D. Engineering Geologist. The engineering geologist shall provide professional inspection within such engineer’s area of technical specialty, which shall include professional inspection of the bedrock excavation to determine if conditions encountered are in conformance with the approved report. Revised recommendations relating to conditions differing from the approved engineering geology report shall be submitted to the soils engineer.

E. Permittee. The permittee shall be responsible for the work to be performed in accordance with the approved plans and specifications and in conformance with the provisions of this Code, and the permittee shall engage consultants, if required, to provide professional inspections on a timely basis. The permittee shall act as a coordinator between the consultants, the contractor and the building official. In the event of changed conditions, the permittee shall be responsible for informing the building official of such change and shall provide revised plans for approval.

F. Building Official. The building official may inspect the project at the various stages of the work requiring approval to determine that adequate control is being exercised by the professional consultants.

G. Notification of Noncompliance. If, in the course of fulfilling their responsibility under this chapter, the civil engineer, the soils engineer, or the engineering geologist finds that the work is not being done in conformance with this chapter or the approved grading plans, the discrepancies shall be reported immediately in writing to the permittee and to the building official. Recommendations for corrective measures, if necessary, shall also be submitted.

H. Transfer of Responsibility. If the civil engineer, the soils engineer, or the engineering geologist of record is changed during the course of the work, the work shall be stopped until:

1. The civil engineer, soils engineer, or engineering geologist, has notified the building official in writing that they will no longer be responsible for the work and that a qualified replacement has been found who will assume responsibility.

2. The replacement civil engineer, soils engineer, or engineering geologist notifies the building official in writing that they have agreed to accept responsibility for the work.

4.6.4 Impacts and Mitigation Measures

This section describes the methodology used in conducting the CEQA impact analysis for geology and soils, the thresholds of significance used in assessing impacts to geology and soils, and the assessment of impacts to geology and soils, including relevant mitigation measures.

Methodology

This section describes the potential geology and soils impacts associated with development of the proposed project. This analysis first established baseline conditions for the affected environment relevant to geology and soils, as presented above in Section 4.6.2 (Environmental Setting). These baseline conditions were evaluated based on their potential to be affected by construction activities as well as operation and maintenance activities for the proposed project. As described in Sections 3.7 (Construction), 3.8 (Operation and Maintenance Activities), and 3.9 (Decommissioning and Repowering), activities that are reasonably expected to occur throughout the life of the proposed project, including construction and installation of WTGs, operation and maintenance, and decommissioning, may extend over a period of 30 years. The predicted interactions between the
affected environment and project activities are evaluated based on the significance criteria identified below (Thresholds of Significance).

Thresholds of Significance

The Kern County CEQA Implementation Document and Kern County Environmental Checklist state that a project would have a significant impact on Geology and Soils if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - 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;
  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction;
  - Landslides;
  - Result in substantial soil erosion or loss of topsoil;
  - 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;
  - Be located on expansive soil, as defined in Section 1802.3.2 of the California Building Code (2007), creating substantial risks to life or property; or
  - Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

Project Impacts

Impact 4.6-1: Expose People or Structures to Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving the Rupture of a Known Earthquake Fault

The proposed project site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone where site-specific studies addressing the potential for surface fault rupture are required (Kleinfelder, 2010). The closest faults mapped within an Alquist-Priolo Earthquake Fault Zone are the Garlock Fault Zone (12.6 miles to the southeast) and the San Andreas Fault Zone (43 miles to the southwest). The White Wolf fault, which has evidence of historic displacement, is 9.5 miles to the southwest (Kleinfelder, 2010). Given the proximity of the project site to the Garlock and White Wolf faults and the overall seismic activity in the region, structures on the project site may be subject to moderate to severe ground shaking, which may result in structural damage. Structural damage to WTGs, overhead transmission lines, or other project facilities could injure workers at the proposed project site. Therefore, impacts from seismic hazards are considered potentially significant and mitigation would be required.

