5.5 GEOLOGY AND SOILS

This section of the Draft Environmental Impact Report (DEIR) evaluates the potential for implementation of the Hyatt Regency Newport Beach expansion (proposed project) to impact geology and soil resources in the City of Newport Beach. This section also evaluates the potential physical environmental effects related to seismic hazards, underlying soil characteristics, slope stability, and erosion within the project site from implementation of the hotel expansion. The analysis in this section is based in part on the following technical report:

- *Geotechnical Feasibility Study, Proposed Additions, Hyatt Regency Newport Beach, 1107 Jamboree Road, Newport Beach, California*, Kleinfelder, November 29, 2005.

A copy of this report is included in its entirety in Appendix F of this DEIR.

5.5.1 Environmental Setting

Regional Geologic Setting

The City of Newport Beach is located in an area of widely diverse terrain at the southern margin of the Los Angeles Basin. The Los Angeles Basin represents the transition between the Transverse Ranges geomorphic province on the north and the Peninsular Ranges geomorphic province on the south. The Transverse Ranges province is characterized by roughly east–west trending, convergent (compressional) deformational structural features in contrast to the predominant northwest–southeast structural trend of the Peninsular Ranges and other geomorphic provinces in California.

The City's landscape can best be described by geographic area, each reflective of its distinct topographic features. The central and northwestern portions of the City are situated on a broad mesa that extends southeastward to join the San Joaquin Hills. Commonly known as Newport Mesa, this upland has been deeply dissected by stream erosion, resulting in moderate to steep bluffs along the Upper Newport Bay estuary, one of the most biologically diverse natural features in Orange County. The nearly flat-topped mesa rises from about 50 to 75 feet above mean sea level (msl) at the northern end of the estuary in the Santa Ana Heights area, to about 100 feet above msl in the Newport Heights, Westcliff, and Eastbluff areas.

Along the southwestern margin of the City, sediments flowing from the two major drainage courses that transect the mesa have formed the beaches, sandbars, and mudflats of Newport Bay and West Newport. These lowland areas were significantly modified during the last century in order to deepen channels for navigation and form habitable islands. Balboa Peninsula, a barrier beach that protects the bay, was once the site of extensive low sand dunes. In the southern part of the City, the San Joaquin Hills rise abruptly from the sea, separated from the present shoreline by a relatively flat, narrow shelf. Originally formed by wave abrasion, this platform (also called a terrace) is now elevated well above the water and is bounded by steep bluffs along the shoreline. The coastal platform occupied by Corona Del Mar ranges from about 95 to 100 feet above msl, and the San Joaquin Hills, site of the Newport Coast development area, rise to an elevation of 1,164 feet at Signal Peak.

The two major drainages that have contributed greatly to the development of the City's landforms are the Santa Ana River and San Diego Creek. North of the City, numerous streams draining the foothills—including Peters Canyon Wash, Rattlesnake Wash, Hicks Canyon, Agua Chinon, and Serrano Creek—merge with San Diego Creek and collectively cut a wide channel through the mesa, later filling it with sediment (Upper Newport Bay and the harbor area). The collected drainages are now contained in the man-made San Diego

Creek Channel and directed into Upper Newport Bay near the intersection of Jamboree Road and University Drive. The Bay also receives water from the Santa Ana Delhi Channel near Irvine Avenue and Mesa Drive.

Project Site

Geology and Geologic Structure

The project site is located within the Newport Mesa portion of the Orange County Coastal Plain of the Central Block of the greater Los Angeles Basin. The project site is situated on a north–south-trending ridge along the east side of the Newport Back Bay. The site is characterized by gentle topography. Beginning at the nine-hole golf course, which forms the project's northern boundary, the surface elevation gradually slopes down to Back Bay Drive, which forms the project's southern and western boundaries. On-site elevations range between 16 feet above mean sea level (msl) on the southwestern perimeter to 69 feet above msl on the northern perimeter.

Prior to development, the site appears to have been a north–south-trending bedrock ridge along the east side of Newport Back Bay separated from east Newport Mesa. The ridge may have been an island in Newport Back Bay surrounded by locally derived Holocene (younger than 10,000 years) alluvium/colluvium and shallow marine deposits. These Holocene deposits thin against the ridge slope and thicken away from the ridge. The local bedrock geology of the project site is mapped as Monterey Formation (Miocene, 10 to 15 million years old) that is capped by undifferentiated nonmarine or marine terrace deposits of Late Quarternary age (Pleistocene, 10,000 to 500,000 years).

