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5.11 Soils

This section describes the potential effects of the construction and operation of the MREC on soil resources and is organized as follows: Section 5.11.1 describes the existing environment, including soil types and their use; Section 5.11.2 presents the environmental analysis for the MREC; Section 5.11.3 discusses cumulative effects; Section 5.11.4 presents mitigation measures; Section 5.11.5 presents the LORS applicable to soils and their use; Section 5.11.6 provides agency contacts for all involved agencies; Section 5.11.7 describes permits required for the MREC; and Section 5.11.8 provides the references that were used to develop this section.

5.11.1 Affected Environment

The MREC site is located southwest of Santa Paula, California, in Ventura County. The general MREC area has mixed industrial and agricultural land uses. Agricultural land and the Ventura County Todd Road Jail Facility are located to the west of the MREC site, agricultural land is located directly north and south of the site, and industrial development is located to the northeast of the site. Adjacent to the north and east of the MREC site is an asphalt-concrete batch plant and biosolids drying area (Padre Associates, Inc., 2015).

Agricultural land in the vicinity of the MREC site consists of mainly citrus and avocado orchards, row crops, and plant nursery facilities. The MREC site is located within an area used for industrial purposes and contains other industrial businesses including auto salvage; heavy equipment storage and maintenance; asphalt production; crude oil production, storage, and pumping facilities; historical aggregate mining operations; and a biosolids drying area. The MREC site is currently being used as a storage facility for boats and recreational vehicles. The entire site is paved.

The MREC site has been historically used as an auto salvage yard. Records show that remediation of hydrocarbon-containing soils was performed at the MREC site in July 1991 (Padre Associates, Inc., 2015) with the removal of affected surface soils. Subsequent to this removal the parcel was almost entirely resurfaced with asphalt and concrete. Based on those actions, the Phase 1 Environmental Site Assessment (ESA) concluded that additional actions or assessment regarding the historical use of the site were not needed (Padre, 2015).

The MREC site laydown area will be directly northeast of the MREC site on a graveled lot currently used as storage for an automobile wrecking yard.

The MREC will connect with the existing SCE Santa Clara Substation via a new 6.6-mile overhead transmission line that runs west and southwest from the MREC site. A natural gas connection will be made to the existing SoCalGas high-pressure gas transmission pipelines via a new 2.4-mile natural gas pipeline that will run northwest and then southwest from the MREC site. A new 1.7-mile-long pipeline will bring recycled water from Limoneira Company’s wastewater discharge line to the MREC via a pipeline along the generator tie-line to the southwest. Potable water and industrial wastewater connections are to pipes that are immediately adjacent to the site.

A description of the soils in the MREC area was developed using the online soil survey information for Ventura Area, California (Natural Resources Conservation Service [NRCS], 2015) via Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm). Descriptions of the soil map units were developed from the soil survey information, and the NRCS Official Soil Series Descriptions (Soil Survey Staff, 2015).

Soil map units for the MREC area are identified in Figure 5.11-1. Soil map unit characteristics for the area that will be potentially affected by project construction are summarized in Table 5.11-1. The MREC area includes the MREC site, laydown area, corridors for the natural gas pipeline, overhead transmission tie line, and process water supply line. The table summarizes depth, texture, drainage, permeability, water runoff, and items related to revegetation potential. Actual soil conditions in the MREC area could differ from what is described in the generalized soil descriptions because of the potential for previous grading or other earthmoving activities at the site, and natural soil variations.

Table 5.11-1 NRCS Soil Map Unit Descriptions and Characteristics*

Map Unit	Description	
AcC	Anacapa sandy loam, 2 to 9 percent slopes:	
	A portion of the generator tie-line corridor crosses this soil map unit.	
	Landform:	Alluvial fans
	Parent material:	Alluvium derived from sedimentary rock
	Typical profile:	Sandy loam over stratified coarse sandy loam to loam
	Shrink-swell potential:	Low
	Depth and drainage:	Very deep, well drained
	Permeability:	Moderately rapid
	Runoff class:	Low
	Capability class:	2e (irrigated), 3e (non-irrigated)
	Taxonomic class:	Coarse-loamy, mixed, thermic Calcic Pachic Haploxerolls
AsF	Arnold sand, 9 to 50 percent slopes:	
	A portion of the generator tie-line corridor crosses this soil map unit.	
	Landform:	Hills
	Parent material:	Residuum weathered from sandstone
	Typical profile:	Sand over weathered bedrock
	Shrink-swell potential:	Low
	Depth and drainage:	Very deep, somewhat excessively drained
	Permeability:	Rapid
	Runoff class:	Low
	Capability class:	6e (irrigated), 6e (non-irrigated)
	Taxonomic class:	Mixed, thermic Typic Xeropsamments
AuC2	Azule loam, 2 to 9 percent slopes, eroded:	
AuD	Azule loam, 9 to 15 percent slopes:	
	Portions of the generator tie-line corridor cross these soil map units.	
	Landform:	Terraces and alluvial fans
	Parent material:	Alluvium derived from sedimentary rock
	Typical profile:	Loam over sandy clay and sandy clay loam
	Shrink-swell potential:	High
	Depth and drainage:	Very deep, well drained
	Permeability:	Slow
	Runoff class:	Very high
	Capability class:	2e (irrigated), 3e (non-irrigated) [AuC2] 3e (irrigated), 3e (non-irrigated) [AuD]
	Taxonomic class:	Fine, montmorillonitic/smectitic, thermic Mollic Haploxeralfs
CfF2	Castaic-Balcom complex, 30 to 50 percent slopes, eroded:	
CfG2	Castaic-Balcom complex, 50 to 65 percent slopes, eroded:	
	Portions of the generator tie-line corridor cross these soil map units.	
	Landform:	Hills
	Parent material:	Residuum weathered from sedimentary rock
	Typical profile:	Silty clay loam or loam over weathered bedrock
	Shrink-swell potential:	Low to moderate
	Depth and drainage:	Moderately deep, well drained
	Permeability:	Moderately slow
	Runoff class:	High to very high
	Capability class:	6e (irrigated), 6e (non-irrigated) [CfF2] Not specified (irrigated), 7e (non-irrigated) [CfG2]
	Taxonomic class:	Fine-silty, mixed, thermic Calcixerollic Xerochrepts; Fine-loamy, mixed, thermic Calcixerollic Xerochrepts

