4.6 GEOLOGY, SOILS, MINERAL, AND PALEONTOLOGICAL RESOURCES

1. INTRODUCTION

This section assesses the effects of the proposed CCAP Update on the geology and soils resources of the County. Government agencies and the public were provided an opportunity to comment on the proposed Project in response to a Notice of Preparation (NOP) of and EIR and an Initial Study that provided a preliminary summary of potential impacts that could result from the Project. No comments related to geology and soils were received.

The following subsections describe the existing geological and paleontological setting of the County and specifically in the lower Cache Creek area, the applicable regulatory framework, criteria of significance used to determine potential environmental effects that may result from implementation of CCAP Update, identified impacts, and mitigation measures to reduce those impacts to a less-than-significant level, if applicable.

2. SETTING

a. Physical Environment

(1) Geology

The planning area is located on the western margin of the Sacramento Valley, the northern portion of the Great Valley Geomorphic Province of California. The Sacramento Valley is a large structural trough formed between the Coast Ranges to the west and the Sierra Nevada to the east. The Valley is filled with a thick sequence of sedimentary rocks and sediments that range from Upper Jurassic age (150 million years old) marine rocks through modern alluvial deposits (Figure 4.6-1).

The headwaters (source) of Cache Creek are located in the upland area of the Coast Ranges to the northwest. The upstream reaches along Cache Creek contain areas of active erosion that are the primary sources of sediment supply, which are transported and deposited downstream. The Creek flows southeastward through the Capay Valley to the southern end of the Capay Hills. From the town of Capay, the Creek flows eastward across Hungry Hollow. Through this reach, the Creek is a wide, braided stream with a relatively low gradient. At the eastern margin of Hungry Hollow, the Creek flows in a more constricted, higher-gradient reach through the southern Dunnigan Hills. The Creek then widens and the bed slope decreases as it emerges onto the Sacramento Valley near the town of Yolo.

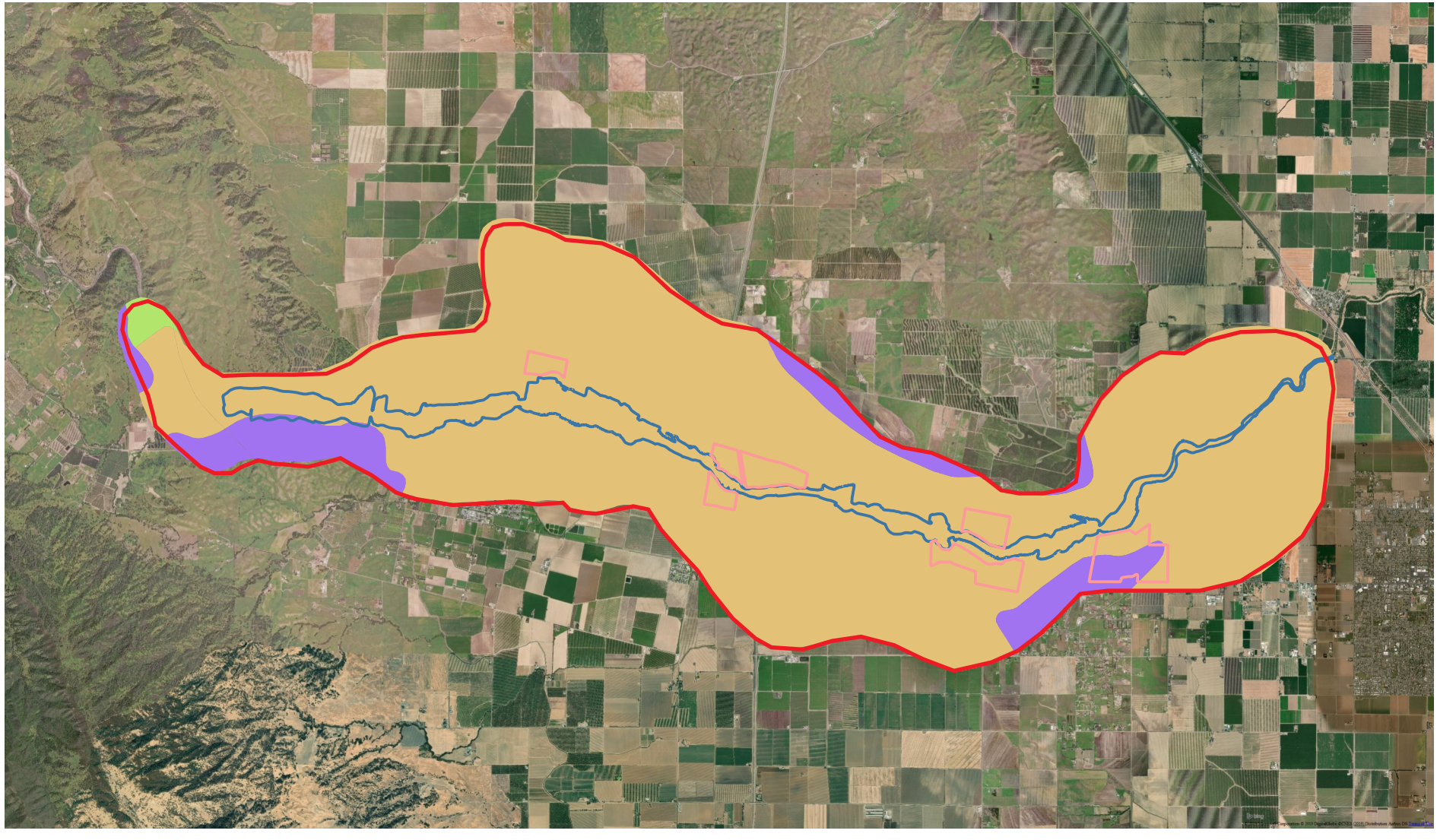
While Yolo County has a relatively low probability for earthquake hazards compared to the rest of California, it is subject to seismic activity both within and near the County and thus, there is a risk of damage to structures and property as a result. There are two known faults of concern in Yolo County,[1] the Hunting Creek Fault and the Dunnigan Hills Fault. The Hunting Creek Fault is located in the extreme northwest portion of the County (over 20 miles from the CCAP Area). The Dunnigan Hills Fault, located about 3 miles north of the CCAP area, is a late Quaternary (<130,000 years) fault,[2] and is not considered active (no demonstrated movement within the last 11,000 years).

[1] County of Yolo Countywide General Plan, 2009, Health and Safety Element, page HS-5.

[2] United States Geological Survey, 2018, U.S. Quaternary Faults and Folds Database, website accessed 10/3/18: https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=db287853794f4555b8e93e42290e9716

CCAP UPDATE AREA GEOLOGY

Figure 4.6-1



Legend

- Q: Pleistocene-Holocene - Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated.
- QPc: Pleistocene-Holocene - Pliocene and/or Pleistocene sandstone, shale, and gravel deposits.
- Ku: Upper Cretaceous - Upper Cretaceous sandstone, shale, and conglomerate.
- Project Area
- CCRMP Area
- Future Proposed Mining Area (as proposed under CCAP Update)

Source: United States Department of Agriculture, Natural Resources Conservation Service, 2019.

