4.8. HYDROLOGY AND WATER QUALITY

4.8.1 INTRODUCTION

The Hydrology and Water Quality chapter of the EIR describes existing drainage patterns on the project site, including current stormwater flows and stormwater infrastructure. The chapter also evaluates potential impacts of the proposed project with respect to changes in on-site drainage patterns, degradation of water quality, changes in groundwater levels, and increases in on- and off-site flooding. Information used for this chapter was primarily drawn from the Yolo County General Plan,[1] the Yolo County General Plan EIR,[2] the Cache Creek Area Plan (CCAP) Update FEIR,[3] and the following: *Cache Creek Hydraulics Study* (Hydraulics Study) (Appendix J)[4] and *Cache Creek Channel Stability Analysis* (Channel Stability Analysis) prepared by Cunningham Engineering Corporation (CEC) (see Appendix J);[5] *Groundwater Conditions in the Vicinity of Planned Wetpit Mining Operations* (2016 Groundwater Study) prepared by Luhdorff & Scalmanini Consulting Engineers (LSCE) in February 2016;[6] supplemental analyses prepared by LSCE on December 9, 2019 (2019 Groundwater Memo)[7] and February 5, 2020 (2020 Groundwater Memo) (see Appendix K);[8] Slope Stability Evaluation prepared by Geocon Consultants, Inc. (Geocon) (see Appendix H);[9] and Technical memorandum prepared by Geocon regarding geology in the project area (Local Geology Memo) (see Appendix H).[10]

In response to the NOP, the County received comments related to Hydrology and Water Quality from a number of residents in the area. These commenters expressed that the Draft EIR should consider the following:

- Existing issues with water supply and quality (Resident);
- Current concentrations of boron and arsenic in the water (Resident);
- Water quality impacts regarding the removal of the natural filtering system of topsoil, natural rocks, and minerals (Resident);

1 Yolo County. *2030 Countywide General Plan.* November 10, 2009.
2 Yolo County. *Yolo County 2030 Countywide General Plan Environmental Impact Report. SCH# 2008102034*. April 2009.
3 Yolo County. *Cache Creek Area Plan Update Project, Final Environmental Impact Report. SCH# 2017052069.* December 2019.
4 Cunningham Engineering Corporation. *Cache Creek Hydraulics Study for Shifler Mining Reach.* January 26, 2016.
5 Cunningham Engineering Corporation. *Shifler Off-Channel Mining and Reclamation Application Cache Creek Channel Stability Analysis.* Updated October 30, 2020.
6 Luhdorff & Scalmanini Consulting Engineers. *Groundwater Conditions in the Vicinity of Planned Wetpit Mining Operations, Shifler Property.* February 2016.
7 Luhdorff & Scalmanini Consulting Engineers. *Technical Memorandum, Groundwater Conditions in the Vicinity of Planned Wetpit Mining Operations, Shifler Property.* December 9, 2019.
8 Luhdorff & Scalmanini Consulting Engineers. *Technical Memorandum, Supplemental Analyses of Groundwater Conditions, Planned Mining and Reclamation Activities, Shifler Property, Woodland, Yolo County*. February 5, 2020.
9 Geocon Consultants, Inc. *Slope Stability Evaluation, Teichert Shifler Mining and Reclamation Project, Yolo County, California.* May 2016.
10 Geocon Consultants, Inc. *Technical Memorandum – Local Geology, Shifler Mining and Reclamation Project, Yolo County, California.* November 27, 2019.

- Potential impacts to the groundwater table (Resident);
- Potential impacts to water supply (Resident);
- Depth to the groundwater table following reclamation of the site (Resident);
- Potential impacts from the connectivity of the reclaimed lake and the active creek channel (Resident);
- Sand and other debris which could enter water wells during mining operations (Resident);
- Potential impacts to water supply in the event of a drought (Resident);
- Potential impacts to water flows from the Moore Canal relocation (Resident); and
- Potential impacts regarding the rising water levels of Cache Creek (Resident).

The CEQA Guidelines note that comments received during the NOP scoping process can be helpful in "identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." (CEQA Guidelines Section 15083.) Neither the CEQA Guidelines or Statutes require a lead agency to respond directly to comments received in response to the NOP, but they do require they be considered. Consistent with these requirements, these comments have been carefully reviewed and considered by Yolo County and are reflected in the analysis of impacts in this chapter. Appendix B includes all NOP comments received.

Concepts and Terminology

The following terms are used throughout this chapter and have important bearing upon properly evaluating hydrology and water quality within the context of the CEQA. As a result, this section begins by providing definitions of key terms, as follows:

The Channel Form Template (CFT) is a conceptual channel configuration developed by the Technical Advisory Committee (TAC) to guide maintenance of, and improvements to, the Cache Creek channel.

The Hydrologic Engineering Center River Analysis System (HEC-RAS) is a computer program that models one-dimensional, steady state, gradually-varied water flow in order to compute water surface profiles.

MODFLOW is a computer program developed by the U.S. Geological Service that models three-dimensional groundwater flow.

4.8.2 EXISTING ENVIRONMENTAL SETTING

The following setting information provides an overview of the existing conditions of the project site and surrounding area in relation to hydrology and water quality.

Description of Regional Environment

The project region is characterized primarily by continuous agricultural lands within a broad, alluvial valley surrounded by distant rolling hills. Cache Creek generally meanders west to east and runs into the Sacramento Valley, ending in a settling basin east of Woodland, eventually flowing into the Sacramento River. Regional topography is generally flat. Vegetation, other than agricultural crops, is primarily limited to grasslands and ornamental landscaping.

The region is rural and sparsely populated, with urban development being primarily concentrated within small towns such as Capay, Esparto, and Madison. Rural residences, farm dwellings with various accessory and agricultural structures, and commercial uses sparsely dot the landscape. Roads provide interconnections between agricultural properties having various crops, such as row crops, orchards, and vineyards. Telephone and electricity poles frequently parallel the roadways throughout the region. Aggregate mining operations, inclusive of above-ground structures and equipment, are prevalent throughout the region, in particular, along the banks of Cache Creek, within the Cache Creek Area Plan (CCAP) boundaries.

Yolo County has a Mediterranean climate characterized by hot, dry summers and temperate, wet winters.[11] Much of the precipitation received in Yolo County falls on the Vaca Mountains to the west of the County. The highest elevation in the County is Berryessa Peak which is 3,046 feet above sea level, the lowest elevation is approximately five feet above sea level near the Sacramento River on the eastern edge of the County. The average annual precipitation is 17 inches per year in the northeast portion of the County, increasing to 34 inches along the western edge of the County.

Description of Local Environment

Moore Canal, a concrete-lined water conveyance structure owned and operated by the Yolo County Flood Control and Water Conservation District (YCFCWCD), bisects the central portion of the site from west to east. Magnolia Canal is an unlined water conveyance structure owned and operated by the YCFCWCD that intersects the Moore Canal on the northeastern portion of the project site. An existing groundwater well used for agricultural purposes is located along the western site boundary. In addition, a domestic water supply well is located at the location of the former ranch headquarters. The northern portion of the site also includes an electric conveyor and associated gravel road formerly used to transport mined aggregate from the Teichert Storz mining site to the Woodland Plant located north of the project site. The natural environment of the immediate vicinity is similarly characterized by agricultural lands, but also includes Cache Creek, immediately north of the project site. Riparian woodland vegetation is located along portions of the banks of Cache Creek.

The sections below describe the surface water features, drainage patterns, groundwater levels, and water quality associated with the project area.

Surface Water

The primary surface water feature in the project area is Cache Creek, which is located north of the project site boundary. Cache Creek is the outfall of Clear Lake, which is located in Lake County, 50 miles northwest of Yolo County. The north fork of Cache Creek is dammed to create the 300,000-acre-foot Indian Valley Reservoir, also located in Lake County.

Several ditches were constructed to divert water from Cache Creek in the 1850's and 1860's, diversifying the agricultural base of the area.[12] Technological advances in water pumps during the 1880's led to widespread use of groundwater irrigation and the expansion of orchard crops, especially in the Capay Valley. As both surface irrigation and the groundwater pumping improved, agriculture intensified in areas previously dry farmed. Due to Cache Creek's unique hydraulic and

[11] Yolo County. *Yolo County General Plan Update Background Report.* January 2005.
[12] Yolo County. *Cache Creek Resources Management Plan (CCRMP) for Lower Cache Creek*. December 17, 2019.

geologic characteristics, the creek soon proved to be an important source of construction grade aggregate. In the early 1900s, in-channel mining expanded to meet the demand and several new gravel operators moved into the area. The amount of sand and gravel removed from the channel increased over time as demand increased with expanding development and population. In the late 1970s the County started examining better methods to regulate the industry. In 1996 the County adopted the CCAP.

Hydraulic Character of Lower Cache Creek

The project site lies between County Roads 94B and 96 in Yolo County, near the south bank of Cache Creek. The reach of Cache Creek abutting the project site, the Hoppin Reach, begins near County Road 94B (Creek Station 1123+95), and extends downstream (east) approximately 3,400 feet (Creek Station 1090+00). For the purposes of the project Hydraulic Study, the study area was assumed to begin just upstream of the County Road 94B bridge (at Creek Station 1144+30) and extend east to a point approximately 1,500 feet downstream of the existing Schwarzgruber mining site (Station 1000+00).

Surface water hydrology in Cache Creek is dependent on winter rainfall – although in some cases, releases from upstream dams can influence base flow in the creek, particularly during the summer irrigation season. Rainfall generally begins in December, and peaks in January and February. Depending on number and timing of storms, surface water flows begin to recede in late spring, although gaining reaches and pools will retain water into the summer. By fall, many segments of the creek are typically dry.

As summarized in the project Hydraulics Study, numerous hydrologic studies of Cache Creek have been performed over the years. In 1994, the U.S. Army Corps of Engineers (USACE) completed a reconnaissance level report titled Westside Tributaries to Yolo Bypass that established peak flow rates for the Capay Gauge located approximately 14 miles upstream of County Road 94B. The 100-year peak discharge was 63,500 cubic feet per second (cfs).

In previous hydraulic studies within Cache Creek, CEC conducted sensitivity analyses to determine the magnitude of change in the 100-year water surface elevation (WSE) using the range of flow rates presented by the USACE in a 2001 *City of Woodland and Vicinity Flood Reduction Study, F3 Milestone Conference Report*. A comparison of the two values presented for the Capay Gauge site (63,500 cfs for 1994 study versus 61,500 cfs for 2001 study) conducted by CEC showed that the modeled 100-year WSE is not substantially altered by variations in peak discharge rates on the order of 2,000 cfs.[13] Such flows are generally consistent with the most recent 2010 Flood Insurance Study (FIS) for the City of Woodland, which shows 100-year flows of approximately 63,700 cfs in the subject study reach. Thus, this EIR analysis uses a flow rate of 63,700 cfs, consistent with the CEC Hydraulics Study.

As part of the Hydraulic Study, the approximate surface water profile for the reach of Cache Creek in the project vicinity was evaluated to determine the 100-year WSE under existing channel conditions. Based on HEC-RAS modeling conducted as part of the Hydraulics Study, between station 1000+00 and 1030+00 of the existing channel boundary conditions, the 100-year WSE extends above the northern bank of the channel. However, within the subject mining reach, the 100-year discharge associated with Cache Creek will be contained within the high banks on the

[13] Cunningham Engineering Corporation. *Cache Creek Hydraulics Study for Shifler Mining Reach.* January 26, 2016.

south side of the creek channel. The modeled 100-year floodplain limits do not extend into the project site boundaries. In addition, recent modeling conducted by the California Department of Water Resources (DWR) indicates that the estimated 200-year and 500-year discharges will also stay within the creek's south bank along the project site reach.

Historical and Current Cache Creek Channel Characteristics

According to the Channel Stability Analysis prepared by CEC, based on U.S. Geological Service (USGS) historical topographic map data, the bank to bank geometry of Cache Creek has not changed significantly in the last century.

Interior to the banks, the geometry of the main channel tends to meander and shift after high-flow seasons; channel migration and sediment transport is apparent based on a review of aerial imagery dating back to 1993. High flow events during the 2016 storm season removed in-channel sediment and vegetation immediately downstream of the County Road 94B bridge. Based on a review of topographic data from 2010, 2015, and 2019 provided by Yolo County, CEC determined that approximately four to five vertical feet of sediment removal occurred in the central portion of the active channel during the 2016 winter flows. However, based on aerial photo review, negligible evidence of erosion of the south bank was noted resulting from the 2016 event, even though high volumes of water were documented to have flowed across the southern bank. Furthermore, the alignment of the southern bank has not changed significantly between the 2010 and 2019 topography, suggesting minimal erosion has occurred at the bank.

Based on the results of a November 1, 2019 site visit conducted by CEC, little to no evidence exists of erosion along the southern bank of Cache Creek in the project vicinity. The bank is 90 to 95 percent vegetated with mature trees, willows, shrubs, and grasses present, which increases the roughness coefficient of the stream in the flood stage, as well as assists with additional bank reinforcement and stabilization. Throughout the entire reach along the project site, the southern bank has a mid-slope terrace. The portion above the terrace is armored with an asphalt-like material that is likely part of fill material that was placed sometime in the past. The resistant bank material provides additional protection against erosion. Recent sediment deposition noted upon the mid-slope terrace bench is evidence that the flow velocities decrease once the WSE reaches the bench therein, quickly widening the overall creek cross section. Such widening further reduces the erosion potential on the southern bank.

According to the Local Geology Memo prepared by Geocon, the floodplain near-surface soil consists of "predominately fine sand and silt, which is indicative of lower-energy alluvial deposition." The upper bank consists of predominately a clay-rich "overburden material" with some slope armoring material. The active stream channel is underlain with a coarse granular material of sand and gravel which is associated with active stream channels.

Project Site Drainage

The topography of the project site slopes gently to the north towards Cache Creek. The ground surface is relatively flat. Existing surface elevations on the project site range from approximately 98 to 112 feet above mean sea level (MSL), with the proposed mining area elevations between approximately 103 and 112 feet above MSL. In addition, Moore Canal, a concrete-lined water conveyance structure, bisects the central portion of the site from west to east. Magnolia Canal is an unlined water conveyance structure that intersects the Moore Canal on the northeastern portion of the project site.

Currently, the project site contains minimal impervious surfaces. The site consists primarily of actively managed agricultural land. Thus, stormwater runoff is allowed to naturally infiltrate through the on-site soils and flow toward Cache Creek.

Groundwater

The project site is located within the Yolo Subbasin, which is a portion of the larger Sacramento Valley groundwater basin. Applicable regulations related to sustainable management of groundwater within the Yolo subbasin are discussed under the Regulatory Context section.

The following sections describe the current groundwater levels and direction of flow within the project area, based on the Groundwater Study prepared by LSCE. Additional information related to historic groundwater monitoring is described further below under the Method of Analysis section.

Shallow Groundwater Levels

Within the project region, historic groundwater conditions have varied at each of the Teichert Woodland properties. Shallow groundwater levels beneath the project site have been observed to fluctuate seasonally and over the long-term since monitoring on the site began in 1987. Groundwater levels in the Stephens water supply well, located to the west of the project site, were lowest during the 1987 to 1992 drought and highest during the 1993 to 1998 wet period and in 2006. Seasonal fluctuations varied from about 10 feet during the comparatively-stable hydrologic conditions observed since 1998, to as much as 15 feet during the 1993 to 1998 wet period and as little as four feet during the prolonged dry conditions in the early 1990s.

Beneath the nearby Muller, Storz, Haller, and Schwarzgruber properties, which are located east of the Plainfield Ridge, similar groundwater level fluctuations have been observed, both seasonally and over the long-term. Shallow monitoring and/or water supply wells on such properties completed in the uppermost aggregate materials have been monitored since as early as 1986. Groundwater levels beneath the Muller and Storz properties fluctuate such that the shallowest wells (Muller TA-11 and -13, Storz TA-7 and -8) repeatedly go dry during drought, shorter dry periods, and following each spring. The deeper monitoring well (TA-13A) shows long-term and seasonal groundwater level fluctuations similar to those beneath the project site, as indicated by the Stephens water supply well. Groundwater levels at the Haller and Schwarzgruber properties also fluctuate in a manner similar to those at the project site.

Further upstream and west of the Plainfield Ridge, the Coors property has had groundwater levels instead show a long-term stability with minor seasonal fluctuation, typically less than three feet. As discussed in further detail under the Groundwater Flow section below, groundwater generally flows from west-northwest to east-southeast, and groundwater beneath the Coors property is directed toward Cache Creek by the adjacent Dunnigan Hills and partially dammed behind the Plainfield Ridge. Such effects on groundwater levels extend as far east as the western-most portion of the Haller property at monitoring well TA-10, in which seasonal water level fluctuations are typically less than two feet.

Per the Groundwater Study, groundwater level fluctuations beneath the project site are similar to those in the surrounding areas where wells have been monitored by the YCFCWCD as far back as the 1950s.

Deep Groundwater Levels

Groundwater levels in existing deep-water supply wells in the project area exhibit a similar pattern of seasonal fluctuations in response to summer pumping for irrigation and subsequent winter recovery. Further, deep wells show similarities in long-term fluctuations with declines in drought or dry periods, apparently due to increased dependence on groundwater, and partial or full recovery during wet periods, likely due to greater availability of surface water deliveries from the YCFCWCD. Groundwater elevations in the deep wells are typically lower than those in shallow wells, and with greater seasonal fluctuation, as indicated by composite groundwater level hydrographs for the shallow Stephens well, which is 75 feet deep, and the deep Storz well, which is 168 feet deep.

Deep groundwater levels are significantly influenced by seasonal pumping conditions and not directly indicative of shallow groundwater conditions. Instead, shallow groundwater conditions are directly related to and affected by the direct recharge of streamflow and other surface waters, as well as the percolation of agricultural return flows, to the shallow aquifer. While the deep aquifer experiences significant seasonal water level fluctuations, on the order of 25 to 40 feet in some deep wells, the shallow aquifer levels have remained relatively stable, as its water levels generally respond quickly to streamflow and other surface activities but not directly to deep pumping.

Groundwater Flow

Contours of equal groundwater elevation (i.e., mapping of groundwater flow rate and direction) developed for spring 1986 indicate groundwater has historically flowed generally in an east-southeasterly direction, with some steepening of the gradient across the Plainfield Ridge area. By fall 1992, which comprised the sixth and last consecutive year of a prolonged drought period in the area, groundwater continued to flow in an east-southeasterly direction; however, groundwater elevations had declined in the western part of the area and were substantially lower in the eastern portion, including beneath the Shifler property. Following several years of above-average rainfall generally from 1993 through 1998, groundwater levels by spring 1998 had recovered to those observed in spring 1986.

Groundwater levels in spring 2006, another long-term high, were similar and even slightly higher than in spring 1998; groundwater flowed generally in an east-southeasterly direction with some steepening of the gradient across the Plainfield Ridge area. More recently, and following below-average rainfall during years 2007 and 2008, groundwater elevations by fall 2008 had declined substantially, including beneath the project site. However, groundwater continued to flow in an east-southeasterly direction and groundwater levels did not decline to the degree observed in fall 1992.