Table 5.11-1 NRCS Soil Map Unit Descriptions and Characteristics*

Map Unit	Description
GaC	Garretson loam, 0 to 2 percent slopes: A portion of the generator tie-line corridor crosses this soil map unit. Landform: Alluvial fans, inset fans Parent material: Alluvium derived from sedimentary rock Typical profile: Loam throughout Shrink-swell potential: Low Depth and drainage: Very deep, well drained Permeability: Moderate Runoff class: Low Capability class: 1 (irrigated), 3c (non-irrigated) Taxonomic class: Fine-loamy, mixed, nonacid, thermic Typic Xerorthents
GxG	Gullied land: Portions of the generator tie-line and natural gas pipeline corridors cross this soil map unit. Landform: NA Parent material: Residuum weathered from igneous and sedimentary rock Typical profile: Variable Shrink-swell capacity: NA Depth and drainage: NA Permeability: NA Runoff class: NA Capability class: None specified (irrigated), 8 (non-irrigated) Taxonomic class: NA
MeA	Metz loamy sand, 0 to 2 percent slopes: A portion of the project site lies in this soil map unit. In addition, portions of the generator tie-line and process water supply line corridors cross this soil map unit. Landform: Alluvial fans Parent material: Stratified alluvium derived from sedimentary rock Typical profile: Loamy sand over stratified sand to sandy loam Shrink-swell potential: Low Depth and drainage: Very deep, somewhat excessively drained Permeability: Moderately rapid Runoff class: Negligible Capability class: 3s (irrigated), 3s (non-irrigated) Taxonomic class: Sandy, mixed, thermic Typic Xerofluvents
MfA	Metz loamy sand, loamy substratum, 0 to 2 percent slopes: A portion of the project site and project site laydown area lies in this soil map unit. Landform: Alluvial fans Parent material: Stratified alluvium derived from sedimentary rock Typical profile: Loamy sand over stratified sand to sandy loam and stratified loamy very fine sand to silt loam Shrink-swell potential: Low Depth and drainage: Very deep, somewhat excessively drained Permeability: Moderately rapid Runoff class: Negligible Capability class: 2s (irrigated), 3s (non-irrigated) Taxonomic class: Sandy, mixed, thermic Typic Xerofluvents

Table 5.11-1 NRCS Soil Map Unit Descriptions and Characteristics*

Map Unit	Description	
MoA	Mocho loam, 0 to 2 percent slopes:	
	Portions of the generator tie-line, natural gas pipeline, and process water supply line corridors cross this soil map unit.	
	Landform:	Alluvial fans, flood plains, terraces, valley floors
	Parent material:	Alluvium derived from sedimentary rock
	Typical profile:	Loam throughout
	Shrink-swell potential:	Low
	Depth and drainage:	Very deep, well drained
	Permeability:	Moderate to moderately slow
	Runoff class:	Low
	Capability class:	1 (irrigated), 3c (non-irrigated)
	Taxonomic class:	Fine-loamy, mixed, superactive, thermic Fluventic Haploxerolls
MoC	Mocho loam, 2 to 9 percent slopes:	
	A portion of the generator tie-line corridor crosses this soil map unit.	
	Landform:	Alluvial fans
	Parent material:	Alluvium derived from sedimentary rock
	Typical profile:	Loam throughout
	Shrink-swell potential:	Low
	Depth and drainage:	Very deep, well drained
	Permeability:	Moderate to moderately slow
	Runoff class:	Medium
	Capability class:	2e (irrigated), 3e (non-irrigated)
	Taxonomic class:	Fine-loamy, mixed, superactive, thermic Fluventic Haploxerolls
MrC	Mocho gravelly loam, 2 to 9 percent slopes:	
	Portions of the generator tie-line and natural gas pipeline corridors cross this soil map unit.	
	Landform:	Alluvial fans
	Parent material:	Alluvium derived from sedimentary rock
	Typical profile:	Gravelly loam throughout
	Shrink-swell potential:	Moderate
	Depth and drainage:	Very deep, well drained
	Permeability:	Moderate to moderately slow
	Runoff class:	Medium
	Capability class:	2e (irrigated), 3e (non-irrigated)
	Taxonomic class:	Fine-loamy, mixed, superactive, thermic Fluventic Haploxerolls
MsA	Mocho clay loam, 0 to 2 percent slopes:	
MsB	Mocho clay loam, 2 to 5 percent slopes:	
	Portions of the generator tie-line, natural gas pipeline, and process water supply line corridors cross these soil map units	
	Landform:	Alluvial fans
	Parent material:	Alluvium derived from sedimentary rock
	Typical profile:	Clay loam throughout
	Shrink-swell potential:	Moderate
	Depth and drainage:	Very deep, well drained
	Permeability:	Moderate to moderately slow
	Runoff class:	Medium
	Capability class:	1 (irrigated), 3c (non-irrigated) [MsA] 2e (irrigated), 3e (non-irrigated) [MsB]
	Taxonomic class:	Fine-loamy, mixed, superactive, thermic Fluventic Haploxerolls

