4.5 GEOLOGY, SOILS, AND MINERAL RESOURCES

4.5.1 Introduction

This section of the EIR analyzes the potential physical environmental effects related to seismic hazards, underlying soil characteristics, slope stability, erosion, and existing mineral resources in the Planning Area, within the City of Newport Beach from implementation of the General Plan Update. Data used to prepare this section was taken from the Hazards Assessment Study prepared for the Technical Background Report, the California Geological Survey (CGS) (formerly known as the Division of Mines and Geology), and previous environmental documentation prepared for the Planning Area.

The Initial Study prepared for the proposed project identified the potential for the project area to expose people or structures to risks from seismic effects (such as fault rupture, groundshaking, liquefaction, and landslides), soil erosion and loss of topsoil, geologically unstable soils, and geologically expansive soils. The City of Newport Beach is almost entirely built out with established utility services and new development would not require the use of septic tanks. Therefore, issues related to the use of alternative waste disposal systems are not included in the detailed analysis presented in this EIR. Full bibliographic entries for all reference materials are provided in Section 4.5.10 (References) of this section.

The Initial Study also identified the potential for impacts related to loss of a availability of a known mineral resource that would be of value to the region and residents, or loss of availability of a locally-important mineral resource recovery site.

One comment letter associated with geology, soils, and mineral resources was received in response to the IS/NOP circulated for the General Plan Update. The Department of Conservation (DOC)—Division of Oil, Gas, and Geothermal Resources requested that the DEIR include an analysis of potential impacts of building over, or in the proximity to, the plugged and abandoned wells located within the administrative boundaries of the West Newport and Newport oil fields. Section 4.5.5 (Project Impacts, Mitigation Measures, and Proposed Policies) provides such an analysis. The DOC also requests that these wells be plotted on future project maps.

4.5.2 Geology and Soils

Existing Conditions

Physiographic Setting

The Planning Area is located in an area of widely diverse terrain at the southern margin of the Los Angeles Basin. The Planning Area's landscape can best be described by geographic area, each reflective of its distinct topographic features. The central and northwestern portions of the Planning Area 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 at the northern end of the estuary in the Santa Ana Heights area, to about 100 feet above sea level in the Newport Heights, Westcliff, and Eastbluff areas.

Along the southwestern margin of the Planning Area, 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 Planning Area, 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 sea level, 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 Planning Area, numerous streams draining the foothills, including Peters Canyon Wash, Rattlesnake Wash, Hicks Canyon, Agua Chinon, and Serrano Creek, merged 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.

Regional and Local Faults

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 lies west of the fault zone. This plate is moving in a northwesterly direction relative to the North American Plate, which lies east of the fault zone. 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 five to twenty millimeters per year.[30] 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 that are categorized by the CGS as active, potentially active, and 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

[30] Southern California Earthquake Data Center (SCEDC), *Alphabetical Fault Index*. 2005. www.dta.scec.org, Accessed October 2005.

the CGS). A fault is classified as potentially active if it has 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 4.5-1 illustrates the regional faults in the vicinity of the Planning Area.

Historic Seismicity

Generally defined, an earthquake is an abrupt release of accumulated energy in the form of seismic waves created when movement occurs along a fault plane. The specific faulting characteristics of the Los Angeles Basin are governed by regional north/south compression, a product of the continued motion between the Pacific and North American Plates.[31] More than half the energy produced by this motion is stored by the San Andreas Fault, the main boundary between the Pacific and North American Plates. The remaining energy is distributed through movement on two principal fault systems: the northwest/southeast–trending faults subparallel to the San Andreas system and the east/west–trending faults of the Transverse Ranges.

The severity of an earthquake generally is expressed in two ways—magnitude and intensity. The energy released, measured on the Moment Magnitude (M_W) scale, represents the "size" of an earthquake. The Richter Magnitude (M) scale has been replaced in most modern building codes by the M_W scale because the M_W scale provides more useful information to design engineers. The intensity of an earthquake is measured by the Modified Mercalli Intensity (MMI) scale, which emphasizes the current seismic environment at a particular site and measures ground shaking severity according to damage done to structures, changes in the earth surface, and personal accounts. Table 4.5-1 (Modified Mercalli Intensity Scale) identifies the level of intensity according to the MMI scale and describes that intensity with respect to how it would be received or sensed by its receptors.

The terms Maximum Credible Earthquake (MCE) and Maximum Probable Earthquake (MPE) have been used for many years to describe the largest earthquake that would be likely to occur along a particular fault and within a given timeframe, respectively. Recent revisions incorporated by California into the California Building Code (CBC), based on recommendations identified by the Seismology Committee of the Structural Engineers Association of California, have eliminated the use of these terms. The 2001 CBC revisions require that the M_W of the "characteristic earthquake" be used in geotechnical

[31] Yerkes, R.F. 1985. Geologic and Seismologic Setting, in, *Evaluating Earthquake Hazards in the Los Angeles Region—An Earth-Science Perspective.* United States Geological Survey Professional Paper 1360.

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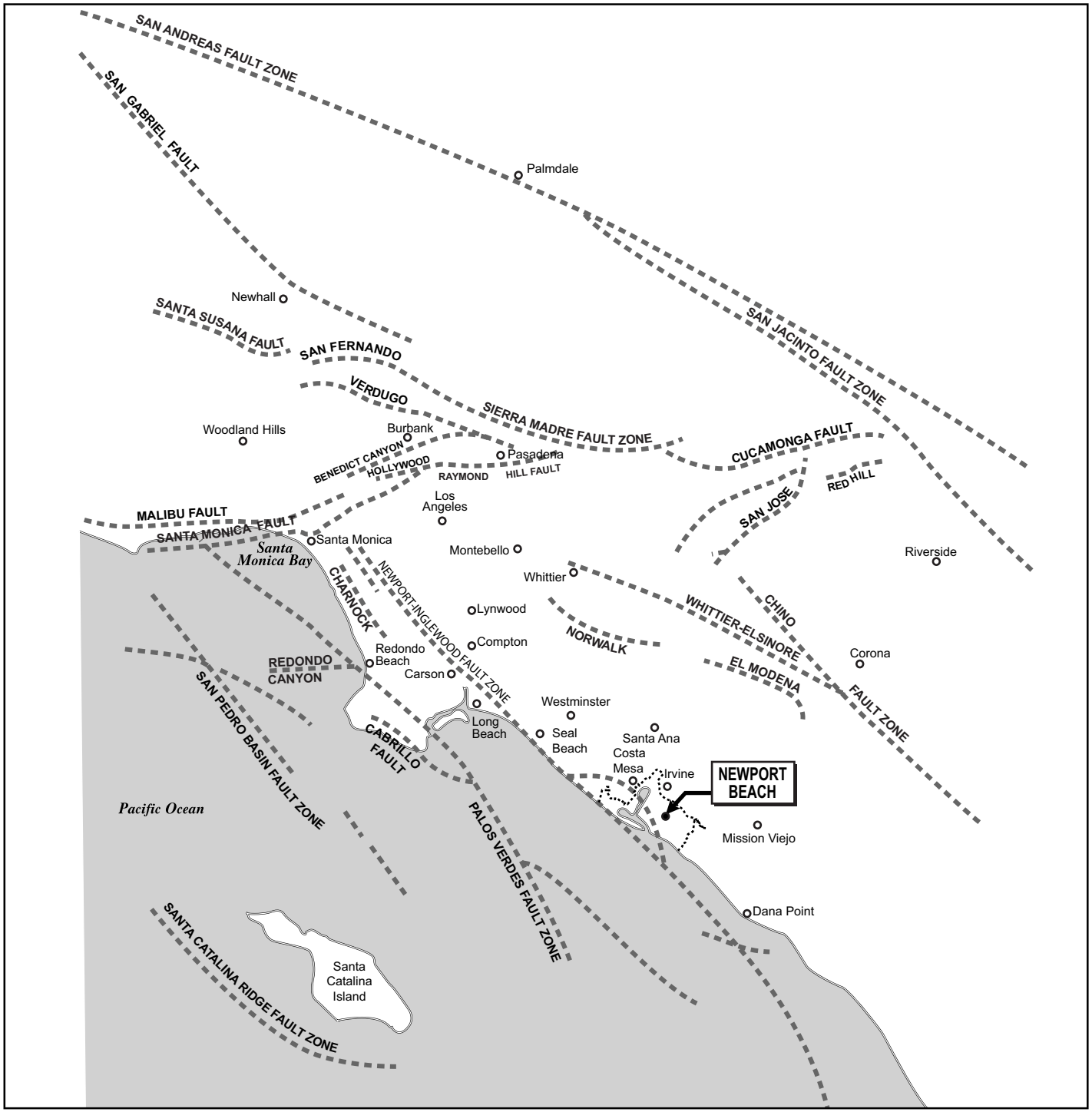
Figure 4.5-1
REGIONAL FAULTS



