
8.0 GEOLOGY AND SOILS

This section describes the current geologic and soil conditions at each of the Dollar General project sites and analyzes issues related to geology and soils. Geotechnical studies have been prepared for each site, which include direct observation, soil borings, and laboratory testing of soil samples (Holdrege and Kull 2014b, 2015b, 2015c; see **Appendices 8.0-A** through **8.0-C**). The information and recommendations from each report have been incorporated into the setting and impact analysis for each site. This section also addresses mineral resources and paleontological resources.

8.0 GENERAL ENVIRONMENTAL CONDITIONS AND REGULATIONS

The following description of regional environmental conditions and applicable regulations, policies, and standards applies to each of the project sites.

8.0.1 REGIONAL ENVIRONMENTAL SETTING

Geology

The project sites are located in the Sierra Nevada foothills, along the western edge of the Sierra Nevada geomorphic province. High elevations in this area are predominantly granitic and metamorphic rocks which transition into the low foothills, terraces, and alluvial-filled valleys in the Central Valley geomorphic province. Bedrock units that dip west toward the Central Valley characterize the area. Cenozoic era (up to 65 million years old) sedimentary rocks, volcanic mudflow deposits, and young sediments comprise the uppermost 4,000 feet of Central Valley fill.

The Sierra Nevada region, like most of California, is a seismically active region. Seismicity is due to complex regional tectonic processes that include movement along major crustal plates and uplift and volcanism in the Sierra Nevada rock. The Foothills fault system, a major zone faulting in basement rock in the western Sierra Nevada, is the major regional geologic feature in the area. It was formed during the Mesozoic era (225 to 65 million years ago) in response to the deformation in the Sierra Nevada.

The Alquist-Priolo Earthquake Fault Zone Map prepared by the California Geological Survey indicates that the project sites are not located within any designated Alquist-Priolo Earthquake Fault Zones. Each project site is within the Foothills fault system, which is designated as a Type C fault zone, with low seismicity and a low rate of recurrence. The risk of seismically induced hazards such as slope instability, liquefaction, and surface rupture at the three sites is remote (Holdrege and Kull 2014b, 2015b, 2015c).

The Foothills fault system is capable of producing an earthquake with a maximum magnitude 6.5. The closest known active fault that has surface displacement within Holocene time (about the last 11,000 years) is the Cleveland Hill fault, which is part of the Foothills fault system. The fault is over 20 miles northwest of the project sites.

Several historic earthquakes have produced noticeable ground shaking in the Sierra Nevada foothills region. In 1975, a magnitude 6.2 earthquake occurred on the Cleveland Hill fault. The event was strongly felt in the Grass Valley/Penn Valley area; however, no major damage or injuries were reported (Holdrege and Kull 2015b, 2015c).

Mineral Resources

The State Geologist has classified aggregate resources in Nevada County into mineral resource zones (MRZs) in accordance with the State Mining and Reclamation Act. The MRZ-2 classification is defined as an area where adequate information indicates significant mineral deposits are

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present, or where it is judged that a high likelihood for their presence exists. None of the project sites is located in an area mapped as MRZ-2 for any mineral commodity (Loyd and Clinkenbeard 1990: Plate 2a).

Paleontological Resources

Paleontological resources are fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. Rock formations that yield significant vertebrate or invertebrate fossil remains are considered to have paleontological sensitivity. The project sites are generally underlain by igneous and metamorphic bedrock, which have low potential to contain fossils.

8.0.2 REGULATORY FRAMEWORK

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 (originally enacted as the Alquist-Priolo Special Studies Zones Act and renamed in 1994) and is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. There are no earthquake fault zones subject to the Alquist-Priolo Earthquake Fault Zoning Act in the area of the project sites (Holdrege and Kull 2014b, 2015b, 2015c).

California Building Standards Code

The state of California provides minimum standards for building design through the California Building Standards Code (CBSC [California Code of Regulations, Title 24]). The CBSC is based on the Uniform Building Code (UBC), which is used widely throughout the United States (generally adopted on a state-by-state or district-by-district basis) and was modified for conditions in California. State regulations and engineering standards related to geology, soils, and seismic activity are reflected in the CBSC requirements. Through the CBSC, the state of California provides a minimum standard for building design and construction. The CBSC contains specific requirements for seismic safety, excavation, foundations, retaining walls, and site demolition. It also regulates grading activities, including drainage and erosion control.

Geotechnical investigation is required by Chapter 18, Section 1803.2 of the CBSC, which would apply to the proposed project. Per Section 1803.3, the geotechnical investigations are required to be based on observation and any necessary tests of the materials disclosed by borings, test pits, or other subsurface exploration. The geotechnical investigations are also required to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction, and expansiveness. Section 1803.6(5) requires that the geotechnical investigations include recommendations for foundation type and design criteria, including but not limited to: bearing capacity of natural or compacted soil; provisions to mitigate the effects of expansive soils; mitigation of the effects of liquefaction, differential settlement, and varying soil strength; and the effects of adjacent loads.

The County enforces the CBSC through the County Building Code (Nevada County Land Use and Development Code, Chapter V).