0 2 Miles

BASELINE ENVIRONMENTAL CONSULTING

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The surface soils that mantle the planning area are developed on alluvial fans, terraces, and in basins. The primary soil associations in the planning area are those of the Yolo-Brentwood association. These soils are generally well-drained, nearly level silt loams to silty clay loams on alluvial fans. The CCAP area is located within a geologic setting that is known to contain important and high-quality aggregate resources. The area is classified as MRZ-2[3]. This classification indicates areas underlain by mineral deposits where geologic data demonstrate that significant measured or indicated economic resources are present. Further, these deposits contain Portland cement concrete (PCC)-grade aggregates. The material specifications for PCC-grade aggregate are more restrictive than the specifications for aggregate for other uses. For this reason PCC-grade aggregate is the scarcest and most valuable aggregate resource in the region.[3]

(2) Paleontology

Paleontology is the science is the study of life of past geological periods as known from fossil remains, and paleontological resources are fossils that typically occur in sedimentary rocks and deposits.

The planning area is located at the boundary between the Coast Ranges and the Central Valley geologic provinces and contains rocks associated with both regions. The rocks in the planning area range in age from Late Cretaceous to recent and vary in lithology from marine sandstones to non-marine sands and gravel (Figure 4.6-1). Rocks from the Forbes (Late Cretaceous), Tehama and Red Bluff (Pliocene), and Modesto-Riverbank (Quaternary) formations are present in the planning area. Each of these formations is reported as being fossiliferous (i.e., potentially bearing paleontological resources). While nearly all of the stratigraphic units contain fossils in other areas, the record of paleontological finds in the planning area is generally sparse.

Recorded paleontological finds within the planning area are limited and are mostly confined to the gravels mapped as Modesto-Riverbank Formations. Several mammoth fossils have been collected from the unit mapped as the Modesto Riverbank Formations. One mammoth locality northeast of Madison was in the bed of Cache Creek but the fossils almost certainly were eroded out of the older gravels. Mammoth tusks, four to five molars, and a skull were collected in 1982. In 1955, a large molar was collected about 3 miles downstream from the 1982 locality.[4]

In September 2004 during aggregate excavations at the Granite Capay mining facility, the pelvis of a mammoth was discovered in the Tehama formation at the mouth of Capay Valley, where Cache Creek once formed a delta. The excavation of the specimen by paleontologists indicated that it was an isolated discovery.[5] Another fossil discovery occurred at the CEMEX mining facility in 2018. Though documentation is not yet available, early reports indicate a portion of a mastodon skeleton was discovered.

b. Regulatory Environment

(1) Federal and State

According to the California Code, Public Resources Code - PRC § 5097.5:

> A person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency,

[3] California Department of Conservation, Division of Mines and Geology, 1988, Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento-Fairfield Production-Consumption Region, Special Report 156. Accessed: https://archive.org/details/minerallandclass156dupr/page/n15

[4] Yolo County, 1996, Draft EIR for Off-Channel Mining Plan for Lower Cache Creek, March 26.

[5] Yolo County, 2009. op.cit

rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands.

The Society of Vertebrate Paleontology has identified vertebrate fossils, their taphonomic and associated environmental indicators, and fossiliferous deposits as significant nonrenewable paleontological resources. Botanical and invertebrate fossils and assemblages may also be considered significant resources.[6]

(2) Local

2030 Countywide General Plan. The CCAP is an adopted part of the 2030 Countywide General Plan that contains the following goals, policies, and actions related to geology, soils, and paleontological resources that are relevant to the CCAP Update:

GOAL CO-3 Mineral Resources. Protect mineral and natural gas resources to allow for their continued use in the economy.

Policy CO-3.1 Encourage the production and conservation of mineral resources, balanced by the consideration of important social values, including recreation, water, wildlife, agriculture, aesthetics, flood control, and other environmental factors.

Policy CO-3.2 Ensure that mineral extraction and reclamation operations are compatible with land uses both on-site and within the surrounding area, and are performed in a manner that does not adversely affect the environment.

Policy CO-3.5 Preserve and protect the County's unique geologic and physical features, which include geologic or soil "type localities", and formations or outcrops of special interest.

Action CO-A63 Require cultural resources inventories of all new development projects in areas where a preliminary site survey indicates a medium or high potential for archaeological, historical, or paleontological resources. In addition, require a mitigation plan to protect the resource before the issuance of permits. Mitigation may include:

- Having a qualified archaeologist or paleontologist present during initial grading or trenching;
- Redesign of the project to avoid historic or paleontological resources;
- Capping the site with a layer of fill; and/or
- Excavation and removal of the historical or paleontological resources and curation in an appropriate facility under the direction of a qualified professional.

Action CO-A65 Require that when cultural resources (including non-tribal archeological and paleontological artifacts, as well as human remains) are encountered during site preparation or construction, all work within the vicinity of the discovery is immediately halted and the area protected from further disturbance. The project applicant shall immediately notify the County Coroner and the Planning and Public Works Department. Where human

[6] Society for Vertebrate Paleontology, 1995. Conformable Impact Mitigation Guidelines. Society for Vertebrate Paleontology News Bulletin 163: January.

remains are determined to be Native American, the project applicant shall consult with the Native American Heritage Commission (NAHC) to determine the person most likely descended from the deceased. The applicant shall confer with the descendant to determine appropriate treatment for the human remains, consistent with State law.

CCAP Plans and Regulations. The existing ordinances related to geology, soils, mineral and paleontological resources are presented below. The CCAP Update proposed minor changes to some of these ordinances (which are not shown here). Refer to the list of proposed CCAP Update changes to these ordinances included in Chapter 3.0 Project Description.

In-Channel Ordinance.

Section 10-3.103. Purpose.

(a) The purpose of this chapter is to implement the provisions of the Cache Creek Area Plan (CCAP) as related to allowed in-channel activities. Limited excavation activities related to stream stabilization, flood protection, and riparian restoration (referred to as "maintenance mining") may be performed pursuant to the Cache Creek Resources Management Plan (CCRMP) and the Cache Creek Improvement Program (CCIP). This maintenance mining is necessary and required in order to protect structures, infrastructure and land uses along the creek and downstream, from damage from natural creek forces (flooding, erosion, deposition, washout, etc.). This chapter establishes the regulations applicable to all maintenance mining allowed to occur within Cache Creek, within the boundaries of the CCAP.

(b) Stabilizing the channel banks and profiles pursuant to the CCRMP/CCIP will result in reduced erosion, increased in-channel recharge, and additional riparian habitat opportunities.

Section 10-3.207. Maintenance Mining (no changes proposed by CCAP Update)

"Maintenance mining" shall mean mining undertaken for the sole and/or primary purpose of stream stabilization, flood protection, and riparian restoration as described in the CCJP. This includes erosion control, flood control, bank protection, riparian restoration, and other in-channel activities and/or in-channel modifications consistent with the CCRMP/CCIP.

Section10-3.501. Applications: Contents. [excerpt]

Except as provided for in Section 10-3.502 of this article, all project application documentation shall be submitted to the Director at one time. Three (3) complete copies of the application shall be provided to the County. Applications for proposed in-channel activities shall include, but shall not be limited to, the following:

(a) Completed Flood Hazard Development Permit (FHDP) application forms;

(b) A detailed narrative description of the proposed activity;

(c) Appropriate site-specific technical reports (if not already on file) such as a biological resources analysis and revegetation program; a hydrology analysis; a geotechnical analysis; an engineered excavation plan.

Section 10-3.1004. Inspections; Designee.

Inspections shall be conducted by a state-registered geologist, state-registered civil engineer, state-licensed landscape architect, state-registered forester, County staff, or other designee as determined by the Director, who is familiar with land reclamation issues (as described in the Act and related regulations) and experienced in activities governed by the Act, and who has not been employed by the applicant in any capacity during the previous twelve (12) months.