Holocene alluvium and colluvium are the dominant lithology in the gentle topography found in the southern portion of the project site. The northern portion of the project site is comprised of Pleistocene marine and nonmarine terrace deposits underlain by marine sedimentary deposits of the Monterey Formation.

Soil/Geologic Units

Numerous bedrock formations and surficial units are located within the project site: structural and nonstructural fill; surficial native materials, including alluvium and colluvium; and bedrock of the Monterey Formation underlie the project site. These geologic units are listed and discussed below.

Holocene Sediments

Holocene sediments within the project site consist of alluvium/colluvium, shallow marine deposits of the Newport Back Bay, and some man-made fills. The majority of the Holocene sediments occur along the southwestern portion of the project site underlying the hotel's existing surface parking areas. The sediments appear to consist of clayey alluvium and possibly limited colluvium overlain by marine origin sand, which is most likely fill but may include some marine sand deposits. Historically, the hotel's main surface parking area along the southern perimeter appears level with the Newport Back Bay area, especially along the west side of the parking area. The eastern side of the parking area appears more elevated reflecting the local alluvium/colluvium landform from the higher bluffs to the north.

The depth of the bedrock from existing ground surface of the parking area ranges from approximately 7 feet near the center cut slope to over 30 feet south of the cut-slope and on the east and west flanks of the bedrock ridge. The materials above the bedrock are assigned a Holocene age based on their location, elevation, and superposition above the bedrock.

Terrace Deposits

The project site contains coarse-grained fluvial sand and gravel overlying the bedrock at the site. The sand terrace deposits are crudely bedded with some evidence of cross-bedding. A thick bed of very fine grained sand and silty sand is also present, which appears to be beach or marine sand. Thus, the terrace consists of both nonmarine and marine sediments. This suggests that the dominantly fluvial origin of the coarser sands and gravels sometimes gave way to shallow marine deposits of finer grained sand, indicating a near coastal sedimentary environment. The base of the terrace deposits is marked by a basal cobble layer with some broken shells contained within the sand near the contact. This represents an erosional unconformity between the terrace deposits and the underlying bedrock that ranges in elevation between 38 and 45 feet above msl.

Monterey Formation/Capistrano Formation

Bedrock underlying the project site consists of dark to very dark brown siltstone that weathers to reddish brown and dark grayish brown. The siltstone is thinly bedded and parts along the bedding. Bedding surfaces are often micaceous. Some bedding is highly disturbed and sheared, displaying distortions and folding between undisturbed bedding. There are abundant fractures in the siltstone that are lined with iron oxides and manganese. The siltstone contains frequent (approximately six inches apart) interbeds of fine- to medium-grained sandstone that are typically one-quarter inch in thickness.

Published literature identifies the project site's local bedrock as Monterey Formation, although the published description of the Monterey Formation differs significantly from the siltstone observed in the field during the geotechnical investigation of the project site. In general, the Monterey Formation is a light gray to gray-brown diatomaceous and siliceous siltstone, whereas the siltstone within the project site is dark brown with no appearance of the diatomaceous or siliceous characteristics of the Monterey Formation. Based on the field observations, the project site's bedrock is most similar to the Pliocene Capistrano Formation (five million years old); however, published sources indicate that microfossils correlate in age to the older Monterey Formation. It is possible that local faulting mapped across the bay juxtaposes the Monterey and Capistrano Formations locally and brings the Capistrano Formation beneath the terrace deposits of the project site.

Artificial Fill

Holocene sediments within the project site consist of alluvium/colluvium, shallow marine deposits of the Newport Back Bay, and some manmade fills. Historical aerials show the introduction of fill, especially in 1967 when the parking lot and the adjacent slope were being graded for hotel expansion.

Faulting and Seismicity

The faulting and seismicity of southern California is dominated by the San Andreas fault system. The zone separates two of the major tectonic plates that comprise the earth's crust. The Pacific Plate on the west moves in a northwesterly direction relative to the North American Plate on the east. The relative movement between the two plates is the driving force of fault ruptures in western California. The San Andreas fault system generally trends northwest–southeast; however, north of the Transverse Ranges Province, the fault trends more in an east–west direction, causing a north–south compression between the two plates. North–south compression in southern California has been estimated from 5 to 20 millimeters per year. This compression has produced rapid uplift of many of the mountain ranges in southern California and is responsible for most of the seismic activity in the region.