General Construction Activity Stormwater Permit

The State Water Resources Control Board (SWRCB) has adopted a General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit) (CAS000002, Waste Discharge Requirements, Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ and Order 2012-0006-DWQ). The General Permit applies to any construction activity affecting 1 acre or more. While the focus of the permit is to minimize the potential effects of construction runoff on receiving water quality, erosion control is a key element of permit requirements. The permit requires preparation of a stormwater pollution prevention plan (SWPPP) that identifies best management practices (BMPs) describing erosion control measures. Examples of typical construction BMPs to address erosion include using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils. Section 11.0, Hydrology and Water Quality, describes the permit in greater detail.

Local

Nevada County General Plan

The Safety and Soils elements of the General Plan contain the following policies (or relevant excerpts thereof) concerning geologic/soil hazards and erosion:

- Policy GH-10.2.1 Ensure that new construction meets current structural and safety standards.
- Policy GH-10.2.2 The project review shall consider the need to mitigate development in such areas in accordance with federal, state and local standards. As part of the project site review process, require sufficient soils and geologic investigations to identify and evaluate the various geologic and seismic hazards that may exist for all proposed development, including subdivisions. Such investigations shall be required within an area determined to be seismically active by the State Department of Conservation – California Geological Survey, or within an area having potential geologic hazards, including slope instability and excessive erosion.
 - Policy GH-10.2.1.3 Carry out the requirements of the California Building Code, particularly with regard to seismic design.
 - Policy GH-10.2.1.4 Require that underground utility lines, particularly water and natural gas mains, be designed to withstand seismic forces.
- Policy 12.1 Enforce Grading Ordinance provisions for erosion control on all new development projects by adopting provisions for ongoing monitoring of project grading. Project site inspection shall be required prior to initial site disturbance and grading to ensure all necessary control measures, including proper staking and tree protection measures, are in place. The installation, maintenance, and performance of erosion and sedimentation control measures shall be monitored by County or District staff (or their designee) and completely funded by a project applicant. All County projects shall comply with this policy.
- Policy 12.4 Require erosion control measures as an element of all County contracts, discretionary projects, and ministerial projects.

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Nevada County Land Use and Development Code

Chapter V, Article 19 – Grading

The Nevada County Land Use and Development Code, Chapter V, Article 19, sets forth rules and regulations to control excavation, grading, and earthwork construction, including fills and embankments; establishes standards of required performance in preventing or minimizing water quality impacts from stormwater runoff; establishes the administrative procedure for issuance of permits; and provides for approval of plans and inspection of grading construction, drainage, and erosion and sediment controls at construction sites.

Chapter II, Article 4 – Steep Slopes/High Erosion Potential

The Nevada County Land Use and Development Code, Chapter II, Article 4.0, Section L-II 4.3.13 includes standards to preserve the natural, topographic, and aesthetic characteristics of steep slopes. Standards are also included to minimize soil erosion, water quality impacts, earth movement and disturbance, and the adverse impact of grading activities, while providing for reasonable use of private property. The standards include requirements for grading permits, limited development on steep slopes, and an erosion and sediment control plan.

Chapter VI, Article I – Sewage Disposal

The Nevada County Land Use and Development Code, Chapter VI, Article I, Sections L-VI 1.1 et seq. regulate the installation and operation of septic systems in the county. On-site septic systems require a county permit. Soil testing is required, and a site approval report must be submitted to the county before a sewage disposal system permit application for a new installation can be submitted. Property owners are required to monitor and maintain the system.

8.0.3 IMPACT METHODOLOGY

Standards of Significance

The impact analysis provided below is based on the following State CEQA Guidelines Appendix G thresholds of significance, which state that a project would have a significant impact on geology and soils if it would:

- 1) 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 California Geological Survey (formerly Division of Mines and Geology) Special Publication 42.
 - ii) Strong seismic ground shaking.
 - iii) Seismic-related ground failure, including liquefaction.
 - iv) Landslides.
- 2) Result in substantial soil erosion or the loss of topsoil.

- 3) 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.
- 4) Be located on expansive soil, as defined in Section 1803.5.3 of the 2013 California Building Code, creating substantial risks to life or property.
- 5) 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.
- 6) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.
- 7) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Methodology

Geotechnical studies have been prepared for each of the sites, which include direct observation, soil borings, and laboratory testing of soil samples. The information and recommendations from each report has been incorporated into the setting and impact analysis for each site.

Thresholds Not Evaluated

There are no Alquist-Priolo Earthquake Fault Zones at any of the sites, and the geotechnical studies did not find any evidence of other conditions that would result in fault rupture. There would be no impact relative to Standard of Significance 1-i, and this impact is not further evaluated for any of the project sites.

The Penn Valley site would connect to the existing force main within Penn Valley Drive adjacent to the site, which is operated by the Nevada County Sanitation District 1, and conveyed to the Lake Wildwood Wastewater Treatment Plant for further treatment and disposal. There would be no impact related to septic systems for the Penn Valley site relative to Standard of Significance 5, and this impact is not further evaluated for this site.

The project sites are not located in areas that are known to contain significant mineral deposits (i.e., MRZ-2). The potential for paleontological resources is low because of the presence of bedrock. There would be no impact on mineral resources or paleontological resources relative to Standards of Significance 6 and 7, respectively, and these impacts are not further evaluated for any of the project sites.

