Geology and Soils
Chapter 3.6

SUMMARY OF FINDINGS

The proposed Project will result in ***Less Than Significant Impacts*** related to Geology and Soils. A detailed review of potential impacts is provided in the following analysis.

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 Section 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]

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, Tulare County General Plan Background Report, and/or Tulare County 2030 General Plan EIR incorporated by reference and summarized below. Additional documents utilized are noted as appropriate. A description of the potential impacts of the proposed Project

[1] 2013 CEQA Guidelines, Section 15126.2 (a)

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 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 ground shaking. 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

[2] General Plan Background Report, page 8-5
[3] Ibid.
[4] Op.Cit.

irrigation water, but evidence due to ground shaking 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 ground shaking. 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

"Ground shaking 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 ground shaking, 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 ground shaking over longer periods of time, thereby affecting a larger area. Ground shaking 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 ground shaking intensities than areas located on hard rock. Therefore, structures located in the valley will tend to suffer greater damage from ground shaking 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."[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

[5] Op. Cit. 8-9
[6] Op. Cit.
[7] Op. Cit. 8-7

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 experience greater ground shaking intensities than areas located on hard rock. Therefore, structures located in the valley will tend to suffer greater damage from ground shaking 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

[8] Op. Cit. 8-6 and 8-7
[9] Op. Cit. 8-8
[10] Op. Cit. 8-7

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]

Soils in Cutler-Orosi

"The Cutler and Orosi area is composed of primarily two soils: Exeter loam and Greenfield sandy loam… Both soils are considered to be "prime" agricultural soils (class I, II, or III). Exeter loam comprises 85 percent of the planning area and Greenfield sandy loam the other 15 percent.

Exeter loam is a class III agricultural soil. Its primary limitation for urbanization and agriculture is the existence of hardpan at a depth of about 30 inches. Typically for agricultural uses, the soil is "ripped" to provide for root and water penetration. The moderately slow permeability and existence of hardpan create "severe" conditions for septic tanks and drainage. The soil is "moderately" suited for building sites and "poorly" suited for streets and roads due to high clay content.

Greenfield sandy loam is located in the northwest quadrant of Orosi. It is a class I agricultural soil which is well-suited for urbanization, including buildings, streets and roads, and septic tanks."[13]

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 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,

[11] Op. Cit. 8-9
[12] Op. Cit. 8-10
[13] Cutler-Orosi Community Plan, page 26

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."[14]

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."[15]

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 [in order] to reduce the hazards associated with fault rupture and to prohibit the location of most structures for human occupancy across these traces."[16]

Local Policy & Regulations

Tulare County General Plan Policies

The Tulare County General Plan has a number of policies that apply to projects within County of Tulare. 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.

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

[14] Geology and Soils Assessment, page 13
[15] General Plan Background Report, page 8-3
[16] Ibid. 8-3

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:

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.

ii) Strong seismic ground shaking?

iii) Seismic-related ground failure, including liquefaction?

iv) Landslides?

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

According to the Geologic and Geotechnical Feasibility Report, the site is "classified as a stiff soil (D) per the 2010 CBD, with standard penetration resistance, N-values averaging between 15 and 50 blows per foot for the upper 100 feet BSG. A design basis ground acceleration of 0.17g was estimated for the site… This level of seismic ground shaking is typical the area of the subject site and is relatively low compared to other areas of California… The current CBC includes seismic design requirements for structures. No other mitigation for seismic ground shaking (exclusive of liquefaction and seismic settlement) would be anticipated for the proposed building"[17]

"Liquefaction and seismic settlement are conditions that can occur under seismic shaking from earthquake events. Liquefaction describes a phenomenon in which a saturated, cohesion less soil loses strength during an earthquake as a result of inducing shearing strains. Lateral and vertical movements of the soil, mass, combined with loss of bearing usually results. Fine, well sorted, loose sand, shallow groundwater conditions, higher intensity earthquakes, and particularly long duration of ground shaking are the requisite conditions for liquefaction. One of the most common phenomena that occurs during seismic shaking is the induced settlement of loose, unconsolidated sediments. This can occur in unsaturated and saturated granular soils; however, seismic settlements are typically largest where liquefaction occurs (saturated soils)."[18]

[17] Geologic and Geotechnical Feasibility Report, page 7 to 8
[18] Ibid. 8

"Lateral spreading can occur with seismic ground shaking on slopes where saturated soils liquefy. It is anticipated that the proposed development would be fairly flat, and that the development would not create significant slopes. Due to the relatively flat nature of the building areas, the potential for lateral spreading is considered less than significant."[19]

"Due to the relatively flat nature of the site, the potential for landslides (seismic or seismically induced) is considered less than significant to the proposed project."[20]

Less Than Significant Project-specific Impacts With Mitigation related 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.

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

Mitigation Measure(s):

6-1 Comply with the seismic design requirements of the most recent edition of the CBC.

6-2 Complete a geotechnical design investigation for project foundation design and subgrade preparation which addresses the recommendation of the Geologic and Geotechnical Feasibility Report.

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

As noted earlier, ***Less Than Significant Project-specific With Mitigation*** related to this Checklist Item will occur. ***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 Project site is not located on a slope and is not located along a stream, river, or other designated waterway. The site is primarily flat and soil erosion is not anticipated. Although, there is an irrigation channel west of the Project site, the Proposed Project does not involve any changes that will affect the adjacent irrigation channel.

