# 3.2 Surface Water

This section of the Final Environmental Impact Report (EIR) describes proposed hydrologic features at the Eagle Mountain Pumped Storage Project (Project) site and addresses potential issues associated with surface water quality based on the mineralogy at the Project site. Information provided in this section is based on field reconnaissance, existing regulations, previously prepared reports as referenced throughout this document, and agency consultation. A mitigation program is provided in order to reduce or avoid potential impacts, where applicable.

*Please note:* This discussion of hydrology and water quality is discussed in both Section 3.2 Surface Water and Section 3.3 Groundwater.

## *3.2.1 Regulatory Setting*

The following federal, state, and local laws and policies apply to the protection of surface waters. The proposed Project will be constructed and operated in conformance with all applicable federal, state, and local laws, ordinances, regulations, and standards (LORS).

### 3.2.1.1 Federal

**Clean Water Act (CWA) of 1977 as amended, Sections 401, 402, and 404.** The primary objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's surface waters. Pollutants regulated under the CWA include priority pollutants, including various toxic pollutants; conventional pollutants, such as biochemical oxygen demand, total suspended solids, oil and grease, and pH; and non-conventional pollutants, including any pollutant not identified as either conventional or priority.

**Clean Water Act Section 401** requires certification from the State Water Resources Control Board (State Water Board and Lead Agency under the California Environmental Quality Act) that the proposed Project is in compliance with established water quality standards. Projects that have the potential to discharge pollutants are required to comply with established water quality objectives. These requirements include the implementation of best management practices (BMPs) during site grading activities and other activities associated with construction of the facility.

Section 401 provides the State Water Board with the regulatory authority to waive, certify, or deny any proposed federally-permitted activity, which could result in a discharge to waters of the state. To waive or certify an activity, these agencies must find that the proposed discharge will comply with California water quality standards. According to the CWA, water quality standards include beneficial uses, water quality objectives/criteria, and compliance with the U.S. Environmental Protection Agency's anti-degradation policy. No license or permit may be issued by a federal agency until the certification required by Section 401 has been granted.

### 3.2.1.2 State

**State of California Constitution Article X, Section 2** prohibits the waste or unreasonable use of water, regulates the method of use and method of diversion of water and requires all water users to conserve and reuse available water supplies to the maximum extent possible.

**Porter-Cologne Water Quality Control Act of 1967**, as amended. California Water Code (CWC) Section 13000 et. seq. requires the State Water Board and the nine state of California, Regional Water Boards to adopt water quality standards to protect state waters. These standards include the identification of beneficial uses, narrative and numerical water quality criteria, and implementation procedures. Water quality standards for the proposed Project area are contained in the Basin Plan, which was adopted in 1994 and was amended in 2006 and 2011. This Basin Plan sets numeric and/or narrative water quality criteria controlling the discharge of wastes to the state's waters and land.

Section 13050 stipulates surface waters (including ephemeral washes) that are affected by the proposed Project are waters of the state and are subject to state requirements and the State Water Board has authority to issue Waste Discharge Requirements (WDRs) for construction and industrial stormwater activities.

Section 13260 et seq. requires filing of a Report of Waste Discharge (ROWD) for activities in which waste is discharged that could affect the water quality of the state. The report shall describe the physical and chemical characteristics of the waste and include the results of all tests required by regulations adopted by the State Water Board, any test adopted by the Department of Toxic Substances Control (DTSC) pursuant to Section 25141 of the Health and Safety Code for extractable, persistent, and bioaccumulative toxic substances in a waste or other material, and any other tests that the State Water Board may require.

Section 13240 et seq. (Water Control Plan). The Water Quality Control Plan for the Colorado River Basin - Region 7 (Basin Plan) establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning. The following chapters are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Beneficial Uses; Chapter 3, Water Quality Objectives; and the sections of Chapter 4, Implementation, entitled Point Source Controls and Non-Point Source Controls.

Section 13243. Under this section, the Regional Water Quality Control Boards (Regional Water Boards) are granted authority to specify conditions or areas where the discharge of waste will not be permitted. The discharge of designated waste can only be discharged to an appropriately designed waste management unit.

Section 13263 (Waste Discharge Requirements). The State Water Board can regulate discharges of fill material, including structural material and/or earthen wastes into wetlands and other waters of the state through WDRs.

Section 13271 (Discharge Notification) of the CWC requires any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the state, or discharge or deposited where it is, or probably will be, discharged in or on any waters of the state to notify the Office of Emergency Services (OES) of the discharge as specified in that section. The OES then immediately notifies the appropriate Regional Water Board and the local health officer and the administrator of environmental health of the discharge.

Section 13550. The use of potable domestic water for non-potable uses, including, but not limited to, cemeteries, golf courses, parks, highway, landscaped areas, and industrial and irrigation uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if recycled water is available and meets the specified conditions, as determined by the State Water Board and after notice to any person or entity who may be ordered to use recycled water or to cease using potable water. This section requires the use of recycled water for industrial purposes subject to recycled water being available and upon a number of criteria including: provisions that the quality and quantity of the recycled water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use will not impact downstream users or biological resources.

Section 13551. This section states a person or public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, shall not use water from any source of quality suitable for potable domestic use for non-potable uses, including cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses if suitable recycled water is available as provided in CWC Section 13550.

**CWC *Section 461*** stipulates that the primary interest of the people of the state of California is the conservation of all available water resources and requires the maximum reuse of reclaimed water as an offset to using potable resources. There are no plans for the proposed Project to use reclaimed water.

**Beneficial Uses.** Chapter 2 of the Basin Plan describes beneficial uses of surface and ground waters. Beneficial uses of surface waters for the Chuckwalla Valley are not listed in the Basin Plan. The beneficial uses of ground waters of the Chuckwalla Valley Hydrologic Unit (717.00) are: municipal and domestic supply, industrial service supply, and agricultural supply.

**Water Quality Objectives.** Region-wide numeric and narrative objectives for general surface waters are described in Chapter 3 of the Basin Plan under the General Surface Water Quality Objective and region-wide objectives for groundwater under the Ground Water Objectives.

**Waste Discharge Requirements.** Chapter 4 of the Basin Plan describes Point Source Controls for wastewater reclamation and reuse, stormwater, and septic systems. The discussion of Non-Point Source Controls in the Basin Plan describes the authority given to the State Water Board to certify projects for CWA Section 401 permits.

**State Water Board Policies**

*Anti-Degradation Policy (Resolution No. 68-16)* requires the State Water Board, in regulating the discharge of waste, to: (a) maintain existing high quality waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial uses, and will not result in water quality less than that described in state or Regional Water Boards policies; and (b) require that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet WDRs which will result in the best practicable treatment or control of the discharge necessary to assure that: 1) a pollution or nuisance will not occur; and 2) the highest water quality consistent with maximum benefit to the people of the state will be maintained.

*Water Reclamation Policy (Resolution No. 77-01)* states that the State Water Board shall encourage reclamation and reuse of water in water-short areas. Reclaimed water will replace or supplement the use of fresh water or better quality water.

*Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (Resolution No. 75-58)* states that the use of inland waters for powerplant cooling needs to be carefully evaluated to assure proper future allocation of inland waters considering all other beneficial uses. The proposed Project will not use or discharge water for powerplant cooling needs.

*Sources of Drinking Water Policy (Resolution No. 88-63)* designates all groundwater and surface waters of the state as potential sources of drinking water, worthy of protection for current or future beneficial uses, except where: (a) the total dissolved solids (TDS) are greater than 3,000 milligrams per liter (mg/L); (b) the well yield is less than 200 gallons per day from a single well; (c) the water is a geothermal resource, or in a water conveyance facility; or (d) the water cannot reasonably be treated for domestic use using either BMPs or best economically achievable treatment practices.

**State Water Board Programs**

*California Construction Storm Water Program.* Construction activities that disturb one acre or more are required to be covered under California's General Permit for Discharges of Storm Water Associated with Construction and Land Disturbance Activities, Construction General Permit Order No. 2009-0009-DWQ (General Construction Permit;

National Pollutant Discharge Elimination System No. CAS 000002), and amendments thereto.

Activities subject to permitting include clearing, grading, stockpiling, and excavation. The General Construction Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) that specifies BMPs that will reduce or prevent construction pollutants from leaving the site in stormwater runoff and will also minimize erosion associated with the construction project. The SWPPP must contain site map(s) that show the construction site perimeter; existing and proposed structures and roadways; stormwater collection and discharge points, general topography both before and after construction; and drainage patterns across the site. Additionally, the SWPPP must describe the monitoring program to be implemented.

*California Industrial Storm Water Program.* Industrial activities with the potential to impact stormwater discharges are required to obtain a National Pollutant Discharge Elimination System permit for those discharges. In California, an Industrial Storm Water General Permit, Order 97-03-DWQ (General Industrial Permit CAS 000001) may be issued to regulate discharges associated with ten broad categories of industrial activities, including electrical power generating facilities. The General Industrial Permit requires the implementation of management measures that will protect water quality. In addition, the discharger must develop and implement a SWPPP and a monitoring plan. Through the SWPPP, sources of pollutants are to be identified and the means to manage the sources to reduce stormwater pollution described. The monitoring plan requires sampling of stormwater discharges during the wet season and visual inspections during the dry season.

#### 3.2.1.3. Local

**Riverside County Title 15 Chapter 15.80 Regulating Flood Hazard Areas and Implementing the National Flood Insurance Program** was developed to comply with Title 44 Code of Federal Regulations (CFR) Part 65 regarding requirements for the identification and mapping of areas identified as Federal Emergency Management Agency (FEMA) Special Flood Hazard Areas. The ordinance is applicable to development within unincorporated areas of Riverside County and is integrated into the process of application for development permits under other county ordinances including, but not limited to, Ordinance Nos. 348, 369, 457, 460, and 555.

When the information required, or procedures involved, in the processing of such applications is not sufficient to assure compliance with the requirements of Chapter 15.80, a separate application must be filed.

As shown on Figure 3.2-1, the proposed Project is not within a Regulatory Floodway. Flood insurance rate maps (FIRM) for the Project site and surrounding areas have not been prepared by FEMA. The FIRM maps include a note that the entire project area is in Zone D.

Zone D is described as: “areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.” Additionally, according to the Riverside County General Plan (Riverside County, 2000) the Project site and surrounding lands do not lay within a 100- or 500-year flood plain.

### *3.2.2 Environmental Setting*

There are two main surface drainage features at the Project site, Eagle Creek and Bald Eagle Creek. Both are ephemeral streams, and both currently drain into the East Mine Pit where flows are contained. Eagle Creek is artificially blocked in two locations by embankments in the main channel placed to divert flood flows into the existing East Pit of the mine (future site of the Lower Reservoir) as a means to provide flood protection at the Eagle Mountain townsite.

Eagle Creek is generally dry throughout the year, except during large storm events, which occur infrequently in this area of California. USGS gage (10253600) data for Eagle Creek were collected between 1960 and 1966. During this period only three events were recorded, all having daily mean discharges less than 20 cubic feet per second (cfs). Hourly flow data were not reported for the gage. Eagle Creek has a watershed area of approximately 7.3 square miles (excluding the Upper Reservoir drainage basin) upstream of the Eagle Mountain townsite and varies considerably in width and gradient.

The channel morphology is typical of streams draining the Eagle Mountains; steep incised channels in the higher elevations leading to broader less-defined channels that essentially disappear into the broad alluvial fans that lie along the foot of the steeper slopes. Bare desert soils exposed to rainfall are subjected to physical and chemical processes that change the hydraulic properties of the soil near the surface. When dried, a hard layer is formed in the soil surface that is often called “desert crust,” commonly enriched in calcite or silica. Desert crust decreases the infiltration rate of soils, thereby increasing runoff and soil erosion, reducing the availability of water to the root zone, and impeding seedling and plant growth.

Prior to mine development and its engineered diversion into the East Pit, Eagle Creek discharged into the broad alluvial fan at the Eagle Mountain townsite with dispersal of flow to the south and east away from the mine feature and the townsite. Flood flows from the steeper portions of the watershed would have spread over a very broad area and flow depths during large flooding events would have been shallow in the numerous dry washes draining the alluvial fan.

Since there are no perennial streams in the Project area, there are no instream flow uses that would be affected by the construction and operation of the Project. Project waters will not be used for any other purpose than power generation. The Project proposes to be established as a closed system where the working fluid will be re-used for power generation, and replenished as necessary to replace losses to evaporation and seepage. Beneficial uses specific to surface waters, including standards for the protection of aquatic life, recreation, and aquaculture, do not apply to this unique setting. Small pools of surface water may accumulate within the existing pits in response to heavy precipitation events; however, the region is arid, averaging 3 to 4 inches of rainfall annually (Regional Water Board, 2007a).

Springs that are fed by groundwater in the Eagle Mountains (*see* Figure 3.3-1) are hydrologically disconnected to the Pinto or Chuckwalla basin aquifers (NPS, 1994). The springs are located in the bedrock above the Pinto and Chuckwalla basins and the water is derived from fractures in the rock in the local area. Seasonal precipitation likely fills the fractures. None of the springs are documented as permanent, year round springs (SCS Engineers, 1990) (Table 3.2-1). It is unlikely the fractures are connected to the sediments in the Pinto or Chuckwalla groundwater basins because if so, water would drain from the fractures into the sediments, leaving the springs dry. If the fractures did extend to the valley, it is unlikely that it would be refilled by the limited precipitation in the area. The difference of the spring elevations to groundwater in the adjacent valleys is 200 to 1,000 feet, which supports the conclusion that the fractures are not hydraulically connected to the valley sediments. None of these springs are identified by Regional Water Board – Region 7 as having site-specific use classifications. Therefore, the default use classifications for these springs are the uses for miscellaneous unnamed tributaries (e.g., groundwater recharge; water contact recreation; non-contact water recreation; warm freshwater habitat; wildlife habitat; and preservation of rare, threatened, or endangered species).