8.1 ALTA SIERRA SITE

8.1.1 PROJECT-SPECIFIC SETTING

The Alta Sierra site consists of three parcels, one of which would be the location of the proposed Dollar General store and associated parking, drainage, lighting, and landscaping improvements (APN 25-430-08), and two of which would be the location of an off-site septic system (APNs 25-430-10 and -12). The store parcel is undeveloped, and the two off-site parcels are developed with commercial and office uses. All parcels slope to the southwest and southeast, with slopes ranging

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from 10 to 25 percent. Drainage is to the southwest and southeast and occurs via channels and swales that indicate seasonal flow of water. Groundwater was not observed in borings or trenches, but saturated soil conditions and groundwater could be encountered in areas of soil/rock transition, and groundwater seepage may be encountered in areas proposed for deeper excavation.

The project site is generally underlain by Paleozoic-age metavolcanic rocks. Surface soils consist of sandy silt, which overlies gravel and highly weathered metavolcanic rock composed of 8- to 10-inch cobbles and boulders up to 35 inches in diameter. Soils at the project site are the Secca-Rock outcrop complex, which is characterized by medium to rapid runoff with slow permeability. These soils generally have a high shrink-swell potential because of their clay content (USDA 1993). The native soil conditions have a mild to moderate corrosion potential for uncoated steel and concrete. Fill and disturbed soil that varied in depth is present on-site.

The primary geotechnical issue for this site is the presence of weathered, fractured metavolcanic rock, which could require splitting, hammering, or blasting to increase the rate of excavation. Fill and disturbed soil is present in some locations. The fill could contain significant rock fragments. However, none of the geologic and soils conditions at the site pose substantial constraints to development, provided the recommendations in the geotechnical report are implemented (Holdrege and Kull 2014b).

8.1.2 REGULATORY FRAMEWORK

There are no additional regulations, policies, or standards that pertain to the Alta Vista site other than those described in Section 8.0.2, above.

8.1.3 IMPACTS AND MITIGATION MEASURES

Ground Shaking and Related Hazards (Standard of Significance 1)

Impact 8.1.1(AS) The Alta Sierra project site is located in an area that would be subject to seismic hazards. **(Less than Significant with Mitigation Incorporated)**

The Alta Sierra site is within the Foothills fault system, which is designated as a Type C fault zone, with low seismicity and a low rate of recurrence. It is not expected the site would be subject to strong ground shaking, but there is the potential that the site could be exposed to some amount of ground shaking from earthquakes on distant faults (Holdrege and Kull 2014b). If not properly designed and constructed in accordance with local and state standards and the recommendations of a site-specific geotechnical study, the site could be affected by seismic ground shaking and seismic-induced ground failure, including liquefaction and landslides. This is a **potentially significant** impact.

Compliance with existing regulations and implementation of mitigation measures **MM AS-8.1.1a** and **MM AS-8.1.1b** would reduce this impact to **less than significant** by ensuring project plans comply with existing standards and the recommendations of a site-specific geotechnical engineering report.

Mitigation Measures

MM AS-8.1.1a Prior to grading permit issuance, the project applicant shall provide a final Geotechnical Engineering Report to the Nevada County Building and Planning Departments that reflects the final site plan. The Building Department shall be

responsible for reviewing the final site plan and final Geotechnical Engineering Report to ensure that they are consistent with both local and building code requirements.

Timing/Implementation: Prior to grading permit issuance

Enforcement/Monitoring: Nevada County Building Department and Planning Department

MM AS-8.1.1b Prior to grading or building permit issuance, the developer shall include the grading and structural improvement design criteria recommendations of the Final Geotechnical Engineering Report as noted on improvement plans and incorporate those recommended actions into the final project design. The Nevada County Building Department shall verify that the recommendations are being implemented during the plan review and inspection stages of the permit process.

Timing/Implementation: Prior to improvement plan approval

Enforcement/Monitoring: Nevada County Building Department and Planning Department

Soil Erosion and Slope Stability (Standards of Significance 2 and 3)

Impact 8.1.2(AS) Development of the Alta Sierra site could result in temporary erosion. **(Less than Significant with Mitigation Incorporated)**

The Alta Sierra site slopes southwest and southeast at approximately 10 to 25 percent. Surface soils are primarily silty sand, with gravel and rock at shallow depths. Grading, excavation, removal of vegetation cover, and loading activities associated with construction at the Alta Sierra site could temporarily increase soil erosion by water or wind. This is a **potentially significant** impact.

However, in accordance with existing regulations and as required by mitigation measure **MM AS-8.1.2b**, a SWPPP would be developed by a qualified engineer or erosion control specialist before construction and BMPs would be implemented throughout and following construction, as appropriate. The SWPPP would include details of how the sediment and erosion control practices (i.e., BMPs) would be implemented. In addition to the SWPPP, the applicant would be required to comply with Chapter V, Article 19 (Grading) and Chapter 11, Article 4 (Steep Slopes/High Erosion Potential) of the County's Land Use and Development Code.

Recommendations in the geotechnical report (Holdrege and Kull 2014b) pertaining to general site preparation would also be implemented (see mitigation measure **MM AS-8.1.1b**). This would include recommendations concerning clearing and grubbing, soil preparation, fill placement, fill slope grading, and erosion control, further reducing impacts. For example, permanent cut slopes up to 17 feet in height with 13 feet of fill are proposed at this site. The cut slopes would be retained by a series of retaining walls. The geotechnical report recommended that permanent cut slopes should not be steeper than 1.5:1, horizontal to vertical (H:V). The upper 2 feet of all cut slopes should be graded to an approximate 2:1, H:V, slope to reduce sloughing and erosion of looser surface soil. Section 5.1.9 of the geotechnical report describes erosion control measures that should be implemented.

