# Geology and Soils
# Chapter 3.6

## SUMMARY OF FINDINGS

The proposed Project will result in ***Less Than Significant Impacts*** related to Geology and Soils, through project design features and implementation of Mitigation Measures. A review of the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) detailing the proposed Project site's soil composition is included as Appendix B. The impact analyses and determinations in this chapter are based upon information obtained from the References listed at the end of this chapter. A detailed review of potential impacts is provided in the analysis below.

## INTRODUCTION

California Environmental Quality Act (CEQA) Requirements

This section of the Draft Environmental Impact Report (DEIR) addresses potential impacts to Geology and Soils. As required in Section 15126, all phases of the proposed Project will be considered as part of the potential environmental impact.

As noted in 15126.2(a), "[a]n EIR shall identify and focus on the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, the human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services. The EIR shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected. For example, an EIR on a subdivision astride an active fault line should identify as a significant effect the seismic hazard to future occupants of the subdivision. The subdivision would have the effect of attracting people to the location and exposing them to the hazards found there. Similarly, the EIR should evaluate any potentially significant impacts of locating development in other areas susceptible to hazardous conditions (e.g., floodplains, coastlines, wildfire risk areas) as identified in authoritative hazard maps, risk assessments or in land use plans addressing such hazards areas."[1]

[1] CEQA Guidelines Section 15126.2

The environmental setting provides a description of the Geology and Soils in the County. The regulatory setting provides a description of applicable Federal, State and Local regulatory policies that were developed in part from information contained in the Tulare County 2030 General Plan, the Tulare County General Plan Background Report and/or the Tulare County General Plan Revised DEIR incorporated by reference and summarized below. Additional documents utilized are noted as appropriate. A description of the potential impacts of the proposed Project is provided and includes the identification of feasible mitigation measures (if necessary and feasible) to avoid or lessen the impacts.

Thresholds of Significance

The thresholds of significance for this section are established by the CEQA Checklist Item.

- Located on a fault line
- Hazard to people or property
- Project subject to landslides
- Located on a liquefaction zone

**ENVIRONMENTAL SETTING**

"Seismicity varies greatly between the two major geologic provinces represented in Tulare County. The Central Valley is an area of relatively low tectonic activity bordered by mountain ranges on either side. The Sierra Nevada Mountains, partially located within Tulare County, are the result of movement of tectonic plates which resulted in the creation of the mountain range. The Coast Range on the west side of the Central Valley is also a result of these forces, and the continued uplifting of Pacific and North American tectonic plates continues to elevate these ranges. The remaining seismic hazards in Tulare County generally result from movement along faults associated with the creation of these ranges."[2]

"Earthquakes are typically measured in terms of magnitude and intensity. The most commonly known measurement is the Richter Scale, a logarithmic scale which measures the strength of a quake. The Modified Mercalli Intensity Scale measures the intensity of an earthquake as a function of the following factors:

- Magnitude and location of the epicenter;
- Geologic characteristics;
- Groundwater characteristics;
- Duration and characteristic of the ground motion;
- Structural characteristics of a building."[3]

"Faults are the indications of past seismic activity. It is assumed that those that have been active

[2] Tulare County General Plan 2030 Update, *Background Report*, Page 8-5.
[3] Ibid.

most recently are the most likely to be active in the future. Recent seismic activity is measured in geologic terms. Geologically recent is defined as having occurred within the last two million years (the Quaternary Period). All faults believed to have been active during Quaternary time are considered "potentially active."[4]

"Settlement can occur in poorly consolidated soils during groundshaking. During settlement, the soil materials are physically rearranged by the shaking and result in reduced stabling alignment of the individual minerals. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils, or improperly founded or poorly compacted fill. These areas are known to undergo extensive settling with the addition of irrigation water, but evidence due to groundshaking is not available. Fluctuating groundwater levels also may have changed the local soil characteristics. Sufficient subsurface data is lacking to conclude that settlement would occur during a large earthquake; however, the data is sufficient to indicate that the potential exists in Tulare County."[5]