Table 5.11-1 NRCS Soil Map Unit Descriptions and Characteristics*

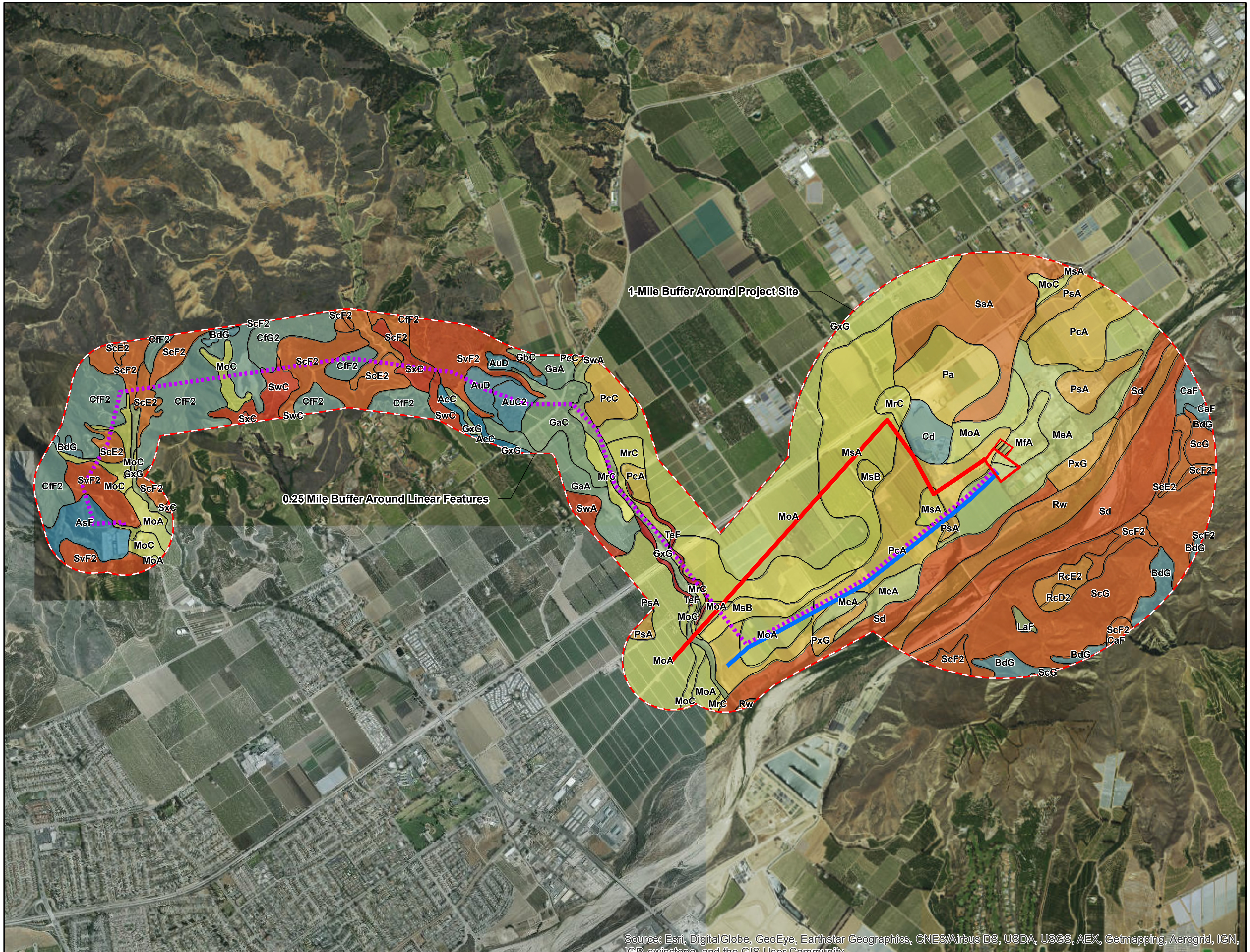
Map Unit	Description	
PcA	Pico sandy loam, 0 to 2 percent slopes:	
	Portions of the project site and project site laydown area lie within this soil map unit. In addition, portions of the generator tie-line, natural gas pipeline, and process water supply line corridors cross this soil map unit.	
	Landform:	Alluvial fans
	Parent material:	Alluvium derived from sedimentary rock
	Typical profile:	Sandy loam over stratified sandy loam to loam and stratified gravelly sand to gravelly loamy coarse sand
	Shrink-swell potential:	Low
	Depth and drainage:	Very deep, well drained
	Permeability:	Moderately rapid
	Runoff class:	Very low
	Capability class:	2s (irrigated), 3e (non-irrigated)
	Taxonomic class:	Coarse-loamy, mixed, thermic Fluventic Haploxerolls
ScE2	San Benito clay loam, 15 to 30 percent slopes, eroded:	
ScF2	San Benito clay loam, 30 to 50 percent slopes, eroded:	
	A portion of the generator tie-line corridor crosses these soil map units.	
	Landform:	Hills and mountains
	Parent material:	Residuum weathered from calcareous shale
	Typical profile:	Clay loam over weathered bedrock
	Shrink-swell potential:	Moderate
	Depth and drainage:	Deep, well drained
	Permeability:	Moderately slow
	Runoff class:	Very high
	Capability class:	4e (irrigated), 4e (non-irrigated) [ScE2] None specified (irrigated), 6e (non-irrigated) [ScF2]
	Taxonomic class:	Fine-loamy, mixed, thermic Calcic Pachic Haploxerolls
SvF2	Soper gravelly loam, 30 to 50 percent slopes, eroded:	
	A portion of the generator tie-line corridor crosses this soil map unit.	
	Landform:	Hills
	Parent material:	Residuum weathered from conglomerate and/or residuum weathered from sandstone
	Typical profile:	Gravelly loam over very gravelly clay loam over weathered bedrock
	Shrink-swell potential:	Moderate
	Depth and drainage:	Moderately deep, well drained
	Permeability:	Moderately slow
	Runoff class:	Very high
	Capability class:	6e (irrigated), 6e (non-irrigated)
	Taxonomic class:	Fine-loamy, mixed, thermic Typic Argixerolls
SwC	Sorrento loam, 2 to 9 percent slopes:	
	A portion of the generator tie-line corridor crosses this soil map unit.	
	Landform:	Alluvial fans
	Parent Material:	Alluvium derived from sedimentary rock
	Typical profile:	Loam throughout
	Shrink-swell potential:	Moderate
	Depth and drainage:	Very deep, well drained
	Permeability:	Moderate to moderately slow
	Runoff class:	Medium
	Capability class:	2e (irrigated), 3e (non-irrigated)
	Taxonomic class:	Fine-loamy, mixed, thermic Calcic Haploxerolls