Section 10-3.408. Hazards and Hazardous Materials. [excerpt] (changed to 10-3.407 under CCAP Update)

(a) All heavy equipment used for channel improvement projects shall be kept in good working order to reduce emissions and preclude the leakage of oils, fuels, and other substances that may adversely affect property, the environment, or human health and safety.

Fueling and maintenance activities shall not occur within one-hundred (100) feet of the active channel. All procedures for handling, storage, and disposal of hazardous materials shall be described in a Storm Water Pollution Prevention Plan if required for the projects. Any long-term project (e.g., extensive erosion control, gravel removal) shall have a chemical spill prevention and emergency plan filed and approved by the appropriate local agency. The plan must include training of the equipment operator and workers in spill reporting and how to minimize environmental damage.

(b) Firms or individuals performing work within the channel shall immediately notify the Director and/or the Yolo County Office of Emergency Services of any events such as fires, explosions, spills, land or slope failures, or other conditions at the site which could pose a risk to property, the environment, or human health and safety outside the permitted area. Upon request by any County agen.cy, the firm or individual shall provide a written report of any such event, within thirty (30) days, which shall include, but not be limited to, a description of the facts of the event, the corrective measures used, and the steps taken to prevent a recurrence of the incident. This condition does not supersede nor replace any requirement of any other government agency for reporting incidents.

Section10-3.418. Slopes.

(a) Final slopes for in-channel excavations shall conform to the channel slope and sinuosity guidelines shown in Figure 11 of the CCRMP. Excavations shall be sloped in a downstream direction, towards the low-

flow channel. When recommended by the TAC, alternate grading plans may be approved by the Director.

(b) In-channel excavations shall generally conform to the cross-section profiles shown in Figures 12 through 16 of the CCRMP. When recommended by the TAC, alternate grading plans may be approved by the Director.

Section10-3.404. Cultural Resources.

(a) If human skeletal remains are encountered during excavation, all work within seventy-five (75) feet shall immediately stop, and the County Coroner shall be notified within twenty-four (24) hours. If the remains are of Native American origin, the appropriate Native American community identified by the Native American Heritage Commission shall be contacted, and an agreement for treating or disposing, with appropriate dignity, of the remains and associated grave goods shall be developed. If any cultural resources, such as chipped or ground stone, historic debris, building foundations, or paleontological materials are encountered during excavation, then all work within seventy-five feet shall immediately stop and the Director shall be notified at once. A qualified archaeologist shall then examine any cultural resources found on the site and the information shall be submitted to the County.

(b) Damaging effects to cultural resources shall be avoided whenever possible. If avoidance is not feasible, the importance of the site shall be evaluated by a qualified archeologist prior to the commencement of excavation operations. If a cultural resource is determined not to be important, both the resource and the effect on it shall be reported to the County, and the resource need not be considered further. If avoidance of an important cultural resource is not feasible, a mitigation plan shall be prepared and implemented. The mitigation plan shall explain the importance of the resource, describe the proposed approach to mitigate destruction or damage to the site, and demonstrate how the proposed mitigation would serve the public interest.

Off-Channel Ordinance

Section 10-4.403. Accident reporting.

The operator shall immediately notify the Director of any events such as fires, explosions, spills, land or slope failures, or other conditions at the site which could pose a hazard to life or property. Action shall be immediately undertaken to alleviate the hazard. Upon request by any County agency, the operator shall provide a written report of any such event, within thirty (30) days, which shall include, but not be limited to, a description of the facts of the event, the corrective measures used, and the steps taken to prevent a recurrence of the incident. This condition does not supersede nor replace any requirement of any other governmental entity for reporting incidents.

A copy of the operators' approved Business Emergency Response Plans and the approved Spill Prevention Control and Countermeasure Plans

shall be submitted to the Yolo County Health Department, prior to the commencement of mining.

Section 10-4.406. Benches.

During mining operations, a series of benches may be excavated in a slope provided that the excavations are made in .compliance with the requirements of the state Mine Safety Orders (California Code of Regulations, Title 8, Subchapter 17). The vertical height and slope of the benches constructed for permanent reclaimed slopes shall not exceed maximum standards for the specific soil types presented in the California Code of Regulations, Title 8, Article 6. In general, vertical cutslopes between benches shall not exceed four (4) feet in height in topsoil and overburden sediments. Benching shall be allowed .in cohesive soil (clay, sandy or silty clay, clayey silt) only. Slopes above the elevation of groundwater (determined at the time of the excavation by the level of exposed water in the excavation) that exceed the maximum vertical height shall be excavated and maintained at slopes not greater than 2:1 (horizontal:vertical). Slopes located five (5) feet or less below the average summer low groundwater level shall not be steeper than 2:1 (horizontal:vertical). Slopes located more than five (5) feet below the average summer low groundwater level shall not be steeper than 1:1 (horizontal to vertical).

Vertical cutslopes in excess of four (4) feet in height may be approved for the development of special habitat (e.g., bank swallows) if a site-specific slope stability analysis, performed by a licensed engineer, indicates that the slope does not exceed critical height for the on-site soil conditions. Projects proposing such slopes shall submit a long-term maintenance plan to ensure that the function of the slopes as habitat is met.

Section 10-4.410. Cultural resources.

(a) All resource records shall be checked for the presence of and the potential for prehistoric and historic sites. Damaging effects on cultural resources shall be avoided whenever possible. If avoidance is not feasible, the importance of the site shall be evaluated by a qualified professional prior to the commencement of mining operations. If a cultural resource is determined not to be important, both the resource and the effect on it shall be reported to the Agency, and the resource need not be considered further If avoidance of an important cultural resource is not feasible, a mitigation plan shall be prepared and implemented. The mitigation plan shall explain the importance of the resource, describe the proposed approach to mitigate destruction or damage to the site, and demonstrate how the proposed mitigation would serve the public interest.

(b) If human skeletal remains are encountered during excavation, all work within seventy-five (75) feet shall immediately stop, and the County Coroner shall be notified within twenty-four (24) hours. If the remains are of Native American· origin, the appropriate Native American community identified by the Native American Heritage Commission shall be contacted, and an agreement for treating or disposing of, with appropriate dignity, the remains and associated grave goods shall be developed. If

any cultural resources, such as chipped or ground stone, historic debris, building foundations, or paleontological materials are encountered during excavation, then all work within seventy-five (75) feet shall immediately stop and the Director shall be notified at once. Any cultural resources found on the site shall be recorded by a qualified archaeologist and the information shall be submitted to the Agency.

Section 10-4.413. Drainage.

Surface water shall be prevented from entering mined areas, through either perimeter berms or ditches and grading. Appropriate erosion control measures shall be incorporated into all surface water drainage systems. Natural and stormwater drainage systems shall be designed so as to prevent flooding on surrounding properties and County rights-of-way. Storm water runoff from mining areas shall be conveyed to lowered areas (detention basins) to provide detention of runoff generated during a 20-year, one hour storm event. All drainage conveyance channels or pipes (including spillways for detention areas) shall be designed to ensure positive drainage and minimize erosion. The drainage conveyance system and storm water detention areas shall be designed and maintained in accordance with Best Management Practices for the reduction of pollutants associated with runoff from mined areas. The design and maintenance procedures shall be documented in the Storm Water Pollution Prevention Plan required for, mining operations. The drainage system shall be inspected annually by a Registered Civil Engineer, Registered Geologist, or Certified Erosion and Sediment Control Specialist to ensure that the drainage system is functioning effectively and that adverse erosion and sedimentation are not occurring. The annual inspection shall be documented in the Annual Mining and Reclamation Report.