"Liquefaction is a process whereby soil is temporarily transformed to a fluid form during intense and prolonged groundshaking. Areas most prone to liquefaction are those that are water saturated (e.g., where the water table is less than 30 feet below the surface) and consist of relatively uniform sands that are low to medium density. In addition to necessary soil conditions, the ground acceleration and duration of the earthquake must be of sufficient energy to induce liquefaction. Scientific studies have shown that the ground acceleration must approach 0.3g before liquefaction occurs in a sandy soil with relative densities typical of the San Joaquin alluvial deposits. Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, tilting, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation, such as that which occurred along the coastline near Seward, Alaska during the 1964 earthquake. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted."[6]

### *Earthquake Hazards*

"Groundshaking is the primary seismic hazard in Tulare County because of the county's seismic setting and its record of historical activity. Thus, emphasis focuses on the analysis of expected levels of groundshaking, which is directly related to the magnitude of a quake and the distance from a quake's epicenter. Magnitude is a measure of the amount of energy released in an earthquake, with higher magnitudes causing increased groundshaking over longer periods of time, thereby affecting a larger area. Groundshaking intensity, which is often a more useful measure of earthquake effects than magnitude, is a qualitative measure of the effects felt by population. The valley portion of Tulare County is located on alluvial deposits, which tend to experience greater groundshaking intensities than areas located on hard rock. Therefore, structures located in the valley will tend to suffer greater damage from groundshaking than those located in the foothill and mountain areas. However, existing alluvium valleys and weathered or

[4] Tulare County General Plan 2030 Update, *Background Report*, 8-5.
[5] Ibid. Page 8-9.
[6] Ibid.

decomposed zones are scattered throughout the mountainous portions of the county which could also experience stronger intensities than the surrounding solid rock areas. The geologic characteristics of an area can therefore be a greater hazard than its distance to the epicenter of the quake."[7]

"There are three faults within the region that have been, and will be, principal sources of potential seismic activity within Tulare County. These faults are described below:

- **San Andreas Fault.** The San Andreas Fault is located approximately 40 miles west of the Tulare County boundary. This fault has a long history of activity, and is thus the primary focus in determining seismic activity within the county. Seismic activity along the fault varies along its span from the Gulf of California to Cape Mendocino. Just west to Tulare County lies the "Central California Active Area," where many earthquakes have originated.

- **Owens Valley Fault Group.** The Owens Valley Fault Group is a complex system containing both active and potentially active faults, located on the eastern base of the Sierra Nevada Mountains. The Group is located within Tulare and Inyo Counties and has historically been the source of seismic activity within Tulare County.

- **Clovis Fault.** The Clovis Fault is considered to be active within the Quaternary Period (within the past two million years), although there is no historic evidence of its activity, and is therefore classified as "potentially active." This fault lies approximately six miles south of the Madera County boundary in Fresno County. Activity along this fault could potentially generate more seismic activity in Tulare County than the San Andreas or Owens Valley fault systems. In particular, a strong earthquake on the Fault could affect northern Tulare County. However, because of the lack of historic activity along the Clovis Fault, inadequate evidence exists for assessing maximum earthquake impacts."[8] "Older buildings constructed before current building codes were in effect, and even newer buildings constructed before earthquake resistance provisions were included in the current building codes, are most likely to suffer damage in an earthquake. Most of Tulare County's buildings are no more than one or two stories in height and are of wood frame construction, which is considered the most structurally resistant to earthquake damage. Older masonry buildings (without earthquake-resistance reinforcement) are the most susceptible to structural failure, which causes the greatest loss of life. The State of California has identified unreinforced masonry buildings as a safety issue during earthquakes. In high risk areas (Bay Area) inventories and programs to mitigate this issue are required. Because Tulare County is not a high risk area, state law only recommends that programs to retrofit URMs are adopted by jurisdictions."[9]

