

4.4 GEOLOGY AND SOILS

This section describes the potential geological resources impacts that could result from construction of the City Fire Station 10.

4.4.1 Existing Setting

Goleta General Plan/Local Coastal Land Use Plan

Based on the Goleta General Plan/Local Land Use Plan, Safety Element (City of Goleta 2016), and the Goleta General Plan/Coastal Land Use Plan, Final Environmental Impact Report (FEIR) (City of Goleta 2006), the Project site is not underlain by geologic hazards, including fault zones, compressible soils, landslides, or radon-emitting soils.

Project Site Setting

Regional

The Project site is located in the western portion of the City of Goleta, which occupies a portion of the eight-mile long and three-mile wide, flat alluvial plain known as the Goleta Valley (City of Goleta 2006). The Goleta Valley is a broad, flat alluvial plain bordered on the south by bluffs along the Pacific coastline, and on the north by foothills and terraces of the Santa Ynez Mountain Range. The valley generally slopes gently toward the Goleta and Devereux sloughs.

Project Site

A Project-specific geotechnical investigation by Leighton Consulting, Inc. (2017, Appendix E) identified that the Project site is underlain by undocumented fill and Pleistocene-age marine terrace deposits, to a depth of 56 feet below ground surface. Approximately 5 feet of undocumented fill material, consisting primarily of silty sand with gravel, blankets the Project site. However, the fill may locally be as deep as 7 to 10 feet in the vicinity of former underground storage tanks associated with a former service station. These tanks were located beneath the western driveway (apparatus bay) of the proposed fire station.

The marine terrace deposits consist primarily of interbeds and lenses of dense silty sand and sandy silt, with some minor stiff clay layers that were interbedded with three distinct layers of dense to very dense, silty to poorly graded sand. The sand layers were encountered during drilling at depths of 10 feet, 25 feet, and 50 feet, and ranged from 5 to 10 feet in thickness.

Topography/Soils

The Project site topography is uneven, with approximately 4 feet of relief across the site, primarily sloping gently towards the southeast. The elevation of the site varies from 117 feet to 121 feet above mean sea level, with the exception of a 35-

foot high slope along the northern portion of the site, which descends to the railroad tracks offsite. The northeast corner of the site slopes gently toward this slope. Surface runoff drains over this north-facing slope, resulting in periodic, localized, severe erosion on the slope.

Surficial soils at the Project site have been mapped as Milpitas-Positas fine sandy loams, on 2 to 9 percent slopes. These soils typically consist of fine sandy loams in the upper 2 feet, with gravelly clay and very gravelly sandy loam below 2 feet. These soils are moderately well drained, have very high runoff, and very low ability to transmit water (USDA NRCS 2016). However, as previously discussed, the upper five feet of geologic material at the site consists of undocumented fill, indicating that the surficial natural soils have been graded and reworked.

Seismic and Other Geologic Hazards

Similar to much of California, the Project site is located within a seismically active region. The site lies within the Santa Barbara Fold and Fault Belt, a region characterized by folds and partially buried oblique and reverse faults that transect the coastal plain, and which are expressed geomorphically on the surface as mesas and hills. Seismic hazards include ground rupture, ground acceleration, and liquefaction. The site is approximately 2,000 feet from the Pacific Ocean at an elevation of 117 to 121 feet above mean sea level. Based on the City of Goleta General Plan - Fire, Flood, and Tsunami Hazards Map (City of Goleta 2016), the Project site is not located within a Potential Tsunami Runup Area.

Fault Rupture. Seismically-induced ground rupture occurs as the result of differential movement across a fault. An earthquake occurs when seismic stress builds to the point where rocks rupture. As the rocks rupture, one side of a fault block moves relative to the other side. The resulting shock wave is the earthquake. If the rupture plane reaches the ground surface, ground rupture occurs. Potentially active faults are those that have moved during the last 1.6 million years but not during the last 11,000 years, while active faults show evidence of movement within the last 11,000 years.