Legend

City Boundary

N

0 5 10 20

Miles

Source: EIP Associates, 2006

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Table 4.5-1 Modified Mercalli Intensity Scale

Modified Mercalli Intensity	*Description*
I	Detected by only sensitive instruments
II	Felt by a few people at rest
III	Felt noticeably indoors, but not always recognized as a quake; vibration like a passing truck
IV	Felt indoors by many and outdoors by few
V	Felt by most people. Some breakage of windows, dishes, and plaster
VI	Felt by all; falling plaster and chimneys; damage small
VII	Damage to buildings varies; depends on quality of construction
VIII	Walls, monuments, chimneys fall; panel walls thrown out of frames
IX	Buildings shift off foundations; foundations crack; ground cracks; underground pipes break
X	Most masonry and frame structures destroyed; ground cracks; landslides
XI	Ground fissures; pipes break; landslides; rails bent; new structures remain standing
XII	Damage total; waves seen on ground surface; objects thrown into the air

SOURCE: *Nuclear Reactors and Earthquakes*, Atomic Energy Commission, TID7024

calculations for design purposes. The new criterion for describing the energy release (i.e., the "size" of an earthquake along a particular fault segment) was determined by the Seismology Committee to represent a more reliable descriptor of future fault activity than the MCE or the MPE. Although the M_W value may differ slightly from the MCE or MPE values reported in some of the older documents cited in this EIR, this current method for describing future fault activity does not alter the assumptions or conclusions of this EIR.

The maximum historic site acceleration in the project region was estimated to be 0.4 g[32] in 1933, caused by an earthquake of 6.3M_w on the Newport-Inglewood Fault. Alquist-Priolo Earthquake Fault Zone mapping has been completed for the City of Newport Beach by the State Geologist concluding that the highest risk originates from the Alquist-Priolo Earthquake Fault Zone for the Newport-Inglewood fault which terminates about two miles northwest of the City limits.[33]

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

[32] **Ground Acceleration**: The speed at which soil or rock materials are displaced by seismic waves. It is measured as a percentage of "g,"the acceleration of gravity (0.5g = 50 percent of 32 feet per second squared, expressed as a vertical or horizontal force). Peak ground acceleration is the maximum acceleration expected from the characteristic earthquake predicted to affect a given area. Repeatable acceleration refers to the acceleration resulting from multiple seismic shocks. Sustained acceleration refers to the acceleration produced by continuous seismic shaking from a single, long-duration event

[33] Seismic Hazards, Hazards Assessment Study, Earth Consultants International, 2003, page 2-12.

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 man-related hazards. Figure 4.5-2 shows areas within Newport Beach that are subject to liquefaction and landslides.

Ground Shaking

Seismic shaking is the geological hazard that has the greatest potential to severely impact the Planning Area, given that the City is located on and near several significant faults that have the potential to cause moderate to large earthquakes. Some of the faults caused moderate sized earthquakes in the last century. Given the length of the faults, they are thought capable of generating even larger earthquakes in the future that 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. A number of historic earthquakes have caused strong ground shaking in Newport Beach. The 1933 Long Beach earthquake caused significant damage in the City.

The Newport Beach area has a ten 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.[34] Liquefaction and slope failure are destructive secondary effects of strong seismic shaking.

Liquefaction

Strong ground shaking can result in liquefaction. Liquefaction, a geologic process that causes ground failure, typically occurs in loose, saturated sediments primarily of sandy composition. Areas of Newport susceptible to liquefaction and related ground failure (i.e. seismically induced settlement) include areas along the coastline that includes 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. It is likely that residential or commercial development will never occur in many of the other liquefiable areas, such as Upper Newport Bay, the Newport Coast beaches, and the bottoms of stream channels. However, other structures (such as bridges, roadways, major utility lines, and park improvements) that occupy these areas are vulnerable to damage from liquefaction if not designed in accordance with current regulations and codes.

[34] Seismic Hazards, Hazards Assessment Study, Earth Consultants International, 2003, page 2-23.

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Figure 4.5-2
SEISMIC HAZARDS

Legend

- Areas with liquefaction potential
- Areas with landslide potential

Note: GIS Data Projection - CA State Plane, Zone 6, NAD83, Feet.

0 0.5 1
Miles

Sources: City of Newport Beach, City Boundary, May 2003; Roads, October 2003; Seismic Hazards, Earth Consultants, 2003.

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Slope Failures

Strong ground motions can also worsen existing unstable slope conditions, particularly if coupled with saturated ground conditions. 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. Approximately 90 percent of the land from Los Trancos Canyon to the Crystal Cove State Park boundary is mapped as susceptible to landsliding by the California Geologic Survey. Additionally, the sedimentary bedrock that crops out in the San Joaquin Hills is locally highly weathered. In steep areas, strong ground shaking can cause slides or rockfalls of this material. Rupture along the Newport-Inglewood Fault Zone and other faults in Southern California could reactivate existing landslides and cause new slope failures throughout the San Joaquin Hills. 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.

Seismically Induced Settlement

Settlement occurs in areas that are prone to different rates of surface settling and densification (differential compaction), and are underlain by sediments that differ laterally in composition or degree of existing compaction. Differential settlement can damage structures, pipelines, and other subsurface entities. Strong ground shaking can cause soil settlement by vibrating sediment particles into more tightly compacted configurations, thereby reducing pore space. Unconsolidated, loosely packed alluvial deposits and sand are especially susceptible to this phenomenon. Poorly-compacted artificial fills also may experience seismically induced settlement. Those portions of the Newport Beach area that may be susceptible to seismically induced settlement are those underlain by late Quaternary unconsolidated sediments. These areas are geographically similar to the liquefaction-susceptible areas shown on Figure 4.5-2.

Soil and Groundwater Conditions

The Planning Area is underlain by Holocene-age alluvial sediments present in active and recently active stream channels throughout the area, in addition to beach, marshland, and intertidal deposits of Newport Harbor and Upper Newport Bay. Newport Mesa is underlain by primarily shallow marine sediments ranging in age from early to late Pleistocene.

Shallow ground water levels (less than 50 feet from the ground surface) are known to occur along the coast, around Newport Bay, and along the major drainages in the Newport Beach area. Shallow ground water perched on bedrock may also be seasonally present in the canyons draining the San Joaquin Hills.

Soil Erosion

Soil erosion is the process by which soil particles are removed from a land surface by wind, water, or gravity. Topsoil is the uppermost layer of soil, usually the top six to eight inches. Topsoil has the highest

concentration of organic matter and microorganisms, and is where most biological soil activity occurs. Plants generally concentrate their roots in, and obtain most of their nutrients from, this layer. Topsoil erosion is of concern when the topsoil layer is blown or washed away, which makes plant life or agricultural production impossible. Most natural erosion occurs at slow rates; however, the rate of erosion increases when land is cleared or altered and left in a disturbed condition. In Newport Beach, erosion is a significant concern, especially along the shoreline (beach sediments and coastal bluffs are susceptible to erosion by wave action), including bluffs along the Upper Newport Bay, and slopes and canyons within the San Joaquin Hills.