Summary of Project Area Groundwater Levels

Within the project site, groundwater levels fluctuate seasonally from 10 to more than 15 feet. Further, long-term water level fluctuations reflect the regional climatological conditions. Groundwater levels declined on the Shifler property to near historical lows during the prolonged drought from 1987 through 1992, then recovered to near historical highs during a subsequent prolonged wet period through 1998 on the order of 25 feet, to an elevation reaching almost 75 feet, NAVD88. Subsequently, water levels beneath the project site primarily showed minor individual-year fluctuations; however, groundwater levels exhibit overall relative stability at elevations well within the range of drought and wet year extremes, reflecting the pattern of local climatological conditions. Such variations included a sharp rise to the historical high in

groundwater levels during 2006 that corresponded to higher than average rainfall that year. Most recently, beginning in 2011, groundwater levels declined sharply to the historical low by fall 2014 with only minor recovery during 2015.

Groundwater levels in numerous area wells show long-term fluctuations similar to those observed in the Shifler property well, including declines during the 1987 to 92 drought, recovery during the 1993 to 98 wet period, relative stability during 1999 through 2008, and the sharp decline through 2014. Over the long term, groundwater levels in the Teichert Woodland Plant area have reflected regional climatological conditions, though not in direct response to incident precipitation. Rather, precipitation records are useful as a broad indicator of climatological conditions because the regional distribution of precipitation historically affects the amount and availability of water for storage and release from Clear Lake and Indian Valley Reservoir, both of which feed Cache Creek through the adjacent Capay Valley and across the Sacramento Valley. The availability of storage water in turn affects the availability of water for recharge from the creek to the aquifer system and for diversion by YCFCWCD from the creek to area farmers for irrigation purposes. The latter affects the amount of groundwater pumping required to meet remaining irrigation requirements, and the overall amounts of water recharged to and pumped from the aquifer system affect area groundwater levels in any given year and on a long-term basis.

Water Quality

The following sections describe existing water quality and groundwater quality in the project area.

Water Quality

Groundbreaking and clearing activities have the potential to cause erosion and sedimentation, which could cause unstabilized soil to be washed or wind-blown into nearby surface water. In addition, the use of heavy equipment during mining and reclamation activities, especially during rainfall events, have the potential to cause petroleum products and other pollutants to enter nearby drainages.

Cache Creek is known to be impaired by mercury originating from historic mining practices upstream. Boron, nitrogen, orthophosphate, and fecal coliforms are also elevated in Cache Creek and likely originate from agricultural sources in the watershed. The Cache Creek Resources Management Plan (CCRMP) water quality monitoring program has involved sampling in the creek since 1999, and few spatial or temporal trends are evident. The CCRMP water quality sampling program has identified Gordon Slough as a major contributor of many of the agriculturally-originating pollutants detected, most notably fecal coliforms and orthophosphate.

Groundwater Quality

As required under the CCAP and project conditions of approval, groundwater quality monitoring has been conducted on at least a semi-annual basis in selected shallow monitoring wells located up- and down-gradient from the Teichert Muller, Coors, Storz, Shifler (up-gradient only), and, most recently, Schwarzgruber properties. All wells sampled are immediately adjacent to, and well within 500 feet of, their respective mining properties, thus providing for the earliest detection of any groundwater quality impacts from mining. Groundwater samples are analyzed for general mineral and inorganic constituents, aromatic and petroleum hydrocarbons, pesticides, and coliform bacteria, as specified in the Yolo County Off-Channel Surface Mining Ordinance (OCSMO), Section 10-4.417, and implemented through Teichert's mining permit conditions.

The results of the groundwater and lake water sampling performed as part of the 2016 Groundwater Study conducted by LSCE indicate that general mineral and inorganic constituent concentrations do not limit the beneficial use of water. Furthermore, the results of analyses for organic compounds (aromatic and petroleum hydrocarbons, pesticides) indicate that water quality is not impaired. The full results of the groundwater quality monitoring are included in Appendix K to this EIR.

In addition to wells located at the Teichert properties in the project vicinity, two water production wells (Pintail well and Canvas Back well) are used to supply the Wild Wings subdivision to the southwest of the project site, as noted in LSCE's 2020 Groundwater Memo. Both wells are located outside of the County-specified radii of influence for model analyses (i.e., 1,000 and 500 feet from wet pit boundaries for water level and water quality concerns, respectively). Of the two wells, the Canvas Back well is located closest to the project site, at a distance of 1,150 feet from the limits of the proposed mining area. The well extends to a depth of 425 feet below ground surface (bgs) and the well screen resides between 364 to 415 feet bgs. Pintail well is significantly deeper than the Canvas Back well, with well screens extending from 935 to 992 and from 1,021 to 1,061 feet bgs. Both wells produce groundwater with total arsenic concentrations that have been gradually increasing, such that operation of the Canvas Back well ceased in 2019 due to concentrations exceeding arsenic's Maximum Contaminant Level (MCL) for regulated drinking water contaminants in California (10 µg/L). Arsenic concentrations in the Pintail well have been approaching, but remain below, the MCL.

4.8.3 REGULATORY CONTEXT

The following is a description of federal, State, and local environmental laws and policies that are relevant to the review of hydrology and water quality under the CEQA process.

Federal Regulations

The following are the federal regulations relevant to hydrology and water quality.

Federal Clean Water Act

The National Pollutant Discharge Elimination System (NPDES) permit system was established in the federal Clean Water Act (CWA) to regulate municipal and industrial discharges to surface waters of the U.S. Each NPDES permit contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits. Section 307 of the CWA describes the factors that EPA must consider in setting effluent limits for priority pollutants.

Nonpoint sources are diffuse and originate over a wide area rather than from a definable point. Nonpoint pollution often enters receiving water in the form of surface runoff, but is not conveyed by way of pipelines or discrete conveyances. As defined in the federal regulations, such nonpoint sources are generally exempt from federal NPDES permit program requirements. However, two types of nonpoint source discharges are controlled by the NPDES program – nonpoint source discharge caused by general construction activities, and the general quality of stormwater in municipal stormwater systems. The 1987 amendments to the CWA directed the federal EPA to implement the stormwater program in two phases. Phase I addressed discharges from large (population 250,000 or above) and medium (population 100,000 to 250,000) municipalities and certain industrial activities. Phase II addresses all other discharges defined by EPA that are not included in Phase I.

Section 402 of the CWA mandates that certain types of construction activities comply with the requirements of the NPDES stormwater program. The Phase II Rule, issued in 1999, requires that construction activities that disturb land equal to or greater than one acre require permitting under the NPDES program. In California, permitting occurs under the General Permit for Stormwater Discharges Associated with Construction Activity, issued to the State Water Resources Control Board (SWRCB), implemented and enforced by the nine Regional Water Quality Control Boards (RWQCBs).

As of July 1, 2015, covered industrial facilities, including mineral mining operations, are required to obtain compliance under NPDES Industrial General Permit Order 2014-0057-DWQ. The Industrial General Permit requires all dischargers to take the following measures:

1. Develop and implement a Stormwater Pollution Prevention Plan (SWPPP) to include a site map(s) of existing and proposed building and roadway footprints, drainage patterns and stormwater collection and discharge points, and pre- and post- project topography;
2. Describe types and placement of Best Management Practices (BMPs) in the SWPPP that will be used to protect stormwater quality;
3. Provide a visual and chemical (if non-visible pollutants are expected) monitoring program for implementation upon BMP failure; and
4. Provide a sediment monitoring plan if the area discharges directly to a water body listed on the 303(d) list for sediment.

To obtain coverage, a SWPPP must be submitted to the RWQCB electronically and a copy of the SWPPP must be submitted to Yolo County. When ground-disturbing activity is completed, the landowner must file a Notice of Termination (NOT).

National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) is responsible for determining flood elevations and floodplain boundaries based on USACE studies. FEMA is also responsible for distributing the Flood Insurance Rate Maps (FIRMS), which are used in the National Flood Insurance Program (NFIP). The FIRMs identify the locations of special flood hazard areas, including the 100-year floodplains.

FEMA allows non-residential development in the floodplain; however, construction activities are restricted within flood hazard areas, depending upon the potential for flooding within each area. Federal regulations governing development in a floodplain are set forth in Title 44, Part 60 of the Code of Federal Regulations (CFR). These standards are implemented at the State level through construction codes and local ordinances; however, these regulations only apply to residential and non-residential structure improvements. Although roadway construction or modification is not explicitly addressed in the FEMA regulations, the California Department of Transportation (Caltrans) has also adopted criteria and standards for roadway drainage systems and projects situated within designated floodplains. Standards that apply to floodplain issues are based on federal regulations (Title 23, Part 650 of the CFR). At the State level, roadway design must comply with drainage standards included in Chapters 800-890 of the Caltrans Highway Design Manual. CFR Section 60.3(c)(10) restricts cumulative development from increasing the WSE of the base flood by more than one foot within the floodplain.

State Regulations

The following are the State regulations relevant to hydrology and water quality.

Surface Mining and Reclamation Act

Acceptable practices and performance standards have been developed as part of the Surface Mining and Reclamation Act (SMARA) while providing protection to wildlife and the successful revegetation of mined lands. Per Section 2712 (b), "The production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment." The relationship of the SMARA to the Cache Creek Area Plan (CCAP) is discussed in Section 1.3 of the OCMP. For more detail, see Chapter 4.9, Land Use and Planning, of this EIR.

State Water Resources Control Board

The SWRCB and the RWQCBs are responsible for ensuring implementation and compliance with the provisions of the federal CWA and California's Porter-Cologne Water Quality Control Act. The project site is situated within the jurisdictional boundaries of the Central Valley RWQCB (CVRWQCB) (Region 5). The CVRWQCB has the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within their jurisdiction.

Central Valley Regional Water Quality Control Board

As authorized by the Porter-Cologne Water Quality Control Act, the CVRWQCB's primary function is to protect the quality of the waters within its jurisdiction for all beneficial uses. State law defines beneficial uses of California's waters that may be protected against quality degradation to include, but not be limited to: domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

The CVRWQCB implements water quality protection measures by formulating and adopting water quality control plans (referred to as basin plans, as discussed below) for specific groundwater and surface water basins, and by prescribing and enforcing requirements on all agricultural, domestic, and industrial waste discharges. The CVRWQCB oversees many programs to support and provide benefit to water quality, including the following major programs: Agricultural Regulatory; Above-Ground Tanks; Basin Planning; CALFED; Confined Animal Facilities; Landfills and Mining; Non-Point Source; Spills, Leaks, Investigations, and Cleanups (SLIC); Stormwater; Total Maximum Daily Load (TMDL); Underground Storage Tanks (UST), Wastewater Discharges (including the NPDES); Water Quality Certification; and Watershed Management.

The CVRWQCB is responsible for issuing permits for a number of varying activities. Activities subject to the CVRWQCB permitting requirements include stormwater, wastewater, and industrial water discharge, disturbance of wetlands, and dewatering. Permits issued and/or enforced by the CVRWQCB include, but are not limited to, the NPDES Construction General Permit, NPDES Municipal Stormwater Permits, Industrial General Permits, Clean Water Act Section 401 and 404 Permits, and Dewatering Permits.

Basin Plans and Water Quality Objectives

The Porter-Cologne Water Quality Control Act provides for the development and periodic review of water quality control plans (basin plans) that are prepared by the regional water quality control boards. Basin plans designate beneficial uses of California's major rivers and groundwater basins, and establish narrative and numerical water quality objectives for those waters. Beneficial uses represent the services and qualities of a water body (i.e., the reasons why the water body is considered valuable), while water quality objectives represent the standards necessary to protect and support those beneficial uses. Basin plans are primarily implemented through the NPDES permitting system and by issuing waste discharge regulations to ensure that water quality objectives are met.

Basin plans provide the technical basis for determining waste discharge requirements and taking regulatory enforcement actions if deemed necessary. The project site is located within the jurisdiction of the CVRWQCB. A basin plan has been adopted for the Sacramento and San Joaquin River Basin (Basin Plan), which covers all of the project area.

The Basin Plan sets water quality objectives for the surface waters in its region for the following substances and parameters: ammonia, bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, radioactivity, salinity, sediment, settleable material, suspended material, taste and odor, temperature, toxicity, turbidity, and pesticides. For groundwater, water quality objectives applicable to all groundwater have been set for bacteria, chemical constituents, radioactivity, taste, odors, and toxicity.

Sustainable Groundwater Management Act

The DWR has developed a Strategic Plan for its Sustainable Groundwater Management (SGM) Program. DWR's SGM Program will implement the new and expanded responsibilities identified in the 2014 Sustainable Groundwater Management Act (SGMA). The expanded responsibilities include the following:

1) Developing regulations to revise groundwater basin boundaries;
2) Adopting regulations for evaluating and implementing Groundwater Sustainability Plans (GSPs) and coordination agreements;
3) Identifying basins subject to critical conditions of overdraft;
4) Identifying water available for groundwater replenishment; and
5) Publishing best management practices for the sustainable management of groundwater.

The SGMA applies to the 127 High and Medium Priority groundwater basins, which account for approximately 96 percent of groundwater use in California. The Yolo subbasin is designated as High Priority under the SGMA. The SGMA requires High and Medium Priority basins under the California Statewide Groundwater Elevation Monitoring (CASGEM) program subject to critical conditions of overdraft to be managed under a groundwater sustainability plan by January 31, 2020 (Water Code § 10720.7(a) (1)), and requires all other groundwater basins designated as High or Medium Priority basins to be managed under a groundwater sustainability plan by January 31, 2022 (Water Code § 10720.7 (a) (2)). According to Bulletin 118[14] and the Urban Water Management Plan (UWMP)[15], the Yolo subbasin is not subject to critical conditions of overdraft.

[14] Department of Water Resources. *Bulletin 118* [pg. 98]. 2003.
[15] City of Davis. *Final 2015 Urban Water Management Plan.* June 2016.

The SGMA requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in their local water basins and adopt locally-based management plans. The SGMA provides substantial time (20 years) for GSAs to implement plans and achieve long-term groundwater sustainability. The SGMA protects existing surface water and groundwater rights and does not impact current drought response measures. Yolo County has partnered with various other local agencies to form the Yolo Subbasin Groundwater Agency (YSGA), which is currently in the process of preparing the Yolo Subbasin Groundwater Sustainability Plan in compliance with the SGMA.[16]

Local Regulations

The following are the regulatory agencies and regulations pertinent to the proposed project on a local level.

Yolo County General Plan

The following goals and policies from the Yolo County General Plan related to hydrology and water quality are applicable to the proposed project:

Policy CO-2.31 Protect wetland ecosystems by minimizing erosion and pollution from grading, especially during grading and construction projects.

Policy CO-5.14 Require that proposals to convert land to uses other than agriculture, open space, or habitat demonstrate that groundwater recharge will not be significantly diminished.

Action CO-A94 Adopt development design standards that use low-impact development techniques that emulate the natural hydrologic regime and reduce the amount of runoff and associated pollutants. Examples include vegetated swales, landscaped detention basins, permeable paving, and green roofs.

Action CO-A97 Continue to monitor water quality in Lower Cache Creek and annually make the resulting data publicly available.

Goal HS-2 Flood Hazards. Protect the public and reduce damage to property from flood hazards.

Policy HS-2.7 Manage the floodplain to improve the reliability and quality of water supplies.

Action HS-A5 Require a minimum of 100-year flood protection for new construction, and strive to

[16] Yolo Subbasin Groundwater Agency. *Yolo Subbasin Groundwater Sustainability Plan.* Available at: https://yologroundwater.org/index.php/yolo-subbasin-groundwater-sustainability-plan/. Accessed July 2019.

achieve 200-year flood protection for unincorporated communities. Where such levels of protection are not provided, require new development to adhere to the requirements of State law and the County Flood Damage Prevention Ordinance. (Policy HS-2.1)

Action HS-A13 Review development proposals to ensure that the need to maintain flood control capacity is balanced with consideration of the environmental health of watercourses that convey floodwaters so as not to cause significant erosion, sedimentation, water quality problems, or loss of habitat. (Policy HS-2.1)

Off-Channel Mining Plan

The following policies from the adopted Yolo County Off-Channel Mining Plan (OCMP) related to hydrology and water quality are applicable to the proposed project:

Goal 3.2-1 Promote the conjunctive use of surface and groundwater to maximize the availability of water for a range of uses, including habitat, recreation, agriculture, water storage, flood control, and urban development.

Goal 3.2-2 Maintain the quality of surface and groundwater so that nearby agricultural productivity and available drinking water supplies are not diminished.

Action 3.2-5. Require that surface mining operations demonstrate that proposed off-channel excavations extending below the groundwater level will not adversely affect the producing capacity or water quality of local active wells.

Action 3.4-3. Include a groundwater monitoring program as a condition of approval for any surface mining and reclamation operation that proposes off-channel excavations that extend below the groundwater level. The monitoring program shall require regular groundwater level data, as well as a water quality monitoring program based on a set of developed standards.

Goal 4.2-1 Recognize that Cache Creek is a dynamic stream system that naturally undergoes gradual and sometimes sudden changes during high flow events.

Goal 4.2-2 Coordinate land uses and improvements along Cache Creek so that the adverse effects of flooding and erosion are minimized.

Goal 4.2-3 Establish a more natural channel floodway capable of conveying floodwaters without damaging essential structures, causing excessive erosion, or adversely affecting adjoining land uses.

Action 4.4-4. Manage activities and development within the floodplain to avoid hazards and adverse impacts on surrounding properties. This shall be accomplished through enforcement of the County Flood Damage Ordinance and ensuring that new development complies with the requirements of the State Reclamation Board.

Action 4.4-5. Allow for the design of spillways or other engineered features that provide controlled flooding of off-channel mining pits during events which exceed the 100-year flood.

Off-Channel Surface Mining Ordinance

Section 10-4.421 of the Yolo County Off-Channel Surface Mining Ordinance (OCSMO) states the following regarding dewatering activities:

Section 10-4.412. Dewatering

"Dewatering" shall mean lowering the water level in a wet pit by pumping water from the pit, regardless of the purpose of the pumping. Water generated from dewatering activities must be beneficially used and discharged on-site. Pumps systems used to dewater the wet pits shall be powered by electricity (i.e., through connection to power lines) or solar power. This ordinance does not permit water generated from dewatering activities to be used or discharged off-site. No off-channel excavation shall use dewatering as a part of surface mining operations, unless site-specific technical analysis performed by a qualified Professional Engineer or Professional Geologist with experience in hydrogeology demonstrates that the proposed dewatering will not adversely affect off-site wells with respect to groundwater level and quality. The Professional Engineer or Professional Geologist shall demonstrate, using appropriate hydrogeologic analysis (i.e., using data-supported empirical, analytical, and/or numerical investigative tools), that the proposed dewatering activity will not adversely impact active off-site wells or other water resources (e.g., creeks and wetlands) within 1,000 feet of the proposed dewatering pit boundary. Average historic low groundwater levels in the subject well, shall be used for the analysis. Site-specific aquifer testing shall be conducted, if needed, to determine aquifer properties for the analysis. Consistent with the OCMP EIR, an effect shall be considered adverse if the reduction in simulated groundwater levels exceeds two (2) feet at any well located within 1,000 feet of the pit boundary or results in well failure.

The hydrogeologic analysis shall be submitted to the County for review and approval prior to implementation of any dewatering activities. If an adverse impact is identified by the analysis (either impacts to existing wells or other water resources, including creeks and wetlands), dewatering activities will be modified to eliminate any adverse impacts, and/or the applicant shall otherwise mitigate adverse impacts to the satisfaction of the County.

Approval to dewater requires Planning Commission approval pursuant to 10-4.506 and 10-4.602.

