4.5 GEOLOGY, SOILS, AND DRAINAGE

This section discusses existing geologic and soils related conditions and the natural and manmade drainage conditions within the NCP. The section is based on existing published geologic and soils data, the *Nipomo Community Park Constraints Analysis* (Morro Group 2004), and the *South County Area Plan Inland Portion Final EIR* (County of San Luis Obispo 1991). This section identifies potential geologic impacts including local geologic conditions. Direct and indirect impacts to the existing drainage system are also included. This section also considers erosion and sedimentation impacts resulting from the proposed project.

4.5.1 Existing Conditions

The topography of the NCP is undulating, with elevations ranging from approximately 300 to 425 feet. Elevation changes are due to small, smoothly eroded hills, and ancient sand dunes with intervening closed depressions. Massive sand dune deposits whose thickness ranges from approximately 70 to 80 feet in depth underlie the park. Surface elevations across the park gently decrease from northeast to southwest, consistent with the coastal plain in the surrounding area.

4.5.1.1 Geologic Setting

Based on USGS maps (California Geological Survey), the proposed project is located on Quaternary sand dune deposits (Qs), which dates to the Holocene time period (approximately 12,000 years ago to present day). The dune shapes are still evident in the surface topography of the park.

Three geologic basins (Pismo, Santa Maria, and Huasna Basins) underlie the South County area. These basins contain thick, mostly marine sedimentary Tertiary deposits that lay on top of a Jurassic-Cretaceous complex.

The triangularly shaped Santa Maria Basin opens toward the west and extends offshore to the Hosgri fault zone. The basin is bounded on the north by the San Rafael Mountains and is in contact with the mountains along the largely concealed system of the Santa Maria River-Foxen Canyon-Little Pine faults. On the south, the basin is bounded by the Santa Ynez Mountains of the Transverse Ranges and is in contact with the mountains along the Santa Ynez River fault.

The Pismo Basin, smaller than the Santa Maria, is flanked by strike-slip faults and trends west-northwest. The basin is bounded on the northeast by the West Huasna fault zone and on the southwest by the Santa Maria River fault (Hall 1981; Heasler and Surdam 1984; Stanley and Surdam 1984). The basin extends west offshore to the Hosgri fault zone (Heasler and Surdam 1984; Kablanow and Surdam 1984; Clark et al. 1994).

The Huasna Basin lies between the West Huasna fault zone on the west and the East Huasna fault zone on the east (outside the South County study area) (Hall and Corbato 1967; Heasler and Surdam 1984; Kablanow and Surdam 1984). The project site is not within a County-designated Geologic Study Area (GSA). Based on the County's Geographic Information Systems (GIS) database, the nearest potentially active fault is located approximately 0.25 mile to the northeast. Landslide and rockfall conditions do not exist at the project site given the relatively flat topographic conditions of the project area.

Soils

There are two soil types present in the area (refer to Figure 4.5-1) where the proposed project would result in ground disturbance. These soils are described below.

Oceano Sand, 0 – 9 % slopes (Soil Unit 184)

This very deep, excessively drained, nearly level to moderately sloping soil is on stabilized sand dunes. It formed in deposits of windblown sand. Typically, the surface layer is brown sand about 29 inches thick, and the underlying material is stratified pale brown and pink sand to a depth of 60 inches or more. Some areas of this soil have a sandy loam surface layer. The permeability of this soil is rapid, and the available water capacity is low. Surface runoff is slow or medium. The hazard of water erosion is slight or moderate, and the hazard of soil blowing is high. The shrink-swell potential is low. This soil is best suited to drip or sprinkler methods of irrigation.

Oceano Sand, 9 – 30 % slopes (Soil Unit 185)

This soil type has similar characteristics as Oceano sand, 0% to 9% slopes, except this soil type is strongly sloping and moderately steep soil located on old established sand dunes. Surface runoff is medium or rapid, and the hazard of water erosion is moderate or high, and the hazard of soil blowing is high.

Faults

Several faults in the region are considered geologically active or potentially active and are capable of causing significant ground motion in the vicinity of the park. An active fault is defined by the California Division of Mines and Geology as a fault that has "had surface displacement within Holocene time (last 11,000 years). A potentially active fault is a fault with evidence of surface displacement during Quaternary time" (last two million years).

Known active faults or fault zones with surface expression that could potentially affect the park include the San Andreas Fault System, Coast Range-Sierran Block, Hosgri Fault Zone, Los Alamos, Santa Lucia, and the Los Osos faults. Fault zones located near the park that are potentially active include: Wilmar Avenue/Santa Maria River fault, Oceano fault, Pecho fault, Oceanic West Huasna Fault Zone, San Luis Bay fault, and the Casmalia-Orcutt-Little Pine fault. Faults that are in close proximity to the park are shown in Figure 4.5-2.

