TCPs, historic-era TCPs must meet the NRHP-eligibility criteria.

18.1.6 Historic-Era Setting

The following section summarizes the historic context developed in the technical report supporting the findings of the built-environment field survey. The resources and events described in the setting are intended to provide an overview of the significance themes associated with the geographic area surrounding the location where impacts may occur. Impacts are identified after the setting in Section 18.3, *Environmental Consequences.* A more detailed discussion of the Delta's history can be found in the technical report prepared to document the inventory and evaluation of accessible built-environment resources (ICF 2012). The Delta's historic-era built environment is largely the product of agricultural and residential development, as well as fishing, canning and other industrialized produce processing. These were facilitated by land reclamation and by transportation development, the latter of which initially depended on Delta waterways but eventually served to surmount those waterways. The Delta's built environment has also been shaped by large-scale flood control and water management efforts, as well as recreational activities such as fishing and boating.

18.1.6.1 The Spanish Era to the Gold Rush

The first Spanish expedition to reach the Delta was led by Captain Pedro Fages in 1772, and it did not spark interest in colonizing the region. Instead, the Spanish presence in California remained concentrated mainly along the coastal strip of missions and *presidios*, the nearest of which was located west of the Delta. During the early nineteenth century Spanish and Mexican soldiers sometimes entered the Delta region on incursions to capture Native Americans who had fled missions. When Mexico achieved independence from Spain in 1822, California became a territory of

Mexico, but remained a remote frontier province. By the end of the decade, American fur trappers began to enter the San Joaquin Valley and the Delta after hearing reports of abundant beaver that circulated after Jedediah Smith's trapping expeditions through central California in 1827 and 1828. Fur trapping in and around the Delta resulted in a steep decline of beaver populations, and fur trappers introduced diseases in the region that also heavily affected Native American tribes (Owens 1991:15; Sandos 2004: 1–13, 99–103; Thompson 1957: 88–90, 94–109).

By 1848, when gold was discovered at Sutter's Mill in Coloma, only a handful of people had settled in the Delta, but thousands of newcomers traveled Delta waterways en route to the foothill and mountain mines to the east. Sacramento and Stockton developed as shipping centers and stopovers for the mining economy. Some California newcomers made the sometimes lucrative decision to forego mining and produce food to feed the growing population of miners. Farmers began to work land at the edge of the Delta, along the natural levees of the major rivers draining into it. Known as "rim landers," these early settlers built so-called *shoestring levees* atop the natural levees to withstand the highest tidal rises. Later, more extensive levee construction would transform the Delta (Paul 1973: 19–20; Street 2004: 117; Thompson 1957: 133–146).

18.1.6.2 Land Reclamation

The Swampland Act of 1850 and subsequent creation of the State Board of Swamp Land Commissioners enabled groups of small landholders to establish districts to undertake Delta land reclamation. Lack of cooperation among small landholders and new legislation allowed most Delta agriculture to be dominated by wealthy absentee owners rather than modest independent farmers. Two large firms formed in the 1860s, George Roberts's Tide Land Reclamation Company and Morton Fischer's Glasgow-California Land and Reclamation Company, dominated Delta reclamation into the late nineteenth century. Speculative, large-scale land reclamation brought thousands of Chinese workers to the Delta. Their labor first enabled the construction of levees and then helped the islands created by such reclamation efforts yield abundant produce (Garone 2011: 113; Kelley 1989: 60; Lund et al. 2007: 20; Owens 1991: 19; Thompson 1957: 198–202, 225).

Reclaimed lands required constant and expensive maintenance and repair. Levees frequently failed and islands flooded. Sacramento and San Joaquin River beds were raised and choked by tailings from hydraulic mining in the Sierra Nevada Mountains, which was outlawed in the mid-1880s but had a longer lasting impact on rivers. The floors of the Delta's peat land islands frequently underwent subsidence, causing groundwater seepage to create new marsh areas. Upstream irrigation draws caused saltwater intrusion deeper into the Delta.

Technology helped landowners overcome some of these problems. The introduction of clamshell dredges in 1879 enabled the construction of increasingly larger and more secure levees. Modern pumps and the introduction of electricity allowed for more efficient and thorough draining of flooded islands. By the early twentieth century, the rise of industrial agriculture across the Delta increased pressure for state and federal action to protect and facilitate the region's agricultural economy through flood control efforts, transportation development, and large-scale water policy and development in the early twentieth century (Garone 2011:115: 155; Thompson 1957: 226–272; Thompson 2006: 48, 55, 65).

18.1.6.3 Agriculture

Agricultural activity initially took place on higher lands near natural levees and rises along the Sacramento River, where farmers raised potatoes, onions, and beans, among other crops, and grazed cattle and sheep. By 1852 the banks of the lower San Joaquin River were almost entirely occupied by small-scale farming operations as well. From the 1860s through the 1880s, reclamation spread agriculture from alluvium lands upstream into the peat lands of the central Delta. Growers typically planted newly reclaimed islands in grains, especially wheat. With water access to a growing urban market in San Francisco, Delta agriculture boomed and crops were diversified. By 1883, large tonnages of vegetables were being shipped to San Francisco in steamers that allowed Delta vegetables and fruit to be sold a day after they were harvested. Over time, dairies, Bartlett pear orchards, and asparagus became important components of the Delta economy (Lokke and Simmons 1980: 223-224; Rawls and Bean 2003: 201-02; Thompson 1957:139–44; Thompson 2006: 52, 56, 61–63).

On land created by large-scale speculative reclamation, patterns of Delta agriculture production usually bore little resemblance to the image of an American farm worked and owned by an independent Anglo-American farmer. Large land holdings were divided into agricultural "camps" with a resident superintendent. American-born Delta farmers tended to be engaged in grain, orchard, and livestock husbandry as lessees, farm managers, and in a few cases, independent farmers. They sometimes subleased to ethnic entrepreneurs who then arranged to have members of their ethnic communities work the land. Chinese, Italian, and Portuguese tenant farmers often specialized in garden or truck farming. Chinese agricultural laborers also became associated with row crops, especially nineteenth-century potato cultivation. In the twentieth century, Japanese farmers frequently engaged in potato and asparagus production. Japanese entrepreneurs George Shima and Hotta Kamajirō built agricultural empires, but most Japanese farmers were hampered with discriminatory laws that barred them from land ownership and eventually barred them from leasing land as well. Beginning in the 1920s, Filipino and Mexican day laborers also worked Delta lands (Azuma 1994: 14–20; Miller 1995: 180–182; Thompson 1957: 300–302, 305–306, 309–310, 312–314, 331, 335).

Technological advances in the first decades of the twentieth century signaled the arrival of modern industrial farming after World War I. "Caterpillar" tractors became commonplace in the Delta, particularly among the large land companies. Although large acreage continued to be reclaimed, a good deal of island land was improved through the introduction of electric pumps. The sale of field crops by consignment to wholesale markets or shippers nurtured the rise of canneries and wholesale produce houses with product standards and field buyers. Adding to the Delta's industrial built environment of salmon canneries developed in the latter nineteenth century were new industrial complexes resembling urban factories, which often employed ethnic laborers to help make sugar out of sugar beets or can fruit, asparagus, and other vegetables (Armentrout-Ma 1981: 149; Thompson 1957: 281, 296–298, 312, 314–318, 343–344).

18.1.6.4 Transportation Development

During the Gold Rush, most Americans who encountered the Delta did so as passengers of sailboats and steamers en route between San Francisco and the mines east of the Delta. A few trails and later roadways complemented the water traffic. Only after the start of the twentieth century did roads begin to dominate traffic in the Delta with the introduction of the automobile and truck. Ferries connected roads with agriculture on remote islands. Anxious to retire their ferries, island owners

convinced county governments to take over their operation and maintenance. Ferries were always a short-term solution to a transportation problem, and most land owners awaited local, state, or federal investment in bridge construction to connect them more directly to markets. Nevertheless, ferry boats still operate at the Empire Tract, Woodward Island, and connecting Jersey Island with Bethel Island, among others. Early trails evolved into roads traveled by stages hauling freight back and forth between the farms and the small towns that took shape behind recently constructed levees. Railroads also played an important role in the development of agriculture, especially after the beginning of the twentieth century. The San Joaquin Railroad was completed across the Delta in 1897 and purchased by Atchison, Topeka, & Santa Fe in 1898. Originating primarily in Antioch, Stockton, and Sacramento, steamboats plied the waterways on set schedules dropping off workers and supplies and transporting harvested crops (Daggett 1922: 122, 334; Thompson 1980: 145–147).

After 1900, county and state investment nurtured bridge construction, which in turn enabled the development of year-round roads serving Delta residents and visitors. During the first decade of the twentieth century, the construction of steel draw and swing bridges across Georgiana Slough, both the North and South Forks of the Mokelumne River, and the Sacramento River below the head of Grand Island, provided for road connections from Walnut Grove and Brannan, Andrus, and Grand Islands to the population centers of Sacramento and Stockton. During the 1910s and early 1920s, additional bridge construction and road development connected the era's increasing automobile traffic from the earlier established roads to new routes extending to Isleton and Rio Vista. In 1915 the American Bridge Company completed the Middle River Bridge, currently the second oldest steel swing bridge in California. This bridge facilitated development of the southern Delta's Borden Highway, or State Route 4 between Stockton and Contra Costa County. By 1922, the completion of River Road through the northern Delta allowed motorists to travel from Stockton and Sacramento across the northern Delta to Vallejo. Constructed in 1926 to replace a major ferry crossing, the American Toll Bridge Company's Antioch Bridge provided for completion of the Victory Highway route, which crossed the Delta to connect Sacramento and the East Bay via Antioch. No longer extant electric interurban railroads also extended into portions of the Delta during the early twentieth century (Blow 1920: 226; California Department of Transportation 1990: 116–117; Thompson 1980: 151–154, 163).

18.1.6.5 Community Development

During the mid-nineteenth century, Sacramento and Stockton took shape east of the Delta and became the most important supply ports and trading centers of the central California interior, dwarfing the small and modest-sized agricultural shipping hubs and processing centers that developed into Delta communities. Some of these Delta towns—Courtland, Rio Vista, Isleton, Knightsen, and Byron—are located outside but in the vicinity of the study area. These communities are discussed below because historically, residents of nearby properties within the study area likely identified themselves as members of those communities even while living on their peripheries. Hood, Locke, Holt and portions of Clarksburg and Walnut Grove are located within the study area.

Clarksburg was established in 1850 in the northernmost Delta as a commercial fishing community along the Sacramento River. The river banks north of Clarksburg attracted Portuguese settlement in what came to be known as the Lisbon District. The American Crystal Sugar Company developed a sugar refinery north of Clarksburg in the 1920s that continued to operate into the mid twentieth century. The community of Courtland was established on Randall Island approximately six-and-a-half miles south of Clarksburg along the east bank of the Sacramento River in 1867, when a post office was moved there from Onisbo across Steamboat Slough. Fruit production and other

agricultural activity on Randall, Grand, and Sutter islands initially drove the town's economy. Encompassing wharves, a hotel, and stores, Courtland experienced continued growth after 1900 as asparagus became the dominant crop. Unlike other Delta landing settlements, Courtland sent its fruits and vegetables to Hood for canning and other processing. Initially known as Richland, Hood was established in 1860 as a river landing with a warehouse and school house serving nearby agricultural producers. Located nearly seven miles southeast of Courtland, Walnut Grove was founded in 1851 by John W. Sharp. By the end of the 1870s the town had a post office, hotel, schoolhouse, meeting hall, sheltered wharf, and warehouses. The construction of nearby bridges and ferry services linked Walnut Grove to other towns as asparagus production boosted the local economy in the twentieth century (Gregory 1913: 158; HARD Townsite Team 2007: 79–80; Reed 1923: 121; Thompson 1957: 427–28, 431).

Located approximately 11 miles southwest of Walnut Grove, Rio Vista was founded by members of the Brazos del Rio ("Arms of the River") community that flooded in 1861. Displaced Brazos del Rio residents established the new town on the ranch lands of Joseph Bruning adjacent to the Montezuma Hills. Rio Vista became a major wheat producer as well as an important shipping center. Between, 1868 and 1878 the population within a ten mile radius of Rio Vista grew from 200 to 1,500. At the turn of the century, Rio Vista's wharf was the Delta's busiest. Cannery operations began in Rio Vista in 1904. The river on the east side of the town was spanned in 1918 by a bridge to Brannan Island. Four miles east of Rio Vista, Isleton was founded in 1874 by Dr. Josiah Pool as an agricultural service town and shipment landing. By 1878, the bustling town had a city hall, a water company, a warehouse, a hotel, a grange hall, two saloons, a blacksmith's shop, several stores, and a commercial ferry that ran to Grand Island and Rio Vista. During the twentieth century, Isleton became a center of asparagus and other vegetable canning, including the Libby, McNeal & Libby operations (HARD Townsite Team 2007: 79; Thompson 1957: 429–30; Thompson 2006: 63–65).

Most of these northern and central Delta communities included Asian immigrant enclaves. Chinatowns comprised of two-story wood-frame buildings took shape in Walnut Grove, Isleton, Courtland, and Rio Vista during the late nineteenth century. Delta Chinatowns housed workers and high status bosses and merchants, and included vice-oriented venues such as opium dens, brothels, and gambling halls. After fire burned Walnut Grove's Chinatown in 1915, members of the community's ethnic Chungshan population—who were prohibited from owning land under the California Alien Land Act of 1913—leased nine acres north of Walnut Grove from George Locke and established a new Chinatown that became known as Locke. Locke residents created an unusual mix of traditional Chinese building patterns and Delta vernacular architecture in the two-story buildings overhanging Locke's 12-foot-wide main street. In the early twentieth century, Japanese immigrants and their Nisei offspring settled in and farmed the Delta in increasing numbers. Limited by the alien land laws barring Japanese land ownership, Japanese farmers nevertheless established new ethnic enclaves in Delta towns such as Walnut Grove and Isleton (Charleton 1990: 23–25; Hoover et al. 1990: 314–315).

Towns established within and in the vicinity of the conveyance alignments include Holt, Byron, and Knightsen. Located approximately seven miles west of the Stockton embarcadero is Holt, a small enclave established as a freight-car loading point along the Atchison, Topeka, and Santa Fe Railroad (Santa Fe) line completed in 1897. Holt was named for brothers Benjamin and Frank Holt, who founded Stockton's Holt Manufacturing Company. Byron was established along the Southern Pacific Railroad line in 1878 approximately 12 miles southwest of Holt. Wheat farming initially drove Byron's economy. Water from the Byron-Bethany irrigation district (1915–1916) helped diversify the town's agricultural output with almond, walnut, alfalfa and dairy production. Knightsen was

founded along the Santa Fe Railroad line at seven miles north of Byron in 1899. The town's agricultural activity featured celery, dairy, and silkworm production. By World War I Knightsen consisted of residences, a store, blacksmith shop, garage, and a saloon (Hoover et al. 2002: 68, 370–371; Hulanski 1917: 404–05, 426–428; Thompson 1957: 411, 416, 425; Tinkham 1923: 339–340).

18.1.6.6 Water Management

The Delta became a focal point of increasingly large-scale water engineering and management during the early twentieth century. Pressure to ameliorate ongoing flood threats due to the legacies of hydraulic mining led to 1917 legislation creating the first federal control project. The plan included nearly two hundred miles of levees, several hundred miles of bypass channels, and ultimately the rerouting of floodwaters of the Sacramento, Yuba, and American Rivers. Large dredges in use in the Delta for decades were now employed to build new levees and create channels for flood control.

Numerous canals and straightened and widened river channels were by-products of the islands and levees created by Delta reclamation. These functioned as an important water source for irrigation and provided both recreational boating waterway and dredge access for levee construction and maintenance. The simplest and most cost-efficient method by which to obtain levee material was to dig a large ditch and build a berm on one side (the levee), with the ditch filling in with Delta waters on the other side (the canal). Late nineteenth century dredges were capable of moving up to 400 cubic yards of earth per hour. The use of similar dredges across the Delta explains the similar appearance of many of the canals throughout the Delta. Most Delta canals appear to have been opportunistically created rather than being formally engineered, hence no design or "as-built" drawings for early canals and levees have been located. Nevertheless, with federal involvement in flood control after 1917, and especially in the 1920s, plans were drawn and implemented for standard levees and canals for both the Sacramento and Mississippi deltas (Kelley 1989: 252, 288–291; Mowry 1951: 152; Pisani 1984: 255).

California's great Central Valley and many smaller valleys to the west and south had abundant land but lacked the water resources necessary for expanded agriculture. The federal Newlands Reclamation Act of 1902, improvements in irrigation technology, and improving transportation technology and networks all held out promise for agricultural expansion in California. Limits on water availability remained the major hindrance to such expansion. After World War I, groundwater levels dropped under drought conditions, and saltwater reached east into the Delta as far as Courtland. At the end of the 1920s, state engineer Edward Hyatt developed a State Water Plan to respond to growing water problems. In 1928 the state's voters approved a constitutional amendment that limited the holders of riparian water rights to reasonable use of their water, which opened the way for the state legislature to pass the Central Valley Project Act in 1933. The Department of Interior's Bureau of Reclamation ultimately took responsibility for the Central Valley Project (CVP) at the behest of Congress. The project included pumping plants that would divert Sacramento River water southward through a series of canals linking with the Delta-Mendota Canal, which was designed to replace water diverted from the San Joaquin River at Friant Dam in the southern Sierra Nevada. Most of the Central Valley Project was completed by the early 1950s, including more than 500 miles of canals and 20 dams and reservoirs. After World War II, the state's Water Resources Control Board began planning for additional large-scale water management projects. Then state engineer Arthur D. Edmonston developed a state water plan entailing major new water impoundment and conveyance development. Known as the State Water Project (SWP), Edmonston's plan promised to augment flows to the Delta during dry years and develop state-

funded canals to convey additional water to the San Joaquin Valley and new supplies to Santa Clara and Alameda Counties. The plan also called for the development of pumps to transmit Delta water to what would become known as San Luis Reservoir and to a huge aqueduct conveying water south to be pumped over the Tehachapi Mountains into Southern California. In 1960 voters approved the financing for the project, and the first phase was implemented between 1962 and 1971 (Cooper 1968: 50–52; Kahrl 1979: 46–51; Rarick 2005: 205–228).

18.1.6.7 Recreation

Wild game and abundant fisheries have attracted people to the Delta for millennia, but with the arrival of Jedediah Strong Smith and other Americans in the first half of the nineteenth century, market hunting and commercial fishing began to dominate the marshes. By the end of the century, however, several factors contributed to a change in emphasis from market to non-sale game and from commercial fishing to sport and recreation. In addition, investors reclaimed swamp land faster than the same could be put to productive agricultural uses, opening large areas for alternative uses, including recreation. By the first decades of the twentieth century the Delta became a haven for sportsmen and by the 1920s, with the construction of year-round roads and bridges, hotels and campsites, it had become a destination for the recreational driver, the car camper, and the sightseer. In the post-World War II era, the widespread development of tract housing bypassed the Delta, primarily due to land ownership patterns, limited transportation options, and the overabundance of water. At the same time, those factors helped to foster an increased demand for recreational opportunities and the proliferation of house and party boats. Recently, wetlands restoration has made the Delta a destination for bird watchers as several communities have embraced rare and endangered birds (California Department of Water Resources 1995: 37–48; Schell 1979: 196; Gardner 1964: 8–19; Steienstra 2012: 289; Thompson 1957: 58; Young 1969: 1).

18.1.7 Historic-Era Built Environment Property Types

This section outlines property types and subtypes known to be located in the geographic area where conveyance facilities may be constructed and where conservation measures may be implemented (the study area). The property types are organized chronologically, according to the historical themes that generated these resources. Surveyors recorded built-environment resources that were 45 years old or older. These structures range from mid-to-late-nineteenth-century wood-frame Delta residences to properties constructed in roughly the middle of the twentieth century. Specific property types include buildings, structures, districts, landscapes, transportation facilities, and reclamation and flood management buildings and structures. Relatively few nineteenth-century buildings have been identified in the study area, reflecting both the sparse settlement during that century and the vast changes that have occurred in more recent decades. These scarce nineteenth-century buildings are more valuable for their rarity. However, the development of communities in the Delta during the twentieth century is represented by a variety of building property types. Residential and agricultural buildings make up the bulk of these properties in the study area, but there are also a moderate number of commercial and industrial buildings within the study area that illustrate equally important components of this development.

18.1.7.1 Residential Buildings

Residential buildings constructed in the nineteenth century are scattered throughout the region. These residences exhibit Anglo-American and vernacular styles. Many of the buildings in the Delta

reflect adaptation to local conditions such as flooding, as well as the adherence to design and structural forms consistent with the larger architectural style. One example of conformity within architectural design can be seen in what are commonly referred to as "river homes," or "Delta homes." These two-story buildings were often built within feet of levees and below the river level. Some of the examples are located in the study area along River Road, the meandering State Highway 160 atop the Sacramento River levee. The second stories of these homes frequently extended beyond the height of the levee, and in the event of a flood, it is customary for the occupant to open all doors and windows on the ground floor, and retreat to the dry, second floor.

Many of the relevant styles fall into the picturesque movement, including the romantic, Gothic revival, Greek revival, Italianate, and Victorian styles. These nineteenth-century homes are found on farms, smaller ranchettes, and in small towns throughout the study area. They also span a wide socioeconomic range, from modest vernacular cottages in the smaller towns to grand Beaux Arts mansions on the pioneering farms and ranches. The urban homes are generally built in the same styles as the rural homes and are typically cottages on small residential parcels that may also include a garage, fences or walls, and landscaping. Homes on farms and ranches may be contributors to rural historic landscapes, the evaluation of which involves consideration of the property as a whole, including residences as well as other ancillary buildings, structures, circulation systems, and boundary demarcations.

Residential buildings in the Delta constructed during the twentieth century include Craftsman-style bungalows, and Foursquare, Colonial Revival, Spanish Colonial Revival, Minimal Traditional, Ranch-style residences. These buildings were mainly constructed during the first half of the twentieth century in urban, rural, and suburban settings. The grand period revival farm and ranch mansions from the 1910s and 1920s represent some of the more striking property types. Rural homes also typically exist within a cluster of farmstead buildings, from barns to packing sheds to equipment sheds, and tank houses. House boats and floating cabins exist along several of the major sloughs within the study area. It is not uncommon to see dilapidated homes (at times reclaimed by the Delta's waterways), sheds, and general agricultural infrastructure in a variety of massing and scale.

Residential buildings exist in the small towns, such as Clarksburg, Hood, Locke, and Walnut Grove. With rare exceptions, the residential structures in these small towns lack the fine design of the grand rural properties. Suburban development dates almost exclusively to the post–World War II era. Homes in small suburban riverfront enclaves best reflect the ranch style and other mid-century modern styles.

18.1.7.2 Commercial Buildings

Commercial buildings located within the study area include a range of compositional types representing a variety of economic activities. Commercial buildings include stores, banks, agricultural vendors, and office buildings, and are typically one-part commercial block buildings with moderately decorative facades. Commercial buildings, with rare exceptions, exist in the small towns as well as the larger communities. Twentieth-century commercial buildings in the rural Delta occur almost exclusively in the small towns, including Clarksburg, Hood, Locke, and Walnut Grove. Although generally small in scale (reflecting the modest scale of commercial activity), these buildings mimic the design of commercial buildings in bigger cities. The few nonurban commercial buildings in the region comprise roadside or waterfront service buildings, such as stores and restaurants.

18.1.7.3 Agricultural Properties

Several property types within the study area are associated with the historical theme of agriculture. The infrastructure of agricultural properties includes individual ranchettes, large orchards and pastures, labor camps, and processing facilities, each of which include a consistent assemblage of mostly utilitarian buildings and structures that provide explicit functions.

Agricultural buildings and structures within the study area include residences, barns, tank houses, shed outbuildings, grain silos and elevators, culling chutes, corrals, fences, and irrigation or drainage ditches. The majority of these resource types date primarily to the early twentieth century and reflect a broad range of architectural styles, from period revival mansions to vernacular barns, tank houses, and weathered storage sheds. Of these architectural types, the most prominent agricultural structure found within the study area is the gable-roofed barn. These barns share similar characteristics, including moderately steep gables, tall sidewalls, rectangular massing, and post and beam construction.

18.1.7.4 Historic Districts

In addition to individual buildings, cultural resources can include historic districts. The National Park Service defines *historic district* in *National Register Bulletin 15* as possessing "a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (National Park Service 1987a:5). Examples of NRHP listed historic districts include Locke and portions of Walnut Grove. Locke was listed in 1971, while the constituent elements of Walnut Grove were listed between 1980 and 1990. These districts each contain a cluster of buildings that are connected by similar themes of Asian-American settlement and agriculture in the Delta. While these historic districts include a few nineteenth-century residences and commercial buildings, they are dominated by buildings constructed during the first few decades of the twentieth century. These districts reflect a wide range of functional building types, including residential buildings, agricultural buildings and structures, and commercial buildings. Districts also include scattered industrial buildings generally associated with food storage or processing.

Districts are not limited to urban settings. South River Road, in the vicinity of Clarksburg, has a series of late-nineteenth and early-twentieth-century grand rural homes associated with agriculture that collectively could be considered a district. Also identified on South River Road are a series of "river" or "Delta" homes built between 1855 and 1875. These modest vernacular buildings are associated with early Portuguese settlers and comprise what is known in the region as the Lisbon District.

18.1.7.5 Reclamation and Flood Management Structures

The single greatest factor advancing settlement in the Delta was the reclamation of land and the introduction of flood-management systems that shaped the landscape to accommodate the agricultural development that still characterizes the region. The entire Delta's natural landscape was significantly altered and many features of these introduced systems are extant. Compared to many built resources in the region, reclamation and flood-management structures have had minimal consideration as historical resources.

Typical structures associated with reclamation and flood management include levees, canals, and land-side irrigation and water conveyance infrastructure such as ditches, pump houses, and other

structures that support reclamation and agriculture on reclaimed uplands. These structures range in sophistication from shoestring levees built in the nineteenth century, which required frequent repair and reconstruction, to the canals built by the Bureau of Reclamation and DWR, which are among the largest and most highly engineered water conveyance structures in the nation.

Diversion structures include weirs, either steel or wood, such as the fish protective facility at the Clifton Court Forebay. Pumping facilities of varying sizes are used to move water from where it is in excess to where it is needed. These range from the massive plants at Banks and Tracy Pumping Plants, to the mid-sized Middle River pumping plant, and to the single pumps that line the levees throughout the study area. Conduits such as canals, flumes, tunnels, and pipelines used to convey water are found throughout the study area. They range from simple dirt-lined ditches found on virtually every agricultural parcel to the three pipelines that make up the massive Mokelumne Aqueduct. Smaller pipelines with siphons, penstocks, gates, valves or other distribution and regulation structures are found throughout the study area.

18.1.7.6 Transportation

One of the direct results of settlement was the development and improvement of the transportation infrastructure in the Delta. During the nineteenth and early twentieth centuries, several railroads were constructed through the region, roads were improved, and bridges were constructed to ensure efficient delivery of produce grown in the Delta region to major markets.

Railroads

Railroads were important in the creation and economic success of many Delta towns. Relevant railroad systems in the Delta include the Southern Pacific Railroad; Atchison, Topeka, and Santa Fe Railway; San Pablo and Tulare Railroad; Sacramento Southern Railroad; Oakland East Bay and Antioch Railroad; and Electric Northern Railroad. The Atchison, Topeka, and Santa Fe Railway line, originally constructed in the late 1890s, now carries the Burlington Northern & Santa Fe as well as Amtrak's *San Joaquin*. Running generally east from the Antioch area, the line passes between Bacon and Woodward Islands before crossing the Middle River Bridge, opened in 1929.

Roads

During the second half of the nineteenth century, early roads in the Delta were built over old trails that ran along the tops of river levees. One of the first public roads established in the Delta was Georgiana Road, which paralleled the east bank of the Sacramento River from Freeport to Walnut Grove and eventually to Sherman Island by 1870. Historic road alignments traverse the Delta and form one of the property types that may be affected by the project options.

Bridges and Ferries

Bridges have been an important element in the transportation network of the Delta since the nineteenth century. Because these bridges often cross navigable waterways, their builders were required by law to provide the means of accommodating river traffic, until recently by constructing movable bridges. This was true of highway bridges as well as railroad bridges. There are dozens of movable spans in the study area, most dating to the early decades of the twentieth century. These include single-leaf as well as double-leaf bascule bridges. They also include a large number of center-pivot swing bridges. Owing to the presence of numerous railroad and highway lines in the region, the Delta is home to the majority of all movable spans in California. Since the end of World

War II, the trend has been to construct high bridges that allow river traffic to pass without interrupting highway traffic.

For less significant crossing, ferries were often built to carry automobile traffic over navigable waters. Most of these were simple cable ferries, capable of carrying only a small number of vehicles at a time. San Joaquin County operated as many as 16 ferries at one time. Several of them are still in service including one connecting the Upper Jones Tract with Woodward Island, and the Empire Tract-Venice Island Ferry. The California Department of Transportation also operated J-Mack ferry operates on Highway 220 at Ryer Island and Howard's Landing.