Prior to and for the duration of dewatering activities, the applicant shall: 1) monitor water levels in the wet pit(s), and nearby monitoring wells on a quarterly basis; and 2) quantify the amount of water pumped from and returned to the wet pit(s). This monitoring data shall

be reviewed by the applicant's Professional Engineer or Professional Geologist to determine whether any adverse impacts are occurring. Documentation of the monitoring and data evaluation shall be submitted the County annually. If adverse impacts are found to be occurring, dewatering activities will be modified to eliminate adverse impacts, or the applicant shall otherwise mitigate impacts to the satisfaction of the County. Any measures designed to mitigate adverse impacts identified after implementation of dewatering activities shall be approved by the Planning Commission at a regularly scheduled meeting, with written notice of the adverse impact and proposed mitigation measures given by mail to all property owners within 1,000 feet of the pit boundary, in addition to any notice otherwise required by law.

For purposes of this section, mitigation measures of adverse impacts may include, but are not limited to well modification, well relocation, compensation of well owners for increased pumping cost, or providing an alternative water supply. Such mitigation measures shall be paid for by the mining operator, with sufficient financial security to ensure completion of the measures.

Pumping of water from the wet pit in lieu of pumping of groundwater from a well shall not require predictive impact analysis in addition to analysis provided in the approved, site-specific CEQA document, unless the total annual water demand, as set forth in the CEQA document, is exceeded. This does not remove the requirement for monitoring and reporting activities described above.

Section 10-4.413 of the OCSMO states the following regarding drainage standards:

Section 10-4.413. Drainage

Surface water may be allowed to enter 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. Stormwater 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 10-4.416 of the OCSMO states the following regarding flood protection standards:

Section 10-4.416. Flood Protection

All off-channel surface mining operations shall be provided with a minimum one-hundred (100) year flood protection. Off-channel excavations shall be designed to minimize the

potential for levee breaching and/or pit capture. In addition, excavations shall be designed to prevent overtopping of channel banks or levees along Cache Creek and all tributaries and drainage channels (including, but not limited to, Willow Slough and Lamb Valley Slough).

The flood protection upgrades shall be designed and constructed to provide the necessary 100-year protection without creating a net increase of in upstream or downstream flooding elevations. Upstream flooding could be increased if additional levee construction serves to confine flows to a narrow width, thereby increasing the water surface elevation. Downstream flooding could be increased if floodplain storage areas were removed from the drainage system by constructing levees in areas where they did not exist before (or raising levees that are overtopped in floods up to the 100-year event). Where feasible, alternative or non-structural flood management designs (potentially using detention basins, infiltration galleries, and/or floodplain storage in noncritical areas) shall be incorporated. New development (such as buildings, levees, or dikes) located within the floodplain shall conform to all applicable requirements of the Yolo County Flood Protection Ordinance and the Federal Emergency Management Agency (FEMA).

Section 10-4.417 of the OCSMO states the following regarding groundwater monitoring requirements:

Section 10-4.417. Groundwater Monitoring Programs

All surface mining operations that propose off-channel excavations extending below the groundwater level shall develop and maintain a groundwater monitoring program consisting of two components: water level measurements and water quality testing. A groundwater level monitoring program shall be initiated at least six months prior to the removal of overburden. At a minimum, the groundwater level monitoring program shall consist of three monitoring wells, with at least one well upgradient of the wet pit and one well downgradient of the wet pit. Monitoring programs for proposed mining areas exceeding one-hundred (100) acres (total proposed mining area over the life of the project) shall include one additional well for each one-hundred (100) acres of wet pit mining. Therefore, wet pit mining areas of 1 to 99 acres would require three (3) wells, 100 to 199 acres would require four (4) wells, 200 to 299 acres would require five (5) wells, and so on. These wells shall be distributed through the vicinity of the wet pit mining area and used for groundwater level measurements. Groundwater levels shall be collected from the monitoring wells on a quarterly basis for six (6) months prior to mining and for the duration of the mining period. All wellheads shall be surveyed with horizontal and vertical control to allow calculation of groundwater elevations and development of groundwater contour maps. Groundwater levels shall be measured with an accuracy of plus or minus 0.01 foot, at minimum.

Water quality in the vicinity of each active wet pit mining location shall be evaluated by analyzing samples from selected monitoring wells (one upgradient and one downgradient) and wet pit surface water sampling locations. Since mining may be conducted in phases over a relatively long period of time, pit boundaries may change with time. Selection, and installation if necessary, of downgradient monitoring wells, which would be critical to adequately characterize the groundwater quality in the vicinity of the wet pits, shall be submitted by the operator for review and approval by the County. The selected monitoring wells shall be installed and sampled at least six (6) months prior to the removal of overburden. The downgradient wells shall be located as near to the active wet pit mining areas as is practical. The upgradient wells shall be located an adequate distance from the proposed mining area to ensure that the effect of the wet pit on water quality in the well would be negligible. The water samples from the wet pit shall be collected in a manner so

as to ensure that they are representative of water quality within the wet pit. The minimum sampling schedule and required analyses are described below.

(a) Groundwater level and pit water surface level measurements shall be performed quarterly in all wells for the duration of mining and reclamation.
(b) For monitoring the groundwater quality of proposed wet pit mining, sample collection and analysis of physical, chemical, and biological constituents shall be conducted according to the following specifications:

(1) Prior to the removal of overburden – one upgradient and one downgradient well shall be sampled at least six (6) months prior to the removal of overburden and again at the start of excavation. The samples shall, at minimum, be analyzed for general minerals; inorganics; nitrates; total petroleum hydrocarbons (TPH) as diesel and motor oil, benzene, toluene, ethylbenzene, and xylenes (BTEX); pesticides (EPA 8140 and 8150); and coliform (with E. coli confirmation).
(2) During wet pit mining and active reclamation – the wet pit shall be sampled semi-annually for the duration of mining and active reclamation. The samples shall, at minimum, be analyzed for general minerals; inorganics; nitrates; TPH as diesel and motor oil, BTEX; pesticides (EPA 8140 and 8150); and coliform (with E. coli confirmation).

One upgradient and one downgradient well shall be analyzed, at minimum, for general minerals; inorganics; nitrates; TPH as diesel and motor oil, BTEX; pesticides (EPA 8140 and 8150); and coliform (with E. coli confirmation). The wells shall be sampled according to the following schedule: semi-annually for the first two years, and annually every year thereafter.
(3) After active reclamation – one (1) year after all heavy equipment work has been completed in the vicinity of the pit, the TPH and BTEX analyses may be discontinued. The wet pit and one upgradient and one downgradient well shall be sampled and analyzed for pH; temperature; nutrients (phosphorous and nitrogen); total dissolved solids; total coliform (with E. coli confirmation); and biological oxygen demand. This monitoring shall be conducted every two (2) years for a ten (10) year period after completion of reclamation.

A report to the Agency and Department of Environmental Health shall be submitted within thirty (30) days of the required groundwater testing.

Additional tests and analysis shall be required only if a new condition is recognized that may threaten water quality or if the results of previous tests fall outside allowable ranges. If at any time during the monitoring period, testing results indicate that sampling parameters exceed Maximum Contaminant Levels (MCLs), as reported in the California Code of Regulations, or established background levels, a qualified professional shall evaluate potential sources of the contaminants. The evaluation shall determine the source and process of migration (surface or subsurface) of the contaminants. A report shall be submitted to the regulatory agencies (the Agency, Yolo County Department of Environmental Health, the Central Valley Regional Water Quality Control Board, and the U.S. Environmental Protection Agency) which identified the source of the detected contaminants and specifies remedial actions to be implemented by the operator for corrective action. If it is determined that the source of water quality degradation is off-site,

and the County and the RWQCB are in agreement with this conclusion, the operator shall not be responsible for corrective action.

If corrective action is ineffective or infeasible, the responsible party must provide reparation to affected well owners, either by treatment of water at the wellhead or by procurement of an alternate water supply.

If, at the completion of the mining and reclamation period, water quality has not been impacted, all monitoring wells shall be destroyed in accordance with the California Department of Water Resources Well Standards. If the County, landowner, or other agency wishes to maintain the wells for future water resources evaluation, selected wells may be preserved for this use. Monitoring wells may remain useful for post-mining land uses.

The County may retain appropriate staff or a contract consultant to provide third party critical review of all hydrologic reports related to monitoring.

Section 10-4.420.1 of the OCSMO states the following regarding mercury levels:

> Section 10-4.420.1. Mercury Bioaccumulation in Fish
> Each mining area to be reclaimed to a permanent lake as part of each approved long-range mining plan shall be evaluated annually by the operator for five years after the pit fills with groundwater with an intensive fish mercury monitoring program described in Section 10-5.517 of the Reclamation Ordinance.

Section 10-4.427 of the OCSMO states the following regarding well water quality:

> Section 10-4.427. Protection of Nearby Drinking Water Wells
> If any off-channel excavation proposes to extend below the level of seasonal high groundwater, then six months prior to the commencement of excavation below the average high groundwater level, the operator shall identify and locate all off-site municipal wells within one-thousand (1,000) feet and all domestic wells within five hundred (500) feet of the proposed wet pit mining boundary. If active wells are identified, well characteristics (pumping rate, depth, and locations of screens) shall be determined. If wells are not located within one-thousand (1,000) feet, the pre-mining impact evaluation shall be considered complete.
>
> If wet pit mining is proposed within one-thousand (1,000) feet of a municipal water supply or within five-hundred (500) feet of a domestic water supply well, a capture zone analysis shall be conducted using the U.S. Environmental Protection Agency model WHPA (or a similar model of equal capability and proven reliability, as approved by the Director). The simulation shall assume thirty (30) days of continuous pumping of the water supply well (at its maximum probable yield) under analysis. A mining setback shall be established so that the capture zone and the pit do not coincide. Alternatively, the operator shall submit a written agreement that the well owner has agreed to relocate or redesign the well, or accept the potential impact (at no expense to the County). The analysis shall be prepared and signed by a Registered Civil Engineer or Certified Hydrogeologist and submitted to the County for review and approved at least six months prior to the commencement of excavation below the seasonal high groundwater level.
>
> Any new drinking water wells proposed for installation within one-thousand (1,000) feet of an approved wet pit mining area shall be subject to review by the Yolo County Environmental Health Department. The County shall determine, based on site-specific

hydrogeology and available water quality data, whether to approve the proposed well installation. Analysis of environmental impact for projects in the vicinity of the wet pits shall include consideration of potential water quality impacts on the open water bodies.

The County may retain appropriate staff or a contract consultant to provide third party critical review of all hydrogeologic reports related to mining applications.

Section 10-4.429 of the OCSMO states the following regarding minimum setback standards:

Sec. 10-4.429. Setbacks

All off-channel surface mining operations shall comply with the following setbacks:

(a) New processing plants and material stockpiles shall be located a minimum of one-thousand (1,000) feet from public rights-of-way, public recreation areas, and/or off-site residences, unless alternate measures to reduce potential noise, dust, and aesthetic impacts are developed and implemented;

(b) Soil stockpiles shall be located a minimum of five-hundred (500) feet from public rights-of-way, public recreation areas, and off-site residences, unless alternate measures to reduce potential dust and aesthetic impacts are developed and implemented;

(c) Off-channel excavations shall maintain a minimum one-thousand (1,000) foot setback from public rights-of-way and adjacent property lines of off-site residences, unless a landscaped buffer is provided or site-specific characteristics reduce potential aesthetic impacts. Where landscaped buffers are proposed, the setback for off-channel excavations may be reduced to a minimum of fifty (50) feet from either the property line or the adjoining right-of-way, whichever is greater. Where mining occurs within one-thousand (1,000) feet of a public right-of-way, operators shall phase mining such that no more than fifty (50) acres of the area that lies within one-thousand (1,000) feet of the right-of-way would be actively disturbed at any time, except where operations are adequately screened from public view. Where adequate screening exists in the form of mature vegetation and/or constructed berms that effectively block public views, the area of active disturbance within one-thousand (1,000) feet of the right-of-way shall not exceed the area that is screened by more than fifty (50) acres at any one time. Actively disturbed areas are defined as those on which mining operations of any kind, or the implementation of reclamation such as grading, seeding, or installation of plant material are taking place.

(d) Off-channel excavations shall provide a minimum 50-foot setback from the neighboring property line to allow for access around the pit during mining and after reclamation for maintenance, safety, and other purposes.

(e) Proposed off-channel excavations located within the streamway influence zone shall be set back a minimum of seven-hundred (700) feet from the existing channel bank, unless it is demonstrated that a smaller distance will not adversely affect channel stability. Under no circumstances should off-channel excavations be located within 200 feet of the existing channel bank. Evaluations of proposed off-channel excavations within 700 feet of the channel bank shall demonstrate, at a minimum, the following:

    (1) The two-hundred (200) foot setback area does not include portions of the historically active channel.
    (2) The two-hundred (200) foot setback area does not include formerly mined lands separated from the active channel by levees or unmined areas less

than two-hundred (200) feet wide (measured perpendicular to the active channel).

(3) Acceptable channel hydraulic conditions (based on existing or site-specific hydraulic models) for the Cache Creek channel adjacent to the site and extending not less than one-thousand (1,000) feet upstream and downstream of the site.

(4) Acceptable level of erosion potential of the channel bank adjacent to the site based on predicted stream flow velocity and shear stress on bank materials during a 100-year flow and historical patterns of erosion.

(5) Acceptable level of stability of the slopes separating the mining area from the creek channel based on an analytical slope stability analysis in conformance with Sections 10-4.426 and 10-5.517 of this title that includes evaluation of stability conditions during 100-year peak flows in the channel.

(6) Appropriate bank stabilization designs, if needed, consistent with channel design recommendations of the Cache Creek Resource Management Plan or approved by the Technical Advisory Committee.

(7) The condition of flood protection structures and the integrity of the land within the approved setback zone separating the mining areas and the channel shall be inspected annually by a Registered Civil Engineer and reported to the Director. The annual report shall include recommendations for remedial action for identified erosion problems (see also Reclamation Ordinance Section 10-5.506).

Approval of any off-channel mining project located within seven-hundred (700) feet of the existing channel bank shall be contingent upon an enforceable agreement which requires the project operator to participate in the completion of identified channel improvement projects along the frontage of their property, consistent with the CCRMP and CCIP, including implementation of the Channel Form Template. The agreement shall require that the operator provide a bond or other financial instrument for maintenance during the mining and reclamation period of any bank stabilization features required of the mining project. The agreement shall also require that a deed restriction be placed on the underlying property which requires maintenance of the streambank protection by future owners of the property. Maintenance of the bank stabilization features following completion of reclamation shall be the responsibility of the property owner.

(f) Off-channel excavations shall be set back a minimum of twenty-five (25) feet from riparian vegetation; and

(g) Recreational facilities shall be located a minimum of one-hundred and fifty (150) feet from private dwellings, with a landscaped buffer provided to reduce noise and maintain privacy, unless the dwelling is proposed to be an integral component of the recreational facility.

(h) No mining activities shall occur within two-thousand (2,000) feet of the community boundaries of Capay, Esparto, Madison, Woodland, and/or Yolo. This setback may be reduced by up to five-hundred (500) feet when existing mature vegetation, proposed landscape buffers of a sufficient height and density to create a visual buffer (consisting of native species and fence-row habitat appropriate to the area), or other site-specific characteristics reduce potential incompatibilities between urban land uses and mining. Commercial mining shall not take place east of County Road 96.

Section 10-4.437 of the OCSMO states the following regarding wastewater discharge limitations:

> Section 10-4.437. Wastewater Discharge
> No wastewater shall be directly discharged to Cache Creek. Sediment fines generated by aggregate processing shall either be used for agricultural soil enhancement, habitat restoration sites, or shall be placed in settling ponds, designed and operated in accordance with all applicable regulations, and used for backfill materials in off-channel excavations. Agricultural tailwater shall be diverted to catchment basins prior to its release to the creek.

Cache Creek Resource Management Plan

The CCRMP is a river management plan that eliminated in-channel commercial mining, established an "improvement program" for implementing on-going projects to improve channel stability, encouraged restoration along the creek banks pursuant to a carefully developed policy and regulatory framework, and established a framework for future recreation along the Creek. The CCRMP was adopted August 20, 1996 (Board Resolution 96-132), underwent a focused update (July 23, 2002 Board Resolution 02-130), and a comprehensive update in 2019. The CCRMP is implemented by the Cache Creek Improvement Program (CCIP) and the In-Channel Ordinance.

Cache Creek Improvement Program

The Technical Advisory Committee (TAC) was established to provide scientific and technical oversight for the CCRMP and the CCIP. The TAC collects and analyzes data, identifies maintenance needs and priorities, and provides critical review of the design and construction of improvement projects. As part of project approval, the TAC would review the proposed project for consistency with the CCIP.

The 1995 Technical Studies for previous versions of the CCRMP proposed a conceptual channel configuration, referred to as the Test 3 Run Boundary, which reflected more uniform channel conditions and included armoring of the channel bed underneath bridges to prevent scour. The Test 3 Run Boundary served as a general goal for developing a more stable channel for Cache Creek. Updated technical evaluations completed in 2017 (2017 Technical Studies) indicated that significant deposition of sediment has occurred in the CCRMP area and resulted in recovery of more natural channel sinuosity and slope in certain locations. While this recovery appears to be occurring faster than originally anticipated in 1996, Cache Creek still exhibits unstable hydraulic and sediment transport conditions in the CCRMP area.

As part of the recent update to the CCAP, the County has implemented an update to the Test 3 Run Boundary, called the Channel Form Template (CFT), which is the result of new topography and modeling data associated with the 2017 Technical Studies. The CFT replaces the Test 3 Run Boundary, but provides similar guidance for smoothing abrupt channel width transitions.

Surface Mining Reclamation Ordinance

Section 10-5.503 of the Surface Mining Reclamation Ordinance (SMRO) states the following regarding groundwater levels:

> Section 10-5.503. Backfilled Excavations: Groundwater Flow Impacts
> The area of backfilled off-channel excavations extending below the groundwater table shall be minimized in order to reduce changes to groundwater levels and flow. Backfilled pits shall be oriented with regard to the direction of groundwater flow to prevent localized

obstructions. If a backfilled off-channel excavation is proposed to penetrate either fifty (50) feet or one-half (1/2) into the saturated thickness of the shallow aquifer, then at least six months prior to the commencement of excavation below the average high groundwater level, the applicant shall demonstrate in a manner consistent with the Technical Studies that the pit design will not adversely affect active off-site wells within one-thousand (1,000) feet of the proposed pit boundary. If the application includes a series of backfilled pits, then the applicant shall also demonstrate that the cumulative effects of the multiple backfilled pits will not adversely affect groundwater flow, if there are any active off-site wells within one-thousand (1,000) feet of the pit boundaries.

The applicant shall demonstrate, using MODFLOW (or a similar model of equal capability and proven reliability, as approved by the Director), that the proposed pit design would not adversely impact active off-site wells within one-thousand (1,000) feet of the proposed pit boundary or result in well failure. Average, historic low groundwater levels, which represent the condition of maximum threat to water levels in the subject well, shall be used for this simulation. If an adverse impact is identified by the MODFLOW (or other approved model) simulation, the mining and reclamation plan shall be modified, or the applicant shall submit a written agreement that the well owner has agreed to relocate or redesign the well, or accept the potential impact (at no expense to the County).

Site-specific aquifer testing shall be conducted, if needed, to determine aquifer properties for the required modeling.

Section 10-5.507 of the SMRO states the following regarding stormwater drainage:

Section 10-5.507. Drainage

Upon the completion of operations, grading and revegetation shall minimize erosion and convey storm water runoff from reclaimed mining areas to natural outlets or interior basins. The condition of the land shall allow sufficient drainage to prevent water pockets or undue erosion. Stormwater drainage shall be designed so as to prevent flooding on surrounding properties and County rights-of-way.