Although the park is located within the seismically active Central Coast region, it lies outside any fault rupture zones (formerly Special Studies Zones) established by the Alquist-Priolo Act of 1972. Should a major earthquake occur in the area on any of these faults, significant ground shaking is expected to occur. The San Andreas Fault is considered the most likely to generate a major earthquake in the region in the near future. Such an earthquake is expected to produce moderate to strong ground shaking along the entire Nipomo Mesa. The potentially active Wilmar Avenue Fault has been mapped east of US 101 in the vicinity of Nipomo Creek. Table 4.5-1 shows local fault systems and the estimated maximum intensity of a ground shaking event that potentially could cause significant damage to the park area.

Figure 4.5-1. Soils Map

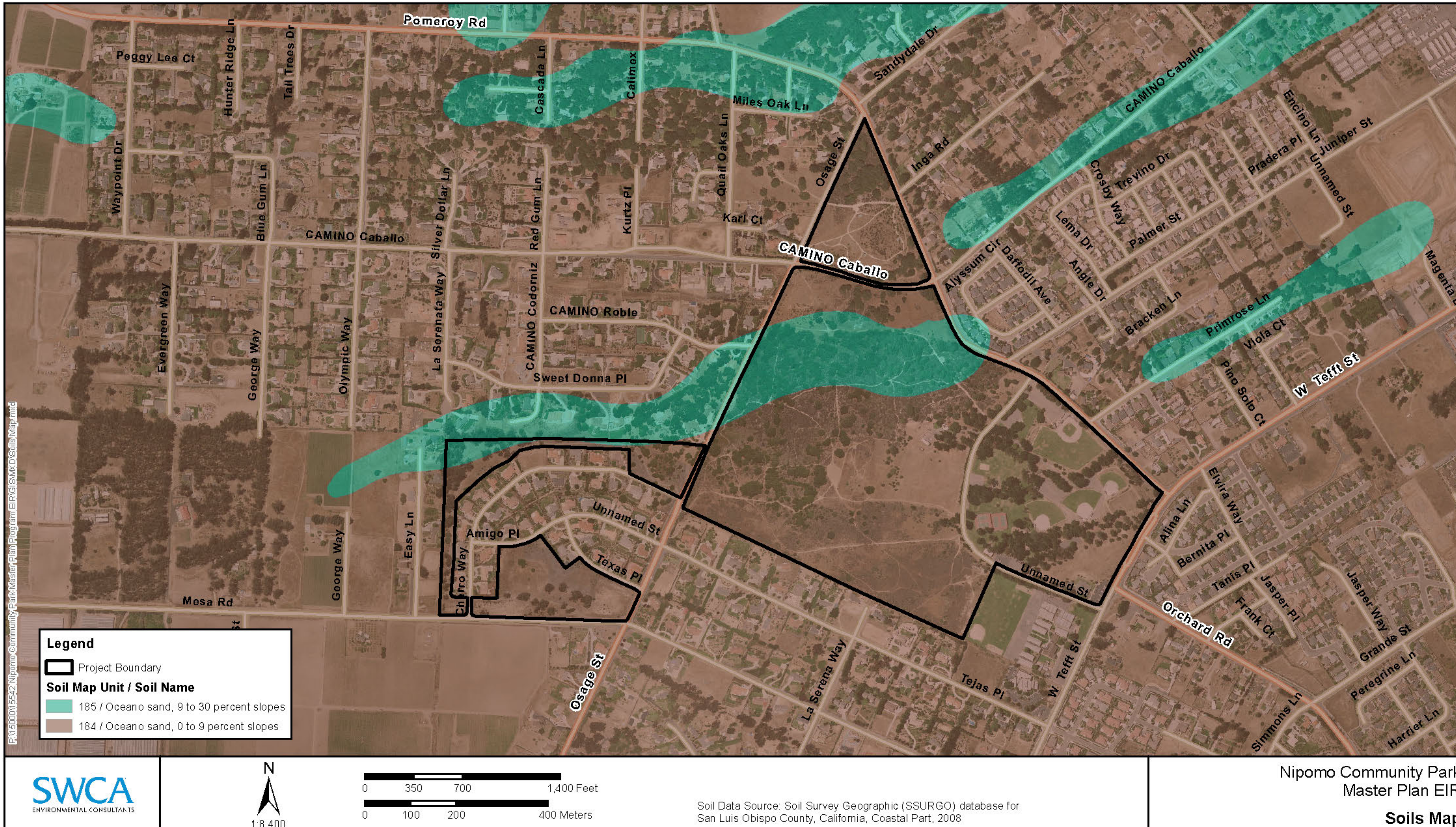

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Figure 4.5-2. Geologic Hazards