Compressible Soils

Compressible soils underlie a significant part of the City, typically in the lowland areas and in canyon bottoms. These are generally young sediments of low density with variable amounts of organic materials. Under the added weight of fill embankments or buildings, these sediments will settle, causing distress to improvements. Low-density soils, if sandy in composition and saturated with water, will also be susceptible of the effects of liquefaction during a moderate to strong earthquake.

Expansive Soils

Some of the geologic units in the Newport Beach area, including both surficial soils and bedrock, have fine-grained components that are moderate 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.

Subsidence

Land subsidence is the condition where the elevation of a land surface decreases due to the withdrawal of fluid. The location of major oil drilling areas and state-designated oil fields are areas with subsidence potential in the City of Newport Beach. However, according to the City's General Plan, the site is not within an area that has been impacted by long-term subsidence due to local oil extraction.

4.5.3 Regulatory Framework

Federal

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.

State

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 are required to be no less restrictive. Chapter 16 of the CBC deals with General Design Requirements, including (but not limited to) regulations governing seismically resistant construction (Chapter 16, Division IV) and construction to protect people and property from hazards associated with excavation cave-ins and falling debris or construction materials. Chapters 18 and A33 deal with site demolition, excavations, foundations, retaining walls, and grading, including (but not limited to) requirements for seismically resistant design, foundation investigations, stable cut and fill slopes, and drainage and erosion control. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in Cal-OSHA regulations (CCR, Title 8).

Seismic Hazards Mapping Act

The CGS provides guidance with regard to seismic hazards. Under CGS *Seismic Hazards Mapping Act*, seismic hazard zones are identified and mapped to assist local governments in land use planning. The intent of this Act is to protect the public from the effects of strong ground shaking, liquefaction, landslides, ground failure, or other hazards caused by earthquakes. In addition, CGS Special Publication 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.

National Pollution Discharge Elimination System (NPDES)

NPDES Phase 1 Permit (General Construction Activity Stormwater Permit)

A Stormwater Pollution Prevention Plan (SWPPP) prepared in compliance with an National Pollutant Discharge Elimination System (NPDES) Phase I Permit describes the project area, erosion and sediment controls, runoff water quality monitoring, means of waste disposal, implementation of approved local plans, control of post-construction 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.

4.5.4 Thresholds of Significance

Implementation of the proposed General Plan Update would result in a significant impact if the project would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - › Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault
  - › Strong seismic ground shaking
  - › Seismic-related ground failure, including liquefaction
  - › Landslides
- Result in substantial soil erosion or 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, as defined in Table 18 1 B of the Uniform Building Code (1994), creating substantial risks to life or property
- 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

4.5.5 Project Impacts, Mitigation Measures, and Proposed Policies

Effects Not Found to Be Significant

Threshold	Would the project 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 determined that the City of Newport Beach is almost entirely built out with established utility services and new development would not require the use of septic tanks. For this reason, no further analysis of this impact is included in this EIR.

Project Impacts

Threshold	Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

Implementation of the General Plan Update would not expose people or structures to adverse effects involving rupture of a fault located in an Alquist-Priolo Fault Zone.

As previously discussed, 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. However, none of these faults has been zoned under the guidelines of the Alquist-Priolo Earthquake Fault Zoning Act. Consequently, there are no Alquist-Priolo zones in the Planning Area and ***no impact*** would result. Impacts related to strong seismic ground shaking are further discussed under Impact 4.5-1.

Threshold	Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

Impact 4.5-1 **Implementation of the General Plan Update could expose people or structures to adverse effects involving strong seismic ground shaking.**

The proposed General Plan Update would allow infill development throughout the Planning Area, consistent with existing land use patterns, intensities, and building types. The Update would concentrate new development and redevelopment in several specified subareas: Newport Center/Fashion Island, Balboa Village, Balboa Peninsula, West Newport Mesa, West Newport Highway, Mariners' Mile, and the Airport Area. In addition, while the General Plan Update prioritizes the retention of the Banning Ranch property as open space, the Plan also considers the possible development of a mixed density residential village with a small component of resident- and visitor-serving commercial should the property not be acquired for open space. The General Plan Update would conserve much of the City's existing pattern of uses. As mentioned above, the fault zones located within the Planning Area each have the potential to cause moderate to large earthquakes that would cause ground shaking in the areas specified above.

Policies contained in the General Plan Update would ensure that adverse effects caused by seismic and geologic hazards such as strong seismic ground shaking are minimized. For example, Policy S 4.1 requires regular update to building and fire codes to provide for seismic safety and design; Policy S 4.2 encourages the seismic retrofitting and strengthening of essential facilities such as hospitals and schools to minimize damage; and Policies S 4.4 and S 4.5 ensure that new development is not located in areas that would be affected by seismic hazards. Additionally, new development would be required to comply with the

building design standards of the CBC Chapter 33 for the construction of new buildings and/or structures, specific engineering design and construction measures would be implemented to anticipate and avoid the potential for adverse impacts. Compliance with applicable regulations and the policies contained in the General Plan Update would ensure that impacts related to strong seismic ground shaking remain at a ***less-than-significant*** level. No mitigation is required.

Threshold	Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: —Seismic-related ground failure, including liquefaction, or —Landslides?

Impact 4.5-2 Implementation of the General Plan Update could expose people or structures to adverse effects involving seismic-related ground failure or landslides.

Strong ground shaking can result in liquefaction. Areas of Newport susceptible to liquefaction and related ground failure (i.e., seismically induced settlement) include areas along the coastline that includes 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. Additionally, sediments lining streams flowing southwest off Pelican Hill may be susceptible to liquefaction and landslide. As mentioned earlier, residential or commercial developments are likely not to occur in many of the other liquefiable areas, such as Upper Newport Bay, the Newport Coast beaches. However, other structures (such as bridges, roadways, major utility lines, and park improvements) that occupy these areas are vulnerable to damage from liquefaction.

A considerable part of the City's mapped liquefiable areas (West Newport, Balboa Peninsula, the harbor islands and vicinity) are already built upon, mostly with residential and commercial development. A portion of the City's active oil field is also built on liquefiable soils. It is likely that a nearby moderate to strong earthquake will cause extensive damage to buildings and infrastructure in these areas.[35] Those portions of the Newport Beach area that may be susceptible to seismically induced settlement are the alluvial surfaces and larger drainages that are underlain by late Quaternary alluvial sediments (similar to the liquefaction-susceptible areas). Sites in the San Joaquin Hills along the margins of the larger drainage channels and west of the Santa Ana River outlet may be particularly vulnerable. However, liquefaction potential does not necessarily limit development potential, as site-specific geotechnical studies would be required to determine the soil properties and specific potential for liquefaction in a specific area prior to development.

In addition, as previously mentioned, strong ground motions can also worsen existing unstable slope conditions, particularly if coupled with saturated ground conditions. Seismically-induced landslides can overrun structures, people or property, sever utility lines, and block roads, thereby hindering rescue operations after an earthquake. Slope stability depends on many factors and their interrelationships. Rock

type and pore water pressure are arguably the most important factors, as well as slope steepness due to natural or human-made undercutting. Where slopes have failed before, they may fail again.

Many of the areas in central and eastern Newport Beach have been identified as vulnerable to seismically induced slope failure, due to steep terrain. Approximately 90 percent of the land from Los Trancos Canyon to Crystal Cove State Park boundary is mapped as susceptible to landsliding by the CGS. Additionally, the sedimentary bedrock that crops out in the San Joaquin Hills is locally highly weathered. 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.