Neither active nor potentially active faults have been identified at this site. The faults closest to the Project site are the north and south branches of the More Ranch Fault, located approximately 0.4 mile south and 1.6 miles southeast of the site, respectively (Leighton Consulting, Inc. 2017, Appendix E). This fault zone is considered potentially active by the California Geological Survey; however, the Santa Barbara County Seismic Safety and Safety Element classifies this fault as active based on the existence of a geologically recent fault scarp (City of Goleta 2016; County of Santa Barbara 2015). Additionally, the potentially active Glen Annie Fault is located approximately one mile north of the Project site and the active Santa Ynez Fault is located approximately 8.5 miles to the northeast (Leighton Consulting, Inc. 2017, Appendix E). None of these faults have been designated as Alquist-Priolo Earthquake Fault Zones, which limit development along many active faults.

Therefore, no significant hazard related to fault rupture is present at the Project site.

Ground Shaking. Strong earthquakes have historically occurred offshore the Santa Barbara/Goleta area, including a 6.3 magnitude earthquake in 1925, a 5.5 magnitude earthquake in 1941, and a 5.1 magnitude earthquake in 1978. Regional faults within and around the Santa Barbara Fold and Fault Belt pose a significant risk for activity and strong ground shaking. Additionally, the San Andreas Fault Zone, located approximately 44 miles to the northeast, has been responsible for several significant historical events, including the 1857 magnitude 7.9 Fort Tejon Earthquake, and can also pose a significant risk for activity and strong ground shaking (Leighton Consulting, Inc. 2017, Appendix E).

A computer program was used to evaluate past, documented seismic activity within 62 miles (100 kilometers) of the Project site. The analysis indicated that the largest historical earthquake within the search radius was the 1857 magnitude 7.9 Fort Tejon Earthquake, which occurred on the San Andreas Fault, approximately 60 miles to the northeast. The earthquake is estimated to have produced a horizontal ground acceleration of 0.13g at the site. The earthquake event to have produced the highest estimated horizontal ground acceleration at the site, was a 5.7 magnitude earthquake generated 5 miles to the east-southeast of the site, near the More Ranch Fault, in 1862. This earthquake is estimated to have resulted in a horizontal ground acceleration at the site of 0.25g (Leighton Consulting, Inc. 2017, Appendix E).

Liquefaction. Liquefaction is a seismic phenomenon in which loose, saturated granular and non-plastic, fine-grained soils lose their structure/strength when subjected to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater (within 50 feet of the ground surface); 2) low density non-plastic soils; and 3) high intensity ground motion.

Shallow groundwater is not present beneath the site. Borings drilled for an environmental site assessment in 2009, to depths up to 100 feet, did not encounter groundwater (Holguin, Fahan & Associates, Inc. 2012, Appendix F). Borings drilled in July 2016 for the proposed Project did not encounter groundwater to a depth of 56 feet. Additionally, borings drilled on adjacent properties in 1957 and 1999 did not encounter groundwater to a depth of 75 feet. Based on soil densities encountered during drilling on-site, and current and historic groundwater conditions, the potential for liquefaction at the site is considered low. In addition, based on the Santa Barbara County, Seismic Safety and Safety Element (Santa Barbara County 2015) and the County of Santa Barbara 2016 Multi-Jurisdictional Hazard Mitigation Plan, the site appears to have a low potential for liquefaction (Leighton Consulting, Inc. 2017, Appendix E).

Seismically-Induced Settlement. During a strong seismic event, seismically-induced settlement can occur within loose to moderately dense, dry or saturated granular soil. Settlement caused by ground shaking is often non-uniformly

distributed, which can result in differential settlement. Assuming overexcavation and recompaction of shallow surface soils in association with the proposed Project, the potential for dry sand seismic settlement is expected to be low to moderate. Based on a site-specific analysis, seismically-induced settlement due to dry sand settlement would be approximately 1.5 to 2.0 inches. Differential settlement is assumed to be one half of the total settlement over a horizontal distance of 40 feet (Leighton Consulting, Inc. 2017, Appendix E).

Expansive Soils. Soils with relatively high clay content can be expansive due to the capacity of clay minerals to take in water and swell (expand) to greater volumes. Expansive soils can crack and damage concrete foundations. Soil samples collected at the site indicate that a clay layer at a depth of 10 to 15 feet has a moderate potential to swell. However, it is unlikely that expansive soils at that depth would adversely impact the proposed improvements. Soil samples collected from shallow soils anticipated to be in contact with the structural foundation indicate that near surface soils are not expansive. However, due to the presence of fine-grained soils on-site, pockets of expansive soil may be present at the site (Leighton Consulting, Inc. 2017, Appendix E).