18.1.7.7 Utility Infrastructure

The growth and development of towns throughout the Delta necessitated the development of utility infrastructure. Documented historic-era utility infrastructure in the study area is related primarily to electrical transmission (e.g., transmission lines, yards, substations). This infrastructure can be found throughout the study area, with features and elements spanning the 1910s through the 1950s.

18.1.7.8 Rural Historic Landscapes

Cultural resources do not always consist of individual sites, buildings, structures, or features. They can also encompass landscapes, including those in rural contexts, such as those found throughout the Delta. According to the National Park Service *National Register Bulletin 18* (National Park Service 1987) a *rural historic landscape* is defined as:

> a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features. Rural landscapes commonly reflect the day-to-day occupational activities of people engaged in traditional work such as mining, fishing, and various types of agriculture. Often, they have developed and evolved in response to both the forces of nature and the pragmatic need to make a living.

Such landscapes have been identified and evaluated in the Delta. The most notable example is Bacon Island; the entire island has been designated an NRHP-eligible Rural Historic District. Although large-scale agriculture is clearly still the predominant industry and way of life in the Delta, the social, ethnic, technological, and economic context has changed dramatically since the early 1900s, and few such complexes retaining a high degree of historical integrity have been recorded in the Delta. Rural historic landscapes can include constituent elements of all the various property types from the historic era. Rural historic landscapes can qualify as historic properties (National Park Service 1987:24).

18.1.8 Historic Archaeological Property Types

Previous studies in the vicinity of the Plan Area provide reasonable expectations of the range of historic archaeological property types relevant to the study area These property types are classified here in terms of function. Intensive historic-era use of waterways within the Plan Area coincides with the discovery of gold in 1848. The sudden influx of fortune seekers resulted in heavy use of waterways within the Plan Area for transportation of individuals and supplies. To accommodate the surge, cities and towns were established along the rivers. Both small- and large-scale mining endeavors were carried out in the Plan Area vicinity along the Feather, Bear, Yuba, and American Rivers. Agricultural endeavors followed quickly, and overland transportation routes were developed

that often paralleled waterways in the Plan Area. Historic archaeological resources within the Plan Area are mostly related to these events. Six categories of historical archaeological property types have been identified within the Plan Area and are described under separate headings below.

18.1.8.1 Building Foundations

This property type is typically related to either commercial or residential structures that have been demolished or burned down. Foundation materials can include stacked rock, wood, brick and mortar, and concrete. There are often associated structural remains such as plate glass, nails, and other hardware in the vicinity. Associated domestic refuse deposits are common, as well as subterranean wells and privy pits. In the Plan Area, many examples of this site type are associated with farming and ranching.

18.1.8.2 Refuse Scatters/Dumps

This property type can range from a single dumping episode to an established community dump. Associated artifacts include glass bottles and jars, ceramics, metal cans, and a multitude of other domestic items. Many examples of this site type represent the remnants of labor camps and townsites.

18.1.8.3 Transportation-Related Features

This property type includes roads, railroads, and landings for water vessels. Roads and railroad lines were often established on the crown of levees that parallel waterways in the Plan Area. Public landings were often established for towns, but many were associated with private properties. Landings associated with private property were typically used for loading and unloading of materials and livestock associated with agricultural endeavors.

18.1.8.4 Water Conveyance Systems

This property type consists of both small-scale systems, such as ditches, canals, and pump house foundations, and large-scale systems, such as levees, sloughs, and weirs. Small-scale water conveyance systems are typically associated with irrigation for agricultural endeavors.

18.1.8.5 Historic Isolates

Isolated finds are three or fewer artifacts that occur within a restricted spatial context, generally within an area 30 feet in diameter. Information potential usually is limited to location, material type, style, and function of the individual artifact.

18.1.8.6 Maritime/Riverine Property Types

The variety of riverine and maritime resources in the Plan Area provides a reasonable prediction of the range of maritime/riverine property types that may be affected by the action alternatives. These property types are classified here in terms of function because of the wide variation in form. Maritime/riverine resources are typically associated with historic-era activities, although there is a small possibility of submerged prehistoric resources. Use of the waterways in the Plan Area for commercial, military, and recreational endeavors has been intensive since the 1840s, resulting, for various reasons, in numerous maritime/riverine properties. Previous cultural resources studies in the Plan Area have identified a few maritime/riverine property types. Maritime/riverine resource

property types include the remains of landings, pilings, and modern and historic vessels. Each property type is described under a separate heading below.

Landings

This property type includes wooden structures used for docking vessels to load and unload people, livestock, and materials. Public landings were often established for towns, but many were associated with private properties. Landings associated with private property were typically used for loading and unloading materials associated with agricultural endeavors. As overland transportation became more common, use of the waterways declined and landings fell into disrepair, often resulting in their collapse into the water.

Pilings

This property type was often associated with landings or structures built along the riverfront. Pilings are wood or concrete poles driven into the river bottom to support the associated structure, but they were sometimes used individually for the mooring of vessels. Many pilings in the Plan Area have fallen into disrepair and sunk, although some are intact and being used for mooring.

Vessels

A wide range of submerged vessels dating from the 1840s to the present can be found in the Plan Area. The earliest vessel types included small and large sailing vessels and barges, typically with wooden hulls and metal hardware. These vessels were usually associated with commercial endeavors because recreational boating was not common until the 1930s. Wooden barges in the Plan Area were typically "dumb" barges (i.e., no built-in means of propulsion) and were used for transporting produce while tethered to a wind- or steam-powered vessel. Steel hulls became more prominent after the 1860s and are typically steamboats, barges, fishing vessels, or military vessels. Modern vessels are most often recreational and are made of fiberglass and wood or steel composite.

18.1.9 Identified Resources and Action Alternatives

Appendix 18B, *Identified Resources Potentially Affected by the BDCP Alternatives*, describes identified cultural resources affected by the alternatives under consideration. These resources were identified through record searches at the various regional offices of the CHRIS as well as historical map research and field inventory efforts for built-environment resources. Appendix 18B identifies which resources occur in each of the alternatives, and resources that are unique to specific alternatives. This set of identified resources provides a sample used to predict the sensitivity of these rights-of-way for additional cultural resources, and indicates that all action alternatives are sensitive for archaeological and built-environment resources. Appendix 18A, *Archaeological Resources Sensitivity Assessment*, provides a further analysis of the sensitivity of the Plan Area for buried archaeological resources based on land forms and geological processes.

18.2 Regulatory Setting

18.2.1 Federal Plans, Policies, and Regulations

18.2.1.1 National Environmental Policy Act

NEPA establishes the federal policy of preserving important historic, cultural, and natural aspects of our national heritage during federal project planning. All federal or federally assisted projects requiring action pursuant to Section 102 of the act must take into account impacts on cultural resources (42 USC Sections 4321–4347).

The Council on Environmental Quality (CEQ) Guidelines provided a standard for determining the significance of impacts analyzed under NEPA. *Significance* as used in NEPA requires considering impacts in terms of both context and intensity (40 CFR 1508.27).

- *Context* means that the action must be analyzed in terms of society as a whole, the affected region and interests, and the local setting. The span of the context should be scaled to match the action. For larger actions a wider context is appropriate. For smaller site-specific actions the local context may be sufficient. Both the short- and long-term impacts of an action are relevant to this analysis (40 CFR 1508.27[a]).
- *Intensity* means the severity of an impact. The CEQ Guidelines direct federal agencies to consider cultural resources when evaluating intensity. Specific factors that may affect the intensity of an impact include the proximity to historical or cultural resources, the potential for impacts on NRHP-eligible or listed properties and the potential for loss or destruction of significant scientific, cultural, or historical resources (40 CFR 1508.27[b]).

These considerations mean that NEPA analysis should identify the potential for an action to adversely affect resources that are or may be eligible for listing on the NRHP. It should be noted that some federal agencies, such as the Corps, follow 33 CFR Part 325, Appendix C. The substance of these regulations generally follows 36 CFR Part 800.

18.2.1.2 Section 106 of the National Historic Preservation Act of 1966

Section 106 of the NHPA ("Section 106") requires federal agencies to consider the effects of their actions on historic properties (16 USC Section 470f). *Historic properties* are resources listed on or eligible for listing on the NRHP (36 CFR 800.16[l][1]). A property may be listed in the NRHP if it meets criteria provided in the NRHP regulations (36 CFR 60.4). Typically properties must also be 50 years old or greater (36 CFR 60.4[d]).

- The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association (further discussed below in Section 18.2.2.1) and:

  (A) That are associated with events that have made a significant contribution to the broad patterns of our history; or

  (B) That are associated with the lives of persons significant in our past; or

(C) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(D) That have yielded, or may be likely to yield, information important in prehistory or history.

Some property types do not typically qualify for the NRHP, however these properties may qualify if they fall into one or more of the following criteria considerations. These considerations consist of the following (36 CFR 60.4).

- A religious property deriving primary significance from architectural or artistic distinction or historical importance (a); or
- A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event (b); or
- A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life (c).
- A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events (d); or
- A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived (e); or
- A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance (f); or
- A property achieving significance within the past 50 years if it is of exceptional importance (g).

The Section 106 review process typically consists of the following major steps.

- Identify the federal agency undertaking.
- Initiate Section 106 process.
- Identify an area of potential effects, and within these limits, identify historic properties.
- Assess adverse effects.
- Resolve adverse effects (typically through treatment, avoidance, preservation, or other mechanisms identified by the lead agency in consultation with SHPO and interested parties).

The Section 106 regulations define an adverse effect as an effect that alters, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 CFR 800.5[a][1]). Consideration must be given to the property's location, design, setting, materials, workmanship, feeling, and association, to the extent that these qualities contribute to the integrity and significance of the resource. Adverse effects may be direct and reasonably foreseeable, or may be more remote in time or distance (36 CFR 8010.5[a][1]).

Under section 304(a) of the National Historic Preservation Act, "[t]he head of a Federal agency … shall withhold from disclosure to the public, information about the location, character, or ownership

of a historic resource if the Secretary and the agency determine that disclosure may … risk harm to the historic resources …"

18.2.1.3 Compliance with Section 106 of the National Historic Preservation Act for the BDCP

Section 106 review will be performed for relevant federal actions that qualify as undertakings and that are necessary to implement the BDCP. Phased identification and evaluation of cultural resources will be completed as authorized by 36 CFR 800.4(b)(2) and 36 CFR 800.14(b)(1). The phased completion of these steps will be accomplished by a programmatic agreement (PA) covering federal agency responsibilities under the NHPA. This PA will require Reclamation, USACE, USFWS and NMFS to complete the management steps required under Section 106 for all future undertakings necessary to implement the BDCP. For each undertaking the agencies shall:

- Identify the area in which historic properties may be affected.
- Complete an inventory for historic properties.
- Evaluate identified resources to determine if they are historic properties.
- Determine if the undertaking will adversely affect those properties.
- Resolve adverse effects.

These steps will be completed in consultation with the SHPO and Indian Tribes, the ACHP, and other interested parties that choose to participate in the Section 106 process.

18.2.1.4 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) provides a process for federal agencies to determine custody of Native American cultural items to lineal descendants and culturally affiliated Indian tribes. NAGPRA defines the ownership of Native American human remains and funerary materials excavated on lands owned or controlled by the federal government. NAGPRA establishes a hierarchy of ownership rights for Native American remains identified on these lands (25 USC Section 3002[a]):

- Where the lineal descendants can be found, the lineal descendants own the remains.
- Where the lineal descendants cannot be found, the remains belong to the Indian tribe or Native Hawaiian organization on whose land the remains were found.
- If the remains are discovered on other lands owned or controlled by the federal government and the lineal descendants cannot be determined, the remains belong to the Indian tribe or Native Hawaiian organization that is culturally affiliated with the remains, or the tribe that aboriginally occupied the land where the remains were discovered.

Under NAGPRA intentional excavation of Native American human remains on lands owned or controlled by the federal government may occur (25 USC Section 3002[c]) only under the following circumstances.

- With a permit issued under the Archaeological Resources Protection Act (16 USC Section 470cc); and;
- After documented consultation with the relevant tribal or Native American groups.

- Ownership and disposition follows NAGPRA for all human remains and associated artifacts (25 US Code Section 3001 and 43 CFR Section 10.6).

NAGPRA also provides guidance on inadvertent discoveries of Native American or Hawaiian human remains on lands owned or controlled by the federal government. When an inadvertent discovery on these lands occurs in association with construction, construction must cease. The party that discovers the remains must notify the relevant federal agency, and the remains must be transferred according the ownership provisions above (25 USC Section 3002[d]).

18.2.1.5 The Archaeological Resources Protection Act

The Archaeological Resources Protection Act (ARPA) requires a permit for intentional excavation of archaeological materials on federal lands (16 USC Section 470ee[a]). The federal agency that owns or controls the land may dispense permits for excavation as provided in the ARPA regulations (43 CFR 7.5). The permit may require notice to affected Indian tribes (43 CFR 7.7), and compliance with the terms and conditions provided in the ARPA regulations (43 CFR 7.9). While few federal lands occur in the study area, it should be noted that work on federal lands and collections retrieved from federal lands are subject to ARPA.

18.2.2 State Plans, Policies, and Regulations

18.2.2.1 California Environmental Quality Act – Statute and Guidelines

CEQA requires the lead agency to consider the effects of a project on cultural resources. Two categories of cultural resources are specifically identified in the State CEQA Guidelines; historical resources (State CEQA Guidelines Section 15064.5[b]) and unique archaeological sites (State CEQA Guidelines 15064.5[c] and California Public Resources Code (PRC) Section 21083.2). Different legal rules apply to the two different categories of cultural resources, though the two categories sometimes overlap where a "unique archaeological resource" also qualifies as an "historical resource." In such an instance, the more stringent rules for archaeological resources that are historical resources apply, as explained below. CEQA and other California laws also set forth special rules for dealing with human remains that might be encountered during construction.

Historical resources are those meeting the requirements listed below.

- Resources listed in or determined eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[a][1]). Note that CRHR-eligible resources include resources listed on or eligible for the NRHP (California PRC Section 5024.1);
- Resources included in a local register as defined in California PRC Section 5020.1(k), "unless the preponderance of evidence demonstrates" that the resource "is not historically or culturally significant." (State CEQA Guidelines Section 15064.5[a][2]);
- Resources that are identified as significant in surveys that meet the standards provided in California PRC Section 5024.1[g] (State CEQA Guidelines Section 15064.5[a][3]); or
- Resources that the lead agency determines are significant, based on substantial evidence (State CEQA Guidelines Section 15064.5[a][3]).

Cultural resources may be listed in the CRHR if they have historical significance and integrity.

- Cultural resources are significant if they meet any of the following criteria:

1. Are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage, or the United States (California Code of Regulations [CCR], Title 14, Section 4852[b][1]),
2. Are associated with the lives of persons important in our past (14 CCR Section 4852[b][2]),
3. Embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values (14 CCR Section 4852[b][3]), or;
4. Yield, or may be likely to yield, information important in prehistory or history (14 CCR Section 4852[b][4]).

Integrity for built-environment resources means the "survival of characteristics that existed during the resource's period of significance. Integrity must also be assessed in relationship to the particular criterion under which a resource has significance. For example, even where a resource has "lost its historic character or appearance [it] may still have sufficient integrity for the California Register if it maintains the potential to yield significant scientific or historical information or specific data." Integrity is further defined as the ability to "convey the reasons" for the significance of the resource (14 CCR Section 4852[c])

For archaeological sites, this language therefore means that a site must have a likelihood of yielding useful information for research in order to have integrity, if the site is significant for its data potential.

The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historic Resources, not included in a local register of historical resources, or identified in an historical resource survey does not preclude a CEQA lead agency from determining that the resource *may* be an historical resource as defined in California PRC Section 5020.1(j) or 5024.1 (State CEQA Guidelines Section 15064.5[a][4]).

Notably, a project that causes a substantial adverse change in the significance of an historical resource is a project that may have significant impact under CEQA (State CEQA Guidelines Section 15064.5[b]). A substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired. The significance of an historical resource is materially impaired if the project demolishes or materially alters any qualities that justify the:

- inclusion or eligibility for inclusion of a resource on the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).
- inclusion of the resource on a local register (State CEQA Guidelines Section 15064.5[b][2][B]).

Unique archaeological resources, on the other hand, are defined in California PRC Section 21083.2 as a resource that meets at least one of the following criteria.

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.

- Is directly associated with a scientifically recognized important prehistoric or historic event or person (California PRC Section 21083.2[g])

Integrity Considerations For Historic-Era Built-Environment Resources

Integrity in this context is the authenticity of a historic resource's physical characteristics so that it is recognizable as a historic resource and retains its ability to convey its historical associations or attributes. The evaluation of integrity is grounded in the evaluator's understanding of a property's physical features and how these features relate to its historical associations or attributes. Associations and attributes for properties found in the Delta have been summarized in Section 18.1.6 *Historic-Era Setting* and Section 18.1.7, *Historic-Era Property Types*.

Both the CRHR and NRHP define the following seven aspects of integrity.

- Location: where the historic property was constructed or the place where the historic event occurred.
- Design: the combination of elements that create the historic form, plan, space, structure, and style of a property. This includes organization of space, proportion, scale, technology, ornamentation, and materials. This is applicable to larger properties for the historic way in which the buildings, sites, and structures are related.
- Setting: the physical environment of a historic property. It refers to the historic character of the property. It includes the historical relationship of the property to surrounding features and open space. These include topographic features, vegetation, simple manmade paths or fencing and the relationships between buildings, structures or open space.
- Materials: the physical elements that were combined during a particular period of time and in a particular pattern or configuration to form the historic property.
- Workmanship: the physical evidence of the crafts of a particular culture or people during a given period in history. It may be expressed in vernacular methods of construction and plain finishes or in highly sophisticated configuration and ornamental detailing.
- Feeling: the property's expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character.
- Association: the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. Like feeling, association requires the presence of physical features that convey a property's historic character.

The Delta contains a large variety of built resources, from levees to communities, spanning a period from about 1850 to present. When considering integrity, properties that are rare or are early examples of built resources in the region are eligible under different criteria, but still maintain integrity for the characteristics that make it eligible for listing in the register. Delta-style houses, some of the earliest residential building in the region, are one such property type because they are particular to the region, having been designed in response to that environment and, due to their age and modest origins, are more likely to have been subject to incongruous alterations over the years or poorly maintained than the grander late 19th century – 1920s farming estates or river-front homes.

Integrity conclusions for large agricultural properties are complex in that these properties have multiple associated features to consider and were likely developed over time in response to technological advances, changes in land use, and changes in number of residents. When determining integrity for this kind of property, the architectural historian looked at the property as a whole and determined which resources would be contributors to the property and which would be of primary importance to the property's significance. For example, an agricultural property may have altered residences, new outbuildings, an altered barn, and a shed that appears to be original or not altered in the last 45 years. Based on the ubiquitous nature of sheds in rural landscapes, it is unlikely that the shed would be individually eligible. Due to the property's majority of altered and newly built resources, it will have been determined to lack integrity. If insufficient primary buildings, such as the main residence or major agriculture-related buildings such as barns were not visible from the public right-of-way, the property as a whole was listed as being insufficiently accessible and no determination could be made.

Properties such as the islands/reclamation districts or railroads that are subject to heavy use or gradual impacts from environmental stresses have to be maintained to continue to be useable. Some materials and structures on the islands may have to be replaced, such as pumps and pipes, or reinforced, such as the levees, Railroad ties rot and have to be replaced. The historic use of the island is maintained and the alignment and grade of the railroad is unaltered, which are the over-arching historic features of these kinds of properties. Accordingly, ongoing repair and replacement of individual components of the resource may be consistent with the character and significance of the resource. These factors are considered when determining levels of integrity.

If a property known to be 45 years old or more appears to have been significantly altered within the last 45 years, such that it no longer retains character-defining elements, and so that it is recognizable as a historic resource, and no longer retains its ability to convey its historical associations or attributes, it is considered to not have adequate historic integrity.

While integrity can be somewhat subjective, the following are alterations commonly seen in Delta buildings.

- Windows have been replaced with inconsistent window types, such as aluminum or vinyl;
- Window openings have been changed, enclosed, or new opening have been made;
- Siding has been replaced with a substitute material, such as vinyl, aluminum, stucco;
- Rooflines have been changed;
- Doors have been replaced with new doors inconsistent with the original in style and/or material;
- Door openings have been altered, enlarged, or moved;
- Ornamentation characteristic to specific architectural styles has been added or removed;
- Additions, particularly those out of scale or otherwise inconsistent in materials, form or massing.

These considerations were taken into account when conducting field surveys and when assessing effects.

Mitigation Requirements for Archaeological Resources Qualifying As Historical Resources

As set forth in State CEQA Guidelines Section 15064.5[c], special rules apply where a lead agency is not certain at first whether an archaeological resource qualifies as either an "historical resource" or a "unique archaeological resource." That section provides that "[w]hen a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource[.]" "If a lead agency determines that the archaeological site is an historical resource," the resource shall be subject to the rules set forth above regarding historical resources. In addition, according to State CEQA Guidelines Section 15126.4[b]

> [p]ublic agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature. The following factors shall be considered and discussed in an EIR for a project involving such an archaeological site:
>
> (A) Preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site.
>
> (B) Preservation in place may be accomplished by, but is not limited to, the following:
>
> 1. Planning construction to avoid archaeological sites;
> 2. Incorporation of sites within parks, greenspace, or other open space;
> 3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site.
> 4. Deeding the site into a permanent conservation easement.

Thus, although California PRC Section 21083.2, in dealing with "unique archaeological sites," provides for specific mitigation options "in no order of preference," CEQA Guidelines Section 15126.4[b], in dealing with "historical resources of an archaeological nature," provides that "[p]reservation in place is the preferred manner of mitigating impacts to archaeological sites."

For archaeological resources that qualify as historical resources, "data recovery" is a disfavored form of mitigation compared with "preservation in place." Yet "[w]hen data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken. Such studies shall be deposited with the California Historical Resources Regional Information Center." Moreover, "[i]f an artifact must be removed during project excavation or testing, curation may be an appropriate mitigation" (State CEQA Guidelines Section 15126.4[b][3][C]). "Data recovery shall not be required[, however,] for an historical resource [as with a unique archaeological resource] if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource, provided that the determination is documented in the EIR and that the studies are deposited with the California Historical Resources Regional Information Center" (State CEQA Guidelines Section 15126.4[b][3][D]).

With respect to *both* historical resources and unique archaeological resources

> a lead agency should make provisions for…resources accidentally discovered during construction. These provisions should include an immediate evaluation of the find by a qualified archaeologist. If

the find is determined to be an historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place (State CEQA Guidelines Section 15064.5[f])

Mitigation for Unique Archaeological Resources

If a lead agency determines that "an archaeological site does *not* meet the criteria" for qualifying as an historical resource "but does meet the definition of a unique archeological resource…, the site shall be treated in accordance with the provisions of section 21083.2" (described above). Section 21083.2 contains the special rules for mitigation for "unique archaeological resources." These rules do not apply if the archaeological resource is an historical resource (State CEQA Guidelines Section 15064.5[c][1]). The CEQA Statute states that

> [i]f it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts to be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. Examples of that treatment, in no order of preference, may include, but are not limited to, any of the following:
>
> 1. Planning construction to avoid archaeological sites.
> 2. Deeding archaeological sites into permanent conservation easements.
> 3. Capping or covering archaeological sites with a layer of soil before building on the sites.
> 4. Planning parks, greenspace, or other open space to incorporate archaeological sites.
>
> Excavation as mitigation shall be restricted to those parts of the unique archaeological resource that would be damaged or destroyed by the project. Excavation as mitigation shall not be required for a unique archaeological resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource, if this determination is documented in the environmental impact report. (California Public Resources Code Section 21083.2[d])

If, however, "an archaeological resource is neither a unique archaeological nor an historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or EIR, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process" (State CEQA Guidelines, Section 15064.5[c][4]).

18.2.2.2 California Public Resources Code, Duties of State Agencies

California state agencies must provide the Office of Historic Preservation an inventory of all state-owned structures older than 50 years of age under its jurisdiction that are listed in or that may be eligible for inclusion in the NRHP or are registered or that may be eligible for registration as a state historical landmark (California PRC Section 5024[a]). The Office of Historic Preservation compiles these lists into a master list (California PRC Section 5024[d]).

State agencies must provide notice to the State Historic Preservation Officer early in the planning process if the agency intends to alter or demolish resources on the master list (California PRC Section 5024.5[a]). The State Historic Preservation Officer has 30 days to respond after receiving notice. If the State Historic Preservation Officer determines that the action will have an adverse effect on a listed historical resource, the agency must adopt prudent and feasible measures to mitigate or eliminate the adverse effects (California PRC Section 5024.5[b]).

18.2.2.3 Discoveries of Human Remains under California Environmental Quality Act Public Law

California law sets forth special rules that apply where *human remains* are encountered during project construction. These rules are set forth in one place in State CEQA Guidelines, Section 15064.5[e] as follows:

> In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps should be taken:
>
> (1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:
>
> (A) The coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required (as required under California Health and Safety Code Section 7050.5).
>
> (B) If the coroner determines the remains to be Native American:
>
> 1. The coroner shall contact the Native American Heritage Commission within 24 hours.
>
> 2. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American.
>
> 3. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods (as provided in Public Resources Code Section 5097.98), or
>
> (2) Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.
>
> (A) The Native American Heritage Commission is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission.
>
> (B) The descendant identified fails to make a recommendation; or
>
> (C) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

18.2.2.4 California Native American Graves Protection and Repatriation Act

Sections 8010–8011 of the California Health and Safety Code establish a state repatriation policy that is consistent with and facilitates implementation of NAGPRA. The policy requires that all California Indian human remains and cultural items be treated with dignity and respect and encourages voluntary disclosure and return of remains and cultural items by publicly funded agencies and museums in California. The policy provides for mechanisms to aid California Indian tribes, including non–federally recognized tribes, in filing repatriation claims and getting responses to those claims.

18.2.2.5 Confidentiality Considerations

CEQA and the California Public Records Act restrict the amount of information regarding cultural resources that can be disclosed in an EIR in order to avoid the possibility that such resources could

be subject to vandalism or other damage (*Clover Valley Foundation v. City of Rocklin* (2011) 197 Cal.App.4th 200, 219). The State CEQA Guidelines prohibit an EIR from including "information about the location of archaeological sites and sacred lands, or any other information that is subject to the disclosure restrictions of Section 6254 of the Government Code [(part of the California Public Records Act)]." (State CEQA Guidelines, § 15120, subd. (d)). In turn, California Government Code section 2654 of the California Public Records Act lists as exempt from public disclosure any records "of Native American graves, cemeteries, and sacred places and records of Native American places, features, and objects described in Sections 5097.9 and 5097.933 of the [California] Public Resources Code maintained by, or in the possession of, the Native American Heritage Commission, another state agency, or a local agency." (Cal. Gov. Code, § 6254, subd. (r)).

California Public Resources Code sections 5097.9 and 5097.993 list the Native American places, features, and objects, the records of which are not to be publically disclosed under the California Public Records Act: "any Native American sanctified cemetery, places of worship, religious or ceremonial site, or sacred shrine located on public property (§ 5097.9) and any "Native American historic, cultural, or sacred site, that is listed or may be eligible for listing in the California Register of Historic Resources …, including any historic or prehistoric ruins, any burial ground, any archaeological or historic site, any inscriptions made by Native Americans at such a site, any archaeological or historic Native American rock art, or any archaeological or historic feature of a Native American historic, cultural, or sacred site …" (§5097.993, subd. (a)(1)).

The California Public Resources Act also generally prohibits disclosure of archaeological records. Government Code section 6254.10 provides: "Nothing in [the California Public Records Act] requires disclosure of records that relate to archaeological site information and reports maintained by, or in the possession of … a local agency, including the records that the agency obtains through a consultation process between a California Native American tribe and a state or local agency."

These authorities prohibit the disclosure of records and information concerning certain of the Delta region's archeological, cultural, and historic resources in this Draft EIS/EIR. The lead agencies believe confidentiality of the site locations of certain archaeological, cultural, and historic resources found in the region is necessary to prevent vandalism to the resources. Public release of information on the sites may allow their discovery by trespassers, leading to potential looting. The lead agencies' position is consistent with the intent of National Historic Preservation Act Section 304(a):

The head of a Federal agency … shall withhold from disclosure to the public, information about the location, character, or ownership of a historic resource if the Secretary and the agency determine that disclosure may … risk harm to the historic resources …"

As a result, specific descriptions of certain of the archeological, cultural, and historic resources are not provided in this chapter. For the preservation of the sites, specific information on the locations and nature of findings at the resources cannot be included in the CEQA documents. Site-specific content and location information will be reviewed by appropriate federal and state agency officials on a need-to-know basis, thereby protecting the confidential information regarding location and content of the sites. The lead agencies believe protecting the confidentiality of certain information concerning the location and nature of the resources from public disclosure is the best way to preserve the integrity of the valuable resources within the Delta region.

18.2.3 Regional and Local Plans, Policies, and Regulations

18.2.3.1 City and County General Plans

Many of the counties and cities encompassing lands in the Plan Area have developed policies and goals intended to document and preserve cultural resources in their areas. These general plans specify locally proposed goals or objectives and policies intended to enforce them and act as performance standards.