**Table 3.2-1. Springs Located in the Northwest Chuckwalla Valley**

| Name | Locations | Elevation (ft) | Dry or Flowing/Date |
|---|---|---|---|
| Eagle Tank | 3S/13E-23 | 2040 | |
| Buzzard | 4S/14E-16 | 2010 | Dry (March/88) |
| Unnamed | 4S/14E-16 | 2400 | |
| Hayfield Summit | 5S/14E-19 | 1900 | |
| Long Tank | 6S/15E-2 | 1190 | Flowing (June/61) |

#### 1.1.1.1 Project Created Surface Waters

The proposed Project will create surface water bodies through the construction of the two working fluid reservoirs with a total storage capacity of 24,200 acre-feet (AF). These reservoirs are strictly intended for use in hydropower production, which would carry industrial and power beneficial use designations. The proposed source water for the Project is groundwater from the Chuckwalla Valley aquifer (*see* Section 3.3 Groundwater for complete discussion). Operations will involve movement of water between the two reservoirs on a daily basis, precluding the development or support of a viable aquatic ecosystem, including fish.

### *3.2.3 Potential Environmental Impacts*

#### 1.1.1.2 Methodology

Preparation of this section is based on a literature review, site investigations, aerial photo interpretation, and review of publicly available environmental documents for projects within and adjacent to the Project area, including an extensive search of existing geologic literature for the site and adjacent region. Data were gathered from four sources to develop analyses and conclusions on how the geological and mineralogical setting of the Project area could affect the water quality of the Project. These sources include: 1) literature on the mineralogy of the Project area and adjacent mining district; 2) water quality of groundwater in the Project area; 3) laboratory analysis of core samples taken from the Project area; and 4) literature on mines in other geographic areas with similar geology.

In addition, contacts were made with the following state and federal agencies to collect data on mineralogy surveys from similar sites in the geologically relevant region:

1. U.S. Department of the Interior, Office of Surface Mine Reclamation and Enforcement
2. U.S. Department of the Interior, Geological Survey, Menlo Park
3. State of California, Regional Water Quality Control Board, Palm Desert (Regional Water Board)
4. State of California, State Water Resources Control Board, Sacramento (State Water Board)
5. State of California, Department of Conservation, Office of Mine Reclamation, Sacramento
6. State of California, Department of Conservation, Geological Survey, Sacramento
7. U.S. Department of the Interior, Bureau of Land Management, Palm Springs

#### 1.1.1.3 Thresholds of Significance

The State Water Board concludes that the proposed Project may have significant impacts on surface water if it does any of the following:

(a) Violates any water quality standards or WDRs;

(b) Substantially alters the existing drainage pattern of the site or area, including through the alternation of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or off-site;

(c) Substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or a substantial increase to the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

(d) Creates or contributes to runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provides a substantial additional source of polluted runoff;

(e) Otherwise substantially degrades water quality;

(f) Places housing within a 100-year flood hazard area which would impede or redirect flood flows;

(g) Exposes people or structures that results in risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; and/or

(h) Inundation by seiche, tsunami, or mudflow.

#### 1.1.1.4 Environmental Impact Assessment

The Project will have no impact on existing surface waters, as there are none in the Project area that will be affected by the proposed Project. A Project Drainage Plan has been developed to address stormwater management for the probable maximum storm event. Details for the Project Drainage Plan are included in Section 12.9.

Water quality in the two new reservoirs could be degraded through two processes. First, degradation would occur due to the evaporation of Project waters, resulting in increased concentrations of salts. Second, the contact of Project waters with pit material could result in elevated metals concentrations.

##### 1.1.1.4.1 *Evaporative Water Losses*

The Project's Upper and Lower reservoirs will be subject to potentially high rates of evaporation. On average approximately 1,760 acre-feet per year (AFY) could be lost to evaporation. As a part of the preliminary engineering design for the Project, potential methods for reducing evaporation losses were evaluated. Products tested and employed (Schmidt, 2009) for controlling evaporation losses from small reservoirs include:

- Continuous floating covers
- Modular covers
- Shade structures
- Chemical mono-layers

Each of these is described and evaluated below.

Key factors in product application are feasibility for reservoir size, percentage water saving achieved, capital costs, operating and replacement costs, impact on water quality, product deployment, and dam safety issues. The cost-benefit of evaporation control is a key factor in decisions related to investment in these technologies. The costs of evaporation suppression measures relate directly to reservoir water surface area. Proposed reservoir surface area information is summarized below:

| Reservoir | Max. Pool Surface Area (Acres) | Min. Pool Surface Area (Acres) | Ave. Pool Surface Area (Acres) |
|---|---|---|---|
| Upper | 191 | 48 | 119.5 |
| Lower | 163 | 63 | 113.0 |
| Total | 354 | 111 | 232.5 |

**Continuous Floating Covers**

Continuous floating plastic covers act as an impermeable barrier that floats on the water surface and can achieve 90 percent or greater evaporation savings for full cover of the reservoir. Most of these products have a high capital cost and replacement life varies (typically between 10 and 20 years). The structural integrity of the product under windy conditions and fluctuating water levels is important. Water quality can be impacted by reduced dissolved oxygen, reduced light penetration and change in water temperature. This can have a positive impact in reducing algal growth but negative impacts can result as well. Significant difficulties (Schmidt, 2009) can be encountered with installation on reservoirs greater than 5 hectares (12 acres). Therefore, this option does not appear to be feasible for the Project due to the surface areas of the reservoirs.

**Modular Systems**

Modular floating covers come in a range of sizes typically up to about 30 square feet in area and act in a similar manner to floating covers. However, they do not have the structural challenges of a continuous sheet. Modular floating covers can also be deployed to cover only a portion of the storage. Modules can be free-floating or connected together to form a larger raft (Schmidt, 2009). Modules are typically made from a plastic material and can generally provide up to 90 percent savings for 100 percent area covered. Actual area covered will depend on number, shape and size of the module and storage characteristics. Generally these systems have high capital cost (range of $2 to $4 per square foot). For example, for the proposed Project, a rough estimate of cost for the initial installation is $31 to $62 million, based on a total surface area of 354 acres. Water quality impacts will depend on the relative area covered, and changes in oxygen transfer, light penetration and water temperature.

The simplest modular system is floating plastic balls, which have been used on small reservoirs, ponds, and tanks to deter birds from accessing the water surface and to reduce evaporation. Bird Balls ™ were investigated for bird control, and total cost for the initial installation was estimated to be $65 to $75 million.

Assuming annual evaporation of 84 inches from an average surface area of 232.5 acres, converting a $70 million investment into an annual cost (6 percent over a 20-year service life for the cover), and assuming 90 percent effectiveness, the cost of the initial installation is estimated to be about $4,170 per AF of water saved. This option does not appear to be feasible for the Project due to the surface areas of the reservoirs, the range of fluctuation required for Project operations, and cost.