There are numerous faults in southern California, which are categorized by the California Geological Survey (CGS) as active, potentially active, or inactive. A fault is classified as active by the state if it has moved during the Holocene epoch (during the last 11,000 years) or is included in an Alquist-Priolo Earthquake Fault Zone (as established by the CGS). A fault is classified as potentially active if it last experienced movement during the Quaternary period (the last 1.6 million years). Faults that have not moved in the last 1.6 million years generally are considered inactive. Surface displacement can be recognized by the existence of cliffs in alluvium, terraces, offset stream courses, fault troughs and saddles, the alignment of depressions, sag ponds, and the existence of steep mountain fronts.

The City of Newport Beach is located in the northern part of the Peninsular Ranges Province, an area that is exposed to risk from multiple earthquake fault zones. The highest risks originate from the Newport-Inglewood fault zone, the Whittier fault zone, the San Joaquin Hills fault zone, and the Elysian Park fault zone, each with the potential to cause moderate to large earthquakes that would cause ground shaking in Newport Beach and nearby communities. Figure 5.5-1 illustrates the regional faults in the vicinity of Newport Beach.

The project site is not located within an Alquist-Priolo Special Study Zone and no known faults traverse the project site (Kleinfelder 2005). The Newport-Inglewood fault is considered to be the most significant active fault with respect to the project site. The Newport-Inglewood Fault is located approximately two miles southwest of the project site.

Seismic Hazards

The geologic diversity of Newport Beach is strongly related to tectonic movement along the San Andreas Fault and its broad zone of subsidiary faults. This, along with sea-level fluctuations related to changes in climate, has resulted in a landscape that is also diverse in geologic hazards. Geologic hazards are generally defined as surficial earth processes that have the potential to cause loss or harm to the community or the environment. Earthquake-triggered geologic effects also include surface fault rupture, landslides, liquefaction, subsidence, and seiches. Earthquakes can also lead to urban fires, dam failures, and toxic chemical releases, all human-related hazards.