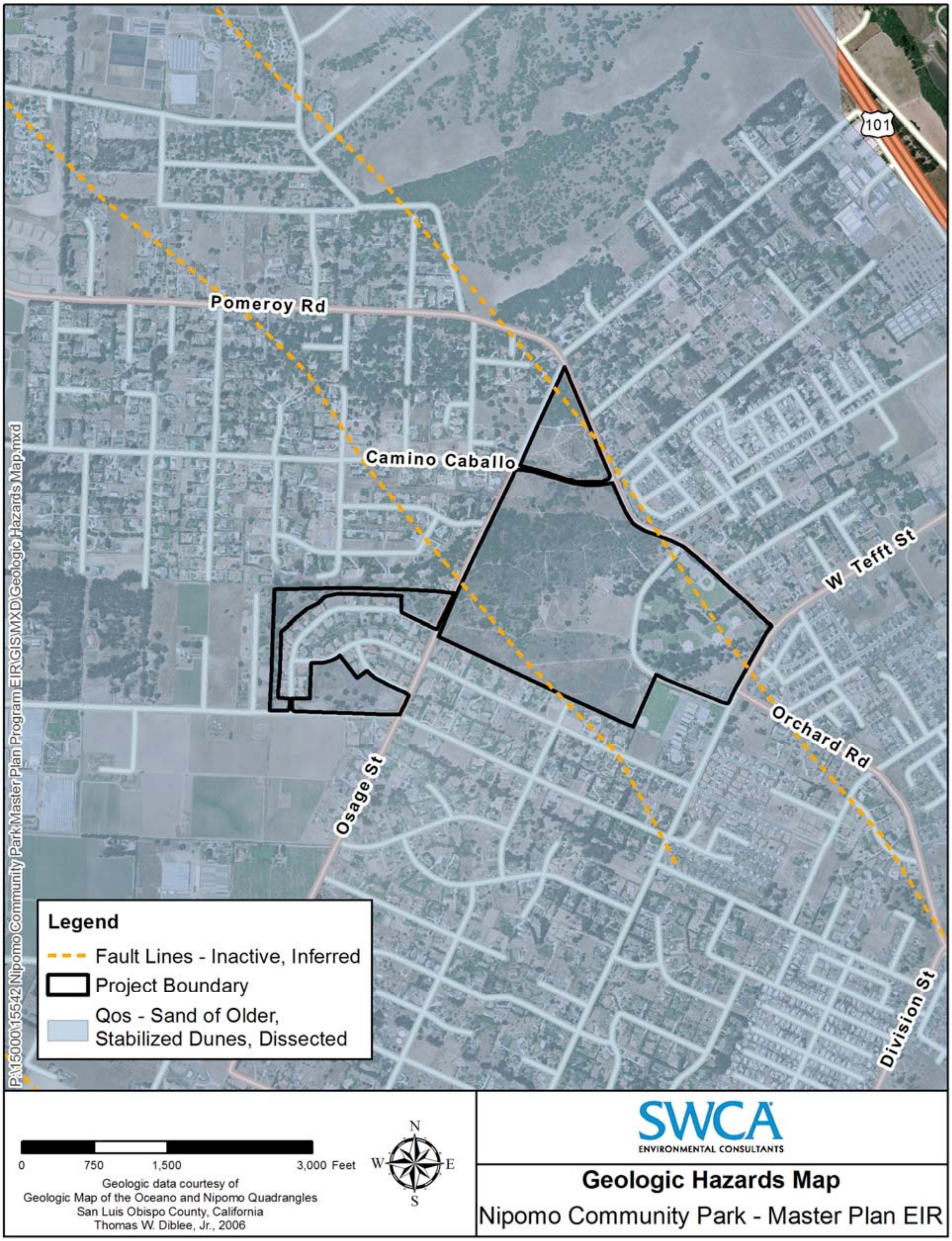

Table 4.5-1. California Geologic Society Listing of Nearby Faults

Fault Name	Activity	Maximum Magnitude
Hosgri-San Simeon	Active	7.3
Casmalia	Potentially Active	6.5
Los Osos	Active	6.8
San Luis Range	Potentially Active	7.0
San Andreas-Carrizo	Active	7.2
San Andreas-Cholame	Active	6.9
San Andreas-Parkfield	Active	6.7
San Andreas (1857 rupture)	Active	7.8
San Andreas (1906)	Active	7.9
East Huasna	Potentially Active	n/a
Edna	Potentially Active	n/a
Oceano	Inactive	6.0
Pecho	Potentially Active	6.25
West Huasna/Oceanic	Potentially Active	7.0