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After construction, the site would be covered by a building, parking lot, and hardscaping and landscaping, which would minimize the potential for long-term or permanent erosion. Cut slopes would be stabilized in accordance with the geotechnical report, which would reduce the potential for the slopes to be subject to erosion. However, compliance with existing regulations and recommendations from the project-specific geotechnical report as well as implementation of mitigation measures **MM AS-8.1.2a** and **MM AS-8.1.2b** would ensure impacts related to erosion would be reduced to **less than significant**.

Mitigation Measures

MM AS-8.1.2a Prior to issuance of grading permits, all grading and improvement plans shall include a note documenting the approved time of year for grading activities. Specifically, no grading shall occur after October 15 or before May 1 unless standard Building Department requirements are met for grading during the wet season.

Timing/Implementation: Prior to grading permit issuance

Enforcement/Monitoring: Nevada County Building Department

MM AS-8.1.2b Prior to issuance of grading permits or improvement plans for all project-related grading including road construction and drainage improvements, all plans shall incorporate, at a minimum, the following erosion and sediment control measures, which shall be implemented throughout the construction phase:

1. During construction, Best Management Practices (BMPs) for temporary erosion control shall be implemented to control any pollutants that could potentially affect the quality of storm water discharges from the site. A Storm Water Pollution Prevention Plan (SWPPP) shall be prepared in accordance with California State Water Resources Control Board (SWRCB) requirements. The SWPPP shall include the implementation of BMPs for Erosion Control, Sediment Control, Tracking Control, Wind Erosion Control, Waste Management and Materials Pollution Control and shall be provided to the Nevada County Planning, Building and Public Works Departments prior to issuance of grading permits or approval of improvement plans.
2. Topsoil that will be used as fill material shall be removed and stockpiled for later reuse prior to excavation activities. Topsoil shall be identified by the soil-revegetation specialist who will identify both extent and depth of the topsoil to be removed.
3. Upon completion of grading, stockpiled topsoil shall be combined with wood chips, compost and other soil amendments for placement on all graded areas. Revegetation shall consist of native seed mixes only. The primary objectives of the soil amendments and revegetation is to create site conditions that keep sediment on site, produce a stable soil surface, resist erosion and are similar to the surrounding native ecosystem.
4. Geo-fabrics, jutes or other mats may be used in conjunction with revegetation and soil stabilization.

Timing/Implementation: Prior to grading permit issuance

Enforcement/Monitoring: Nevada County Building Department

Expansive or Unstable Soils (Standards of Significance 3 and 4)

Impact 8.1.3(AS) The Alta Sierra site may include soils that may be subject to expansion potential. **(Less than Significant with Mitigation Incorporated)**

Expansive soils are those soils that shrink or swell depending on the level of moisture they absorb. Expansive soils typically contain clay minerals that determine the ability of the soil to absorb and retain moisture. When structures are located on expansive soils, foundations have the tendency to rise during the wet season and sink during the dry season. This movement can create new stresses on various sections of the foundation and connected utilities and can lead to structural failure and damage to infrastructure. The Secca Rock outcrop complex soils are generally considered expansive, which could pose a hazard. The geotechnical report includes soil management recommendations such as mixing expansive soil with granular soil, and/or using excavated expansive soil only in landscape areas. The presence of fill and disturbed soils at variable depths could result in differential settlement-induced structural distress beneath structures. Section 5.1.6 of the geotechnical report includes several recommendations for mitigating the potential hazards associated with fill materials, such as overexcavation, compaction, and recompaction, and additional testing to confirm soil stability for footings and structures. With implementation of the recommendations in the geotechnical report (Holdrege and Kull 2015), as required by mitigation measures **MM AS-8.1.1a** and **MM AS-8.1.1b**, potential soil hazards would not result in substantial hazards at the site due to soil expansion. Impacts would be **less than significant**.

Mitigation Measures

Implement mitigation measures **MM AS-8.1.1a** and **MM AS-8.1.1b**.

Septic Systems (Standard of Significance 5)

Impact 8.1.4(AS) The Alta Sierra site may have soils incapable of supporting a septic system. **(Less than Significant)**

Wastewater treatment and disposal would be provided through a septic system located on-site and on two off-site parcels to the north. The septic tank and pump/dosing tank would be located on the store parcel (APN 25-430-08); the septic tight line would run from the tanks through APN 25-430-10 immediately north; the tight line would then run north to the leach field located on APN 25-430-12. Septic testing (perc and mantle) has been completed. Soils have been tested for off-site sewage disposal and found to be adequate for a Minimum Useable Sewage Disposal Area (MUSDA), which has been established exclusive of the existing systems on APNs 25-430-10 and -12, which serve the commercial uses on those properties (Holdrege and Kull 2014a, 2015a). If the project is approved, the current owner of the three Alta Sierra project parcels would be required to record a declaration that he would provide an easement across the off-site parcels for the benefit of the store site. This requirement would be a condition of project approval. A letter of intent to record said easement has been provided (CJS Development 2015). Impacts would be **less than significant**.