Slope Stability. The Project site is bound on the north by an approximately 35-foot high descending slope that has a gradient of about 1:1 (horizontal to vertical), but is locally steeper. Based on site observations in January 2017 (Leighton Consulting, Inc. 2017), surficial erosion due to rain created a talus of soil on the lower eastern portion of the slope and created a steeper more vertical slope section on the upper portion of the slope. The western half of the slope is more vegetated and the slope gradient from toe to crest is more even and regular (Leighton Consulting, Inc. 2017, Appendix E).

Two geologic cross sections were analyzed for gross stability. One cross section extended through the area of the proposed fire station and one cross section extended through the western side of the site, where portions of the slope have eroded and retreated. Shear strength parameters were derived from laboratory testing performed on samples recovered during the geotechnical investigation. Ultimate and peak strengths of the soil were used to analyze the static and pseudostatic (i.e., seismic) stability of the slopes, respectively, to assess whether mitigation of slope stability was required. The existing slope was calculated to not meet minimum required factors of safety. The slope stability models on the north-facing slope yielded calculated static factors of safety below the code minimum required factor of safety of 1.5. Therefore, slope mitigation is required. However, this slope is grossly stable with respect to pseudostatic (i.e., seismic) conditions, based on seismic screening procedures (Leighton Consulting, Inc. 2017, Appendix E).

4.4.2 Regulatory Setting

The California Building Code (CBC), the Goleta General Plan, and the Goleta Municipal Code prescribe measures to safeguard life, health, property, and public welfare from geologic hazards. Each of these is described below:

California Building Code. California law provides a minimum standard for building design through the CBC (C.C.R. Title 24). Chapter 23 of the CBC contains specific requirements for seismic safety. Chapter 29 regulates excavation, foundations, and retaining walls. Chapter 33 of the CBC contains specific requirements pertaining to site demolition, excavation, and construction to protect people and property from hazards associated with excavation cave-ins and falling debris or construction materials. Chapter 70 of the CBC regulates grading activities, including drainage and erosion control. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in California Division of Occupational Safety and Health (Cal/OSHA) regulations (C.C.R. Title 8).

Alquist-Priolo Earthquake Fault Zoning Act. The Alquist-Priolo Earthquake Fault Zoning Act was signed into law in 1972 (14 C.C.R. §§ 3600 et seq.). The purpose of this Act is to prohibit the location of most structures for human occupancy across the traces of active faults and to thereby mitigate the hazard of fault rupture. Under the Act, the State Geologist is required to delineate “Earthquake Fault Zones” along known active faults in California (14 C.C.R. §3601). Cities and counties affected by the zones must regulate certain development projects within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting (14 C.C.R. §3603). No Alquist-Priolo Earthquake Zones have been identified in the Santa Barbara-Goleta metropolitan area.

Seismic Hazards Mapping Act. The California Geologic Survey, formerly the California Department of Conservation, Division of Mines and Geology (CDMG), provides guidance with regard to seismic hazards. Under CDMG’s Seismic Hazards Mapping Act (1990), seismic hazard zones are to be identified and mapped to assist local governments in land use planning (California Public Resources Code §§ 2690 et seq.). The intent of these maps is to protect the public from the effects of strong ground shaking, liquefaction, landslides, ground failure, or other hazards caused by earthquakes. In addition, CDMG’s Special Publications 117, “Guidelines for Evaluating and Mitigating Seismic Hazards in California,” provides guidance for the evaluation and mitigation of earthquake-related hazards for projects within designated zones of required investigations. Regulatory maps delineating earthquake zones of required investigation have not been prepared for the Santa Barbara/Goleta area.