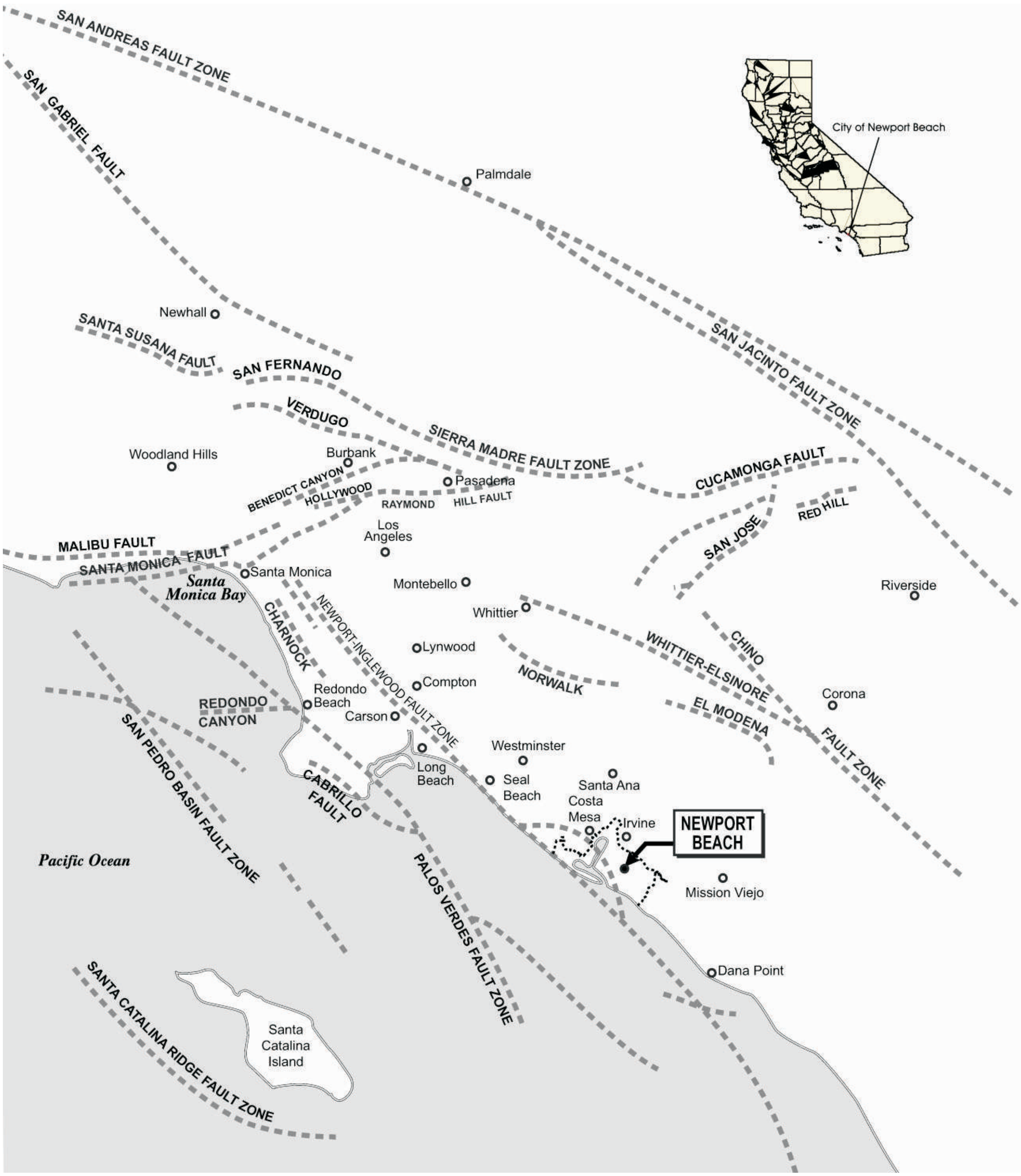
Strong Seismic Ground Shaking

A number of earthquakes have caused strong ground shaking in Newport Beach, including the 1933 Long Beach earthquake, which caused significant damage in the City. Seismic shaking is the geological hazard with the greatest potential to severely impact the City of Newport Beach, including the project site, because it is located on or near several significant faults that have the potential for moderate to large earthquakes (see Figure 5.5-1, *Regional Faults*). Some of the faults caused moderate-sized earthquakes in the last century and, given their length, they are thought capable of generating even larger earthquakes in the future, which would cause strong ground shaking in Newport Beach and nearby areas. Numerous other active faults, both onshore and offshore, have the potential to generate earthquakes that would cause strong ground shaking in Newport Beach.

The Newport Beach area has a 10 percent chance of experiencing ground acceleration greater than 43 to 52 percent the force of gravity in 50 years. These probabilistic ground motion values for the City of Newport Beach are in the high to very high range for southern California and are the result of the City's proximity to major fault systems with high earthquake recurrence rates. These levels of shaking can be expected to cause damage particularly to older and poorly constructed buildings.

Similar to the rest of City of Newport Beach, the project site is subject to ground shaking and potential damage in the event of seismic activity. The most likely source of strong seismic ground shaking within the project site would be a major earthquake along the Newport-Inglewood Fault, which is located approximately two miles southwest of the project site. The fault is classified as active with a seismic capability over magnitude 7.0.

Regional Faults



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Seismically Induced Slope Failure/Landslides

Strong ground motions can also worsen existing unstable slope conditions, particularly if coupled with saturated ground. Seismically induced landslides can overrun structures, people, or property; sever utility lines; and block roads, thereby hindering rescue operations after an earthquake. Much of the area in eastern Newport Beach has been identified as vulnerable to seismically induced slope failure. Rupture along the Newport-Inglewood Fault Zone and other faults in southern California could reactivate existing landslides and cause new slope failures. Slope failures can also be expected to occur along stream banks and coastal bluffs, such as Big Canyon, around San Joaquin Reservoir, Newport and Upper Newport Bays, and Corona del Mar.

Liquefaction and Related Ground Failure

Strong ground shaking can result in liquefaction, which occurs when there is a loss of strength or stiffness in the soils, resulting in the settling of buildings, ground failures, or other hazards. Liquefaction generally occurs as a “quicksand” type of ground failure. The primary factors influencing liquefaction potential include groundwater, soil type, relative density of the sandy soils, confining pressure, and the intensity and duration of ground shaking. Areas of Newport susceptible to liquefaction and related ground failure (i.e., seismically induced settlement) include areas along the coastline such as Balboa Peninsula, in and around the Newport Bay and Upper Newport Bay, in the lower reaches of major streams in Newport Beach, and in the floodplain of the Santa Ana River.