Table 5.11-1 NRCS Soil Map Unit Descriptions and Characteristics*

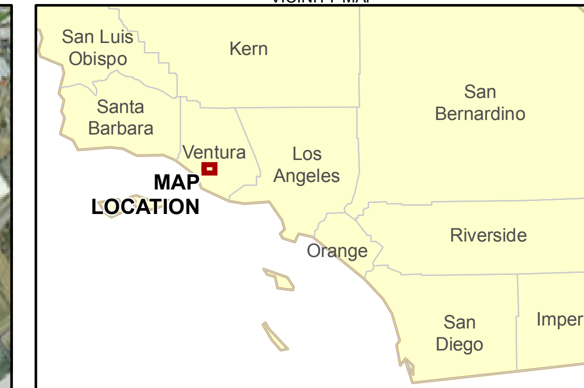
Map Unit	Description	
SxC	Sorrento silty clay loam, 2 to 9 percent slopes:	
	A portion of the generator tie-line corridor crosses this soil map unit.	
	Landform:	Alluvial fans
	Parent Material:	Alluvium derived from sedimentary rock
	Typical profile:	Silty clay loam
	Shrink-swell potential:	Moderate
	Depth and drainage:	Very deep, well drained
	Permeability:	Moderate to moderately slow
	Runoff class:	High
	Capability class:	2e (irrigated), 3e (non-irrigated)
	Taxonomic class:	Fine-loamy, mixed, thermic Calcic Haploxerolls
TeF	Terrace escarpments:	
	A portion of the generator tie-line corridor crosses this soil map unit.	
	Landform:	Terraces
	Parent Material:	Alluvium derived from sedimentary rock
	Typical profile:	Variable
	Shrink-swell potential:	NA
	Depth and drainage:	NA
	Permeability:	NA
	Runoff class:	NA
	Capability class:	None specified (irrigated), 7s (non-irrigated)
	Taxonomic class:	Xerorthents

*Phases of the same soil unit (those with the same soil series name, surface texture, landform, and typical profile) are grouped together in this table for brevity.

Soil characteristics are based on soil descriptions available on the NRCS's Web Soil Survey http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm), and the NRCS Official Soil Series Descriptions (https://soilseries.sc.egov.usda.gov/osdname.asp). Soil descriptions provided above are limited to those soil units that could be directly affected by the MREC. Other soil map units, which are well outside of the project area but are shown on Figure 5.11-1, include BdG – Badland; Cd – Camarillo loam; CaF – Calleguas shaly loam, 30 to 50 percent slopes; GaA – Garretson loam, 0 to 2 percent slopes; GbC – Garretson gravelly loam, 2 to 9 percent slopes; LaF – Landslides; McA – Metz loamy fine sand, 0 to 2 percent slopes; Pa – Pacheco silty clay loam; PcC –Pico sandy loam, 2 to 9 percent slopes; PsA - Pico loam, sandy substratum, 0 to 2 percent slopes; PxG – Pits and dumps; RcD2 – Rincon silty clay loam, 9 to 15 percent slopes, eroded; RcE2 – Rincon silty clay loam, 15 to 30 percent slopes, eroded; Rw – Riverwash; SaA – Salinas clay loam, 0 to 2 percent slopes; ScG – San Benito clay loam, 50 to 75 percent slopes; Sd – Sandy alluvial land; SwA – Sorrento loam, 0 to 2 percent slopes.



VICINITY MAP



LEGEND

- Project Site
- Laydown Area
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Soil Map Unit
- AcC: Anacapa sandy loam, 2 to 9 percent slopes
- AsF: Arnold sand, 9 to 50 percent slopes
- AuC2: Azule loam, 2 to 9 percent slopes, eroded
- AuD: Azule loam, 9 to 15 percent slopes
- BdG: Badland
- CaF: Calleguas shaly loam, 30 to 50 percent slopes
- Cd: Camarillo loam
- CfF2: Castaic-Balcom complex, 30 to 50 percent slopes, eroded
- CfG2: Castaic-Balcom complex, 50 to 65 percent slopes, eroded
- GaA: Garretson loam, 0 to 2 percent slopes
- GaC: Garretson loam, 2 to 9 percent slopes
- GbC: Garretson gravelly loam, 2 to 9 percent slopes
- GxG: Gullied land
- LaF: Landslides
- McA: Metz loamy fine sand, 0 to 2 percent slopes
- MeA: Metz loamy sand, 0 to 2 percent slopes
- MfA: Metz loamy sand, loamy substratum, 0 to 2 percent slope s
- MoA: Mocho loam, 0 to 2 percent slopes, warm MAAT, MLRA 19
- MoC: Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19
- MrC: Mocho gravelly loam, 2 to 9 percent slopes
- MsA: Mocho clay loam, 0 to 2 percent slopes, warm MAAT, MLRA 19
- MsB: Mocho clay loam, 2 to 5 percent slopes
- Pa: Pacheco silty clay loam
- PcA: Pico sandy loam, 0 to 2 percent slopes
- PcC: Pico sandy loam, 2 to 9 percent slopes
- PsA: Pico loam, sandy substratum, 0 to 2 percent slopes
- PxG: Pits and dumps
- RcD2: Rincon silty clay loam, 9 to 15 percent slopes, eroded, warm MAAT, MLRA 19
- RcE2: Rincon silty clay loam, 15 to 30 percent slopes, eroded
- Rw: Riverwash
- SaA: Salinas clay loam, 0 to 2 percent slopes, warm MAAT, MLRA 19
- ScE2: San Benito clay loam, 15 to 30 percent slopes, eroded
- ScF2: San Benito clay loam, 30 to 50 percent slopes, eroded
- ScG: San Benito clay loam, 50 to 75 percent slopes
- Sd: Sandy alluvial land
- SvF2: Soper gravelly loam, 30 to 50 percent slopes, eroded
- SwA: Sorrento loam, 0 to 2 percent slopes
- SwC: Sorrento loam, 2 to 9 percent slopes
- SxC: Sorrento silty clay loam, 2 to 9 percent slopes
- TeF: Terrace escarpments