Source: CGS (1997), Jennings (1994), and Namson & Davis (1990), as cited in the County Safety Element (1999)

Liquefaction

Liquefaction is the rapid transformation of saturated, loose, fine-grained sediment (such as silt and sand) to a fluid-like state, often caused by an earthquake. During the shaking the soil loses its bearing strength and it may spread laterally, undergo settlement, and/or form fissures. Liquefaction can result in substantial damage to property, roads, and infrastructure. Due to the sandy soil conditions underlying the Nipomo Mesa, the NCP area has been mapped as being susceptible to liquefaction hazards during a ground-shaking event. The area containing the park can be seen as having moderate liquefaction hazard potential.

Drainage

The topography of the site is gently to moderately sloping, with general slope directions towards the interior of the park. The park area is irregularly shaped and has an undulating topographic profile with generally higher elevations being located to the exterior boundaries along the bordering roadways. The ground surface elevations range from between 375 feet near the intersection of West Tefft Street and Pomeroy Road, 382 feet at the southwest corner of the property (near the intersection of Osasge Street and Tejas Place), 378 feet near Dana

Elementary School, 390 feet near the Nipomo Community Library, and 382 feet in the northern corner of the Nipomo Native Gardens portion of the park.

The Mesa Meadows area is at an approximate elevation of 400 feet in the northeast corner of the development, 365 feet dropping off to approximately 315 feet in the western portion, and approximately 350 feet along Mesa Road at the southern border of the development near the constructed drainage infiltration basins. Near surface soils observed at the park appear to be very well drained. No evidence of wetlands or springs was observed on site during several site visits.

The project site is not located within a floodplain as determined by the Federal Emergency Management Agency (FEMA) (Flood Insurance Rate Map, County of San Luis Obispo 1996). There are no surface water features observed in the site vicinity that would present a risk of flooding to the park. However, due to the rolling topography and existence of several closed depressions of the park and lack of drainage outlets, there are several areas where stormwater accumulates, causing localized flooding conditions.

The undeveloped areas of the park rely on natural percolation of stormwater for drainage discharge. The park has minimal areas of surface water due to the sandy soil conditions that allow water to penetrate into the ground at a rapid rate. Drainage systems in the more developed northeast areas of the park consist of small drainage channels, v-shaped concrete swales, culverts, and unlined infiltration basins.

Drainage is internal to the park, with no evidence of stormwater flowing out of or through the area. Stormwater generally percolates through the permeable surface soils before it has a chance to accumulate and cause substantial flows. There currently is stormwater run-on flowing into the park from several outside areas including: the northeast corner originating from residential development to the north and east (this water percolates through the retention basin system), the northwest corner of the park due to a topographical low point (natural percolation), and an area in the northeastern portion of the Nipomo Native Gardens. There are also several stormwater infiltration basins that were constructed in the Mesa Meadows area to the southwest, which allow for drainage discharge from a housing development known as McKenzie Tract 2304. There are no jurisdictional areas or drainages that would be considered “waters of the United States” found within the park boundaries.

Along the northern property line, an earthen drainage channel has been constructed to accommodate storm water flows originating from the parking lot along the Pomeroy Road frontage. This channel starts out as nothing more than a small roadside swale, but develops into a 3-foot wide by 2-foot deep erosive channel near Primrose Lane, where it picks up residential runoff from the north via a 12-inch culvert that runs underneath Pomeroy Road. The earthen drainage channel then flows southwest and empties onto a rock riprap energy dissipater into the primary unlined infiltration basin constructed at the West Tefft Street and Pomeroy Road intersection. The infiltration basin also receives storm flows via three 12-inch culverts: one that conveys storm water from underneath Pomeroy Road from a low-lying area across the street at the intersection of West Tefft Street and Pomeroy Road, a storm drain on the park side of West Tefft Street, and a culvert that flows underneath West Tefft Street originating from bordering residential developments to the east of the park.