Mitigation Measures

**MM 4.6-1** Prior to the issuance of building or grading permits, the project proponents shall conduct a full geotechnical study to evaluate soil conditions and geologic hazards on the project site and submit it to the Kern County Engineering, Surveying, and Permit Services Department for review and approval. The geotechnical study must be
signed by a California-registered professional engineer and must identify the following:

- Location of fault traces and potential for surface rupture;
- Maximum considered earthquake and associated ground accelerations;
- Potential for seismically induced ground shaking, liquefaction, landslides, differential settlement, and mudflows;
- Stability of existing cut-and-fill slopes;
- Collapsible or expansive soils;
- Foundation material type;
- Potential for wind erosion, water erosion, sedimentation, and flooding;
- Location and description of unprotected drainage that could be impacted by the proposed development; and
- Recommendations for placement and design of facilities, foundations, and remediation of unstable ground.

The project proponents shall determine the final siting of project facilities based on the results of the geotechnical study and implement recommended measures to minimize geologic hazards. The project proponents shall not locate project facilities on or immediately adjacent to a fault trace. The Kern County Engineering, Surveying, and Permit Services Department will evaluate any final facility siting design developed prior to the issuance of any building or grading permits to verify that geological constraints have been avoided.

**Level of Significance after Mitigation**

Impact would be less than significant.

**Impact 4.6-2: Expose People or Structures to Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Strong Seismic Ground Shaking**

As described in Section 4.6.2, the Garlock, White Wolf, and San Andreas faults, are located 6 miles, 9.5 miles, and 43 miles, respectively, from the proposed project site. Due to the proximity of the project to these active faults, the proposed project site would likely experience strong ground shaking resulting from moderate to strong earthquakes during the lifetime of the project. While the shaking would be less severe from an earthquake that originates farther from the project site, the effects could potentially be damaging to project infrastructure. It is likely that the proposed project would be subjected to at least a moderate or larger earthquake occurring close enough to produce strong ground shaking at the project location. Therefore, this impact is considered potentially significant; however, the project proponent is required to design all WTGs and associated infrastructure to withstand substantial ground shaking in accordance with applicable California Building Code seismic design standards, Kern County Building Code, Chapter 17, and as recommended by a California registered professional engineer in the site-specific geotechnical review.

**Mitigation Measures**

The project would comply with the goals, policies, and implementation measures of the KCGP. No additional mitigation measures are proposed.
Level of Significance

Impact would be less than significant.

Impact 4.6-3: Expose People or Structures to Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Seismic-related Ground Failure, Including Liquefaction

Due to the presence of faults that have displaced recent alluvial deposits in the project area, seismic-related ground failure has the potential to result in surface rupture at or near the proposed project site. Seismic event(s) also have the potential to result in liquefaction, which occurs when saturated granular sediments temporarily lose their shear strength. As described in Section 4.6.2, the potential for seismically induced liquefaction to occur on either the North Sky site or the Jawbone site is considered minimal due to the depth to groundwater and the siting of towers where bedrock is at or near the ground surface. However, because of the potential for seismic-related ground surface rupture to occur at or near the project site, impacts from seismic-related ground failure would be considered potentially significant and mitigation would be required.

Mitigation Measures

Implement Mitigation Measure 4.6-1.

Level of Significance after Mitigation

Impact would be less than significant.

Impact 4.6-4: Expose People or Structures to Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death Involving Landslides

Strong shaking has the potential to activate landslides on hillsides (particularly the steeper bluffs along the ridgelines of the Jawbone study area boundary), slope failures on creek banks, and tension cracking in areas underlain by loose, low-density soil, such as extensive fill. This potential impact would more likely occur immediately following construction activities. During construction of the proposed project, destabilization of natural or constructed slopes could occur as a result of excavation and/or grading activities. Unmapped landslides and areas of localized slope instability may also be encountered, particularly during installation of project facilities. Excavation operations associated with construction of WTG foundations and grading operations for temporary and permanent access roads, as well as construction activities in areas of hilly or sloping terrain could result in slope instability, landslides, soil creep, or debris flows. Geotechnical studies would be required for final siting of project infrastructure in order to identify site-specific geologic conditions. Impacts from hazards associated with landslides would be potentially significant and mitigation would be required.