### *Soils and Liquefaction*

"The San Joaquin Valley portion of Tulare County is located on alluvial deposits, which tend to

[7] Tulare County General Plan 2030 Update, *Background Report*, 8-7.
[8] Ibid. Pages 8-6 to 8-7.
[9] Ibid. Page 8-8.

experience greater groundshaking intensities than areas located on hard rock. Therefore, structures located in the valley will tend to suffer greater damage from groundshaking than those located in the foothill and mountain areas. However, existing alluvium valleys and weathered or decomposed zones are scattered throughout the mountainous portions of the county which could also experience stronger intensities than the surrounding solid rock areas. The geologic characteristics of an area can therefore be a greater hazard than its distance to the epicenter of the quake."[10]

"No specific countywide assessments to identify liquefaction hazards have been performed in Tulare County. Areas where groundwater is less than 30 feet below the surface occur primarily in the valley. However, soil types in the area are not conducive to liquefaction because they are either too coarse or too high in clay content. Areas subject to 0.3g acceleration or greater are located in a small section of the Sierra Nevada Mountains along the Tulare-Inyo County boundary. However, the depth to groundwater in such areas is greater than in the valley, which would minimize liquefaction potential as well. Detailed geotechnical engineering investigations would be necessary to more accurately evaluate liquefaction potential in specific areas and to identify and map the areal extent of locations subject to liquefaction."[11]

### *Landslides*

"Landslides are a primary geologic hazard and are influenced by four factors:

- Strength of rock and resistance to failure, which is a function of rock type (or geologic formation);
- Geologic structure or orientation of a surface along which slippage could occur;
- Water (can add weight to a potentially unstable mass or influence strength of a potential failure surface); and,
- Topography (amount of slope in combination with gravitation forces)."[12]

## REGULATORY SETTING

### *Federal Agencies & Regulations*

None that apply to the proposed Project.

### *State Agencies & Regulations*

Seismic Hazards Mapping Act

"Under the Seismic Hazards Mapping Act, the State Geologist is responsible for identifying and mapping seismic hazards zones as part of the California Geologic Survey (CGS). The CGS

[10] Tulare County General Plan 2030 Update, *Background Report* 8-7.
[11] Ibid. Page 8-9.
[12] Ibid. Page 8-10.

provides zoning maps of non-surface rupture earthquake hazards (including liquefaction and seismically induced landslides) to local governments for planning purposes. These maps are intended to protect the public from the risks associated with strong ground shaking, liquefaction, landslides or other ground failure, and other hazards caused by earthquakes. For projects within seismic hazard zones, the Seismic Hazards Mapping Act requires developers to conduct geological investigations and incorporate appropriate mitigation measures into project designs before building permits are issued."[13]

California Building Code

"The California Building Code is another name for the body of regulations known as the California Code of Regulations (C.C.R.), Title 24, Part 2, which is a portion of the California Building Standards Code. Title 24 is assigned to the California Building Standards Commission, which, by law, is responsible for coordinating all building standards."[14]

Alquist-Priolo Earthquake Fault Zoning Act

"The Alquist- Priolo Earthquake Fault Zoning Act (formerly the Alquist- Priolo Special Studies Zone Act), signed into law December 1972, requires the delineation of zones along active faults in California. The purpose of the Alquist-Priolo Act is to regulate development on or near active fault traces to reduce the hazards associated with fault rupture and to prohibit the location of most structures for human occupancy across these traces."[15]

***Local Policy & Regulations***

Tulare County General Plan Policies

The General Plan has a number of policies that apply to projects within Tulare County. General Plan policies that relate to the proposed Project are listed below.