N

0 0.25 0.5
Miles

Source:
U.S. Department of Agriculture,
Natural Resources Conservation Service (2013)

Figure 5.11-1
NRCS Soil Map Units within Project Area
Mission Rock Energy Center
Ventura County, California

ch2m

5.11.1.1 Agricultural Use

The MREC site is located north of the Santa Clara River within the Santa Clara River Valley. The Santa Clara River Valley is known for its long history of citrus production. Aerial photography and site reconnaissance confirm that much of the land surrounding the MREC site is currently used for commercial agriculture. Major crops in the vicinity include citrus and avocado orchards, row crops, and plant nursery facilities. While the MREC site is not currently used for agriculture, portions of the transmission corridors will cross over agricultural lands that are designated as important farmland areas. Issues associated with land use and agricultural conversion (e.g. Williamson Act contracts) are discussed in Section 5.4, Land Use.

5.11.1.2 Wetlands

A small area adjacent to the southern boundary of the MREC site and areas within the Santa Clara River Valley are designated as wetlands by the NWI (USWFS, 2015). Construction and operation of the MREC will not impact these features. Wetlands are discussed in more detail in Section 5.2, Biological Resources.

5.11.1.3 NRCS Soil Map Units

Table 5.11-1 describes the properties of the NRCS soil map units found in the vicinity of the project site. The major soil map units for each feature are discussed briefly below.

As shown in Figure 5.11-1, the MREC site and laydown area are associated with three map units that include Metz loamy sand (MeA, MfA) and Pico sandy loam (PcA). These soils have sandy loam to loamy sand surface textures, and are formed in alluvium from the Santa Clara River. The Phase 1 ESA of the MREC site (Padre Associates, Inc., 2015) noted that the MREC site had soil excavated and removed during a 1991 petroleum hydrocarbon soil remediation effort, so the potential for surficial fill soils to differ significantly from the native soils described by the NRCS at the MREC site is high.

The linear features traverse numerous soil map units on the valley floor. The natural gas pipeline route remains in the valley and traverses sandy loam soils that are similar to those at the MREC site (PcA) before traversing soil map units with finer loam and clay loam soils (e.g., Mocho clay loam [MsA], and Mocho loam [MoA]).

The process water supply line also remains in the valley within the alluvial loamy sand to loam soil map units (Metz loamy sand [MeA], PcA, and MoA).

The transmission line initially traverses the valley floor on the same alluvial soils, then follows along a drainageway (the Ellsworth Barranca) consisting of map units Gullied land [GxG], and Garretson loam [GaC], before heading up into steep mountain soils (Azule loam [AuC2], San Benito clay loam [ScE2, ScF2], Castaic-Balcom complex [CfF2], Soper gravelly loam [SvF2], and Arnold sand [AsF]).

5.11.1.4 Potential for Soil Loss and Erosion

The factors that have the largest effect on soil loss include steep slopes, lack of vegetation, and erodible soils composed of large proportions of silt and fine sands. The MREC area and corridors for the natural gas and supply water line are relatively flat, with medium to coarse-textured soils, so erosion should not be significant for those project features. The transmission line travels into the steep mountain soils, so particular measures will have to be undertaken to prevent erosion during construction in those areas.

The MREC site is flat and is completely covered with asphalt concrete and existing structures. It is expected that the paving and existing structures will be removed during project grading, leaving site soils disturbed and exposed. In addition, imported fill will be added to the project site to raise the site elevation approximately 5 feet, above the 100-year floodplain level. It is expected that the imported fill soil will be similar in composition to the native soil at the project site. The soils at the MREC site are expected to have relatively low water erosion potential and a moderate wind erosion potential for the following reasons:

- There are nearly level conditions at the MREC site and laydown areas, and the native soils units are expected to have moderately rapid permeability (and consequently, low runoff).
- The sandy loam and loamy sand surface materials are normally very susceptible to wind erosion. However, the on-site soils are expected to be somewhat compacted beneath the paving and structures which could mitigate wind erosion potential.
- The MREC is in a rural area where locally significant ground-level winds could lead to wind erosion.
- Imported fill soils will be compacted as they are added, but as they did not form in place, they may be more easily weathered than the native soils if not protected.

5.11.1.5 Other Significant Soil Characteristics

Other significant soil characteristics at the MREC site include the presence of expansive soils, the potential for contaminated soils, and the presence of onsite wastewater treatment systems (OWTS); which are discussed below.

Expansive Soils

The soil units underlying the MREC site are classified as having a low shrink-swell potential, so expansive soils will not be a concern at the site. A number of the soil units underlying the linear features, however, have soils classified as having a moderate to high shrink-swell potential. The presence of soils with a moderate to high shrink-swell potential may affect the suitability of the soil as a bearing surface for transmission line foundations and pipelines because expansive clays have the potential to heave or collapse with changing moisture content. The soil unit of greatest concern is Azule (AuC2, AuD), found under a small portion of the transmission line corridor (towers 20 and 21), because of its montmorillonitic/smectitic mineralogy, which is typically characterized by high shrink-swell potential.

A design-level geotechnical soil investigation will being conducted to determine the site-specific presence or absence of expansive soils and mitigation will be recommended, as appropriate. Mitigation may include the removal and replacement of unsuitable soils. With geotechnical evaluation and mitigation (if required), the presence of expansive soils will not create a substantial risk to life or property and this potentially adverse impact will be reduced to a less-than-significant level.