Groundwater

Groundwater was encountered in numerous borings excavated during the geotechnical investigation of the project site. According to the geotechnical investigation, the historical depth to groundwater in the project area is approximately 10 feet below grade surface (bgs). Groundwater was encountered in one of the boring excavations at a depth of approximately 7 feet bgs in the western portion of the hotel’s main parking area, corresponding to a surface elevation of approximately 13.5 feet above msl. Fluctuations of the groundwater level, localized zones of perched water, and soil moisture content should be anticipated during and following the rainy season or periods of locally intense rainfall or stormwater runoff. Irrigation of landscaped areas can also cause fluctuation of local groundwater levels.

Regulatory Background

State laws, regulations, plans, or guidelines that are potentially applicable to the proposed project are summarized below.

California Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was signed into state law in 1972, as amended, to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy on an active fault. The Act requires the State Geologist to delineate “Earthquake Fault Zones” along faults that are “sufficiently active” and “well defined.” The Act also requires that cities and counties withhold development permits for sites within an Earthquake Fault Zone until geologic investigations demonstrate that the sites are not threatened by surface displacements from future faulting. Pursuant to this Act, structures for human occupancy are not allowed within 50 feet of the trace of an active fault. The City of Newport Beach is not located within an Alquist-Priolo Earthquake Fault Zone.

Seismic Hazard Mapping Act

The Seismic Hazard Mapping Act (SHMA) was adopted by the state in 1990 for the purpose of protecting public safety from the effects of (nonsurface fault rupture) earthquake hazards. The CGS prepares and provides local governments with seismic hazard zones maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures. The seismic hazards zones are referred to as "zones of required investigation" because site-specific geological investigations are required for construction projects located within these areas. Before a project can be permitted, a geologic investigation, evaluation, and written report must be prepared by a licensed geologist to demonstrate that proposed buildings will not be constructed across active faults. If an active fault is found, a structure for human occupancy must be set back from the fault (generally 50 feet). In addition, sellers (and their agents) of real property within a mapped Seismic Hazard Zone must disclose that the property lies within such a zone at the time of sale.

Uniform Building Code

The Uniform Building Code (UBC) is published by the International Conference of Building Officials. It forms the basis of about half the state building codes in the United States, including California's, and has been adopted by the state legislature, together with Additions, Amendments, and Repeals to address the specific building conditions and structural requirements in California.

California Building Code

California Code of Regulations (CCR), Title 24, Part 2, the California Building Code (CBC), provides minimum standards for building design in the state, consistent with or more stringent than UBC requirements. Local codes are permitted to be more restrictive than Title 24, but not less restrictive. The procedures and limitations for the design of structures are based on site characteristics, occupancy type, configuration, structural system height, and seismic zoning. Seismic ratings are derived from UBC specifications, which divide the U.S. into four geographical zones, of which Zone 4—comprising most of central and coastal California—is rated the most prone to earthquake activity. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in Cal/OSHA regulations (CCR, Title 8).

Unreinforced Masonry Law

In California, unreinforced masonry (URM) buildings are generally brick buildings constructed prior to 1933 and predating modern earthquake-resistant design. In earthquakes, the brick walls (especially parapets) tend to disconnect from the building and fall outward, creating a hazard for people below and sometimes causing the building to collapse. The Unreinforced Masonry Law, enacted by the state in 1986, requires cities and counties within Seismic Zone 4 to identify hazardous URM buildings and to consider local regulations to abate potentially dangerous buildings through retrofitting or demolition, as outlined in the State Office of Planning and Research Guidelines. No URM buildings are shown to be located within the project site.

National Pollution Discharge Elimination System (NPDES)

NPDES Phase 1 Permit (General Construction Activity Stormwater Permit)

A Storm Water Pollution Prevention Plan (SWPPP) prepared in compliance with a National Pollutant Discharge Elimination System (NPDES) Phase I Permit describes erosion and sediment controls, runoff water quality monitoring, means of waste disposal, implementation of approved local plans, control of postconstruction sediment and erosion control measures and maintenance responsibilities, and non-stormwater management controls. Dischargers are also required to inspect construction sites before and after storms to identify stormwater discharge from construction activity, and to identify and implement controls where necessary.