Section 10-4.414. Dust control.

The following measures shall be implemented in order to control fugitive dust:

(a) All stockpiled soils shall be enclosed, covered, or adequately watered to keep soil moist at all times. Inactive soil stockpiles should be vegetated or adequately watered to create an erosion-resistant outer crust.

(b) During operating hours, all disturbed soil and unpaved roads shall be adequately watered to keep soil moist.

(c) All disturbed but inactive portions of the site shall either be seeded or watered until vegetation is grown or shall be stabilized using methods such as chemical soil binders, jute netting, or other Yolo-Solano Air Quality Management District approved methods.

Section 10-4.431 Slopes.

Except where benches are used, all banks above groundwater level shall be sloped no steeper than 2:1 (horizontal:vertical). Proposed steeper slopes shall be evaluated by a slope stability study, prepared by a

Registered Civil engineer, Slopes below the groundwater level shall be no steeper than 1 :1 (horizontal:vertical). Slopes located five (5) feet or less below the summer low groundwater level shall not be steeper than 2:1 (horizontal:vertical).

Section 10-4.432. Soil removal.

Soil shall be cut in maximum depths in order to minimize traffic and limit compaction. The handling and transportation of soil shall be minimized. All handling of topsoil shall be accomplished when the soil is dry in order to avoid undue compaction.

Section 10-4.433. Soil stockpiles.

Topsoil, subsoil, and subgrade materials in stockpiles shall not exceed forty (40) feet in height, with slopes no steeper than 2:1 (horizontal:vertical). Stockpiles, other than aggregate stockpiles, shall be seeded with a vegetative cover to prevent erosion and leaching. The use of topsoil for purposes other than reclamation shall not be allowed. without the prior approval of the Director.

Slopes on stockpiled soils shall be graded to a 2:1 (horizontal:vertical) slope for long-term storage to prevent use by bank swallows. At no time during the active breeding season (May 1 through July 31) shall slopes on stockpiles exceed a slope of 1:1, even on a temporary basis. Stockpiles shall be graded to a minimum 1:1 slope at the end of each work day where stockpiles have been disturbed during the active breeding season.

Section 10-4.502 Applications: Contents. [excerpt] (no proposed changes under CCAP Update)

(b)(5) A geotechnical study to evaluate any proposed operational slopes steeper than a 2:1 (horizontal:vertical) ratio to ensure that they will be stable while mining is being conducted and that the slopes possess an adequate factor of safety. The study shall include an evaluation of any slopes proposed to provide flood protection from Cache Creek and shall indicate what measures are proposed to prevent breaching or pit capture. Measures shall be included within the study to ensure slope stability and maintenance;

Section 10-4.701 Annual Reports: Contents. [excerpt] (no proposed changes under CCAP Update)

Every surface mining operator shall submit an annual report of surface mining operations no later than November 1 of each year, describing the activities of the previous twelve (12) months. Annual reports shall no longer be required, once final reclamation has been completed and financial assurances have been released. Such reports shall contain the following information:

(g) A report prepared by a Registered Geologist, a Licensed Geotechnical Engineer, or a Registered Civil Engineer describing the remedial

measures necessary to remediate any slope failures, levee breaches, or other topographical problems referred to in the site plan above.

Section 10-4.1104. Inspections; Designee.

Inspections shall be conducted by a state-registered geologist, state-registered civil engineer, state-licensed landscape architect, state-registered forester, County staff, or other designee as determined by the Director, who is experienced in mined land reclamation and who has not been employed by the mining operation in any capacity during the previous twelve (12) months.

Section 10-5.505. Backfilled excavations: Inspections.

Backfilled mining areas and slopes shall be inspected by the Yolo County Community Development Agency following strong seismic shaking events. Observable damage shall be reported to the landowner. If the YCCDA determines that the damage requires repair to meet the intended use of the reclaimed land, the landowner shall perform the required repairs.

Reclamation Ordinance

Section 10·5.508. Erosion control.

The grading of final slopes, the replacement of soil, and associated erosion control measures shall take place prior to November 1 in areas where mining has been completed. To minimize erosion, the finish grading of mining pit slopes above the average seasonal high groundwater level, with the exception of the location of designated haul roads, shall be performed as soon as practical after the mining of overburden and unsaturated aggregate resources has been completed. A drought-tolerant, weed-free mix of native and non-native grass species shall be established on slopes prior to November 1 or alternate erosion control (mulch or netting) shall be placed on exposed soil on the slopes prior to this date. Phasing of mining to minimize the length of exposed mining slopes during the rainy season is encouraged.

Section 10-5.530. Slopes.

All final reclaimed slopes shall have a minimum safety factor equal to or greater than the critical gradient as determined by an engineering analysis of the slope stability. Final slopes less than five (5) feet below the average summer low groundwater level shall be designed in accordance with the reclaimed use and shall not be steeper than 2:1 (horizontal:vertical). Reclaimed wet pit slopes located five (5) feet or more below the average summer low groundwater level shall not be steeper than 1 :1 (horizontal:vertical), in order to minimize the effects of sedimentation and biological clogging on groundwater flow, to prevent stagnation, and to protect the public health.

The maximum slope angle for all final reclaimed slopes shall be determined by slope stability analysis performed by a Licensed

Geotechnical Engineer or Registered Civil Engineer and submitted with any mining and reclamation application for review by the Yolo County Community Development Agency. The slope stability analysis shall conform with industry standard methodologies ·regarding rotational slope failures under static and pseudostatic (seismic) conditions. The minimum factor of safety for all design reclamation slopes located adjacent to levees or below existing structures shall not be less than 1.5 for static and 1.1 for pseudostatic (seismic) conditions. Other reclamation slopes shall meet a minimum factor of safety that is consistent with the post-reclamation use proposed for the mining area.

Section 10-5.601. Applications: Contents. [excerpt]

Applications for proposed reclamation plan shall include, but shall not be limited to, the following:

(c)(3) A geotechnical study to evaluate the proposed final slopes to ensure that they will be stable once mining has been completed and that the slopes possess an adequate factor of safety. Measures shall be included within the study to ensure slope stability and maintenance.

Section 10-5.531. Soil ripping.

Where areas are to be reclaimed to agricultural usage, all A and B horizon soil shall be ripped to a depth of three (3) feet after every two (2) foot layer of soil is laid down, in order to minimize compaction.

Section 10-5.601. Applications: Contents. [excerpt]

(c)(3) A geotechnical study to evaluate the proposed final slopes to ensure that they will be stable once mining has been completed and that the slopes possess an adequate factor of safety. Measures shall be included within the study to ensure slope stability and maintenance.

Section 10-5.1202. Inspections: Annual.

At least once every year, the Director shall conduct an inspection of each surface mining operation to determine whether the operator is in compliance with the Act, the Regulations, and this chapter. Each inspection shall be conducted within six (6) months after receipt by the County of the operation's annual report, submitted pursuant to Section 2207 of the Public Resources Code, and may be combined with other site inspections, as appropriate. The Director shall notify the Department within thirty (30) days of the completion of the inspection, and shall forward a copy of said inspection notice and any supporting documentation to the operator.