Mitigation Measures

MM 4.6-2: Prior to the issuance of grading and building permits, the project proponents shall demonstrate compliance with the following:

(a) The project proponents shall design cut/fill slopes for an adequate factor of safety, considering material type and compaction, identified during the site-specific geotechnical study. The slope of cut surfaces shall be no steeper than
2:1 (horizontal to vertical), unless the project proponents furnish a soils engineering or an engineering geology report, or both, stating that the site has been investigated and given an opinion that a cut at a steeper slope will be stable, if acceptable stabilization methods are employed and it will not create a hazard to public or private property. Other potential considerations would include structures set back from the slopes, and subsequent design recommendations.

(b) The project proponents shall avoid locating roads and structures near landslide and mudflow areas. Where avoidance of landslide areas is not feasible, the project proponents shall construct relatively flat cut-and-fill at slopes not to exceed 2:1 (horizontal to vertical), or 26 percent, or flatter.

(c) The project proponents will not locate turbines, transmission lines, and/or associated structures across faults, lineaments, or unstable areas.

Level of Significance after Mitigation

Impact would be less than significant.

Impact 4.6-5: Result in Substantial Soil Erosion or Loss of Topsoil

Excavation and grading for WTG foundations, work areas, and access roads could loosen soil or remove stabilizing vegetation and expose areas of loose soil. These areas, if not properly stabilized during construction, could be subject to increased soil loss and erosion by wind and stormwater runoff. As described in Section 4.6.2, ridge tops (where the WTGs would likely be sited) generally consist of bedrock outcrops, whereas increasing thicknesses of alluvium and colluvium sediments are present on the lower flanks and valleys. Due to these soil characteristics, the potential for wind erosion to affect the structural integrity of project features would be low. As described in Section 4.9 (Hydrology and Water Quality), the placement of proposed project infrastructure is not expected to result in substantial erosion related to stormwater runoff.

In compliance with the federal CWA as well as regulations of the State Water Resources Control Board (SWRCB), a SWPPP including site-specific BMPs for erosion and sediment control, would be developed and implemented for the proposed project.

Pursuant to 19.64.140 (Wind Energy Combining District - Development Standards and Conditions) of the Kern County Zoning Ordinance, prior to the issuance of any grading permit, a project proponent is required to submit a plan, prepared by a registered civil engineer or other professional, for the mitigation of potential soil erosion and sedimentation and submit it to the Director of the Engineering, Surveying, and Permit Services Department for review and approval. At a minimum, the plan is required to include: a) provisions for site revegetation, including any necessary re-soiling; b) proposed plant species; c) proposed plant density and percentage of ground coverage; d) the methods and rates of plant seed application; and e) sediment collection facilities as may be required by the Engineering, Surveying, and Permit Services Department. Furthermore, the soil erosion and sedimentation control plan is to be consistent with the applicable requirements of the Regional Water Quality Control Board (RWQCB) pertaining to the project’s SWPPP.

Notwithstanding the foregoing, the revegetation portion of the soil erosion and sedimentation plan will need to be prepared by a professional biologist or other professional approved, prior to review and approval of the soil erosion and sedimentation plan by the Engineering, Surveying, and Permit Services Department. The plan will also need to include a timetable for full implementation,
estimated costs, and a surety bond or other security as approved by the Engineering, Surveying, and Permit Services Department in an amount determined by that department to guarantee plan implementation. The security will remain on file with the Engineering, Surveying, and Permit Services Department until that department has verified that the plan has been successfully implemented.

**Mitigation Measures**

The project would comply with the goals, policies, and implementation measures of the KCGP and Kern County Zoning Ordinance. No additional mitigation measures are proposed.