Mitigation Measures

None required.

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8.2 PENN VALLEY SITE

8.2.1 PROJECT-SPECIFIC SETTING

The Penn Valley site is undeveloped and slopes gently toward the south central portion of the property, where there is a small wetland. Potentially shallow, seasonal groundwater and saturated soil conditions are present. Groundwater was not observed but saturated soil conditions and groundwater could be encountered in areas of soil/rock transition, particularly during or after the rainy season.

The project site is generally underlain by Jurassic-age gabbroic rocks associated with the Smartville complex. Surface soils consist of alluvial land, loamy, which is characterized by moderate runoff and variable shrink-swell potential (USDA 1993). Subsurface soils are dense silty sand with high organic content. Weathered granitic rock is approximately 40 to 80 inches below the ground surface.

The primary geotechnical issue for the Penn Valley site is the potential for near-surface seasonal groundwater and saturated soil conditions. However, this condition does not pose a substantial constraint to development, provided the recommendations in the geotechnical report are implemented (Holdrege and Kull 2015b).

8.2.2 REGULATORY FRAMEWORK

There are no additional regulations, policies, or standards that pertain to the Penn Valley site other than those described in Section 8.0.2, above.

8.2.3 IMPACTS AND MITIGATION MEASURES

Ground Shaking and Related Hazards (Standard of Significance 1)

Impact 8.2.1(PV) The Penn Valley project site is located in an area that would be subject to seismic hazards. **(Less than Significant with Mitigation Incorporated)**

The Penn Valley site is within the Foothills fault system, which is designated as a Type C fault zone, with low seismicity and a low rate of recurrence. It is not expected the site would be subject to strong ground shaking, but there is the potential that the site could be exposed to some amount of ground shaking from earthquakes on distant faults (Holdrege and Kull 2015b). If not properly designed and constructed in accordance with local and state standards and the recommendations of a site-specific geotechnical study, the site could be affected by seismic ground shaking and seismic-induced ground failure including liquefaction. This is a **potentially significant** impact.

Compliance with existing regulations and implementation of mitigation measures **MM PV-8.2.1a** and **MM PV-8.2.1b** would reduce this impact to **less than significant** by ensuring project plans comply with existing standards and the recommendations of a site-specific geotechnical engineering report.

Mitigation Measures

MM PV-8.2.1a Prior to grading permit issuance, the project applicant shall provide a final Geotechnical Engineering Report to the Nevada County Building and Planning

Departments that reflects the final site plan. The Building Department shall be responsible for reviewing the final site plan and final Geotechnical Engineering Report to ensure that they are consistent with both local and building code requirements.

Timing/Implementation: Prior to grading permit issuance

Enforcement/Monitoring: Nevada County Building Department and Planning Department

MM PV-8.2.1b Prior to grading or building permit issuance, the developer shall include the grading and structural improvement design criteria recommendations of the Final Geotechnical Engineering Report as notes on improvement plans and incorporate those recommended actions into the final project design. The Nevada County Building Department shall verify that the recommendations are being implemented during the plan review and inspection stages of the permit process.

Timing/Implementation: Prior to improvement plan approval

Enforcement/Monitoring: Nevada County Building Department and Planning Department

Soil Erosion and Slope Stability (Standards of Significance 2 and 3)

Impact 8.2.2(PV) Development of the Penn Valley site could result in temporary erosion. **(Less than Significant with Mitigation Incorporated)**

The Penn Valley site is undeveloped and gently slopes toward the south central portion of the property. Soils are primarily sand and silty sand. Grading, excavation, removal of vegetation cover, and loading activities associated with construction at the Penn Valley site could temporarily increase soil erosion by water or wind. This is a **potentially significant** impact.

However, in accordance with existing regulations and as required by mitigation measure **MM PV-8.2.2b**, a SWPPP would be developed by a qualified engineer or erosion control specialist before construction and BMPs would be implemented throughout and following construction, as appropriate. The SWPPP would include details of how the sediment and erosion control practices (i.e., BMPs) would be implemented. In addition to the SWPPP, the applicant would be required to comply with Chapter V, Article 19 (Grading) of the County's Land Use and Development Code.

Recommendations in the geotechnical report (Holdrege and Kull 2015b) pertaining to general site preparation would also be implemented (see mitigation measure **MM PV-8.2.1b**). This would include recommendations concerning clearing and grubbing, soil preparation, fill placement, fill slope grading, and erosion control, further reducing impacts. Significant cut slopes are not proposed at this site. The geotechnical report recommended the upper 2 feet of all cut slopes be graded to an approximate 2:1, H:V, slope to reduce sloughing and erosion of looser surface soil; to reduce the likelihood of sloughing or failure, temporary cut slopes should not remain over the winter. Section 5.1.6 of the geotechnical report describes erosion control measures that should be implemented (Holdrege and Kull 2015b).

After construction, the site would be covered by a building, parking lot, and hardscaping and landscaping, which would minimize the potential for long-term or permanent erosion.

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Compliance with existing regulations and recommendations from the project-specific geotechnical report as well as implementation of mitigation measures **MM PV-8.2.2a** and **MM PV-8.2.2b** would ensure impacts related to erosion would be reduced to **less than significant**.