Potential for Soil Contamination

A Phase 1 ESA was completed by Padre Associates, Inc. in September, 2015. The Phase 1 ESA identified that the MREC site had been used as an auto salvage yard and that soil remediation of total petroleum hydrocarbon-containing surficial soils was performed at the project site in July-November 1991 (Padre Associates, Inc., 2015). No additional action or assessment regarding hazardous materials/petroleum products was recommended by Padre Associates, Inc. because of the reported surficial soil remediation and the fact that the parcel was resurfaced with asphalt and concrete. The asphalt will be removed for MREC construction and grading and deeper excavations (for example beneath foundations), could uncover contaminated soils at depth on the MREC site. Standard Conditions of Certification including the Construction Waste Management Plan and oversight by an approved Registered Geologist will be implemented to manage potential residual or previously unidentified subsurface soil contamination that could be encountered during construction of the MREC project.

Presence of Onsite Wastewater Treatment Systems

The Phase 1 ESA also identified that OWTS are in place at the MREC site. A General Waste Discharge Permit with the California Regional Water Quality Control Board is in place for the OWTS operated at the MREC site (Padre Associates, Inc., 2015). Although the liquid and solid waste generated at the site appeared properly contained during the Phase 1 ESA assessment (Padre Associates, Inc., 2015), these OWTS structures will need to be considered during project development to ensure they are managed properly.

5.11.2 Environmental Analysis

The following sections describe the potential environmental effects on soils during the construction and operation phases of the MREC.

5.11.2.1 Significance Criteria

The potential for impacts to soil resources and their uses (such as agriculture) were evaluated with respect to the criteria described in Appendix G of the CEQA Guidelines (§15000–15387, CCR Title 14, Chapter 3). An impact is considered potentially significant if it would:

- Involve other changes in the existing environment which, because of their location or nature, could result in conversion of farmland to non-agricultural use
- Impact jurisdictional wetlands
- Result in substantial soil erosion or the loss of topsoil
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (International Code Council, 1997), creating substantial risks to life or property

The following sections describe the anticipated environmental impacts on agricultural production and soils during project construction and operation.

5.11.2.2 Farmland Conversion

The MREC site has been used for industrial purposes for decades, so construction of the MREC itself will not result in the conversion of farmland to non-farmland use. However, project linear features extend through farmland, and will cross prime farmland and farmland of statewide importance. The amount of land permanently converted from farmland use for pole footprints during the construction of transmission line will be minimal and will not alter land use. The construction impacts for pipelines will be temporary because the pipelines will be installed at a depth that will not preclude agricultural activities after completion. Segregation and re-use of surface soils would help reduce future adverse crop effects over the disturbed areas. Additional information on farmland status of lands crossed by the linear features will be discussed in Section 5.6, Land Use.

5.11.2.3 Jurisdictional Wetlands

A freshwater forested/shrub wetland along the southeastern property line was identified in the National Wetlands Inventory. In addition, wetland areas will be crossed by the project linear features. The location and jurisdictional nature of these features is discussed in greater detail in Section 5.2, Biological Resources. Regardless, all wetland features will be avoided and protected during construction and operation of the MREC through implementation of erosion and sediment control BMPs. Wetlands that are adjacent to the Santa Clara River are located at least 0.30 mile from the site and will not be affected by the MREC. Therefore, impacts to wetlands will not occur.

5.11.2.4 Soil Erosion during Construction

Construction impacts on soil resources can include increased soil erosion and soil compaction. Soil erosion causes the loss of topsoil and can increase the sediment load in surface receiving waters downstream of the construction site. The magnitude, extent, and duration of construction-related impacts depends on the erodibility of the soil; the proximity of the construction activity to the receiving water; and the construction methods, duration, and season.

Because conditions that could lead to excessive soil erosion via water are not present at the MREC site, little soil erosion from rain events is expected during the construction period. Additionally, BMPs will be implemented during construction in accordance with a site-specific SWPPP that is required under the CWA for all construction projects over 1 acre in size. The CEC also requires that project owners develop and implement a drainage, erosion, and sediment control plan (DESCP) to reduce the impact of runoff from construction sites. Monitoring will involve inspections to ensure that the BMPs described in the SWPPP/DESCP are properly implemented and effective. Therefore, impacts from soil erosion via water are expected to be less than significant.

The sandy site soils could potentially have a moderate to high wind erosion potential, as could the imported fill materials depending on texture, especially if no BMPs are utilized to minimize erosion. Wind erosion potential would be highest when dry, fine sandy material is left exposed; however, compaction of fill as it is added to the site would be expected to reduce the overall potential for wind erosion in these soils. Regular watering of exposed soils and establishment of short- and long-term erosion control measures will be used to further reduce soil loss due to erosion. For these reasons, impacts from soil erosion via wind are expected to be less than significant. Estimates of erosion by water and wind are provided in the following sections.

Water Erosion

An estimate of soil loss during construction by water erosion is provided in Table 5.11-2. This estimate was developed using the Revised Universal Soil Loss Equation (RUSLE2) program using the following assumptions. Detailed calculations and assumptions for the soil loss estimates are provided in Appendix 5.11A.

- The MREC construction site totals 9.79 acres. It is assumed that soil grading and the addition of fill at the site will occur over a 6-month period. The soil in this area will then be exposed for an additional 18-month construction period, after which the majority of the site will be paved or covered with MREC facilities. It is assumed that 75 percent of the MREC site will have bare soil exposure during the construction period due to the removal of onsite asphalt and importing of fill soils.
- Estimates of soil loss (in tons) were made for the site-specific NRCS soil map units available within the RUSLE2 database.
- RUSLE2 rainfall erosivity conditions were estimated for the MREC site using the site-specific rainfall estimate for the 2-year, 6-hour storm from online National Weather Service data (NOAA, 2015).
- A 100-foot slope length was assumed for all soil units. The median of each soil unit slope class was used for the RUSLE calculations.