**Shade Structures**

Shade structures are suspended above the water surface using cables creating a web-like structure with shade cloth fitted between the cables (Schmidt, 2009). The shade cloth can come in a range of ultraviolet (UV) ratings. This is a rating to describe the amount of UV blocked by the shade cloth. Evaporation savings of 70 to 80 percent have been demonstrated in small-scale trials. Floating shade cloth modules or rafts have recently been marketed. Most of these products have relatively high capital cost. In general shade structures are not as effective in reducing evaporation as floating covers. This option does not appear to be feasible for the Project due to the surface areas of the reservoirs.

**Chemical Covers**

Chemical covers have been promoted as a low-cost method to reduce evaporation losses (Schmidt, 2009). Some products are true mono-layers (i.e., a single molecule thick), while others are multilayered, with different water saving characteristics and water quality impacts. These products are generally biodegradable (fatty alcohol surfactants) and there is a need to reapply frequently (every 3 to 10 days). Water savings have been shown to be highly variable, from less than 10 percent to up to 50 percent, and are impacted by prevailing wind, temperature and water quality (Schmidt, 2009).

True mono-layers are applied at very low application rates and rely on the self-spreading ability of the chemical. Advantages of these products are the low capital cost and choice to apply only when needed. Mono-layers provide an attractive option for reducing evaporation losses given low capital costs and potential suitability for large reservoirs. Inconsistent evaporation saving performance has limited their use in the United States and most of the current research seems to be happening in Australia. Recent research has improved understanding of mono-layer product performance and factors affecting this performance. Research is also focusing on the development of improved monolayer products and effective mono-layer application, monitoring, and control systems (Schmidt, 2009).

Recent studies in Australia have demonstrated significant variability in product performance with evaporation savings ranging from 0 to 70 percent (Schmidt, 2009). There is evidence that variability in product performance is related to wind velocity and the characteristics of the water in storage, specifically the temperature, water chemistry, and physical conditions affecting the natural water surface layer. A key challenge is detecting when the mono-layer has been disrupted so that additional product can be applied.

Where mono-layers are feasible to employ, chemical treatments can cost between $30 and $200 per AF of water saved (Hightower and Brown, 2004). Assuming annual evaporation of 84 inches from an average surface area of 232.5 acres, 50 percent effective evaporation reduction, and the $200 per AF cost, annual cost would be $163,000. This equates to a present worth cost of about $2.5 million (assuming a discount rate of 6 percent and a 40-year period), making the treatment potentially cost effective. However, it is unknown whether these products can be effective in the high summer temperatures of the proposed Project area. In addition, the size of the reservoirs and the effects of occasional high winds typical for the region suggest that chemical treatments are unlikely to be effective or feasible. Finally, water quality may be affected by chemical residues from this method. Therefore, this option is determined to be not feasible for the proposed Project.

**Reverse Osmosis**

Evaporative water losses from the reservoirs are estimated to be 1,760 AF per year. Over time, evaporation will result in water in the reservoirs becoming increasingly saline. In order to maintain water quality within the reservoirs, a water treatment system has been added to the Project as a project design feature (PDF GW-2) to remove certain constituents from the reservoir water supply. This facility would treat the water in the reservoir system, which will come from groundwater wells in the Chuckwalla Basin.

The design of the treatment facility comprises several pretreatment steps to ensure that the stored surface water is suitable for treatment by the reverse osmosis (RO) process, which will provide for the bulk of the salt concentration. Treated water will be returned to the Lower Reservoir while the concentrated brine from the RO process will be directed to brine ponds. The treatment goal will be to maintain water quality levels in the reservoirs comparable to the existing groundwater quality.

Water quality data from wells in the Chuckwalla Valley aquifer were used to make assumptions about the source water quality. The RO treatment system would remove water from the Upper Reservoir at a rate of 2,055 gallons per minute (gpm) and remove sufficient total dissolved solids (TDS) to maintain the in-reservoir TDS at the same average concentration of the source water.

**Eutrophication**

Eutrophication is a process whereby water bodies, such as lakes, estuaries, or slow-moving streams receive excess nutrients that stimulate excessive plant growth (e.g., algae, periphyton attached algae, and nuisance plants weeds). This enhanced plant growth, often called an algal bloom, reduces dissolved oxygen in the water when dead plant material decomposes and can cause other organisms to die. Nutrients can come from many sources, such as fertilizers applied to agricultural fields, golf courses, and suburban lawns; deposition of nitrogen from the atmosphere; erosion of soil containing nutrients; and sewage treatment plant discharges.

Because the proposed Eagle Mountain Landfill project would be designed to prevent water from becoming contaminated, this is an unlikely scenario. In addition, the Project’s water treatment process in the RO system will remove nutrients as well as salts, eliminating the risks of eutrophication.

#### 1.1.1.4.2 *Elevated Metals Concentrations*

The iron deposits at Eagle Mountain Mine are contained within a low to medium grade metamorphosed series of sedimentary units consisting of quartzite, meta arkose, and marble. Locally the sediments are intruded by monzonite and granodiorite with minor mafic and andesitic dikes.

The Lower Quartzite, composed of 98 to 99 percent quartz has no significant oxide or sulfide minerals that could leach and impact water quality. This zone is most likely a zone formed by the hydrothermal replacement of an existing gneiss and marble.

The Meta-arkose, essentially a dirty sandstone with significant feldspar and some mafic minerals exhibits some iron oxide staining, possibly from the oxidation of biotite and “opaque” minerals that probably include magnetite. Some of the iron-bearing clays may also be oxidizing. This appears to be relatively minor with probably no impact on water quality other than some contribution of iron and manganese.

The Lower Marble is a metamorphosed limestone comprised of dolomite ($CaMg(CO_3)_2$). It consists of hematite ($Fe_2O_3$) dolomite layers and contains ore horizons of magnetite ($Fe_3O_4$) and hematite along with minor amounts of the following minerals: pyrite ($FeS_2$), actinolite, tremolite, diopside, serpentine, calcite, gypsum, apatite, chalcopyrite, tourmaline, and garnet. Pyrite is reported to range up to 10 percent locally within the ore lenses, but averages 3 to 4 percent (Force, 2001). The presence of gypsum could be primary or it could be an indication of pyrite and the carbonates reacting to form the gypsum ($CaSO_4.2H_2O$). It seems that the mineralogy is primarily oxides with very minor sulfide, therefore, the probability of generating significant acidic metal leachate is low. Additionally, other than iron, calcium and magnesium, there do not appear to be any metals that would create notable toxicity.

The Middle Quartzite is mineralogically similar to the Lower Quartzite and appears to have no likelihood of significantly impacting water quality. The Upper Marble is mineralogically similar to the Lower Marble and does contain ore zones of hematite and magnetite with minor pyrite. It will react similarly. The Upper Quartzite is mineralogically similar to the other quartzites and appears to have no likelihood of significantly impacting water quality.