18.2.3.2 Alameda County

East County Area Plan

Land use planning in the eastern portion of Alameda County is governed by the East County Area Plan (ECAP), which was adopted by the County in May 1994. In November 2000, the Alameda County electorate approved Measure D, the Save Agriculture and Open Space Lands Initiative, which amended portions of the general plan, including the ECAP (Alameda County 2000).

The Open Space Element addresses sensitive lands and regionally significant open space, including cultural resources. Goals and policies from the ECAP related to protection of cultural resources that apply to the Plan Area are listed below (Alameda County 2000).

- **Goal:** To protect cultural resources from development.
    - **Policy 136:** The County shall identify and preserve significant archaeological and historical resources, including structures and sites which contribute to the heritage of East County.
    - **Policy 137:** The County shall require development to be designed to avoid cultural resources or, if avoidance is determined by the County to be infeasible, to include appropriate mitigation measures that offset the impacts.

18.2.3.3 Contra Costa County

Contra Costa County General Plan

A comprehensive update to the Contra Costa County General Plan was adopted on January 18, 1991. Amendments to the general plan followed in 1996 and 2005 to reflect changes to the Land Use Map and the incorporation of the City of Oakley (Roche pers. comm.). The Open Space Element of the general plan addresses preservation of historical and cultural resources. The following goal and policy from the Open Space Element are considered applicable to implementation of the BDCP (Contra Costa County 2005).

- **Policy 9-31:** To identify and preserve important archaeological and historic resources within the County.
- **Policy 9-32:** Areas which have identifiable and important archaeological or historic significance shall be preserved for such uses, preferably in public ownership.

18.2.3.4 City of Lathrop

The Resource Management Element of the City of Lathrop General Plan (2004) identifies the following goals and policies encouraging protection of cultural resources for land development projects within the City's boundaries:

- **Policy 7.3**: Significant natural open space and cultural resources should be identified prior to development and incorporated into site-specific development project design.
    - Archaeological and Cultural Resource Policies:

        (1) Existing known archaeological and cultural resources are to be protected, beginning with the filing of an application for development in the immediate vicinity of such resources. The City shall follow the procedures set forth in Appendix K of CEQA Guidelines. Confidentiality shall be maintained between the City and developer to avoid vandalism or desecration of such resources. Alternatives for development design intended to protect cultural resources shall be reviewed by a Native American having competence in understanding and interpreting the importance of the resources and of the most desirable methods to assure their preservation.

        (2) The potential loss of as yet unknown archaeological and cultural resources shall be avoided by close monitoring of the development process. The close proximity of properties intended for development to natural watercourses or to known archaeological or cultural resources shall be taken as a signal by the City and developer of a potential for unearthing unknown resources. In such cases, the City shall instruct the developers, construction foremen and City inspectors of the potential for damage to artifacts and sites, and provide written instructions requiring a halt to all excavation work in the event of any find until the significance of the find can be evaluated by competent archaeological and Native American specialists. The costs of such protection work shall be the responsibility of the developer.

18.2.3.5 City of Oakley

City of Oakley General Plan

The City of Oakley General Plan was adopted on December 16, 2002. The Open Space and Conservation Element of the general plan addresses protection and enhancement of environmental resources, including cultural resources, in the Sacramento–San Joaquin River Delta (Delta). The following goal and policy from the Open Space and Conservation Element are considered applicable to implementation of the BDCP (City of Oakley 2002).

- **Goal 6.4:** Encourage preservation of cultural resources within the Plan Area.
    - **Policy.6.4.1:** Preserve areas that have identifiable and important archaeological or paleontological significance.

18.2.3.6 Sacramento County

Sacramento County General Plan

The Sacramento County General Plan Update was adopted on November 9, 2011. The amended Conservation Element addresses protection of cultural resources. The following objective and

policies from the Conservation Element of the general plan are considered applicable to implementation of the BDCP (Sacramento County 2011).

- **Goal:** Promote the inventory, protection and interpretation of the cultural heritage of Sacramento County, including historical and archaeological settings, sites, buildings, features, artifacts and/or areas of ethnic historical, religious, or socioeconomic importance.
    - **Objective:** Preserve structures such as buildings, bridges, or other permanent structures with architectural or historical importance to maintain contributing design.
        - **Policy CO-164:** Structures having historical and architectural importance shall be preserved and protected.
        - **Policy CO-165:** Refer projects involving structures or within districts having historical or architectural importance to the Cultural Resources Committee to recommend appropriate means of protection and mitigation.
        - **Policy CO-166:** Development surrounding areas of historic significance shall have compatible design in order to protect and enhance the historic quality of the areas.
        - **Policy CO-167:** When conducting planning studies, County Planning staff, shall encourage the adaptive reuse of historic resources when the original use is no longer feasible or allowed under proposed area planning efforts.
        - **Policy CO-168:** County-owned historic and cultural resources shall be preserved and maintained, such that modifications, alterations, and rehabilitations are conducted in a manner that is consistent with the U.S. Secretary of the Interiors Standards for the Treatment of Historic Properties.

18.2.3.7 City of Sacramento

City of Sacramento General Plan

The City of Sacramento 2030 General Plan was adopted on March 3, 2009. The revised Historic and Cultural Resources Element of the general plan addresses preservation of historical and cultural resources and adaptive reuse of historic structures. The following goal and policies from the Historic and Cultural Resources Element are considered applicable to implementation of the BDCP (City of Sacramento 2009).

- **Goal HCR 2.1, Identification and Preservation of Historic and Cultural Resources:** Identify and preserve the City's historic and cultural resources to enrich our sense of place and our understanding of the City's prehistory and history.
    - **HCR 2.1.2, Applicable Laws and Regulations:** The City shall ensure that City, State, and Federal historic preservation laws, regulations, and codes are implemented, including the California Historical Building Code and State laws related to archaeological resources, to ensure the adequate protection of these resources.
    - **HCR 2.1.3, Consultation:** The City shall consult with the appropriate organizations and individuals (e.g., Information Centers of the CHRIS System, the NAHC, and Native American groups and individuals) to minimize potential impacts to historic and cultural resources.

- **HCR 2.1.15, Archaeological Resources:** The City shall develop or ensure compliance with protocols that protect or mitigate impacts to archaeological, historic, and cultural resources including prehistoric resources.

18.2.3.8 San Joaquin County

San Joaquin County General Plan

The San Joaquin County General Plan 2010 was adopted on July 29, 1992. The Resources Element contained in Volume 1 of the general plan addresses protection of heritage resources, including archaeological resources. The following objective and policies from the Resources Element are considered applicable to implementation of the BDCP (San Joaquin County 1992):

- **Objective 1:** To protect San Joaquin County's valuable architectural, historical, archaeological, and cultural resources.
  - **Policy 2:** Significant archaeological and historical resources shall be identified and protected from destruction. If evidence of such resources appears after development begins, an assessment shall be made of the appropriate actions to preserve or remove the resources.
  - **Policy 3:** No significant architectural, historical, archaeological or cultural resources shall be knowingly destroyed through County action.

18.2.3.9 Solano County

Solano County General Plan

The Solano County General Plan was adopted on August 5, 2008, and was subject to voter approval as Measure T on the November 4, 2008, ballot. Measure T was passed by the voters, thereby confirming the approval of the new general plan.

The Resources Chapter of the Solano County General Plan includes an Open Space Element that addresses preservation and protection of recreational, scenic, agricultural, and cultural resources. The following policy from the Open Space Element of the Resources Chapter is considered applicable to implementation of the BDCP (Solano County 2008).

- **Policy RS.P-38:** Identify and preserve important prehistoric and historic structures, features, and communities.

18.2.3.10 City of Stockton

City of Stockton General Plan

The City of Stockton General Plan includes a natural and cultural resources element with the following policies that addresses protection of cultural resources within the City (City of Stockton 2007):

- **NCR-3.5 Archaeological Resource Surveys:** Prior to project approval, the City shall require project applicant to have a qualified archeologist conduct the following activities: (1) conduct a record search at the Central California Information Center located at California State University Stanislaus and other appropriate historical repositories, (2) conduct field surveys where

appropriate, and (3) prepare technical reports, where appropriate, meeting California Office of Historic Preservation Standards.

- **NCR-3.6 Discovery of Archaeological Resources:** Consistent with Stockton Municipal Code Section 16-310.050, *Cultural Resources*, in the event that archaeological/paleontological resources are discovered during site excavation, the City shall require that grading and construction work on the project site be suspended until the significance of the features can be determined by a qualified archaeologist/paleontologist. The City will require that a qualified archeologist/paleontologist make recommendations for measures necessary to protect any site determined to contain or constitute an historical resource, a unique archaeological resource, or a unique paleontological resource or to undertake data recovery, excavation, analysis, and curation of archaeological/paleontologist materials. City staff shall consider such recommendations and implement them where they are feasible in light of project design as previously approved by the City.
- NCR-3.8 Discovery of Human Remain: Consistent with Stockton Municipal Code Section 16-310.050, If any human remains are discovered or recognized in any location on the project site, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the county coroner is notified, and if the remains are of prehistoric Native American origin, the NAHC is notified and the requirements of California PRC Section 5097.98 are met.

18.2.3.11 City of Rio Vista

City of Rio Vista General Plan

The City of Rio Vista General Plan 2001 was adopted on July 18, 2002. The Resource Conservation and Management Element of the general plan addresses conservation of resources, including historical resources. The following goal and policy from the general plan are considered applicable to implementation of the BDCP (City of Rio Vista 2002).

- **Goal 10.10:** To encourage preservation of the City's historic resources while enhancing their value and economic life.
    - **Policy 10.10.C:** The City shall require that discretionary development projects identify important historic, archaeological, and cultural sites and their contributing environment from damage, destruction, and abuse. The City shall ensure that such assessments are incorporated into the City's cultural and historical database, to be maintained by the Rio Vista Museum.

18.2.3.12 Yolo County

Yolo County General Plan

The Yolo County General Plan was adopted on November 10, 2009. The general plan integrates, by reference, locally effective parts of the Delta Protection Commission's Land Use and Resource Management Plan for the Primary Zone of the Delta.

The Conservation and Open Space Element of the Yolo County General Plan addresses preservation of various resources in an open space environment. The following policies from the general plan are considered applicable to implementation of the BDCP (County of Yolo 2009a).

- **Goal CO-4, Cultural Resources:** Preserve and protect cultural resources within the County.
  - **Policy CO-4.1:** Identify and safeguard important cultural resources.
  - **Policy CO-4.12:** Work with culturally affiliated tribes to identify and appropriately address cultural resources and tribal sacred sites through the development review process.
  - **Policy CO-4.13:** Avoid or mitigate to the maximum extent feasible the impacts of development on Native American archaeological and cultural resources.
  - **Policy CO-4.14:** Within the Delta Primary Zone, ensure compatibility of permitted land use activities with applicable cultural resources policies of the Land Use and Resource Management Plan of the Delta Protection Commission.

18.3 Environmental Consequences

This section describes the methods used to identify the known resources that would be affected by the action alternatives as well as BDCP effects on previously unidentified resources. The direct, indirect, and cumulative effects on known and unknown archeological, built environment, and TCP resources that would result from implementing BDCP alternatives are evaluated and mitigation measures are presented to reduce potential effects.

18.3.1 Determination of Effects

This section describes the criteria used to identify adverse effects on cultural resources. "Adverse effect" here means effects that are significant under CEQA and other the relevant state regulatory frameworks and thresholds, and are "adverse" within the meaning of NEPA and the Section 106 regulations.

Effects on unique archaeological resources and historical resources are considered adverse for purposes of NEPA, and significant for purposes of CEQA, if the BDCP would do any of the following.

- Demolish or materially alter the qualities that justify the resource for inclusion or eligibility for inclusion on the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]). For the purposes of this analysis, "materially altering or destroying qualities that contribute to eligibility" means altering the resource so that it can no longer convey its association with significant historical events or people, distinctive style or artistic value, or the potential to yield information important in history or prehistory (14 CCR Section 4852[b]).
- Demolish or materially alter the qualities that justify the inclusion of the resource on a local register (State CEQA Guidelines Section 15064.5[b][2][B]) or its identification as an historical resource survey meeting the requirements of California PRC Section 5024.1(g). For the purposes of this analysis, "materially altering a resource so that it no longer qualifies for a local register" means altering the resource so it can no longer convey the significance that makes it eligible for the local register. These significance themes often mirror the CRHR and the NRHP, but emphasize historical or cultural themes that are locally relevant.
- Demolish or materially impair the characteristics that allow a site to qualify as a unique archaeological resource (California PRC Section 21083.2[g]). "Demolishing or materially impairing a unique archaeological resource" means altering the ability of the site to convey one or more of the following characteristics.

- Data useful in important scientific questions associated with demonstrable public interest in those questions.
- The quality of being the oldest or best example of a type.
- Association with an important person or event in history or prehistory (California PRC Section 21083.2[g]).

- The criteria of adverse effect in 36 CFR Part 800.5(a)(1) provides a standard for Section 106 of the NHPA. Alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5[a][1]). For the purposes of this analysis, "alteration of qualifying characteristics" may include but is not necessarily limited to:
  - Physical destruction of all or part of a property.
  - Alteration of built-environment resources that is not consistent with the federal standards for treatment of historic properties (36 CFR 68).
  - Removal of a property from its historical location.
  - Alteration of the significant features of a property or introduction of incongruous elements to the setting.
  - For federally owned properties, transfer of the property out of federal control without adequate and legally enforceable mechanisms to ensure preservation.
  - Neglect of a property that results in deterioration (36 CFR 800.5[a][2]).
- Disturbance of human remains, including remains interred outside of established cemeteries is an adverse effect (State CEQA Guidelines, Appendix G checklist). For the purposes of this analysis, "disturbance" may consist of direct excavation or damage through compaction even where the resource is not directly excavated.

18.3.2 Direct and Indirect Effects and Impact Mechanisms

BDCP-related activities may affect cultural resources directly or indirectly. This section describes the direct and indirect impact mechanisms associated with the BDCP alternatives. Direct effects on cultural resources may occur through any of the following.

- Ground-disturbing construction that damages historic or prehistoric archaeological sites and impairs the constituent deposits in the site and their utility for answering archaeological research questions.
- Ground-disturbing construction that unearths and damages human remains.
- Direct demolition of built-environment resources such as historic-era residences, structures or buildings, or landscape features.
- Direct excavation or alteration of TCPs.
- Direct effects on individual resources creating adverse effects on rural historic landscapes, where the individual resource is a constituent element of the rural historic landscape.

Indirect effects may occur under any of the circumstances described below.

- Construction in the vicinity of a resource removes features of the surrounding setting, where the setting is an integral part of the resource.
- Construction in the vicinity introduces new physical features that are incongruent with the setting, where the setting is an integral part of the resource.
- Introduction of new sources of sound or activities in the vicinity that would be inconsistent with the setting, where the setting is an integral part of the resource.

The BDCP alternatives would result in direct and indirect effects, as described below. Where resources have been recorded in the footprint of action alternatives, these resources are identified in the relevant impact discussions.

18.3.3 Geographic Scope of Effects

The BDCP covers a large, generally rural area. The boundaries of the area in which significant effects could occur for each alternative were determined by taking this kind of environment into consideration, as well as the nature of CM1, such as temporary impacts, temporary and permanent power access, and indirect or visual impacts. The approach was as follows:

- For direct impacts: all land physically within the footprint of alternative water conveyance alignments is included, for both temporary impacts and permanent impacts. Usually the entire legal parcel is included, whether or not it is all within the area of direct impacts. In areas where the parcels are very large, generally agricultural, the boundary of the survey map may not include the entire parcel, but includes a reasonable portion, determined by land use. The edge of the survey may be established following features such as roads, irrigation channels, changes in crops, or natural topographic features.
- For the tunnel areas: all land directly above the tunnel was included, again generally including the entire legal parcel. It was decided that it would be prudent in some areas to include properties adjacent to the tunnel footprint if they contain built resources in close proximity to the tunnel footprint to demonstrate that effects potentially resulting from settlement or vibration are considered.
- For temporary and permanent power: only the footprint of the power line is included in the survey map. In cases where a built resource is very close to this footprint, that resource is included in the survey.
- For visual or auditory impacts: built resources facing on-bank intake facilities or pumping plants, but are across the river, are included. Resources adjacent to these plants are also included for these potential indirect effects where the height or line of sight to the structure creates an effect.
- For impacts to National Register listed districts or potential districts: the district in its entirety is included, because an effect to one element of the district has the potential to diminish the integrity of the entire district.

18.3.4 Issues Not Carried Forward for Detailed Analysis

Potential effects on cultural resources at upstream reservoirs associated with operational changes are not carried forward for detailed analysis because they are too speculative for meaningful consideration. Currently, reservoir levels upstream of the Delta fluctuate greatly between wet and

dry years, and during operational changes necessary to meet flood management and water use demands. Each action alternative is associated with particular operational changes for upstream reservoirs, or "scenarios" (see Chapter 3, *Description of Alternatives*). These operational changes, combined with other regional effects such as climate change, may (but are not certain to) increase both the range of variation in water levels at these reservoirs and the frequency that reservoir levels are drawn down. Current modeling shows that precipitation, rather than operational rules, is the largest cause of fluctuation at upstream reservoirs. Because precipitation patterns may be altered by climate change, a slight increase in the frequency with which cultural resources at upstream reservoirs are exposed rather than inundated may occur. However, because the increase in degree and frequency fluctuation is likely to be small and is speculative as to degree and intensity, this effect cannot be carried forward for meaningful analysis for the majority of the action alternatives. Of the action alternatives, Alternative 4 however, has some potential to increase fluctuation of reservoir levels at Lake Oroville. Because all cultural resources within the area affected by water storage at Lake Oroville are currently managed pursuant to applicable state and federal law, the BDCP is not expected to meaningfully contribute to new effects requiring additional management policies at this storage facility. Furthermore, climate change, by itself, is not an effect of the action alternatives.

18.3.5 Effects and Mitigation Approaches

18.3.5.1 No Action Alternative

Under the No Action Alternative, current and reasonably foreseeable projects would continue, with the associated potential for effects on cultural resources. These projects and programs include the continued implementation of SWP/CVP operations, maintenance, enforcement, and protection programs by federal, state, and local agencies and nonprofit groups, as well as projects that are permitted or under construction. A complete list of the programs and plans considered under the No Action Alternative is provided in Appendix 3D, *Defining Existing Conditions, the No Action/No Project Alternative, and Cumulative Impact Conditions*. The following discussion describes the effects on cultural resources that would occur if no new conveyance facilities were constructed; these effects would not be the result of the BDCP, but instead the result of reasonably foreseeable projects and actions that would occur without the BDCP as of the year 2060.

The Future of Cultural Resources in the Delta

The Delta region is rich in prehistoric and historic-era cultural resources. These resources include prehistoric and historic archaeological sites, buried human remains, and built-environment resources. Subsidence, levee failure, and climate change all have the potential to increase the inundation and erosion of cultural resources that currently occur on the landside of existing flood management structures.

SWP/CVP Operations

Ongoing SWP/CVP operations include both levee repair and habitat restoration and conservation activities. Where specific projects will result in ground-disturbing construction these actions have the potential to result in effects on cultural resources through direct excavation into such resources or the introduction of new inconsistent features such as setback levees, borrow areas, or other landside features that may not be consistent with the rural agricultural setting.

Ongoing Plans, Policies, and Programs

The plans, policies, and projects that are included in the No Action Alternative are summarized in Table 18-1 as well as in Appendix 3D, *Defining Existing Conditions, the No Action/No Project Alternative, and Cumulative Impact Conditions*.

Table 18-1. Programs and Projects Occurring under the No Action Alternative

Agency	Program/ Project	Status	Description of Program/Project	Potential Effects on Cultural Resources
California Department of Water Resources	Levee Repair-Levee Evaluation Program	Ongoing	Identification and repair of hundreds of levees throughout the Central Valley. These repairs are necessary to maintain the functionality of flood management systems that have deteriorated over time and/or do not meet current design standards.	Individual future levee repair projects may disturb landside and waterside cultural resources such as prehistoric and historic archaeological sites, and result in direct and indirect effects on built-environment resources.
U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Water Resources and California Department of Fish and Wildlife	San Joaquin River Restoration Program	Ongoing	The program would implement a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river. There are many physical improvements within and near the San Joaquin River that will be undertaken to fully achieve the river restoration goal.	Individual projects necessary to implement this program may result in disturbance to cultural resources such as prehistoric and historic archaeological sites, and result in direct and indirect effects on built-environment resources.
California Department of Water Resources	Delta Levees Flood Protection Program	Ongoing	Under this program DWR works with the local agencies to maintain, plan, and complete levee rehabilitation projects.	Individual projects necessary to implement this program may result in disturbance to cultural resources such as prehistoric and historic archaeological sites, and result in direct and indirect effects on built-environment resources.
Yolo County	Yolo County General Plan Update/Plan Buildout	Ongoing	The Yolo County 2030 General Plan was adopted in November of 2009. The updated plan would allow for additional growth in the unincorporated area of the County of approximately 30,195 people, up to 10,784 homes, and 19,209 jobs.	Buildout will result in significant effects on archaeological and built-environment resources.
Semitropic Water Storage District	Delta Wetlands Project	EIR/EIS completed 2011	Wildlife enhancement on Delta islands.	The project may demolish cultural resources or expedite decay of cultural resources.
NMFS/USFWS	2008 and 2009 Biological Opinions	Ongoing.	The Biological Opinions issued by NMFS and USFWS establish certain RPAs to be implemented requiring habitat restoration	Construction of habitat may demolish cultural resources or expedite decay of cultural resources.

The plans, programs, and projects that would occur under the No Action Alternative collectively will result in adverse effects on cultural resources. For example, Yolo County concludes in the General Plan Update EIR that plan buildout will result in significant and unavoidable effects on cultural resources (County of Yolo 2009b:546). Similarly, levee repairs performed in the Delta region under the No Action conditions are likely to contribute to effects on archaeological and built-environment resources and buried human remains because the Delta is sensitive for such resources, and construction of such improvements would require ground-disturbing work. Habitat restoration in Suisun Marsh or elsewhere necessary to comply with federal biological opinions could also contribute to effects on archaeological and built-environment resources and buried human remains.

Although mitigation may be implemented as a part of these ongoing projects, which would reduce their effects, or manage significant effects through treatment, such treatment typically does not reduce impacts on cultural resources to less than adverse. Mitigation such as data recovery excavations conducted to retrieve scientifically important material from archaeological sites reduces the loss of data, but does not completely avoid data loss because complete recovery of data is typically infeasible. In addition, treatment of identified effects and construction monitoring cannot guarantee that effects on undiscovered archaeological resources and buried human remains would be avoided, because unidentified resources can occur without surface manifestation that would allow their identification and avoidance. In a similar fashion the set of actions that would occur under the No Action Alternative would likely result in the demolition of significant historical structures. Although mitigation is typically performed to document such structures before they are lost, such documentation does not replace the structure and does not reduce such impacts to a level less than significant. For these reasons, the loss of built environment cultural resources under the No Action Alternative would be adverse. No mitigation is proposed under this impact because the BDCP would not be implemented and no mitigation would be prepared for the action alternatives. Collectively, effects on cultural resources under the No Action Alternative would therefore be adverse.

Catastrophic Seismic Risks

The Delta and vicinity is within a highly active seismic area, with a generally high potential for major future earthquake events along nearby and/or regional faults, and with the probability for such events increasing over time. Based on the location, extent and non-engineered nature of many existing levee structures in the Delta area, the potential for significant damage to, or failure of, these structures during a major local seismic event is generally moderate to high. In the instance of a large seismic event, levees constructed on liquefiable foundations are expected to experience large deformations (in excess of 10 feet) under a moderate to large earthquake in the region (see Appendix 3E, *Potential Seismic and Climate Change Risks to SWP/CVP Water Supplies* for more detailed discussion). Reclaiming land or rebuilding levees after a catastrophic event due to climate change or a seismic event could result in the destruction of cultural resources.

CEQA Conclusion: Under the No Action conditions significant effects on archaeological and built-environment resources as well as human remains would occur. Although it is expected that project-level review for individual actions would result in mitigation of these impacts, such mitigation would reduce but not necessarily avoid such effects. Data recovery excavations and construction phase monitoring do not avoid the loss of data in archaeological sites or the potential for inadvertent damage to buried resources and human remains that cannot be identified in advance of construction. Similarly, treatment for built-environment resources would reduce the severity of

effects, but would not mitigate the anticipated loss of significant structures to a level less than significant. For these reasons effects on cultural resources would be significant and unavoidable.

18.3.5.2 Alternative 1A—Dual Conveyance with Pipeline/Tunnel and Intakes 1–5 (15,000 cfs; Operational Scenario A)

A total of five intakes would be constructed on the east bank of the Sacramento River under Alternative 1A. For the purposes of this analysis, Alternative 1A was assumed to entail construction of Intakes 1–5. This alternative would also include an intermediate forebay, and the conveyance facility would be a buried pipeline/tunnel (see Figures 3-2 and 3-3 in Chapter 3, *Description of the Alternatives*).

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified seven previously recorded prehistoric archaeological sites in the footprint of this alternative (Appendix 18B, Table 18B-1). These seven previously recorded resources represent the known resources that occur in the footprint of this alternative. Detailed site descriptions are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*.

Significance of Identified Archaeological Resources

Many of the directly affected sites are midden sites, with debris and artifacts associated with prehistoric habitation and residence activities. Midden sites in the Plan Area are often colloquially referred to as "mound sites" because they often form low mounds elevated relative to the surrounding landform. While the original raised deposit has sometimes been destroyed, midden sites often have substantial deposits below the original raised landform that remain intact that typically contain the material remains associated with prehistoric habitation. This organic debris can be used for radiocarbon dating, as well as material that reveals the nature of subsistence activities pursued by prehistoric populations. Because there is no single unified prehistoric chronology for the Delta region, substantial research questions remain unresolved regarding nature and changes of subsistence and settlement activity over the span of the prehistoric occupation of the Delta. The Delta is the prehistoric point of articulation between Central Valley cultures and the aboriginal people that occupied the San Francisco Bay area. Because the cultural chronology and sources of cultural change for the Delta remain unresolved in part, sites in the footprint of this alternative likely contain information that could help clarify these research issues. For these reasons these resources are likely significant under the fourth criterion for the CRHR and NRHP (see Section 18.2.1.2, "That have yielded, or may be likely to yield, information important in prehistory or history").

Three of the identified sites contain human burials, as described on the site records (CA-SAC-328, CA-SAC-59, and CA-SAC-65/H). Most if not all of the remaining sites are likely to contain additional burials because midden sites in the Plan Area typically contain human burials or cremations. Burial components within these sites often contain ornaments and other personal items such as charmstones, beads, and other decorative material. Because the style and form of these artifacts change throughout prehistory, and because these stylistic changes have been defined, these

materials provide a method of associating archaeological material with specific prehistoric time periods. The ability to associate habitation remains with specific time periods is one of the most significant problems in prehistoric research, because the sequence of specific adaptations and behaviors only becomes clear when a chronology can be constructed that associates behavior and material culture with specific time frames. For this reason these resources are likely significant under the fourth criterion for the CRHR and NRHP.

Because many of these resources are large (typically in excess of 30 meters across), they are each likely to contain some portion of the deposit with sufficient integrity to yield artifacts in their original associations in a manner that will convey these significance themes. Therefore these identified resources are likely to qualify as historical resources under CEQA. For the same reasons, these resources are likely to be eligible for the NRHP.

Anticipated Effects on Identified Resources

The exact location of these resources cannot be disclosed because such disclosure might lead to damage of the sites. However, these resources occur within the footprint of both temporary work areas and permanent surface impacts. The resources are generally distributed evenly across the alignment, but are somewhat clustered where construction of large above-ground features would occur, such as the northern end of the alignment, at the intermediate forebay, and at the southern end of the alignment. Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the

spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site with important information may remain after treatment. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Prior to ground-disturbing construction, the BDCP proponents will implement a treatment plan for identified "historic properties," "historical resources" and "unique archaeological resources" sites affected by Alternative 1A construction, that cannot be avoided.

Basis for Selection of Treatment

Identified archaeological resources occur in the footprint of large features that would be constructed under this alternative. Preservation in place, through methods such as redesign of relevant facilities to avoid destruction or damage to eligible cultural resources, capping resources with fill, or deeding resources into conservation easements shall be the preferred method of mitigation where feasible. Because these resources occur within the footprint of these features, avoidance may not be feasible in light of costs, logistics, technological and environmental considerations, the location of the archeological resources, and the extent to which avoidance and/or preservation of the resource is inconsistent with the objectives of the project. These objectives include protection of other sensitive environmental resources where possible. Because of the density and location of other sensitive environmental resources such as natural communities and habitats, relocation of proposed facilities necessary to ensure all historical resources are preserved in places is unlikely to be feasible. Furthermore, the large, linear, nature of proposed conveyance facilities would result in overlap with cultural resources across almost any potential alignment because of the manner in which cultural resources are distributed in the study area. These same facilities will require ongoing maintenance and operational activities that would likely be inconsistent with dedicated conservation easements or other land management methods designed to preserve existing resources in place. For these reasons, preservation of all potentially affected archaeological sites through capping with soil or incorporation into conservation easements or green space is not likely to be feasible. Accordingly, data recovery is necessary to retrieve information that conveys the significance of the resource that would otherwise be lost This data recovery excavation will conform to the following standards that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 68:

- The BDCP proponents will retain a qualified archaeological consultant to conduct data recovery excavations necessary to retrieve material that would otherwise be lost, (material with scientifically important data associated with the significance of the resource). Qualified archaeological consultant here means a consultant with a graduate degree in archaeology, anthropology, or closely related field, plus at least one year full-time professional experience or equivalent specialized training in archaeological research, administration or

management, at least four months of supervised field and analytic experience in general North American archaeology, and has demonstrated experience conducting and completing effective data recovery excavations at the kinds of sites subject to treatment.