Section 10-5.1204. Inspections; Designee.

Inspections shall be conducted by a state-registered geologist, state-registered civil engineer, state-licensed landscape architect, state-registered forester, County staff, or other designee as determined by the Director, who is experienced in mined land reclamation and who has not

been employed by the mining operation in any capacity during the previous twelve (12) months.

3. IMPACTS AND MITIGATION MEASURES

a. Significance Criteria

The following significance criteria are based on the changes to CEQA, including Appendix G, that were adopted by the California Natural Resources Agency on December 28, 2018.[7] The following criteria are for the topics of geology, soils and mineral resources and have not changed from the previously adopted CEQA criteria that were identified in the NOP/Initial Study released in May 2017 with one exception. Per the adopted 2019 changes, paleontological resources are now addressed in this section of the Draft EIR, and the criteria regarding that topic are identified below.

A significant impact to geology, soils, mineral and paleontological resources could occur if the Project would:

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

   i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

   ii) Strong seismic ground shaking?

   iii) Seismic-related ground failure, including liquefaction?

   iv) Landslides?

b) Result in substantial soil erosion or the loss of topsoil?

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

g) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

h) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

b. Impacts Found Less than Significant in Initial Study

In the Initial Study, the conclusion was reached that implementation of the proposed CCAP Update would not result in significant impact for several of the significance criteria. These are summarized below.

[7] http://resources.ca.gov/ceqa/ accessed January 9, 2019.

Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.

Fault rupture of the surface typically occurs along existing faults that have ruptured the surface in the past. No portion of the CCAP area is within the established Alquist-Priolo Earthquake Fault Zone (A-PEFZ), and no active faults have been mapped in the area by the United States Geological Survey (USGS) or the California Geological Survey (CGS). Since faults with known surface rupture have been mapped in California, and none are known to occur at or near the CCAP area, the potential for impacts to the proposed Project due to fault rupture are less than significant.

Strong Seismic Ground Shaking.

While Yolo County has a relatively low probability for earthquake hazards compared to the rest of California, it is subject to seismic activity both within and near the County. In the event of a major earthquake, the CCAP area could be subject to seismic ground shaking. However, the proposed restoration projects and mining and aggregate processing land uses would not be particularly susceptible to seismic ground shaking, and therefore impacts related to seismic shaking are less than significant.

Seismic-related Ground Failure, Including Liquefaction.

The Initial Study found that the CCAP area could be susceptible to liquefaction. However, the proposed land uses at the site, surface mining and post-mining reclamation to open space, are not particularly susceptible to liquefaction hazards, and therefore impacts related to liquefaction are less than significant.

These two criteria are considered together:

Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse; and

Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.

In general, the types of coarse-grained soils (which include abundant sand and gravel) that characterize the CCAP area are not unstable or highly expansive. In addition, the proposed land uses at the site, in-channel open space, off-channel surface mining and post-mining reclamation to open space, are not particularly susceptible to unstable soil hazards or expansive soil hazards, and therefore impacts related to unstable/expansive soils are less than significant.

Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

It is possible that new mining sites may need to install new septic systems. However, existing County ordinances include specific soils testing requirements for new systems and if on-site soils are found to be inadequate, imported soils can be used and alternative treatment systems which meet County requirements constructed, and therefore impacts related to septic systems are less than significant.

Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State.

The CCAP area is located within a geologic setting that is known to contain important and high-quality aggregate resources. The area is classified as MRZ-2. The loss of availability of this resource could occur, for example, if urbanization was allowed to encroach on the resource zone, eliminating access to the resource due to the presence of high-value improvements at the surface. One of the primary objectives of the CCAP (in particular the OCMP portion of the program) is allow for the extraction of these sand and gravel resources while recognizing that there are other resources that require recognition and protection. As a mining plan, the OCMP ensures the preservation and regulation of known mineral resources, and would not cause the loss of the availability of the resource. Therefore, the potential impact related to a loss of availability of a known mineral resource of regional value is less than significant.

Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan

The Yolo County General Plan shows that the CCAP area is located within an MRZ-2 zone. Mining in Yolo County is regulated by the OCMP, which is a component of the CCAP. The OCMP and implementing ordinances preserve, protect, and allow controlled harvesting of mineral resources consistent with state policy and law. Therefore, the potential impact related to a loss of availability of a known mineral resource of regional value is less than significant.

c. Approach

The proposed CCAP Update is comprised of a series of specific text changes to eight policy and regulatory County plans and ordinances that govern the County's activities along Lower Cache Creek. The proposed text changes that have the potential to result in impacts related to geology and soils are identified in Table 4.6-1, located at the end of this section. Each proposed change is discussed in the impact analysis below.

d. Impacts Analysis

Impact GEO-1: The CCAP Update would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides. (LTS)

Proposed Revisions to In-Channel Plans and Regulations

The 1996 CCAP eliminated commercial mining within the Cache Creek channel. The CCRMP acknowledged that channel bank instability could persist after mining was eliminated in the channel. Therefore, the CCAP included the CCIP to monitor and improve the stability of the creek. Implementation of specific In-Channel Ordinance ordinances (Sections 10-3.103 and 10-3.307) that support this goal of the program (to increase bank stability and minimize landslides within the channel) would ensure that the CCAP Update would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides. Specifically, the In-Channel ordinance [Section10-3.418. Slopes] requires that final slopes for in-channel excavations conform to the channel slope and sinuosity guidelines established in the CCRMP. Excavations must be sloped in a downstream direction, towards the low-flow channel. In addition, the TAC may recommend alternate grading plans to increase bank stability. In addition, the In-Channel ordinance [Section 10-3.1004. Inspections; Designee] requires Inspections to be conducted by a state-registered geologist, state-registered civil engineer, state-licensed landscape architect, state-registered forester, County staff, or other designee as determined by the Director, who is familiar with land reclamation issues. There are no proposed changes to the CCAP documents that would adversely affect slope stability or

create new landslide hazards within and adjacent to the Cache Creek Channel. Therefore, this potential impact is less than significant.

Proposed Revisions to Off-Channel Plans and Regulations

As indicated in Table 4.6-1, the CCAP Update includes a proposed modification to Section 10-4.431. Drainage, of the Mining Ordinance that clarifies that the section applies only to final/reclaimed slopes and not to active mining faces. If the steepness of active mining faces is not managed or controlled, safety issues related to slope failures (and potential injuries to workers) could occur. However, the Mining Ordinance (as modified by the proposed CCAP Update) includes two regulations Section 10-4.406. Benches, and Section 10-4.403. Accident Reporting, that would ensure proper slope management during mining and maintenance of worker safety (see Table 4.6-1). The Mining Ordinance [Section 10-4.406. Benches] specifies that during mining operations, a series of benches may be excavated in a slope provided that the excavations are made in compliance with the requirements of the state Mine Safety Orders (California Code of Regulations, Title 8, Subchapter 17) and that the vertical height and slope of the benches constructed for permanent reclaimed slopes must not exceed maximum standards for the specific soil types. In addition, Off-Channel Ordinance [Section 10-5.530. Slopes] specifies that all final reclaimed slopes have a minimum safety factor equal to or greater than the critical gradient as determined by an engineering analysis of the slope stability.

Existing County and State regulations that restrict mining slope steepness, specify bench constructions parameters, slope steepness based on engineering studies, and require reporting of slope failures would ensure that potential safety hazards related to mining period slope failures are less than significant.