Additionally, Newport Beach operates a municipal separate storm sewer system (MS4) permit under the NPDES. MS4 permits require an aggressive water quality ordinance, specific municipal practices, and the use of best management practices (BMPs) in many development-related activities to further reduce the amount of contaminants in urban runoff. MS4 permits also require local agencies to cooperatively develop a public education campaign to inform people about what they can do to protect water quality.

5.5.2 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would:

G-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 Division of Mines and Geology Special Publication 42.)
- ii) Strong seismic ground shaking.
- iii) Seismic-related ground failure, including liquefaction.
- iv) Landslides.

G-2 Result in substantial soil erosion or the loss of topsoil.

G-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.

G-4 Be located on expansive soil, as defined in Table 18-1B of the Uniform building Code (1994), creating substantial risks to life or property.

G-5 Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

The Initial Study, included as Appendix A, substantiates that impacts associated with the following thresholds would be less than significant: G-5

This impact will not be addressed in the following analysis.

5.5.3 Environmental Impacts

The following impact analysis addresses thresholds of significance for which the Initial Study disclosed potentially significant impacts. The applicable thresholds are identified in brackets after the impact statement.

IMPACT 5.5-1: PERSONS AND EXISTING AND FUTURE STRUCTURES WITHIN THE PROJECT SITE WOULD BE SUBJECTED TO POTENTIAL SEISMIC-RELATED HAZARDS. [THRESHOLD G-1]

Impact Analysis: The project site is located in a seismically active region. Existing and future structures within the project site can be expected to be subject to strong seismic shaking during the design life of the structures. Potential seismic hazards include ground failure due to seismic activity, ground shaking, landslides, and localized liquefaction. The following is a discussion of these potential seismic hazards with respect to the project site.

Seismic-Related Ground Failure

The project site is not located within an Alquist-Priolo Special Study Zone and no known faults traverse the project site (Kleinfelder 2005). However, the project site is located within seismically active southern California (Seismic Zone 4). Regional active faults are typical of southern California, so it is reasonable to expect a moderately strong seismic event to occur in the City of Newport Beach in the future. The Newport-Inglewood fault, approximately two miles southwest of the project site, is considered to be the most significant active fault with respect to the City and the project site.

Measures outlined in the Geotechnical Feasibility Study (Appendix F) for the project site, relative to site preparation, excavation, fill placement and compaction, foundation design, site drainage, and retaining wall designs, would be incorporated into the structural design of the project and would minimize the potential for significant seismic-related impacts.

Strong Seismic Ground Shaking

As with other developments in southern California, development associated with the proposed project may be exposed to impacts from strong seismic ground shaking caused by earthquakes. The project site is located in Seismic Zone 4, one of five zones (0–4) mapped in the CBC to identify areas subject to varying degrees of potential impact and frequency of large earthquakes. Seismic Zone 4 is potentially subject to the greatest seismic shaking and frequency of large earthquakes.

The state regulates development in California through a variety of tools that reduce potential hazards from earthquakes and other geologic hazards. The CBC contains provisions to safeguard against major structural failures or loss of life caused by earthquakes or other geologic hazards.

Landslides

Landslides are the downslope movement of soil and/or rock under the influence of gravity. Landslide processes are influenced by factors such as thickness of soil or fill over bedrock, steepness, and height of slope, physical properties of the fill, amount of soil or bedrock materials, and moisture content. These factors may increase the effective force of gravity on a slope, decrease the ability of the slope to resist gravitational influence, or a combination of the two, which can lead to landslides and mudflows. Strong ground motions can also worsen existing unstable slope conditions, particularly if coupled with saturated ground conditions. Slope failures in the form of landslides are common during strong seismic shaking in areas of significant relief. Seismically induced landslides can overrun structures, people, or property; sever utility lines; and block roads, thereby hindering rescue operations after an earthquake.

According to Figure S2, *Seismic Hazards*, of the Safety Element of the City's General Plan, the project site is not located in an area with landslide potential. However, the geotechnical feasibility study performed for the project site found that the slopes in the northern portion of the project site (along the golf course) are located within a state-designated Seismic Hazard Zone for Earthquake-Induced Landsliding (Kleinfelder 2005).

Based on the geologic conditions observed in the boring excavations performed by Kleindelder as a part of the geotechnical feasibility study, the potential for slope instability is considered low. However, based on additional subsurface data, slope stability analysis should be performed during the design-level geotechnical study.

