1 **3.6 GEOLOGY AND SOILS**

<table>
<thead>
<tr>
<th>GEOLOGY AND SOILS – Would the Project:</th>
<th>Potentially Significant Impact</th>
<th>Less Than Significant with Mitigation</th>
<th>Less Than Significant Impact</th>
<th>No Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>ii) Strong seismic ground shaking?</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>iii) Seismic-related ground failure, including liquefaction?</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>iv) Landslides?</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>b) Result in substantial soil erosion or the loss of topsoil?</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

2 **3.6.1 Environmental Setting**

The backwater habitat would be created through dry-cutting (dry land excavation) to establish a new channel within the Project area. Dry-cutting would involve earthwork consisting of excavation, grading, and contouring of the perimeter of the backwater channel that would extend from the River to the existing Park Moabi Channel (Figure 2.4-1). Excavated material would consist of dry fill gathered above the ground water elevation. Areas within the footprint of the backwater channel may be excavated until the groundwater elevations are reached and further if necessary and feasible.

Groundwater elevations within the Project area fluctuate between the depth of 3.5 and 13 feet with the rise and fall of the River. Excavation would be accomplished through...
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the use of mechanical and hydraulic equipment such as excavators, back hoes, skid steers, and front loaders.

During earthwork and excavation, approximately 1.2 million cubic yards of compacted fill would be excavated. Dry fill materials would be placed directly adjacent to the newly excavated channel to bury vegetation debris collected during Phase 1 (Figure 2.4-1).

The dry fill material would be soils that are characterized as Salothids and Indio-Silt. Soil textures within the Project area are a combination of clay to sand depending on their position in the landscape. The diameter ranges from 0.0625 millimeter (or 1/16 inch) to 2 millimeter in diameter. The Project area contains large areas that are covered with a salt crust and soils that commonly contain salt concentrations. Currently, this area consists of 146.5 acres of land within a Reclamation dredge spoil area created as a result of past dredging operations.

All material excavated within the Project area, located on fee lands of CSLC leased to the CDFW and the County, would fall under the jurisdiction of CSLC. Ownership of the dry fill material belongs to the state of California.

Hazard overlay maps prepared by the County for the areas do not identify the risk of seismic activity. Seismic ground shaking is influenced by the proximity of the site to an earthquake fault, the intensity of the seismic event, and the underlying soil composition.

In addition, the area is relatively flat and has been altered by the construction roadways around the perimeter. The hazard overlay maps do not identify the risk of landslides and liquefaction. Liquefaction or lateral spreading refers to slides that commonly form on gentle slopes and that have rapid fluid-like flow movement, like water.

3.6.2 Regulatory Setting

The following Federal and State laws and regulations pertaining to this issue area and relevant to the Project are identified in Table 3.6-1.

<table>
<thead>
<tr>
<th>CA</th>
<th>Alquist-Priolo Earthquake Fault Zoning Act (Pub. Resources Code, §§ 2621-2630)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This Act requires that &quot;sufficiently active&quot; and &quot;well-defined&quot; earthquake fault zones be delineated by the State Geologist and prohibits locating structures for human occupancy across the trace of an active fault.</td>
</tr>
<tr>
<td>California Building Code (CBC) (Cal. Code Regs., tit. 23)</td>
<td>The CBC contains requirements related to excavation, grading, and construction of pipelines alongside existing structures. A grading permit is required if more than 50 cubic yards of soil are moved. Sections 3301.2 and 3301.3 contain provisions requiring protection of adjacent properties during excavations and require a 10-day written notice and access agreements with adjacent property owners.</td>
</tr>
<tr>
<td>California Seismic Hazards</td>
<td>This Act and the Seismic Hazards Mapping Regulations (Cal. Code Regs., tit. 14, Div. 2, Ch. 8, Art. 10) are designed to protect the public from the effects of strong ground shaking, liquefaction, landslides, other ground failures, or other consequences.</td>
</tr>
</tbody>
</table>
Table 3.6-1. Laws, Regulations, and Policies (Geology and Soils)

| Mapping Act (Pub. Resources Code, § 2690 and following as Division 2, Chapter 7.8) | hazards caused by earthquakes. The Act requires that site-specific geotechnical investigations be conducted identifying the hazard and formulating mitigation measures prior to permitting most developments designed for human occupancy. Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California (CDC 208), constitutes guidelines for evaluating seismic hazards other than surface fault rupture and for recommending mitigation measures as required by section 2695, subdivision (a). |

The following local goals and policies related to geology and soils from the San Bernardino County 2007 General Plan include (SBC 2007):

- Chapter VIII. Safety Element – Section B. Goals and Policies of the Safety Element:
  - **Goal S 6.** To protect residences from natural and manmade hazards by utilizing the Hazard and Resources Overlay Maps to identify areas suitable or required for retention as open space.
  - **Goal S 7.** To minimize exposure to hazards and structural damage from geological and seismic conditions by:
    - Designating areas identified by the Alquist-Priolo Earthquake Fault Zoning Act (Public Resource Code, Division 2, Chapter 7.5) on the Hazard Overlay Maps to protect occupants and structures from high level of risk caused by ground rupture during earthquake.
    - Minimizing damage cause by liquefaction, which can cause devastating structural damage and a high potential for saturation exists when the groundwater level is within the upper 50 feet of alluvial material.
    - Protecting life and property from risks resulting from landslide, especially in San Bernardino and San Gabriel Mountains that have high landslide potential.