Drainage and detention facilities within the proposed mining areas and vicinity shall be designed to prevent discharges to the wet pits and surface water conveyances (i.e., creeks and sloughs) from the 20-year/1-hour storm or less. For events greater than the 20-year/1-hour storm, runoff from around the perimeter of the mining areas shall be directed into surface water conveyances. Runoff from within the lowered mining area shall be directed away from wet pits to detention/infiltration areas. Drainage plans shall not rely solely on ditches and berms to direct runoff away from the wet pit. Without proper maintenance, berms and ditches may deteriorate with time and become ineffective. Drainage plans shall emphasize grading of disturbed areas that results in broad, gentle slopes that drain away from the pits. Grading plans shall be reviewed by the County to evaluate compliance with drainage plan objectives prior to project approval.

In addition, a restriction shall be recorded on the deed that requires berms and ditches to be permanently maintained in a condition consistent with the final approval. The deed restriction shall require an inspection easement which allows County staff or other authorized personnel access for the inspection of berms and ditches. If the County determines that evidence of damage to those facilities exists, the County shall require that the owner have an inspection report for the property prepared by a Registered Geologist or Registered Civil Engineer. The inspection report, including recommendations for corrective action, if needed, shall be submitted to the Director. The property owner shall be required to implement recommended corrective actions, if any.

Section 10-5.508 of the SMRO states the following regarding erosion control:

> 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 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 10-5.511 of the SMRO states the following regarding post-mining drainage conditions:

> Section 10-5.511. Field Drainage
> Reclaimed agricultural surfaces shall be graded to provide adequate field gradients to allow surface/furrow irrigation of crops and allow for adequate storm water drainage.

Section 10-5.516 of the SMRO states the following regarding groundwater levels in areas proposed for reclamation with agricultural uses:

> Section 10-5.516. Lowered Elevations for Reclaimed Agricultural Fields
> The final distance between lowered surfaces reclaimed to agriculture and the average high groundwater shall not be less than five (5) feet. The average high groundwater level shall be established for each proposed mining area. The degree of groundwater level fluctuation varies with location throughout the basin and within relatively small areas (proposed mining sites). The determination of the average high groundwater level shall be conducted by a Registered Civil Engineer or Certified Hydrogeologist and shall be based on wet season water level elevation data collected at the proposed site or adjacent areas with similar hydrogeological conditions. Water level records prior to 1977 shall not be used since they would reflect conditions prior to the installation of the Indian Valley Dam. The dam caused a significant change in hydrology of the basin and data collected before its installation shall not be used in estimating current average high groundwater levels. The wells shall be adequately distributed throughout the proposed mining site to reflect spatial variation in groundwater levels and fluctuations.

Section 10-5.517 of the SMRO states the following regarding mercury bioaccumulation issues:

> Section 10-5.517. Mercury Bioaccumulation in Fish
> As part of each approved long-term mining plan involving wet pit mining to be reclaimed to a permanent pond, lake, or water feature, the operator shall maintain, monitor, and report to the Director according to the standards given in this section. Requirements and restrictions are distinguished by phase of operation as described below.
>
> (a) Mercury Protocols. The Director shall issue and update as needed "Lower Cache Creek Off-Channel Pits Mercury Monitoring Protocols" (Protocols), which shall provide detailed requirements for mercury monitoring activities. The Protocols shall include procedures for monitoring conditions in each pit lake, and for monitoring ambient mercury level in the lower Cache Creek channel within the

CCAP planning area, as described below. The Protocols shall be developed and implemented by a qualified aquatic scientist or equivalent professional acceptable to the Director. The Protocols shall identify minimum laboratory analytical reporting limits, which may not exceed the applicable response threshold identified in subsection (e) below. Data produced from implementing the Protocols shall meet or exceed applicable standards in the industry.

(b) Ambient Mercury Level. The determination of the ambient or "baseline" fish mercury level shall be undertaken by the County every ten years in years ending in 0. This analysis shall be undertaken by the County for use as a baseline of comparison for fish mercury testing conducted in individual wet mining pits. The work to establish this baseline every ten years shall be conducted by a qualified aquatic systems scientist acceptable to the Director and provided in the form of a report to the Director. It shall be paid for by the mining permit operators on a fair-share basis. The results of monitoring and evaluation of available data shall be provided in the report to substantiate the conclusions regarding ambient concentrations of mercury in fish within the lower Cache Creek channel within the CCAP planning area.

(c) Pit Monitoring.

(1) Mining Phase (including during idle periods as defined in SMARA). The operator shall monitor fish and water column profiles in each pit lake once every year during the period generally between September and November for the first five years after a pit lake is created. Fish monitoring should include sport fish where possible, together with other representative species that have comparison samples from the creek and/or other monitored ponds. Sport fish are defined as predatory, trophic level four fish such as bass, which are likely to be primary angling targets and have the highest relative mercury levels. The requirements of this subsection apply to any pit lake that is permanently wet and navigable by a monitoring vessel. If, in the initial five years after the pit lake is created, the applicable response threshold identified in subsection (e) is exceeded in any three of five monitoring years, the operator shall, solely at their own expense, undertake expanded analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g).

(2) Reclamation Phase. No monitoring is required after mining has concluded, during the period that an approved reclamation plan is being implemented, provided reclamation is completed within the time specified by SMARA or the project approval, whichever is sooner.

(3) Post-Reclamation Phase. After reclamation is completed, the operator shall monitor fish and water column profiles in each pit lake at least once every two years during the period of September-November for ten years following reclamation. Monitoring shall commence in the first calendar year following completion of reclamation activities. If fish monitoring results from the post-reclamation period exceed the applicable response threshold described in subsection (e) or, for ponds that have implemented mitigation management, results do not exhibit a general decline in mercury levels, the operator shall, solely at their own expense, undertake expanded analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g).

(4) Other Monitoring Obligation. If monitoring conducted during both the mining and post-reclamation phase did not identify any exceedances of the ambient mercury level for a particular pit lake, and at the sole discretion of the Director no other relevant factors substantially support that continued monitoring is merited, the operator shall have no further obligations.

(d) Reporting.

(1) Pit Monitoring Results. Reporting and evaluating of subsection (c) pit monitoring results shall be conducted by a qualified aquatic scientist or equivalent professional acceptable to the Director. Monitoring activities and results shall be summarized in a single report (addressing all wet pit lakes) and submitted to the Director within six months following each annual monitoring event. The report shall include, at a minimum: (1) results from subsection (b) (pit monitoring), in relation to subsection (a) (ambient mercury levels).

(2) Expanded Analysis Results. Reporting and evaluation of subsection (f) expanded analysis shall be conducted by a qualified aquatic scientist or equivalent professional acceptable to the Director. Results shall be summarized in a single report (addressing all affected wet pit lakes) and submitted to the Director within six months following each annual monitoring event. The report shall include, at a minimum, the results of the expanded analysis undertaken pursuant subsection (f).

(3) Data Sharing. For pit lakes open to the public, the Director may submit the data on mercury concentrations in pit lake fish to the state Office of Environmental Health Hazard Assessment (or its successor) for developing site-specific fish consumption advisories.

(e) Response Thresholds.

(1) Fish Consumption Advisory. If at any time during any phase of monitoring the pit lake's average sport fish tissue mercury concentration exceeds the Sport Fish Water Quality Objective, as it may be modified by the state over time (as of 2019, the level was 0.2 mg/kg), the operator shall post fish consumption advisory signs at access points around the lake and around the lake perimeter. Catch-and-release fishing may still be allowed. Unless site-specific guidance has been developed by the state's Office of Health Hazard Assessment or the County, statewide fish consumption guidance shall be provided.

(2) Mining Phase Results. If, during the mining phase of monitoring, the pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three of five monitoring years, annual monitoring shall continue for an additional five years, and the operator shall undertake expanded analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g).

(3) Post-Reclamation Phase Results. If during the first ten years of the post-reclamation phase of monitoring, the pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three of five monitoring years, biennial monitoring shall continue for an additional ten years, and the operator shall undertake expanded analysis pursuant to subsection(f) and preparation of a lake management plan pursuant to subsection(g).

(f) Expanded Analysis.

(1) General. If during the mining or post-reclamation phase, any pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three years, the operator shall undertake expanded analyses. The analysis shall include expanded lake water column profiling (a minimum of five profiles per affected wet pit lake plus one or more nonaffected lakes for control purposes) conducted during the warm season (generally May through October) in an appropriate deep profiling location for each pit lake. The following water quality parameters shall be collected at regular depth intervals, from surface to bottom of each lake,

following protocols identified in subsection (a): temperature, dissolved oxygen, conductivity, pH and oxidation-reduction potential (ORP), turbidity or total suspended solids, dissolved organic matter, and algal density by Chlorophyll or Phycocyanin. The initial analysis shall also include one-time collections of fine grained (clay/silt) bottom sediments from a minimum of six well distributed locations for each affected lake, and from one or more non-affected lakes for control purposes, to be analyzed for mercury and organic content.

(2) Scope of Analysis. The purpose of the expanded analyses is to identify and assess potential factors linked to elevated methylmercury production and/or bioaccumulation in each pit lake. The scope of the expanded analyses shall include monitoring and analysis appropriate to fulfill this purpose, invoking best practices in the industry. In addition to the analyses described in subsection (f)(1) above, the analysis should also consider such factors as: electrical conductivity, bathymetry (maximum and average depths, depth-to-surface area ratios, etc.), and trophic status indicators (concentrations, Secchi depth, chlorophyll a, fish assemblages, etc.). Additional types of testing may be indicated and appropriate if initial results are inconclusive.

(3) Use of Results. The results of the expanded analyses undertaken pursuant to this subsection shall be used to inform the preparation of a lake management plan described below under subsection (g).

(g) Lake Management Activities

(1) General. If monitoring conducted during the mining or post-reclamation phases triggers the requirement to undertake expanded analysis and prepare and implement a lake management plan, the operator shall implement lake management activities designed by a qualified aquatic scientist or equivalent professional acceptable to the Director, informed by the results of subsection (f). Options for addressing elevated mercury levels may include (A) and/or (B) below at the Director's sole discretion and at the operator's sole expense.

(A) Lake Management Plan. Prepare a lake management plan that provides a feasible, adaptive management approach to reducing fish tissue mercury concentrations to at or below the ambient mercury level. Potential mercury control methods could include, for example: addition of oxygen to or physical mixing of anoxic bottom waters; alteration of water chemistry (modify pH or organic carbon concentration); and/or removal or replacement of affected fish populations. The lake management plan may be subject to external peer review at the discretion of the Director. Lake management activities shall be appropriate to the phase of the operation (e.g., during mining or post-reclamation). The Lake Management Plan shall include a recommendation for continued monitoring and reporting. All costs associated with preparation and implementation of the lake management plan shall be solely those of the operator. Upon acceptance by the Director, the operator shall immediately implement the plan. The lake management plan shall generally be implemented within three years of reported results from the expanded analyses resulting from subsection (f). If lake management does not achieve acceptable results and/or demonstrate declining mercury levels after a maximum of three years of implementation, at the sole discretion of the Director, the operator may prepare an alternate

management plan with reasonable likelihood of mitigating the conditions.

(B) Revised Reclamation Plan. As an alternative to (A), or if (A) does not achieve acceptable results and/or demonstrate declining mercury levels after a maximum of three years of implementation, at the sole discretion of the Director, the operator shall prepare and submit revisions to the reclamation plan (including appropriate applications and information for permit amendment) to fill the pit lake with suitable fill material to a level no less than five (5) feet above the average seasonal high groundwater level, and modify the end use to agriculture, habitat, or open space at the discretion of the Director, subject to Article 6 of the Mining Ordinance and/or Article 8 of the Reclamation Ordinance as may be applicable.

(2) Implementation Obligations.

(A) If a lake management plan is triggered during the mining or post-reclamation phase and the subsequent lake management activities do not achieve acceptable results and/or demonstrate declining mercury levels, the operator may propose different or additional measures for consideration by the Director and implementation by the operator, or the Director may direct the operator to proceed to modify the reclamation plan as described in subsection (g)(1)(B).

(B) Notwithstanding the results of monitoring and/or lake management activities during the mining phase, the operator shall, during the post-reclamation phase, conduct the required ten years of biennial monitoring.

(C) If monitoring conducted during the post-reclamation phase identifies three monitoring years of mercury concentrations exceeding the ambient mercury level, the operator shall implement expanded analyses as in subsection (f), to help prepare and implement a lake management plan and associated monitoring.

(D) If subsequent monitoring after implementation of lake management activities, during the post-reclamation phase, demonstrates levels of fish tissue mercury at or below the ambient mercury level for any three monitoring years (i.e., the management plan is effective), the operator shall be obligated to continue implementation of the plan and continue monitoring, or provide adequate funding for the County to do both, in perpetuity.

Section 10-5.511 of the SMRO states the following regarding groundwater monitoring:

> Section 10-5.524. Post-Reclamation Groundwater Monitoring
> Monitoring during the mining and reclamation period shall be a condition of the permit. The applicant shall ensure that the groundwater monitoring of wet pit mining continues for (10) years after the completion of reclamation.

4.8.4 IMPACTS AND MITIGATION MEASURES

This section describes the standards of significance and methodology used to analyze and determine the proposed project's potential impacts related to hydrology and water quality. In addition, a discussion of the project's impacts, as well as mitigation measures where necessary, are also presented.

Standards of Significance

The significance criteria used for this analysis were developed from Appendix G of the CEQA Guidelines, and applicable policies and regulations of Yolo County. A hydrology and water quality impact is considered significant if the proposed project would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    - Result in substantial erosion or siltation on- or off-site;
    - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
    - Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
    - Impede or redirect flood flows;
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation;
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan; or
- Cause a significant environmental impact due to a conflict with applicable plans, policies, or regulations adopted for the purpose of avoiding or mitigating impacts to hydrology and water quality.

The proposed project's impacts associated with erosion or siltation on- or off-site are discussed in Chapter 4.6, Geology and Soils, Mineral Resources, and Paleontological Resources, of this EIR.

Impacts Found Less than Significant in Initial Study

The Initial Study prepared for the proposed project (see Appendix A) did not identify any less-than-significant impacts related to hydrology and water quality.

Method of Analysis

Issues related to groundwater levels and groundwater quality were evaluated in the 2016 Groundwater Study, 2019 Groundwater Memo, and 2020 Groundwater Memo prepared by LSCE. Issues related to flooding and erosion were evaluated in the Hydraulics Study and Channel Stability Analysis prepared by CEC. The methodologies employed in each of the studies is

described below. Methodologies employed in the Slope Stability Evaluation prepared by Geocon are discussed in Chapter 4.6 of this EIR.

2016 Groundwater Study

The potential impacts on groundwater levels and quality from the proposed reclamation activities were analyzed as part of the Groundwater Study prepared by LSCE in 2016. The Yolo County SMRO and OCSMO require the following analyses to be completed as input to the reclamation planning for all wet pit mining projects:

1. Water Supply Well Identification: Identify and determine characteristics of active off-site wells within 1,000 feet of the proposed wet pit mining boundary and domestic wells within 500 feet of the pit boundary (OCSMO Sec. 10-4.427);
2. Potential Groundwater Level Impacts: Demonstrate using MODFLOW that the proposed wet pit mining project, in this case the reclamation of the mining pit to agricultural land and a seasonal lake, will not adversely impact active off-site wells within 1,000 feet of the pit boundary (SMRO Sec. 10-5.503); and
3. Potential Groundwater Quality Impacts: Conduct a capture zone analysis for domestic wells within 500 feet of the lake boundary (OCSMO Sec. 10-4.427).

Requirement 3 above regarding capture zone analysis (OCSMO Sec. 10-4.427) is not applicable to the proposed project, as off-site domestic water supply wells are not located within the specified boundary (within 500 feet) of the proposed reclamation lake location. However, in order to address water quality concerns, LSCE conducted an assessment of mining and reclamation activities at the Teichert off-channel mining properties, as well as of the historical water quality conditions at such properties. The methodology used to address requirements 1 and 2 are described below. In addition, while not required per OCSMO Section 10-4.427, a discussion of methods used to evaluate groundwater quality at water wells associated with the Wild Wings subdivision is provided under the 2020 Groundwater Memo section below.

Water Supply Well Identification

While SMRO Section 10-5.503 requires identification of wells within 1,000 feet of the future mining lake boundary, the 2016 Groundwater Report conservatively analyzed all wells within 1,000 feet of the proposed mining boundary, which encompasses a larger area and results in the inclusion of a greater number of wells.

Per the Groundwater Report, as many as 21 active off-site water supply wells exist within 1,000 feet of the proposed mining boundary. During 2015, Teichert contacted and requested water supply well information from neighboring landowners within 1,000 feet of the proposed mining boundary by way of original and follow-up letters. The well and water usage information provided by the neighbors responding to Teichert's request were incorporated into the Groundwater Report. Subsequently, publicly available Yolo County parcel maps and aerial photos were used to estimate the location of additional wells, with the assumption that each individual parcel had a water supply well. Well depth and water usage for the additional wells were estimated based on known information about similar water supply wells in the project area. Pertinent information about the off-site water supply wells is provided in Table 1 of the 2016 Groundwater Report, including well depth, aquifer production zones (MODFLOW model layers), and pumping rates.

Potential Groundwater and Seasonal Lake Water Level Impacts

As specified by the Yolo County SMRO (Section 10-5.503), the required method of investigating potential impacts on groundwater from the backfilling of mined parcels includes using a MODFLOW model to simulate such impacts. For the project site, changes in groundwater levels due to the proposed backfilling associated with the reclamation of the mining pit to agricultural land and a lake were simulated, in particular at the active off-site water supply well locations.

A steady-state numerical model was developed based on a previous model (LSCE, 2011) to conduct the groundwater level simulations. The model is a three-dimensional groundwater flow model, which uses a finite-difference modeling code termed MODFLOW, developed by the U.S. Geological Survey. MODFLOW uses a collection of subroutines called "packages" to simulate different groundwater flow components such as aquifer characteristics, well pumping, and recharge/discharge such as from/to streams. For the proposed project, input parameters for the model included aquifer (layer) top and bottom elevations, starting heads, hydraulic conductivity, leakance, river bed conductance, recharge, and well pumping.

Calibration of the model was performed by varying the initial input parameters, specifically the hydraulic conductivity of all layers (active cells), the conductance values of all layers (general head cells), the leakances between layers, and the conductance of the Cache Creek streambed. The calibrated model was used to simulate the effect of the proposed Shifler reclamation on groundwater levels beneath the Teichert Woodland Plant area. With respect to the model design, the mining and reclamation of the project site would occur in layer 1 only. The bottom of the reclaimed agricultural land and seasonal lake would be near the base of layer 1, and layer 2 would remain undisturbed by mining. The model simulated full reclamation of the project site, including development of the proposed reclamation lake.

2019 Groundwater Memo

The 2019 Groundwater Memo was prepared to evaluate potential effects to groundwater associated with project operations that were not previously evaluated in LSCE's 2016 Groundwater Study; specifically, pumping all or partial water supply for aggregate processing from the proposed mining wet pit (requested dewatering), with all aggregate wash water discharged back to the wet pit. This contrasts with the 2016 analyses, wherein mining operations were assumed to derive all water supply solely from the Teichert Woodland Plant well. Analyses were conducted using the calibrated MODFLOW groundwater flow model of 2016, but simulating groundwater and lake levels under two additional main scenario categories:

- Scenario 1: The initial wet pit mining, within the western portion of the project site; and
- Scenario 2: The remaining wet pit mining, within the central portion of the project site, with the western portion of the site reclaimed to agricultural land.