Liquefaction

According to Figure S2, Seismic Hazards, of the Safety Element of the City's General Plan, the project site is located in an area considered to have a potential for ground failure in the form of liquefaction. More specifically, the areas surrounding the main hotel complex to the south, east, and west (parking lots) are located within a designated seismic hazard zone for liquefaction potential (Kleinfelder 2005). The proposed improvements within the designated liquefaction hazard zone consist of the parking structure and the new 800-seat ballroom. Additionally, groundwater was encountered at a depth of approximately seven feet below grade surface in the western portion of the hotel's main parking area (Kleinfelder 2005).

As encountered in one of the boring excavations of the geotechnical feasibility study performed by Kleinfelder, the soils below the groundwater level consist of medium stiff to very stiff sandy clay and siltstone/claystone of the Monterey/Capistrano formations. These soils are not considered liquefiable and, therefore, the potential for liquefaction and its adverse affects, such as seismic settlement and lateral spreading, are considered low within the project site.

IMPACT 5.5-2: THE PROPOSED PROJECT WOULD NOT RESULT IN SUBSTANTIAL SOIL EROSION OR THE LOSS OF TOPSOIL. [THRESHOLD G-2]

Impact Analysis: Soil erosion is a normal and inevitable geologic process whereby earthen materials are loosened, worn away, decomposed, or dissolved, and removed from one place and transported to another. Precipitation, running water, waves, and wind are all agents of erosion. Ordinarily, erosion proceeds so slowly as to be imperceptible, but when the natural equilibrium of the environment is disturbed, the rate of erosion can be greatly accelerated. This can create aesthetic as well as engineering problems. Accelerated erosion within an urban area can cause damage by undermining structures, blocking storm sewers, and depositing silt, sand, or mud in roads and tunnels. Eroded materials are eventually deposited into our coastal waters, where the carried silt remains suspended in the water for some time, constituting a pollutant and altering the normal balance of plant and animal life.

In Newport Beach, erosion is a significant concern, especially along the shoreline (beach sediments and coastal bluffs are susceptible to erosion by wave action) and including the bluffs along the Upper Newport Bay and the slopes and canyons within the San Joaquin Hills.

Substantial soil erosion is not expected to occur during the operational phase of the proposed project. However, construction of the proposed project would involve grading, excavation, and hauling of materials (including dirt, demolition debris, etc.) off the site. These activities may result in the loss of topsoil or substantial soil erosion impacts on off-site areas, such as nearby streets and storm drains, which could expose people or structures to potential substantial adverse effects.

Mitigation for erosion potential includes capping areas with a more cohesive fill material, providing replacement fills with more cohesive materials on planned cut slopes, and/or placing erosion protection on the surface of the soils (such as polymer coatings, jute matting, geotextiles, or gunite V-ditches). Proper control of surface drainage also helps to mitigate against soil erosion. The drainage systems of the proposed project would be designed and maintained to collect surface waters and direct flows away from slopes.

Development of the project site is subject to local and state codes and requirements for erosion control and grading during construction. The proposed project shall comply with standard conditions, including South Coast Air Quality Management District (SCAQMD) Rules 402 and 403, which would reduce construction erosion impacts. Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emissions source. Rule 402 requires dust suppression techniques be implemented to prevent dust and soil erosion from creating a nuisance off-site. The proposed project would also be subject to NPDES permitting regulations, including the development and implementation of an SWPPP, which is further discussed in Section 5.7, *Hydrology and Water Quality*, of this Draft EIR.

IMPACT 5.5-3: UNSTABLE GEOLOGIC UNIT OR SOILS CONDITIONS, INCLUDING SOIL CORROSIVITY, COULD RESULT DUE TO DEVELOPMENT OF THE PROJECT. [THRESHOLD G-3]

Impact Analysis: Soil corrosion is an electrochemical process that is responsible for the corrosion of metals and other building materials in contact with soil.

As a part of the geotechnical feasibility study performed by Kleinfelder, selected samples of on-site soils were tested for preliminary evaluation of the potential soil corrosivity to concrete and reinforced steel. Based on the minimum resistivity results from the soils tested, the near-surface site soils may be considered to be severely corrosive to buried ferrous metals. The relatively low concentrations of soluble sulfates indicate that on-site soils of similar composition should not be aggressive to concrete elements.