Impact GEO-2: Off-channel mining and channel maintenance activities that include excavation would not result in substantial soil erosion or the loss of topsoil. (LTS)

The activities that could occur under the CCAP program include soil excavation and grading close to a surface water body (Cache Creek) and could result in adverse impacts related to erosion and sedimentation.

Proposed Revisions to In-Channel Plans and Regulations

In general, surficial materials within the Cache Creek channel are composed of recently deposited gravel, sand, silt, and clay (not top soil). In addition, a primary goal of all in-channel maintenance activity under the CCRMP/CCIP is to reduce and minimize erosion. Therefore, potential in-channel impacts related to erosion of top soil under the CCAP Update are less than significant.

Proposed Revisions to Off-Channel Plans and Regulations

Expanding the potential mining area in the OCMP area (by increasing the area covered by the SGRO zoning overlay designation) would result in the removal of top soil and overburden (to expose the underlying aggregate resources for mining) and could result in loss of topsoil to erosion and sedimentation. However, removal of surficial materials and mining the underlying aggregate is an ongoing activity that is regulated under the CCAP. The Mining Ordinance includes several regulations designed to protect and preserve top soil and to minimize erosion, including Sections 10-4.413, 10-4.414, 10-4.432, 10·5.508, and 10-5.531 (included in Table 4.6-1), and briefly summarized below.

> Section 10-4.413. Drainage. Requires that surface water be prevented from entering mined areas, through either perimeter berms or ditches and grading and that appropriate erosion control measures be incorporated into all surface water drainage systems. The

proposed CCAP Update would modify this ordinance to allow surface water to enter mined areas, but would not alter erosion control requirements.

Section 10-4.414. Dust control. Specifies that fugitive dust and wind erosion is controlled by requiring that all stockpiled soils are enclosed, covered, or adequately watered to keep soil moist at all times. Inactive soil stockpiles should be vegetated or adequately watered and that all disturbed but inactive portions of the site be either be seeded or watered. The proposed CCAP Update would not substantially changes these requirements.

Section 10-4.432 Soil removal. Specifies that soil be cut in maximum depths in order to minimize traffic and limit compaction and that all handling of topsoil shall be accomplished when the soil is dry in order to avoid undue compaction. The proposed CCAP Update would not substantially changes these requirements.

Section 10-5.508 Erosion control. Specifies that the grading of final slopes, the replacement of soil, and associated erosion control measures must take place prior to November 1 in areas where mining has been completed to minimize erosion. The proposed CCAP Update would not substantially changes these requirements.

Section 10-5.531 Soil ripping. The purpose of this ordinance is to minimize compaction of soil, which could damage the soil and limit its usefulness in agricultural reclamation. The proposed CCAP Update would not change this ordinance.

The CCAP Update would not substantially change the requirements related to soil erosion and soil management. Compliance with these regulations, as updated, will ensure that potential impacts related to loss of top soil to erosion are less than significant.

Impact GEO-3: Off-channel mining and channel maintenance activities that include excavation could directly or indirectly destroy a unique paleontological resource site, and could destroy a unique geologic feature. (S)

Unique Geologic Resources. According to the 2030 Countywide General Plan, unique geologic features are not common in Yolo County. The geologic processes in the County are generally the same as those in other parts of the State. The County's few unique geologic or physical features include geologic or soil "type localities" and formations or outcrops of special interest. For example, the type location for "Yolo Series Soil" is located at a particular site on the University of California at Davis campus.

No unique geologic features have been identified by the County within the CCAP area. However, an inventory of these features has not been completed and therefore it is possible that one or more unique geologic features could be present within the CCAP area (either in-channel or off-channel) and could be disturbed or destroyed by activities under the CCAP Update. This is a significant impact, that can be mitigated to a less-than-significant level with implementation of mitigation measures GEO-3a and GEO-3b.

Mitigation Measure GEO-3: Implementation of mitigation measures GEO-3a and GEO-3b would ensure that this impact is mitigated to a less-than-significant level. (LTS)

Paleontological Resources. As described above, many of the sedimentary geologic units with Yolo County (and potentially those within the CCAP Area) are fossil-bearing and could contain paleontological resources. Both in-channel CCRMP/CCIP and off-channel OCMP excavation

activities could encounter and potentially damage or destroy paleontological resources, as described below.

Proposed Revisions to In-Channel Plans and Regulations

As indicated in Table 4.6-1, under the CCAP Update, the preferred channel form would be modified (based on current hydraulic modeling) and renamed the Channel Form Template. Similar to the Test 3 boundary, implementation of the Channel Form Template could result in excavation of undisturbed Cache Creek channel banks. In addition, the In-Channel Ordinance would allow an increase in the amount of aggregate material that could be removed from the channel during any given year for purposes of channel maintenance and erosion control. These changes to the CCAP documents could result in a modest change in the configuration of the Cache Creek channel banks, potentially widening the channel in some areas and narrowing the channel in others. During these excavations paleontological resources could be encountered, and potentially damaged.

The In-Channel Ordinance includes a regulation (Section 10-3.404) that specifies that damage to cultural resources shall be avoided whenever possible. But that if avoidance is not feasible, the importance of the site must be evaluated by a qualified archeologist prior to the commencement of excavation operations. Further, if avoidance of an important resource is not feasible, a mitigation plan must be prepared and implemented. However, the ordinance (Section 10-3.404) does not specify required actions that must be implemented if a paleontological resource is discovered during excavation. The proposed CCAP Update would not substantially change this ordinance. This is a potentially significant impact. Implementation of the following mitigation measure would reduce this potentially significant impact to a less-than-significant level.

> **Mitigation Measure GEO-3a**: The text of In-Channel Ordinance Section 10-3.404 shall be replaced with the following:
>
> Section10-3.404. Cultural Resources.
>
> (a) <u>All resource records shall be checked for the presence of and the potential for prehistoric and historic sites, paleontological resources, and unique geologic features. Damaging effects to cultural resources shall be avoided whenever possible. If avoidance is not feasible, the importance of the site shall be evaluated by a qualified professional (e.g. archeologist, paleontologist, or geologist, depending on the resource type) prior to the commencement of operations. If a cultural or unique geological resource is determined not to be important, both the resource and the effect on it shall be reported to the County, and the resource need not be considered further. If avoidance of an important cultural resource is not feasible, a mitigation plan shall be prepared and implemented. The mitigation plan shall explain the importance of the resource, describe the proposed approach to mitigate destruction or damage to the site, and demonstrate how the proposed mitigation would serve the public interest.</u>
>
> (b) If human skeletal remains are encountered during material removal, all work within seventy-five (75) feet shall immediately stop, and the County Coroner shall be notified within twenty-four (24) hours. If the remains are of Native American origin, the appropriate Native American community identified by the Native American Heritage Commission shall be contacted, and an agreement for treating or disposing, with appropriate dignity, of the remains and associated grave goods shall be developed.

If any cultural resources, such as chipped or ground stone, historic debris, building foundations, or paleontological materials are encountered during material removal, then all work within seventy-five feet shall immediately stop and the Director shall be notified at once. Any cultural or paleontological resources found on the site shall be recorded by a~~A~~ qualified archaeologist or paleontologist using relevant professional protocols ~~shall then examine any cultural resources found on the site and the information~~ and a report fully recording the find shall be submitted to the County. This report shall include recommendations for appropriate treatment of the resource/artifact. The County encourages the donation of resources, other than tribal cultural resources, to the County for public display at the Cache Creek Nature Preserve or other appropriate venue.