City of Goleta Regulations. The Safety Element in the Goleta General Plan contains policies intended to reduce the potential for geologic hazards to adversely affect people and property, including the following:

SE 1.2 Guidelines for Siting Highly Sensitive Uses and Critical Facilities. *[GP/CP] In accord with the Land Use Element, the City shall discourage essential services buildings and other highly sensitive uses in areas subject to safety hazards. Highly sensitive uses are defined as those that meet one or more of the following criteria:*

- a. *Land uses whose on-site population cannot be readily evacuated or otherwise adequately protected from serious harm through methods such as sheltering in-place. This includes, but is not limited to, schools, hospitals, clinics, nursing homes, multiple-family housing exclusively for the elderly or disabled, high-density residential, stadiums, arenas, and other uses with large public-assembly facilities.*
- b. *Land uses that serve critical “lifeline” functions such as water supplies, fire response, and police response if exposed to a significant risk that will curtail their lifeline functions for a critical period of time.*

SE 1.3 Site-Specific Hazards Studies. *[GP/CP] Applications for new development shall consider exposure of the new development to coastal and other hazards. Where appropriate, an application for new development shall include a geologic/soils/geotechnical study and any other studies that identify geologic hazards affecting the proposed project site and any necessary mitigation measures. The study report shall contain a statement certifying that the project site is suitable for the proposed development and that the development will be safe from geologic hazards. The report shall be prepared and signed by a licensed certified engineering geologist or geotechnical engineer and shall be subject to review and acceptance by the City.*

SE 1.6 Enforcement of Building Codes. *[GP] The City shall ensure through effective enforcement measures that all new construction in the city is built according to the adopted building and fire codes.*

SE 4.3 Geotechnical and Geologic Studies Required. *[GP/CP] Where appropriate, the City shall require applications for planning entitlements for new or expanded development to address potential geologic and seismic hazards through the preparation of geotechnical and geologic reports for City review and acceptance.*

SE 4.5 Adoption of Updated California Building Code Requirements. *[GP] The City shall review, amend, and adopt new California Building Code requirements, when necessary, to promote the use of updated construction standards. The City shall consider and may adopt new optional state revisions for Seismic Hazards.*

SE 4.8 Seismic Standards for Critical Structures. [GP] *New critical facilities (hospitals, schools, communication centers, fire and police facilities, power plants, etc.) shall be designed and built in conformance with all California Building Code Requirements. Existing critical facilities within Goleta should be evaluated by a qualified structural engineer to assess the facilities' earthquake resistance. If any such facility is found to be deficient, appropriate structural retrofits or other mitigation measures should be identified and required.*

SE 4.10 Avoidance of Liquefaction Hazard Areas for Critical Facilities. [GP/CP] *The City shall discourage the construction of critical facilities in areas of potential liquefaction. In cases where construction of such facilities cannot avoid liquefaction- hazard areas, the City shall require implementation of appropriate mitigation as recommended in site-specific geotechnical and soils studies.*

SE 4.11 Geotechnical Report Required. [GP/CP] *The City shall require geotechnical and/or geologic reports as part of the application for construction of habitable structures and essential services buildings (as defined by the building code) sited in areas having a medium-to-high potential for liquefaction and seismic settlement. The geotechnical study shall evaluate the potential for liquefaction and/or seismic-related settlement to impact the development, and identify appropriate structural-design parameters to mitigate potential hazards.*

SE 5.1 Evaluation of Slope-Related Hazards. [GP/CP] *The City shall require geotechnical/geological, soil, and structural engineering studies for all development proposed in areas of known high and moderate landslide potential or on slopes equaling or exceeding 25 percent. The studies shall evaluate the potential for landslides, rockfalls, creep, and other mass movement processes that could impact the development; they shall also identify mitigation to reduce these potential impacts, if needed. The studies shall be included as part of an application for development.*

SE 5.2 Evaluation of Soil-Related Hazards. [GP/CP] *The City shall require structural evaluation reports with appropriate mitigation measures to be provided for all new subdivisions, and for discretionary projects proposing new nonresidential buildings or substantial additions. Depending on the conclusions of the structural evaluation report, soil and geological reports may also be required. Such studies shall evaluate the potential for soil expansion, compression, and collapse to impact the development; they shall also identify mitigation to reduce these potential impacts, if needed.*

SE 5.3 Avoidance of Landslide Hazards for Critical Facilities. [GP/CP] *The City shall prohibit the construction of critical facilities (hospitals, schools, communication centers, fire and police facilities, power plants, etc.) in areas of high landslide potential. The City shall discourage the construction of critical facilities in areas of moderate landslide potential. In cases where construction of such facilities cannot avoid moderate landslide hazard areas, the City shall require*

implementation of appropriate mitigation as recommended in site-specific geotechnical and soils studies.