Mitigation Measures

MM PV-8.2.2a Prior to issuance of grading permits, all grading and improvement plans shall include a note documenting the approved time of year for grading activities. Specifically, no grading shall occur after October 15 or before May 1 unless standard Building Department requirements are met for grading during the wet season.

Timing/Implementation: Prior to grading permit issuance

Enforcement/Monitoring: Nevada County Building Department

MM PV-8.2.2b Prior to issuance of grading permits or improvement plans for all project-related grading including road construction and drainage improvements, all plans shall incorporate, at a minimum, the following erosion and sediment control measures, which shall be implemented throughout the construction phase:

1. During construction, Best Management Practices (BMPs) for temporary erosion control shall be implemented to control any pollutants that could potentially affect the quality of storm water discharges from the site. A Storm Water Pollution Prevention Plan (SWPPP) shall be prepared in accordance with California State Water Resources Control Board (SWRCB) requirements. The SWPPP shall include the implementation of BMPs for Erosion Control, Sediment Control, Tracking Control, Wind Erosion Control, Waste Management and Materials Pollution Control and shall be provided to the Nevada County Planning, Building and Public Works Departments prior to issuance of grading permits or approval of improvement plans.
2. Topsoil that will be used as fill material shall be removed and stockpiled for later reuse prior to excavation activities. Topsoil shall be identified by the soil-revegetation specialist who will identify both extent and depth of the topsoil to be removed.
3. Upon completion of grading, stockpiled topsoil shall be combined with wood chips, compost and other soil amendments for placement on all graded areas. Revegetation shall consist of native seed mixes only. The primary objectives of the soil amendments and revegetation is to create site conditions that keep sediment on site, produce a stable soil surface, resist erosion and are similar to the surrounding native ecosystem.
4. Geo-fabrics, jutes or other mats may be used in conjunction with revegetation and soil stabilization.

Timing/Implementation: Prior to grading permit issuance

Enforcement/Monitoring: Nevada County Building Department

Expansive or Unstable Soils (Standards of Significance 3 and 4)

Impact 8.2.3(PV) The Penn Valley site may include soils that may be subject to expansion potential. **(Less than Significant with Mitigation Incorporated)**

Expansive soils are those soils that shrink or swell depending on the level of moisture they absorb. Expansive soils typically contain clay minerals that determine the ability of the soil to absorb and retain moisture. When structures are located on expansive soils, foundations have the tendency to rise during the wet season and sink during the dry season. This movement can create new stresses on various sections of the foundation and connected utilities and can lead to structural failure and damage to infrastructure. The alluvial land, loamy soils have variable expansion potential, which could pose a hazard. Section 5.1.5 of the geotechnical report (Holdrege and Kull 2015b) includes soil management recommendations such as mixing expansive soil with granular soil, and/or using excavated expansive soil only in landscape areas. The presence of fill and disturbed soils at variable depths could result in differential settlement-induced structural distress beneath structures. Section 5.1.5 of the geotechnical report also includes several recommendations for mitigating the potential hazards associated with fill materials, such as overexcavation, compaction and recompaction, and additional testing to confirm soil stability for footings and structures. With implementation of the recommendations in the geotechnical report (Holdrege and Kull 2015b), as required by mitigation measures **MM PV-8.2.1a** and **MM PV-8.2.1b**, expansive soil on-site would not result in substantial hazards at the site. Impacts would be **less than significant**.

Mitigation Measures

Implement mitigation measures MM PV-8.2.1a and MM PV-8.2.1b.

8.3 ROUGH AND READY HIGHWAY SITE**8.3.1 PROJECT-SPECIFIC SETTING**

The Rough and Ready Highway site is relatively level and has been previously developed with a commercial building and a parking area. Groundwater was not observed but saturated soil conditions and groundwater could be encountered in areas of soil/rock transition, particularly during or after the rainy season.

The project site is generally underlain by Miocene- to Pliocene-age volcanic rocks composed of volcanic mudflow, tuff, sediments, and conglomerate. Surface soils consist of Aiken loam, which is characterized by slow to medium runoff, moderate erosion hazard, and moderate shrink-swell potential (USDA 1993). Subsurface soils are loam and heavy clay loam and clay. There may be loose fill in portions of the site from previous development that could contribute to future differential settlement. Weathered andesitic tuff and conglomerate is typically encountered at a depth of approximately 64 inches.

The geotechnical report did not identify any notable geotechnical hazards with the exception of the potential for near-surface seasonal groundwater and saturated soil conditions. However, this condition does not pose a substantial constraint to development, provided the recommendations in the geotechnical report are implemented (Holdrege and Kull 2015c).

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8.3.2 REGULATORY FRAMEWORK

There are no additional regulations, policies, or standards that pertain to the Rough and Ready Highway site other than those described in Section 8.0.2, above.

8.3.3 IMPACTS AND MITIGATION MEASURES

Ground Shaking and Related Hazards (Standard of Significance 1)

Impact 8.3.1(RR) The Rough and Ready Highway project site is located in an area that would be subject to seismic hazards. **(Less than Significant with Mitigation Incorporated)**

The Rough and Ready Highway site is within the Foothills fault system, which is designated as a Type C fault zone, with low seismicity and a low rate of recurrence. It is not expected that the site would be subject to strong ground shaking, but there is the potential that the site could be exposed to some amount of ground shaking from earthquakes on distant faults (Holdrege and Kull 2015c). If not properly designed and constructed in accordance with local and state standards and the recommendations of a site-specific geotechnical study, the site could be affected by seismic ground shaking and seismic-induced ground failure including liquefaction. This is a **potentially significant** impact.