For both main scenario categories, the 2019 Groundwater Memo included several focused scenarios evaluating the predicted impacts to groundwater and lake levels from varying wet pit sediment lining permeability and thickness, and water supply source, as shown in Table 4.8-1 below.

2020 Groundwater Memo

The 2020 Groundwater Memo is focused on two primary issues: potential effects of the planned mining and reclamation activities on groundwater levels and quality in the Pintail and Canvas

Back production wells of the Wild Wings subdivision, and the comparability of two different laboratory analytical methods used for groundwater quality testing at the Wild Wings subdivision and at the Teichert Woodland properties in Teichert's long-term monitoring effort.

Wild Wings Subdivision Wells

As a result of proximity and construction, potential effects from the proposed mining and reclamation activities, were they to occur, would first manifest in the Canvas Back well. Therefore, model analysis conducted as part of the 2020 Groundwater Memo focused on predicted effects on the Canvas Back well, as opposed to the Pintail well.

Table 4.8-1
Groundwater Analysis Scenarios: 2019 Groundwater Memo

Focused Scenario	Sediment Permeability K (feet/day)	Sediment Thickness b (feet)	Supply from Pit (% of Total)	Supply from Woodland Plant Well (% of Total)	Discharge to Mining Pit (% of Total)
Scenario 2 (West Pit)					
1A	100	1	100	0	100
1B	100	1	50	50	100
1C	2.67	1	100	0	100
1D	2.67	3	100	0	100
1E	2.67	3	50	50	100
Scenario 1 (Central Pit)					
2A	2.67	1	100	0	100
2B	2.67	1	50	50	100
2C	2.67	3	100	0	100
2D	2.67	3	50	50	100

Source: LSCE, 2019.

The 2020 Groundwater Memo follows several lines of investigation to examine potential effects of the proposed mining and reclamation activities on groundwater levels and quality in the Canvas Back well, in addition to evaluating mining pit water budgets and the model domain water budget to ascertain mutual interference between mining/reclamation activities and operation of the Canvas Back well. The 2020 Groundwater Memo includes the following components:

1. Comparison of simulated versus observed head for the calibrated Baseline Model (i) without Canvas Back extraction and (ii) with Canvas Back extraction at 125 gallons per minute (gpm);
2. Comparison of mining pit water budgets (volumetric flow rates and water level elevations);
3. Comparison of model domain water budgets (volumetric flow rates);
4. Proportional sources of Canvas Back well extraction; and
5. Canvas Back well particle tracking analysis.

The Canvas Back well extraction rate of 125 gpm is a steady-state model rate based on available well production data provided by Wild Wings representatives. Specifically, the well produced a total of 58, 62, and 69 million gallons per year (MGY) in years 2011, 2012, and 2013, respectively. Most recently, total well production was about 65 MGY in 2018 and was on track for 65 MGY in 2019 (until ceasing production in September). From this production data, a typical annual

production was designated as 65 MGY. The model rate of 125 gpm then derives from this typical annual production, with 65 MGY converted to an average 125 gpm continuously produced for 60 minutes per hour, 24 hours per day, every day of the year into the future. Given the pump operating capacity of approximately 1,380 gpm, and typical annual production of 65 MGY, LSCE determined that the pump has been operated, on average, for 2 to 2.5 hours per day.

The fate of all extraction was assumed to be consumptive use (i.e., not including return flows to groundwater). In practice, a portion of the extracted water applied to landscaping (e.g. irrigation for Wild Wings golf course and residential landscaping) returns to groundwater by way of deep percolation. Attribution of all groundwater extraction to consumptive use provides "worst-case" scenarios predicting maximum potential impacts. To facilitate comparison to the predictive model scenarios presented in LSCE's 2019 Groundwater Memo, the same terminology is used in the 2020 Groundwater Memo. Specifically, mining activities are examined with Scenarios A, B, and AB, where:

- "A" denotes that all water used for aggregate processing and dust control is obtained directly from the active mining pit;
- "B" denotes that 50 percent of the supply is obtained from the active mining pit and 50 percent is provided by the on-site production well (Teichert plant well); and
- "AB" denotes that all water supply is derived from the Teichert plant well.

As is the case for the 2019 Groundwater Report, Scenario 1 pertains to the initial mining phase (only the west portion of project site is mined) and Scenario 2 pertains to an advanced mining phase where the central portion of the Shifler property is actively mined and the west portion has been reclaimed to agricultural land.

Groundwater Quality Laboratory Methods

Regarding laboratory analytical methods used for groundwater quality testing, LSCE consulted with the laboratory director of California Laboratory Services (CLS), Dr. James Liang, about descriptions and comparison of analytical methods for arsenic in water.

Arsenic analysis has been part of Teichert Materials' historical and ongoing long-term groundwater monitoring and reporting efforts at their properties along Cache Creek. Groundwater analyses are carried out by California Laboratory Services (CLS) in Rancho Cordova and the method of choice for arsenic has been EPA Method 6020/7000. The analytical reporting limit is 5.0 µg/L. This method is typically used in the context of groundwater and surface water studies including environmental assessment and cleanup. In contrast, for drinking water applications (e.g., municipal supply wells), EPA Method 200.8 is typically used. The analytical reporting limit is 2.0 µg/L.

Both methods are National Institute of Standards and Technology (NIST) certified and produce the same results (i.e., same accuracy and precision), consistent with the EPAs acceptance criteria. EPA's only acceptable difference for analytical methods quantifying the same constituent is the methods' sensitivity, as reflected by their reporting limit. The reporting limit of EPA Method 6020/7000 accounts for the potential of matrix interferences often associated with environmental studies due to the presence of multiple metals, high constituent concentrations, turbidity, and complex chemical makeup. In drinking water applications, such interferences are very rare, and in the absence of interferences, EPA Method 200.8 achieves a lower reporting limit. If interference

is a concern, EPA Method 200.8 employs a dynamic reaction chamber (DRC) to improve results and must state so in the laboratory documentation. The DRC can also be used with EPA Method 6020/7000, but it need not state so in the laboratory documentation.

Hydraulics Study

The purpose of the Hydraulics Study prepared by CEC, dated 2016, was to estimate approximate 100-year water surface profiles in Cache Creek abutting the project site under the two channel bank geometries, as follows:

1. Current bank geometry (same geometry as that which was used in the 2011 analysis for the adjacent Schwarzgruber reach).
2. Bank geometry translated such that the north and south banks coincide with the 1996 Test 3 Line (now known as CFT).

The Hydraulics Study was completed using the Hydrologic Engineering Center River Analysis System (HEC-RAS) computer program, which models one-dimensional, steady state, gradually-varied flow in order to compute water surface profiles. As noted previously, for design purposes, the Hydraulics Study assumed a peak flow rate of 63,700 cfs for the Cache Creek channel, based on the 2010 Flood Insurance Study (FIS) for the City of Woodland and previous hydraulic studies conducted within Cache Creek.

To determine the 100-year water surface approximation, a numerical model of the creek topography and flow characteristics was created using HEC-RAS. The creek centerline was approximated based on the existing bank geometry, and begins approximately 9,500 feet downstream of the Shifler site (i.e., at Station 1000+00). Since the hydraulic model addresses a high-flow condition, the HEC-RAS centerline does not necessarily follow the stream thalweg at all locations. Cross-sections were spaced approximately every 500 feet, with additional cross-sections added to model the County Road 94B bridge and the Teichert Conveyor bridge crossing at approximate Station 1071+10. A starting WSE of 94 (NAVD 88) was applied as a downstream boundary condition at Station 1000+00, based on the 100-year WSE as previously determined in the 2010 FIS for the City of Woodland and indicated on FEMA FIRM Panel# 06113C0430G. The Hydraulics Study relied on a roughness coefficient (Manning's "n") of 0.038 for channel flow, consistent with the 2010 City of Woodland FIS and previous Cache Creek studies done by CEC in neighboring reaches in 1996, 2001, 2007 and 2009. A roughness value of 0.070 was applied to overbank flow.

Channel Stability Analysis

At the request of the County, CEC prepared a Channel Stability Analysis focused on the stability of the embankment of Cache Creek adjacent to the project site. To address the potential erodibility, CEC completed the following tasks:

- Reviewed historical topographic maps and aerial photographs;
- Reviewed flow velocity data based on the 2D HEC-RAS model of Cache Creek prepared by FlowWest from 2018;
- Conducted a site visit on November 1, 2019 to observe the condition of the south bank; and
- Reviewed the current stream bank alignment in conjunction with the CFT.

Project Specific Impacts and Mitigation Measures

The following discussion of impacts related to hydrology and water quality is based on implementation of the proposed project in comparison to existing conditions and the standards of significance presented above.

4.8-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. This impact would be *less than significant*.

Mining activities associated with the proposed project would include removal of overburden on the project site, thereby resulting in exposed soils. Exposed soils could result in an increased risk of erosion and sediment transport. Soils exposed by the aforementioned types of ground disturbing activities have the potential to affect water quality in two ways: 1) suspended soil particles and sediments transported through runoff; or 2) sediments transported as dust that reach Cache Creek to the north of the site. Spills or leaks from heavy equipment and machinery involved in the proposed mining and reclamation activities also have the potential to enter stormwater runoff. Typical pollutants include, but are not limited to, petroleum and heavy metals from equipment. Discharge of polluted stormwater or non-stormwater runoff could violate waste discharge requirements. Issues related to groundwater quality are discussed under Impact 4.8-2 below. Issues related to slope stability, erosion, loss of topsoil, and pit capture are addressed in Chapter 4.6, Geology and Soils, Mineral Resources, and Paleontological Resources, of this EIR, under Impact 4.6-3. As discussed in Chapter 4.6, pit capture is not anticipated to occur at the project site; thus, the risk of physical connection between the proposed reclaimed lake and Cache Creek and any resultant water quality impacts is not considered significant.

The project site would be graded to allow stormwater runoff to collect in the proposed mining pit, where the runoff would gradually percolate or evaporate. At the conclusion of mining, the site would remain contoured such that stormwater runoff would be directed to the reclaimed mining area. New stormwater detention basins would be provided within the western and eastern reclaimed agricultural areas of the site. Based on the above, stormwater runoff would not leave the site during, or after completion of, the proposed mining activities.

Because the proposed project would include mineral mining activities the project applicant would be required by the State to comply with the most current Industrial General Permit requirements. Per the Industrial General Permit requirements and Section 10-4.413 of the OCSMO, a SWPPP would be prepared for the overall project, which would specify the design and maintenance procedures for all proposed stormwater controls, including Best Management Practices (BMPs) for the reduction of pollutants associated with runoff from mined areas. The BMPs would include, but would not be limited to, the following:

- Measures for controlling erosion and sedimentation such as ground covers, revetment systems, or bioengineering stabilization (e.g., live staking or vegetated geogrids);

- Procedures for handling and disposing of hazardous materials (e.g., fuel and lubricants) and construction waste; and
- Methods to eliminate or reduce non-storm water discharges to receiving waters.

In addition, a Notice of Intent (NOI) would be filed with the CVRWQCB. Consistent with Section 10-4.413 of the OCSMO, the drainage system would 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 would be documented in the Annual Mining and Reclamation Report. If the system is found to be functioning ineffectively, the project applicant would be required to promptly implement the recommendations of the Registered Civil Engineer.

Per Section 10.4.415 of the OCSMO, all internal combustion engine driven equipment and vehicles on the project site would be kept tuned according to the manufacturer's specifications and properly maintained to minimize the leakage of oils and fuel. Fueling and maintenance activities of heavy equipment (except draglines and floating suction dredges) are prohibited within 100 feet of open bodies of water during mining and reclamation. The SWPPP would be required to include provisions for releases of fuels during fueling activities for draglines and floating suction dredges.

Compliance with the State NPDES Industrial General Permit and the applicable requirements of the OCSMO, as described above, would minimize the potential degradation of stormwater quality and downstream surface water associated with the proposed project. As discussed in further depth in Impact 4.8-2 below, the project is not anticipated to result in impacts related to groundwater quality; therefore, the project would not result in any impacts to surface water through groundwater connection of the reclaimed lake and Cache Creek. Based on the above, the proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. Thus, a ***less-than-significant*** impact would occur.

Mitigation Measure(s)

None required.

4.8-2 Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin or conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. This impact would be *less than significant*.

The proposed project includes the following key elements: 1) relocation of a segment of Moore Canal to the northerly portion of the site and modification of Magnolia Canal to align with the relocated Moore Canal; 2) transfer of tonnage from the Teichert Esparto and Teichert Schwarzgruber operation to the Teichert Shifler operation; 3)

continued operation and expansion of the Teichert Woodland Plant facilities (including new equipment and increased processing capacity); 4) excavation at the Shifler site; 5) reclamation of the Shifler site; 6) delayed reclamation at Woodland Plant site; 7) dedication of various reclaimed properties to the County; and 8) completion of an in-channel gravel bar removal project. The Magnolia Canal modification would include removal of a 1,200-foot-long segment of the canal. The proposed expansion of equipment at the Woodland Plant would accommodate processing of aggregate from the proposed mining operation.

Dewatering of the Shifler mining area will be required once excavation reaches the groundwater level. Groundwater from the Shifler mining area would be pumped to the adjacent Woodland Plant to supply the aggregate processing operations at the plant. As allowed under OCSMO Section 10-4.412, Teichert proposes to conduct dewatering in-lieu of pumping groundwater solely from a well as part of the proposed surface mining operations on the project site. The proposed water transfer to the Woodland Plant would require installation of a new water pipe, to be located alongside the existing conveyor belt alignment. Installation of the pipe would not require trenching in areas that have not already been subject to substantial prior disturbance associated with the conveyor belt. Processing water from the project site and the Woodland Plant would be recycled through the use of settling ponds located at the Woodland Plant site. The discharge of aggregate wash water to the settling ponds at the Woodland Plant site would continue to be regulated through Waste Discharge Requirements (WDRs) issued by the CVRWQCB. The project would include modifications to the existing WDRs to allow for the use of fine sediment from aggregate processing (i.e., “fines”) in the eventual reclamation of the project site. The processing fines would be pumped from the Woodland Plant site as a slurry (mix of water and fines) and discharged into the mining pit in accordance with the requirements of the revised WDRs.

Teichert requests the ability to conduct limited dewatering activities at the project site subject to the following conditions:

- Groundwater pumping rate from the Shifler mining area may not exceed 3,500 gallons per minute (gpm), consistent with the maximum pumping rate for dewatering at Esparto.
- Annual water use may not exceed 1,910 acre-feet/year (average steady state flow rate of 1,184 gpm or 227,920 cubic feet per day based on 24 hours/day, 365 days/year operations).
- Off-site discharge of pumped groundwater shall not occur. Groundwater from the Shifler mining area would be pumped to the adjacent Woodland Plant for use in aggregate processing. Aggregate wash water from the Woodland Plant would be discharged to the Shifler mining area in accordance with WDRs to be specified by the RWQCB.
- Groundwater levels would be monitored quarterly, as required under OCSMO Section 10-4.412.
- Groundwater pumping volumes would be recorded, as required under OCSMO Section 10-4.412.

As required under Section 10-4.412 of the OCSMO, Teichert would conduct monitoring of water levels in the wet pit(s), evaluate nearby monitoring wells on a quarterly basis, and quantify the amount of water pumped from and returned to the wet pit(s).

Groundwater Levels in Project Vicinity

Consistent with SMRO Section 10-5.503, LSCE has provided an analysis of potential impacts to groundwater levels for all active off-site wells within 1,000 feet of the proposed mining pit. In addition, LSCE analyzed water levels associated with the proposed lake that would be constructed as part of project reclamation activities. As described in the Method of Analysis section above, groundwater and lake levels were analyzed for two main scenario categories: Scenario 1, which includes the initial wet pit mining planned within the western portion of the project site; and Scenario 2, which includes the remaining wet pit mining in the central portion of the project site, with the western portion of the site reclaimed to agricultural land.

The results of the scenario model simulations are provided in Tables 1 and 2 of the 2019 Groundwater Memo (Appendix K to this EIR) for Scenarios 1 and 2, respectively. The tables show, including in each area well and in each model layer, the following information:

- The model layer, row, and column;
- The simulated calibrated model baseline groundwater and lake levels;
- The predicted scenario groundwater and lake levels; and
- The predicted change in groundwater and lake levels, baseline vs. scenario.

It should be noted that groundwater level changes are calculated from comparison of the scenario results (proposed mining and reclamation) to the baseline conditions (no mining or reclamation).

The model simulations predict the greatest changes in groundwater levels under the scenarios with 100 percent of pumping derived from the wet pits. Such changes are predicted to occur only in shallow groundwater of the uppermost portion of the aquifer (model layer 1) in which wet pit mining is planned. Groundwater levels are predicted to range between a two-foot decline under Scenario 1A (west pit mined) and 23 feet of lowering under Scenario 2A (central pit mined and west pit reclaimed). Under Scenario 1A, shallow groundwater levels are predicted to decline upgradient of the west wet pit and rise downgradient of the pit, presumably in response to the flattening of the sloped water table (pre-mining) into the wet pit (during mining). Under Scenario 2A, shallow groundwater levels are predicted to rise upgradient of the property and decline on and downgradient of the project site, likely in response to the impedance of shallow groundwater flow through the fine materials of the reclaimed west wet pit. Wet pit levels are predicted to remain essentially the same under the scenarios of 50/50 percent pumping from the proposed mining pit and the Woodland Plant well.

In contrast, under Scenarios 1A and 2A, the predicted changes in groundwater levels of the deeper portions of the aquifer (model layers 2 and 3), that would be undisturbed by the proposed mining, range between 1 foot of decline to 1 foot of rise around the

project site. Given that water supply well constructions in the project area are completed in the lower portions of the aquifer, per LSCE, the water levels in such wells are predicted to be essentially unaffected by the proposed mining and reclamation.

Groundwater Levels at Wild Wings Subdivision Wells

As noted previously, two water production wells (Pintail well and Canvas Back well) are used to supply the Wild Wings subdivision to the southwest of the project site, as noted in the 2020 Groundwater Memo. Both wells are located outside of the County-specified radii of influence for model analyses (i.e., 1,000 and 500 feet from wet pit boundaries for water level and water quality concerns, respectively).

As a result of proximity and construction, potential effects from the proposed mining and reclamation activities, were they to occur, would first manifest in the Canvas Back well. Therefore, model analysis conducted as part of the 2020 Groundwater Memo focused on predicted effects on the Canvas Back well, as opposed to the Pintail well. As described in the Method of Analysis section above, the 2020 Groundwater Memo included detailed water level, water budget, and particle tracking analyses at the Canvas Back well.

The results indicate that the proposed mining and reclamation activities at the project site would not cause water levels to decline or water quality impacts at the Canvas Back well associated with the Wild Wings subdivision. Such findings are mainly attributed to the well's upgradient location with respect to the project site and the fact that the well terminates in an aquifer zone that is deeper than the depth of the proposed mining activities. The results were found to not be sensitive to the well's pumping rate; even a 10-fold increase of the pumping rate at the Canvas Back well, up to 1,250 gpm (comparable to daily operation at capacity of approximately 22 hours, every day of the year), would not substantially affect the findings presented in the 2020 Groundwater Memo. Thus, the proposed project would not result in substantial adverse effects to groundwater levels at either of the Wild Wings subdivision wells.