A series of three infiltration basins was constructed in the northeast corner of the park (one primary and two secondary basins), due to the increase in storm water runoff that can be attributed to residential development occurring to the north and northeast, which has created more impermeable surfaces and concentrated storm flows towards the park. The primary infiltration basin is designed to let storm flow percolate into the permeable dune sands underlying the area. Finished bottom elevation of the primary infiltration basin is 345 feet above mean sea level. In the event that larger volumes of stormwater flow into the primary infiltration basin than its maximum design capacity, a secondary unlined infiltration basin is connected via one 24-inch and three 12-inch culverts to the primary basin. The overflow basin is constructed approximately 15 feet to the southwest of the primary basin at a bottom surface elevation of 348 feet. If required, the secondary basin overflows into a smaller third area at a slightly lower finished elevation, which is essentially nothing more than a natural depression located next to the middle softball field.

Drainage from the two parking lots located near the softball fields is conveyed via sheet flow into a series of four 24-inch corrugated metal storm drain standpipes constructed to a depth of approximately 6 feet. The standpipes are located behind the middle softball field to the west, several feet from the edge of the outfield grass in a constructed low-lying drainage swale. This low-lying area is subject to adverse flooding conditions during larger storm events because of the minimal retention capacity of the standpipes and the bowl-shaped topography in the immediate vicinity.

Near Dana Elementary School, stormwater sheet flows down the park entrance where it intercepts sheet flow from the parking lot, slightly concentrates, and then flows alongside the roadway to a low point near the tennis courts. At this point, the flow fans out and presumably percolates on either side of the roadway. This low-lying area is potentially subject to adverse flooding conditions during larger storm events due to the saddle shape topography in the immediate vicinity and lack of any drainage outlet.

Drainage along the southern portion of the park appears to be by percolation only, and no definitive drainage patterns are evident. This portion of the park has an undulating rolling profile characterized with several saddle-shaped areas that are heavily vegetated. Ground surface elevations are generally higher to the southern boundary and slope directions are to the interior of the park. If enough surface saturation were to occur, sheet flow would be directed into the park along the entire southern boundary.

Drainage patterns along the western portion of the park, bounded by Osage Street are also internal to the park. Osage Street is a raised roadway that only allows drainage flow to the east and partially to the north along the park boundary. In the northwestern section of the park, near the intersection of Osage Street and Camino Caballo, there appears to be a small seasonal vegetated drainage swale that runs parallel to the park/roadway interface for approximately 100 feet. This swale does not have a defined bed or bank and fans out and flattens near the northwestern corner of the park.

Drainage along the portion of the park bounded by Camino Caballo is conveyed via several asphalt roadside swales and overside drains cut in the curb. All drainage is directed into the park along this boundary, as Camino Caballo is elevated several feet above park grade.

In the Nipomo Native Gardens section of the park, more distinct drainage patterns are distinguishable. In the northeast portion of the Garden, there is a roadside asphalt drainage swale and a 12-inch culvert, which empty into a small-unlined infiltration basin. The small infiltration basin overflows into an adjacent low-lying area of the Garden. To the south of the low lying area of the Garden, there appears to be a moderately defined non-contiguous drainage swale running in an east-west direction along most of the southern boundary of the

Garden. Once again, due to the raised elevation of Camino Caballo, this swale has no outlet and fans out to the western portion of the Garden where natural percolation occurs.

The Mesa Meadows section of the park, containing the McKenzie Tract 2304 residential development, has an engineered storm drain system. The drainage system consists of multiple 24-inch corrugated metal culverts designed to convey storm runoff from the development into any one of four infiltration basins located adjacent to Mesa Road. The infiltration basins then discharge storm water via percolation into the sandy topsoil.

4.5.2 Regulatory Setting

4.5.2.1 Federal and State Regulations

The Alquist-Priolo Earthquake Hazard Zone Act was developed by the State to regulate development near active faults and mitigate the surface fault rupture and other hazards. The Act identifies active earthquake fault zones and restricts building habitable structures over known active or potentially active faults.

Water quality protection is regulated by the Federal National Pollutant Discharge Elimination System (NPDES) Program established by the Clean Water Act. The U.S. Environmental Protection Agency (EPA) establishes stormwater permit requirements based on compliance with a NPDES permit. Discharges of stormwater associated with construction activity that results in a disturbance of one acre or more of total land area requires a NPDES General Permit for Discharges of Stormwater Associated with Construction Activity. This permit requires developers to implement BMPs to prevent the discharge of sediment-laden or otherwise contaminated water off site. The site-specific plan to implement BMPs is called the Stormwater Pollution Prevention Plan (SWPPP). The plan must include a description of soil stabilization and sediment load control methods that would be implemented to minimize erosion and sediment loading during construction of the project. The SWPPP also includes descriptions of post-construction BMPs. The State of California administers stormwater permits through the State Water Resources Control Board (SWRCB) and its local RWQCB – Central Coast Region. A SWPPP would be required for the proposed project.