Compliance with the standards set forth in the current CBC would also require an assessment of hazards related to landslides and liquefaction and the incorporation of design measures into structures to mitigate this hazard if development were considered feasible. The City has included policies in its Safety Element to achieve the goal of minimizing the risk of injury, loss of life, and property damage caused by earthquake hazards or geologic disturbances. Specifically, Policies S 4.1 through S 4.6 include requiring new development to be in compliance with the most recent seismic and other geologic hazard safety standards, and the protection of community health and safety through the implementation of effective, state of the art standards for seismic design of structures in the City. Additionally, if any development on steep terrain were to occur upon implementation of the General Plan Update, site-specific slope stability design would be required to ensure adherence to the standards contained in Appendix Chapter A33, Excavation and Grading, of the City Building Code, as well as by California Division of Occupational Safety and Health (DOSH, CAL/OSHA) requirements for shoring and stabilization. With compliance of applicable regulations as well as policies identified in the General Plan Update, impacts would be ***less than significant*** and no mitigation is required.

Threshold	Would the project result in substantial soil erosion or the loss of topsoil?

Impact 4.5-3 Implementation of the proposed General Plan Update could result in substantial soil erosion and the loss of topsoil.

Topsoil is the uppermost layer of soil, usually the top six to eight inches. It has the highest concentration of organic matter and microorganisms, and is where most biological soil activity occurs. Plants generally concentrate their roots in, and obtain most of their nutrients from, this layer. Topsoil erosion is of concern when the topsoil layer is blown or washed away, which makes plant life or agricultural production impossible. Much of the City is built out and topsoil erosion is, thus, not an issue as there is no existing and exposed topsoil or any agricultural or biological production that would be affected. Underdeveloped areas such as Banning Ranch could be affected by loss of topsoil if the area is developed.

Soil erosion is a significant concern in Newport Beach, especially along the shoreline, where beach sediments and coastal bluffs are highly susceptible to erosion by wave action. Other parts of the City, including bluffs along Upper Newport Bay, canyon walls along tributary streams leading to the Bay, and

[35] Seismic Hazards, Hazards Assessment Study, Earth Consultants International, 2003, page 2-36

slopes (both natural and man-made) within the San Joaquin Hills are also susceptible to the impacts from precipitation, stream erosion, and man's activities.

All demolition and construction activities within the City would be required to comply with CBC Chapter 70 standards, which would ensure implementation of appropriate measures during grading activities to reduce soil erosion. In addition, all new developments would also be subject to regional and local regulations pertaining to construction activities. Specifically, development that is greater than five acres would be required to comply with the provisions of the General Construction Activity Stormwater Permit adopted by the State Water Resources Control Board (SWRCB), which would require the employment of Best Management Practices (BMPs) to limit the extent of eroded materials from a construction site. All development that is between one and five acres would be required to comply with the provisions of the NPDES Phase II regulations concerning the discharge of eroded materials and pollutants from construction sites.

Compliance with policies contained in the General Plan Update would further ensure that new development would not result in substantial soil erosion or loss of topsoil. Specifically, Policies NR 3.11, NR 3.12, and NR 3.13 would require compliance with applicable local, State, or Federal laws. This would ensure maximum practicable protection available for soils excavated during the construction and building associated with infrastructure. Compliance with the CDC and the NPDES permits would minimize effects from erosion and ensure consistency with the RWQCB Water Quality Control Plan. In view of these policies, implementation of the General Plan Update would have a ***less-than-significant*** impact associated with soil erosion or topsoil. No mitigation is required.

Threshold	Would the project 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 landscape, lateral spreading, subsidence, liquefaction, or collapse?

Impact 4.5-4 Implementation of the proposed General Plan Update could subject people and structures to hazards associated with lateral spreading, subsidence, collapse, differential settlement, or heaving.

Impacts related to landslides and liquefaction are addressed in Impact 4.5-2. This analysis addresses impacts related to unstable soils, or compressible and expansive soils, as a result of collapse, subsidence, differential settlement, lateral spreading, or heaving. As discussed above in Section 4.5.1 (Existing Conditions), compressible soils underlie a significant part of the City. Under the added weight of fill embankments or buildings, these sediments will settle, causing distress to improvements. Low-density soils, if sandy in composition and saturated with water, will also be susceptible to the effects of liquefaction during a moderate to strong earthquake. Also, some of the geologic units in the Newport Beach area, including both surficial soils and bedrock, have fine-grained components that are moderate 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. Using unsuitable materials for fill and/or foundation support would have the potential to create future heaving, subsidence, spreading, or collapse problems leading to building settlement and/or utility line and pavement disruption.

An acceptable degree of soil stability can be achieved for expansive or compressible material by the Building Code required incorporation of soil treatment programs (replacement, grouting, compaction, drainage control, etc.) in the excavation and construction plans to address site-specific soil conditions. A site-specific evaluation of soil conditions is required by the City Building Code and must contain recommendations for ground preparation and earthwork specific to the site, that become an integral part of the construction design.

As part of the construction permitting process, the City requires completed reports of soil conditions at specific construction sites to identify potentially unsuitable soil conditions including liquefaction, subsidence, and collapse. The evaluations must be conducted by registered soil professionals, and measures to eliminate inappropriate soil conditions must be applied. The design of foundation support must conform to the analysis and implementation criteria described in CBC Chapter 15.

Adherence to the City's codes and policies contained in the General Plan Update would ensure the maximum practicable protection available for users of buildings and infrastructure and associated trenches, slopes, and foundations. Compliance with Policies S 4.4 and S 4.6 would ensure that development is not located on unstable soils or geologic units. In view of these requirements, the proposed project would have a ***less-than-significant*** impact associated with the exposure of people or structures to hazards associated with unstable geologic units or soils. No mitigation is required.

Threshold	Would the project be located on expansive soil, as defined in Table 18-1-A of the California Building Code (2001), creating substantial risks to life or property?

Impact 4.5-5 Implementation of the proposed General Plan Update could result in the construction of facilities on expansive soils, creating substantial risk to people and structures.

As discussed above in Section 4.5.1 (Existing Conditions), fine-grained soils, such as silts and clays, may contain variable amounts of expansive clay minerals. Most of the Newport Mesa and Corona Del Mar areas are underlain by marine terrace deposits and young alluvial fan sediments that are composed primarily of granular soils (silty sand, sand, and gravel). Such units are typically in the low to moderately low range for expansion potential. However, thick soil profiles developed on the older marine deposits exposed west of Newport Bay are typically clay-rich and will probably fall in the moderately expansive range. Areas underlain by beach and dune sands have very little expansion potential.

Development under the General Plan Update would be required to comply with applicable provisions of the CBC with regard to soil hazard-related design. Even the slight potential for the existence of expansive soils within the project area raises the possibility that foundation stability for dwellings, roads, and utilities could be compromised. The City's Building Code requires a site-specific foundation investigation and report for each construction site that identifies potentially unsuitable soil conditions and contains appropriate recommendations for foundation type and design criteria that conform to the analysis and implementation criteria described in the City's Building Code, Chapters 16, 18, and A33. This regulatory framework exists to address weak soils issues, including expansion. Additionally, policies contained in the General Plan Update would further reduce impacts related to expansive soils.

Specifically, Policies S 4.4 and S 4.6 would require that development not be located on unstable soils or geologic units. This impact is considered ***less than significant*** and no mitigation is required.

Cumulative Impacts

The geographic context for the analysis of impacts resulting from geologic hazards generally is site-specific, rather than cumulative in nature, because each project area has unique geologic considerations that would be subject to uniform site development and construction standards. As such, the potential for cumulative impacts to occur is limited.

Impacts associated with potential geologic hazards related to soil or other conditions occur at individual building sites. These effects are site-specific, and impacts would not be compounded by additional development. Development that would occur under the General Plan Update would be sited and designed in accordance with appropriate geotechnical and seismic guidelines and recommendations consistent with the CBC. Adherence by future projects developed pursuant to the General Plan to all relevant plans, codes, and regulations with respect to project design and construction would provide adequate levels of safety, which would ensure that the proposed project would not result in a cumulatively considerable contribution to cumulative impacts regarding geologic hazards, and the cumulative impact of the project would, therefore, be ***less than significant***.