Groundwater Quality

Given that off-site domestic water supply wells are not located within 500 feet of the proposed reclamation lake location, OCSMO Section 10-4.427 related to capture zone analysis requirements is not applicable to the proposed project.

Nonetheless, in order to address water quality concerns, the 2016 Groundwater Study included an assessment of past and proposed mining and reclamation activities at the Teichert off-channel mining properties, as well as the historical water quality monitoring results for the Teichert mining properties. This assessment indicates that mining and reclamation activities are protective of water quality; impacts to mining pond, reclaimed seasonal lake, or groundwater quality have not been observed historically. Thus, while topsoil and subsurface material may generally act as filters for groundwater, the removal of material at other nearby Teichert mining properties has not been demonstrated to result in negative impacts to water quality, and, similarly, mining of material at the project site would not be anticipated to result in degradation of groundwater quality, particularly at wells in the area. The results of the 2020 Groundwater Memo demonstrated that wells in the Wild Wings subdivision would not

be impacted by the project, whether in terms of water level or quality (such as debris and contaminants). Further, the proposed project would include groundwater level and quality monitoring at the project site, as well as mining pit and reclaimed seasonal lake water quality monitoring, in accordance with Yolo County OCSMO Section 10-4.417 requirements. Thus, with past monitoring results as an indication of potential water quality impacts from the proposed project, and the planned water level and quality monitoring program, the proposed setback distance between nearby domestic water supply wells and the reclaimed seasonal lake is considered sufficient for protection of groundwater quality.

Conclusion

Based on the above, the proposed project would not substantially decrease groundwater levels at active off-site wells within 1,000 feet of the proposed mining pit or result in substantial adverse effects to groundwater levels at either of the Wild Wings subdivision wells. In addition, the project would not adversely affect groundwater quality. Therefore, the proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the Yolo Subbasin or conflict with or obstruct implementation of the Yolo Subbasin Groundwater Sustainability Plan, and a ***less-than-significant*** impact would occur.

Mitigation Measure(s)

None required.

4.8-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: result in substantial erosion or siltation on- or off-site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; or create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. This impact would be *less than significant*.

The project site would be graded to allow stormwater runoff to collect in the proposed mining pit, where the runoff would gradually percolate or evaporate. At the conclusion of mining, the site would remain contoured such that stormwater runoff would be directed to the reclaimed mining area. New stormwater detention basins would be provided within the western and eastern reclaimed agricultural areas of the site. Based on the above, stormwater runoff would not leave the site during, or after completion of, the proposed mining activities. Consistent with OCSMO Section 10-4.437, the proposed project would not include discharge of any stormwater or wastewater to Cache Creek during the proposed mining activities or upon reclamation of the site to agricultural and recreational uses.

Based on the above, the proposed project would not substantially alter the existing drainage pattern of the project area in a manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site, or create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Thus, a ***less-than-significant*** impact would occur.

As a component of the Development Agreement, the applicant is proposing to design and complete a gravel bar removal project to help prevent further channel bank erosion and provide for addition capacity in the Cache Creek channel. The proposed in-channel bar skimming would take place over a five-year period in the area in-channel segment bounded by the County Road 87 bridge to the west and the Interstate 505 bridge to the east. The project would remove approximately 3,000,000 tons of excess sand and gravel material from the Cache Creek channel, realign the low-flow channel of Cache Creek away from the banks and toward the center of the creek channel, remove invasive species from the project area, and complete bank repairs adjacent to the Teichert Esparto Plant consistent with the CRMP/CCIP Channel Form Template. The amount of material removed in any one year would be governed by Section 10.3-409 of the In-Channel Maintenance Mining Ordinance and would generally not exceed 690,800 tons in any one year.

This work is anticipated and encouraged in the CCRMP/CCIP and associated impacts are addressed in the CCAP Update EIR (certified December 2019). The work would require issuance of a subsequent Flood Hazard Development Permit (FHDP) by the County and would require subsequent hydraulic analysis to confirm public benefit through reduction of flood risk. All removal would be subject to review and oversight by the Cache Creek Technical Advisory Committee (TAC).

Mitigation Measure(s)
None required.

4.8-4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows. This impact would be *less than significant*.

The proposed mining and reclamation activities would not include the creation of substantial new impervious surfaces within the project site. However, given that the project would include the excavation of a mining pit, the project has the potential to alter the existing drainage pattern of the project area.

As proposed, the relocated alignment of the Moore Canal would be set back 200 feet and the proposed mining would be set back approximately 300 feet from the 100-year floodplain associated with Cache Creek. Section 10-4.429 of the OCSMO requires a 700-foot setback between off-channel excavations and the existing bank of Cache Creek (see Figure 3-21 and Figure 3-22 of the Project Description chapter of this EIR).

The setback may be reduced to 200 feet if the project applicant can demonstrate compliance with specific standards, including the following:

- The lesser setback will not adversely affect channel stability;
- The existing bank configuration or proposed bank stabilization measures would provide protection from lateral erosion and pit capture equivalent to a 700-foot setback, and;
- Channel maintenance and reshaping activities along the proposed mining reach are consistent with the CFT established by the County for Cache Creek, previously referred to as the "Test 3 Line."

Per the Channel Stability Analysis, historic excessive bank erosion has not occurred within the reach of Cache Creek located within the vicinity of the proposed mining pit location. Periods of low flow channel migration and in-channel sand and gravel bar transport and deposition are noted; however, such events did not appear to result in bank erosion. Based on visual observation of the channel bank, evidence of significant current bank erosion does not exist, even though the winter of 2016 experienced well above average flows (20,500 cfs max daily mean flow, which represents the third-highest flow recorded in the last 20 years). Vegetation on the southern bank, the terraced slope configuration, and the asphalt-like bank material within the upper terrace may be providing additional bank reinforcement and stabilization.

The *Lower American River - Erosion Susceptibility Analysis for Infrequent Flood Events* completed by Ayers Associates in 2004 cited the following references as velocity thresholds, presented in feet per second (fps), for the initiation of erosion with varying vegetation covers:

1. *Erosion of Bare, Fine Grained Sandy Soils: Velocity exceeding 2 fps;*
2. *Erosion with Annual Grass Cover: Velocity exceeding 3.5 fps;*
3. *Erosion with Grass-Lined Earth, Kentucky Blue Grass: Velocity exceeding 5 fps; and*
4. *Erosion of Dense Vegetation: Velocity exceeding 5 fps.*

The maximum velocity and shear stress values shown in the HEC-RAS model along the southern bank of Cache Creek in the project vicinity do not exceed those estimated to cause erosion of a well-vegetated stream bank (i.e., 5 fps). In addition, the bank alignment within the reduced setback area closely follows the CFT, indicating that the current bank location is situated at the preferred modeled channel form approved by the Cache Creek TAC. Therefore, measures to modify the bank to match the CFT along the project reach are not necessary but measures to ensure stability are recommended.

Chapter 4.6, Geology and Soils, Mineral Resources, and Paleontological Resources, of this EIR includes an analysis of potential impacts related to damage to Moore Canal and risks related to mining pit capture. As noted in Impact 4.6-3, relocation of the Moore Canal to the north is not anticipated to result in exposure to unacceptable risks related to lateral migration (the process of a water course moving due to stream bank erosion) of the Cache Creek channel, particularly as a result of the mitigation identified

below. The proposed mining slopes and stockpiled soils would not be subject to substantial risk of overflowing floodwaters; thus, the proposed project would not result in significant impacts related to pit capture.

This segment of the creek has been subjected to recent in-channel activity from hydraulic conditions including removal of a large in-stream island in 2017 demonstrating the volatility at the channel bend at this location. The County regulations allow the setback to be reduced; however, the Cache Creek TAC has recommended a reduction to no more than 250 feet in this location to allow a prudent margin of error for future creek volatility (see Appendix R for the Cache Creek TAC review memorandum). The TAC has also recommended SSP improvements to reinforce the area of the creek in the path of a potential migration of a creek meander bend (see Figure 4.8-1) through a combination of backfilled soil and planted rock revetment to reinforce the bank, and habitat enhancement on the identified inset terrace, both of which will protect the CFT which is generally already in place along this stretch of bank, and also provide co-benefits by enhancing habitat values.

As required in the OCSMO, the Cache Creek channel would be annually monitored once the proposed mining activity begins, and if minor lateral migration does begin to occur, additional plantings, armoring, and/or a geotextile fabric may be incorporated along the southern stream bank within the reduced setback, if necessary.

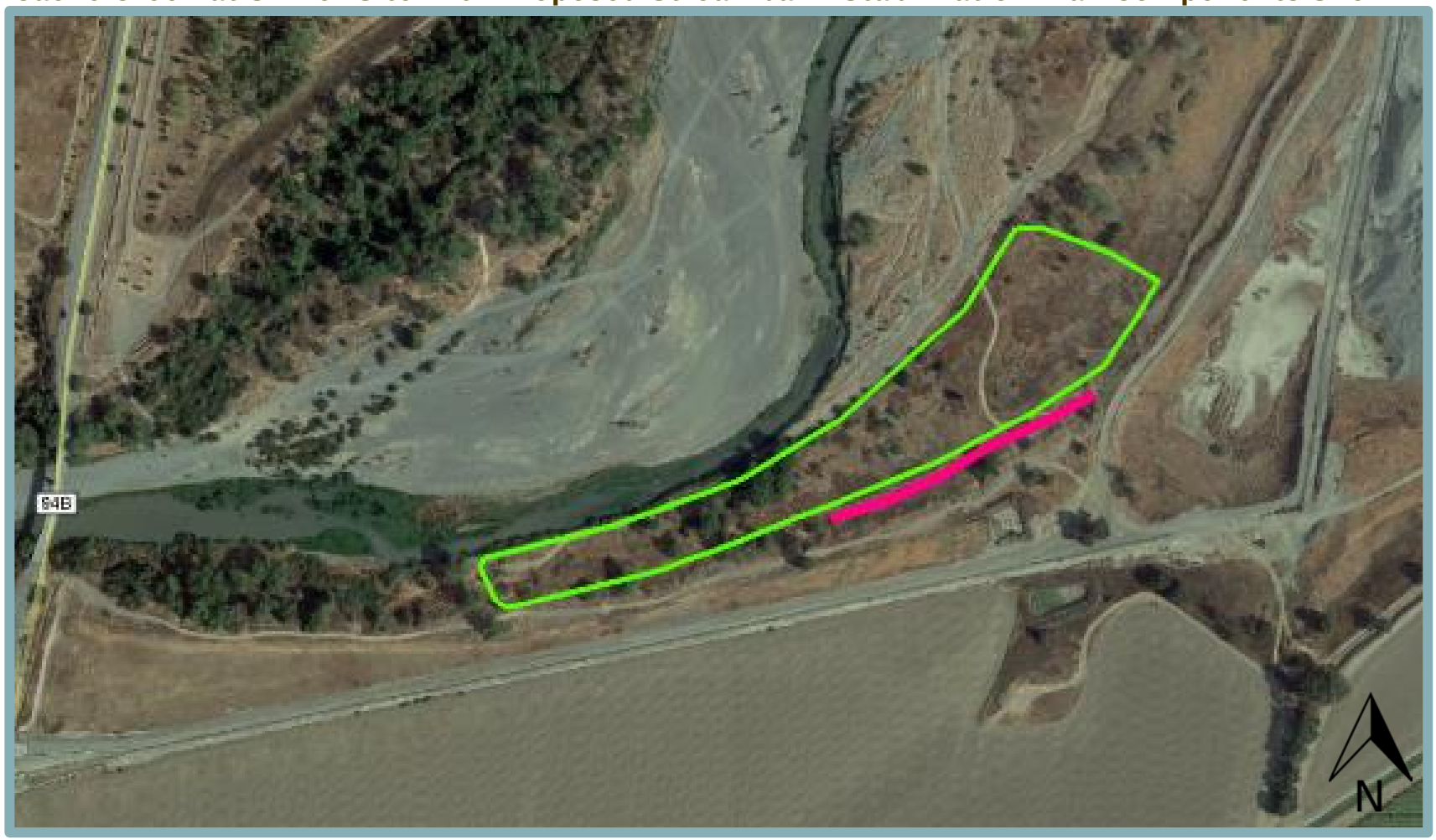
The proposed project has the potential to result in adverse effects related to mining within the 700-foot setback from the top of bank, therefore impacts may be ***significant*** related to alteration of the existing drainage pattern of the site or area, including through alteration of a course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows.

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level:

4.8-4(a) *Prior to mining or other activity closer than 700 feet to the top of bank, the applicant shall implement a reinforcement improvement in an approximately 600-foot area of streambank (shown in Figure 4.8-1 of the Draft volume of the EIR) which lies in the path of a potential theoretical migration of the creek meander bend. Along this alignment the improvements will consist of a soil-backfilled and planted rock revetment designed and installed to help prevent future bank erosion in the area closest to the Moore Canal and where there is the highest potential for channel migration. The design and placement of this improvement will be subject to review and approval by the Cache Creek TAC.*

Figure 4.8-1
Cache Creek at Shifler Site with Proposed Streambank Stabilization Plan Components Shown



Source: FlowWest. Technical Memorandum: Cache Creek TAC Review Of Teichert Shifler Mining And Reclamation Project. December 3, 2020.

4.8-4(b) Prior to mining of other activity closer than 700 feet to the top of bank, the applicant shall implement a habitat enhancement improvement in an approximately 6-acre area of inset terrace (shown in Figure 4.8-1 of the Draft volume of the EIR). There exists an area on the inset terrace below the Shifler property that extends from County Road 94B along the right (south) bank to the Teichert Aggregates Woodland Plant. This terrace has some native woody vegetation along the first approximately 1,000 feet east of CR 94B but is otherwise predominantly bare or covered with non-native ruderal species. Within the approximately 6-acre zone shown in the referenced figure, the applicant shall remove non-native species and plant appropriate native woody (tree and shrub) species (with the species selection informed by which trees and shrubs are already present on the terrace). This action shall be undertaken in a manner so as not to disturb existing native species (especially elderberry) that already exist within this 6-acre zone. This action will help stabilize this terrace in addition to enhancing habitat between the creek channel and the project site, further reducing potential for channel migration. The habitat enhancement project shall be implemented, monitored, and maintained to the same revegetation standards as stipulated in the approved reclamation plan.

4.8-4(c) The minimum allowed setback between the top of bank and mining or other activity shall be 250 feet. Mining and reclamation plans shall be modified accordingly.

4.8-5 In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation. This impact would be *less than significant*.

As noted previously, the proposed mining and reclamation activities would occur outside of the 100-year floodplain associated with Cache Creek. In addition, as discussed in Chapter 4.6 of this EIR, Impact 4.6-3, the project plans include a 300-foot setback that would separate the creek and the mining pit, and all stockpiled soils would occur within the mining pit. The relocated Moore Canal would be set back a minimum of 200 feet from the creek. Based on historic channel migration and floodwater conditions in Cache Creek, the floodwaters, when present, do not flow over the south bank of the creek adjacent to the site. Historic photographs also show increasing vegetation on the south bank over the course of 54 years. The existing and historic conditions, coupled with the absence of adverse seepage and slope stability conditions, would result in low potential for pit capture (i.e., breach of the mining pit).

Pit capture potential is analyzed in further detail in Chapter 4.6, Geology and Soils, Mineral Resources, and Paleontological Resources, of this EIR. Therefore, neither the mining slopes nor stockpiled soils would be subject to risk of overflowing floodwaters. Furthermore, the project site is not located near the ocean and, thus, would not be subject to tsunami hazards. In addition, the site is not located within the vicinity of a large closed body of water such as a lake or reservoir that could be subject to risks from seiches.

Based on the above, the proposed project would result in a ***less-than-significant*** impact related to the release of pollutants due to inundation.

Mitigation Measure(s)
None required.

4.8-6 Cause a significant environmental impact due to a conflict with applicable plans, policies, or regulations adopted for the purpose of mitigating impacts to hydrology and water quality. This impact would be *less than significant*.

Table 4.8-2 below provides an analysis of the proposed project's consistency with applicable policies and regulations that have been adopted for the purpose of avoiding or mitigating environmental effects related to hydrology and water quality. It should be noted that consistency with other standards in SMARA, the County Zoning Ordinance, and the SMRO that are specific to land use and planning issues are discussed in Chapter 4.9, Land Use and Planning, of this EIR. As shown in the table, the proposed project would be generally consistent with applicable standards related to hydrology and water quality. Thus, a ***less-than-significant*** impact would occur.

Mitigation Measure(s)
None required.

Table 4.8-2
Consistency with Applicable Standards

Policy / Regulation	Consistency Discussion
Yolo County General Plan	
Policy CO-2.31 Protect wetland ecosystems by minimizing erosion and pollution from grading, especially during grading and construction projects.	See Impact 4.8-1. The ground-disturbing activities associated with the proposed project would not result in adverse effects to water quality. Therefore, the proposed project would be consistent with this policy.
Policy CO-5.14 Require that proposals to convert land to uses other than agriculture, open space, or habitat demonstrate that groundwater recharge will not be significantly diminished.	Mining is an allowed use in the A-N zone; therefore, by definition land use conversion would not occur. The proposed project would include reclamation of the project site to agriculture, habitat, and open space in the form of a lake through which groundwater recharge could occur. Also Mitigation Measure 4.2-1 requires mitigation for net loss of agricultural land. Therefore, the proposed project is consistent with this policy.
Action A94 Adopt development design standards that use low-impact development techniques that emulate the natural hydrologic regime and reduce the amount of runoff and associated pollutants. Examples include vegetated swales, landscaped detention basins, permeable paving, and green roofs.	As discussed throughout this chapter, the proposed project would not include any discharge of stormwater runoff to Cache Creek or other downstream waterways. All runoff would be captured and treated on-site. Thus, the proposed project is consistent with this action.

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Table 4.8-2
Consistency with Applicable Standards

Policy / Regulation	Consistency Discussion
Action A97 Continue to monitor water quality in Lower Cache Creek and annually make the resulting data publicly available.	The County Parks and Resources Department is responsible for implementation of this action. Thus, this action would not apply to the proposed project. However, consistent with Section 10-4.417 of the OCSMO, the project would be required, as a condition of approval, to provide for ongoing monitoring of groundwater quality in the project area over the life of the project.
Policy HS-2.7 Manage the floodplain to improve the reliability and quality of water supplies.	As discussed under Impact 4.8-4, the proposed mining pit would be set back approximately 300 feet from the 100-year floodplain associated with Cache Creek. Per the Channel Stability Analysis prepared by CEC, additional Cache Creek bank stabilization measures are needed to ensure equivalent protection to a 700-foot setback from the channel bank (see Mitigation Measure 4.8-4). As mitigated, the proposed project would be consistent with this policy.
Action HS-A5 Require a minimum of 100-year flood protection for new construction, and strive to achieve 200-year flood protection for unincorporated communities. Where such levels of protection are not provided, require new development to adhere to the requirements of State law and the County Flood Damage Prevention Ordinance. (Policy HS-2.1)	Per the project Hydraulics Study, the modeled 100-year floodplain limits associated with Cache Creek do not extend into the project site boundaries. In addition, recent modeling conducted by the California Department of Water Resources (DWR) indicates that the estimated 200-year and 500-year discharges will also stay within the creek's south bank along the project site reach. Thus, the proposed project is consistent with this policy.
Action HS-A13 Review development proposals to ensure that the need to maintain flood control capacity is balanced with consideration of the environmental health of watercourses that convey floodwaters so as not to cause significant erosion, sedimentation, water quality problems, or loss of habitat. (Policy HS-2.1)	See Policy HS-2.7 above.
Off-Channel Mining Plan	
Action 3.2-5. Require that surface mining operations demonstrate that proposed off-channel excavations extending below the groundwater level will not adversely affect the producing capacity or water quality of local active wells.	See Impact 4.8-2. The proposed project would not result in substantial adverse effects to water quality or groundwater levels at existing wells in the project vicinity or at the Wild Wings subdivision. Therefore, the project would be consistent with this regulation.
Action 3.4-3. Include a groundwater monitoring program as a condition of approval for any surface mining and reclamation operation that proposes off-channel excavations that extend below the groundwater level. The monitoring program shall require regular groundwater level data, as well as a water	The proposed project would include groundwater level and quality monitoring at the project site as a condition of approval, as well as mining pit and reclaimed seasonal lake water quality monitoring, in accordance with Yolo County OCSMO Section 10-4.417 requirements. Therefore, the project would be consistent with this regulation.