4.5.3 Thresholds of Significance

The County thresholds of significance are based on the criteria set forth in Appendix G of the CEQA Guidelines. According to those criteria, a project would result in a significant geology, soils or drainage-related impact if it would:

1. Result in exposure to or production of unstable earth conditions, such as landslides, earthquakes, liquefaction, ground failure, land subsidence or other similar hazards;

2. Be within a California Geological Survey “Alquist-Priolo” Earthquake Fault Zone;

3. Result in soil erosion, topographic changes, loss of topsoil or unstable soil conditions from project-related improvements, such as vegetation removal, grading, excavation or fill;

4. Change rates of soil absorption, or amount or direction of surface runoff;

5. Include structures located on expansive soils;

6. Change the drainage patterns where substantial on- or off-site sedimentation/erosion or flooding may occur;

7. Involve activities within the 100-year flood zone;

8. Be inconsistent with the goals and policies of the County's Safety Element relating to Geologic and Seismic Hazards;

9. Preclude the future extraction of valuable mineral resources.

4.5.4 Impact Assessment and Methodology

Potential geologic, soils and drainage impacts were evaluated based upon a review of the County's GIS database of local geologic and soils conditions, the 2004 Environmental Constraints Analysis and field review of the project site. The assessment considers compliance with regulations, such as the Uniform Building Code (UBC). In addition, while the County is not subject to ordinance standards, preparation of reports and plans such as drainage and erosion control plans are recommended as mitigation for future development where applicable to ensure that specific issues identified during preparation of the EIR are included in the plans.

4.5.5 Project-specific Impacts and Mitigation Measures

4.5.5.1 Exposure to or Production of Unstable Earth Conditions

Soil Stability

The primary geotechnical concern at the project site is the loose condition of the surficial soil. Re-compaction of the upper zone is recommended to limit any potential settlement, consistent with the California Building Code. As Nipomo/Oceano sands are known to be susceptible to hydro-consolidation, which is the tendency of a soil to collapse upon addition of water, the soil should be compacted at a moisture content slightly above optimum. The R-value of the sand was determined to be 64, which indicates that the soil has a high resistance to the type of loading imposed by roads and traffic. Compliance with the UBC and preparation of site-specific geo-technical reports would address this issue; impacts are considered *less than significant* (Class III).

Earthquake Rupture and Groundshaking

The park area contains two inactive fault zones within its boundaries (refer to Figure 4-5.2). Should a major earthquake occur in the area on any of these faults, significant ground shaking is expected to occur in the immediate vicinity. Active fault hazards are not considered to be a significant impact that would preclude development of the park. Compliance with the UBC and preparation of site-specific geo-technical reports would mitigate these effects; impacts are considered *less than significant* (Class III).

Liquefaction

Due to the sandy soil conditions underlying the park, the area has been mapped as being susceptible to moderate liquefaction hazard during a ground-shaking event. Soils that area particularly susceptible to liquefaction hazards generally consist of unconsolidated loose sandy conditions near the groundwater table. The groundwater table underlying the park is generally found at depths over 100 feet below ground surface. Liquefaction is not considered to be a major concern that would preclude development of the park.

There are several possibilities to reduce liquefaction hazards when designing and constructing new buildings or other structures: avoid liquefaction susceptible soils, build liquefaction resistant structures, or improve the soil. The first possibility to avoid construction on liquefaction susceptible soils is not practicable in this case. If it is necessary to construct on liquefaction susceptible soil, it may be possible to make the structure liquefaction resistant by designing the foundation elements to resist the effects of liquefaction. The third option involves mitigation of the liquefaction hazards by improving the strength, density, and/or drainage characteristics of the soil. This can be done using a variety of soil improvement techniques. Based on the application of standard UBC requirements, and preparation of site-specific geotechnical reports, impacts resulting from the potential for liquefaction are considered *less than significant* (Class III).

Landslides

The project site is not located in an area that is subject to landslide hazards, due to slope and topography.

GSD Impact 1 **Development of the project may expose structures and persons to existing geologic hazards including liquefaction and ground shaking.**

GSD/mm-1 *Prior to initiation of each phase of development for major amenities requiring structural improvements and/or major grading (i.e., sports fields, parking, amphitheater(s), playgrounds, restrooms, pre-school and administration building, gymnasium, recreation center, pool, skate park, and courts), and as required by the County Environmental Coordinator, the General Services Agency shall prepare project-specific geo-technical reports. The reports shall investigate subsurface conditions within areas proposed for structural development and the findings and recommendations shall be incorporated into grading and construction plans, as appropriate.*

Residual Impact

The project site is not located within a geologic unit or soil that is unstable, or that could potentially result in landslide, lateral spreading, subsidence, or collapse. The liquefaction potential is moderate, due to underlying sandy soils; however, due to the depth of the groundwater table and lack of surface waters onsite, this risk is not high. Based on the application of standard UBC requirements, and preparation of site-specific geotechnical reports, impacts resulting from standard geologic and soils hazards would be *less than significant* (Class III).