Proposed General Plan Update Policies

The Safety and Natural Resources Elements of the proposed General Plan Update include policies that would address issues related to geology and soils. The policies that are applicable to the project are included below. Policies identified below also contained in the Harbor and Bay Element are denoted with a "HB".

Safety Element

Goal S 4 **Adverse effects caused by seismic and geologic hazards are minimized by reducing the known level of risk to loss of life, personal injury, public and private property damage, economic and social dislocation, and disruption of essential services.**

Policy S 4.1 **Updating of Building and Fire Codes**

Continue to regularly update building and fire codes to provide for seismic safety design.

Policy S 4.2 **Retrofitting of Essential Facilities**

Support and encourage the seismic retrofitting and strengthening of essential facilities such as hospitals and schools to minimize damage in the event of seismic or geologic hazards.

Policy S 4.3 Unreinforced Masonry Buildings

Continue to require the retrofitting of unreinforced masonry buildings during remodels to minimize damage in the event of seismic or geologic hazards. (Imp 36.1)

Policy S 4.4 New Essential Facility Siting

Regulate the location of new essential facilities within areas that would directly be affected by seismic or geologic hazards, in accordance with State law.

Policy S 4.5 New Essential Facility Siting

Regulate the location of new sensitive facilities such as schools, hospitals, and facilities for the elderly population, within 500 feet to active and potentially active faults, in accordance with state law.

Policy S 4.6 Maintenance of Existing Essential Facilities

Ensure that existing essential facilities that have been built in or on seismic and geological hazards are upgraded and maintained in order to prevent and reduce loss.

Natural Resources Element

Water Quality

Goal NR 3 Enhancement and protection of water quality of all natural water bodies, including coastal waters, creeks, bays, harbors, and wetlands. (Goal HB8)

Policy NR 3.1 Information and Education on Water Quality Issues

Support the development of a model (physical and/or mathematical) of the Bay and coastline that provides information regarding the nature and extent of the water quality problem and enables prediction of the effects of changes on the entire system. (Policy HB8.1)

Policy NR 3.2 Chemical Use Impacts

Support regulations limiting or banning the use insecticides, fertilizers, and other chemicals which are shown to be detrimental to water quality. (Policy HB8.2)

Policy NR 3.3 Water Pollution Prevention

Promote pollution prevention and elimination methods that minimize the introduction of pollutants into natural water bodies. (Policy HB8.3)

Policy NR 3.4 Ground Water Contamination

Suspend activities and implement appropriate health and safety procedures in the event that previously unknown groundwater contamination is encountered during construction. Where site contamination is identified, implement an appropriate remediation strategy that is approved by the City and the state agency with appropriate jurisdiction. (Policy HB8.4)

Policy NR 3.5 Storm Sewer System Permit

Require all development to comply with the regulations under the City's municipal separate storm sewer system permit under the National Pollutant Discharge Elimination System. (Policy HB8.5)

Policy NR 3.6 Natural Water Bodies

Require that development not result in the degradation of natural water bodies. (Policy HB8.6)

Policy NR 3.7 Watershed Runoff Quality Control

Support and participate in watershed-based runoff reduction, water quality control, and other planning efforts with the California Regional Water Quality Control Board (RWQCB), the County of Orange, and upstream cities. (Policy HB8.7)

Policy NR 3.8 Newport Beach Water Quality Ordinance

Update and enforce the Newport Beach Water Quality Ordinance. (Policy HB8.8)

Policy NR 3.9 Permit Review Process

Develop and maintain a water quality checklist to be used in the permit review process to assess potential water quality impacts. (Policy HB8.9)

Policy NR 3.10 Water Quality Management Plan

Require new development applications to include a Water Quality Management Plan (WQMP) to minimize runoff from rainfall events during construction and post-construction. (Policy HB8.10)

Policy NR 3.11 Best Management Practices

Implement and improve upon Best Management Practices (BMPs) for residences, businesses, development projects, and City operations. (Policy HB8.11)

Policy NR 3.12 Site Design and Source Control

Include site design and source control BMPs in all developments. When the combination of site design and source control BMPs are not sufficient to

protect water quality as required by the National Pollutant Discharge Elimination System (NPDES), structural treatment BMPs will be implemented along with site design and source control measures. (Policy HB8.12)

Policy NR 3.13 Reduction of Infiltration

Include equivalent BMPs that do not require infiltration, where infiltration of runoff would exacerbate geologic hazards. [LCP] (Policy HB8.13)

Policy NR 3.14 Natural Wetlands

Promote the use of natural wetlands to improve water quality. (Policy HB8.14)

Policy NR 3.15 Runoff Reduction on Private Property

Retain runoff on private property to prevent the transport of pollutants into recreational waters, to the maximum extent practicable. (Policy HB8.15)

Policy NR 3.16 Street Drainage Systems

Require all street drainage systems and other physical improvements created by the City, or developers of new subdivisions, to be designed, constructed, and maintained to minimize adverse impacts on water quality. Investigate the possibility of treating or diverting street drainage to minimize impacts to water bodies. (Policy HB8.16)

Policy NR 3.17 Siting of New Development

Require that development be located on the most suitable portion of the site and designed to ensure the protection and preservation of natural and sensitive site resources that provide important water quality benefits. (Policy HB8.17)

Policy NR 3.18 Parking Lots and Rights-of-Way

Require that parking lots, and public and private rights-of-way be maintained and cleaned frequently to remove debris and contaminated residue. (Policy HB8.18)

Policy NR 3.19 Water Quality Education

Effectively communicate water quality education to residents and businesses, including the development of a water quality testing lab and educational exhibits at various educational facilities. (Policy HB8.19)

Policy NR 3.20 Natural Drainage Systems

Require incorporation of natural drainage systems and stormwater detention facilities into new developments, where appropriate and feasible, to retain stormwater in order to increase groundwater recharge. (Policy HB8.20)

Policy NR 3.21 Impervious Surfaces

Require new development and public improvements to minimize the creation of and increases in impervious surfaces, especially directly connected impervious areas, to the maximum extent practicable. Require redevelopment to increase area of pervious surfaces, where feasible. (Policy HB8.21)

Goal NR 4 Maintenance of water quality standards through compliance with the total maximum daily loads (TMDLs) standards.

Policy NR 4.1 Total Maximum Daily Loads

Develop and implement the TMDLs established by the RWQCB, Santa Ana Region and guided by the Newport Bay Watershed Executive Committee (WEC).

Policy NR 4.2 Funding for Restoration and Dredging Projects

Secure funding for the Upper Newport Bay Ecosystem Restoration Project and long-term funding for successor dredging projects for Upper and Lower Newport Bay.

Policy NR 4.3 Restore Natural Hydrologic Conditions

Preserve, or where feasible, restore natural hydrologic conditions such that downstream erosion, natural sedimentation rates, surface flow, and groundwater recharge function near natural equilibrium states.

Policy NR 4.4 Erosion Minimization

Require grading/erosion control plans with structural BMPs that prevent or minimize erosion during and after construction for development on steep slopes, graded, or disturbed areas.

Goal NR 5 Sanitary Sewer Outflows—Minimal adverse effects to water quality from sanitary sewer outflows.

Policy NR 5.1 City Sewer Management and Master Plans

Implement the Sewer System Management Plan and the Sewer Master Plan.

Policy NR 5.2 Waste Discharge Permits

Require waste discharge permits for all food preparation facilities that produce grease.

Policy NR 5.3 Sewer Pump Stations

Renovate all older sewer pump stations and install new plumbing according to most recent standards.

Policy NR 5.4 Waste Discharge Permits

Comply with the RWQCB's Waste Discharge Requirements (WDRs) associated with the operation and maintenance of the City's sewage collection system.

Mitigation Measures

With implementation of the proposed General Plan Update policies listed above, no mitigation measures would be required.

Level of Significance After Policies/Mitigation Measures

Impacts associated with geologic and seismic hazards within the City would be ***less than significant***.