SE 5.4. Avoidance of Soil Related Hazards. [GP/CP] *For the proposed development of any critical facilities in areas subject to soil-related hazards, as well as for noncritical facilities in areas subject to soil-related hazards, the City shall require site-specific geotechnical, soil, and/or structural engineering studies to assess the degree of hazard on the propose site and recommend any appropriate site design modifications or considerations as well as any other mitigation measures. The City shall not approve development in areas subject to soil-related hazards, unless mitigation measures are identified and committed to that would reduce hazards to an acceptable level.*

The Goleta Municipal Code (GMC) adopts the most recent CBC and contains additional requirements for construction in the City (Chapter 15, Buildings and Construction) (15 GMC, § 15.01 et seq.).

4.4.3 Impact Analysis

Methodology and Significance Thresholds

Assessment of impacts is based on review of site information and conditions and City information regarding geologic issues. In accordance with the CEQA Guidelines, a project would result in a significant impact 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, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides;
- Result in substantial soil erosion or the 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, 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.

Per the City's Environmental Thresholds and Guidelines Manual (published 2008), impacts are classified as potentially significant with regard to geology if:

- The project site or any part of the project is located on land having substantial geologic constraints, as determined by Planning and Development or Public Works Department. Areas constrained by geology

include parcels located near active or potentially active faults and property underlain by rock types associated with compressible/collapsible soils or susceptible to landslides or severe erosion. "Special Problems" areas designated by the Board of Supervisors have been established based on geologic constraints, flood hazards and other physical limitations to development;

- The project results in potentially hazardous geologic conditions such as the construction of cut slopes exceeding a grade of 1.5 horizontal to 1.0 vertical;
- The project proposes construction of a cut slope over 15 feet in height as measured from the lowest finished grade; or
- The project is located on slopes exceeding 20% grade.

Based on the Mitigated Negative Declaration (City of Goleta 2010, Appendix B), the *Geotechnical Exploration, Proposed City of Goleta Fire Station No. 10*, prepared by Leighton Consulting, Inc. (2017, Appendix E), and the geologic hazards mapping in the Goleta General Plan, Safety Element (City of Goleta 2016), geologic hazards posed by fault rupture, seismic ground shaking, seismic-related ground failure including liquefaction and lateral spreading, and expansive soil would be less than significant. In addition, the proposed fire station would be served by the Goleta West Sanitary District. Therefore, no geologic hazards related to the use of septic systems in inadequate soils would occur as a result of future construction. Consequently, impacts related to these thresholds considered less than significant are discussed in Section 4.10, *Less Than Significant Issues*.

Project Impacts and Mitigation Measures

Potential impacts on geological resources and associated mitigation measures are discussed below.

Impact GEO-1: The north-facing Project slope exceeds 20% grade and is susceptible to failure and severe erosion. This is a Class II, significant but mitigatable impact.

The Project site abuts the UPRR right-of-way to the north. The property boundary is located approximately midway down a heavily eroded, 35-foot high, 1:1 (horizontal to vertical) slope. In the northeast corner of the Project site, slope erosion has extended well inside the northern property line. If left in an unabated condition, erosion will continue to consume the adjoining flat portion of the site, as a portion of Project site surface runoff flows over the top of slope. In addition, as part of a Project-specific geotechnical investigation (Leighton Consulting, Inc. 2017, Appendix E), ultimate and peak strengths of the soil were used to analyze the static and pseudostatic (i.e., seismic) stability of the slopes, respectively, to assess whether mitigation of slope stability was required. The existing slope was calculated to not meet minimum required factors of safety with respect to static

stability (i.e., non-seismically related). The slope stability models on the north-facing slope yielded calculated static factors of safety below the code minimum required factor of safety of 1.5. In the absence of slope stabilization measures of the north-facing slope, impacts would be *potentially significant* (Class II) with respect to geological resources.

Three slope stabilization alternatives have been presented in a site-specific geotechnical report by Leighton Consulting, Inc. (2017, Appendix E), including:

- Piles at the top of the slope;
- Piles in between the property line and the top of the slope, with a reconstructed upper slope (2:1, horizontal to vertical) behind it; and
- Piles at the property line extended to proposed finished grade, with backfill behind it to create additional level space.