4.5.5.2 Alquist-Priolo Earthquake Fault Zone

The project site is not located within an Alquist-Priolo Earthquake Fault Zone; therefore, there would be no impact. Potential impacts related to earthquake rupture and ground-shaking are discussed in Section 4.5.5.1 above.

4.5.5.3 Result in Substantial Soil Erosion or the Loss of Topsoil

The soils in the park would be easily excavated using conventional equipment; utility trenches would be subject to caving, particularly where loose soil conditions are encountered. Shoring or sloped sidewalls of relatively shallow trenches may be necessary. Where trees are to be removed, deeper earthwork may be necessary to ensure large roots are removed and that any disturbed soils are adequately compacted.

The ground surface of the Park should be prepared for grading by removal of vegetation, large roots, and other materials. Stabilization of soils, particularly those disturbed by construction, is essential to protect fill slopes from erosive damage. Care should be taken to establish and maintain vegetation. Landscaping should be planned and installed to maintain surface drainage. Slopes greater than 10% should be benched prior to fill placement. If fills are to be placed on slopes greater than 20%, the toe shall be keyed. All voids should be backfilled and re-compacted. Footing depths should be excavated in accordance with the applicable load type as shown in the UBC. Foundations should be designed in accordance with the architect and or engineer. Unpaved ground surfaces should be finished graded to drain away from any foundation. If this is not possible because of terrain, swales should be provided to divert drainage away from foundations. Paved surfaces should slope away from foundations.

In addition to proposed and recommended drainage measures described above, grading activities should be conducted during the dry season (April through September). If grading, vegetation removal, and any site disturbance occur during the rainy season, County Parks has agreed to prepare and implement an erosion and sedimentation control plan including the use of silt fences, straw bales, perimeter ditches, water bars, temporary culverts and swales, sediment traps, minimal grading concepts, and similar techniques appropriate for the site. These erosion and sediment transport control structures need to be in place prior to the onset of seasonal rains. Restoration and re-vegetation of graded areas and unprotected slopes shall be completed as soon as possible following site disturbance.

Preparation and implementation of a site-specific short and long-term erosion and sedimentation control plan would mitigate potential impacts. Therefore, the potential for erosion and down-gradient sedimentation would result in a *potentially significant impact, which can be mitigated to less than significant* by implementation of standard measures.

GSD Impact 2 Ground disturbance activities may result in erosion and down-gradient sedimentation.

Implement WAT/mm-1 (incorporate BMPs into drainage plans) and WAT/mm-2 (prepare and implement SWPPP).

GSD/mm-2 Prior to initiation of construction, the General Services Agency shall prepare a site-specific erosion and sedimentation control plan. The plan shall include measures addressing short-term, construction related effects, and long-term soil stabilization. Grading and construction shall be conducted during the dry season (April through September) if possible. In the event grading occurs during the wet season (October through April), the following measures shall be incorporated into applicable grading and construction plans, and implemented prior to ground disturbance:

a. *Incorporate the use of silt fences, straw bales, perimeter ditches, water bars, temporary culverts and swales, sediment traps, minimal grading concepts, and similar techniques appropriate for the site.*

b. *Erosion and sediment transport control structures shall be in place prior to the onset of seasonal rains.*

c. *Restoration and re-vegetation of graded areas and unprotected slopes shall be completed as soon as possible following site disturbance.*

Residual Impact

During grading and construction activities, some on-site erosion may occur. Implementation of an erosion and sedimentation control plan would reduce impacts associated with erosion and down-gradient sedimentation to *less than significant* (Class II).

4.5.5.4 Rates of Soil Absorption, or Amount or Direction of Surface Runoff

Based on review of the existing drainage system within the park, existing facilities are not adequate to handle existing and future stormwater flows, and localized flooding within the park occurs during storm events. In addition, the existing drainage swale adjacent to Pomeroy Road is subject to erosion, and subsequent sedimentation of the primary retention basin. If this basin becomes inundated with sediment and debris during a major rain event, storm water could back up, flow across the spillway, and discharge into the low-lying areas near the West Tefft Street and Pomeroy Road intersection.