IMPACT 5.5-4: THE PROJECT SITE IS LOCATED ON EXPANSIVE SOIL THAT COULD RESULT IN SUBSTANTIAL RISKS TO LIFE OR PROPERTY. [THRESHOLD G-4]

Impact Analysis: Expansive soil, with respect to engineering properties, refers to those soils that, upon wetting and drying, will alternately expand and contract, causing problems for foundations of buildings and other structures. Expansive soils can also consist of silty to sandy clay.

Some of the geologic units in the Newport Beach area, including both surficial soils and bedrock, have fine-grained components that are moderately to highly expansive. These materials may be present at the surface or exposed by grading activities. Man-made fills can also be expansive depending on the soils used to construct them.

The geotechnical feasibility study evaluated the potential for expansive soils within the project site. Based on the soil classification (sands) encountered, the potential for expansion of the fill soils and terrace deposit is very low. However, based on laboratory testing, the potential for expansion of the alluvium and bedrock is considered high (Kleinfelder 2005). The finish-grade soils should be further analyzed to verify the expansion potential of final subgrade soils.

5.5.4 Cumulative Impacts

Impacts relating to soils and geologic influences are site specific and are difficult to evaluate in cumulative terms. Mitigation of geologic, seismic, and soil impacts of development projects would be specific to each site. Development of the proposed project would not combine with other area projects to result in cumulatively considerable impacts.

5.5.5 Existing Regulations

Existing Regulations

- Statewide General Construction NPDES Permit (Order 92-08-DWQ)
- South Coast Air Quality Management District (SCAQMD) Rules 402 and 403
- California Building Code (CBC). California Code of Regulations (CCR), Title 24, Part 2
- Uniform Building Code (UBC). Published by the International Conference of Building Officials

5.5.6 Level of Significance Before Mitigation

Upon implementation of regulatory requirements, the following impacts would be less than significant: 5.5-2

Without mitigation, the following impacts would be **potentially significant**:

- Impact 5.5-1 The proposed project would subject persons and existing and future structures to potential seismic-related hazards.
- Impact 5.5-3 Development of the proposed project could result in an unstable geologic unit or soils conditions.
- Impact 5.5-4 The proposed project is located on expansive soils.

5.5.7 Mitigation Measures

Impacts 5.5-1, 5.5-3 and 5.5-4

5-1 Prior to issuance of grading permits, the project applicant shall demonstrate that all grading operations and construction will be conducted in conformance with the City of Newport Beach Grading Ordinance and the most recent version of the Uniform Building Code, to the satisfaction of the City Engineer.

5-2 Prior to issuance of grading permits, the project applicant shall include a note on all grading plans indicating that grading and earthwork shall be performed under the observation of a Registered Civil Engineer specializing in Geotechnical Engineering in order to achieve proper subgrade preparation, selection of satisfactory fill materials, placement and compaction of structural fill, stability of finished slopes, and incorporation of data supplied by the engineering geologist. The geologist shall geologically map the exposed earth units during grading to verify the anticipated conditions, and if they are different, provide findings to the geotechnical engineer for possible design modifications.

5-3 Prior to issuance of grading permits, a detailed design-level geotechnical investigation report shall be prepared and submitted with engineered grading plans to further evaluate expansive soils, soil corrosivity, slope stability, landslide potential, settlement, foundations, grading constraints, and other soil engineering design conditions and to provide site-specific recommendations to address these conditions, if determined necessary. The geotechnical reports shall be prepared and signed/stamped by a Registered Civil Engineer specializing in geotechnical engineering and a Certified Engineering Geologist. Geotechnical rough grading plan review reports shall be prepared in accordance with the City of Newport Beach Grading Ordinance.

5-4 Prior to issuance of grading permits and based upon the soil corrosivity tests conducted for the proposed project, the project applicant shall include a note on all grading plans indicating that site-specific soils testing shall be performed under the observation of a registered corrosion engineer specializing in soil corrosivity for any areas proposed to be developed with structures. The corrosion engineer shall evaluate the corrosion potential of the soils on proposed improvements, recommend further testing if deemed necessary, and identify specific construction methods to address soil corrosivity, if detected.

5.5.8 Level of Significance After Mitigation

Compliance with existing rules, regulations and codes, and the mitigation measures identified above would reduce potential impacts associated with geology and soils to a level of less than significant. Therefore, no significant unavoidable adverse impacts relating to geology and soils have been identified.