Table 5.11-2 Estimated Soil Loss from Water Erosion During Construction

Feature (acreage)[a]	Activity	Duration (months)	Soil Loss (tons) without BMPs	Soil Loss (tons) with BMPs	Soil Loss (tons/year) No Project
Project Site – 9.79 acres	Grading	6	16.6	0.15	0.0017
	Construction	18	16.1	0.45	—
Project Site Laydown Area – 2.89 acres, 100% of which is covered	Grading	0	0.0	0.0	0.0000
	Construction	24	0.0	0.0	—
Transmission Line – 43.1 acre construction corridor; 0.03 acre for pole footprints	Grading	12	5.0	12.1	0.0001
	Construction	18	640.3	18.1	—
	Grading	6	6.5	0.8	0.0006

Table 5.11-2 Estimated Soil Loss from Water Erosion During Construction

Feature (acreage)[a]	Activity	Duration (months)	Soil Loss (tons) without BMPs	Soil Loss (tons) with BMPs	Soil Loss (tons/year) No Project
Natural Gas Pipeline – 1.2 acre trench; 21.8 acre construction corridor	Construction	12	56.4	1.6	—
Process Water Supply Line – 0.83 acre trench; 15.5 acre construction corridor	Grading	6	1.1	0.1	0.0002
	Construction	12	8.7	0.2	—
Project Soil Loss Estimates		24	750.6	33.6	0.0027

Notes:

[a] Soil losses (tons/acre/year) are estimated using RUSLE2 software available online at http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm.

- Soil characteristics were estimated using RUSLE2 soil profiles corresponding to the mapped soil unit.

- Soil loss (R-factors) were estimated using 2-year, 6-hour point precipitation frequency amount for the MREC site [online at: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ca].

- Estimates of actual soil losses use the RUSLE2 soil loss multiplied by the duration and the affected area. The No Project Alternative estimate does not have a specific duration so loss is given as tons/year.

Soil losses are estimated using the following RUSLE2 conditions:

- **Construction** soil losses were approximated using BMPs: bare ground; Contouring: Rows up and down hill; Diversion/terracing: None; and Strips and Barriers: None.
- **Active grading** soil losses were approximated using BMPs: bare ground, rough surface; Contouring: Rows up and down hill; Diversion/terracing: None; and Strips and Barriers: None.
- **Construction** soil losses **with implementation of construction BMPs** was approximated using Management: Silt fence; Contouring: Perfect, no row grade; Diversion/terracing: None; and Strips and Barriers: two silt fences, one at end of RUSLE2 slope.
- A **"No Project"** soil loss estimate was also approximated using BMPs: Dense grass, not harvested; Contouring: Rows up and down hill; Diversion/terracing: None; and Strips and Barriers: None.

With the implementation of appropriate BMPs that will be required under the NPDES permit, and as described in Section 5.11.4.1, the total project soil loss of about 34 tons would not constitute a significant impact. It also should be recognized that the estimate of accelerated soil loss by water is very conservative (overestimate of soil loss). For example, the RUSLE2 calculation assumes only a single BMP (that is, silt fencing), whereas the SWPPP will include multiple soil erosion and sediment control measures.

Wind Erosion

The potential for wind erosion of surface material was estimated by calculating the TSP that could be emitted as a result of grading and the wind erosion of exposed soil. The total site area and grading duration were multiplied by emission factors to estimate the TSP matter emitted from the site. Fugitive dust from site grading was calculated using the default PM10 emission factor used in URBEMIS2002 (Jones and Stokes Associates, 2003) and the ratio of fugitive TSP to PM10 published by the Bay Area Air Quality Management District (BAAQMD), (2005). Fugitive dust resulting from the wind erosion of exposed soil was calculated using the emission factor in AP-42 (EPA, 1995; BAAQMD, 2005 Table 11.9-4).

Table 5.11-3 summarizes the mitigated TSP predicted to be emitted from the MREC site from grading and the wind erosion of exposed soil. Without mitigation, the maximum predicted erosion of material from the MREC site is estimated at 14.9 tons over the course of the MREC construction cycle. This estimate is reduced to approximately 5.2 tons by implementing basic mitigation measures such as water application (see Section 5.11.4). These estimates are conservative because they make use of emission rates for a generalized soil rather than site-specific soil properties. With the implementation of mitigation measures described in Section 5.11.4.1, impacts related to soil erosion from wind will be less than significant.

Table 5.11-3 Soil Loss from Grading and Wind Erosion

Emission Source	Acreage	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust:				
MREC Site	9.79	6	1.01	0.35
Laydown Area	2.89	0	0.00	0.00
Transmission Line Pole Holes	0.025	12	0.005	0.002
Natural Gas Pipeline Trench	1.16	6	0.12	0.04
Process Water Supply Line Trench	0.83	6	0.09	0.03
Wind Blown Dust:				
MREC Site	9.79	18	4.18	1.46
Laydown Area	2.89	24	0.00	0.00
Transmission Line Corridor	4.31	18	2.46	0.86
Natural Gas Pipeline Corridor	10.9	12	4.15	1.45
Process Water Supply Line Corridor	7.74	12	2.94	1.03
Estimated Total		**24**	**14.9**	**5.2**

Note:

It is assumed that the MREC site laydown area is currently covered with gravel, and will remain that way for the duration of MREC construction. The rest of the assumptions for these calculations are provided in Appendix 5.11A.

5.11.2.5 Expansive Soils

The soil units underlying the MREC site are classified as having a low shrink-swell potential, so expansive soils will not be a concern at the project site. A number of the soil units underlying the linear features, however, have soils classified as having a moderate to high shrink-swell potential. The presence of soils with a moderate to high shrink-swell potential may affect the suitability of the soil as a bearing surface for transmission line foundations and pipelines because expansive clays have the potential to heave or collapse with changing moisture content.