**Level of Significance**

Impact would be less than significant.

**Impact 4.6-6: 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**

The potential for the site soils to experience liquefaction during a seismic event is considered low due to the high relative density of the soil and the absence of groundwater from the ground surface to a depth of at least 50 feet on the North Sky River site and due to the presence of bedrock at the Jawbone Canyon site, as described above under Impact 4.6-3.

As previously discussed, lateral spreading typically occurs adjacent to free faces such as slopes and creek channels. With the low potential for liquefaction at the project site, on-site lateral spreading would be highly unlikely.

Seismically induced settlement is dependent on the relative density of the subsurface soils, and would not occur on surface or near surface bedrock (where the WTGs would most likely be sited).

A geotechnical assessment for soils at the proposed project site would be conducted prior to final design and approval of the project, and would be used in determining final siting of project infrastructure. Ideal soil conditions should have low to moderate shrink-swell potential and should not include expansive soils. Based on feasibility-level geotechnical investigations conducted at the proposed project site, existing soils at the project site exhibit low probability for shrink-swell patterns, or expansive characteristics (Kleinfelder, 2010).

As described under Impact 4.6-3, portions of the proposed project site are located within 6 miles of the Garlock Fault Alquist-Priolo Special Study Zone, and seismic-related ground failure may result in surface rupture near the proposed project site. Such event(s) could potentially result in damage to project facilities/structures, introducing the potential to subsequently result in on- or off-site landslide, liquefaction, or collapse. In order to avoid such an occurrence, a geotechnical evaluation would be required to avoid locating project infrastructure on unstable or potentially unstable geologic units or soils.

**Mitigation Measures**

Implement Mitigation Measure 4.6-1.
Level of Significance after Mitigation

Impact would be less than significant.

**Impact 4.6-7: Be Located on Expansive Soil, as Defined in Section 1802.3.2 of the California Building Code (2007), Creating Substantial Risks to Life or Property**

During geologic reconnaissance of the site, no expansive soils were observed; however, future subsurface exploration at the specific tower sites may encounter shear zones in the near surface granitic bedrock that may contain clay. Expansive soils may cause differential and cyclical foundation movements that can cause damage and/or distress to structures and equipment. In addition, potential impacts associated with loose sands or other compressible soils include excessive settlement, low foundation-bearing capacity, and limitation of year-round access to Project facilities. Implementation of MMs 4.6-1 and 4.6-3 is required to ensure that impacts would be less than significant.

**Mitigation Measures**

Implement Mitigation Measure 4.6-1.

**MM 4.6-3:** Utility lines shall be designed to withstand vertical and horizontal displacement. If determined necessary by the findings of the site-specific geotechnical study, the project proponents shall remove and replace shrink-swell soils with a non-expansive or non-collapsible soil material.

Level of Significance after Mitigation

Impact would be less than significant.

**Impact 4.6-8: Have Soils that are Incapable of Adequately Supporting the Use of Septic Tanks or Alternative Wastewater Systems Where Sewers are Not Available for the Disposal of Wastewater**

As described above in Section 3.5 (Proposed Project Characteristics), a septic system and leach line would be used for sewage treatment of the proposed project’s permanent Operation and Maintenance (O&M) Facility. The septic system and leach lines would be located away from surface drainages and protected from potential surface runoff. If located in the older alluvial soils, leach line wastewater infiltration would be slow due to the dense soils, while the younger alluvial, sandy soils would experience moderate to fast wastewater infiltration. Proper siting and design would minimize potential for a health impact from flooding. The septic system and leach field would be constructed to comply with applicable requirements of the Kern County Environmental Health Services Department. If not designed correctly, septic systems could result in health impacts, adversely affect natural habitat, and pollute groundwater. This impact is therefore considered to be potentially significant and mitigation is required.
Mitigation Measures

MM 4.6-4: Prior to the issuance of any building permit for the Operation and Maintenance Facility or Facilities, the project proponents shall obtain all required permits and approvals from the Kern County Environmental Health Services Department, and shall implement all required conditions including but not limited to the set-back of project sewage system(s) from area fault traces and drainages.