~~Damaging effects to cultural resources shall be avoided whenever possible. If avoidance is not feasible, the importance of the site shall be evaluated by a qualified archeologist prior to the commencement of operations. If a cultural resource is determined not to be important, both the resource and the effect on it shall be reported to the County, and the resource need not be considered further. If avoidance of an important cultural resource is not feasible, a mitigation plan shall be prepared and implemented. The mitigation plan shall explain the importance of the resource, describe the proposed approach to mitigate destruction or damage to the site, and demonstrate how the proposed mitigation would serve the public interest.~~ (LTS)

Proposed Revisions to Off-Channel Plans and Regulations

As indicated in Table 4.6-1, the CCAP Update would result in the designation of 1,188 new acres within the OCMP planning area to SGRO which would allow future mining consistent with the program but on acreage not previously evaluated in the original OCMP and OCMP EIR. The potential new mining areas would be located within (and constrained to) the "Future Proposed Mining" areas shown on Figure 3-4. One or more of the "Future proposed Mining" areas could be underlain by sedimentary geologic units that contain paleontological resources. If not properly managed, mining could damage or destroy these resources, if present. The Mining Ordinance includes regulations, including Section 10-4.410 (Table 4.6-1), that ensure resources are protected.

Any proposed new off-channel mining area would be subject to project-level CEQA review (i.e., an EIR would be prepared). As specified in subsection (a) above, the proposed mining site would be evaluated for by a qualified professional to determine if resources are likely to be present prior to the commencement of mining operations, and avoided if possible. In addition, in accordance with Mining Ordinance Section 10-4.410, if any paleontological resources are encountered during excavation, then all work within seventy-five (75) feet must be immediately stopped and the County notified. Any paleontological resources found on the site would be recorded by a qualified archaeologist and the information submitted to the Agency. However, the ordinance (Section 10-4.410) does not specify what would be done with the artifact if a paleontological resource is discovered during excavation. The proposed CCAP Update would not change this ordinance. This is a potentially significant impact. Implementation of the following mitigation measure would ensure that the artifact is properly preserved and reduce this potentially significant impact to a less-than-significant level.

Mitigation Measure GEO-3b: The text of Off-Channel Ordinance Section 10-4.410 shall be modified as follows:

Section 10-4.410. Cultural resources.

(a) All resource records shall be checked for the presence of and the potential for prehistoric and historic sites, paleontological resources, and unique geologic features. Damaging effects on cultural, paleontological, and unique geologic resources shall be avoided whenever possible. If avoidance is not feasible, the importance of the site shall be evaluated by a qualified professional (either an archaeologist of geologist, depending on the resource type) prior to the commencement of mining operations. If a cultural resource or unique geologic resource is determined not to be important, both the resource and the effect on it shall be reported to the County~~Agency~~, and the resource need not be considered further. If avoidance of an important cultural, paleontological, or unique geologic resource is not feasible, a mitigation plan shall be prepared and implemented. The mitigation plan shall explain the importance of the resource, describe the proposed approach to mitigate destruction or damage to the site, and demonstrate how the proposed mitigation would serve the public interest.

(b) If human skeletal remains are encountered during excavation, all work within seventy-five (75) feet shall immediately stop, and the County Coroner shall be notified within twenty-four (24) hours. If the remains are of Native American origin, the appropriate Native American community identified by the Native American Heritage Commission shall be contacted, and an agreement for treating or disposing of, with appropriate dignity, the remains and associated grave goods shall be developed.

If any cultural resources, such as chipped or ground stone, historic debris, building foundations, or paleontological materials are encountered during excavation, then all work within seventy-five (75) feet shall immediately stop and the Director shall be notified at once. ~~Any cultural resources found on the site shall be recorded by a qualified archaeologist and the information shall be submitted to the Agency.~~ The find must be recorded by a qualified archaeologist or paleontologist using relevant professional protocols and a report fully recording the find submitted to the County. This report shall include recommendations for appropriate removal and preservation of the artifact. The County encourages the donation of the find to the County for public display at the Cache Creek Nature Preserve or other appropriate venue. (LTS)

Table 4.6-1: Proposed CCAP Updates Related to Geology, Soils, Mineral and Paleontological Resources

Geology	
	CCAP DOCUMENT CHANGE
Increase in Potential Off-Channel Mining Area	
OCMP (page 15)	**Planning Area for OCMP and CCRMP~~The Cache Creek Resources Management Plan~~** The planning area for the OCMP is defined as the area contained within the Mineral Resource Zones (28,130 acres), minus the planning~~in-channel~~ area regulated under the CCRMP (2,266 acres), or a total of 25,864 acres (see Figure 4). Within the OCMP planning area, 1,900 acres are currently approved for excavation which is a subset of the 2,464-acre total for all approved mine sites (area zoned Sand and Gravel Overlay or SGO), 1,001 acres are zoned currently to allow for future mining (Sand and Gravel Reserve Overlay or SGRO), and another 1,188 acres are proposed to be rezoned for future mining, as described below. The planning area for the CCRMP is equal to the active in-channel area of the creek system, as defined by the delineated~~present~~ channel bank line or the 100-year flood elevation, ~~described in the Westside Tributaries Study prepared by the U.S. Army Corps of Engineers,~~ whichever is wider ~~(see Figure 3)~~ modified as described in the CCRMP. The in-channel area encompasses 5,109~~around 4,956~~ acres, including 2,266~~1,600~~ acres within the CCRMP~~present channel~~ boundary, plus several thousand acres located in the floodplain north of the City of Woodland (see Figure 3). ~~Subtracting this acreage from the 28,130 acres included in the State MRZs, leaves a total of approximately 23,174 acres within the planning area of the Off-Channel Mining Plan. As described in the following section, however, only 2,887 acres of the plan area are proposed to be rezoned to allow for off-channel mining over the next fifty years, or about 12 percent of the OCMP planning area.~~
Regulations Relevant to Geology and Soils and Paleontology	
Off-Channel Surface Mining Ordinance	**Section 10-4.403. Accident reporting.** The operator shall immediately notify the Director of any events such as fires, explosions, spills, land or slope failures, or other conditions at the site which could pose a hazard to life or property. Action shall be immediately undertaken to alleviate the hazard. ~~Upon request by any County agency, t~~The operator shall provide a written report of any such event, within thirty (30) days, which shall include, but not be limited to, a description of the facts of the event, the corrective measures used, and the steps taken to prevent a recurrence of the incident. Failure to provide this report shall initiate violation proceedings pursuant to Article 11. This condition does not supersede nor replace any requirement of any other governmental entity for reporting incidents. ~~A copy of the operators' approved Business Emergency Response Plans and the approved Spill Prevention Control and Countermeasure Plans shall be submitted to the Yolo County Health Department, prior to the commencement of mining~~.
	Section 10-4.406. Benches. During mining operations, a series of benches may be excavated in a slope provided that the excavations are made in compliance with the requirements of the state Mine Safety Orders (California Code of Regulations, Title 8, Subchapter 17). The vertical height and slope of the benches constructed for permanent reclaimed slopes shall not exceed maximum standards for the specific soil types presented in the California Code of Regulations, Title 8, Article 6. In general, vertical cutslopes between benches shall not exceed four (4) feet in height in topsoil and overburden sediments. Benching shall be allowed in cohesive soil (clay, sandy or silty clay, clayey silt) only. Slopes above the elevation of groundwater (determined at the time of the excavation by the level of exposed water in the excavation) that exceed the maximum vertical height shall be excavated and maintained at slopes not steeper~~greater~~ than 2:1 (horizontal:vertical). Slopes located five (5) feet or less

below the average summer low groundwater level shall not be steeper than 2:1 (horizontal:vertical). Slopes located more than five (5) feet below the average summer low groundwater level shall not be steeper than 1:1 (horizontal to vertical).