4.5.6 Mineral Resources

Existing Conditions

Oil and gas seeps are common occurrences in many parts of California, including in and around the Planning Area. Historically, drilling for oil in this part of Orange County began as early as 1904, and subsequently, oil production became the primary mineral extraction activity in and around the City.

Oil and Gas Production

According to the California Department of Oil, Gas, and Geothermal Resources, two separate production and reserve areas exist within the Planning Area: the Newport oil field and the West Newport oil field. The Newport Oil Field is located in the western portion of the Planning Area and is estimated to have oil reserves of approximately 35 million barrels (Mbbl) and produces approximately 55 billion cubic feet of gas. Located in the western tip of the Planning Area, the West Newport oil field produces approximately 20.5 billion cubic feet of gas with a daily production per oil well of approximately 5 bbl. Estimated oil reserves within this field are approximately 728 Mbbl. Figure 4.5-3 illustrates the location of active, abandoned, and shut-in oil wells in the Planning Area. As shown, the concentration of active wells lies within the West Newport and Newport production areas. Approximately three active gas wells (out of 68 total oil and gas wells) are located in the Newport production area, while there are approximately 65 active oil and four active injection wells (out of 862 total wells) located in the West Newport production area. Of those 65 wells in the West Newport area, approximately 16 are directionally drilled from onshore to off-shore, and an additional 29 wells are currently not used for production but have not been abandoned (classified as "shut-in"). Thus, as of 2002, there were approximately 68 wells (plus four injection wells) producing oil and natural gas within the City, which includes wells from both the Newport and the West Newport oil fields. Fifteen (not counting one injection well) of the 68 producing wells are operated by the City; 48 are operated by West Newport Oil

Company, three by Hoag Memorial Hospital, and two by South Coast Oil.[36] Thirty-three abandoned oil wells are located in numerous sites throughout the City, concentrated along the northwest boundary. However, there are no other known active oil or gas wells located in any other areas outside of the identified oil fields.

Newport Oil Field

The Newport Oil Field is located in the western portion of Newport Beach. The field was divided into two areas known as the Cagney and Beach areas. The discovery well in this field was drilled in 1922 by Gilbert H. Beesemyer in the Beach Area. The well was completed at a depth of 1,750 feet, and peak production from this well was 28,946 barrels (bbl) of oil in 1925. The first well in the Cagney Area was developed by the California Exploration Co. in June 1947. This well, drilled to a total depth of 1,906 feet, had a peak production of 4,270 bbl in 1948. The deepest well in this area was developed by Jergins Oil Co. to a depth of 3,878 feet. According to the California Division of Oil and Gas (1997), the Beach Area of this field has been abandoned. As of December 2001, there were still three gas producing wells in the Cagney area, and this field was estimated to have oil reserves of 35 million bbl (Division of Oil, Gas and Geothermal Resources, 2001 Annual Report). In the most recent map of the Division of Oil, Gas and Geothermal Resources (2003) only two active wells are shown in this field.

West Newport Oil Field

The West Newport Oil Field, located to the west of the older Newport Field, was discovered in April 1943, when the discovery well "Banning" 1 was completed by D.W. Elliott to a depth of 2,404 feet. Initial production of this well was 40 bbl a day. Another well was drilled about 1,000 feet to the northeast in November 1943. This well, "Banning" 2, was completed at a depth of 2,497 feet, and produced 12 bbl of oil a day. No new wells were drilled after that until 1945. Since then, hundreds of wells have been drilled in the area, the deepest completed at a depth of 7,889 feet. At the end of 2001, there were 66 producing wells in this field, including several offshore, and 30 shut-in wells (idle but not abandoned). At least one new well was being drilled in this field in 2002. Fifteen of the producing wells are owned by the City of Newport Beach. In 2001, the 66 wells produced 131,831 bbl of oil and condensate; and the field was estimated to have 847 millions bbl of oil in reserves. In 2002, the West Newport oil field produced approximately 20.5 billion cubic feet of gas with a daily production per oil well of approximately 5 bbl. Estimated reserves within this field are approximately 728 million bbl.

Surface Mining Resources

Mining activities within the State are regulated by the Surface Mining and Reclamation Act, which is discussed further below in Section 4.5.3 (Regulatory Framework). This Act provides for the reclamation of mined lands and directs the State Geologist to classify (identify and map) the non-fuel mineral resources of the State to show where economically significant mineral deposits occur and where they are likely to occur based upon the best available scientific data. Based on guidelines adopted by the CGS, areas known as Mineral Resource Zones (MRZ) are classified according to the presence or absence of

[36] Dave Sanchez, California Division of Oil, Gas, and Geothermal Resources, December 11, 2003.

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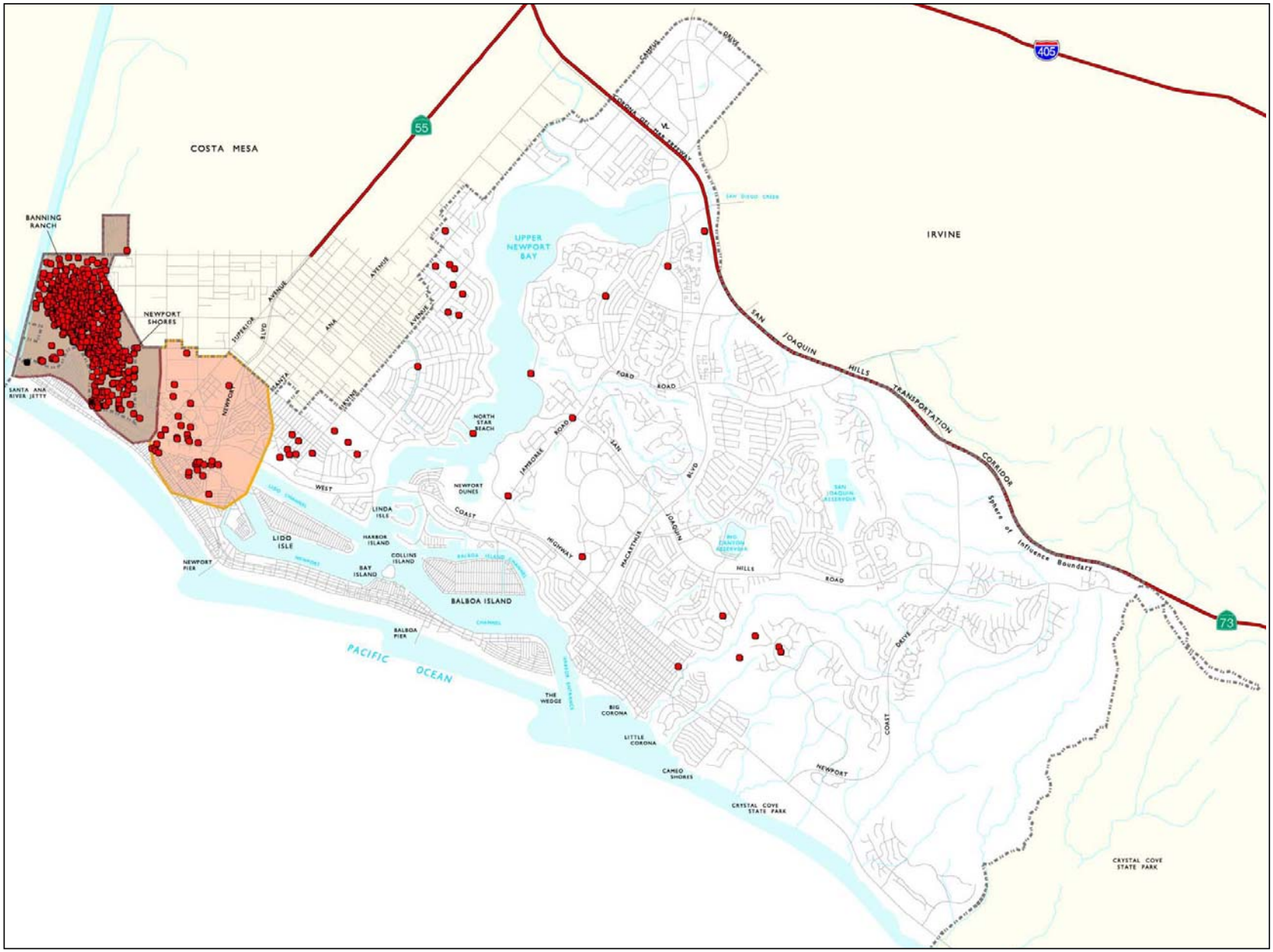
Figure 4.5-3
OIL PRODUCTION AREAS



Legend

- City Boundary

Oil Infrastructure

- Newport Oil Field
- West Newport Oil Field
- Oil Well

Hydrography

- Tidelands and Submerged Lands
- Waterway

Roads

- State and Federal Highway
- Streets

Note: GIS Data Projection - CA State Plane, Zone 6, NAD83, Feet.