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Table 4.8-2
Consistency with Applicable Standards

Policy / Regulation	Consistency Discussion
quality monitoring program based on a set of developed standards.	
Action 4.4-4. Manage activities and development within the floodplain to avoid hazards and adverse impacts on surrounding properties. This shall be accomplished through enforcement of the County Flood Damage Ordinance and ensuring that new development complies with the requirements of the State Reclamation Board.	See Impacts 4.8-4 and 4.8-5. The proposed mining and reclamation area is located outside of the 100-year floodplain associated with Cache Creek. The proposed project would not result in flood-related hazards. Therefore, the project would be consistent with this regulation.
Action 4.4-5. Allow for the design of spillways or other engineered features that provide controlled flooding of off-channel mining pits during events which exceed the 100-year flood.	The results of the Hydraulics Study prepared for the proposed project by CEC substantiate that 200-year and 500-year storm discharges within Cache Creek would not overtop the south bank of the waterway in the project vicinity; thus, flooding of the mining pit is unlikely to occur, and the project would be consistent with this regulation.
Off-Channel Surface Mining Ordinance	
Section 10-4.412. "Dewatering" shall mean lowering the water level in a wet pit by pumping water from the pit, regardless of the purpose of the pumping. Water generated from dewatering activities must be beneficially used and discharged on-site. Pumps systems used to dewater the wet pits shall be powered by electricity (i.e., through connection to power lines) or solar power. This ordinance does not permit water generated from dewatering activities to be used or discharged off-site. No off-channel excavation shall use dewatering as a part of surface mining operations, unless site-specific technical analysis performed by a qualified Professional Engineer or Professional Geologist with experience in hydrogeology demonstrates that the proposed dewatering will not adversely affect off-site wells with respect to groundwater level and quality. The Professional Engineer or Professional Geologist shall demonstrate, using appropriate hydrogeologic analysis (i.e., using data-supported empirical, analytical, and/or numerical investigative tools), that the proposed dewatering activity will not adversely impact active off-site wells or other water resources (e.g., creeks and wetlands) within 1,000 feet of the proposed dewatering pit boundary. Average historic low groundwater levels in the subject well, shall be used for the analysis. Site-specific aquifer testing shall be conducted, if needed, to determine aquifer properties for the analysis. Consistent with the OCMP EIR, an effect shall be	Teichert proposes to conduct dewatering in-lieu of pumping groundwater solely from a well as part of the proposed surface mining operations on the project site. Groundwater from the Shifler mining area would be pumped to the adjacent Woodland Plant to supply the aggregate processing operations at the plant. Processing water from the project site and the Woodland Plant would be recycled through the use of settling ponds located at the Woodland Plant site. The discharge of aggregate wash water to the settling ponds at the Woodland Plant site would continue to be regulated through WDRs issued by the CVRWQCB. See Impact 4.8-2. The proposed dewatering activities would not adversely affect any active wells within 1,000 feet of the mining pit boundary. In addition, the project applicant would monitor water levels in the wet pit(s), evaluate nearby monitoring wells on a quarterly basis, and quantify the amount of water pumped from and returned to the wet pit(s). Therefore, the proposed project would be consistent with this regulation.

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Table 4.8-2
Consistency with Applicable Standards

Policy / Regulation	Consistency Discussion
considered adverse if the reduction in simulated groundwater levels exceeds two (2) feet at any well located within 1,000 feet of the pit boundary or results in well failure. The hydrogeologic analysis shall be submitted to the County for review and approval prior to implementation of any dewatering activities. If an adverse impact is identified by the analysis (either impacts to existing wells or other water resources, including creeks and wetlands), dewatering activities will be modified to eliminate any adverse impacts, and/or the applicant shall otherwise mitigate adverse impacts to the satisfaction of the County. Approval to dewater requires Planning Commission approval pursuant to 10-4.506 and 10-4.602. Prior to and for the duration of dewatering activities, the applicant shall: 1) monitor water levels in the wet pit(s), and nearby monitoring wells on a quarterly basis; and 2) quantify the amount of water pumped from and returned to the wet pit(s). This monitoring data shall be reviewed by the applicant's Professional Engineer or Professional Geologist to determine whether any adverse impacts are occurring. Documentation of the monitoring and data evaluation shall be submitted the County annually. If adverse impacts are found to be occurring, dewatering activities will be modified to eliminate adverse impacts, or the applicant shall otherwise mitigate impacts to the satisfaction of the County. Any measures designed to mitigate adverse impacts identified after implementation of dewatering activities shall be approved by the Planning Commission at a regularly scheduled meeting, with written notice of the adverse impact and proposed mitigation measures given by mail to all property owners within 1,000 feet of the pit boundary, in addition to any notice otherwise required by law. For purposes of this section, mitigation measures of adverse impacts may include, but are not limited to well modification, well relocation, compensation of well owners for increased pumping cost, or providing an alternative water supply. Such mitigation measures shall be paid for	

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Table 4.8-2
Consistency with Applicable Standards

Policy / Regulation	Consistency Discussion
by the mining operator, with sufficient financial security to ensure completion of the measures. Pumping of water from the wet pit in lieu of pumping of groundwater from a well shall not require predictive impact analysis in addition to analysis provided in the approved, site-specific CEQA document, unless the total annual water demand, as set forth in the CEQA document, is exceeded. This does not remove the requirement for monitoring and reporting activities described above.	
Section 10-4.413 Surface water may be allowed to enter 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. Stormwater 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	The project site would be graded to allow stormwater runoff to collect in the proposed mining pit, where the runoff would gradually percolate or evaporate. See Impact 4.8-1. A SWPPP would be prepared for the overall project, which would specify the design and maintenance procedures for all proposed stormwater controls, including BMPs for the reduction of pollutants associated with runoff from mined areas. In addition, a NOI would be filed with the CVRWQCB. Consistent with OCSMO Section 10-4.413, a condition of approval would require the drainage system to 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.

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operator shall promptly implement the recommendations of the engineer.	
Section 10-4.416 All off-channel surface mining operations shall be provided with a minimum one-hundred (100) year flood protection. Off-channel excavations shall be designed to minimize the potential for levee breaching and/or pit capture. In addition, excavations shall be designed to prevent overtopping of channel banks or levees along Cache Creek and all tributaries and drainage channels (including, but not limited to, Willow Slough and Lamb Valley Slough). The flood protection upgrades shall be designed and constructed to provide the necessary 100-year protection without creating a net increase of in upstream or downstream flooding elevations. Upstream flooding could be increased if additional levee construction serves to confine flows to a narrow width, thereby increasing the water surface elevation. Downstream flooding could be increased if floodplain storage areas were removed from the drainage system by constructing levees in areas where they did not exist before (or raising levees that are overtopped in floods up to the 100-year event). Where feasible, alternative or non-structural flood management designs (potentially using detention basins, infiltration galleries, and/or floodplain storage in noncritical areas) shall be incorporated. New development (such as buildings, levees, or dikes) located within the floodplain shall conform to all applicable requirements of the Yolo County Flood Protection Ordinance and the Federal Emergency Management Agency (FEMA).	See Impact 4.8-5. The proposed mining and reclamation activities would occur outside of the 100-year floodplain associated with Cache Creek. In addition, as discussed in Chapter 4.6 of this EIR, Impact 4.6-3, the project plans include a 200-foot setback which would separate the creek and relocated Moore Canal, and a 20-foot minimum setback between the canal and the mining operations. A 100-foot buffer would be established between the stockpiled soils and the creek. The existing and historic conditions associated with Cache Creek, coupled with the absence of adverse seepage and slope stability conditions, would result in low potential for pit capture (i.e., beach of the mining pit). The project would not be required to include any flood protection improvements within Cache Creek. Therefore, the proposed project would comply with this regulation.
Section 10-4.417 All surface mining operations that propose off-channel excavations extending below the groundwater level shall develop and maintain a groundwater monitoring program consisting of two components: water level measurements and water quality testing. A groundwater level monitoring program shall be initiated at least six months prior to the removal of overburden. At a minimum, the groundwater level monitoring program shall consist of three monitoring wells, with at least one well upgradient of the wet pit and one well downgradient of the wet pit. Monitoring programs for proposed mining areas exceeding	A condition of approval would be recommended to ensure that the proposed project would comply with all applicable groundwater monitoring and reporting requirements established by OCSMO Section 10-4.417. Therefore, the proposed project would comply with this regulation.

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one-hundred (100) acres (total proposed mining area over the life of the project) shall include one additional well for each one-hundred (100) acres of wet pit mining. Therefore, wet pit mining areas of 1 to 99 acres would require three (3) wells, 100 to 199 acres would require four (4) wells, 200 to 299 acres would require five (5) wells, and so on. These wells shall be distributed through the vicinity of the wet pit mining area and used for groundwater level measurements. Groundwater levels shall be collected from the monitoring wells on a quarterly basis for six (6) months prior to mining and for the duration of the mining period. All wellheads shall be surveyed with horizontal and vertical control to allow calculation of groundwater elevations and development of groundwater contour maps. Groundwater levels shall be measured with an accuracy of plus or minus 0.01 foot, at minimum. Water quality in the vicinity of each active wet pit mining location shall be evaluated by analyzing samples from selected monitoring wells (one upgradient and one downgradient) and wet pit surface water sampling locations. Since mining may be conducted in phases over a relatively long period of time, pit boundaries may change with time. Selection, and installation if necessary, of downgradient monitoring wells, which would be critical to adequately characterize the groundwater quality in the vicinity of the wet pits, shall be submitted by the operator for review and approval by the County. The selected monitoring wells shall be installed and sampled at least six (6) months prior to the removal of overburden. The downgradient wells shall be located as near to the active wet pit mining areas as is practical. The upgradient wells shall be located an adequate distance from the proposed mining area to ensure that the effect of the wet pit on water quality in the well would be negligible. The water samples from the wet pit shall be collected in a manner so as to ensure that they are representative of water quality within the wet pit. The minimum sampling schedule and required analyses are described below. (a) Groundwater level and pit water surface level measurements shall be performed quarterly in all wells for the duration of mining and reclamation.	

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(b) For monitoring the groundwater quality of proposed wet pit mining, sample collection and analysis of physical, chemical, and biological constituents shall be conducted according to the following specifications: (1) Prior to the removal of overburden – one upgradient and one downgradient well shall be sampled at least six (6) months prior to the removal of overburden and again at the start of excavation. The samples shall, at minimum, be analyzed for general minerals; inorganics; nitrates; total petroleum hydrocarbons (TPH) as diesel and motor oil, benzene, toluene, ethylbenzene, and xylenes (BTEX); pesticides (EPA 8140 and 8150); and coliform (with E. coli confirmation). (2) During wet pit mining and active reclamation – the wet pit shall be sampled semi-annually for the duration of mining and active reclamation. The samples shall, at minimum, be analyzed for general minerals; inorganics; nitrates; TPH as diesel and motor oil, BTEX; pesticides (EPA 8140 and 8150); and coliform (with E. coli confirmation). One upgradient and one downgradient well shall be analyzed, at minimum, for general minerals; inorganics; nitrates; TPH as diesel and motor oil, BTEX; pesticides (EPA 8140 and 8150); and coliform (with E. coli confirmation). The wells shall be sampled according to the following schedule: semi-annually for the first two years, and annually every year thereafter. (3) After active reclamation – one (1) year after all heavy equipment work has been completed in the	

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vicinity of the pit, the TPH and BTEX analyses may be discontinued. The wet pit and one upgradient and one downgradient well shall be sampled and analyzed for pH; temperature; nutrients (phosphorous and nitrogen); total dissolved solids; total coliform (with E. coli confirmation); and biological oxygen demand. This monitoring shall be conducted every two (2) years for a ten (10) year period after completion of reclamation. A report to the Agency and Department of Environmental Health shall be submitted within thirty (30) days of the required groundwater testing. Additional tests and analysis shall be required only if a new condition is recognized that may threaten water quality or if the results of previous tests fall outside allowable ranges. If at any time during the monitoring period, testing results indicate that sampling parameters exceed Maximum Contaminant Levels (MCLs), as reported in the California Code of Regulations, or established background levels, a qualified professional shall evaluate potential sources of the contaminants. The evaluation shall determine the source and process of migration (surface or subsurface) of the contaminants. A report shall be submitted to the regulatory agencies (the Agency, Yolo County Department of Environmental Health, the Central Valley Regional Water Quality Control Board, and the U.S. Environmental Protection Agency) which identified the source of the detected contaminants and specifies remedial actions to be implemented by the operator for corrective action. If it is determined that the source of water quality degradation is off-site, and the County and the RWQCB are in agreement with this conclusion, the operator shall not be responsible for corrective action. If corrective action is ineffective or infeasible, the responsible party must provide reparation to affected well owners, either by treatment of water	

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at the wellhead or by procurement of an alternate water supply. If, at the completion of the mining and reclamation period, water quality has not been impacted, all monitoring wells shall be destroyed in accordance with the California Department of Water Resources Well Standards. If the County, landowner, or other agency wishes to maintain the wells for future water resources evaluation, selected wells may be preserved for this use. Monitoring wells may remain useful for post-mining land uses. The County may retain appropriate staff or a contract consultant to provide third party critical review of all hydrologic reports related to monitoring.	
Section 10-4.420.1 Each mining area to be reclaimed to a permanent lake as part of each approved long-range mining plan shall be evaluated annually by the operator for five years after the pit fills with groundwater with an intensive fish mercury monitoring program described in Section 10-5.517 of the Reclamation Ordinance.	See Section 10-5.517 below.
Section 10-4.427 If any off-channel excavation proposes to extend below the level of seasonal high groundwater, then six months prior to the commencement of excavation below the average high groundwater level, the operator shall identify and locate all off-site municipal wells within one-thousand (1,000) feet and all domestic wells within five hundred (500) feet of the proposed wet pit mining boundary. If active wells are identified, well characteristics (pumping rate, depth, and locations of screens) shall be determined. If wells are not located within one-thousand (1,000) feet, the pre-mining impact evaluation shall be considered complete. If wet pit mining is proposed within one-thousand (1,000) feet of a municipal water supply or within five-hundred (500) feet of a domestic water supply well, a capture zone analysis shall be conducted using the U.S. Environmental Protection Agency model WHPA (or a similar model of equal capability and proven reliability, as approved by the Director). The simulation shall assume thirty	See Impact 4.8-2.

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(30) days of continuous pumping of the water supply well (at its maximum probable yield) under analysis. A mining setback shall be established so that the capture zone and the pit do not coincide. Alternatively, the operator shall submit a written agreement that the well owner has agreed to relocate or redesign the well, or accept the potential impact (at no expense to the County). The analysis shall be prepared and signed by a Registered Civil Engineer or Certified Hydrogeologist and submitted to the County for review and approved at least six months prior to the commencement of excavation below the seasonal high groundwater level. Any new drinking water wells proposed for installation within one-thousand (1,000) feet of an approved wet pit mining area shall be subject to review by the Yolo County Environmental Health Department. The County shall determine, based on site-specific hydrogeology and available water quality data, whether to approve the proposed well installation. Analysis of environmental impact for projects in the vicinity of the wet pits shall include consideration of potential water quality impacts on the open water bodies. The County may retain appropriate staff or a contract consultant to provide third party critical review of all hydrogeologic reports related to mining applications.	
Section 10-4.429 All off-channel surface mining operations shall comply with the following setbacks: (a) New processing plants and material stockpiles shall be located a minimum of one-thousand (1,000) feet from public rights-of-way, public recreation areas, and/or off-site residences, unless alternate measures to reduce potential noise, dust, and aesthetic impacts are developed and implemented; (b) Soil stockpiles shall be located a minimum of five-hundred (500) feet from public rights-of-way, public recreation areas, and off-site residences, unless alternate measures to reduce potential dust and aesthetic impacts are developed and implemented;	The project plans include a 200-foot setback which would separate the creek and the relocated Moore Canal, and a 20-foot minimum setback between the canal and the mining operations. A 100-foot buffer would be established between the stockpiled soils and the creek. See Impact 4.8-4. Based on the findings of the Channel Stability Analysis prepared for the proposed project, the proposed project would comply with the standards established by OCSMO Section 10-4.429(e). Additional bank stabilization measures are needed to ensure equivalent protection to a 700-foot setback from the channel bank (see Mitigation Measure 4.8-4). Compliance with the other setback standards established by OCSMO Section 10-4.429 is discussed in Chapter 4.9, Land Use and Planning, of this EIR.