Compliance with existing regulations and implementation of mitigation measures **MM RR-8.3.1a** and **MM RR-8.3.1b** would reduce this impact to **less than significant** by ensuring project plans comply with existing standards and the recommendations of a site-specific geotechnical engineering report.

Mitigation Measures

MM RR-8.3.1a Prior to grading permit issuance, the project applicant shall provide a final Geotechnical Engineering Report to the Nevada County Building and Planning Departments that reflects the final site plan. The Building Department shall be responsible for reviewing the final site plan and final Geotechnical Engineering Report to ensure that they are consistent with both local and building code requirements.

Timing/Implementation: Prior to grading permit issuance

Enforcement/Monitoring: Nevada County Building Department and Planning Department

MM RR-8.3.1b Prior to grading or building permit issuance, the developer shall include the grading and structural improvement design criteria recommendations of the Final Geotechnical Engineering Report as notes on improvement plans and incorporate those recommended actions into the final project design. The Nevada County Building Department shall verify that the recommendations are being implemented during the plan review and inspection stages of the permit process.

Timing/Implementation: Prior to improvement plan approval

Enforcement/Monitoring: Nevada County Building Department and Planning Department

Soil Erosion and Slope Stability (Standards of Significance 2 and 3)

Impact 8.3.2(RR) Development of the Rough and Ready Highway site could result in temporary erosion. **(Less than Significant with Mitigation Incorporated)**

The Rough and Ready Highway site is flat and has been partially developed with a building and a parking lot. Soils are primarily loam and clay loam with moderate erosion hazard. Grading, excavation, removal of vegetation cover, and loading activities associated with construction at the site could temporarily increase soil erosion by water or wind. This is a **potentially significant** impact.

However, in accordance with existing regulations and as required by mitigation measure **MM RR-8.3.2b**, a SWPPP would be developed by a qualified engineer or erosion control specialist before construction and BMPs would be implemented throughout and following construction, as appropriate. The SWPPP would include details of how the sediment and erosion control practices (i.e., BMPs) would be implemented. In addition to the SWPPP, the applicant would be required to comply with Chapter V, Article 19 (Grading) of the County's Land Use and Development Code.

Recommendations in the geotechnical report (Holdrege and Kull 2015c) pertaining to general site preparation would also be implemented (see mitigation measure **MM RR-8.3.1b**). This would include recommendations concerning clearing and grubbing, soil preparation, fill placement, fill slope grading, and erosion control, further reducing impacts. Permanent cut slopes up to 6 feet high are anticipated. The geotechnical report recommended that permanent cut slopes should not be steeper than 1.5:1, H:V. The geotechnical report also recommended the upper 2 feet of all cut slopes be graded to an approximate 2:1, H:V slope to reduce sloughing and erosion of looser surface soil; to reduce the likelihood of sloughing or failure, temporary cut slopes should not remain over the winter. Sections 5.1.3 and 5.1.6 of the geotechnical report describe cut slope and grading erosion control measures that should be implemented.

After construction, the site would be covered by a building, parking lot, and hardscaping and landscaping, which would minimize the potential for long-term or permanent erosion. Compliance with existing regulations and recommendations from the project-specific geotechnical report as well as implementation of mitigation measures **MM RR-8.3.2a** and **MM RR-8.3.2b** would ensure impacts related to erosion would be reduced to **less than significant**.

Mitigation Measures

MM RR-8.3.2a Prior to issuance of grading permits, all grading and improvement plans shall include a note that documents the approved time of year for grading activities. Specifically, no grading shall occur after October 15 or before May 1 unless standard Building Department requirements are met for grading during the wet season.

Timing/Implementation: Prior to grading permit issuance

Enforcement/Monitoring: Nevada County Building Department

MM RR-8.3.2b Prior to issuance of grading permits or improvement plans for all project-related grading including road construction and drainage improvements, all plans shall incorporate, at a minimum, the following erosion and sediment control measures, which shall be implemented throughout the construction phase:

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1. During construction, Best Management Practices (BMPs) for temporary erosion control shall be implemented to control any pollutants that could potentially affect the quality of storm water discharges from the site. A Storm Water Pollution Prevention Plan (SWPPP) shall be prepared in accordance with California State Water Resources Control Board (SWRCB) requirements. The SWPPP shall include the implementation of BMPs for Erosion Control, Sediment Control, Tracking Control, Wind Erosion Control, Waste Management and Materials Pollution Control and shall be provided to the Nevada County Planning, Building and Public Works Departments prior to issuance of grading permits or approval of improvement plans.
2. Topsoil that will be used as fill material shall be removed and stockpiled for later reuse prior to excavation activities. Topsoil shall be identified by the soil-revegetation specialist who will identify both extent and depth of the topsoil to be removed.
3. Upon completion of grading, stockpiled topsoil shall be combined with wood chips, compost and other soil amendments for placement on all graded areas. Revegetation shall consist of native seed mixes only. The primary objectives of the soil amendments and revegetation is to create site conditions that keep sediment on site, produce a stable soil surface, resist erosion and are similar to the surrounding native ecosystem.
4. Geo-fabrics, jutes or other mats may be used in conjunction with revegetation and soil stabilization.