0 0.5 1
Miles

Sources: City of Newport Beach, General Plan, July 2003, City Boundary, May 2003, Counties, May 2003; Earth Consultants, Oil Wells, July 2003; US Census Bureau, Other City Boundaries, 2000; ESRI, Major Roads, February 2002; EIP Associates, GIS Program, December, 2003.

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significant deposits, as defined below. These classifications indicate the potential for a specific area to contain significant mineral resources:

- *MRZ-1*—Areas where available geologic information indicates there is little or no likelihood for presence of significant mineral resources
- *MRZ-2*—Areas underlain by mineral deposits where geologic data indicate that significant measured or indicated resources are present or where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists
- *MRZ-3*—Areas containing known mineral occurrences of undetermined mineral resource significance
- *MRZ-4*—Areas of no known mineral occurrences where geologic information does not rule out the presence or absence of significant mineral resources

According to the CGS, the Planning Area does not have any land classified as MRZ-2; rather, it is classified by mineral resource zones MRZ-1 and MRZ-3 as shown in Figure 4.5-4. Generally, areas along the coast within the Planning Area are located in MRZ-1 areas, indicating that little or no likelihood for the presence of significant mineral resources exist. The remaining portion of the Planning Area is in MRZ-3 where areas that contain mineral resources are of undetermined significance. Other than oil and gas resources, there is no active mining within the Planning Area.

4.5.7 Regulatory Framework

State Regulations

Surface Mining and Reclamation Act (SMARA) of 1975

As previously discussed, mining activities are regulated by SMARA. The purpose of this act is to create and maintain an effective and comprehensive surface mining and reclamation policy with regulation of surface mining operations so as to assure that (1) adverse environmental effects are prevented or minimized and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses; (2) the production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, wildlife, range and forage, and aesthetic enjoyment; and (3) hazards to the public health and safety are eliminated. These goals are achieved through land use planning by allowing a jurisdiction to balance the economic benefits of resource reclamation with the need to provide other land uses.

Local Regulations

Charter of the City of Newport Beach

Section 1401, Oil Well Drilling, prohibits the drilling of, production, or refining of oil, gas, or other hydrocarbon substances within the City boundaries, as defined by the effective date of this Charter section. Areas annexed to the City after the effective date of this Charter section, if such activities were being conducted in such areas at the date of annexation, can continue to occur.

City of Newport Beach Municipal Code

Chapter 20.81, Oil Wells, of the City of Newport Beach Municipal Code contains ordinances that address oil wells and related issues within the City. Specifically, this chapter regulates the restricted and designated drilling areas throughout the City, states the required approval process necessary for permitted area alteration, contains fire prevention regulations, prohibits the creation of nuisance associated with drilling activities, and requires appropriate watchmen to be in charge of oil fields.

4.5.8 Thresholds of Significance

The following thresholds of significance are based on Appendix G of the 2005 CEQA Guidelines. For purposes of this EIR, implementation of the proposed General Plan Update may result in a significant impact if the project would do either of the following:

- 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
- 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

4.5.9 Project Impacts, Mitigation Measures, and Proposed Policies

Effects Not Found to Be Significant

The IS/NOP prepared for the proposed project did not identify any effects not found to be significant associated with Mineral Resources. Therefore, all thresholds are addressed in this section.

Project Impacts

Threshold	Would the proposed project 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?

Implementation of the proposed General Plan Update Update would not result in the loss of the availability of known mineral resources that would be of value to the region and the residents of the State.

Based on guidelines adopted by the CGS, areas known as MRZs are classified according to the presence or absence of significant deposits, as defined below. The City is required to respond to mineral resource recovery areas that have been designated by the State as MRZ-2 (significant existing or likely mineral deposits). These classifications indicate the potential for a specific area to contain significant mineral resources. As previously mentioned, according to the CGS, the Planning Area does not have any land classified as MRZ-2; rather, it is classified by mineral resource zones MRZ-1 and MRZ-3.

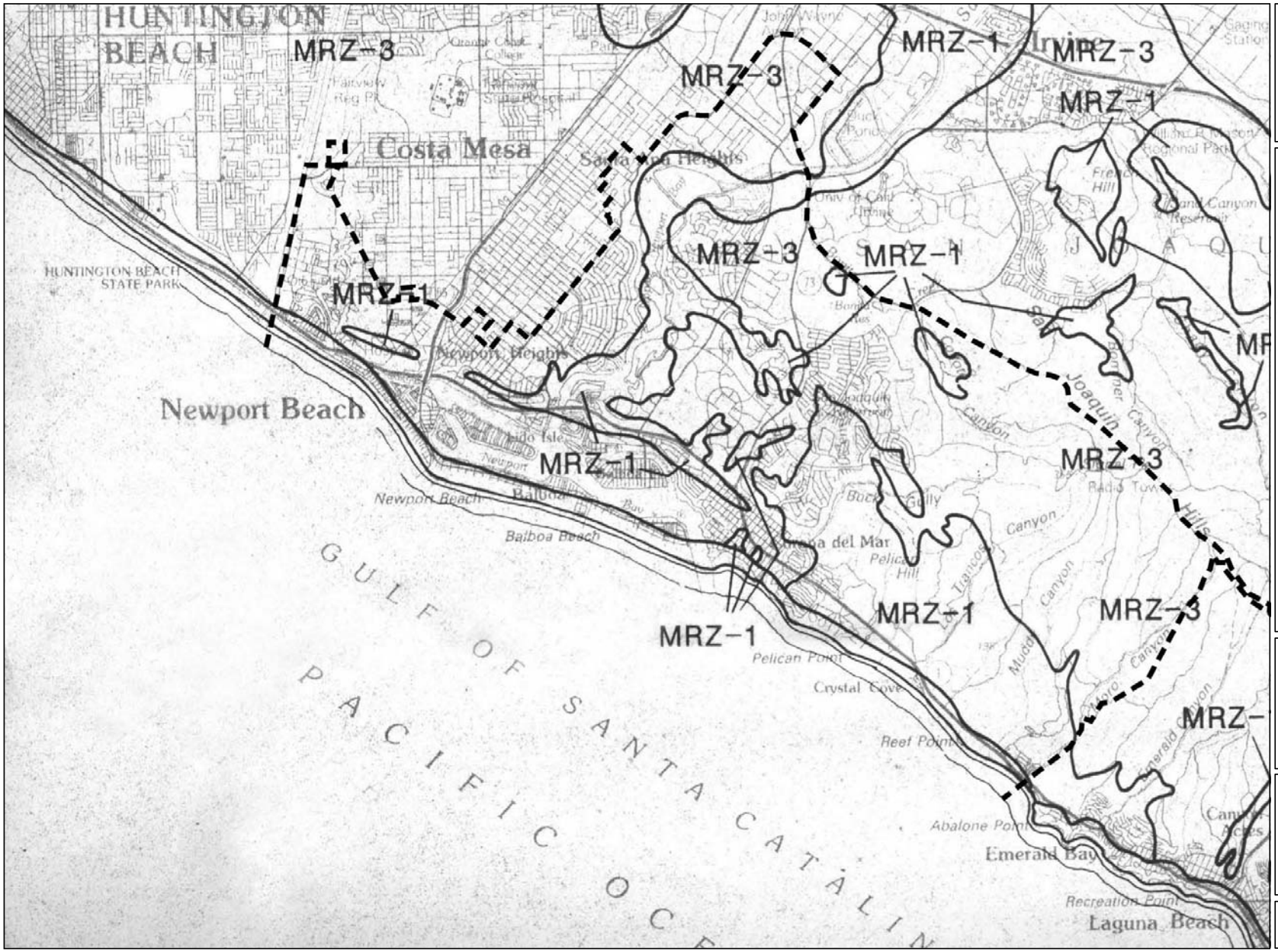

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Figure 4.5-4
MINERAL RESOURCE ZONES