- BDCP proponents will prepare, and deposit with the relevant information center of the CHRIS, a data recovery plan prior to conducting these excavations, as required under State CEQA Guidelines Section 15126.4(b)(3)(C). The plan will provide a literature review of recent regional archaeological research and a summary of regional research questions. The plan will incorporate the methods prescribed above and include a more detailed description of the sampling and excavation methods that are appropriate for the regional research questions. The plan will not disclose the location of the resources subject to treatment in a manner that would allow their location to be known by the public so as to avoid inadvertent or intentional damage to or removal of the resources by members of the public.
- Data recovery excavations will remove a sample of the affected portion of the deposit to retrieve scientifically important material. Excavation will be conducted in representative levels, and material removed will be divided and screened through a combination of 1/4" and 1/8 " mesh screen, so as to capture both the gross cultural constituents and the finer material that can only be captured in fine mesh. Excavation will be conducted in 10-centimeter levels so that the horizontal association of different cultural materials is recorded. Removed material will be segregated by type and bagged with labels noting their horizontal and vertical location relative to an established datum point. The datum point will be recorded in the field with GPS to at least 10-centimeter horizontal and vertical accuracy. If, in the course of data recovery excavations, it is determined that, contrary to available evidence, the resource lacks integrity, data recovery excavations will cease.
- Faunal material (animal bone) will be segregated and studied by a qualified faunal analyst to identify the species pursued, relative abundance and diversity of different species present, and the manner in which the prey were processed by the prehistoric occupants.
- Obsidian glass will be retrieved and studied through both X-ray fluorescence (a method that allows the source of the obsidian to be identified) and obsidian hydration analysis (a method that allows approximate determination of the time when the material was subject to human modification).
- Soil samples will be retrieved, with their horizontal and vertical location recorded, for flotation analysis (a method of separating light organic material such as fine plant remains from the deposit, in order to identify plant species pursued by prehistoric populations).
- Because some of the resources subject to treatment contain human remains, provisions for such remains are necessary. If human remains are discovered in these deposits during data recovery, the county coroner will be contacted as required in California Health and Safety Code Section 7050.5. After the coroner confirms the remains are of prehistoric origin, the NAHC will be contacted and given the opportunity to identify a most likely descendant (MLD). The MLD will be given the opportunity to reinter the remains with appropriate dignity. If the NAHC fails to identify the MLD or if the parties cannot reach agreement as to how to reinter the remains as described in California PRC Section 5097.98(e), the landowner will reinter the remains at a location not subject to further disturbance. The BDCP proponents will ensure the protections prescribed in California PRC Section 5097.98(e), are performed, such as the use of conservation easements and recording of the

location with whichever county in which the remains are found as well as the relevant information center of the CHRIS.

- After completion of data recovery excavations DWR and/or the appropriate federal agencies will prepare a data recovery report. DWR and/or the appropriate federal agencies will retain a qualified archaeological consultant to conduct relevant studies specified in the data recovery plan such as obsidian hydration, faunal analysis, and X-ray fluorescence. The consultant or staff archaeologists will synthesize the results of these studies and summarize the results relative to regional research questions in the data recovery report. The report will be filed with the relevant information center of the CHRIS. DWR and/or the appropriate federal agencies will also store the recovered material (other than human remains) at an appropriate facility for curation.
- **Construction phase monitoring and resource protection:** During construction on or near the resource, DWR and/or the appropriate federal agencies will retain a qualified archaeologist (a person knowledgeable in the identification of the kind of resources known to occur), to observe excavations over any remaining portions of the deposit that are sensitive for buried human remains or which may contain other significant buried archaeological material that could be inadvertently damaged. If human remains are discovered the archaeologist will direct compliance with the requirements of California Health and Safety Code Section 7050.5 and California PRC Section 5097.98 and the relevant federal agency with responsibility for Section 106 will be contacted. In addition DWR and/or the appropriate federal agencies will use fencing, flagging, or other appropriate means to exclude unnecessary disturbance and activity from sensitive resources during construction.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

An inventory for the majority of the footprint for this alternative has not been conducted because the majority of the footprint is not currently legally accessible (Appendix 4A, *Summary of Survey Data Collection by Department of Water Resources to Obtain Information Regarding Baseline Conditions in Areas That Could Be Affected by BDCP*). Furthermore, complete evaluation of all potentially affected resources associated with this alternative may require destructive test excavation in advance of any final decision regarding the selection of the alternative. Because several prehistoric archaeological sites qualifying as historical resources have been identified in the footprint of this alternative, the remaining non-accessible portion of the footprint for this conveyance feature is sensitive for previously unidentified archaeological resources. Record searches performed through the CHRIS reviewed the mapped location of previous cultural resource inventories in the footprint of this alternative and the vicinity. This map review revealed that a cultural resources inventory has never been conducted in the majority of the footprint for this alternative. The presence of archaeological sites that qualify as historical resources and historic

properties in the portion of the footprint that has been previously inspected provides a sample of the likely density and occurrence of resources in the remaining footprint. For this reason, additional prehistoric archaeological resources are likely to be found in the portion of the footprint where surveys have not been conducted, once access is available and such studies can be completed.

In addition to prehistoric archaeological resources, the BDCP area is sensitive for historic-era archaeological resources. It is likely that previously unidentified historic archaeological sites occur in the footprint of this alternative because of the intensity of human activity in the Plan Area during the historic era, as described in Section 18.1.6, *Historic-Era Setting.*

Prehistoric sites in the Plan Area tend to be large and rich in material remains, including human burials and associated ornaments and beads. Habitation debris also often contains both floral and faunal material that can be used for both radiocarbon dating and analysis regarding subsistence strategies. In addition, the large scale of typical prehistoric archaeological resources suggests portions of these deposits will remain with sufficient integrity to convey research information. Therefore, these sites are likely to qualify as historical resources or unique archaeological resources under CEQA and be eligible for the NHPA.

Historic sites are likely to be associated with the historic-era themes of settlement, reclamation, agriculture, and flood management in the Delta region. Because the reclamation and agricultural development of the Delta region provided part of the economic base for the development of surrounding urban centers, these historic themes are significant at both a state and national level. These resources accordingly may contain data useful in historical research. In addition, the intensity of historic activity in the Delta region suggests that many of these resources are likely to be distributed across the footprint of this alternative and some are likely to retain sufficient integrity to convey this significance if they are subject to archaeological excavation and investigation. Therefore, these sites are likely to qualify as historical resources or unique archaeological resources under CEQA and be eligible for the NHPA.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA. The locations of various features such as intakes, forebays, and tunnels shaft locations that would result in ground disturbance are depicted in Figure M3-1 in the mapbook volume. These effects would be adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** The footprint for this alternative is sensitive for both prehistoric and historic-era archaeological resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA and be eligible for the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be

retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Prior to ground-disturbing construction, the BDCP proponents will implement the following mitigation measures:

- Because DWR and federal agencies could not feasibly access the majority of the footprint for this alternative, a cultural resource inventory has not been completed for the entire footprint. Prior to ground-disturbing construction, the BDCP proponents will ensure that an inventory and evaluation report for cultural resources is completed. The inventory will cover the APE for relevant federal undertakings.
- The scope of the inventory will include the entire area where effects may occur. Such effects consist of direct disturbance through excavation or indirect damage through vibration or changes to the setting, where the setting may be relevant for archaeological resources.
- The work will be led or supervised by cultural resource specialists who meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 61.
- Inventory methods will include pedestrian surveys and other any other appropriate sampling methods identified by DWR and/or the federal lead agencies.
- Identified resources will be mapped and described on forms provided by the California State Parks forms ("DPR" forms). Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- For all identified resources DWR and/or the appropriate federal agencies will evaluate the resources to determine if they are any of the following.
    - Historical resources (State CEQA Guidelines Section 15064.5[a])
    - Unique archaeological resources under CEQA (California PRC Section 21083.2[g])
    - Historic properties (36 CFR 60.4)
    - Eligible for local registers
- The recorded resources and the resource evaluations will be summarized in an inventory report. In the inventory report DWR and/or the appropriate federal agencies will also determine if individual resources qualifying as unique archaeological sites, historical resources, or historic properties will require mitigation to the extent feasible, as described below. The BDCP proponents will make such a determination if the BDCP would involve any of the following consequences.
    - Demolish or materially alter the qualities that make the resource eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).
    - Demolish or materially alter the qualities that justify the inclusion of the resource on a local register or its identification in an historical resources survey meeting the

requirements of California PRC Section 5024.1(g), unless the BDCP proponents establishes by a preponderance of evidence that the resource is not historically or culturally significant (State CEQA Guidelines Section 15064.5[b][2][B]).

- Alter, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 CFR 800.5[a][1]).
- Demolish or materially impair the qualities that allow a resource to qualify as a unique archaeological site (California PRC Section 21083.2).

- For all resources qualifying as unique archaeological resources, historical resources, or historic properties that would be subject to significant effects, the BDCP proponents will develop and implement treatment. Such treatment will consist of the following, in order of priority.
  - It should be noted that this order of priority applies to mitigation on historical resources performed to satisfy CEQA. Relevant federal agencies with management responsibilities for cultural resources shall implement mitigation for adverse effects to satisfy Section 106 of the NHPA, which does not specify this order of priority.
  - Preservation in place where feasible in light of costs, logistics, technological, and environmental considerations, and the extent to which avoidance is consistent with the objectives of the project, through methods such as redesign of relevant facilities to avoid destruction or damage to eligible cultural resources, capping resources with fill, or deeding resources into conservation easements.
  - Review and study of existing collections previously retrieved from affected resources, where feasible, in lieu of data recovery excavations.
  - Data recovery excavations that retrieve the information that makes the resource eligible for CRHR or NRHP listing, or that qualifies the site as a unique archaeological resource. If data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, will be prepared and adopted prior to any excavation being undertaken. Such studies will be deposited with the relevant information center of the CHRIS. Excavation as mitigation will be restricted to those parts of the resource that would be damaged or destroyed by the BDCP. If, in the course of data recovery excavations, it is determined that contrary to available evidence, the resource lacks integrity, data recovery excavations will cease. The data recovery plan will specify the basis for the significance of the resource and methods for retrieving the consequential information from the site. After completion of excavation the BDCP proponents will retain a qualified archaeological consultant to synthesize the findings into a data recovery report describing the findings and will deposit the report at the relevant information center of the CHRIS.

- The treatment plan will identify treatment methods that are proposed by the Lead Agencies and other public entities. The plan will also specify the basis for selecting a particular mitigation measure.
- For archaeological sites that qualify as historical resources, the BDCP proponents will consider preservation in place (including by avoidance) as the preferred treatment where

feasible in light of costs, logistics, technological, and environmental considerations and the extent to which avoidance is consistent with the objectives of the project.

- If preservation in place of archaeological sites that qualify as historical resources or unique archaeological resources is not feasible in light of costs, logistics, technological considerations, the location of the find, and the extent to which preservation of the find is consistent or inconsistent with the design and objectives of the BDCP, the BDCP proponents will include a discussion in the treatment plan describing why the selected mitigation serves the interests protected by CEQA better than preservation in place.
- **Construction phase monitoring**: During construction on or near resources sensitive for human remains, the BDCP proponents will retain a qualified archaeologist to observe excavations over any remaining portions of the deposit that are sensitive for buried human remains. If human remains are discovered the archaeologist will direct compliance with the requirements of California Health and Safety Code Section 7050.5 and California PRC Section 5097.98 and the relevant federal agency with responsibility for Section 106 will be contacted. If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and the BDCP proponents will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]).

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment,* presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. While surveys will be completed for the footprint, once access is available, such surveys cannot guarantee that all sites will be identified prior to construction. The rapid rate of at which alluvium and sediment accumulates in the Delta region, and the geologically unstable nature of the floodplain and riverbank environments in which these resources may occur, makes it likely that numerous sites are naturally capped below surface soils. Cultural resource inventory efforts cannot always identify such resources, even with exhaustive sampling methods designed to reveal sites with little or no surface manifestation because subsurface sampling to identify every buried resource is economically and technically infeasible. These sites may also occur buried at the depth at which tunnel boring operations would be performed.

Many of these unidentified prehistoric resources are likely to qualify as historical resources, historic properties, or unique archaeological resources because prehistoric sites in the Delta region tend to

be large and contain a rich material culture. In particular, burial features tend to be associated with numerous shell ornaments, charmstones, and associated grave goods. Habitation components often contain abundant faunal and floral remains that elucidate prehistoric adaptations such as subsistence methods.

In addition to prehistoric archaeological resources, the BDCP area is sensitive for historic-era archaeological resources. Archaeological debris found in historic era archaeological sites activity is likely to be associated with significant themes such as agriculture, reclamation, and settlement of the Delta region. The size of the BDCP area and the intensity of historic activity suggest that some of these resources may qualify as historical resources, historic properties, or unique archaeological resources.

Ground-disturbing work, including the construction of surface features such as intakes, and the subterranean tunnel boring operations and shafts may disturb and damage these resources before they can be identified and avoided during monitoring efforts required under Mitigation Measure CUL-3. This damage and disturbance may materially impair these resources within the meaning of CEQA or adversely affect the resources within the meaning of Section 106 because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-3 would reduce the potential for this impact, it would not guarantee the impact would be avoided entirely. Therefore, this impact is adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may be eligible for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measure CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Prior to ground-disturbing construction, the BDCP proponents will include a cultural resources discovery plan in the contract conditions of the construction contractor, incorporating the following actions to be taken in the event of the inadvertent discovery of cultural resources.

- An archaeological monitor will be present to observe construction at geographic locations that are sensitive for unidentified cultural resources. Such locations consist of construction near identified sites (within a 100-foot radius around the known boundaries of identified

resources), and where ground-disturbing construction will occur within 500 feet of major water features.

- In the event of an archaeological resources discovery, work will cease in the immediate vicinity of the find (typically 100-feet), based on the direction of the archaeological monitor or the apparent distribution of cultural resources if no monitor is present. A qualified archaeologist will assess the significance of the find and make recommendations for further evaluation and treatment as necessary.
- Discovered resources will be mapped and described on forms provided by the California Department of Parks and Recreation (DPR). Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- Evaluation and treatment will follow the standards and order of priority described above for Mitigation Measure CUL-2. After receiving recommendations from the qualified archaeologist, DWR and/or the appropriate federal agencies shall jointly determine the feasibility of such recommendations, and particularly any recommended avoidance measures, in light of factors such as costs, logistics, technological, and environmental considerations and the extent to which avoidance is consistent with the objectives of the project.
- If human remains are discovered as part of a larger cultural deposit, the BDCP proponents and the contractors will coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98.
- If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and the BDCP proponents will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]), as defined below under Mitigation Measure CUL-4.
- DWR and/or the appropriate federal agencies shall provide pre-construction training of all construction personnel engaged in construction that has the potential to affect archaeological resources. This training will provide instruction on how to identify resources in the field and appropriate measures to be taken if a discovery or potential discovery occurs.

DWR will include a list of DWR cultural-resources staff that can respond to cultural resource discoveries and provide management direction following discoveries in the construction training materials, and will also provide this list as well as these discovery requirements to the supervisory field staff for the construction workers.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. Historic and prehistoric human remains have been discovered as isolated interments rather than as part of larger sites. Because these isolated resources are not associated with larger deposits, their distribution and depth cannot be estimated. Construction of this alternative would require ground-disturbing work that may damage previously unidentified human remains, resulting in direct effects on these resources. While inventory and monitoring efforts are prescribed under Mitigation Measures CUL-2, CUL-3, and CUL-4, the large acreages subject to disturbance under this alternative make exhaustive sampling to identify all buried and isolated human remains technically and economically infeasible. For these reasons the potential remains that such resources may be damaged or exposed before they can be discovered through inventory or monitoring. This effect would be adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The Alternative 1A area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

- If human remains are discovered as part of a larger cultural deposit, the BDCP proponents and the construction contractors will coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98. The provisions of these state laws apply unless discoveries occur on land owned or controlled by the federal government. For discoveries on federal land the bulleted procedures for NAGPRA, provided below shall be followed. Compliance with state law for discoveries occurring on private or state lands requires the following steps.
    - Notification of the county coroner so the coroner may determine if an investigation regarding the cause of death is required. It the coroner determines that the remains are of prehistoric Native American origin, the coroner will notify the NAHC.
    - Upon notification the NAHC will identify the MLD, and the MLD will be given the opportunity to reinter the remains with appropriate dignity. If the NAHC fails to identify the MLD or if the parties cannot reach agreement as to how to reinter the remains as described in California PRC Section 5097.98(e), the landowner will reinter the remains at a location not subject to further disturbance. The BDCP proponents will ensure the protections prescribed in California PRC Section 5097.98(e), are performed, such as the

use of conservation easements and recording of the location with the relevant county as well as information center of the CHRIS.

- If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and the BDCP proponents will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]):
  - Where the lineal descendants can be found, the lineal descendants own the remains.
  - Where the lineal descendants cannot be found, the remains belong to the Indian tribe on whose land the remains were found.
  - If the remains are discovered on other lands owned or controlled by the federal government and the lineal descendants cannot be determined, the remains belong to the Indian tribe that is culturally affiliated with the remains, or the tribe that aboriginally occupied the land where the remains were discovered.
  - "Indian Tribe" here means federally recognized tribes identified in the list of such tribes published by the Bureau of Indian Affairs in the *Federal Register* as well as in the tribal directory compiled by the BIA.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-2, a total of 24 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-2. These resources are spatially distributed across the alignment, but are clustered to some extent, either where large project features such as intakes and the intermediate forebay occur, or where the alignment approaches small towns and other concentrations of resources such as the town of Walnut Grove. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.3, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Direct effects would result from demolition of resources to construct features such as intakes or other improvements. Indirect effects would result where resources would remain, but the nearby setting would be altered by new inconsistent structures such as intakes or transmission lines. Modification of resources may result in direct effects. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-2. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Historic-era built-environment resources have been identified in the footprint of this alternative (24 individual resources, as described in Appendix 18B, Table 18B-2). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

All mitigation will be undertaken by individuals who meet the Secretary of the Interior's professional qualifications and have demonstrable experience conducting the following recommended measures. In preparation of the built environment treatment plan measures relevant parties will be consulted. Such parties may include but are not limited to the State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), local historical societies, and other interested parties such as local preservation and community organizations. The BDCP proponents will perform the following measures as part of mitigation and monitoring for compliance with CEQA. Appropriate federal agencies shall perform these measures as part of their management responsibilities performed to satisfy Section 106 of the NHPA. Property specific mitigation is identified in Tables 18B-17 through 18B-31 and shall be implemented. Typical mitigation for affected and eligible properties consists of the following:

A built environment treatment plan (BETP) will be prepared by an architectural historian with demonstrated experience preparing treatment for similar kinds of resources, and reviewed by

relevant parties prior to any demolition or ground-disturbing activity for all CRHR- and NRHP-eligible built-environment resources subject to adverse effects or significant impacts. The following protective measures and monitoring protocols will be implemented for historic resources in close proximity to the project but that are not anticipated to be directly affected by demolition or construction but which may be subject to direct effects such as vibration or inadvertent damage activities:

- Historic Structures Reports (HSR) will be prepared for buildings and structures adjacent to the project for which detailed information is required to develop protection measures. These will be done for buildings and structures that appear to be in poor condition and, therefore, potentially sensitive to construction-related activities such as vibration. Preconstruction stabilization or temporary removal of these buildings may be necessary.
- Preconstruction condition assessments will be prepared for buildings and structures adjacent to the project that are stable, but could be unintentionally damaged during construction. Should there be any question as to whether or not the project caused damage, these condition assessments will provide confirmation of the preconstruction condition.
- Precautions to protect built resources from construction vehicles, debris and dust may include fencing or debris meshing. Temporary mothballing, and fire and intrusion protection may be needed if the buildings are unoccupied during construction.
- Protective measures will be field checked as needed during construction by a qualified architectural historian with demonstrated experience conducting monitoring of this nature. Vibration monitoring may be required for buildings determined to be susceptible to vibration damage that are in close proximity to construction activities or machinery that cause vibration.
- These measures are designed to avoid direct effects such as vibration that may result in structural damage or inadvertent direct effects such as demolition.
- Redesign of relevant facilities will be used to avoid destruction or damage where feasible, taking into account costs, logistics, technological and environmental considerations, and the extent to which avoidance is consistent with the objectives of the project.

For built resources that will be directly and adversely impacted, mitigation typically includes:

- Historic American Building Survey (HABS) records will be prepared for CRHR- and NRHP-eligible buildings and structures that will be demolished (National Park Service 2000). These reports will include written and photographic documentation of the significant and character-defining features of these properties. These reports will minimize the adverse effect by capturing and preserving a description of the significant information and characteristics associated with the resource.
    - All HABS reports are subject to review and approval by the National Park Service. Following approval, the BDCP lead agencies will produce sufficient copies for distribution to identified repositories, including the Library of Congress, the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties. Distribution will further enhance the mitigation of the adverse effect because it will ensure that the significance is retained and conveyed to a wide audience.

- As applicable, Historic American Landscape Survey (HALS) records and Historic American Engineering Record (HAER) documents will be prepared for historic water-associated resources (National Park Service 2005). The levees and other linear CRHR- and NRHP-eligible features will be recorded following HAER guidelines. Additionally the settings will be recorded following HALS guidelines. These reports will include written and photographic documentation of the significant and character-defining features of these properties. The HALS and HAER reports will minimize the adverse effect by capturing and retaining a description of the significant engineering and design information associated with the resource.
    - All HALS/HAER reports are subject to review and approval by the National Park Service. Following approval, the BDCP lead agencies will produce sufficient copies for distribution to identified repositories, including the Library of Congress, the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties. Distribution will further enhance the mitigation of the adverse effect because it will ensure that the significance is retained and conveyed to a wide audience.
- Salvage of materials will be performed to the extent feasible to enable the restoration of similar buildings, structures, or water-conveyance features outside of the area of direct impact. Salvage will further minimize adverse effects by using salvaged materials to ensure that similar resources are restored and maintained in manner that will ensure the significance of the resource is preserved.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Because DWR does not have legal access to the majority of the footprint for this alternative, inventory efforts in the entire footprint have not been completed. Nonetheless, the intensity of activity in the Delta region during the historic era and a review of available data such as aerial photographs suggest that numerous additional resources occur in the footprint that have not been identified or which cannot currently be accessed and evaluated.

Review of available data such as aerial photographs, historic topographic maps, and assessors' records also indicates that many of these inaccessible properties are 45 years of age or older and have the potential to be eligible historic resources. Approximately 71 unevaluated built-environment resources have been identified in the footprint of this alternative (ICF 2012, see tables of inaccessible properties and associated maps). Many of these resources are likely to be significant because they may be associated with the important historical themes described above in Section 18.1.6, *Historic-Era Setting.* In addition, such resources may be associated with historically significant persons, or may represent significant artistic values. Thus the resources may have significance under both CEQA (State CEQA Guidelines Section 15064.5[a][3]) and the NRHP (30 CFR 60.4). In addition, because many of the historic-era structures in the Delta region are intact, and

retain their rural agricultural setting, many of these resources are likely to have integrity within the meaning of CEQA and the NRHP (14 CCR Section 4852[c], 30 CFR 60.4). Because many unidentified resources are likely to have significance and integrity, they may qualify as historical resources under CEQA and historic properties under Section 106 of the NHPA.

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. The scale of the BDCP and other design constraints, such as the presence of other important environmental resources, makes avoidance of all direct and indirect effects unlikely. Therefore, this effect would be adverse.

TCPs may also occur within the footprint of this alternative. These resources consist of built environment features or activity areas that are important in the cultural life of a living community. Examples of such resources include local gathering halls and Native American traditional activity areas. Where these resources have both integrity of condition and integrity of relationship, and meet the criteria for listing in the NRHP, they can qualify as historic properties (National Park Service 1998:11–12). Resources that are NRHP-eligible would also be historical resources under CEQA (California PRC Section 5024.1[d][1]). Construction has the potential to directly or indirectly damage such resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects: This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

***CEQA Conclusion*:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Because DWR does not have legal access to the majority of the footprint for this alternative, a built resources inventory has not been completed for the entire footprint for this alternative. Prior to construction, the BDCP proponents will ensure that an inventory and evaluation report is completed within all areas where effects on built resources may occur. This subsequent survey will be conducted in a manner consistent with the May–June 2012 survey.

- The scope of the inventory will include the entire area where effects may occur that were inaccessible or partially inaccessible in the first survey efforts. Such effects consist of direct disturbance, damage through vibration, or changes to the setting.
- The work will be led or supervised by architectural historians that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 61.
- Inventory methods and evaluation will include pedestrian surveys, photographic documentation, historical research using both primary and secondary sources, and interviews and oral histories.
- Newly identified resources will be mapped and described on forms provided by the DPR. Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- For all identified resources, the BDCP proponents will evaluate the resources to determine if they are any of the following.
    - Historical resources (State CEQA Guidelines Section 15064.5[a])
    - Significant historic resources under CEQA (California PRC Section 21084.1)
    - Historic properties (36 CFR 60.4)
    - Eligible for local registers
- The recorded resources and the resource evaluations will be summarized in an inventory report. In the inventory report, the BDCP proponents will also determine if individual resources qualifying as historical resources or historic properties will be subject to significant effects. DWR will make such a finding if the BDCP would result in the following.
    - Demolish or materially alter the qualities that make the resource eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).
    - Demolish or materially alter the qualities that justify the inclusion of the resource on a local register or its identification in an historical resources survey meeting the requirements of California PRC Section 5024.1(g), unless DWR establishes by a preponderance of evidence that the resource is not historically or culturally significant (State CEQA Guidelines Section 15064.5[b][2][B]).
    - Alter, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 CFR 800.5[a][1]).
    - Cause a substantial adverse change in the significance of an historical resource (California PRC Section 21084.1).

Where built-environment resources that are listed or qualify for listing in the CRHR or NRHP, or that have been designated as locally significant, or are otherwise identified by the BDCP proponents as historical resources will be subject to significant effects, the BDCP proponents will prepare a BETP. The treatment plan will provide detailed descriptions of treatment measures that will be implemented to avoid, protect, minimize, and mitigate adverse effects on historic properties in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68) and the National Park Service's Guidelines for the Treatment of Cultural Landscapes. The treatment plan will describe work to be done prior to, during, and after construction.

- Where feasible in light of costs, logistics, technological and environmental considerations, and the extent to which avoidance is consistent with the objectives of the project, The BDCP proponents will first seek to avoid demolition or materially altering the historical resource by avoidance measures, such as the following.
    - Construction condition assessments or HSRs of properties adjacent to construction to determine if these properties are at risk of being damaged.
    - Redesign of relevant facilities to avoid destruction or damage.
    - Determination of tolerable levels of construction vibration.
    - Stabilization design and implementation to ensure fragile built resources are not damaged by construction activities.
    - Temporarily moving built resources, or other measures determined appropriate.
- If avoidance is not feasible, the BDCP proponents will implement treatment measures such as, but not limited to the following examples of treatments used to minimize effects on built-environment resources.
    - Redesign of relevant facilities to minimize the scale or extent of damage to eligible or listed built resources.
    - Design standards to minimize the visual impact and to ensure context-appropriate design.
    - Complete documentation in accordance with HABS/HAER/HALS programs, including written and photographic documentation of the significant qualities of the CRHR and NRHP listed and determined eligible districts or individually eligible resources (where resources cannot be avoided).
    - Relocation of historic buildings that would otherwise be demolished.
    - Following the Secretary of the Interior's standards to restore built resources outside of the area of direct effect that are of the same type as resources that will be demolished by the BDCP.
    - Other appropriate treatment methods that are identified in relation to particular resources that are affected.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings

(actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. The following conservation measures would not result in impacts on cultural resources because they consist of changes to existing activities, or planning and regulatory actions that do not have the potential to result in ground-disturbing work with effects on cultural resources.

- *CM11: Natural Communities Enhancement and Management*
- *CM12: Methylmercury Management*
- *CM13: Invasive Aquatic Vegetation Control*
- *CM14: Stockton Deep Water Ship Channel Dissolved Oxygen Levels*
- *CM15: Predator Control*
- *CM16: Nonphysical Fish Barriers*
- *CM17: Illegal Harvest Reduction*
- *CM19: Urban Stormwater Treatment*
- *CM20: Recreational Users Invasive Species Program*
- *CM21: Nonproject Diversions*
- *CM22: Avoidance and Minimization Measures*

Implementation of the remaining conservation measures could result in effects on prehistoric and historic archaeological resources, as well as TCPs and the built environment because the scope of conservation actions includes large areas of land, and the areas identified for potential restoration or other conservation actions are sensitive for cultural resources, including prehistoric and historic archaeological sites as well as human remains, architectural resources, and rural historic landscapes. Specific conservation actions that could result in foreseeable ground-disturbing work that could alter or impair the significance of NRHP-, CRHR-, or local registry-eligible cultural resources are listed below.