Additional flooding occurs within the softball field parking lot, and the park access road west of the existing tennis courts. Stormwater sheet flows from two adjacent parking lots towards the softball field, and the lack of drainage outlets and bowl shaped topography cause flooding in the parking lot. In addition, stormwater flows from the upland areas of the park, and flows west where it ponds on the access road, which is a low point. Implementation of the proposed master plan would create additional impervious surfaces (e.g., roofs, structures, sidewalks, and paved parking) that would increase the amount of stormwater flow directed towards to lower areas of the park. Increased flooding could also occur if subsurface clay layers inhibit percolation of runoff beneath potential development sites, and rising ground water levels surface, resulting in flooding conditions. The proposed Master Plan includes the following drainage improvements to manage stormwater flow during rain events: 1) construct a new basin in the center of the southern half of the park, and 2) install a drainage pipe along Pomeroy Road within the existing drainage swale.

In addition to the drainage improvement measures proposed in the Master Plan, project-specific geo-technical reports shall be required to investigate subsurface conditions within areas proposed for structural development. Incorporation of improvements to existing facilities, including the installation of trash gates on drainage pipes, interception and dissipation of stormwater flow from impervious surfaces, and installation of storm drain inlets and engineered drainage courses is recommended to address existing drainage and flooding issues. Alternative drainage control incorporating BMPs and Low Impact Development (LID) strategies is recommended, including bio-retention filters, vegetated swales, and landscaping within existing infiltration basins. These measures would serve as filtration systems to reduce contaminants and downstream turbidity and sedimentation. Regular maintenance and repair would be required.

Preparation and implementation of a site-specific drainage plan would mitigate potential impacts. Therefore, development of the project would result in a *potentially significant impact, which can be mitigated to less than significant* (Class II).

GSD Impact 3 **Permanent improvements, including the creation of additional impervious surfaces, would change existing drainage patterns within the site, potentially increasing the potential for localized flooding during rain events.**

Implement WAT/mm-3 (incorporate BMPs and LID strategies).

GSD/mm-3 *Prior to implementation of the first phase of the Master Plan, the General Services Agency shall prepare a stormwater drainage plan, for inclusion in the Master Plan. The plan shall include a schedule for regular maintenance checks, and incorporate additional improvements to existing facilities, including the installation of trash gates on drainage pipes, interception and dissipation of stormwater flow from impervious surfaces, and installation of storm drain inlets and engineered drainage courses.*

Residual Impact

Implementation of this measure would reduce impacts associated with drainage to a *less than significant* level (Class III).

4.5.5.5 Expansive Soils

Underlying soils are judged to be non-expansive. Therefore, no special measures with respect to expansive soils are necessary, and there would be no impact.

4.5.5.6 Change in Drainage Patterns Resulting in Erosion and Sedimentation

As noted in Sections 4.5.5.4 above, the proposed Master Plan includes drainage improvements, which would address current erosion and sedimentation issues and manage stormwater flow during rain events. In addition, the County has agreed to prepare project-specific geo-technical reports addressing subsurface conditions, and BMPs and LID strategies would be incorporated into grading and construction plans (refer to GS/mm-1, mm-2, mm-3; and WAT/mm-3). Preparation and implementation of a site-specific drainage plan would mitigate potential impacts. Therefore, potential impacts would be mitigated to less than significant (Class II).

4.5.5.7 100-year Flood Zone

The project site is not located within the 100-year flood zone; therefore, no impact would occur. Drainage and localized flooding is discussed under Section 4.5.5.4 above.

4.5.5.8 Consistency with the County Safety Element

As discussed in Chapter 3 Table 3-2 (Environmental Setting, Consistency with Plans and Policies), the project would be consistent with Safety Element standards and policies.

4.5.5.9 Mineral Resources

The project site is not located within an Extractive (EX) combining designation for mineral extraction, and is not known to contain valuable mineral resources. Therefore, no impact would occur.

4.5.6 Cumulative Impacts

Implementation of the pending and approved projects listed in the cumulative development scenario would increase development in the immediate area. Additional development, including the proposed project, would increase the number of people and structures exposed to a variety of geologic and soils hazards within the County, including liquefaction and ground shaking. Potential impacts related to geologic, soils, and seismic hazards are all site-specific, and mitigation measures are applied to each project to minimize the potential for significant geologic impacts. All development projects are required to comply with State and local regulations regarding grading and construction; therefore, no cumulative impacts related to these issues have been identified. Implementation of mitigation measures identified above, and compliance with existing regulations would mitigate impacts to less than significant, and not additional measures are necessary.

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