The first option would result in long-term stabilization of the building pad, but the slope would continue to erode until reaching an angle of repose (i.e., maximum slope angle before slumping or failure of surficial sediments) of 2.5:1 (horizontal to vertical). The second option would result in long-term stabilization of the building pad, with the upper slope eventually eroding to the angle of repose of 2.5:1 (horizontal to vertical). This option might also result in removal of the toe of slope (i.e., removal of slope support) by UPRR.

The City is pursuing the third option, which includes construction of a soldier pile wall at the mid-slope property line, and placement of fill behind the wall in order to achieve additional buildable space (see Figure 2-6). As part of Project construction, a soldier pile concrete wall topped with an attached retaining wall would be constructed along the northern Project site boundary at an elevation of approximately 111 feet, or approximately 6 feet below the top of the bluff. The wall would then be backfilled to recapture approximately 10 feet of developable site area. Approximately 900 cubic yards of soil would be imported to complete backfilling behind the wall and bring the building pad up to final grade.

Mitigation Measures and Residual Impacts

The following mitigation measures would be required to reduce impacts associated with geological resources:

GEO-1: Geotechnical Design Considerations. Consistent with recommendations in the Leighton Consulting, Inc. (2017) *Geotechnical Exploration* report (Appendix E), the applicant shall prepare a permanent slope stabilization plan for the northern portion of the Project site to prevent continued erosion and slope instability. The plan shall include construction of a pile wall at the mid-slope property line, and placement of fill behind the wall in order to achieve additional buildable space. The recommendations in the *Geotechnical*

Exploration report pertaining to slope mitigation shall be incorporated into the proposed Project grading and building plans. These recommendations include:

- Review of final civil and structural plans and specifications by a California licensed Geotechnical Engineer.
- Coordination with the pile installer, as extending the piles from the current elevation of the property line to the finished grade level will require special construction methods and structural details.
- Incorporation of specific design earth pressures in association with concrete pile construction.
- Embedment of piles to a minimum depth of 5 feet below the lowest adjacent railroad grade at the toe of slope.
- Backfill of the retaining wall with granular, non-expansive soil.
- Construction of retaining wall backdrain, which would direct water away from the wall and toward drainage devices.
- Incorporation of proper seismic design parameters.
- Incorporation of proper temporary excavation slope gradients and shoring.

Plan Requirements and Timing: A permanent slope stabilization plan to remedy existing erosion and potential slope instability along the northern site boundary shall be prepared by a licensed engineer as part of the preliminary grading/drainage plan submitted for any formal development plan application. The approved slope stabilization plan shall be implemented as approved by the Planning and Environmental Review Director or designee before issuance of grading and building permits.

Monitoring: The Project Geotechnical Engineer must observe all pile or pier installation, in accordance with the California Building Code.

The above measure would reduce potential impacts due to slope erosion and slope instability, such that impacts would be *adverse, but feasibly mitigated to less than significant* (Class II).

Impact GEO-2: On-site slope repair, grading, and construction would potentially temporarily increase soil erosion on the Project site. Implementation of BMPs and a SWMP would minimize on-site soil erosion over the long term. Temporary impacts related to soil erosion would be adverse, but less than significant (Class III).

Site preparation would include cut and fill grading of the upper 5 to 7 feet of soil to obtain the finished floor elevation. Grading would include approximately 1,350 cubic yards of cut and 2,250 cubic yards of fill, with 900 cubic yards of imported soil. In addition, slope stabilization measures would be implemented along the north property boundary. Rough grading and site preparation would occur over an approximate 4-month period and construction would occur over a 12-month period. During slope repair activities, grading, and temporary stockpiling of soil, there is the potential for soil migration offsite as a result of wind and/or water erosion.

Such erosion could result in sedimentation of nearby drainages, Devereux Creek, and downstream Devereux Slough. Impacts would be minimized during all phases of Project construction through compliance with the Construction General Permit. To comply with this permit, the permittee would be required to prepare and implement a Stormwater Management Plan (SWMP), which must include erosion and sediment control Best Management Practices (BMPs) that would meet or exceed measures required by the Construction General Permit, as well as BMPs that control other potential construction-related pollutants.