The mineralogy of the geologic units in the vicinity of the pits indicates that there is primarily oxide mineralization with minor pyrite and gypsum and therefore minor potential to generate acid leachate. Additionally there do not seem to be any oxide or sulfide minerals that contain significant toxic metals. Pyrite, which averaged 3 to 4 percent in the ore body (which has been mined from the pit areas) was detected at levels of 1.5 to 3 percent in some samples reported by Force (2001). While Force (2001) does report local concentrations of pyrite as high as 10 to 50 percent in the lower portions of the ore, this would be atypical as pyrite is typically present in low concentrations as reported by Force (3 to 4 percent) and by Lamey (1945) (averages 3 to 4 percent, ranges to no more than 10 percent).

Cannon (1986) in a study of Lake Superior banded iron formations noted that the ore zones generally contained trace elements at concentrations below crustal averages and that while the presence of pyrite could allow for some acid generation and enhanced leaching of metals, the trace amounts of carbonate present would provide fairly significant neutralization.

There is a potential for a slight increase in the concentration of iron, magnesium and calcium which could cause some iron oxide precipitation and scaling in equipment. However, these effects are likely to be insignificant due to additions of make-up water to offset water lost through evaporative losses. Additionally, the quality of the water would be maintained through the use of the water treatment plant.

**Mineral Distribution**

The original distribution of the ore minerals would be within the zones that were mined through the development of the pits. By design, most of the highest concentration of iron minerals would have been removed and processed in the mill.

Previous studies (Kaiser Steel Resources, 1991) indicate that approximately 195 million metric tons of iron ore remain in the Central and East pits. Of the 99 million metric tons considered to be economically recoverable, approximately 65 million metric tons remain in the Central Pit and 34 million metric tons in the East Pit. The East Pit reserves include approximately 21.4 million metric tons of placer deposits (concentrated magnetite-rich sands).

Lamey (1945), Hadley (1948), DuBois and Brummett (1968), and Force (2001) report on the distribution of pyrite in which they cite averages of less than 3 percent for the ore body as a whole. A detailed summary of Bureau of Mines drilling and research by Hadley (1948) notes that pyrite is almost exclusively found in the deeper (more than 200 feet below ground surface), unoxidized portions of the ore bodies, which average 80 feet in thickness. Total sulfur, primarily as pyrite in the deeper portions of the ore body, averaged 1.5 percent (equivalent to approximately 3 percent pyrite). In the shallow portions of the ore bodies (from approximately 200 feet below ground surface to the surface), where pyrite was almost entirely oxidized to hematite and byproduct gypsum, total sulfur averaged 0.2 percent (equivalent to approximately 0.5 percent pyrite). Hadley (1948) only examined the area that approximates the East Pit as mined by Kaiser Steel. The ore zones were broken into the North, South and Bald Eagle zones. Approximately 65 percent of the ore in the North zone, 90 percent in the South zone, and 80 percent of the ore in the Bald Eagle zone are in the oxidized zone and contained from 0.08 to 0.13 percent sulfur (less than 0.5 percent pyrite).

Lower grade ore may also have been removed during pit development as waste rock and put on the waste rock dumps. Waste rock is typically dumped at the margins of the pits, usually on the down slope side (in this case to the south) to minimize haulage costs. Review of the air photographs of the site indicates that the pits are generally rimmed by dumps mostly to the south and that some may have been partially backfilled with waste rock.

After the ore is mined from the pit, it is hauled to the mill and processed. Here, the minerals of interest, in this case magnetite and hematite would be concentrated and the tailings that consist of non-ore minerals (quartz, dolomite, etc.) and some fine-grained ore minerals that could not be effectively separated, would be conveyed (usually as a slurry) to the tailings pond where the water is decanted from the pond and recycled to the mill. The tailings eventually harden forming extensive, flat waste piles of very fine-grained material. The tailings ponds are located at a lower elevation than the mining pits and to the southeast.

Some impact on water quality could occur from interaction of ore left in the pit bottom or walls. The waste rock dumps and tailings ponds, given their location, are likely to have little impact on water quality in the pits used by the Project.

Davis et al. (2009) provide data on the post-closure water quality of the Homestake Mine, in Lead, South Dakota. The gold deposits at Lead were hosted in sulfide-bearing Precambrian rock, averaging approximately 8 percent pyrite and containing siderite, an acid neutralizing iron carbonate. The mine was closed in 2003 and allowed to flood at about 750 gpm. The resulting pH, as monitored by the South Dakota Department of Environment and Natural Resources, ranged from 6.3 to 8.5, averaging approximately 7.6. The pyrite content at Homestake is higher than the average of 3 to 4 percent in the Eagle Mountain Mine, but does have similar acid buffering capacity through carbonate gangue.

Arsenic is present in the Homestake Mine ore body as arsenopyrite, ranging up to 6 percent. However, it's concentration in mine water averaged 0.012 mg/L (Davis et al., 2009), just exceeding the South Dakota drinking water standard of 0.01 and below the surface water aquatic life standard of 0.15 mg/L. This would suggest that arsenopyrite, which is fairly soluble in low pH acid waters, is fairly immobile in the near neutral waters of the Homestake Mine. Based on similar geology, it is reasonable to speculate that trace metals in the Eagle Mountain sulfides will be similarly insoluble.

**Leachate Analysis**

**Results of Literature Review.** An exhaustive search of existing literature for the site and adjacent region identified comparable iron ore deposits based on mineralogy, primarily the percent sulfides and total sulfur, in the Upper Peninsula of Michigan and in Northern Minnesota (Cannon, 1986; Hendricksen and Doonan, 1966). Those authors determined that mining produced no significant impact on the pH of the mine waters.

The literature review for the Eagle Mountain Mine and adjacent area yielded several papers on the mine and adjacent mining district (Hadley, 1948; McColly, 1983; Force, 2001). The historic geology reports provided information on the percentage, composition and distribution of sulfide minerals. None of the documentation produced by Kaiser Steel Corporation (including the Reclamation Plan submitted in 1978) submitted in support of the landfill project, including the ROWD dealt with the subject of the potential for acid mine leachate and dissolved metals. The ROWD discussed water quality from the perspective of landfill waste leachate, primarily how it would be collected and transported off-site for treatment at a wastewater treatment facility. However, it did not offer any detail on the interaction of the leachate with the native soil and/or mine tailings that would be used as part of the liner design.

**Results of Laboratory Sampling.** In 1993, ECE collected five samples from the ore body in the East Pit that were analyzed for standard soil analyses and water soluble leachate from saturate paste extracts. During this sampling, an effort was made to obtain a variety of rock types representative of the geologic formations present in the pits. Analytical tests followed procedures from the U.S. Department of Agriculture Handbook 60 (USDA, 1954), where leachate is produced by adding distilled water to the homogenized core samples that pass through a 2 millimeter sieve. Initial water quality of the distilled water was not reported with the lab reports.