"According to the Natural Resources Conservation Web Soil Survey (WSS), the site is underlain by Exeter loam, 0 to 2 percent slopes and Hanford sandy loam, 0 to 2 percent slopes. The WSS indicated a "slight' rating for these soils meaning that erosion is unlikely under ordinary climate conditions. During construction of the project grading and excavation of site soils will increase the risk of erosion and loss of topsoil and would be a potentially significant impact. Typical erosion mitigation measures include the use of Best Management Practices (BMPs) for erosion control and a site specific Storm Water Pollution Prevention

[19] Op. Cit. 8
[20] Op. Cit. 9

Plan (SWPPP), if applicable based on size of the projects, to address temporary impacts during construction. Post construction erosion mitigation for this project should be addressed in the project civil plans and would likely include surface treatments such as paving and a storm water collection, distribution, and storage system comprising graded swales, inlets, and piping to a storm water basin. Operational dust control should be employed in areas without surface treatment to reduce erosion.

Considering the WSS erosion rating, the relatively flat and level ground surface at the site, and the anticipated post construction site use, post construction erosion and/or loss of topsoil is considered less than significant with mitigation for the proposed project."[21]

Therefore, ***Less Than Significant Project-specific Impacts With Mitigation*** 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.

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

Mitigation Measure:

6-3 Comply with construction BMPs for erosion and a SWPPP (if required) during construction. Provide sound civil design for surface water management, and employ post-construction operational controls to limit erosion, such as dust control.

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

As noted earlier, ***Less Than Significant Project-specific Impacts*** related to this Checklist Item will occur with mitigation. ***Less Than Significant Cumulative Impacts*** are anticipated without mitigation.

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 with Mitigation***

As noted in the Response to 3.6 a), due to the relatively flat nature of the building areas, the potential for lateral spreading is considered ***Less Than Significant***.

"Due to the relatively flat nature of the site, the potential for landslides (seismic or seismically induced) is considered less than significant to the proposed project."[22]

[21] Op. Cit.
[22] Op. Cit.

"The most common measures to mitigate compressible and collapsible soils and reduce the potential for excessive static settlement is to over-excavate the soils from within a foot or more below the anticipated elevation of the bottom of new foundations, and place these soils or imported soils as compacted engineered fill to support the new foundations. In more extreme cases with high predicted static settlements, potential future settlement below buildings can be mitigated using deep foundations (drilled piers, driven piles, etc.). Based on the anticipated loads from the proposed one-story structures, deep foundations would not be anticipated for this project. Settlement analyses should be conducted in conjunction with the future geotechnical engineering investigations for this site, and used to develop foundation design and site preparation recommendations.

Areas in the western portion of the San Joaquin Valley have historically been subject to land subsidence as a result of groundwater withdrawal; however, areas such as Cutler, on the east side of the valley, are not near areas of recognized subsidence (Ireland, R.L., 1984). Thus, the potential for subsidence to impact the project is considered less than significant."[23]

With the implementation of **Mitigation Measures 6-1 and 6-2**, ***Less Than Significant Project-specific Impacts*** related 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.

The proposed Project will have a minor impact on soil compaction on the Project site. This minor compaction will not impact off-site soils. Although the Proposed Project will include minor amounts of excavation for a few footings, this excavation will not impact the soils in the immediate area. Therefore, ***Less Than Significant Cumulative Impacts*** to this Checklist Item will occur.

Mitigation Measure(s): ***See Mitigation Measures 6-1 and 6-2.***

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

As noted earlier, with the implementation of **Mitigation Measures 6.1 and 6-2**, ***Less Than Significant Project-specific Impacts*** will occur. ***Less Than Significant Cumulative Impacts*** will occur.

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: ***Less Than Significant Impact***

"The near surface soils are silty sands. The results of our previous investigation of the site do not indicate the presence of potentially expansive soils in the near surface soils. Thus, it is not anticipated that typical mitigation measures for expansive soils (include placement of imported, non-expansive engineered fills below interior and exterior slabs on grade would be

[23] Op. Cit. 6

required for the proposed improvements."[24] ***Less Than Significant Project-specific Impacts*** related 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.

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

Mitigation Measure(s): ***None Required.***

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

Potential ***Less Than Significant Project-specific and Cumulative Impacts*** 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 on the Project site. The proposed Project would include an additional septic tank to address the sewage needs of the administrative offices and expansion of the existing use. The geology report noted silty sand and hard pan.

"In general, these soils would be anticipated to provide suitable percolation characteristics for leach field type disposal systems. The exception to this is that the portion of the leach line sidewall area occupies by the cemented soils should be discounted for determining the required absorption area. It will be important for future septic design investigations to assess the percolation capacity of the soils and the impact of cemented soils on the overall disposal capacity of the leach lines. Some areas of the site may have cemented soils which severely limit the disposal capacity of leach lines."[25] There are no restrictions on the use of leach field type disposal systems for the site area; however, a new septic system will need and engineered design and a permit from environmental health. ***Less Than Significant Project-specific Impacts With Mitigation*** related 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.

With Mitigation, ***Less Than Significant Cumulative Impacts*** will occur.

Mitigation Measure

[24] Op. Cit. 6
[25] Op. Cit. 8

6-4 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 Mitigation Measure 6-4 will reduce impacts Project-specific impacts to a ***Less Than Significant*** level. ***Less Than Significant Cumulative Impacts*** will occur.

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)."[26]

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."[27]

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."[28]

REFERENCES

Tulare County 2030 General Plan, August 2012

Tulare County 2030 General Plan Background Report, February 2010

2013 CEQA Guidelines

Geologic and Geotechnical Engineering Feasibility Report, Moore Twining Associates, Inc., August 13, 2013

[26] General Plan Background Report, page 8-2
[27] Ibid.
[28] Op. Cit.