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(c) Off-channel excavations shall maintain a minimum one-thousand (1,000) foot setback from public rights-of-way and adjacent property lines of off-site residences, unless a landscaped buffer is provided or site-specific characteristics reduce potential aesthetic impacts. Where landscaped buffers are proposed, the setback for off-channel excavations may be reduced to a minimum of fifty (50) feet from either the property line or the adjoining right-of-way, whichever is greater. Where mining occurs within one-thousand (1,000) feet of a public right-of-way, operators shall phase mining such that no more than fifty (50) acres of the area that lies within one-thousand (1,000) feet of the right-of-way would be actively disturbed at any time, except where operations are adequately screened from public view. Where adequate screening exists in the form of mature vegetation and/or constructed berms that effectively block public views, the area of active disturbance within one-thousand (1,000) feet of the right-of-way shall not exceed the area that is screened by more than fifty (50) acres at any one time. Actively disturbed areas are defined as those on which mining operations of any kind, or the implementation of reclamation such as grading, seeding, or installation of plant material are taking place. (d) Off-channel excavations shall provide a minimum 50-foot setback from the neighboring property line to allow for access around the pit during mining and after reclamation for maintenance, safety, and other purposes. (e) Proposed off-channel excavations located within the streamway influence zone shall be set back a minimum of seven-hundred (700) feet from the existing channel bank, unless it is demonstrated that a smaller distance will not adversely affect channel stability. Under no circumstances should off-channel excavations be located within 200 feet of the existing channel bank. Evaluations of proposed off-channel excavations within 700 feet of the channel	

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bank shall demonstrate, at a minimum, the following: (1) The two-hundred (200) foot setback area does not include portions of the historically active channel. (2) The two-hundred (200) foot setback area does not include formerly mined lands separated from the active channel by levees or unmined areas less than two-hundred (200) feet wide (measured perpendicular to the active channel). (3) Acceptable channel hydraulic conditions (based on existing or site-specific hydraulic models) for the Cache Creek channel adjacent to the site and extending not less than one-thousand (1,000) feet upstream and downstream of the site. (4) Acceptable level of erosion potential of the channel bank adjacent to the site based on predicted stream flow velocity and shear stress on bank materials during a 100-year flow and historical patterns of erosion. (5) Acceptable level of stability of the slopes separating the mining area from the creek channel based on an analytical slope stability analysis in conformance with Sections 10-4.426 and 10-5.517 of this title that includes evaluation of stability conditions during 100-year peak flows in the channel. (6) Appropriate bank stabilization designs, if needed, consistent with channel design recommendations of the Cache Creek Resource Management Plan or approved by the Technical Advisory Committee. (7) The condition of flood protection structures and the integrity of the land within the approved setback	

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zone separating the mining areas and the channel shall be inspected annually by a Registered Civil Engineer and reported to the Director. The annual report shall include recommendations for remedial action for identified erosion problems (see also Reclamation Ordinance Section 10-5.506). Approval of any off-channel mining project located within seven-hundred (700) feet of the existing channel bank shall be contingent upon an enforceable agreement which requires the project operator to participate in the completion of identified channel improvement projects along the frontage of their property, consistent with the CCRMP and CCIP, including implementation of the Channel Form Template. The agreement shall require that the operator provide a bond or other financial instrument for maintenance during the mining and reclamation period of any bank stabilization features required of the mining project. The agreement shall also require that a deed restriction be placed on the underlying property which requires maintenance of the streambank protection by future owners of the property. Maintenance of the bank stabilization features following completion of reclamation shall be the responsibility of the property owner. (f) Off-channel excavations shall be set back a minimum of twenty-five (25) feet from riparian vegetation; and (g) Recreational facilities shall be located a minimum of one-hundred and fifty (150) feet from private dwellings, with a landscaped buffer provided to reduce noise and maintain privacy, unless the dwelling is proposed to be an integral component of the recreational facility. (h) No mining activities shall occur within two-thousand (2,000) feet of the community boundaries of Capay, Esparto, Madison, Woodland, and/or Yolo. This setback may be reduced by up to five-hundred (500)	

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feet when existing mature vegetation, proposed landscape buffers of a sufficient height and density to create a visual buffer (consisting of native species and fence-row habitat appropriate to the area), or other site-specific characteristics reduce potential incompatibilities between urban land uses and mining. Commercial mining shall not take place east of County Road 96.	
Section 10-4.437 No wastewater shall be directly discharged to Cache Creek. Sediment fines generated by aggregate processing shall either be used for agricultural soil enhancement, habitat restoration sites, or shall be placed in settling ponds, designed and operated in accordance with all applicable regulations, and used for backfill materials in off-channel excavations. Agricultural tailwater shall be diverted to catchment basins prior to its release to the creek.	Stormwater runoff would not leave the site during, or after completion of, the proposed mining activities. See Impact 4.8-2. Processing water from the project site and the Woodland Plant would be recycled through the use of settling ponds located at the Woodland Plant site. The discharge of aggregate wash water to the settling ponds at the Woodland Plant site would continue to be regulated through WDRs issued by the CVRWQCB. The project would include modifications to the existing WDRs to allow for the use of fine sediment from aggregate processing (i.e., "fines") in the eventual reclamation of the project site. The processing fines would be pumped from the Woodland Plant site as a slurry (mix of water and fines) and discharged into the mining pit in accordance with the requirements of the revised WDRs. Based on the above, the proposed project would comply with this regulation.
Surface Mining Reclamation Ordination	
Section 10-5.503 The area of backfilled off-channel excavations extending below the groundwater table shall be minimized in order to reduce changes to groundwater levels and flow. Backfilled pits shall be oriented with regard to the direction of groundwater flow to prevent localized obstructions. If a backfilled off-channel excavation is proposed to penetrate either fifty (50) feet or one-half (1/2) into the saturated thickness of the shallow aquifer, then at least six months prior to the commencement of excavation below the average high groundwater level, the applicant shall demonstrate in a manner consistent with the Technical Studies that the pit design will not adversely affect active off-site wells within one-thousand (1,000) feet of the proposed pit boundary. If the application includes a series of backfilled pits, then the applicant shall also demonstrate that the cumulative effects of the	See OCSMO Section 10-4.412 above.

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multiple backfilled pits will not adversely affect groundwater flow, if there are any active off-site wells within one-thousand (1,000) feet of the pit boundaries. The applicant shall demonstrate, using MODFLOW (or a similar model of equal capability and proven reliability, as approved by the Director), that the proposed pit design would not adversely impact active off-site wells within one-thousand (1,000) feet of the proposed pit boundary or result in well failure. Average, historic low groundwater levels, which represent the condition of maximum threat to water levels in the subject well, shall be used for this simulation. If an adverse impact is identified by the MODFLOW (or other approved model) simulation, the mining and reclamation plan shall be modified, or the applicant shall submit a written agreement that the well owner has agreed to relocate or redesign the well, or accept the potential impact (at no expense to the County). Site-specific aquifer testing shall be conducted, if needed, to determine aquifer properties for the required modeling.	
Section 10-5.507 Upon the completion of operations, grading and revegetation shall minimize erosion and convey storm water runoff from reclaimed mining areas to natural outlets or interior basins. The condition of the land shall allow sufficient drainage to prevent water pockets or undue erosion. Stormwater drainage shall be designed so as to prevent flooding on surrounding properties and County rights-of-way. Drainage and detention facilities within the proposed mining areas and vicinity shall be designed to prevent discharges to the wet pits and surface water conveyances (i.e., creeks and sloughs) from the 20-year/1-hour storm or less. For events greater than the 20-year/1-hour storm, runoff from around the perimeter of the mining areas shall be directed into surface water conveyances. Runoff from within the lowered mining area shall be directed away from wet pits to detention/infiltration areas. Drainage plans shall not rely solely on ditches and berms to direct runoff away from the wet pit. Without proper	See Impact 4.8-3. The project site would be graded to allow stormwater runoff to collect in the proposed mining pit, where the runoff would gradually percolate, contributing to groundwater recharge, or evaporate. At the conclusion of mining, the project site would remain contoured such that stormwater runoff would be directed to the reclaimed mining area. New stormwater detention basins would be provided within the western and eastern reclaimed agricultural areas of the site. During mining activities, as well as upon reclamation of the site to agriculture, lake, and habitat uses, the proposed project would not include discharge of stormwater to Cache Creek. In addition, consistent with County requirements, the project site would be subject to ongoing maintenance and monitoring to ensure that the drainage facilities on the reclaimed site continue to function properly. Therefore, the proposed project would comply with this regulation.

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maintenance, berms and ditches may deteriorate with time and become ineffective. Drainage plans shall emphasize grading of disturbed areas that results in broad, gentle slopes that drain away from the pits. Grading plans shall be reviewed by the County to evaluate compliance with drainage plan objectives prior to project approval. In addition, a restriction shall be recorded on the deed that requires berms and ditches to be permanently maintained in a condition consistent with the final approval. The deed restriction shall require an inspection easement which allows County staff or other authorized personnel access for the inspection of berms and ditches. If the County determines that evidence of damage to those facilities exists, the County shall require that the owner have an inspection report for the property prepared by a Registered Geologist or Registered Civil Engineer. The inspection report, including recommendations for corrective action, if needed, shall be submitted to the Director. The property owner shall be required to implement recommended corrective actions, if any.	
Section 10-5.508 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 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.	Conditions of approval will be included for the project to ensure compliance with this requirement. Therefore, the proposed project would comply with this regulation.
Section 10-5.511 Reclaimed agricultural surfaces shall be graded to provide adequate field gradients to allow surface/furrow irrigation of crops and allow for adequate storm water drainage.	Conditions of approval will be included to ensure that at the conclusion of mining, the project site would remain contoured such that stormwater runoff would be directed to the reclaimed mining area. Therefore, the proposed project would be consistent with this regulation.

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Section 10-5.516 The final distance between lowered surfaces reclaimed to agriculture and the average high groundwater shall not be less than five (5) feet. The average high groundwater level shall be established for each proposed mining area. The degree of groundwater level fluctuation varies with location throughout the basin and within relatively small areas (proposed mining sites). The determination of the average high groundwater level shall be conducted by a Registered Civil Engineer or Certified Hydrogeologist and shall be based on wet season water level elevation data collected at the proposed site or adjacent areas with similar hydrogeological conditions. Water level records prior to 1977 shall not be used since they would reflect conditions prior to the installation of the Indian Valley Dam. The dam caused a significant change in hydrology of the basin and data collected before its installation shall not be used in estimating current average high groundwater levels. The wells shall be adequately distributed throughout the proposed mining site to reflect spatial variation in groundwater levels and fluctuations.	Agricultural reclamation would require the use of overburden and processing fines to raise the pit floor elevation above the average high groundwater level followed by the placement of a minimum of four feet of salvaged reclamation soils (stockpiled topsoil and upper layers of overburden) on the created land. The Reclamation Plan proposes reclaimed agricultural field elevations of a minimum of five feet above the average high groundwater elevations. Average high groundwater levels would range from 75 feet MSL in the northwestern corner to 57 feet MSL in the southeastern corner of the western agricultural field, and from 57 feet MSL in the northwestern corner to 47 feet MSL in the southeastern corner of the eastern agricultural field. Therefore, the proposed project would comply with this regulation.
Section 10-5.517 As part of each approved long-term mining plan involving wet pit mining to be reclaimed to a permanent pond, lake, or water feature, the operator shall maintain, monitor, and report to the Director according to the standards given in this section. Requirements and restrictions are distinguished by phase of operation as described below. (a) Mercury Protocols. The Director shall issue and update as needed "Lower Cache Creek Off-Channel Pits Mercury Monitoring Protocols" (Protocols), which shall provide detailed requirements for mercury monitoring activities. The Protocols shall include procedures for monitoring conditions in each pit lake, and for monitoring ambient mercury level in the lower Cache Creek channel within the CCAP planning area, as described below. The Protocols shall be developed and implemented by a qualified aquatic scientist or equivalent professional acceptable to the Director. The Protocols shall identify minimum laboratory analytical reporting limits, which	Conditions of approval would be included to require the proposed project to comply with all applicable water quality monitoring and reporting requirements established by SMRO Section 10-5.517. Therefore, the proposed project would be consistent with this regulation.

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may not exceed the applicable response threshold identified in subsection (e) below. Data produced from implementing the Protocols shall meet or exceed applicable standards in the industry. (b) Ambient Mercury Level. The determination of the ambient or "baseline" fish mercury level shall be undertaken by the County every ten years in years ending in 0. This analysis shall be undertaken by the County for use as a baseline of comparison for fish mercury testing conducted in individual wet mining pits. The work to establish this baseline every ten years shall be conducted by a qualified aquatic systems scientist acceptable to the Director and provided in the form of a report to the Director. It shall be paid for by the mining permit operators on a fair-share basis. The results of monitoring and evaluation of available data shall be provided in the report to substantiate the conclusions regarding ambient concentrations of mercury in fish within the lower Cache Creek channel within the CCAP planning area. (c) Pit Monitoring. (1) Mining Phase (including during idle periods as defined in SMARA). The operator shall monitor fish and water column profiles in each pit lake once every year during the period generally between September and November for the first five years after a pit lake is created. Fish monitoring should include sport fish where possible, together with other representative species that have comparison samples from the creek and/or other monitored ponds. Sport fish are defined as predatory, trophic level four fish such as bass, which are likely to be primary angling targets and have the highest relative mercury levels. The requirements of this subsection apply to any pit lake that is permanently wet and navigable by a monitoring vessel. If, in the initial five years after the pit lake is created, the applicable response threshold identified in subsection (e) is exceeded in any three of five monitoring years, the operator shall, solely at their own expense, undertake expanded	

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analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g). (2) Reclamation Phase. No monitoring is required after mining has concluded, during the period that an approved reclamation plan is being implemented, provided reclamation is completed within the time specified by SMARA or the project approval, whichever is sooner. (3) Post-Reclamation Phase. After reclamation is completed, the operator shall monitor fish and water column profiles in each pit lake at least once every two years during the period of September-November for ten years following reclamation. Monitoring shall commence in the first calendar year following completion of reclamation activities. If fish monitoring results from the post-reclamation period exceed the applicable response threshold described in subsection (e) or, for ponds that have implemented mitigation management, results do not exhibit a general decline in mercury levels, the operator shall, solely at their own expense, undertake expanded analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g). (4) Other Monitoring Obligation. If monitoring conducted during both the mining and post-reclamation phase did not identify any exceedances of the ambient mercury level for a particular pit lake, and at the sole discretion of the Director no other relevant factors substantially support that continued monitoring is merited, the operator shall have no further obligations. (d) Reporting. (1) Pit Monitoring Results. Reporting and evaluating of subsection (c) pit monitoring results shall be conducted by a qualified aquatic scientist or equivalent professional acceptable to the Director. Monitoring activities and results shall be summarized in a single report (addressing all wet pit lakes) and submitted to the Director within six months following each annual monitoring event. The report shall	

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include, at a minimum: (1) results from subsection (b) (pit monitoring), in relation to subsection (a) (ambient mercury levels). (2) Expanded Analysis Results. Reporting and evaluation of subsection (f) expanded analysis shall be conducted by a qualified aquatic scientist or equivalent professional acceptable to the Director. Results shall be summarized in a single report (addressing all affected wet pit lakes) and submitted to the Director within six months following each annual monitoring event. The report shall include, at a minimum, the results of the expanded analysis undertaken pursuant subsection (f). (3) Data Sharing. For pit lakes open to the public, the Director may submit the data on mercury concentrations in pit lake fish to the state Office of Environmental Health Hazard Assessment (or its successor) for developing site-specific fish consumption advisories. (e) Response Thresholds. (1) Fish Consumption Advisory. If at any time during any phase of monitoring the pit lake's average sport fish tissue mercury concentration exceeds the Sport Fish Water Quality Objective, as it may be modified by the state over time (as of 2019, the level was 0.2 mg/kg), the operator shall post fish consumption advisory signs at access points around the lake and around the lake perimeter. Catch-and-release fishing may still be allowed. Unless site-specific guidance has been developed by the state's Office of Health Hazard Assessment or the County, statewide fish consumption guidance shall be provided. (2) Mining Phase Results. If, during the mining phase of monitoring, the pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three of five monitoring years, annual monitoring shall continue for an additional five years, and the operator shall undertake expanded analysis pursuant to subsection (f) and preparation of a lake	

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management plan pursuant to subsection (g). (3) Post-Reclamation Phase Results. If during the first ten years of the post-reclamation phase of monitoring, the pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three of five monitoring years, biennial monitoring shall continue for an additional ten years, and the operator shall undertake expanded analysis pursuant to subsection(f) and preparation of a lake management plan pursuant to subsection(g). (f) Expanded Analysis. (1) General. If during the mining or post-reclamation phase, any pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three years, the operator shall undertake expanded analyses. The analysis shall include expanded lake water column profiling (a minimum of five profiles per affected wet pit lake plus one or more nonaffected lakes for control purposes) conducted during the warm season (generally May through October) in an appropriate deep profiling location for each pit lake. The following water quality parameters shall be collected at regular depth intervals, from surface to bottom of each lake, following protocols identified in subsection (a): temperature, dissolved oxygen, conductivity, pH and oxidation-reduction potential (ORP), turbidity or total suspended solids, dissolved organic matter, and algal density by Chlorophyll or Phycocyanin. The initial analysis shall also include one-time collections of fine grained (clay/silt) bottom sediments from a minimum of six well distributed locations for each affected lake, and from one or more non-affected lakes for control purposes, to be analyzed for mercury and organic content. (2) Scope of Analysis. The purpose of the expanded analyses is to identify and assess potential factors linked to elevated methylmercury production and/or	

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bioaccumulation in each pit lake. The scope of the expanded analyses shall include monitoring and analysis appropriate to fulfill this purpose, invoking best practices in the industry. In addition to the analyses described in subsection (f)(1) above, the analysis should also consider such factors as: electrical conductivity, bathymetry (maximum and average depths, depth-to-surface area ratios, etc.), and trophic status indicators (concentrations, Secchi depth, chlorophyll a, fish assemblages, etc.). Additional types of testing may be indicated and appropriate if initial results are inconclusive. (3) Use of Results. The results of the expanded analyses undertaken pursuant to this subsection shall be used to inform the preparation of a lake management plan described below under subsection (g). (g) Lake Management Activities (1) General. If monitoring conducted during the mining or post-reclamation phases triggers the requirement to undertake expanded analysis and prepare and implement a lake management plan, the operator shall implement lake management activities designed by a qualified aquatic scientist or equivalent professional acceptable to the Director, informed by the results of subsection (f). Options for addressing elevated mercury levels may include (A) and/or (B) below at the Director's sole discretion and at the operator's sole expense. (A) Lake Management Plan. Prepare a lake management plan that provides a feasible, adaptive management approach to reducing fish tissue mercury concentrations to at or below the ambient mercury level. Potential mercury control methods could include, for example: addition of oxygen to or physical mixing of anoxic bottom waters; alteration of water chemistry (modify pH or organic carbon concentration); and/or removal or replacement of affected	

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fish populations. The lake management plan may be subject to external peer review at the discretion of the Director. Lake management activities shall be appropriate to the phase of the operation (e.g., during mining or post-reclamation). The Lake Management Plan shall include a recommendation for continued monitoring and reporting. All costs associated with preparation and implementation of the lake management plan shall be solely those of the operator. Upon acceptance by the Director, the operator shall immediately implement the plan. The lake management plan shall generally be implemented within three years of reported results from the expanded analyses resulting from subsection (f). If lake management does not achieve acceptable results and/or demonstrate declining mercury levels after a maximum of three years of implementation, at the sole discretion of the Director, the operator may prepare an alternate management plan with reasonable likelihood of mitigating the conditions. (B) Revised Reclamation Plan. As an alternative to (A), or if (A) does not achieve acceptable results and/or demonstrate declining mercury levels after a maximum of three years of implementation, at the sole discretion of the Director, the operator shall prepare and submit revisions to the reclamation plan (including appropriate applications and information for permit amendment) to fill the pit lake with suitable fill material to a level no less than five (5) feet above the average seasonal high groundwater level, and modify the end use to agriculture, habitat, or open space at the discretion of the Director, subject to Article 6 of the Mining Ordinance and/or Article 8 of the Reclamation Ordinance as may be applicable.	

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(2) Implementation Obligations. (A) If a lake management plan is triggered during the mining or post-reclamation phase and the subsequent lake management activities do not achieve acceptable results and/or demonstrate declining mercury levels, the operator may propose different or additional measures for consideration by the Director and implementation by the operator, or the Director may direct the operator to proceed to modify the reclamation plan as described in subsection (g)(1)(B). (B) Notwithstanding the results of monitoring and/or lake management activities during the mining phase, the operator shall, during the post-reclamation phase, conduct the required ten years of biennial monitoring. (C) If monitoring conducted during the post-reclamation phase identifies three monitoring years of mercury concentrations exceeding the ambient mercury level, the operator shall implement expanded analyses as in subsection (f), to help prepare and implement a lake management plan and associated monitoring. (D) If subsequent monitoring after implementation of lake management activities, during the post-reclamation phase, demonstrates levels of fish tissue mercury at or below the ambient mercury level for any three monitoring years (i.e., the management plan is effective), the operator shall be obligated to continue implementation of the plan and continue monitoring, or provide adequate funding for the County to do both, in perpetuity.	
Section 10-5.524 Monitoring during the mining and reclamation period shall be a condition of the permit. The applicant shall ensure that the groundwater monitoring of wet pit mining continues for (10) years after the completion of reclamation.	A condition of approval will be included to require the project to undertake water quality monitoring consistent with this regulation.