**ERM-7.2 Soil Productivity -** The County shall encourage landowners to participate in programs that reduce soil erosion and increase soil productivity. To this end, the County shall promote coordination between the Natural Resources Conservation Service, Resource Conservation Districts, UC Cooperative Extension, and other similar agencies and organizations.

**ERM-7.3 Protection of Soils on Slopes -** Unless otherwise provided for in this General Plan, building and road construction on slopes of more than 30 percent shall be prohibited, and development proposals on slopes of 15 percent or more shall be accompanied by plans for control or prevention of erosion, alteration of surface water runoff, soil slippage, and wildfire occurrence.

**HS-2.1 Continued Evaluation of Earthquake Risks -** The County shall continue to evaluate areas to determine levels of earthquake risk.

[13] USDA NRCS Web Soils Report, *Custom Soil Resource Report for Tulare County, California, Western Part,* June 2014. Appendix B
[14] Ibid, Page 8-3.
[15] Ibid, Page 8-3.

**HS-2.4 Structure Siting -** The County shall permit development on soils sensitive to seismic activity permitted only after adequate site analysis, including appropriate siting, design of structure, and foundation integrity.

**HS-2.7 Subsidence -** The County shall confirm that development is not located in any known areas of active subsidence. If urban development may be located in such an area, a special safety study will be prepared and needed safety measures implemented. The County shall also request that developments provide evidence that its long-term use of ground water resources, where applicable, will not result in notable subsidence attributed to the new extraction of groundwater resources for use by the development.

**HS-2.8 Alquist-Priolo Act Compliance -** The County shall not permit any structure for human occupancy to be placed within designated Earthquake Fault Zones (pursuant to and as determined by the Alquist-Priolo Earthquake Fault Zoning Act; Public Resource code, Chapter 7.5) unless the specific provision of the Act and Title 14 of the California Code of Regulations have been satisfied.

## IMPACT EVALUATION

**Would the project:**

**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.**

Project Impact Analysis: ***Less Than Significant Impact***

No substantial faults are known to traverse Tulare County according to the Alquist-Priolo Earthquake Fault Zoning Maps and the State of California Department of Conservation.[16] The nearest minor fault line is the Poso Creek fault zone approximately 15 miles southwest of the proposed Project site. The nearest major fault line, which lies outside of Tulare County, is the San Andreas fault zones; approximately 56 miles southwest of the proposed Project site. According to the Five County Seismic Safety Element (FCSSE), Tulare County is located in the V-1 zone. This zone includes most of the eastern San Joaquin Valley, and is characterized by a relatively thin section of sedimentary rock overlying a granitic basement. Amplification of shaking that would affect low to medium-rise structures is relatively high, but the distance of the faults that are expected sources of the shaking is sufficiently great that the effects should be minimal. The requirements of Zone II of the Uniform Building Code should be adequate for normal facilities.[17] Therefore, any impacts resulting from the rupture of a known earthquake

[16] State of California Department of Conservation, Alquist-Priolo Earthquake Fault Zone Maps, http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm. Accessed June, 2014.
[17] Five County Seismic Safety Element, Summary & Policy Recommendations II, 3 and 15.

fault would be ***Less Than Significant.***

**ii) Strong seismic ground shaking?**

Project Impact Analysis: ***Less Than Significant Impact***

Tulare County is characterized as Severity Zone "Nil" and "Low" for groundshaking events.[18] Deaggregation of the hazard was performed by using the USGS Interactive Deaggregation website and it was found that all faults within a 20 mile radius are quaternary faults between the ages of 750,000 and 1.6 million years old. [19] Quaternary faults are defined as those faults that have been recognized at the surface and which have evidence of movement in the past 1.6 million years, which is the duration of the Quaternary Period.[20] Due to the distance and types of faults in the proposed Project vicinity, strong ground shaking is unlikely. Therefore, any impact would be ***Less Than Significant.***

**iii) Seismic-related ground failure, including liquefaction?**

Project Impact Analysis: ***No Impact***

The proposed Project area is not located within an area mapped to have a potential for soil liquefaction. Liquefaction in soils and sediments occurs during earthquake events, when soil material is transformed from a solid state to a liquid state, generated by an increase in pressure between pore space and soil particles. Earthquake induced liquefaction typically occurs in low-lying areas with soils or sediments composed of unconsolidated, saturated, clay-free sands and silts, but it can also occur in dry, granular soils or saturated soils with partial clay content. Based on available subsurface data, the proposed Project site is underlain by shallow rock that would not liquefy.