- *CM2: Yolo Bypass Fisheries Enhancement*
- *CM3: Natural Communities Protection and Restoration*
- *CM4: Tidal Natural Communities Restoration*
- *CM5: Seasonally Inundated Floodplain Restoration*
- *CM6: Channel Margin Enhancement*
- *CM7: Riparian Natural Community Restoration*
- *CM8: Grassland Natural Community Restoration*
- *CM9: Vernal Pool Complex Restoration*
- *CM10: Nontidal Marsh Restoration*

- *CM18: Conservation Hatcheries*

These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse. These effects would be material alterations and adverse changes because demolition or alteration of the setting would diminish or destroy the ability of these resources to convey their significance. Mitigation Measure CUL-7 below addresses this effect.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource, and;
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance, and;
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other

environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

As part of the site-specific environmental review for all conservation measures other than *CM1 Water Facilities and Operation* that could involve adverse effects on cultural resources within the meaning of NEPA, or significant impacts on cultural resources within the meaning of CEQA, DWR and/or the federal lead agencies will conduct cultural resource studies and develop mitigation measures. The cultural resource studies will include the following steps.

- Record searches at the relevant information centers of the CHRIS to retrieve records of identified resources. Inventories will consist of surveys using both historical and map research as well as field-inspection. Evaluation will consist of assessment of identified resources to determine if they have both significance and integrity sufficient to qualify for the CRHR, and NRHP, as well as any relevant local registers.
- Cultural resource inventories and evaluations that identify archaeological resources and built-environment resources.
- Correspondence or discussion with the Native American contacts on file with the NAHC and relevant tribes from the list of relevant federally recognized tribes that qualify as *Indian tribes*, as used in 36 CFR 800.16(m), maintained by the Bureau of Indian Affairs (BIA), in order to identify resources that may be known to the Native American community, and to incorporate their preferences for treatment and management.
- Resource-specific evaluations that apply the criteria to determine if the identified resources qualify as historical resources (State CEQA Guidelines Section 15064.5[a]) or unique archaeological resources under CEQA (California PRC Section 21083.2[g]), historic properties (36 CFR 60.4), or are eligible for local registers.
- Resource-specific treatment for historical resources, unique archaeological resources, and historic properties that would be materially impaired as defined in CEQA (State CEQA Guidelines Section 15064.5[b][1]) or adversely affected, as defined in the Section 106 regulations (36 CFR 800.5[a][1]).

Treatment and mitigation will include the following elements and steps.

- Treatment for archaeological resources qualifying as historical resources that are subject to significant effects will follow the order of preference described in State CEQA Guidelines Section 15126.4[b][3].
- Treatment for unique archaeological resources subject to significant effects will conform to the mitigation prescribed under CEQA (California PRC Section 21083.2[b])
- Treatment for historic properties subject to adverse effects will seek to avoid or minimize the consequences of the BDCP that would diminish the characteristics that make the historic property eligible for inclusion in the NRHP.
- Treatment plans or mitigation measures in environmental documents will include monitoring and discovery plans that provide for observation of construction to avoid

inadvertent effects on previously unidentified human remains and cultural resources, to the extent feasible.

- Treatment plans or mitigation measures in environmental documents will also include the notification and consultation provisions required for discoveries of human remains provided in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98.
- If Native American human remains are discovered on federal land, work in the immediate vicinity will cease and the BDCP proponents will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]).
- For federal agency undertakings, management will be coordinated through a PA and memoranda of agreement, as described above in 18.2.1.3, *Section 106 Compliance for the BDCP.*

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies related to protecting cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in *Section 18.2.3, Regional and Local Plans, Policies, and Regulations*. This overview of plan and policy compatibility evaluates whether Alternative 1A is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. The physical and indirect effects of the alternatives on cultural resources are address in Impacts CUL-1 through CUL-7, as described for each alternative. The following comparison analyzes the compatibility of the BDCP with the cultural resource preservation plans and policies of the cities and counties in the region that have adopted such policies. In general, these policies fall into two categories; policies that emphasize preservation *or* mitigation for effects on significant cultural resources, and policies that specifically emphasize or favor preservation as the preferred management method. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies for the reasons described below. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely.

- The Alameda County East Area Plan requires that Alameda County design development to avoid cultural resources that contribute to the heritage of the County, or in the alternative to include mitigation to offset impacts to those resources (Alameda County 2000:36). Because the BDCP includes mitigation measures requiring identification of cultural resources, evaluation for the

CRHR and NRHP, and mitigation to reduce unavoidable effects, the BDCP would be compatible with this policy.

- The Contra Costa County General Plan encourages identification and preservation of important cultural resources, preferably in public ownership. While other general plans and policies typically encourage preservation or mitigation, the Contra Costa County General Plan emphasizes preservation (Contra Costa County 2005: 9-11). While the BDCP will require identification, evaluation, and mitigation to the extent feasible, the preservation of all affected cultural resources is infeasible because conflicting constraints such as the location of other significant environmental resources make such avoidance unlikely in every instance. For this reason, the BDCP is not compatible with the Contra Costa County General Plan.

- San Joaquin County has adopted cultural resource protection policies as part of their general plan (San Joaquin County 1992:VI-37). These policies require identification of cultural resources prior to construction where feasible, and assessment of resources identified during construction so that appropriate mitigation may be implemented. The BDCP would be compatible with these policies because cultural resource inventories are in progress for the BDCP, and this section identifies mitigation measures and consultation that will be conducted to manage effects on cultural resources.

- The Sacramento County General Plan includes policies encouraging preservation of important buildings, bridges, and other important structures (Sacramento County 2011:80). The General Plan requires that projects involving structures or districts of architectural importance are referred to the Cultural Resources Committee of the County to recommend appropriate mitigation. The BDCP would be potentially incompatible with these policies because the scale of the project and the constraints associated with mitigation and avoidance for other resources makes protection and avoidance of all significant architectural resources unlikely.

- The Solano County General Plan encourages identification and preservation of important archaeological and built-environment resources (Solano County 2008:RS-43). The BDCP would be potentially incompatible with these policies because the scale of the project and the constraints associated with mitigation and avoidance for other resources makes protection and avoidance of all significant architectural resources unlikely.

- The Yolo County General Plan requires identification of important cultural resources, consultation with Native Americans that attach significance to these resources, and avoidance or mitigation for important cultural resources affected by development (County of Yolo 2009a:CO-55 to CO-56). The General Plan also requires that permitted land uses in the Primary Zone of the Delta are consistent with the policies of the Land Use and Resource Management Plan of the Delta Protection Commission, but these policies do not have specific provisions for cultural resources. The BDCP would be compatible with these policies because cultural resource inventories are in progress for the BDCP, and this section identifies mitigation measures and consultation that will be conducted to manage effects on cultural resources.

- The Yolo County General Plan also encourages the preservation and protection of cultural resources where feasible and consultation with Native American tribes (County of Yolo 2009a:CO-55). The plan specifically encourages identification efforts, avoidance and mitigation to the maximum extent feasible, and consultation with tribes that attach significance to those resources. Because the BDCP includes mitigation measures requiring identification of cultural resources, evaluation for the CRHR and NRHP, consultation with Native American individuals

and organizations, and mitigation to reduce unavoidable effects, the BDCP would be compatible with this policy.

It should be noted that incompatibility with land use policies, is not, by itself, a physical effect on the environment. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations.

NEPA Effects: Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws.

***CEQA Conclusion*:** The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations.

18.3.5.3 Alternative 1B—Dual Conveyance with East Alignment and Intakes 1–5 (15,000 cfs; Operational Scenario A)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified 17 previously recorded archaeological sites in the footprint of this alternative as described in Appendix 18B, Table 18B-1. Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. These sites are distributed more heavily towards the northern and southern end of the alignment.

Significance of Identified Archaeological Resources

Many of the directly affected sites are midden sites, with debris and artifacts associated with prehistoric habitation and residence activities. Midden sites in the Plan Area are often colloquially referred to as “mound sites” because they often form low mounds elevated relative to the surrounding landform. While the original raised deposit has sometimes been destroyed, midden sites often have substantial deposits below the original raised landform that remain intact that typically contain the material remains associated with prehistoric habitation. This organic debris can be used for radiocarbon dating, as well as material that reveals the nature of subsistence activities pursued by prehistoric populations. Because there is no single unified prehistoric chronology for the Delta region, substantial research questions remain unresolved regarding nature and changes of subsistence and settlement activity over the span of the prehistoric occupation of the Delta. The Delta is the prehistoric point of articulation between Central Valley cultures and the aboriginal people that occupied the San Francisco Bay area. Because the cultural chronology and sources of cultural change for the Delta remain unresolved in part, sites in the footprint of this

alternative likely contain information that could help clarify these research issues. For this reason these resources are likely significant under the fourth criterion for the CRHR and NRHP.

Six of the identified sites contain human burials, as described on the site records. Most if not all of the remaining sites are likely to contain additional burials because midden sites in the Plan Area typically contain human burials or cremations. Burial components within these sites often contain ornaments and other personal items such as charmstones, beads, and other decorative material. Because the style and form of these artifacts change throughout prehistory, and because these stylistic changes have been defined, these materials provide a method of associating archaeological material with specific prehistoric time periods. The ability to associate habitation remains with specific time periods is one of the most significant problems in prehistoric research, because the sequence of specific adaptations and behaviors only becomes clear when a chronology can be constructed that associates behavior and material culture with specific time frames. For this reason these resources are likely significant under the fourth criterion for the CRHR and NRHP.

Because many of these resources are large (typically in excess of 30 meters across), they are each likely to contain some portion of the deposit with sufficient integrity to yield artifacts in their original associations in a manner that will convey these significance themes. Therefore these identified resources are likely to qualify as historical resources under CEQA. For the same reasons, these resources are likely to qualify as historic properties under the NRHP.

Anticipated Effects on Identified Resources

The exact location of these resources cannot be disclosed because such disclosure might lead to inadvertent damage. However these resources occur within the footprint of both temporary work areas and permanent surface impacts. These sites are distributed more heavily towards the northern and southern end of the alignment. Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect identified 17 archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions

in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is generally similar to Impact CUL-2 described under Alternative 1A. This alternative is sensitive for previously unidentified archaeological resources that are likely to be significant and to have integrity for the same reasons as described under Alternative 1A. It should be noted however, that the eastern canal would cross more sensitive soil formations and result in continuous ground-disturbance than Alternative 1A, which consists of a tunnel, and Alternative 1C which makes use of a tunnel for a portion of the conveyance alignment. This results in a slightly greater potential to affect prehistoric archaeological resources compared to Alternative 1A and 1C. Figure 1 in Appendix 18A depicts the eastern canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The locations of ground-disturbing features such as the canal, access roads, pumping plants, borrow areas and concrete batch plants are depicted in Figure M3-2 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. These effects would be adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify

as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment*, presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. This sensitivity and the potential impact mechanisms are substantially similar to the sensitivity and impact mechanism described for Alternative 1A. It should be noted however, that the eastern canal would cross more sensitive soil formations and result in continuous ground-disturbance than Alternative 1A, which consists of a tunnel, and Alternative 1C which makes use of a tunnel for a portion of the conveyance alignment. This results in a slightly greater potential to affect prehistoric archaeological resources compared to Alternative 1A and 1C. Figure 1 in Appendix 18A depicts the eastern canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. These effects would be adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant

effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. However, because the eastern canal crosses more sensitive soil formations and may result in greater continuous ground disturbance than the tunnel option or the western canal, the potential for impacts on buried human remains may be slightly higher than described for these other options.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The Alternative 1B area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys

for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-3, a total of 24 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. These resources are spatially distributed across the alignment. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

Discussion of Anticipated Effects on Identified and Accessible Resources

Direct effects would result from demolition of resources to construct features such as intakes, the canal, and reusable tunnel material (RTM) areas. Indirect effects would result where resources would remain, but the nearby setting would be altered by these same features. Modification of resources may result in direct effects. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-3. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (24 individual resources, as described in Appendix 18B, Table 18B-3). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Because DWR does not have legal access to the majority of the footprint for this alternative, inventory efforts in the entire footprint have not been completed. Nonetheless, the intensity of activity in the Delta region during the historic era and a review of available data such as aerial photographs suggest that numerous additional resources occur in the footprint that have not been identified or which cannot currently be accessed and evaluated.

Review of available data such as aerial photographs, historic topographic maps, and assessors' records indicate that many of these inaccessible properties are 45 years of age or older and have the potential to be eligible historic resources.

Approximately 67 unevaluated built-environment resources have been identified in the footprint of this alternative (ICF 2012, see tables of inaccessible properties and associated maps). Many of these resources are likely to be significant because they may be associated with the important historical themes described above in Section 18.1.6, *Historic-Era Setting.* In addition, such resources may be associated with historically significant persons, or may represent significant artistic values. Thus the resources may have significance under both CEQA (State CEQA Guidelines Section 15064.5[a][3]) and the NRHP (30 CFR 60.4). In addition, because many of the historic-era structures in the Delta region are intact, and retain their rural agricultural setting, many of these resources are likely to have integrity within the meaning of CEQA and the NRHP (14 CCR Section 4852[c], 30 CFR 60.4). Because many unidentified resources are likely to have significance and integrity, they may qualify as historical resources under CEQA and historic properties under Section 106 of the NHPA.

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. The scale of the BDCP and other design constraints, such as the presence of other important environmental resources, makes avoidance of all direct and indirect effects unlikely. Therefore, this effect would be adverse.

TCPs may also occur within the footprint of this alternative. These resources consist of built environment features or activity areas that are important in the cultural life of a living community. Examples of such resources include local gathering halls and Native American traditional activity areas. Where these resources have both integrity of condition and integrity of relationship, and meet the criteria for listing in the NRHP, they can qualify as historic properties (National Park Service 1998:11–12). Resources that are NRHP-eligible would also be historical resources under CEQA (California PRC Section 5024.1[d][1]).

Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects: This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

***CEQA Conclusion*:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local

registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse. Mitigation Measure CUL-7 below addresses this effect.

***NEPA Effects*:** Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons:

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource, and;
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance, and;
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local

Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 1B is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 1B would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects: Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.4 Alternative 1C—Dual Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario A)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified 12 previously recorded archaeological sites in the footprint of this alternative as described in Appendix 18B, Table 18B-1 (only 11 are potentially register eligible). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*.

These sites are distributed more heavily towards the northern and southern end of the alignment where ground-disturbing effects of the western canal are concentrated.

Significance of Identified Archaeological Resources

Many of the directly affected sites are midden sites, with debris and artifacts associated with prehistoric habitation and residence activities. Midden sites in the Plan Area are often colloquially referred to as “mound sites” because they often form low mounds elevated relative to the

surrounding landform. While the original raised deposit has sometimes been destroyed, midden sites often have substantial deposits below the original raised landform that remain intact that typically contain the material remains associated with prehistoric habitation. This organic debris can be used for radiocarbon dating, as well as material that reveals the nature of subsistence activities pursued by prehistoric populations. Because there is no single unified prehistoric chronology for the Delta region, substantial research questions remain unresolved regarding nature and changes of subsistence and settlement activity over the span of the prehistoric occupation of the Delta. The Delta is the prehistoric point of articulation between Central Valley cultures and the aboriginal people that occupied the San Francisco Bay area. Because the cultural chronology and sources of cultural change for the Delta remain unresolved in part, sites in the footprint of this alternative likely contain information that could help clarify these research issues. For this reason these resources are likely significant under the fourth criterion for the CRHR and NRHP.

Seven of the identified sites in the footprint of the western canal contain human burials, as described on the site records. Most if not all of the remaining sites are likely to contain additional burials because midden sites in the Plan Area typically contain human burials or cremations. Burial components within these sites often contain ornaments and other personal items such as charmstones, beads, and other decorative material. Because the style and form of these artifacts change throughout prehistory, and because these stylistic changes have been defined, these materials provide a method of associating archaeological material with specific prehistoric time periods. The ability to associate habitation remains with specific time periods is one of the most significant problems in prehistoric research, because the sequence of specific adaptations and behaviors only becomes clear when a chronology can be constructed that associates behavior and material culture with specific time frames. For this reason these resources are likely significant under the fourth criterion for the CRHR and NRHP.

Because many of these prehistoric resources are large (typically in excess of 30 meters across), they are each likely to contain some portion of the deposit with sufficient integrity to yield artifacts in their original associations in a manner that will convey these significance themes. Therefore these identified resources are likely to qualify as historical resources under CEQA. For the same reasons, these resources are likely to qualify as historic properties under the NRHP.

One historic-era archaeological resource consists of the remains of pilings and rip-rap (CA-Yol-165H). A site record update for CA-Yol-165H indicates that under a memorandum dates March 23, 2006 “with the California SHPO,” the site is not considered a contributing element of the Sacramento River levee system because it lacks integrity of design, setting, materials, workmanship, and feeling (Bell 2006). For these reasons this site is not an historic property, nor is it likely to qualify as an historical resource under CEQA.

Anticipated Effects on Identified Resources

The exact location of these resources cannot be disclosed because such disclosure might lead to damage (CA Gov. Code Section 6254[r]). However these resources occur within the footprint of both temporary work areas and permanent surface impacts. These sites are distributed more heavily towards the northern and southern end of the alignment. Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the

proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect identified 12 archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is generally similar to Impact CUL-2 described under Alternative 1A. This alternative is sensitive for previously unidentified archaeological resources that are likely to be significant and to have integrity for the same reasons as described under Alternative 1A. It should be noted however, that the western canal would cross more sensitive soil formations along the northern and southern ends of the alignment compared to Alternative 1A. The middle segment of this alternative would make use of a subterranean tunnel that crosses low-sensitivity soil units. The overall sensitivity for prehistoric archaeological resources may be slightly higher than Alternative 1A because of the

relative proportion of high sensitivity geological formations, but the sensitivity for yet-unidentified resources may be slightly lower than the eastern canal (Alternative 1B). Figure 1 in Appendix 18A depicts the western canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The location of ground-disturbing features such as intakes, the canal, tunnel segment, and borrow areas are depicted in Figure M3-3 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment*, presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. This sensitivity and the potential impact mechanisms are substantially similar to the sensitivity and impact mechanism described for Alternative 1A. It should be noted however, that the western canal would cross more sensitive soil formations along the northern and southern ends of the alignment compared to Alternative 1A. The portion of the alignment that would cross archaeologically

sensitive soil units is slightly lower than the eastern canal. The middle segment of this alternative would make use of a subterranean tunnel that crosses low-sensitivity soil units. Figure 1 in Appendix 18A depicts the western canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A and 1B.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. However, because the western canal crosses more sensitive soil formations and may result in greater continuous ground disturbance than 1A, the potential for impacts on buried human remains may be slightly higher than described for Alternative 1A, but this sensitivity is not as high as the eastern canal because soil units this alignment crosses may be slightly less sensitive as depicted in Appendix 18.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-4, a total of 22 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-4. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Construction of canal, intakes, borrow areas, and other features such as temporary work areas will result in direct and indirect effects on built-environment resources. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-4. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct

demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (22 individual resources, as described in Appendix 18B, Table 18B-4). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Because DWR does not have legal access to the majority of the footprint for this alternative, inventory efforts in the entire footprint have not been completed. Nonetheless, the intensity of activity in the Delta region during the historic era and a review of available data such as aerial photographs suggest that numerous additional resources occur in the footprint that have not been identified or which cannot currently be accessed and evaluated.

Review of available data such as aerial photographs, historic topographic maps, and assessors' records indicate that many of these inaccessible properties are 45 years of age or older and have the potential to be eligible historic resources. Approximately 74 unevaluated built-environment resources have been identified in the footprint of this alternative (ICF 2012, see tables of inaccessible properties and associated maps). Many of these resources are likely to be significant because they may be associated with the important historical themes described above in Section 18.1.6, *Historic-Era Setting.* In addition, such resources may be associated with historically significant persons, or may represent significant artistic values. Thus the resources may have significance under both CEQA, and the NRHP. In addition, because many of the historic-era structures in the Delta region are intact, and retain their rural agricultural setting, many of these resources are likely to have integrity within the meaning of CEQA and the NRHP. Because many unidentified resources are likely to have significance and integrity, they may qualify as historical resources under CEQA and historic properties under Section 106 of the NHPA.

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. The scale of the BDCP and other design constraints, such as the presence of other important environmental resources, makes avoidance of all direct and indirect effects unlikely. Therefore, this effect would be adverse.

TCPs may also occur within the footprint of this alternative. These resources consist of built environment features or activity areas that are important in the cultural life of a living community. Examples of such resources include local gathering halls and Native American traditional activity areas. Where these resources have both integrity of condition and integrity of relationship, and meet the criteria for listing in the NRHP, they can qualify as historic properties (National Park Service 1998:11–12). Resources that are NRHP-eligible would also be historical resources under CEQA (California PRC Section 5024.1[d][1])

Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects: This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

***CEQA Conclusion*:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

***NEPA Effects*:** Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons:

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource, and;
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance, and;
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation

is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 1C is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 1C would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects: Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.5 Alternative 2A—Dual Conveyance with Pipeline/Tunnel and Five Intakes (15,000 cfs; Operational Scenario B)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified six previously recorded archaeological sites in the footprint of this alternative (Appendix 18B, Table 18B-1). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. These six previously recorded resources represent the known resources that occur in the footprint of this alternative. The resources are distributed evenly across the alignment, but are somewhat clustered where construction of large above-ground features would occur, such as the northern end of the alignment, at the intermediate forebay, and at the southern end of the alignment.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1A.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites qualify as historical resources. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect six identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially

alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is substantially similar to Impact CUL-2 described under Alternative 1A. While the intake locations would vary, the number of intakes is the same, and thus the overall potential for effects on archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

This impact is substantially similar to Impact CUL-3 described under Alternative 1A. While the intake locations would vary, the number of intakes is the same, and thus the overall potential for effects on archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. While the intake locations would vary, the number of intakes is the same, and thus the overall potential for effects on buried human remains is similar.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-5, a total of 24 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-5. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Construction of intakes, transmission lines, temporary work areas and other features will result in direct and indirect effects on identified and eligible built-environment resources. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-5. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (24 individual resources, as described in Appendix 18B, Table 18B-5). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1A. Approximately 71 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects: This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

***CEQA Conclusion*:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or

historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

***NEPA Effects*:** Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes.

The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 2A is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 2A would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects: Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.6 Alternative 2B—Dual Conveyance with East Alignment and Five Intakes (15,000 cfs; Operational Scenario B)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified 16 previously recorded prehistoric archaeological sites in the footprint of this alternative (Table 18B-1). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. These sites are distributed more heavily towards the northern and southern end of the alignment. A total of six of these sites have documented human remains, however most of the sites are likely to contain human remains because midden sites and identified artifacts are typically associated with burials.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1B.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may

diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect identified 16 archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is generally similar to Impact CUL-2 described under Alternative 1B. This alternative is sensitive for previously unidentified archaeological resources that are likely to be significant and to have integrity for the same reasons as described under Alternative 1B. It should be noted however, that the eastern canal would cross more sensitive soil formations than the tunnel option and result in continuous ground-disturbance that may have a slightly greater potential to affect prehistoric archaeological resources compared to Alternative 1A and Alternative 1C. Figure 1 in Appendix 18A depicts the eastern canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. The locations of ground-disturbing features such as the canal, access roads, pumping plants, borrow areas and concrete batch plants are depicted in

Figure M3-2 in the mapbook volume. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment*, presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. This sensitivity and the potential impact mechanisms are substantially similar to the sensitivity and impact mechanism described for Alternative 1B. It should be noted however, that the eastern canal would cross more sensitive soil formations and result in continuous ground-disturbance that may have a slightly greater potential to affect prehistoric archaeological resources compared to Alternative 1A and Alternative 1C. Figure 1 in Appendix 18A depicts the eastern canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of

some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1B. However, because the eastern canal crosses more sensitive soil formations and may result in greater continuous ground disturbance than 1A and 1C, the potential for impacts on buried human remains may be slightly higher than described for Alternative 1A.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and

treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-6, a total of 25 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-6. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Construction of the canal, intakes, RTM areas, and other temporary and permanent features would result in direct and indirect effects. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-6. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (25 individual resources, as described in Appendix 18B, Table 18B-6). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The

scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and Implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1B. Approximately 67 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects*:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

CEQA Conclusion**:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this

impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.

- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 2B is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 2B would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects*:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant

effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.7 Alternative 2C—Dual Conveyance with West Alignment and Intakes W1-W5 (15,000 cfs; Operational Scenario B)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified 12 previously recorded archaeological sites in the footprint of this alternative as described in Appendix 18B, Table 18B-1 (only 11 are potentially register eligible). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*.

These sites are distributed more heavily towards the northern and southern end of the alignment where ground-disturbing effects of the western canal are concentrated.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1C. CA-Yol-165H does not have sufficient integrity to convey significance and therefore does not qualify as an historical resource or historic property. Seven of these sites have documented human remains; additional human remains are likely to be contained in the other sites based on the nature of the associated deposits (midden, ornaments typically used as grave goods).

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect 12 identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is generally similar to Impact CUL-2 described under Alternative 1C. This alternative is sensitive for previously unidentified archaeological resources that are likely to be significant and to have integrity for the same reasons as described under Alternative 1C. It should be noted however, that the western canal would cross more sensitive soil formations along the northern and southern ends of the alignment compared to Alternative 1A. The middle segment of this alternative would make use of a subterranean tunnel that crosses low-sensitivity soil units. The overall sensitivity for prehistoric archaeological resources may be slightly higher than Alternative 1A because of the relative proportion of high sensitivity geological formations. The overall sensitivity for the western canal may be less than for eastern canal alternatives because the concentration of sensitivity geological formations is higher for the eastern canal. Figure 1 in Appendix 18A depicts the western canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The location of ground-disturbing features such as intakes, the canal, tunnel segment, and borrow areas are depicted in Figure M3-3 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA

because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment*, presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. This sensitivity and the potential impact mechanisms are substantially similar to the sensitivity and impact mechanism described for Alternative 1C. It should be noted however, that the western canal would cross more sensitive soil formations along the northern and southern ends of the alignment compared to Alternative 1A. The middle segment of this alternative would make use of a subterranean tunnel that crosses low-sensitivity soil units. The overall sensitivity for prehistoric archaeological resources may be slightly higher than Alternative 1A because of the relative proportion of high sensitivity geological formations. The overall sensitivity may be lower relative to the eastern canal options. Figure 1 in Appendix 18A depicts the western canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources

within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. However, because the western canal crosses more sensitive soil formations and may result in greater continuous ground disturbance than 1A, the potential for impacts on buried human remains may be slightly higher than described for Alternative 1A. Because the western canal crosses slightly lower sensitivity soil formations it may be slightly less sensitive for buried human remains relative to eastern canal options. Figure 1 in Appendix 18 depicts geological map units relative to the alignments.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-7, a total of 22 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-7. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Construction of the canal, intakes, and borrow and spoil areas will result in direct and indirect effects. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-7. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (22 individual resources, as described in Appendix 18B, Table 18B-7). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-

environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1C. Approximately 74 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects: This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

***CEQA Conclusion*:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character,

resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 2C is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 2C would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

***NEPA Effects**:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.8 Alternative 3—Dual Conveyance with Pipeline/Tunnel and Intakes 1 and 2 (6,000 cfs; Operational Scenario A)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified six previously recorded prehistoric archaeological sites in the footprint of this alternative (Appendix 18B, Table 18B-1). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. These six previously recorded resources represent the known resources that occur in the footprint of this alternative. The resources are distributed evenly across the alignment, but are somewhat clustered where construction of large above-ground features would occur, such as the northern end of the alignment, at the intermediate forebay, and at the southern end of the alignment. Two of these sites have documented human remains; however additional sites are likely to contain human remains because burials are typically associated with midden sites.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1A.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction may disrupt these associations and thus disrupt the qualities for which the sites qualify as historical resources. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of

noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is substantially similar to Impact CUL-2 described under Alternative 1A. While the number of intakes would be reduced, slightly reducing the footprint the overall potential for effects on archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. The locations of various features such as intakes, forebays, and tunnels shaft locations are depicted in Figure M3-1 in the mapbook volume. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

This impact is substantially similar to Impact CUL-3 described under Alternative 1A. While the number of intakes would be reduced, slightly reducing the footprint the overall potential for effects on archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may

disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. While the number of intakes would be reduced, slightly reducing the footprint the overall potential for effects on buried human resources is similar.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys

for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-8, a total of 20 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-8. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Intakes, transmission lines, and other features would result in direct and indirect impacts. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-8. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (20 individual resources, as described in Appendix 18B, Table 18B-8). Construction of conveyance facilities may require demolition of the historic built-environment resources. These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1A. Approximately 71 unevaluated built-environment resources have been identified that may be

subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects*:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

CEQA Conclusion**:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct

improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A.