The results from these leachate analyses (Table 3.2-2) were compared to standards that would apply to the maximum contaminant levels (MCL) from the Colorado River Basin Plan (RWQCB 2006 as amended 2011), shown in Table 3.2-2. Based on this comparison, leachate concentrations are generally within the range of historic groundwater quality concentrations.

Potential seepage from the reservoirs has a low potential to exceed the MCLs for cadmium and mercury. The potential for arsenic, barium, chromium, lead, selenium, and silver to exceed the MCLs is uncertain since detection limits for these analytes were higher than the MCL. For nitrate, one sample exceeded the 10 mg/L MCL, suggesting that potential seepage from the reservoirs may contain nitrate concentrations greater than the domestic MCL. Results for pH ranged from 6.5 to 9.8.

These results indicate sulfur as pyrite ranging from non-detected to 0.09 percent, consistent with the literature. In conversations with the laboratory analyst, it was reported that these samples were highly unlikely to generate acidity (personal telephone communication, 2009, Scott Habermehl, ACZ Laboratories).

Mines located in comparable iron ore deposits were located and the pH of waters in those mines was researched to determine if acid generation has been a problem at other mineralogically-similar locations. Comparison mines were located based on mineralogy, primarily the percent sulfides and total sulfur, in the Upper Peninsula of Michigan and in Northern Minnesota (Cannon, 1986; Hendricksen and Doonan, 1966). Those investigations determined that there was no significant impact on the pH of the mine waters.

Groundwater in the region of the mine pits is alkaline and would have some capacity to buffer the minor amount of acid generated by the oxidation of pyrite. In groundwater samples from on-site monitoring wells, pH generally ranged from 7.4 to 8.6. One well, MW10, had a higher pH of 9.7 possibly due to the dissolution of carbonate veins in the ore horizon by the oxidation of the minor pyrite. The existing groundwater quality in the Project area indicates that historic mining has not resulted in acid generation.

Overall, there are no notable factors related to the mining pits that should significantly impact the quality of the water stored in the pits compared to the naturally occurring groundwater. The mineralogy of the deposit is predominately magnetite and hematite with minor pyrite. The ability of the pyrite to oxidize and generate acidic solutions is somewhat limited by the alkaline nature of the groundwater and the presence of calcite and dolomite. Some of the cations and anions present could increase in concentration due to evaporation in the pits, but this can be offset by the addition of makeup water and RO treatment (PDF GW-2) prior to running water through the generation and pumping equipment.

**Table 3.2-2. Results of 1993 geochemical analyses.**
**(Note: Bolded values exceed domestic or municipal supply MCLs[1])**

| Parameter | Units | Sample 1 | Sample 2 | Sample 3 | Sample 4 | Sample 5 |
|---|---|---|---|---|---|---|
| Acid Base Potential ($CaCO_3$) | Tons/1000T | 2 | 40 | 3 | 372 | 56 |
| Sulfur, total | percent | 0.06 | <0.01 | 0.03 | <0.01 | 0.09 |
| Neutralization Potential | percent as $CaCO_3$ | 0.4 | 4 | 0.4 | 37.2 | 5.9 |
| Sulfur, organic | percent | 0.04 | <0.01 | 0.03 | <0.01 | <0.01 |
| Sulfur, pyritic | percent | 0.02 | <0.01 | <0.01 | <0.01 | <0.01 |
| Sulfur, sulfate | percent | <0.01 | <0.01 | <0.01 | <0.01 | 0.09 |
| Nitrate as N, soluble | mg/kg | 3.5 | **11.7** | 3.4 | 7.3 | 2 |
| Calcium, soluble | meq/L | 5.94 | 2.5 | 9.08 | 0.7 | 26.8 |
| Magnesium, soluble | meq/L | 2.47 | 1.81 | 3.13 | 3.62 | 3.37 |
| Sodium, soluble | meq/L | 0.7 | 2.7 | 1 | 0.74 | 0.96 |
| pH, Saturated paste | units | 6.8 | 8.5 | 6.5 | 9.6 | 8.5 |
| Sodium Absorption Ratio | | 0.3 | 1.8 | 0.4 | 0.5 | 0.2 |
| Conductivity, Saturated Paste | mmhos/cm | 0.86 | 0.82 | 1.22 | 0.51 | 2.25 |
| Sulfate, soluble | mg/kg | 128 | 36 | 67 | 19 | 1597 |
| Aluminum, extractable | mg/L | 0.3 | 0.9 | <0.3 | <0.3 | 1.9 |
| Arsenic, extractable | mg/L | **<0.5** | **<0.5** | **<0.5** | **<0.5** | **<0.5** |
| Boron, extractable | mg/L | 0.2 | 0.2 | <0.1 | <0.1 | 0.2 |
| Cadmium, extractable | mg/L | **<0.03** | **<0.03** | **<0.03** | **<0.03** | **<0.03** |
| Copper, extractable | mg/L | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Iron, extractable | mg/L | 7 | 0.3 | <0.1 | <0.1 | <0.1 |

[1] MCLs from Colorado River Basin Plan (RWQCB 2006 as amended 2011).

| Parameter | Units | Sample 1 | Sample 2 | Sample 3 | Sample 4 | Sample 5 |
|---|---|---|---|---|---|---|
| Lead, extractable | mg/L | **< 0.1** | **< 0.1** | **< 0.1** | **< 0.1** | **< 0.1** |
| Manganese, extractable | mg/L | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Mercury, extractable | mg/L | <0.0002 | <0.0002 | <0.0002 | <0.0002 | <0.0002 |
| Molybdenum, extractable | mg/L | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Selenium, extractable | mg/L | **<0.5** | **<0.5** | **<0.5** | **<0.5** | **<0.5** |
| Zinc, extractable | mg/L | <0.05 | <0.05 | 0.08 | 0.21 | 0.12 |
| Sand (2.0 - 0.062 mm) | Percent | 98 | 96 | 98 | 93 | 99 |
| Silt (0.062 - 0.002 mm) | Percent | 1 | 3 | 1 | 4 | 0 |
| Clay ( < 0.02mm) | Percent | 1 | 1 | 1 | 3 | 1 |

#### 1.1.1.4.3 *Construction Impact on Surface Water*

The Central Project Area (which includes both reservoirs, RO water treatment plant, switchyard, and underlying tunnels and powerhouse) is located in the northeast portion of the Eagle Mountains. The site was formerly used for open pit mining and extensive fine and coarse mine tailings are deposited near and around the Project site. There are no permanent water courses on the Project site and the only surface water occurring at the site is that associated with storm events. Both the Upper and Lower reservoirs are located in closed basins, with minimal drainage areas. Because of the extensive nature of the surface mining that has been conducted on the site, only remnants of natural stream channels are in the reservoir area. One ephemeral creek, Eagle Creek, exists on the southern edge of the Project site. Flows in Eagle Creek are presently captured in the bowl of the East Pit. Bald Eagle Canyon is a dry canyon which drains the mountains to the northwest of the East Pit. There are numerous washes south of the primary Project site, which cross the water supply pipeline and transmission pipeline routes.