The site soil type consists of Tagus loam, 0 to 2 percent slopes. Tagus loam has a depth of root restrictive layer of more than 80 inches, and has a natural drainage class of well drained.[21] No subsidence-prone soils or oil or gas production is involved on or near the proposed Project site. As such, there would be ***No Impact*** caused by seismic-related ground failure, including liquefaction.

**iv) Landslides?**

Project Impact Analysis: ***No Impact***

Landslides are not a significant threat as the topography in the proposed Project area is relatively flat. No geologic landforms exist on or near the site that would result in a landslide event. Therefore, there proposed Project would result in ***No Impact***.

[18] Tulare County General Plan 2030 Update, *Part 1-Goals and Policies Report*, 253.
[19] USGS, *Earthquake Hazards Program: Custom Mapping & Analysis Tools*, http://geohazards.usgs.gov/qfaults/ca/California.php. Accessed June, 2014.
[20] USGS. *Earthquake Hazards Program: Glossary,* http://earthquake.usgs.gov/hazards/qfaults/glossary.php#Q. Accessed June, 2014.
[21] USDA NRCS Web Soils Report, *Custom Soil Resource Report for Tulare County, California, Western Part*, June 2014. Appendix B

Cumulative Impact Analysis: ***Less Than Significant Impact***

The geographic area of this cumulative analysis is Tulare County. This cumulative analysis is based on the information provided in the Tulare County 2030 General Plan, Tulare County General Plan Background Report, and/or Tulare County 2030 General Plan EIR.

With ***Less Than Significant*** Project-specific impacts, ***Less Than Significant Cumulative Impacts*** will also occur.

Mitigation Measures: **None Required.**

Conclusion: ***Less Than Significant Impact***

As noted earlier, implementation of the proposed Project will not cause a significant impact to this Checklist Item. ***Less Than Significant Cumulative Impacts*** are anticipated without mitigation.

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

Project Impact Analysis: ***Less Than Significant Impact With Mitigation***

The proposed Project area is primarily flat and as such, soil erosion is not anticipated. The majority of the proposed Project site will remain non-vegetated in order to accommodate operations/maintenance (O&M) considerations and to decrease fire risks. Project O&M staff will ensure maintenance of any vegetation as necessary to minimize noxious weeds, pests, and/or fire hazard.

In addition, as required by the Clean Water Act (CWA) and the Central Valley Regional Water Quality Control Board (CVRWQCB), a Stormwater Pollution Prevention Plan (SWPPP) will be developed by a qualified engineer or erosion control specialist and implemented before construction begins. The SWPPP will be kept on site during construction activity and will be made available upon request to representatives of the CVRWQCB. The objectives of the SWPPP will be to identify pollutant sources that may affect the quality of stormwater associated with construction activity and to identify, construct, and implement stormwater pollution prevention measures to reduce pollutants in stormwater discharges during and after construction. To meet these objectives, the SWPPP will include a description of potential pollutants, a description of methods of management for dredged sediments, and hazardous materials present on site during construction (including vehicle and equipment fuels). The SWPPP will also include details for best management practices (BMPs) for the implementation of sediment and erosion control practices. Implementation of the SWPPP will comply with state and federal water quality regulations and will reduce this impact to a less-than-significant level. Compliance with local grading and erosion control ordinances will also help minimize adverse effects associated with erosion and sedimentation. Any stockpiled soils will be watered and/or covered to prevent loss due to wind erosion as part of the SWPPP during construction and reclamation. As a result of these efforts, loss of topsoil and substantial soil erosion during the construction and

reclamation periods are not anticipated. The impact will be ***Less Than Significant***. No mitigation is required.