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 3 is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 3 would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.9 Alternative 4—Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified ten previously recorded archaeological sites in the footprint of this alternative(Appendix 18B, Table 18B-1). Site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. These ten previously recorded resources represent the known resources that occur in the footprint of this alternative. The majority of these sites either have burials or cultural constituents or characteristics strongly associated with burials (such as a “mound” deposit or burial associated items such as *Olivella biplicata* beads).

Significance of Identified Archaeological Resources

Many of the directly affected sites are midden sites, with debris and artifacts associated with prehistoric habitation and residence activities. Midden sites in the Plan Area are often colloquially referred to as "mound sites" because they often form low mounds elevated relative to the surrounding landform. While the original raised deposit has sometimes been destroyed, midden sites often have substantial deposits below the original raised landform that remain intact that typically contain the material remains associated with prehistoric habitation. This organic debris can be used for radiocarbon dating, as well as material that reveals the nature of subsistence activities pursued by prehistoric populations. Because there is no single unified prehistoric chronology for the Delta region, substantial research questions remain unresolved regarding nature and changes of subsistence and settlement activity over the span of the prehistoric occupation of the Delta. The Delta is the prehistoric point of articulation between Central Valley cultures and the aboriginal people that occupied the San Francisco Bay area. Because the cultural chronology and sources of cultural change for the Delta remain unresolved in part, sites in the footprint of this alternative likely contain information that could help clarify these research issues. For this reason these resources are likely significant under the fourth criterion for the CRHR and NRHP.

Two of the identified sites contain human burials, as described on the site records. Many of the remaining sites are likely to contain additional burials because midden sites in the Plan Area typically contain human burials or cremations. Burial components within these sites often contain ornaments and other personal items such as charmstones, beads, and other decorative material. Because the style and form of these artifacts change throughout prehistory, and because these stylistic changes have been defined, these materials provide a method of associating archaeological material with specific prehistoric time periods. The ability to associate habitation remains with specific time periods is one of the most significant problems in prehistoric research, because the sequence of specific adaptations and behaviors only becomes clear when a chronology can be constructed that associates behavior and material culture with specific time frames. For this reason these resources are likely significant under the fourth criterion for the CRHR and NRHP.

Because many of these resources are large (typically in excess of 30 meters across), they are each likely to contain some portion of the deposit with sufficient integrity to yield artifacts in their original associations in a manner that will convey these significance themes. Therefore these identified resources are likely to qualify as historical resources under CEQA. For the same reasons, these resources are likely to qualify as historic properties under the NRHP.

Impact Mechanisms For Identified Resources

The exact location of these resources cannot be disclosed because such disclosure might lead to damage and disturbance. However, these resources occur within the footprint of both temporary work areas and permanent surface impacts. The resources are distributed evenly across the alignment, but are somewhat clustered where construction of large above-ground features would occur, such as the northern end of the alignment, at the intermediate forebay, and at the southern end of the alignment. Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer

particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) or vibration may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect ten identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Prior to ground-disturbing construction, DWR will implement treatment for identified and register eligible archaeological sites affected by Alternative 4 construction.

Basis for Selection of Treatment

Identified archaeological resources occur in the footprint of large features that would be constructed under this alternative. Because they occur within the footprint of these features, avoidance may not be feasible. These objectives include protection of other sensitive environmental resources where possible. Because of the density and location of other sensitive environmental resources such as natural communities and habitats, relocation of proposed facilities necessary to ensure all historical resources are preserved in places is unlikely to be feasible. Furthermore, the large, linear, nature of proposed conveyance facilities would result in overlap with cultural resources across almost any potential alignment because of the manner in which cultural resources are distributed in the study area. These same facilities will require ongoing maintenance and operational activities that would likely be inconsistent with dedicated conservation easements or other land management methods designed to preserve existing

resources in place. For these reasons, preservation of all potentially affected archaeological sites through capping with soil or incorporation into conservation easements or green space is not likely to be feasible. Accordingly, data recovery is proposed to retrieve the scientifically important material that remains in these deposits. This data recovery excavation will conform to the following standards that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 68.

- DWR will retain a qualified archaeological consultant to conduct data recovery excavations necessary to retrieve material that would otherwise be lost, (material with scientifically important data associated with the significance of the resource). Qualified archaeological consultant here means a consultant with demonstrated experience conducting effective data recovery excavations at the kinds of sites subject to treatment, including qualification under the Secretary of the Interior's Professional Qualification Standards.
- BDCP proponents will prepare, and deposit with the relevant information center of the CHRIS, a data recovery plan prior to conducting these excavations, as required under State CEQA Guidelines Section 15126.4(b)(3)(C). The plan will provide a literature review of recent regional archaeological research and a summary of regional research questions. The plan will incorporate the methods prescribed above and include a more detailed description of the sampling and excavation methods that are appropriate for the regional research questions. The plan will not disclose the location of the resources subject to treatment in a manner that would allow their location by the public and inadvertent damage.
- Data recovery excavations will remove a sample of the affected portion of the deposit to retrieve scientifically important material. Excavation will be conducted in representative levels, and material removed will be divided and screened through a combination of 1/4" and 1/8" mesh screen, so as to capture both the gross cultural constituents and the finer material that can only be captured in fine mesh. Excavation will be conducted in 10-centimeter levels so that the horizontal association of different cultural materials is recorded. Removed material will be segregated by type and bagged with labels noting their horizontal and vertical location relative to an established datum point. The datum point will be recorded in the field with GPS to at least 10-centimeter horizontal and vertical accuracy. If, in the course of data recovery excavations, it is determined that, contrary to available evidence, the resource lacks integrity, data recovery excavations will cease.
- Faunal material (animal bone) will be segregated and studied by a qualified faunal analyst to identify the species pursued, relative abundance and diversity of different species present, and the manner in which the prey were processed by the prehistoric occupants.
- Obsidian glass will be retrieved and studied through both X-ray fluorescence (a method that allows the source of the obsidian to be identified) and obsidian hydration analysis (a method that allows approximate determination of the time when the material was subject to human modification).
- Soil samples will be retrieved, with their horizontal and vertical location recorded, for flotation analysis (a method of separating light organic material such as fine plant remains from the deposit, in order to identify plant species pursued by prehistoric populations).
- Because some of the resources subject to treatment contain human remains, provisions for such remains are necessary. If human remains are discovered in these deposits during data recovery, the county coroner will be contacted as required in California Health and Safety

Code Section 7050.5. If the coroner confirms the remains are of prehistoric origin, the NAHC will be contacted and given the opportunity to identify a MLD. The MLD will be given the opportunity to reinter the remains with appropriate dignity. If the NAHC fails to identify the MLD or if the parties cannot reach agreement as to how to reinter the remains as described in California PRC Section 5097.98(e), the landowner will reinter the remains at a location not subject to further disturbance. DWR will ensure the protections prescribed in California PRC Section 5097.98(e), are performed, such as the use of conservation easements and recording of the location with whichever county in which the remains are found as well as the relevant information center of the CHRIS and the NAHC.

- After completion of data recovery excavations DWR and appropriate federal agencies will prepare a data recovery report synthesizing the results of data recovery and associated studies and analysis. The consultant or staff archaeologists will synthesize the results of these studies and summarize the results relative to regional research questions in the data recovery report. The report will be filed with the relevant information center of the CHRIS. DWR and appropriate federal agencies will also store the recovered material at an appropriate facility for curation. Relevant federal curation standards such as 36 CFR 79 will be followed where applicable.
- **Construction phase monitoring and resource protection:** During construction on or near the resource, DWR and appropriate federal agencies will retain a qualified archaeologist (a person knowledgeable in the identification of the kind of resources known to occur), to observe excavations over any remaining portions of the deposit that are sensitive for buried human remains or which may contain other significant buried archaeological material that could be inadvertently damaged. If human remains are discovered the archaeologist will direct compliance with the requirements of California Health and Safety Code Section 7050.5 and California PRC Section 5097.98 and the relevant federal agency with responsibility for Section 106 will be contacted. In addition DWR and the appropriate federal agencies will use fencing, flagging, or other appropriate means to exclude unnecessary disturbance and activity from sensitive resources during construction.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

An inventory for the majority of the footprint for this alternative has not been conducted because the footprint is not currently legally accessible (Appendix 4A, *Summary of Survey Data Collection by Department of Water Resources to Obtain Information Regarding Baseline Conditions in Areas That Could Be Affected by BDCP*). Furthermore, complete evaluation of all potentially affected resources associated with this alternative may require destructive test excavation in advance of any final decision regarding the selection of the alternative. Because several prehistoric archaeological sites qualifying as historical resources have been identified in the footprint of this alternative, the remaining portion of the footprint for this conveyance feature is sensitive for previously

unidentified archaeological resources. Record searches at the relevant information centers of the CHRIS reviewed the mapped location of previous cultural resource inventories in the footprint of this alternative and the vicinity. This map review revealed that a cultural resources inventory has never been conducted in the majority of the footprint for this alternative. The presence of three archaeological sites that qualify as historical resources and historic properties in the portion of the footprint that has been previously inspected provides a sample of the likely density and occurrence of resources in the remaining footprint. For this reason, additional prehistoric archaeological resources are likely to be found in the portion of the footprint where surveys have not been conducted, once access is available and such studies can be completed.

In addition to prehistoric archaeological resources, the BDCP area is sensitive for historic-era archaeological resources. It is likely that previously unidentified historic archaeological sites occur in the footprint of this alternative because of the intensity of human activity in the Plan Area during the historic era, as described in Section 18.1.6, *Historic-Era Setting.*

Prehistoric sites in the Plan Area tend to be large and rich in material remains, including human burials and associated ornaments and beads. Habitation debris also often contains both floral and faunal material that can be used for both radiocarbon dating and analysis regarding subsistence strategies. In addition, the large scale of typical prehistoric archaeological resources suggests portions of these deposits will remain with sufficient integrity to convey research information. Therefore, these sites are likely to qualify as historical resources or unique archaeological resources under CEQA and historic properties under Section 106 of the NHPA.

Historic sites are likely to be associated with the historic-era themes of settlement, reclamation, agriculture, and flood management in the Delta region. Because the reclamation and agricultural development of the Delta region provided part of the economic base for the development of surrounding urban centers, these historic themes are significant at both a state and national level. These resources accordingly may contain data useful in historical research. In addition, the intensity of historic activity in the Delta region suggests that many of these resources are likely be distributed across the footprint of this alternative and some are likely to retain sufficient integrity to convey this significance if they are subject to archaeological excavation and investigation. Therefore, these sites are likely to qualify as historical resources or unique archaeological resources under CEQA and historic properties under Section 106 of the NHPA.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The locations of various features such as intakes, forebays, and tunnels shaft locations are depicted in Figure M3-4 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA. These effects would be adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify

as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Prior to ground-disturbing construction, DWR will implement the following mitigation measures.

- Because DWR and federal agencies could not feasibly access the majority of the footprint for this alternative, a cultural resource inventory has not been completed for the entire footprint. Prior to ground-disturbing construction, DWR will ensure that an inventory and evaluation report for cultural resources is completed. The inventory will cover the federal APE for relevant undertakings.
- The scope of the inventory will include the entire area where effects may occur. Such effects consist of direct disturbance through excavation or indirect damage through vibration or changes to the setting, where the setting may be relevant for archaeological resources.
- The work will be led or supervised by cultural resource specialists that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 61.
- Inventory methods will include pedestrian surveys and other any other appropriate sampling methods identified by DWR and the federal lead agencies.
- Identified resources will be mapped and described on forms provided by the California State Parks forms ("DPR" forms). Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- For all identified resources DWR and appropriate federal agencies will evaluate the resources to determine if they are any of the following.
    - Historical resources (State CEQA Guidelines Section 15064.5[a])
    - Unique archaeological resources under CEQA (California PRC Section 21083.2[g])
    - Historic properties (36 CFR 60.4)
    - Eligible for local registers
- The recorded resources and the resource evaluations will be summarized in an inventory report. In the inventory report DWR and appropriate federal agencies will also determine if individual resources qualifying as unique archaeological sites, historical resources, or historic properties will require mitigation to the extent feasible, as described below. DWR will make such a determination if the BDCP would involve any of the following consequences.

- Demolish or materially alter the qualities that make the resource eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).
- Demolish or materially alter the qualities that justify the inclusion of the resource on a local register or its identification in an historical resources survey meeting the requirements of California PRC Section 5024.1(g), unless DWR establishes by a preponderance of evidence that the resource is not historically or culturally significant (State CEQA Guidelines Section 15064.5[b][2][B]).
- Alter, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 CFR 800.5[a][1]).
- Demolish or materially impair the qualities that allow a resource to qualify as a unique archaeological site (California PRC Section 21083.2).

- For all resources qualifying as unique archaeological resources, historical resources, or historic properties that would be subject to significant effects, DWR will develop and implement treatment. Such treatment will consist of the following, in order of priority.
  - It should be noted that this order of priority applies to mitigation on historical resources performed to satisfy CEQA. Relevant federal agencies with management responsibilities for cultural resources shall implement mitigation for adverse effects to satisfy Section 106 of the NHPA, which does not specify this order of priority.
  - Preservation in place where feasible, in light of costs, logistics, technological, and environmental considerations, and the extent to which avoidance is consistent with the objectives of the project, through methods such as redesign of relevant facilities to avoid destruction or damage to eligible cultural resources, capping resources with fill, or deeding resources into conservation easements.
  - Review and study of existing collections previously retrieved from affected resources, where feasible, in lieu of data recovery excavations.
  - Data recovery excavations that retrieve the information that makes the resource eligible for CRHR or NRHP listing, or that qualifies the site as a unique archaeological resource. If data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, will be prepared and adopted prior to any excavation being undertaken. Such studies will be deposited with the relevant information center of the CHRIS. Excavation as mitigation will be restricted to those parts of the resource that would be damaged or destroyed by the BDCP. If, in the course of data recovery excavations, it is determined that contrary to available evidence, the resource lacks integrity, data recovery excavations will cease. The data recovery plan will specify the basis for the significance of the resource and methods for retrieving the consequential information from the site. After completion of excavation DWR will retain a qualified archaeological consultant to synthesize the findings into a data recovery report describing the findings and will deposit the report at the relevant information center of the CHRIS.
- The treatment plan will identify treatment methods that are proposed by the Lead Agencies and other public entities. The plan will also specify the basis for selecting a particular mitigation measure.

- For archaeological sites that qualify as historical resources, the BDCP proponents will consider preservation in place as the preferred treatment where feasible, in light of costs, logistics, technological, and environmental considerations and the extent to which avoidance is consistent with the objectives of the project
- If preservation in place of archaeological sites that qualify as historical resources or unique archaeological resources is not feasible in light of costs, logistics, technological considerations, the location of the find, and the extent to which preservation of the find is consistent or inconsistent with the design and objectives of the BDCP, the BDCP proponents will include a discussion in the treatment plan describing why the selected mitigation serves the interests protected by CEQA better than preservation in place.
- **Construction phase monitoring**: During construction on or near resources sensitive for human remains, DWR will retain a qualified archaeologist to observe excavations over any remaining portions of the deposit that are sensitive for buried human remains. If human remains are discovered the archaeologist will direct compliance with the requirements of California Health and Safety Code Section 7050.5 and California PRC Section 5097.98 and the relevant federal agency with responsibility for Section 106 will be contacted. If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]).

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment*, presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. While surveys will be completed for the footprint, once access is available, such surveys cannot guarantee that all sites will be identified prior to construction. The rapid rate of at which alluvium and sediment accumulates in the Delta region, and the geologically unstable nature of the floodplain and riverbank environments in which these resources may occur makes it likely that numerous sites occur buried below surface soils. Cultural resource inventory efforts cannot always identify such resources, even with intermittent surface excavation designed to reveal sites with little or no surface manifestation because exhaustive sampling to identify every resource is economically and technically infeasible. These sites may also occur buried at the depth at which tunnel boring operations would be performed.

Many of these unidentified prehistoric resources are likely to qualify as historical resources, historic properties, or unique archaeological resources because prehistoric sites in the Delta region tend to be large and contain a rich material culture. In particular, burial features tend to be associated with numerous shell ornaments, charmstones, and associated grave goods. Habitation components often contain abundant faunal and floral remains that elucidate prehistoric adaptations such as subsistence methods.

In addition to prehistoric archaeological resources, the BDCP area is sensitive for historic-era archaeological resources. Archaeological debris found in historic era archaeological sites activity is likely to be associated with significant themes such as agriculture, reclamation, and settlement of the Delta region. The size of the Plan area and the intensity of historic activity suggest that some of these resources may qualify as historical resources, historic properties, or unique archaeological resources.

Ground-disturbing work, including the construction of surface features such as intakes, and the subterranean tunnel boring operations and shafts may disturb and damage these resources before they can be identified and avoided during monitoring efforts required under Mitigation Measure CUL-3. This damage and disturbance may materially impair these resources within the meaning of CEQA or adversely affect the resources within the meaning of Section 106 because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-3 would reduce the potential for this impact, it would not guarantee the impact would be avoided entirely. Therefore, this impact is adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Prior to ground-disturbing construction, the BDCP proponents will include a cultural resources discovery plan in the contract conditions of the construction contractor, incorporating the following actions to be taken in the event of the inadvertent discovery of cultural resources.

- An archaeological monitor will be present to observe construction at geographic locations that are sensitive for unidentified cultural resources. Such locations consist of construction near identified sites (within a 100-foot radius around the known boundaries of identified resources), and where ground-disturbing construction will occur within 500 feet of major water features.
- In the event of an archaeological resources discovery, work will cease in the immediate vicinity of the find (typically 100-feet), based on the direction of the archaeological monitor or the apparent distribution of cultural resources if no monitor is present. A qualified archaeologist will assess the significance of the find and make recommendations for further evaluation and treatment as necessary.
- Discovered resources will be mapped and described on forms provided by the DPR. Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- Evaluation and treatment will follow the standards and order of priority described above for Mitigation Measure CUL-2. After receiving recommendations from the qualified archaeologist, DWR and appropriate federal agencies shall jointly determine the feasibility of such recommendations, and particularly any recommended avoidance measures, in light of factors such as costs, logistics, technological, and environmental considerations and the extent to which avoidance is consistent with the objectives of the project.
- If human remains are discovered as part of a larger cultural deposit, DWR and the contractors will coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98.
- If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]), as defined below under Mitigation Measure CUL-4.
- DWR and appropriate federal agencies shall provide pre-construction training of all construction personnel engaged in construction that has the potential to affect archaeological resources. This training will provide instruction on how to identify resources in the field and appropriate measures to be taken if a discovery or potential discovery occurs.

DWR will include a list of DWR cultural-resources staff that can respond to cultural resource discoveries and provide management direction following discoveries in the construction training materials, and will also provide this list as well as these discovery requirements to the supervisory field staff for the construction workers.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on

historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. Historic and prehistoric human remains have been discovered as isolated interments rather than as part of larger sites. Because these isolated resources are not associated with larger deposits, their distribution and depth cannot be estimated. Construction of this alternative would require ground-disturbing work that may damage previously unidentified human remains, resulting in direct effects on these resources. While inventory and monitoring efforts are prescribed above under Mitigation Measures CUL-2 and CUL-3, the large acreages subject to disturbance under this alternative make exhaustive sampling to identify all buried and isolated human remains technically and economically infeasible. For these reasons the potential remains that such resources may be damaged or exposed before they can be discovered through inventory or monitoring. This effect would be adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist, therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

- If human remains are discovered as part a larger cultural deposit, the BDCP proponents and the construction contractors will coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98. The provisions of these state laws apply unless discoveries occur on land owned or controlled by the federal government. For discoveries on federal land the bulleted procedures for NAGPRA, provided below shall be followed. Compliance with state law for discoveries occurring on private or state lands requires the following steps.
    - Notification of the county coroner so the coroner may determine if an investigation regarding the cause of death is required. It the coroner determines that the remains are of prehistoric Native American origin, the coroner will notify the NAHC.
    - Upon notification the NAHC will identify the MLD, and the MLD will be given the opportunity to reinter the remains with appropriate dignity. If the NAHC fails to identify the MLD or if the parties cannot reach agreement as to how to reinter the remains as described in California PRC Section 5097.98(e), the landowner will reinter the remains

at a location not subject to further disturbance. DWR will ensure the protections prescribed in California PRC Section 5097.98(e), are performed, such as the use of conservation easements and recording of the location with the relevant county and information center of the CHRIS.

- If Native American human remains are discovered on federal land, work in the immediate vicinity will cease, and DWR will contact the relevant representative of the federal agency where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]):
  - Where the lineal descendants can be found, the lineal descendants own the remains.
  - Where the lineal descendants cannot be found, the remains belong to the Indian tribe on whose land the remains were found.
  - If the remains are discovered on other lands owned or controlled by the federal government and the lineal descendants cannot be determined, the remains belong to the Indian tribe that is culturally affiliated with the remains, or the tribe that aboriginally occupied the land where the remains were discovered.
  - "Indian Tribe" here means federally recognized tribes identified in the list of such tribes published by the Bureau of Indian Affairs in the *Federal Register* as well as in the tribal directory compiled by the BIA.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-9, a total of 18 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. Some of these resources have multiple contributing elements, as described in Appendix 18B. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-9. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

The construction of intakes, transmission lines, RTM spoil areas and other features would result in direct and indirect effects on identified and eligible resources. The exact effect mechanism for each

resource is described in Appendix 18B, in Table 18B-9. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (18 individual resources, as described in Appendix 18B, Table 18B-9). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

All mitigation will be undertaken by individuals who meet the Secretary of the Interior's professional qualifications and have demonstrable experience conducting the following recommended measures. In preparation of the built environment treatment measures relevant parties will be consulted. Such parties may include but are not limited to the SHPO, the ACHP, local historical societies, and other interested parties such as local preservation and community organizations. DWR will perform the following measures as part of mitigation and monitoring for compliance with CEQA. Appropriate federal agencies shall perform these measures as part of their management responsibilities performed to satisfy Section 106 of the NHPA. Property specific mitigation is identified in Tables 18B-17 through 18B-31. Typical mitigation for affected and eligible properties consists of the following:

A BETP will be prepared by an architectural historian with demonstrated experience preparing treatment for similar kinds of resources, and reviewed by relevant parties prior to any demolition or ground-disturbing activity for all built-environment resources subject to adverse effects or significant impacts. The following protective measures and monitoring protocols will be implemented for historic resources in close proximity to the project but that are not anticipated to be directly affected by demolition or construction but which may be subject to direct effects such as vibration or inadvertent damage activities:

- HSR will be prepared for buildings and structures adjacent to the project for which detailed information is required to develop protection measures. These will be done for buildings and structures that appear to be in poor condition and, therefore, potentially sensitive to construction-related activities such as vibration. Preconstruction stabilization or temporary removal of these buildings may be necessary.
- Preconstruction condition assessments will be prepared for buildings and structures adjacent to the project that are stable, but could be unintentionally damaged during construction. Should there be any question as to whether or not the project caused damage, these condition assessments will provide confirmation of the preconstruction condition.
- Precautions to protect built resources from construction vehicles, debris and dust may include fencing or debris meshing. Temporary mothballing, and fire and intrusion protection may be needed if the buildings are unoccupied during construction.
- Protective measures will be field checked as needed during construction by a qualified architectural historian with demonstrated experience conducting monitoring of this nature. Vibration monitoring may be required for buildings determined to be susceptible to vibration damage that are in close proximity to construction activities or machinery that cause vibration.
- These measures are designed to avoid direct effects such as vibration that may result in structural damage or inadvertent direct effects such as demolition.
- Redesign of relevant facilities will be used to avoid destruction or damage where feasible.

For built resources that will be directly and adversely impacted, mitigation typically includes:

- HABS records will be prepared for CRHR and NRHP-eligible historic buildings and structures that will be demolished (National Park Service 2000). These reports will include written and photographic documentation of the significant and character-defining features of these properties. These reports will minimize the adverse effect by capturing and preserving a description of the significant information and characteristics associated with the resource.
    - All HABS reports are subject to review and approval by the National Park Service. Following approval, the BDCP lead agencies will produce sufficient copies for distribution to identified repositories, including the Library of Congress, the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties. Distribution will further enhance the mitigation of the adverse effect because it will ensure that the significance is retained and conveyed to a wide audience.
- As applicable, HALS records and HAER documents will be prepared for historic water-associated resources (National Park Service 2005). The levees and other CRHR and NRHP-eligible linear historic features will be recorded following HAER guidelines. Additionally the settings will be recorded following HALS guidelines. These reports will include written and photographic documentation of the significant and character-defining features of these properties. The HALS and HAER reports will minimize the adverse effect by capturing and retaining a description of the significant engineering and design information associated with the resource.

- All HALS/HAER reports are subject to review and approval by the National Park Service. Following approval, the BDCP lead agencies will produce sufficient copies for distribution to identified repositories, including the Library of Congress, the California State Library, the University of California Water Resources Center Archives, and any local repositories, as appropriate and agreed upon with the SHPO and interested parties. Distribution will further enhance the mitigation of the adverse effect because it will ensure that the significance is retained and conveyed to a wide audience.

- Salvage of materials will be performed to the extent feasible to enable the restoration of similar buildings, structures, or water-conveyance features outside of the area of direct impact. Salvage will further minimize adverse effects by using salvaged materials to ensure that similar resources are restored and maintained in manner that will ensure the significance of the resource is preserved.

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Because DWR does not have legal access to the majority of the footprint for this alternative, inventory efforts in the entire footprint have not been completed. Nonetheless, the intensity of activity in the Delta region during the historic era and a review of available data such as aerial photographs suggest that numerous additional resources occur in the footprint that have not been identified or which cannot currently be accessed and evaluated.

Review of available data such as aerial photographs, historic topographic maps, and assessors' records also indicates that many of these inaccessible properties are 45 years of age or older and have the potential to be eligible historic resources. Approximately 37 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2013, see tables of inaccessible properties and associated maps, one inaccessible property was determined NRHP-eligible and is not counted here but included under CUL-5 for this alternative). Many of these resources are likely to be significant because they may be associated with the important historical themes described above in Section 18.1.6, *Historic-Era Setting*. In addition, such resources may be associated with historically significant persons, or may represent significant artistic values. Thus the resources may have significance under both CEQA (State CEQA Guidelines Section 15064.5[a][3]) and the NRHP (30 CFR 60.4). In addition, because many of the historic-era structures in the Delta region are intact, and retain their rural agricultural setting, many of these resources are likely to have integrity within the meaning of CEQA and the NRHP (14 CCR Section 4852[c], 30 CFR 60.4). Because many unidentified resources are likely to have significance and integrity, they may qualify as historical resources under CEQA and historic properties under Section 106 of the NHPA.

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. The scale of the BDCP and other design constraints, such as the presence of other important environmental resources, makes avoidance of all direct and indirect effects unlikely. Therefore, this effect would be adverse.

Traditional cultural properties may also occur within the footprint of this alternative. These resources consist of built environment features or activity areas that are important in the cultural life of a living community. Examples of such resources include local gathering halls and Native American traditional activity areas. Where these resources have both integrity of condition and integrity of relationship, and meet the criteria for listing in the NRHP, they can qualify as historic properties (National Park Service 1998:11–12). Resources that are NRHP-eligible would also be historical resources under CEQA (California PRC Section 5024.1[d][1]) Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects: This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

***CEQA Conclusion*:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Because DWR does not have legal access to the majority of the footprint for this alternative, a built resources inventory has not been completed for the entire footprint for this alternative.

Prior to construction, the BDCP proponents will ensure that an inventory and evaluation report is completed within all areas where effects on built resources may occur. This subsequent survey will be conducted in a manner consistent with the May–June 2012 survey.

- The scope of the inventory will include the entire area where effects may occur that were inaccessible or partially inaccessible in the first survey efforts. Such effects consist of direct disturbance, damage through vibration, or changes to the setting.
- The work will be led or supervised by architectural historians that meet the Secretary of the Department of the Interior's professional qualification standards provided in 36 CFR 61.
- Inventory methods and evaluation will include pedestrian surveys, photographic documentation, historical research using both primary and secondary sources, and interviews and oral histories.
- Newly identified resources will be mapped and described on forms provided by the DPR. Mapping will be performed by recording data points with GPS hardware that can be imported and managed digitally.
- For all identified resources, DWR will evaluate the resources to determine if they are any of the following.
    - Historical resources (State CEQA Guidelines Section 15064.5[a])
    - Significant historic resources under CEQA (California PRC Section 21084.1)
    - Historic properties (36 CFR 60.4)
    - Eligible for local registers
- The recorded resources and the resource evaluations will be summarized in an inventory report. In the inventory report, DWR will also determine if individual resources qualifying as historical resources or historic properties will be subject to significant effects. DWR will make such a finding if the BDCP would result in the following.
    - Demolish or materially alter the qualities that make the resource eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).
    - Demolish or materially alter the qualities that justify the inclusion of the resource on a local register or its identification in an historical resources survey meeting the requirements of California PRC Section 5024.1(g), unless DWR establishes by a preponderance of evidence that the resource is not historically or culturally significant (State CEQA Guidelines Section 15064.5[b][2][B]).
    - Alter, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 CFR 800.5[a][1]).
    - Cause a substantial adverse change in the significance of an historical resource (California PRC Section 21084.1).