Vertical cutslopes in excess of four (4) feet in height may be approved for the development of special habitat (e.g., bank swallows) if a site-specific slope stability analysis, performed by a licensed engineer, indicates that the slope does not exceed critical height for the on-site soil conditions. Projects proposing such slopes shall submit a long-term maintenance plan to ensure that the function of the slopes as habitat is met.

Section 10-4.410. Cultural resources.

(a) All resource records shall be checked for the presence of and the potential for prehistoric and historic sites. Damaging effects on cultural resources shall be avoided whenever possible. If avoidance is not feasible, the importance of the site shall be evaluated by a qualified professional prior to the commencement of mining operations. If a cultural resource is determined not to be important, both the resource and the effect on it shall be reported to the Agency, and the resource need not be considered further. If avoidance of an important cultural resource is not feasible, a mitigation plan shall be prepared and implemented. The mitigation plan shall explain the importance of the resource, describe the proposed approach to mitigate destruction or damage to the site, and demonstrate how the proposed mitigation would serve the public interest.

(b) If human skeletal remains are encountered during excavation, all work within seventy-five (75) feet shall immediately stop, and the County Coroner shall be notified within twenty-four (24) hours. If the remains are of Native American origin, the appropriate Native American community identified by the Native American Heritage Commission shall be contacted, and an agreement for treating or disposing of, with appropriate dignity, the remains and associated grave goods shall be developed. If any cultural resources, such as chipped or ground stone, historic debris, building foundations, or paleontological materials are encountered during excavation, then all work within seventy-five (75) feet shall immediately stop and the Director shall be notified at once. Any cultural resources found on the site shall be recorded by a qualified archaeologist and the information shall be submitted to the Agency.

Section 10-4.413. Drainage.

Surface water may be allowed to ~~shall be prevented from~~ enter~~ing~~ mined areas, through either perimeter berms or ditches and grading, when designed and engineered pursuant to an approved reclamation plan and where effective best management practices (BMPs) to trap sediment and prohibit contamination are included. Appropriate erosion control measures shall be incorporated into all surface water drainage systems. S~~Natural and s~~tormwater drainage systems shall be designed to connect with natural drainages so as to prevent flooding on surrounding properties and County rights-of-way. Storm water runoff from mining areas shall be conveyed to lowered areas (detention basins) to provide detention of runoff generated during a 20-year, one-hour storm event. All drainage conveyance channels or pipes (including spillways for detention areas) shall be designed to ensure positive drainage and minimize erosion. The drainage conveyance system and storm water detention areas shall be designed and maintained in accordance with Best Management Practices for the reduction of pollutants associated with runoff from mined areas. The design and maintenance procedures shall be documented in the Storm Water Pollution Prevention Plan required for mining operations. The drainage system shall be inspected annually by a Registered Civil Engineer, Registered Geologist, or Certified Erosion and Sediment Control Specialist to ensure that the drainage system is functioning effectively and that adverse erosion and sedimentation are not occurring. The annual inspection shall be documented in the Annual Mining and Reclamation Report. If the system is found to be functioning ineffectively, the operator shall promptly implement the recommendations of the engineer.

Section 10-4.414. Dust control.

	Unless superseded by newer more effective standards, t~~T~~he following measures shall be implemented in order to control fugitive dust: (a) All stockpiled soils shall be enclosed, covered, or have sufficient moisture to control fugitive dust~~adequately watered to keep soil moist~~ at all times. Inactive soil stockpiles should be vegetated or adequately watered to create an erosion-resistant outer crust. (b) During operating hours, all disturbed soil and unpaved roads shall be adequately watered to keep soil moist. (c) All disturbed but inactive portions of the site shall either be seeded or watered until vegetation is grown or shall be stabilized using methods such as chemical soil binders, jute netting, or other Yolo-Solano Air Quality Management District approved methods.
	Section 10-4.431. Slopes. Except where benches are used, all banks above groundwater level shall be sloped no steeper than 2:1 (horizontal:vertical). Proposed steeper slopes shall be evaluated by a slope stability study, prepared by a Registered Civil ~~engineer~~Engineer, Certified Engineering Geologist, or Professional Geologist. Slopes below the groundwater level shall be no steeper than 1:1 (horizontal:vertical). Slopes located five (5) feet or less below the summer low groundwater level shall not be steeper than 2:1 (horizontal:vertical). This section applies only to final/reclaimed slopes and not to active mining faces.
	Section 10-4.432. Soil removal. Soil shall be cut in maximum depths in order to minimize traffic and limit compaction. The handling and transportation of soil shall be minimized. To the extent feasible, a~~A~~ll handling of topsoil shall be accomplished when the soil is dry in order to avoid undue compaction.
Surface Mining Reclamation Ordinance	**Section 10-5.508. Erosion control.** The grading of final slopes, the replacement of soil, and associated erosion control measures shall take place prior to November 1 in areas where mining has been completed. To minimize erosion, the finish grading of mining pit slopes above the average seasonal high groundwater level, with the exception of the location of designated haul roads, shall be performed as soon as practical after the mining of overburden and unsaturated aggregate resources has been completed. A drought-tolerant, weed-free mix of native ~~and non-native~~ grass species shall be established on slopes prior to November 1 or alternate erosion control (mulch or netting) shall be placed on exposed soil on the slopes prior to this date. Phasing of mining to minimize the length of exposed mining slopes during the rainy season is encouraged.
	Section 10-5.531. Soil ripping. Where areas are to be reclaimed to agricultural usage, all A and B horizon soil shall be ripped to a depth of three (3) feet after every two (2) foot layer of soil is laid down, in order to minimize compaction.
In-Channel ~~Maintenance Mining~~ Ordinance	**Section10-3.404. Cultural Resources.** (a) If human skeletal remains are encountered during material removal~~excavation~~, all work within seventy-five (75) feet shall immediately stop, and the County Coroner shall be notified within twenty-four (24) hours. If the remains are of Native American origin, the appropriate Native American community identified by the Native American Heritage Commission shall be contacted, and an agreement for treating or disposing, with appropriate dignity, of the remains and associated grave goods shall be developed. If any cultural resources, such as chipped or ground stone, historic debris, building foundations, or paleontological materials are encountered during material removal~~excavation~~, then all work within seventy-five feet shall immediately stop and the Director shall be notified at once. A qualified archaeologist shall then examine any cultural resources found on the site and the information shall be submitted to the County. (b) Damaging effects to cultural resources shall be avoided whenever possible. If avoidance is not feasible, the importance of the site shall be evaluated by a qualified archeologist prior to the commencement of ~~excavation~~ operations. If

	a cultural resource is determined not to be important, both the resource and the effect on it shall be reported to the County, and the resource need not be considered further. If avoidance of an important cultural resource is not feasible, a mitigation plan shall be prepared and implemented. The mitigation plan shall explain the importance of the resource, describe the proposed approach to mitigate destruction or damage to the site, and demonstrate how the proposed mitigation would serve the public interest.