Cumulative Impact Analysis: ***Less Than Significant Impact***

The geographic area of this cumulative analysis is Tulare County. This cumulative analysis is based on the information provided in the Tulare County 2030 General Plan, Tulare County General Plan Background Report, and/or the Tulare County 2030 General Plan EIR.

The proposed Project site is not located on slope or adjacent to a designated waterway. The proposed Project also does not involve changes that will affect off-site hillsides or designated waterways. Therefore, ***Less Than Significant*** impacts related to this Checklist Item will occur.

Mitigation Measures: **None required.**

Conclusion: ***Less Than Significant Impact***

Implementation of the proposed Project will not cause a significant impact, potential Project-specific impacts related to this Checklist Item will be reduced to a level considered ***Less Than Significant*** and ***No Cumulative Impacts*** related to this Checklist Item will occur.

**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?**

Project Impact Analysis: ***Less Than Significant Impact***

According to the USDA NRCS Web Soil Survey, the proposed Project site is located on alluvial fan remnants, which are unlikely to become unstable.[22] Substantial grade change will not occur in the topography to the point where the proposed Project would expose people or structures to potential substantial adverse effects on, or offsite, such as landslides, lateral spreading, liquefaction or collapse. Therefore, the impact will be ***Less Than Significant***.

Cumulative Impact Analysis: ***Less Than Significant Impact***

The geographic area of this cumulative analysis is Tulare County. This cumulative analysis is based on the information provided in the Tulare County 2030 General Plan, Tulare County General Plan Background Report, and/or Tulare County 2030 General Plan EIR.

The proposed Project will have a minor impact on soil compaction. This minor compaction will have a *de minimus* impact of on-site soils. As such, ***Less Than Significant Cumulative Impacts*** related to this Checklist Item will occur.

Mitigation Measures: **None required.**

[22] USDA NRCS Web Soils Report, *Custom Soil Resource Report for Tulare County, California, Western Part*, June 2014. Appendix B

Conclusion: ***Less Than Significant Impact***

As noted earlier, the Project-specific or Cumulative Impacts related to this Checklist Item will be ***Less Than Significant***.

**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?**

Project Impact Analysis: ***No Impact***

No subsidence prone soils, oil or gas production or overdraft exists at the proposed Project area. Furthermore, soil conditions are not prone to soil instability due to their low shrink swell behavior. Compliance with the locally-adopted building code will result in ***No Project Impact.***

Cumulative Impact Analysis: ***No Impact***

The geographic area of this cumulative analysis is Tulare County. This cumulative analysis is based on the information provided in the Tulare County 2030 General Plan, Tulare County General Plan Background Report, and/or Tulare County 2030 General Plan EIR.

The proposed Project site is not located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994). As such, the proposed Project will not create a risk to life or property related to this Checklist Item throughout any stage of the Project's life span. Therefore, ***No Cumulative Impacts*** will occur.

Mitigation Measures: **None required.**

Conclusion: ***No Impact***

As noted earlier, no Project-specific or Cumulative Impacts related to this Checklist Item will occur.

**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?**

Project Impact Analysis: ***Less Than Significant Impact With Mitigation***

There is an existing septic tank and leach field on the proposed Project site. The proposed Project would install an additional septic tank to address the sewage needs of the proposed administrative offices and expansion of the existing use. The installation of a septic tank is regulated and monitored by the Tulare County Environmental Health Department (TCEHD). Upon submission of an application to install a septic system, TCEHD requires that percolation tests are performed, in accordance with U.S. Environmental Protection Agency's "Manual of Septic Tank Practice".[23] The final design will be based off the percolation

[23] U.S. Environmental Protection Agency, Public Health Service Publication No. 526.

testing results, ensuring that the soils at the proposed Project site will support the use of the septic system. By complying with existing TCEHD regulations/permit requirements through project design features and Mitigation Measures, ***Less Than Significant*** Project-specific impacts to this Checklist Item will occur.