Level of Significance after Mitigation

Impact would be less than significant.

Cumulative Setting Impacts and Mitigation Measures

Cumulative Setting

The geographic scope for considering cumulative impacts to Geology and Soils includes the extent of the project site because impacts to geology and soils are site-specific. For this project, cumulative impacts to soil erosion and topsoil loss are considered at a larger, watershed level. Impacts of the proposed project would be cumulatively considerable if they would have the potential to combine with similar impacts of other past, present, or reasonably foreseeable projects. As described in Section 3.11, most cumulative projects are characterized as other wind energy projects in the Tehachapi Wind Resource Area.

Impact 4.6-9: Contribute to Cumulative Geologic and Soils Impacts

With regard to the project’s potential to expose people or structures to hazards associated with the rupture of a known earthquake fault or from strong seismic groundshaking, damage to WTGs and associated project facilities could occur from direct rupture of a fault in the project area. In the event of such an earthquake, structural damage to WTGs, overhead transmission lines, and other associated facilities from the project could injure workers at the proposed project site. However no fault traces exist within several miles of the project site, and the project would be required to construct project facilities in conformance with relevant building codes, which would minimize placement of structures in active faults zones. As such, when combined with similar impacts of past, present, or reasonably foreseeable projects, proposed project impacts are not expected to result in a significant cumulative impact.

With regard to the proposed project’s potential to expose people or structures to hazards associated with seismic-related ground failure, including liquefaction, it is possible that ground rupture and/or failure could occur in the project area, and that such an event could result in damage to project infrastructure. However, such an impact would be site-specific, and would be reduced to less-than-significant levels with the implementation of MM 4.6-1. Therefore, this potential impact would not be expected to combine with similar impacts of past, present, or reasonably foreseeable projects to result in a cumulative impact.

Regarding the proposed project’s potential to expose people or structures to hazards associated with landslides, destabilization of slopes could occur during construction of project infrastructure. However, implementation of MM 4.6-2 would reduce the potential for structures to be subject to landslides or slope instability. Therefore, this impact of the proposed project impacts would not have the potential to combine with similar impacts of past, present, or reasonably foreseeable projects to result in a cumulative impact.
Regarding the proposed project’s potential to result in substantial soil erosion or loss of topsoil, the characteristics of soil at the proposed project site indicate that the potential for substantial erosion or loss of topsoil would be low. This impact is not expected to combine with similar impacts of other cumulative projects located in the Jawbone Canyon watershed; implementation of measures of the KGCP would reduce this impact of the proposed project to less-than-significant levels. Additionally, the project would be required to implement a SWPPP, which would include site-specific BMPs for erosion and sediment control, reducing this cumulative impact to a less-than-significant level.

With regard to the proposed project’s potential to place infrastructure on soil that is unstable or expansive, geotechnical assessments at the project site would be conducted prior to construction to assure that soils are suitable for the placement of project infrastructure. MM 4.6-3 would further reduce the impacts of expansive soils on project infrastructure. With regard to the proposed project’s potential to have soils incapable of adequately supporting the use of septic tanks, compliance with MM 4.6-4 would reduce this site-specific impact to less than significant. Therefore, these impacts would not have the potential to combine with similar impacts of past, present, or reasonably foreseeable projects to result in a cumulative impact.

The proposed project site is not located in a populated area and, in compliance with WE Combining District requirements, project facilities would be set back from any existing residences, as would other wind energy projects in the cumulative scenario. All projects in the cumulative scenario are subject to the requirements of laws and regulations described in Section 4.6.3, which would mitigate project impacts, including as related to geology and soils.

**Mitigation Measures**

Implement Mitigation Measures 4.6-1 through 4.6-4.

**Level of Significance after Mitigation**

Cumulative impacts would be less than significant.