Regulatory requirement and permits related to this resource area including, but not limited to, the CWA 404 Permit, National Pollutant Discharge Elimination System (NPDES), Storm Water Pollution Prevention Program (SWPPP), and Water Quality Management Plan (WQMP) would be obtained to control soil erosion during and after construction. Conditions and stipulations required in the permits would be adhered to by Reclamation.

3.6.3 Impact Analysis (CEQA)

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

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

No Impact. The Project is not located within an Alquist-Priolo Earthquake Fault Zone according to maps prepared by the California Geologic Survey or on the County of San Bernardino Geologic Hazards Overlay Surface Mining and Reclamation Act (SMARA) Overlay Map (California Department of Conservation 2015a).

ii. Strong seismic ground shaking?

Less than Significant Impact. The Project is not located in the immediate vicinity of an earthquake fault but like all of Southern California, large earthquakes can subject land that is not in the immediate vicinity of an earthquake fault to some degree of seismic ground shaking. Impacts from seismic ground shaking are forecast to be less than significant because the site is not located within close proximity of an earthquake fault.

iii. Seismic-related ground failure, including liquefaction?

No Impact. According to the Geologic Hazards Overlay SMARA Overlay Map, the Project is not located in an area susceptible to liquefaction (California Department of Conservation 2015a).

iv. Landslides?

No Impact. According to the Geologic Hazards Overlay SMARA Overlay Map, the Project is not located in an area susceptible to landslides (California Department of Conservation 2015a). In addition, the Project area is relatively flat and no new significant slopes will be created.

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

Less than Significant Impact. Development of the Project would require vegetation removal, grading, and excavation to create the open backwater. The excavated material would be placed at the adjacent staging area to the east of the Project area leased by the County. There would be no loss of soil material within the Project area because the excavated soil material would stay within the Project area.

The Project design includes a re-vegetation plan using native plants to improve and enhance wildlife and riparian habitat. Although Phase 1, vegetation clearing activities, and Phase 2, construction activities, would present a potential for soil erosion, the impacts would be short-term and controlled by having an NPDES, SWPPP, and a WQMP in place. Preparation of an NPDES, SWPPP, and WQMP are regulatory requirements and would be obtained by the Applicant. Conditions and stipulations specific to the Project area would be adhered to, to control soil erosion during and after construction.

The implementation of the Project, specifically during re-vegetation scheduled in Phase 3, is anticipated to restore and improve site conditions. Following
construction of the Project, the restored and improved site conditions would have
no increased potential for soil erosion and would maintain current conditions.

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

**Less than Significant Impact.** As noted in the response to item a) above:

- Item a, iv) above, the Project site is not susceptible to landslides; thus, the
  impacts from lateral spreading are considered less than significant.
- Item a, iv) above, the Project site is not susceptible to landslides; thus, no
  impacts from landslides are forecast to occur.
- Item a, iii) above, the Project site is not located in an area that is
  susceptible to liquefaction.

In addition, there is no identifiable risk from a geologic unit that is unstable or soil
that is unstable within the Project area. The proposed design of the open
backwater area does not propose habitable structures so there is no risk from a
gеologic unit that is unstable or soil that is unstable.

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

**No Impact.** The Project area is not located in an area which has been identified
by the County Building and Safety Geologist as having the potential for
expansive soils. No impact is anticipated.

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

**No Impact.** The Project will not require a wastewater system. No impact is
anticipated.

### 3.6.4 Environmental Consequences (NEPA)

#### No Action Alternative

The No Action Alternative would have no effect to Geology and Soils because there
would be no construction to alter the existing conditions of the Project area. The current
use as a designated OHV recreational area would continue and the geology/soils would
remain in its current condition.

#### Proposed Action (Project)

The Project would be implemented within a location that is relatively flat and outside any
areas at risk for severe seismic activity, liquefaction, and landslides. Although the
implementation of the Project would require vegetation removal, grading, and
excavation of an open backwater channel in Phases 1 and 2, soil materials excavated
would be moved within the Project area to the east (leased by the County). It would not
result in the loss of soil material.

The Project design includes a re-vegetation plan using native plants to improve and
enhance wildlife and riparian habitat. Although Phase 1, vegetation clearing activities,
and Phase 2, construction activities, would present a potential for soil erosion, the
impacts would be short term and controlled by having an NPDES, SWPPP, and a
WQMP in place. Preparation of an NPDES, SWPPP, and WQMP are regulatory
requirements and would be obtained by the applicant. Conditions and stipulations
specific to the Project area that would be adhered to control soil erosion during and after
construction.

The implementation of the Project, specifically during re-vegetation scheduled in Phase
3, is anticipated to restore and improve site conditions. Following construction of the
Project, the restored and improved site conditions would have no increased potential for
soil erosion and would maintain or improve current conditions.

Cumulative Impacts

The OHV use within the Park may contribute to localized soil erosion on previously
disturbed lands. Re-vegetation is expected to restore and improve site conditions that
would have no increased potential for soil erosion and would maintain or improve
current site conditions; therefore, significant cumulative impacts from soil erosion are
not anticipated. No other cumulative impacts are anticipated as there would be no other
potential impacts to the resources evaluated in this section.

3.6.5 Mitigation Summary (CEQA Only)

The Project would result in less than significant impacts to Geology and Soils.
Therefore, no mitigation measure is required.