During construction, erosion may occur from disturbed areas during storm events. An erosion control plan will be implemented to prevent erosion from occurring, and to keep sediment from entering washes.

Environmental Impact Assessment Summary:

(a) *Would the project violate any water quality standards or waste discharge requirements?* No. Water quality will be maintained through the use of an RO water treatment facility (PDF GW-2).

(b) *Would the project substantially alter the existing drainage pattern of the site or area, including through the alternation of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or off-site?* No. An erosion control plan is will be implemented which will incorporate best management practices to control erosion (MM GEO-2).

(c) *Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site, or that would result in flooding on- or off-site;* No. The existing drainage pattern will be maintained.

(d) *Would the project create or contribute to runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional source of polluted runoff?* A stormwater drainage plan has been developed to address water management in the event of a flood up to the size of the probable maximum flood.

(e) *Would the project otherwise substantially degrade water quality?* No. There are no notable factors related to the mining pits that should significantly impact the quality of the water stored in the pits compared to the naturally occurring groundwater.

(f) *Would the project place housing within a 100-year flood hazard area which would impede or redirect flood flows?* No. The Project does not entail construction of housing. In addition, flood insurance rate maps for the Project site or surrounding areas have not been prepared by FEMA. According to the Riverside County General Plan (Riverside County 2000) the Project site and surrounding lands do not lie within a 100- or 500-year flood plain.

(g) *Would the project expose people or structures to significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?* The Upper Reservoir dams will be built to Federal Energy Regulatory Commission (FERC) and California Division of Safety of Dams standards and guidelines. The Lower Reservoir will be entirely included within the existing mining pit and will not require the construction of dams.

(h) *Would the project be at risk of inundation by seiche, tsunami, or mudflow*? No. Primary surface features include the reservoirs, brine ponds, wells, and transmission lines. The tunnels, powerhouse, and water pipeline are all located beneath the ground surface.

**Impact 3.2-1 Existing Surface Water.** There are no perennial streams in the Project area. Springs are located outside of the Project area, and are not hydrologically connected to groundwater in the Chuckwalla Valley Aquifer. Eagle Creek and other unnamed washes are ephemeral streams which could be affected by erosion from Project construction. There is a *potentially significant impact, which is subject to mitigation.* Erosion from construction areas will be controlled through the implementation of an Erosion Control Plan (MM GEO-1).

**Impact 3.2-2 Eutrophication.** This is a *less than significant* impact, as the Project will not add nutrients to the environment. In addition, the RO water treatment facility (PDF GW-2) will maintain water quality at the level of existing groundwater quality.

**Impact 3.2-3 Water quality impacts to the Project created surface waters.** This impact is *potentially significant and subject to mitigation*. Potential impacts include sedimentation from erosion as a result of land disturbing activities during construction and increased metals as a result of former mining activities on the Project site. An Erosion Control Plan (MM GEO-1) has been developed to reduce erosion and sedimentation to a level that is less than significant. A field and laboratory evaluation of acid production potential will be conducted pre-construction (MM SW-1).

Without water quality treatment, the water in the reservoirs would change over time due to evaporation, resulting in increasing levels of TDS. In order to maintain TDS at a level consistent with existing groundwater quality, a water treatment plant using RO is proposed as a part of the Project to maintain reservoir water quality at the existing quality of the source groundwater. This consists primarily of an RO desalination facility and brine disposal ponds to remove salts and metals from reservoir water and maintain TDS concentrations equivalent to the source water quality (PDF GW-2). Water quality monitoring (MM GW-6) has been incorporated into the Project design and mitigation measures.

### *3.2.4 Mitigation Program*

**MM SW-1. On-site studies of acid production potential.** When access is granted to the Licensee for the purpose of collecting samples, the field and analytical program will be undertaken as described in the Phase I Site Investigations detailed in Section 12.1. This program will:

Obtain samples from each pit (upper and lower) across the stratigraphic section (porphyritic quartz monzonite, upper quartzite, middle quartzite, schistose meta arkose, vitreous quartzite, and the ore zones).

Perform analysis for total sulfur, pyrite sulfur, and sulfate sulfur (ASTM Method 1915-97 (2000) for total sulfur, and ASTM 1915-99 method E (2000) for sulfide sulfur).

Calculate acid production potential (APP) by the method of Sobek et al. (1978) and calculate acid production.

Determine the neutralization potential (NP) by the method of Sobek et al. (1978). Calculate the net neutralizing potential (NNP): NNP = NP – APP expressed as kilogram calcium carbonate/ton.

In the event that APP is found, water treatment will be added to the treatment program, consisting of one or more of the following strategies:

- Use of limestone, hydrated lime, soda ash, or other similar neutralizing substances to increase pH of the water
- Increased seepage control to reduce seepage through the reservoir

- Construction of limestone drains or limestone ponds to treat water
- Modifications to the RO system to increase pH

Phase I Site Investigations will begin after the FERC license is granted, site access is obtained, and regulatory agencies have granted approval for ground disturbing activities.

*Performance Standard:* As a performance standard, the proposed Project must not cause or contribute to the degradation of background water quality of the aquifer, as required by the Region 7 Colorado River Water Quality Control Plan. Water quality in the reservoirs will be maintained at the existing quality of the source groundwater.

**PDF GW-2.** **Water Treatment Facility.** In order to maintain TDS at a level consistent with existing groundwater quality, a water treatment plant using a RO desalination system and brine disposal lagoon will be constructed as a part of the Project to remove salts and metals from reservoir water and maintain TDS concentrations equivalent to the source groundwater.

Treated water will be returned to the Lower Reservoir while the concentrated brine from the RO process will be directed to brine ponds. In addition to removing salts from the water supply, other contaminants, nutrients, and minerals, if present, would be removed, preventing eutrophication from occurring.

Salts from the brine disposal lagoon will be removed and disposed of at an approved facility when the lagoons become full, approximately every 10 years. The lagoons will be maintained in a wetted condition, to maintain air quality in the Project area.

**MM GW-6.** **Water Quality Sampling.** Water quality sampling will be done at the source wells, and within the reservoirs, and in monitoring wells up-gradient and down-gradient of the reservoirs and brine disposal lagoon consistent with applicable portions of California Code of Regulations Title 27. Figure 3.3-18 shows the proposed locations of these wells. The Licensee shall prepare and implement a site-specific monitoring and reporting plan for groundwater and surface waters which will specify the location and timing of water quality monitoring, and constituents to be monitored. Monitoring will be done on a quarterly basis for the first four years and may be reduced to biannually thereafter based on initial results. Results of the sampling will be used to adjust water treatment volume, and to add or adjust treatment modules for TDS and other potential contaminants as needed to maintain groundwater quality under the direction of the State Water

Board and FERC. Groundwater quality monitoring results will be made available to the MWD upon request.

*Performance Standard*: As a performance standard, the proposed Project: 1) must not cause or contribute to the degradation of background water quality; and 2) water quality in the reservoirs will be maintained at the existing quality of the source groundwater.