Where built-environment resources that are listed or qualify for listing in the CRHR or NRHP, or that have been designated as locally significant, or are otherwise identified by DWR as historical resources will be subject to significant effects, DWR will prepare a BETP. The treatment plan will provide detailed descriptions of treatment measures that will be implemented to avoid, protect, minimize, and mitigate adverse effects on historic properties in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68) and the National

Park Service's Guidelines for the Treatment of Cultural Landscapes. The treatment plan will describe work to be done prior to, during, and after construction.

- Where feasible, in light of costs, logistics, technological and environmental considerations, and the extent to which avoidance is consistent with the objectives of the project, DWR will first seek to avoid demolition or materially altering the historical resource by avoidance measures, such as the following.
    - Construction condition assessments or HSRs of properties adjacent to construction to determine if these properties are at risk of being damaged.
    - Redesign of relevant facilities to avoid destruction or damage.
    - Determination of tolerable levels of construction vibration
    - Stabilization design and implementation to ensure fragile built resources are not damaged by construction activities
    - Temporarily moving built resources, or other measures determined appropriate.
- If avoidance is not feasible, DWR will implement treatment measures such as, but not limited to the following examples of treatments used to minimize effects on built-environment resources.
    - Redesign of relevant facilities to minimize the scale or extent of damage to eligible or listed built resources.
    - Design standards to minimize the visual impact and to ensure context-appropriate design.
    - Complete documentation in accordance with HABS/HAER/HALS programs, including written and photographic documentation of the significant qualities of the CRHR and NRHP listed and determined eligible districts or individually eligible resources (where resources cannot be avoided).
    - Relocation of historic buildings that would otherwise be demolished.
    - Following the Secretary of the Interior's standards to restore built resources outside of the area of direct effect that are of the same type as resources that will be demolished by the BDCP.
    - Other appropriate treatment methods that are identified in relation to particular resources that are affected.

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Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. The following conservation measures would not result in impacts on cultural resources because they consist of changes to

existing activities, or planning and regulatory actions that do not have the potential to result in ground-disturbing work with effects on cultural resources.

- *CM11: Natural Communities Enhancement and Management*
- *CM12: Methylmercury Management*
- *CM13: Invasive Aquatic Vegetation Control*
- *CM14: Stockton Deep Water Ship Channel Dissolved Oxygen Levels*
- *CM15: Predator Control*
- *CM16: Nonphysical Fish Barriers*
- *CM17: Illegal Harvest Reduction*
- *CM19: Urban Stormwater Treatment*
- *CM20: Recreational Users Invasive Species Program*
- *CM21: Nonproject Diversions*
- *CM22: Avoidance and Minimization Measures*

Implementation of the remaining conservation measures could result in effects on prehistoric and historic archaeological resources, as well as TCPs and the built environment because the scope of conservation actions includes large areas of land, and the areas identified for potential restoration or other conservation actions are sensitive for cultural resources, including prehistoric and historic archaeological sites as well as human remains, architectural resources, and rural historic landscapes. Specific conservation actions that would result in foreseeable ground-disturbing work that could alter or impair the significance of NRHP-, CRHR-, or local registry-eligible cultural resources are listed below.

- *CM2: Yolo Bypass Fisheries Enhancement*
- *CM3: Natural Communities Protection and Restoration*
- *CM4: Tidal Natural Communities Restoration*
- *CM5: Seasonally Inundated Floodplain Restoration*
- *CM6: Channel Margin Enhancement*
- *CM7: Riparian Natural Community Restoration*
- *CM8: Grassland Natural Community Restoration*
- *CM9: Vernal Pool Complex Restoration*
- *CM10: Nontidal Marsh Restoration*
- *CM18: Conservation Hatcheries*

These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource.

Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

***NEPA Effects*:** Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

As part of the site-specific environmental review for all conservation measures other than *CM1 Water Facilities and Operation* that could involve adverse effects on cultural resources within the

meaning of NEPA, or significant impacts on cultural resources within the meaning of CEQA, the BDCP proponents will conduct cultural resource studies and develop mitigation measures. The cultural resource studies will include the following steps.

- Record searches at the relevant information centers of the CHRIS to retrieve records of identified resources. Inventories will consist of surveys using both historical and map research as well as field-inspection. Evaluation will consist of assessment of identified resources to determine if they have both significance and integrity sufficient to qualify for the CRHR, and NRHP, as well as any relevant local registers.
- Cultural resource inventories and evaluations that identify archaeological resources and built-environment resources.
- Correspondence or discussion with the Native American contacts on file with the NAHC and relevant tribes from the list of relevant federally recognized tribes that qualify as *Indian tribes*, as used in 36 CFR 800.16(m), maintained by the BIA, in order to identify resources that may be known to the Native American community, and to incorporate their preferences for treatment and management.
- Resource-specific evaluations that apply the criteria to determine if the identified resources qualify as historical resources (State CEQA Guidelines Section 15064.5[a]) or unique archaeological resources under CEQA (California PRC Section 21083.2[g]), historic properties (36 CFR 60.4), or are eligible for local registers.
- Resource-specific treatment for historical resources, unique archaeological resources, and historic properties that would be materially impaired as defined in CEQA (State CEQA Guidelines Section 15064.5[b][1]) or adversely affected, as defined in the Section 106 regulations (36 CFR 800.5[a][1]).

Treatment and mitigation will include the following elements and steps.

- Treatment for archaeological resources qualifying as historical resources that are subject to significant effects will follow the order of preference described in State CEQA Guidelines Section 15126.4[b][3].
- Treatment for unique archaeological resources subject to significant effects will conform to the mitigation prescribed under CEQA (California PRC Section 21083.2[b])
- Treatment for historic properties subject to adverse effects will seek to avoid or minimize the consequences of the BDCP that would diminish the characteristics that make the historic property eligible for inclusion in the NRHP.
- Treatment plans or mitigation measures in environmental documents will include monitoring and discovery plans that provide for observation of construction to avoid inadvertent effects on previously unidentified human remains and cultural resources, to the extent feasible.
- Treatment plans or mitigation measures in environmental documents will also include the notification and consultation provisions required for discoveries of human remains provided in California Health and Safety Code Section 7050.5 and California PRC Section 5097.98.
- If Native American human remains are discovered on federal land, work in the immediate vicinity will cease and DWR will contact the relevant representative of the federal agency

where the remains were discovered, as prescribed in 25 USC Section 3002(d) (NAGPRA). After notification from the relevant agency representative and treatment of the remains as required under NAGPRA, work may continue. Disposition of the remains will follow the ownership priority described in NAGPRA (25 USC Section 3002[a]).

- For federal agency undertakings, management will be coordinated through a PA and memoranda of agreement, as described above in 18.2.1.3, *Section 106 Compliance for the BDCP.*

The Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the U.S. Army Corps of Engineers are entering into a Programmatic Agreement with the California State Historic Preservation Officer for the implementation of NHPA Section 106 for their undertakings associated with the BDCP. The effects of Federal undertakings (actions) on historic properties (eligible for or listed on the National Register of Historic Places) will be taken into account through the implementation of this programmatic agreement.

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, *Regional and Local Plans, Policies, and Regulations*. This overview of plan and policy compatibility evaluates whether Alternative 4 is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. The physical and indirect effects of the alternatives on cultural resources are address in Impacts CUL-1 through CUL-7, as described for each alternative. The following comparison analyzes the compatibility of the BDCP with the cultural resource preservation plans and policies of the cities and counties in the region that have adopted such policies. In general, these policies fall into two categories; policies that emphasize preservation *or* mitigation for effects on significant cultural resources, and policies that specifically emphasize or favor preservation as the preferred management method. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely.

- The Alameda County East Area Plan requires that Alameda County design development to avoid cultural resources that contribute to the heritage of the County, or in the alternative to include mitigation to offset impacts to those resources (Alameda County 2000:36). Because the BDCP includes mitigation measures requiring identification of cultural resources, evaluation for the CRHR and NRHP, and mitigation to reduce unavoidable effects, the BDCP would be compatible with this policy.
- The Contra Costa County General Plan encourages identification and preservation of important cultural resources, preferably in public ownership. While other general plans and policies typically encourage preservation or mitigation, the Contra Costa County General Plan emphasizes preservation (Contra Costa County 2005: 9-11). While the BDCP will require identification, evaluation, and mitigation to the extent feasible, the preservation of all affected

cultural resources is infeasible because conflicting constraints such as the location of other significant environmental resources make such avoidance unlikely in every instance. For this reason, the BDCP is not compatible with the Contra Costa County General Plan.

- San Joaquin County has adopted cultural resource protection policies as part of their general plan (San Joaquin County 1992:VI-37). These policies require identification of cultural resources prior to construction where feasible, and assessment of resources identified during construction so that appropriate mitigation may be implemented. The BDCP would be compatible with these policies because cultural resource inventories are in progress for the BDCP, and this section identifies mitigation measures and consultation that will be conducted to manage effects on cultural resources.
- The Sacramento County General Plan includes policies encouraging preservation of important buildings, bridges, and other important structures (Sacramento County 2011:80). The General Plan requires that projects involving structures or districts of architectural importance are referred to the Cultural Resources Committee of the County to recommend appropriate mitigation. The BDCP would be potentially incompatible with these policies because the scale of the project and the constraints associated with mitigation and avoidance for other resources makes protection and avoidance of all significant architectural resources unlikely.
- The Solano County General Plan encourages identification and preservation of important archaeological and built-environment resources (Solano County 2008:RS-43). The BDCP would be potentially incompatible with these policies because the scale of the project and the constraints associated with mitigation and avoidance for other resources makes protection and avoidance of all significant architectural resources unlikely.
- The Yolo County General Plan requires identification of important cultural resources, consultation with Native Americans that attach significance to these resources, and avoidance or mitigation for important cultural resources affected by development (County of Yolo 2009a:CO-55 to CO-56). The General Plan also requires that permitted land uses in the Primary Zone of the Delta are consistent with the policies of the Land Use and Resource Management Plan of the Delta Protection Commission, but these policies do not have specific provisions for cultural resources. The BDCP would be compatible with these policies because cultural resource inventories are in progress for the BDCP, and this section identifies mitigation measures and consultation that will be conducted to manage effects on cultural resources.
- The Yolo County General Plan also encourages the preservation and protection of cultural resources where feasible and consultation with Native American tribes (County of Yolo 2009a:CO-55). The plan specifically encourages identification efforts, avoidance and mitigation to the maximum extent feasible, and consultation with tribes that attach significance to those resources. Because the BDCP includes mitigation measures requiring identification of cultural resources, evaluation for the CRHR and NRHP, consultation with Native American individuals and organizations, and mitigation to reduce unavoidable effects, the BDCP would be compatible with this policy.

It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects: Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.10 Alternative 5—Dual Conveyance with Pipeline/Tunnel and Intake 1 (3,000 cfs; Operational Scenario C)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified five previously recorded archaeological sites in the footprint of this alternative (Appendix 18B, Table 18B-1). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. Two of these sites have documented human remains.

The resources are distributed evenly across the alignment, but are somewhat clustered where construction of large above-ground features would occur, such as the northern end of the alignment, at the intermediate forebay, and at the southern end of the alignment.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1A.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the

potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect identified five archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is substantially similar to Impact CUL-2 described under Alternative 1A. While only one intake would be constructed, slightly reducing the footprint, the overall potential for effects on archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The locations of various features such as intakes, forebays, and tunnels shaft locations are depicted in Figure M3-1 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

This impact is substantially similar to Impact CUL-3 described under Alternative 1A. While only one intake would be constructed, slightly reducing the footprint, the overall potential for effects on unidentified archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may

disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. While only one intake would be constructed, slightly reducing the footprint, the overall potential for effects on buried human remains is similar.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys

for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-10, a total of 17 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-10. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

As with other tunnel alternatives, construction of intakes, RTM areas, transmission lines, and other features would result in direct and indirect effects. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-10. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (17 individual resources, as described in Appendix 18B, Table 18B-10). Construction of conveyance facilities may require demolition of the historic built-environment resources. These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative

1A. Approximately 71 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects*:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

CEQA Conclusion**:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result

in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 5 is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 5 would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects*:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.11 Alternative 6A—Isolated Conveyance with Pipeline/Tunnel and Intakes 1–5 (15,000 cfs; Operational Scenario D)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified seven previously recorded archaeological sites in the footprint of this alternative (Appendix 18B, Table 18B-1). Three of these sites have documented human remains. Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*.

These seven previously recorded resources represent the known resources that occur in the footprint of this alternative. The resources are distributed evenly across the alignment, but are somewhat clustered where construction of large above-ground features would occur, such as the northern end of the alignment, at the intermediate forebay, and at the southern end of the alignment.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1A.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect seven identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions

in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is substantially similar to Impact CUL-2 described under Alternative 1A. The same intakes would be constructed, and thus the overall potential for effects on archaeological resources to be identified through inventory efforts is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The locations of various features such as intakes, forebays, and tunnels shaft locations are depicted in Figure M3-1 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot

guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

This impact is substantially similar to Impact CUL-3 described under Alternative 1A. The same intakes would be constructed, and thus the overall potential for effects on archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. The same intakes would be constructed, and thus the overall potential for effects on buried human remains is similar.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-11, a total of 24 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-11. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Direct and indirect effects would result from construction of intakes, RTM storage areas, transmission lines, access roads, and other ground-disturbing features. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-11. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (24 individual resources, as described in Appendix 18B, Table 18B-11). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1A. Approximately 71 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot

guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects*:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

CEQA Conclusion**:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural

landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 6A is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 6A would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects*:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.12 Alternative 6B—Isolated Conveyance with East Alignment and Intakes 1–5 (15,000 cfs; Operational Scenario D)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified 17 previously recorded archaeological sites in the footprint of this alternative (Appendix 18B, Table 18B-1). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. These sites are distributed more heavily towards the northern and southern end of the alignment. Seven of these sites have human remain documented as part of the deposit.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1B.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect 17 identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is generally similar to Impact CUL-2 described under Alternative 1B. This alternative is sensitive for previously unidentified archaeological resources that are likely to be significant and to have integrity for the same reasons as described under Alternative 1B. It should be noted however, that the eastern canal would cross more sensitive soil formations and result in continuous ground-disturbance that may have a slightly greater potential to affect prehistoric archaeological resources compared to Alternative 1B and Alternative 1C. Figure 1 in Appendix 18A depicts the eastern canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1B.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. The locations of ground-disturbing features such as the canal, access roads, pumping plants, borrow areas and concrete batch plants are depicted in Figure M3-2 in the mapbook volume. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment*, presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. This sensitivity and the potential impact mechanisms are substantially similar to the sensitivity and impact mechanism described for Alternative 1B. It should be noted however, that the eastern canal would cross more sensitive soil formations and result in continuous ground-disturbance that may have a slightly greater potential to affect prehistoric archaeological resources compared to Alternative 1A and Alternative 1C. Figure 1 in Appendix 18A depicts the eastern canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1B. However, because the eastern canal crosses more sensitive soil formations and may result in greater continuous ground disturbance than 1A and Alternative 1C, the potential for impacts on buried human remains may be slightly higher than described for Alternative 1A and 1C.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-12, a total of 23 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature of the impact mechanism for each affected resource is also described in Table 18B-12. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Direct and indirect effects on identified and eligible resources will result from construction of intakes, RTM storage areas, the canal itself, and transmission lines. The exact effect mechanism for

each resource is described in Appendix 18B, in Table 18B-12. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (23 individual resources, as described in Appendix 18B, Table 18B-12). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1B. Approximately 67 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character

defining elements or setting of the resource would be lost, resulting in a materially adverse change and adverse effect. Therefore, impacts on these resources may be adverse.

NEPA Effects*:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

CEQA Conclusion**:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide

guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 6B is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 6B would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects*:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.13 Alternative 6C—Isolated Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario D)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified 12 previously recorded archaeological sites in the footprint of this alternative as described in Appendix 18B, Table 18B-1 (only 11 are potentially register eligible). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*.

These sites are distributed more heavily towards the northern and southern end of the alignment where ground-disturbing effects of the western canal are concentrated.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1C. CA-Yol-

165H does not have sufficient integrity to convey significance and therefore does not qualify as an historical resource or historic property.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect 12 identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is generally similar to Impact CUL-2 described under Alternative 1C. This alternative is sensitive for previously unidentified archaeological resources that are likely to be significant and to have integrity for the same reasons as described under Alternative 1C. It should be noted however, that the western canal would cross more sensitive soil formations along the northern and southern ends of the alignment compared to Alternative 1A and the eastern canal. The middle segment of this alternative would make use of a subterranean tunnel that crosses low-sensitivity soil units. While this alternative is thus sensitive for archaeological sites, it should be noted that the eastern canal options would result in the construction of more structures and thus have even greater potential to affect archaeological resources. Figure 1 in Appendix 18A depicts the western canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to Alternative 1A.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The location of ground-disturbing features such as intakes, the canal, tunnel segment, and borrow areas are depicted in Figure M3-3 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment*, presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. This sensitivity and the potential impact mechanisms are substantially similar to the sensitivity and impact mechanism described for Alternative 1C. It should be noted however, that the western canal would cross more sensitive soil formations along the northern and southern ends of the alignment compared to the tunnel and eastern canal. The middle segment of this alternative would make use of a subterranean tunnel that crosses low-sensitivity soil units. The overall sensitivity for prehistoric archaeological resources may be slightly higher than the tunnel, but slightly lower than the eastern canal, because of the relative proportion of high sensitivity geological formations. Figure 1 in Appendix 18A depicts the western canal relative to archaeologically sensitive soil formations. The general sensitivity for historic-era archaeological resources is similar to the tunnel and eastern canal.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1C. However, because the western canal crosses more sensitive soil formations and may result in greater continuous ground disturbance than the tunnel option, the potential for impacts on buried human remains may be slightly higher than described for the tunnel option. Based on the relative proportion of geologically sensitive map units, the western canal may be slightly lower in sensitivity for buried human remains compared to the eastern canal.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-13, a total of 22 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature of the impact mechanism for each affected resource is also described in Table 18B-13. The affected resources have been

evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Construction of intakes, transmission lines, the canal itself, and other ground-disturbing features will result in direct and indirect effects on identified and eligible built-environment resources. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-13. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (22 individual resources, as described in Appendix 18B, Table 18B-13). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1C. Approximately 74 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects*:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

CEQA Conclusion**:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1C because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment

resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons:

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 6C is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 6C would result in the same kinds of effects as Alternative 1C, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects*:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.14 Alternative 7—Dual Conveyance with Pipeline/Tunnel, Intakes 2, 3, and 5, and Enhanced Aquatic Conservation (9,000 cfs; Operational Scenario E)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified six previously recorded prehistoric archaeological sites in the footprint of this alternative (Appendix 18B, Table 18B-1). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. Two of these sites have human remains documented as part of the deposit.

The resources are distributed evenly across the alignment, but are somewhat clustered where construction of large above-ground features would occur, such as the northern end of the alignment, at the intermediate forebay, and at the southern end of the alignment.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1A.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect six identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the

potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is substantially similar to Impact CUL-2 described under Alternative 1A. While the intake locations would be reduced to three facilities, slightly reducing the potential for effects on archaeological resources, the overall potential for effects on archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The locations of various features such as intakes, forebays, and tunnels shaft locations are depicted in Figure M3-1 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important

data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

This impact is substantially similar to Impact CUL-3 described under Alternative 1A. While the intake locations would be reduced to three facilities, slightly reducing the potential for effects on archaeological resources, and thus the overall potential for effects on archaeological resources that may not be identified through inventory is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. While the intake locations would be reduced to three facilities, slightly reducing the potential for effects on buried human remains, the overall potential for effects on buried human remains is similar.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-14, a total of 19 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-14. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Construction of intakes, transmission lines and other features will result in direct and indirect effects on identified and eligible built-environment resources. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-14. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (19 individual resources, as described in Appendix 18B, Table 18B-14). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1A. Approximately 71 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would

not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

NEPA Effects*:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

CEQA Conclusion**:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and

settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons:

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource, and;
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance, and;
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 7 is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 7 would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects*:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.15 Alternative 8—Dual Conveyance with Pipeline/Tunnel, Intakes 2, 3, and 5, and Increased Delta Outflow (9,000 cfs; Operational Scenario F)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified six previously recorded archaeological sites in the footprint of this alternative (Appendix 18B, Table 18B-1). Detailed site descriptions summarizing available information regarding these resources, are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*. Two of these sites have human remains documented as part of the deposit.

The resources are distributed evenly across the alignment, but are somewhat clustered where construction of large above-ground features would occur, such as the northern end of the alignment, at the intermediate forebay, and at the southern end of the alignment.

Significance of Identified Archaeological Resources

The resources affected by this alternative have likely have significance and integrity within the meaning of the NRHP and CRHR for the same reasons described above under Alternative 1A.

Anticipated Effects on Identified Resources

Ground-disturbing construction is likely to disturb the deposits and thus materially alter their ability to convey their significance. Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect six identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 under Alternative 1A.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

This impact is substantially similar to Impact CUL-2 described under Alternative 1A. While the intake locations would be reduced to three facilities, slightly reducing the potential for effects on archaeological resources that have yet to be identified, the overall potential for effects on these kinds of resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The locations of various features such as intakes, forebays, and tunnels shaft locations are depicted in Figure M3-1 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-2 would reduce these effects, it cannot guarantee all effects would be avoided because relocation of proposed facilities to avoid all resources is unlikely. These effects would remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 as described under Alternative 1A.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

This impact is substantially similar to Impact CUL-3 described under Alternative 1A. While the intake locations would be reduced to three facilities, slightly reducing the potential for effects on archaeological resources, and thus the overall potential for effects on archaeological resources is similar.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA because this disturbance would impair the ability of these resources to yield data useful in research. Mitigation Measure CUL-3 would reduce these effects, but cannot guarantee that all effects would be avoided because inadvertent disturbance of some resources is inevitable given the scale of the proposed construction. These effects would therefore remain adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3 as described under Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. This sensitivity and the impact mechanisms are substantially similar to the sensitivity and impact mechanisms described under Alternative 1A. While the intake locations would be reduced to three facilities, slightly reducing the potential for effects on buried human remains, the overall potential for effects on buried human remains is similar.

Ground-disturbing construction has the potential to damage and disinter buried human remains, resulting in an adverse effect. While mitigation is available under Mitigation Measure CUL-4 to reduce this effect, it cannot guarantee that this effect would be avoided entirely, therefore this effect remains adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4 as described under Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-15, a total of 19 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-15. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Construction of intakes, transmission lines, and other features will result in direct and indirect effects on identified and eligible built-environment resources. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-15. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct

demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (19 individual resources, as described in Appendix 18B, Table 18B-15). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1A. Approximately 71 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

***NEPA Effects**:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

***CEQA Conclusion*:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. This impact is substantially similar to Impact CUL-7 as discussed under Alternative 1A because the nature of the affected resources, scope of activities, and geographic area of effects are generally similar. These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. Because the ability of the resources to convey their significance would be lost this effect would materially alter these resources under CEQA and would be adverse under NEPA. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching.

Mitigation Measure CUL-7 below addresses this effect. However, because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in

direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 8 is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 8 would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided

where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects*:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.16 Alternative 9—Through Delta/Separate Corridors (15,000 cfs; Operational Scenario G)

Impact CUL-1: Effects on Identified Archaeological Sites Resulting from Construction of Conveyance Facilities

Identified Resources

Record searches at the CHRIS and inventory efforts for the BDCP have identified four previously recorded archaeological sites in the footprint of this alternative as indicated in Appendix 18B, Table 18B-1. Individual site descriptions are provided in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*.

Significance of Identified Archaeological Resources

The site record for CA-SAC-47 describes a site measuring 30 meters by 90 meters across. The sparse record only indicates that Dr. Robert Heizer removed artifacts from the site to a museum. The size of the deposit is consistent with expectations for a midden site. The site record does indicate that the erosion and damage to the site is "slight." The site record for CA-SAC-75 describes a midden deposit distributed in a linear form extending north-south for approximately 400 meters. The deposit at CA-SAC-249 contains human remains, obsidian and chert debitage, chert projectile points, fire-cracked rock, mortar and pestle fragments, and glass beads. This prehistoric deposit was recorded in 1962, with no subsequent update to the site record. The site record indicates that the site contains shell, bone, burnt clay objects in a deposit spanning approximately 12 meters by 3 meters. The site record indicates some loss of integrity through surface grading for agriculture. The historic archaeological deposit recorded at CA-SJo-232-H consists of historic cultural debris containing the remains of agricultural equipment, old stoves, glass, ceramic and metal. The site measures approximately 350

feet across (dimensions for historic resources are typically given in standard increments, the site spans 107 meters). The deposit was associated with several standing structures at the time of the last site record update (1991), which may have subsequently collapsed; the structures appear to be leaning in the available photographs. Because these materials and deposits may yield information useful in prehistoric and historic research they likely have significance under the fourth criterion for the CRHR and the NRHP. If these sites retain sufficient integrity to convey this significance they may qualify as historical resources or historic properties.

Anticipated Effects on Identified Resources

The exact location of these resources cannot be disclosed because such disclosure might lead to damage. However CA-SAC-47 and CA-SAC-75 occur near a potential work areas. If the site boundaries actually extend into the work areas, ground-disturbing construction, staging, or other activity may damage this resource. The mapped location of CA-SAC-249 coincides with the footprint of proposed channel enlargement. Ground-disturbing construction may thus damage this resource. The mapped boundaries of CA-SJo-232-H coincide with the location of an operable barrier. Construction of this feature may disturb and damage the resource.

Much of the data potential in archaeological resources exists in the spatial associations of different artifacts and other cultural material. Where artifacts that have known associations with particular time periods occur adjacent to other material such as faunal bone or plant remains from subsistence activity, the proximity of the materials allows an inference as to the age of the subsistence remains, thereby allowing researchers to infer particular subsistence strategies during different prehistoric periods. Intrusive ground-disturbing construction, vibration, and other physical disturbance may disrupt these associations and thus disrupt the qualities for which the sites may qualify as historical resources or historic properties. In addition, because not all identified resources are legally accessible, these resources may be significant for other reasons than their data potential. Indirect effects such as introduction of changes to the setting associated with construction of new features or creation of new sources of noise (also a change to the setting) may diminish the basis for the significance of these resources. For these reasons, construction has the potential to materially impair these resources under CEQA and to adversely affect the resources as defined by Section 106 of the NHPA. This effect would be adverse.

NEPA Effects: Construction may disturb NRHP and CRHR-eligible archaeological resources and damage these resources. This damage may impair the integrity of these resources and thus reduce their ability to convey their significance. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Construction of conveyance facilities would affect four identified archaeological resources that occur in the footprint of this alternative. DWR identified these resources and finds that they are likely to qualify as historical resources under CEQA (see the individual site descriptions in Appendix 18B, Section B.1.2 *Archaeological Site Descriptions*); these resources thus have the potential to qualify as historical resources. Therefore, these sites are considered historic resources for the purposes of CEQA. This impact would be significant because construction could materially alter or destroy the potential of these resources to yield information useful in archaeological research, the basis for the significance of these resources, through excavation and disruption of the spatial associations that contain meaningful information. Identified but currently inaccessible resources may also be significant under other register criteria; indirect effects such as introduction of new inconsistent changes to the setting may also diminish the significance of these resources. Mitigation Measure CUL-1 would reduce this impact, but would not guarantee that all of the

scientifically important material would be retrieved because feasible archaeological excavation only typically retrieves a sample of the deposit, and portions of the site may remain after treatment with important information. Construction could damage these remaining portions of the deposit. Therefore, this impact is significant and unavoidable.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please refer to Mitigation Measure CUL-1 for Alternative 1A, above.

Impact CUL-2: Effects on Archaeological Sites to Be Identified through Future Inventory Efforts

An inventory for the majority of the footprint for this alternative has not been conducted because the footprint is not currently legally accessible (see Appendix 4A, *Summary of Survey Data Collection by Department of Water Resources to Obtain Information Regarding Baseline Conditions in Areas That Could Be Affected by BDCP*). Furthermore, complete evaluation of all potentially affected resources associated with this alternative may require destructive test excavation in advance of any final decision regarding the selection of the alternative. Because several prehistoric archaeological sites qualifying as historical resources have been identified in the footprint of this alternative, the remaining portion of the footprint for this conveyance feature is sensitive for previously unidentified archaeological resources. Record searches at the relevant information centers of the CHRIS reviewed the mapped location of previous cultural resource inventories in the footprint of this alternative and the vicinity. This map review revealed that a cultural resources inventory has never been conducted in the majority of the footprint for Alternative 9. The presence of three archaeological sites that qualify as historical resources and historic properties in the portion of the footprint that has been previously inspected provides a sample of the likely density and occurrence of resources in the remaining footprint. For this reason, additional prehistoric archaeological resources are likely to be found in the portion of the footprint where surveys have not been conducted, once access is available and such studies can be completed.