Legend

City Boundary (approximate)

Mineral Resource Zones

- MRZ-1 — Area with No Significant Mineral Deposits
- MRZ-2 — Area with Significant Mineral Deposits
- MRZ-3 — Areas Containing Mineral Deposits of Undetermined Significance
- MRZ-4 — Areas with Inadequate Information

Not to Scale

Source: Department of Conservation Division of Mines and Geology, DMG Open-File Report 94-15, 1994.

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Most of the active oil wells are currently located in the West Newport and Newport production areas. Generally, these areas overlap with the Banning Ranch subarea, with a smaller portion of the Newport Oil Field within the Balboa Peninsula subarea. As previously discussed, in 2002, there were a total of approximately 68 wells producing oil and natural gas within the City, including within these two production areas. However, there are no other known active oil or gas wells located in any other areas outside of the identified oil fields. Development under the proposed General Plan Update, particularly if the Banning Ranch subarea is not retained as open space, could affect the availability of oil and gas produced in these areas.

Policy NR 19.4 in the General Plan Update encourages consolidation of existing oil and gas activities. Implementation of this policy would help ensure that access to these resources would not be altered, which could potentially alter the projected aggregate production or consumption for the area. Policies contained in the Land Use Element consolidation and/or relocation for the oil and gas operations on Banning Ranch where, as previously discussed, a significant portion of the Planning Area's production areas are currently located. Policy 6.5.1 specifies that oil operations on Banning Ranch should be relocated or clustered. With regard to the two land use options for Banning Ranch, the Policies 3.4 and 6.4.11 ensure that under either option, loss of availability would not be altered by encouraging consolidation of oil operations. Finally, Policy 6.5.1, which applies to both Land Use Options for Banning Ranch, encourages that this subarea's oil operations are relocated and clustered. With respect to future oil and gas production, the General Plan Update does not require existing to operations to cease production but does contain policies (NR19.1 through 19.4) that prohibit additional, future oil extraction within the City and oppose new offshore oil and gas drilling activities. As a result, implementation of the proposed General Plan Update would not result in the loss of the availability of known mineral resources that would be of value to the region and the residents of the State. ***No impact*** would occur.

Threshold	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.

Implementation of the proposed General Plan Update would not 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.

The discussion in the previous threshold of the lack of impacts to known mineral resources that would be of value to the region and the residents of the State applies equally to locally important mineral resource recovery sites. Consequently, implementation of the General Plan Update would not substantially alter the projected production or consumption of the City, County, or State and ***no impact*** would occur.

Cumulative Impacts

The geographic context for cumulative mineral resources impacts that would occur under the proposed General Plan Update is the Orange County, which includes all cumulative growth within the County. This cumulative impact analysis considered implementation of the proposed General Plan Update, in

conjunction with other development in the City of the City of Newport Beach, as represented by bull implementation of the General Plan Update. Development under the General Plan Update, in combination with all other development in the area, could the availability of a known mineral resource. However, since proposed General Plan Update policies do not prohibit existing oil and gas production and, in fact, encourages that existing operations be clustered and/or relocated so as to not alter production, contributions to adverse impacts to mineral resources as a result of the General Plan Update would not be cumulatively considerable. Therefore, in this regard, the General Plan Update's impact would be ***less than significant***.

Proposed General Plan Update Policies

The Land Use and Natural Resources elements of the proposed Newport Beach General Plan Update would directly or indirectly minimize impacts related to mineral resources. The policies that are applicable to the project are included below. Policies identified below that are also contained in the Harbor and Bay Element are denoted with an "HB".

Natural Resources Element

Goal NR 19 Minimized impacts from oil and gas drilling activities

Policy NR 19.1 New and Existing Extraction Activities

Prohibit additional oil, gas and other hydrocarbon extraction activities within the City limits but allow that existing wells be used, if needed, for water injection systems that increase oil extraction, and consolidated when necessary.

Policy NR 19.2 New Offshore Drilling Activities

Oppose new offshore oil, gas and other hydrocarbon drilling activities.

Policy NR 19.3 New On-Shore Drilling Activities

Prohibit on-shore support facilities for off-shore oil, gas and other hydrocarbon drilling.

Policy NR 19.4 Consolidation of Existing Uses

Encourage consolidation of existing oil, gas and other hydrocarbon activities.

Land Use Element

Goal LU 2 **A living, active, and diverse environment that complements all lifestyles and enhances neighborhoods, without compromising the valued resources that make Newport Beach unique. It contains a diversity of uses that support the needs of residents, sustain and enhance the economy, provide job opportunities, serve visitors that enjoy the City's diverse recreational amenities, and protect its important environmental setting, resources, and quality of life.**

Policy LU 2.7 **Oil and Gas Facilities**

Prohibit the construction of new onshore oil processing, refining or transportation facilities, including facilities designed to transport oil from offshore tracts, with the exceptions of slant drilling from onshore oil fields or for the consolidation and more efficient production of wells should Banning Ranch be annexed to the City.

Goal LU 3 **A development pattern that retains and complements the City's residential neighborhoods, commercial and industrial districts, open spaces, and natural environment.**

Policy LU 3.4 **Banning Ranch**

Prioritize the retention of Banning Ranch as an open space amenity for the City and region, consolidating oil operations, enhancing wetland and other habitats, and providing parkland amenities to serve nearby neighborhoods. If the property cannot be acquired in a timely manner, allow for the development of a compact residential village that preserves the majority of the site as open space and restores critical habitat in accordance with Policies 6.3.1 through 6.5.5.

Goal LU 6.4 **If acquisition for open space is not successful, a high-quality residential community with supporting uses that provides revenue to restore and protect wetlands and important habitats.**

Policy LU 6.4.11 **Comprehensive Site Planning and Design**

Require the preparation of a master development or specific plan for any development on the Banning Ranch specifying lands to be developed, preserved, and restored, land uses to be permitted, parcelization, roadway and infrastructure improvements, streetscape improvements, development regulations, architectural design and landscape guidelines, processes for oil operations consolidation, habitat preservation and restoration plan, sustainability practices plan, financial implementation, and other appropriate elements.

Policies Pertaining to Both Land Use Options (Goals 6.3 and 6.4)

Policy LU 6.5.1 Oil Operations

Relocate and cluster oil operations.

Impacts and Mitigation Measures

No mitigation measures are necessary, as the proposed General Plan Update policies fully mitigate the impacts.

Level of Significance After Policies/Mitigation Measures

No impacts are associated with mineral resources with implementation of the proposed General Plan Update.

4.5.10 References

Earth Consultants International, Hazards Assessment Study, Technical Background Report, 2003.

California Division of Oil, Gas, and Geothermal Resources, 2002 Annual Report—Production and Reserves

City of Newport Beach Municipal Code, http://ordlink.com/codes/newportb/_DATA/TITLE15/Chapter_15_04_BUILDING_CODE_/15_04_010_Adoption_of_the_Cali.html

Dave Sanchez, California Division of Oil, Gas, and Geothermal Resources, December 11, 2003.