**MM GEO-1.** **Erosion Control Plan**. Erosion and sediment control measures for each area type, including proposed best management practices (BMPs), are listed in the Erosion Control Plan in Section 12.2. The Applicant shall limit impacts to soil erosion through implementation of an Erosion Control Plan limiting surface disturbance to only those areas necessary for construction as required by California Code of Regulations, title 23, section 122.26. Where natural topsoil occurs, it would be salvaged and stockpiled prior to construction, and the soil piles stabilized.

Following construction, all areas where natural topsoils were removed that are not occupied by permanent Project facilities would be re-graded, have the topsoils replaced, and be seeded with native vegetation to reduce erosion potential.

Erosion control measures will be maintained throughout the life of the Project.

At minimum, the Applicant shall use and implement the following BMPs for effective temporary and final soil stabilization during construction.

Preserving existing vegetation where required and when feasible to prevent or minimize erosion.

Once existing vegetation is cleared, construction will follow immediately behind to reduce unnecessary exposure of scarified soil to wind and water.

Sloping roadways and excavations away from washes will prevent or minimize erosion into washes. Where haul roads cross surface washes, the ground will be cleared of loose soil and pre-existing sediments, as necessary.

Installation of riprap at the washes to prevent or minimize erosion.

Small earthen embankments will be built within washes in order to slow or divert surface water to reduce erosion.

Silt fences will be installed when working around a wash to prevent sediment from entering washes during a rain storm and will be constructed as described in Attachment B of Section 12.2 (e.g., buried to a depth of at least 12 inches).

The Applicant will be required to preserve and protect existing vegetation not required, or otherwise authorized, to be removed. Vegetation will be protected from damage or injury caused by construction operations, personnel, or equipment by the use of temporary fencing, protective barriers, or other similar methods.

Water will be applied to disturbed soil areas of the Project site to control wind erosion and dust. Water applications will be monitored to prevent excessive runoff.

Sediment controls, structural measures that are intended to complement and enhance the soil stabilization (erosion control) measures, will be implemented. Sediment controls are designed to intercept and filter out soil particles detached and transported by the force of water.

Prior to construction, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared detailing BMPs that will be implemented at the site. The Applicant will comply with the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit; Order No. 2009-0009-DWQ and amendments thereto; National Discharge Elimination System No. CAS000002).

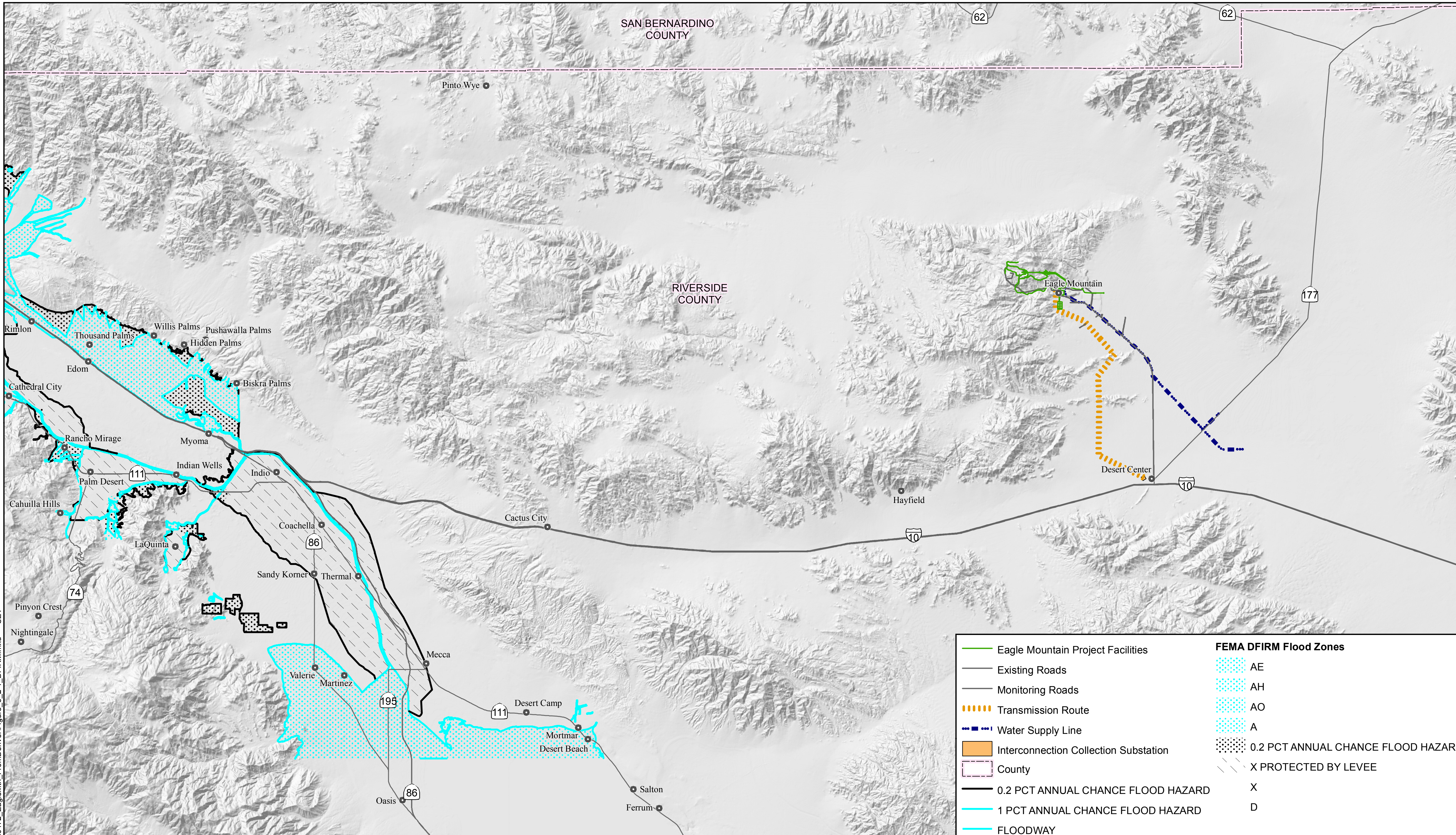
### *3.2.5 Level of Impact after Implementation of Mitigation Program*

**Impact 3.2-1 Existing Surface Water.** This potential impact is *less than significant*.

**Impact 3.2-2 Eutrophication.** This potential impact is *less than significant*.

**Impact 3.2-3 Water quality impacts to the project created surface waters.** Implementation of mitigation reduces this impact to *less than significant* (PDF GW-2) (MM GW-6).

No residual impacts to surface water would occur with Project implementation.




Environmental Impact Report
prepared for State Water Resources Control Board
by GEI Consultants, Inc.

Eastern Riverside County, California

California Water Boards
State Water Resources Control Board
Regional Water Quality Control Boards

FEMA DIGITAL FLOOD INSURANCE RATE MAP FLOOD ZONES NEAR THE PROJECT AREA

July 2013

Figure 3.2-1

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