Timing/Implementation: *Prior to grading permit issuance*

Enforcement/Monitoring: *Nevada County Building Department*

Expansive or Unstable Soils (Standards of Significance 3 and 4)

Impact 8.3.3(RR) The Rough and Ready Highway site may include soils that may be subject to expansion potential. **(Less than Significant with Mitigation Incorporated)**

Expansive soils are those soils that shrink or swell depending on the level of moisture they absorb. Expansive soils typically contain clay minerals that determine the ability of the soil to absorb and retain moisture. When structures are located on expansive soils, foundations have the tendency to rise during the wet season and sink during the dry season. This movement can create new stresses on various sections of the foundation and connected utilities and can lead to structural failure and damage to infrastructure. The Aiken loam soils have moderate expansion potential, which could pose a hazard. Section 5.1.5 of the geotechnical report (Holdrege and Kull 2015c) includes soil management recommendations such as mixing expansive soil with granular soil and/or using excavated expansive soil only in landscape areas. The presence of fill and disturbed soils at variable depths could result in differential settlement-induced structural distress beneath structures. Section 5.1.5 of the geotechnical report also includes several recommendations for mitigating the potential hazards associated with fill materials, such as overexcavation, compaction and recompaction, and additional testing to confirm soil stability for footings and structures. With implementation of the recommendations in the geotechnical report (Holdrege and Kull 2015c), as required by mitigation measures **MM RR-8.3.1a** and **MM RR-8.3.1b**, potential soil hazards would not result in substantial hazards at the site. Impacts would be **less than significant**.

Mitigation Measures

Implement mitigation measures MM RR-8.3.1a and MM RR-8.3.1b.

Septic Systems (Standard of Significance 5)

Impact 8.3.4(RR) Wastewater treatment and disposal at the Rough and Ready Highway site would be provided septic system. **(Less than Significant)**

There is an existing permitted and built, but unused, on-site sewage disposal system (disposal/absorption bed) on the Rough and Ready Highway site parcel. The County Environmental Health Department has determined use of this disposal/absorption bed to be feasible under certain conditions, with independent service provider demonstration and documentation of the absorption bed functionality, and consistency with the project plan and setback requirements. In June 2016, testing required by the County was performed; the system accepted water properly, there was no evidence of saturation, and setbacks were confirmed (Navo 2016). The results of this flow/stress test indicate that the septic system can perform under expected normal waste flow conditions. Impacts would be **less than significant**.

Mitigation Measures

None required.

8.4 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

CUMULATIVE SETTING

The cumulative setting for geology and soils are the three Dollar General Store sites combined and cumulative development in the western portion of Nevada County in the Sierra Nevada foothills.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Geology and Soils Impacts

Impact 8.4.1 Implementation of the proposed projects, in combination with existing, approved, proposed, and reasonably foreseeable development in nearby areas of Nevada County, would not contribute to cumulative geologic and soils impacts. The proposed project's incremental contribution would be **less than cumulatively considerable**.

Geotechnical impacts tend to be site-specific rather than cumulative in nature. For example, seismic events or underlying geologic and soil conditions may damage or destroy a building on the project site, but the construction of a development project on one site would not cause any adjacent parcels to become more susceptible to geotechnical hazards, nor can a project affect local geology in such a manner as to increase risks regionally. Impacts such as erosion and sediment deposition, however, can be cumulative in nature within a watershed. See Section 11, Hydrology and Water Quality, of this Draft EIR for a discussion of cumulative water quality impacts from soil erosion.

The three Dollar General Store proposed sites are not connected geographically. Impacts associated with seismic ground shaking, fill materials, expansive soils, and septic systems are based

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on site-specific conditions. With proper evaluation of these conditions and compliance with existing codes and standards, as described in the impact analysis above, the proposed project's contribution to geology and soils impacts would be **less than cumulatively considerable**.

Mitigation Measures

None required.

REFERENCES

- CJS Development and Serge Bartlome Family Trust. 2015. Septic Easements, APN: 25-430-08, -10, -12. Memorandum to Nevada County Planning and Environmental Health Departments.
- Holdrege and Kull. 2014a. Reference: 10166 Alta Sierra Drive, APN 25-430-08, Nevada County, California; Subject: Response to County Comments Regarding Sewage Disposal. Letter from Chuck Kull, C.E.G. to Dan Biswas, CJS Development II, LLC.
- . 2014b. Geotechnical Engineering Report for 10166 Alta Sierra Drive, APN 25-430-08, Nevada County, California
- . 2015a. Reference: 10166 Alta Sierra Drive, APN 25-430-08, Nevada County, California. Subject: Continued Use of Geotechnical Engineering Report.
- . 2015b. Geotechnical Engineering Report for 17652 Penn Valley Drive, APN 51-120-06, Nevada County, California
- . 2015c. Geotechnical Engineering Report for 12345 Rough and Ready Highway, APN 52-122-03, Nevada County, California
- Loyd, Ralph and John Clinkenbeard. 1990. Mineral Land Classification of Nevada County. California Department of Conservation, Division of Mines and Geology Special Report 164.
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- USDA (US Department of Agriculture). 1993. Soil Survey of Nevada County Area, California.

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