Cumulative Impact Analysis: ***Less Than Significant Impact***

The geographic area of this cumulative analysis is Tulare County. This cumulative analysis is based on the information provided in the Tulare County 2030 General Plan, General Plan background Report, and/or Tulare County 2030 General Plan EIR.

As noted above, by complying with existing TCEHD regulations/permit requirements through project design features and implementation of Mitigation Measures, ***Less Than Significant Cumulative Impacts*** will occur.

Mitigation Measure

**6-1 Secure a permit from the Tulare County Environmental Health Department for an on-site septic disposal system and comply with permit conditions. The permit application will require an engineered design report. The engineered design report should include percolation testing and address the recommendations of the Geologic and Geotechnical Feasibility Report.**

Conclusion: ***Less Than Significant Impact With Mitigation***

As noted earlier, implementation of project design features and Mitigation Measure 6-1 will reduce impacts Project-specific impacts to a ***Less Than Significant*** level. ***Less Than Significant Cumulative Impacts***.

## DEFINITIONS

**Fault** - "A fault is a fracture in the Earth's crust that is accompanied by displacement between the two sides of the fault. An active fault is defined as a fracture that has shifted in the last 10,000 to 12,000 years (Holocene Period). A potentially active fault is one that has been active in the past 1.6 million years (Quaternary Period). A sufficiently active fault is one that shows evidence of Holocene displacement on one or more of its segments or branches (Hart, 1997)."[24]

**Liquefaction** - "Liquefaction in soils and sediments occurs during earthquake events, when soil material is transformed from a solid state to a liquid state, generated by an increase in pressure between pore space and soil particles. Earthquake-induced liquefaction typically occurs in low-lying areas with soils or sediments composed of unconsolidated, saturated, clay-free sands and silts, but it can also occur in dry, granular soils or saturated soils with partial clay content."25

[24] Tulare County General Plan 2030 Update, *Background Report*, Page 8-2
[25] Tulare County General Plan 2030 Update, *Background Report*, Page 8-2

**Magnitude** - "Earthquake magnitude is measured by the Richter scale, indicated as a series of Arabic numbers with no theoretical maximum magnitude. The greater the energy released from the fault rupture, the higher the magnitude of the earthquake. Magnitude increases logarithmically in the Richter scale; thus, an earthquake of magnitude 7.0 is thirty times stronger than one of magnitude 6.0. Earthquake energy is most intense at the point of fault slippage, the epicenter, which occurs because the energy radiates from that point in a circular wave pattern. Like a pebble thrown in a pond, the increasing distance from an earthquake's epicenter translates to reduced ground shaking."[26]

## REFERENCES

CEQA Guidelines Section 15126.2

Five County Seismic Safety Element, Summary & Policy Recommendations II, 3 and 15

State of California Department of Conservation, Alquist-Priolo Earthquake Fault Zone Maps, http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm. Accessed June, 2014

Tulare County General Plan 2030 Update, *Part 1-Goals and Policies Report*, 253

Tulare County General Plan 2030 Update, *Background Report*, Page 8-2, 8-5, 8-6, 8-7, 8-8, 8-9, 8-10

U. S. Department of Agriculture. NRCS Web Soils Report, *Custom Soil Resource Report for Tulare County, California, Western Part*, June 2014

U.S. Environmental Protection Agency, Public Health Service Publication No. 526.

U. S. Geological Survey, *Earthquake Hazards Program: Custom Mapping & Analysis Tools*, http://geohazards.usgs.gov/qfaults/ca/California.php. Accessed June, 2014.

[26] Ibid.