In addition to prehistoric archaeological resources, the BDCP area is sensitive for historic-era archaeological resources. It is likely that previously unidentified historic archaeological sites occur in the footprint of this alternative because of the intensity of human activity in the Plan Area during the historic era, as described in Section 18.1.6, *Historic-Era Setting.*

Prehistoric sites in the Plan Area tend to be large and rich in material remains, including human burials and associated ornaments and beads. Habitation debris also often contains both floral and faunal material that can be used for both radiocarbon dating and analysis regarding subsistence strategies. In addition, the large scale of typical prehistoric archaeological resources suggests portions of these deposits will remain with sufficient integrity to convey research information. Therefore, these sites are likely to qualify as historical resources or unique archaeological resources under CEQA and historic properties under Section 106 of the NHPA.

Historic sites are likely to be associated with the historic-era themes of settlement, reclamation, agriculture, and flood management in the Delta region. Because the reclamation and agricultural development of the Delta region provided part of the economic base for the development of surrounding urban centers, these historic themes are significant at both a state and national level. In addition, the intensity of historic activity in the Delta region suggests that many of these resources

are likely to retain sufficient integrity to convey this significance. Therefore, these sites are likely to qualify as historical resources or unique archaeological resources under CEQA and historic properties under Section 106 of the NHPA.

Absent mitigation, ground-disturbing construction is likely to physically damage many of these resources by disrupting the spatial associations that convey data useful in research or changing the setting such that the resource no longer contains its significance. The locations of ground-disturbing features such as borrow and spoil areas, control structures, and pumping plants are depicted in Figure M3-5 in the mapbook volume. These impacts would thus materially impair these resources within the meaning of CEQA and adversely affect the resources within the meaning of Section 106 of the NHPA. These effects would be adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

CEQA Conclusion: The footprint for this alternative is sensitive for both prehistoric and historic-era resources that cannot be identified at this time because much of the footprint is not legally accessible. Because many of these resources are likely to have data useful in prehistoric and historic archaeological research, as well as the integrity to convey this significance, they are likely to qualify as historical resources or unique archaeological sites under CEQA or historic properties under the Section 106 of the NHPA. Ground-disturbing construction may materially alter the significance of these resources by disrupting the spatial associations that could yield important data, resulting in a significant effect. While mitigation is available (Mitigation Measure CUL-2), this mitigation cannot guarantee that all eligible or significant resources would be preserved in place, or that all important data would be retrieved before construction destroys these resources. The scale of the BDCP, investment into existing designs, and the presence of other important environmental resources such as habitat, natural communities, and wetlands that should be avoided are constraints on the flexibility and feasibility of avoidance. For these reasons this impact is significant and unavoidable.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please refer to Mitigation Measure CUL-2 for Alternative 1A, above.

Impact CUL-3: Effects on Archaeological Sites That May Not Be Identified through Inventory Efforts

Appendix 18A, *Archaeological Resources Sensitivity Assessment*, presents an overview of the sensitivity of the Plan Area for previously unidentified archaeological resources and demonstrates that additional prehistoric and historic-era sites that have not yet been identified are almost certain to occur in the portion of the Plan Area where this alternative would be constructed. While surveys will be completed for the footprint, once access is available, such surveys cannot guarantee that all sites will be identified prior to construction. The rapid rate of at which alluvium and sediment accumulates in the Delta region, and the geologically unstable nature of the floodplain and riverbank environments in which these resources may occur makes it likely that numerous sites occur buried below surface soils. Cultural resource inventory efforts cannot always identify such resources, even with intermittent surface excavation designed to reveal sites with little or no surface manifestation because exhaustive sampling to identify every resource is economically and technically infeasible.

These sites may also occur buried at the depth at which tunnel boring operations would be performed.

Many of these unidentified prehistoric resources are likely to qualify as historical resources, historic properties, or unique archaeological resources because prehistoric sites in the Delta region tend to be large and contain a rich material culture. In particular, burial features tend to be associated with numerous shell ornaments, charmstones, and associated grave goods. Habitation components often contain abundant faunal and floral remains that elucidate prehistoric adaptations such as subsistence methods.

In addition to prehistoric archaeological resources, the BDCP area is sensitive for historic-era archaeological resources. Archaeological debris found in historic era archaeological sites activity is likely to be associated with significant themes such as agriculture, reclamation, and settlement of the Delta region. The size of the BDCP area and the intensity of historic activity suggest that some of these resources may qualify as historical resources, historic properties, or unique archaeological resources.

Ground-disturbing work may disturb and damage these resources before they can be identified and avoided during monitoring efforts required under Mitigation Measure CUL-3. This damage and disturbance may materially impair these resources within the meaning of CEQA or adversely affect the resources within the meaning of Section 106 because this disturbance would impair the ability of these resources to yield data useful in research. While Mitigation Measure CUL-3 would reduce the potential for this impact, it would not guarantee the impact would be avoided entirely. Therefore, this impact is adverse.

NEPA Effects: This alternative has the potential to damage previously unidentified archaeological sites that also may not necessarily be identified prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified prior to construction. Because these sites may qualify for the NRHP or CRHR, damage to these sites may diminish their integrity. For these reasons this effect would be adverse.

***CEQA Conclusion*: *CEQA Conclusion*:** This impact would be significant. Construction has the potential to disturb previously unidentified archaeological sites qualifying as historical resources, historic properties, or unique archaeological resources. Because direct excavation, compaction, or other disturbance may disrupt the spatial associations that contain scientifically useful information it would alter the potential basis for eligibility, thus materially altering the resource and resulting in a significant effect. Because these resources would not be identified prior to construction, they cannot be recorded and effects cannot be managed through construction treatment. Mitigation Measures CUL-3 would reduce but not entirely avoid the potential for this impact, by implementing construction worker training, monitoring and discovery protocols. However, because archaeological resources may not be identified prior to disturbance through these measures, the effect cannot be entirely avoided. Therefore, this impact would remain significant and unavoidable.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please refer to Mitigation Measure CUL-3, above, for Alternative 1A.

Impact CUL-4: Effects on Buried Human Remains Damaged during Construction

The footprint of this alternative is sensitive for buried human remains that may occur in isolation, rather than as part of prehistoric or historic archaeological sites. Historic and prehistoric human remains have been discovered as isolated interments rather than as part of larger sites. Because these isolated resources are not associated with larger deposits, their distribution and depth cannot be estimated. Construction of this alternative would require ground-disturbing work that may damage previously unidentified human remains, resulting in direct effects on these resources. While inventory and monitoring efforts are prescribed above under Mitigation Measures CUL-2 and CUL-3, the large acreages subject to disturbance under this alternative make exhaustive sampling to identify all buried and isolated human remains technically and economically infeasible. For these reasons the potential remains that such resources may be damaged or exposed before they can be discovered through inventory or monitoring. This effect would be adverse.

NEPA Effects: Buried human remains may be damaged by this alternative because such remains may occur either in isolation or as part of identified and previously unidentified archaeological resources where construction will occur. This effect would be adverse.

***CEQA Conclusion*:** This impact would be significant. The project area is sensitive for buried human remains. Construction would likely result in disturbance of these features. Disturbance of human remains, including remains interred outside of cemeteries is considered a significant impact in the CEQA Appendix G checklist; therefore disturbance of these remains would result in a significant effect. Mitigation measures would reduce the severity of this impact, but not to a less-than-significant level because mitigation would not guarantee that these features could be discovered and treated in advance of construction; the scale of construction makes it technically and economically infeasible to perform the level of sampling necessary to identify all such resources prior to construction. Therefore, this impact is considered significant and unavoidable.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please refer to Mitigation Measure CUL-4, above, for Alternative 1A.

Impact CUL-5: Direct and Indirect Effects on Eligible and Potentially Eligible Historic Architectural/Built-Environment Resources Resulting from Construction Activities

Built-environment resources that may be affected by this alternative include resources identified and evaluated in inventory efforts conducted for other projects and resources identified in surveys for the BDCP. Some of resources are considered historic properties for the purposes of this analysis because they meet the criteria in the NRHP regulations (36 CFR 60.4), as described below. For the similar reasons some are considered historical resources under CEQA. As identified in Appendix 18B, Table 18B-16, a total of 13 built-environment resources have the potential to be directly or indirectly affected by construction of this alternative. The specific nature and location of the impact mechanism for each affected resource is also described in Table 18B-16. The affected resources have been evaluated for the NRHP and CRHR. The basis for the eligibility recommendations for each resource is provided in Appendix 18B, in Section B.1.2, *Built Environment Resource Descriptions.*

Discussion of Anticipated Effects on Identified and Accessible Resources

Construction of transmission lines, canals leading to operable barriers, and intakes, and other features have the potential to result in direct and indirect effects on built-environment resources. The exact effect mechanism for each resource is described in Appendix 18B, in Table 18B-16. Facility redesign to avoid direct impacts on historic architectural resources is preferred as mitigation if possible. However, it is unlikely that all identified resources can be avoided because of the scale of the BDCP and the need to balance avoidance of other important environmental resources such as wetlands, natural communities, and special-status species habitat. These effects would materially impair the resources within the meaning of CEQA and result in adverse effects within the meaning of Section 106 because they would diminish the characteristics that convey the significance of the resources. Some direct demolition and indirect effects such as setting changes are likely to occur even with mitigation. Therefore, these effects would be adverse.

NEPA Effects: This alternative would result in direct and indirect effects on NRHP and CRHR eligible built environment resources. These alterations may diminish the integrity of these resources. For these reasons this effect would be adverse.

***CEQA Conclusion*:** Several identified historic-era built-environment resources have been identified in the footprint of this alternative (13 individual resources, as described in Appendix 18B, Table 18B-16). These resources have been evaluated for the CRHR and qualify as historical resources under CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A

Impact CUL-6: Direct and Indirect Effects on Unidentified and Unevaluated Historic Architectural/Built-Environment Resources Resulting from Construction Activities

The footprint of this alternative is sensitive for unidentified and unevaluated built-environment resources that may have significance and integrity for the same reasons described under Alternative 1A. Approximately 29 unevaluated built-environment resources have been identified that may be subject to direct or indirect effects as a result of the construction of this alternative (ICF 2012, see tables of inaccessible properties and associated maps).

Anticipated Effects

Construction may result in direct demolition of these resources, damage through vibration, or indirect effects such as changes to the setting. While mitigation is available to reduce these effects, this mitigation cannot guarantee that all effects would be avoided because mitigation cannot

guarantee that eligible resources would be avoided and that adverse changes to the setting would not occur. Construction has the potential to directly or indirectly damage built-environment resources through demolition or introduction of new inconsistent features into the setting. These changes would impair the ability of the resources to convey their significance because the character defining elements or setting of the resource would be lost. Therefore, impacts on these resources may be adverse.

***NEPA Effects**:* This alternative may result in direct modification or indirect changes to the setting for inaccessible and NRHP and CRHR-eligible built environment resources. These changes may diminish the integrity of these resources. For these reasons, this effect would be adverse.

***CEQA Conclusion*:** The study area is sensitive for built-environment resources that have not yet been recorded and evaluated because the majority of the area is legally inaccessible. Inventory efforts have not gathered complete information in these inaccessible areas. Many of these resources are likely to be associated with important historical themes or persons, or possess high creative values; therefore, they are likely to have significance under CEQA and the NHPA. Because many of these resources remain intact and retain their rural agricultural setting they are also likely to have integrity under CEQA and the NHPA. Therefore, many are likely to qualify as historic properties or historical resources under the NHPA and CEQA. Construction of conveyance facilities may require demolition of the historic built-environment resources. Construction may also result in permanent indirect effects such as changes to the setting. Direct demolition or changes to the setting would be material alterations because they would either remove the resource or alter the resource character, resulting in an inability of the resource to convey its significance. For these reasons this would be a significant effect. Mitigation described below may reduce these effects, but cannot guarantee they would be entirely avoided. The scale of the BDCP and the constraints imposed by other environmental resources make avoidance of all significant effects unlikely. For these reasons this impact remains significant and unavoidable even with implementation of the following mitigation measures.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please refer to Mitigation Measure CUL-6 under Alternative 1A.

Impact CUL-7: Effects of Other Conservation Measures on Cultural Resources

This impact describes the potential effects of other conservation measures at a program level of detail, with the exception of *CM1 Water Facilities and Operation*. The following conservation measures would not result in impacts on cultural resources because they consist of changes to existing activities, or planning and regulatory actions that do not have the potential to result in ground-disturbing work with effects on cultural resources.

- *CM11: Natural Communities Enhancement and Management*
- *CM12: Methylmercury Management*
- *CM13: Invasive Aquatic Vegetation Control*
- *CM14: Stockton Deep Water Ship Channel Dissolved Oxygen Levels*
- *CM15: Predator Control*

- *CM16: Nonphysical Fish Barriers*
- *CM17: Illegal Harvest Reduction*
- *CM19: Urban Stormwater Treatment*
- *CM20: Recreational Users Invasive Species Program*
- *CM21: Nonproject Diversions*
- *CM22: Avoidance and Minimization Measures*

Implementation of the remaining conservation measures could result in effects on prehistoric and historic archaeological resources, as well as TCPs and the built environment because the scope of conservation actions includes large areas of land, and the areas identified for potential restoration or other conservation actions are sensitive for cultural resources, including prehistoric and historic archaeological sites as well as human remains, architectural resources, and rural historic landscapes. Specific conservation actions that would result in foreseeable ground-disturbing work that could alter or impair the significance of NRHP-, CRHR-, or local registry-eligible cultural resources are listed below.

- *CM2: Yolo Bypass Fisheries Enhancement*
- *CM3: Natural Communities Protection and Restoration*
- *CM4: Tidal Natural Communities Restoration*
- *CM5: Seasonally Inundated Floodplain Restoration*
- *CM6: Channel Margin Enhancement*
- *CM7: Riparian Natural Community Restoration*
- *CM8: Grassland Natural Community Restoration*
- *CM9: Vernal Pool Complex Restoration*
- *CM10: Nontidal Marsh Restoration*
- *CM18: Conservation Hatcheries*

These measures would result in effects on cultural resources when ground-disturbing work is performed to construct improvements and enhance or restore natural communities. Direct effects would occur through demolition or destruction of NRHP-, CRHR-, and/or local registry-eligible prehistoric and historic archaeological sites, unique archaeological sites, TCPs, human remains, and built-environment resources. Indirect effects may occur where changes to the setting alter the existing setting in a manner that is inconsistent with the feeling and association of the resource. For example, reclaimed agricultural landscapes that are converted to habitat may no longer convey the themes of agriculture and settlement, and thus would be inconsistent with remaining features associated with rural historic landscapes created by reclamation, cultivation, and ranching. These effects would be material alterations and adverse effects because they would diminish or destroy the ability of these resources to convey their significance.

Because of the large acreages of land included in all conservation measures that would be implemented under this alternative, it is unlikely that all effects on NRHP-, CRHR-, and /or local registry-eligible resources and unique archaeological sites could be avoided. Therefore, this impact would be adverse. Mitigation Measure CUL-7 below addresses this effect.

NEPA Effects: Implementation of conservation measures will result in ground disturbing work and introduction of new infrastructure to the Plan Area. These physical modifications may result in direct effects on NRHP and CRHR eligible resources. These changes may therefore reduce the integrity of these resources. For these reasons these effects would be adverse.

***CEQA Conclusion*:** Construction and implementation of conservation measures would result in ground-disturbing work that could alter the significant characteristics of NRHP, CRHR, and/or local registry-eligible cultural resources, including prehistoric and historic archaeological sites, TCPs, and built-environment resources such as historic architectural structures and rural historic landscapes. The same construction may damage unique archaeological sites. This construction would likely result in materially adverse changes for the following reasons.

- Ground-disturbing construction in archaeological sites disrupts the spatial associations that contain data useful in research, thus diminishing or destroying the basis for the significance of the resource.
- Ground-disturbing construction may either directly demolish or indirectly affect the setting of built-environment resources, resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may either directly demolish or change the setting of TCPs resulting in an inability of the resource to convey its significance.
- Ground-disturbing construction may inadvertently disturb human remains.

The alteration of a resource that changes the characteristics that convey its significance is a material alteration under CEQA. The inadvertent disturbance of human remains is a significant impact under CEQA under the Appendix G checklist. Because this construction would materially alter these categories of resources and disturb human remains it would result in a significant impact. Mitigation is available to reduce these impacts by identifying and evaluating resources, avoiding resources where possible, and developing treatment where avoidance is not possible. In addition construction would be monitored. However, because of the acreage associated with the proposed restoration under conservation measures, as well as the multiple constraints associated with other environmental resources that require mitigation or avoidance, it is unlikely that all cultural resources could be avoided. Therefore, this impact remains significant and unavoidable.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please refer to Mitigation Measure CUL-7 above, for Alternative 1A.

Impact CUL-8: Compatibility of the Proposed Water Conveyance Facilities and Other Conservation Measures with Plans and Policies

Constructing the proposed water conveyance facilities (CM1) and implementing CM2–CM22 could result in the potential for incompatibilities with plans and policies adopted to protect the cultural resources of the Delta. A number of plans and policies that coincide with the study area provide guidance for protection of cultural resources as overviewed in Section 18.2.3, Regional and Local Plans, Policies, and Regulations. This overview of plan and policy compatibility evaluates whether Alternative 9 is compatible or incompatible with these policies, rather than whether impacts are adverse or not adverse or significant or less than significant. Because Alternative 9 would result in the same kinds of effects as Alternative 1A, this alternative is only compatible with some of the land

use policies that govern the Plan Area. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because significant cultural resources will be avoided where feasible, and mitigation will be implemented to reduce effects where avoidance and preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

NEPA Effects*:* Because federal agencies are not regulated by local land use policy, the BDCP alternatives would not result in a conflict with local land use laws for the purposes of NEPA.

CEQA Conclusion: The Plan Area is governed by cultural resource management policies adopted by the various counties with jurisdiction in this region. For policies that emphasize preservation or mitigation the BDCP will be compatible with these policies because DWR and appropriate federal agencies will implement cultural resource management practices that will identify significant resources, preserve such resources where feasible, and complete mitigation to reduce significant effects where preservation is not feasible. For policies that emphasize preservation the BDCP is incompatible in some instances because multiple constraints governing the location of proposed facilities makes preservation of all significant cultural resources unlikely. It should be noted that, as described in *Land Use*, Section 13.2.3, state and federal agencies are not subject to local land use regulations. Furthermore, policy incompatibility, by itself is not a physical impact on the environment.

18.3.5.17 Cumulative Analysis

Assessment Methodology

This cumulative impact analysis considers projects that could affect cultural resources within the same timeframe as the BDCP alternatives, which could result in cumulative effects on cultural resources. Although cultural resources typically manifest as discrete archaeological sites, structures, or residences, the combination of projects in the region can result in a cumulative loss of these resources and associated data potential for archaeological research as well as examples of significant historical themes and instances of significant engineering or design. In addition, for rural historic landscapes, historic districts, and other cultural resources that cover large geographic areas, the combined effects of numerous projects at disparate locations can potentially result in a loss of integrity that diminishes the quality of the individual resources. This section first analyzes the cumulative setting, to determine where the range of reasonably foreseeable projects and programs in the Delta will result in a significant cumulative effect on cultural resources. This range includes the BDCP. This section then analyzes the contribution of the BDCP to determine if that contribution is cumulatively considerable.

Cumulative Setting

The set of programs and projects that would occur within the same timeframe as the BDCP will collectively result in the cumulative loss of cultural resources. The BDCP will contribute to this loss. While the various alternatives analyzed above would each affect a slightly different set of resources, each alternative would result in adverse effects on cultural resources. This setting describes the other projects that, in combination with the BDCP, will result in adverse effects on cultural resources.

Levee repair programs will result in repair and maintenance of existing project levees in the Delta. The construction of upgrades and repair of existing levees will result in ground-disturbing work that has the potential to result in adverse effects on archaeological resources, built-environment structures, and large landscape-level cultural resources such as historic districts, rural historic landscapes, and TCPs. These effects typically occur when construction of setback levees or widening of existing levee prisms disturbs landside archaeological resources, or where borrow activity necessary to provide fill material disturbs the same resources. In addition, maintenance and repair projects can result in the demolition of structures and residences that form portions of rural historic landscapes associated with themes of reclamation and agriculture. Where deep cutoff walls are constructed through existing levee prisms, buried archaeological resources may be damaged or destroyed.

Restoration projects may require inundation to enhance wetland and riparian vegetation, which in turn expedites the decay of archaeological resources, and may require demolition of structures and residences in the Delta.

Infrastructure projects such as the California High-Speed Rail System, Sacramento to Merced Section, will require ground-disturbing construction along linear corridors where new rail service is placed, resulting in disturbance of archaeological resources and demolition of built-environment resources. Human remains may be encountered and disturbed where they occur as part of larger archaeological sites, or also as discrete burials.

Development and plan buildout under general plan blueprints results in the conversion of raw land and the associated disturbance of archaeological resources, buried human remains, and, in some cases, demolition of existing built environment structures and residences.

Although project proponents will implement typical mitigation and avoidance measures for most if not all projects occurring as part of the cumulative context, unavoidable effects on cultural resources will nonetheless occur because it is not always feasible to avoid resources. Treatment such as data recovery or documentation cannot replace the lost resource and therefore would not reduce impacts to less-than-significant levels. In addition, archaeological resources are often encountered and damaged inadvertently during construction because these resources cannot be identified before construction takes place.

A sample of the projects considered as part of the cumulative context is provided below in Table 18-2. The complete set of projects that form the cumulative context is provided in Appendix 3D, *Defining Existing Conditions, the No Action/No Project Alternative, and Cumulative Impact Conditions*.

Table 18-2. Cumulative Context for Effects on Cultural Resources

Agency	Program/Project	Status	Description of Program/Project
California Department of Water Resources and Solano County Water Agency	North Bay Aqueduct Alternative Intake Project	Planned action	This project will construct an alternative intake on the Sacramento River and a new segment of pipeline to connect it to the North Bay Aqueduct system, with the possibility of disturbing existing cultural resources.
Reclamation District 2093	Liberty Island Conservation Bank	Planned action	This project includes the restoration of inaccessible, flood prone land zoned as agriculture but not actively farmed, to area enhancement of wildlife resource. Changes in land cover may expedite the decay of existing cultural resources.
California High Speed Rail Authority and Federal Railroad Administration	California High-Speed Rail System, Sacramento to Merced Section	Briefing on Initial Alternatives completed. Sacramento to Merced section is part of Phase 2.	Development of new high-speed rail service will disturb and demolish existing cultural resources.
Bureau of Reclamation	Delta-Mendota Canal/California Aqueduct Intertie	Completed in 2012.	New project facilities include a pipeline and pumping plant that could disturb cultural resources occurring in the path of these features.
SWP/CVP operations	Throughout Plan Area	Continuing actions	Repair and maintenance activities may disturb or demolish cultural resources.
CALFED Levee Stability Program	Existing project levees in the Delta	Continuing actions	Protection of resources in the Delta through maintenance and improvement of existing levees may disturb or demolish cultural resources.
California Department of Water Resources, U.S. Bureau of Reclamation, California Department of Fish and Wildlife	Suisun Marsh Habitat Management, Preservation, and Restoration Plan	Planned Action	Develop a regional plan for Suisun Marsh that balances implementation of the CALFED Program, the Suisun Marsh Preservation Agreement, and other management and restoration programs within the Suisun Marsh in a manner responsive to the concerns of stakeholders and based upon voluntary participation by private landowners.
Delta Wetlands Project	Semitropic Water Storage District	Planned action	Wildlife enhancement on Delta islands may demolish cultural resources or expedite decay of cultural resources.

No Action Alternative

The Delta region is rich in prehistoric and historic-era cultural resources. These resources include prehistoric and historic archaeological sites, buried human remains, and built-environment resources. Subsidence, levee failure, and climate change all have the potential to increase the inundation and erosion of cultural resources that currently occur on the landside of existing flood management structures. Ongoing SWP/CVP operations include both levee repair and habitat restoration and conservation activities. Where specific projects will result in ground-disturbing construction these actions have the potential to result in effects on cultural resources through direct excavation into such resources or the introduction of new inconsistent features such as setback levees, borrow areas, or other landside features that may not be consistent with the rural agricultural setting. The plans, programs, and projects that would occur under the No Action Alternative in addition to the cumulative scenario, collectively will result in adverse effects on cultural resources. For example, Yolo County concludes in the General Plan Update EIR that plan buildout will result in significant and unavoidable effects on cultural resources (County of Yolo 2009b:546). Similarly, levee repairs performed in the Delta region in the cumulative No Action scenario are likely to contribute to effects on archaeological and built-environment resources and buried human remains because the Delta is sensitive for such resources, and construction of such improvements would require ground-disturbing work. Habitat restoration in Suisun Marsh or elsewhere necessary to comply with federal biological opinions could also contribute to effects on archaeological and built-environment resources and buried human remains. Although mitigation may be implemented as a part of these ongoing projects, which would reduce their effects, or manage significant effects through treatment, such treatment typically does not reduce impacts on cultural resources to less than adverse.

The Delta and vicinity is within a highly active seismic area, with a generally high potential for major future earthquake events along nearby and/or regional faults, and with the probability for such events increasing over time. Based on the location, extent and non-engineered nature of many existing levee structures in the Delta area, the potential for significant damage to, or failure of, these structures during a major local seismic event is generally moderate to high. In the instance of a large seismic event, levees constructed on liquefiable foundations are expected to experience large deformations (in excess of 10 feet) under a moderate to large earthquake in the region (see Appendix 3E, *Potential Seismic and Climate Change Risks to SWP/CVP Water Supplies* for more detailed discussion). Reclaiming land or rebuilding levees after a catastrophic event due to climate change or a seismic event could result in the destruction of cultural resources. While similar risks would occur under implementation of the action alternatives, these risks may be reduced by BDCP-related levee improvements along with those projects identified for the purposes of flood protection in Table 18-2.

Impact CUL-9: Potential For the Action Alternatives to Contribute to the Cumulative Loss of Cultural Resources in the Plan Area

Alternatives 1A through 9

The action alternatives vary in terms of location and scale of construction. Tunnel alternatives would avoid some surface resources where tunnels would replace canals, but would require construction of large intakes, RTM storage areas, and associated features. Alternatives that would result in construction of an eastern or western canal would also require construction of large intake features along the northern end of proposed alignments and would require excavation and borrow

activities along the entire footprint. Alternative 9 would have a smaller footprint, but also has the potential to result in significant and unavoidable effects on cultural resources. All action alternatives have the potential to result in the following categories of impacts.

- Demolition or destruction of identified and identifiable archaeological and built-environment resources that qualify as historical resources, unique archaeological sites, or historic properties.
- Demolition or destruction of archeological sites that qualify as historical resources, unique archaeological resources, and historic properties that cannot feasibly be identified in advance of construction.
- Demolition or destruction of buried human remains that occur cannot be feasibly be identified in advance of construction.

Because the action alternatives would generate these effects they would make a cumulatively considerable contribution to a cumulatively significant loss of cultural resources in the Plan Area. Mitigation Measures CUL-1 through CUL-7 are available to reduce this effect, however, because all effects cannot be reduced to less than significant, the BDCP would still result in a cumulatively considerable contribution.

NEPA Conclusion: Existing and foreseeable projects in the Plan Area will result in adverse effects on cultural resources. The BDCP alternatives, with the exception of the No Action Alternative, would create a considerable contribution to this effect. For these reasons this effect would be adverse.

***CEQA Conclusion*:** The set of projects that would be implemented in the Plan Area during the same timeframe as the BDCP, including the BDCP, will result in a cumulatively significant loss of cultural resources. Each of the action alternatives has significant and unavoidable effects on identified and identifiable archaeological resources and built-environment resources. In addition each action alternative has the potential to result in significant and unavoidable effects on buried human remains and buried archaeological sites that cannot feasibly be identified in advance of construction. Therefore, the action alternatives would each make a cumulatively significant contribution to a cumulatively significant loss of cultural resources.

Mitigation Measure CUL-1: Prepare a Data Recovery Plan and Perform Data Recovery Excavations on the Affected Portion of the Deposits of Identified and Significant Archaeological Sites

Please see Mitigation Measure CUL-1 under Impact CUL-1 in the discussion of Alternative 1A.

Mitigation Measure CUL-2: Conduct Inventory, Evaluation, and Treatment of Archaeological Resources

Please see Mitigation Measure CUL-2 under Impact CUL-2 in the discussion of Alternative 1A.

Mitigation Measure CUL-3: Implement an Archaeological Resources Discovery Plan, Perform Training of Construction Workers, and Conduct Construction Monitoring

Please see Mitigation Measure CUL-3 under Impact CUL-3 in the discussion of Alternative 1A.

Mitigation Measure CUL-4: Follow State and Federal Law Governing Human Remains if Such Resources Are Discovered during Construction

Please see Mitigation Measure CUL-4 under Impact CUL-4 in the discussion of Alternative 1A.

Mitigation Measure CUL-5: Consult with Relevant Parties, Prepare and implement a Built Environment Treatment Plan

Please see Mitigation Measure CUL-5 under Impact CUL-5 in the discussion of Alternative 1A.

Mitigation Measure CUL-6: Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be Adversely Impacted by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts

Please see Mitigation Measure CUL-6 under Impact CUL-6 in the discussion of Alternative 1A.

Mitigation Measure CUL-7: Conduct Cultural Resource Studies and Adopt Cultural Resource Mitigation Measures for Cultural Resource Impacts Associated with Implementation of Conservation Measures 2–22

Please see Mitigation Measure CUL-7 under Impact CUL-7 in the discussion of Alternative 1A.

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