Erosion control BMPs are designed to prevent erosion, whereas sediment controls are designed to trap sediment once it has been mobilized. Examples of BMPs that may be implemented during construction include the use of geotextiles and mats, temporary drains and swales, surface water energy dissipaters, and covering of stockpiled soil. Erosion control practices may include use of silt fences, straw wattles, temporary sedimentation pits, and vehicle tracking control pads. Sedimentation basins and traps would be cleaned periodically and the silt would be disposed in a location approved by the City. Proposed landscaping and a bioretention basin would prevent long-term erosion in areas not hardscaped.

A SWMP would be developed for the Project as required by, and in compliance with, the Construction General Permit and City regulations, including grading regulations. The Construction General Permit requires the SWMP to include a menu of BMPs to be selected and implemented, based on the phase of construction and the weather conditions to effectively control erosion and sediment, using the Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology (BAT/BCT). Although soil erosion/offsite soil migration would potentially occur during slope repair, grading, and construction activities, their duration would be temporary. Additionally, soil erosion impacts over the long term would be addressed by implementation of standard City BMPs and a SWMP that would ensure that soil erosion impacts were minimized. As implementation of the BMPs and SWMP are standard requirements that would apply to this Project, short-term erosion impacts from construction would be *adverse, but less than significant* (Class III).

Mitigation Measures and Residual Impacts

As impacts on geologic resources would be less than significant given the Project's implementation of standard City BMPs and a SWMP, no mitigation is required. Residual impacts would be *adverse, but less than significant* (Class III).

4.4.4 Cumulative Impacts

Region of Influence

The Region of Influence for evaluating cumulative impacts related to slope stability is confined to the Project site, as geotechnical issues are generally site-specific and would have no impact with respect to past, present, and reasonably probable projects in the Goleta area. However, the Regional of Influence for evaluating cumulative impacts related to potential temporary erosion during grading and construction includes those areas in which related past, present, and reasonably probable projects would have the potential to contribute to erosion induced sedimentation of drainages and creeks within the same watershed as the Project site. The Project site is located approximately 600 feet west of the upper reaches of Devereux Creek, which along with several other creeks, feeds into the Devereux Slough. The slough is considered by the City to be an Environmentally Sensitive Habitat. The intent of this designation is to ensure that all development is designed and carried out in a manner that will provide maximum protection. Therefore, all related projects within the Devereux Slough watershed would be within the Region of Influence.

Implementation of Mitigation Measure GEO-1 would reduce potential slope erosion and slope instability related impacts, such that Project-related impacts would be *adverse, but feasibly mitigated to less than significant* (Class II). In addition, implementation of standard BMPs associated with a City-mandated SWMP during slope repair, grading, and construction would address potential short-term erosion related impacts such that Project-related impacts would be *adverse, but less than significant* (Class III).

Cumulative development in and around Goleta, including the proposed Project, would add 2,746 residential units (including 1,000 student beds in a new dormitory at UCSB) and more than 1.5 million square feet of commercial and industrial space (see Tables 3-1 and 3-2 in Section 3.0, Related Projects). Related development would be located on infill sites throughout the community, as well as large tracts of undeveloped open spaces along the area's urban perimeters. Related past projects within the Devereux Slough watershed include The Hideaway residential development.

With respect to geotechnical issues, impacts would be confined to individual project sites, as impacts associated with geologic hazards are primarily those directly impacting the proposed structures and its inhabitants. There would be no overlap or cumulative impact among related projects. However, short-term erosion

related impacts could be cumulatively considerable, in the absence of proper erosion control features, as erosion induced sedimentation associated with past, present, and reasonably probable projects within the Devereux Slough watershed could cumulatively impact the water quality of that environmentally sensitive water body.

The proposed Project's contribution to these potential cumulative impacts resulting from erosion induced sedimentation of Devereux Creek and the downstream Devereux Slough would be cumulatively considerable in the absence of implementation of standard construction BMPs associated with a City-mandated SWMP. However, erosion prevention and erosion control features would be implemented during grading and construction of the proposed Project and related projects located within the Devereux Slough watershed. The City would require that a Construction General Permit Qualified Storm Water Pollution Prevention Plan (SWPPP) Practitioner (QSP) and/or Qualified SWPPP Developer (QSD) be responsible for implementation of SWMPs during grading and construction of the proposed Project and all related projects. As a result, the Project's contribution to this potentially cumulative impact would be *less than considerable*.