A design-level geotechnical soil investigation will being conducted to determine the presence or absence of expansive soils and mitigation will be recommended, as appropriate. With geotechnical evaluation and mitigation (if required), the presence of expansive soils will not create a substantial risk to life or property and this potentially adverse impact will be reduced to a less-than-significant level.

5.11.2.6 Compaction during Construction and Operation

Construction of the proposed project would result in soil compaction by use of heavy equipment during construction. Soil compaction increases soil density by reducing soil pore space. This also reduces the ability of the soil to absorb precipitation. Soil compaction can result in increased runoff, erosion, and sedimentation. The incorporation of BMPs in accordance with the SWPPP/DESCP guidelines during construction will result in less-than-significant impacts from soil compaction.

The project site laydown area is not expected to be graded before use because it is already relatively flat and covered with gravel. The proposed MREC will be constructed in an area that has been disturbed by previous development. It is expected that this area has already experienced some level of compaction in preparation for the paving that exists presently. The MREC site will be graded after the removal of the paving, and as imported fill soils are added to raise the elevation of the MREC site. It is expected that the fill soils will be compacted as necessary to provide foundation areas for the MREC buildings. After grading of the MREC site, runoff would occur as sheet flow, or percolate to groundwater. Because these areas will be paved or otherwise protected after construction, the overall anticipated impacts of compaction during construction are considered to be less than significant.

Operation of the MREC will not result in impacts on the soil from erosion or compaction. Routine vehicle traffic during plant operation will be limited to existing roads, all of which are paved or covered with gravel, and standard operational activities will not involve the disruption of soil. Therefore, impacts on soil from project operations will be less than significant.

5.11.2.7 Effects of Emissions on Soil-Vegetation Systems

Emissions from a generating facility could have an adverse effect on soil-vegetation systems in the project vicinity. This is principally a concern where environments that are highly sensitive to nutrients or salts are downwind of the project. The additional nitrogen from air emissions from the MREC is expected to be negligible when compared to the nitrogen content in fertilizers that are likely already being applied to the nearby agricultural fields. Additionally, there are no habitats in or surrounding the project area that are known to be especially sensitive to the effects of nitrogen deposition. Finally, the project will operate as a peaking facility and will be in operation only a low percentage of the time. For these reasons, the addition of small amounts of nitrogen to the area will result in a less-than-significant impact to soil-vegetation systems. Additional discussion regarding nitrogen deposition and impacts to biological resources in the area can be found in Section 5.2, Biological Resources.

5.11.3 Cumulative Effects

A cumulative impact refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (PRC §21083; CCR, title 14, §15064[h], 15065[c], 15130, and 15355).

Approved projects being constructed near the MREC site include the following:

- National Disaster Search Dog Foundation dog kennel and training facility (6800 Wheeler Canyon Road)
- Installation of a CNG fueling facility related to Harrison Industries Solid Waste transport facility (1895 Lirio Ave, Ventura, California).
- Small-scale solar generation system at the County of Ventura Juvenile Justice Complex (4333 Vineyard Avenue)
- Construction of a canopy and concrete slab for citrus washing activities (1141 Cummings Road, Santa Paula)
- Construction of a concrete block wall and motorized gate entry (1015 Mission Rock Road, Santa Paula)
- Installation of a centralized stormwater runoff treatment system at Harrison Industries (1895 Lirio Ave, Ventura, California)

Because the MREC site will not result in significant adverse impacts, and the stringent permitting process the MREC and the other approved projects must go through, impacts from the MREC combined with those from the projects listed above are not expected to result in cumulative significant impacts.

As previously described, the MREC will have minimal effect on agriculture. Agricultural uses along the linear features will be restored to pre-construction condition after construction is complete. The project's expected minor to negligible effects on soil erosion, sedimentation, and compaction are not considered to be significant, particularly with the application of onsite construction BMPs. The MREC site is surrounded by rural and industrial land uses, with no plans for residential development nearby to the site in the near future. Therefore, the potential for cumulative impacts of the MREC combined with other projects will be insignificant.

5.11.4 Mitigation Measures

BMPs in accordance with the SWPPP and DESCP will be used to minimize erosion at the site during construction. These erosion-control measures will be required to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation that destroys soil productivity and soil capacity. Typically, these measures include mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. Water erosion and sedimentation will be mitigated through the use of surface protections and sediment barriers. Wind erosion potential will be reduced significantly by keeping soil moist or by covering and/or hydroseeding soil stockpiles. Upon completion of construction activities, land surfaces will be permanently stabilized. The MREC site will be paved or completely covered with structures or pervious ground cover (for example, gravel or landscape). Therefore, soil erosion losses after construction are expected to be less than significant.

5.11.4.1 Temporary Erosion Control Measures

BMPs will be implemented during construction in accordance with the SWPPP required by the State's General Construction Permit for all construction projects over 1 acre in size which discharge to the nation's waters. Additionally, the CEC requires that project owners develop and implement a DESCP to reduce the impact of runoff from construction sites. In some cases, the DESCP may be combined with the SWPPP.

Temporary erosion control measures required for the SWPPP and DESCP will be implemented before construction begins, and will be evaluated and maintained during construction. These measures typically include, but are not limited to revegetation, mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. Temporary measures will be removed from the MREC site after the completion of construction.

During construction of the MREC, dust erosion control measures will be implemented to minimize the wind-blown loss of soil from the MREC site. Water of a quality equal to or better than existing surface runoff will be sprayed on the soil in construction areas to control dust prior to completion of permanent control measures.

Sediment barriers, which slow runoff and trap sediment, will be incorporated as discussed below. Sediment barriers include straw bales, sand bags, straw wattles, and silt fences. These features are generally placed below disturbed areas, at the base of exposed slopes, and along streets and property lines below the disturbed area. Sediment barriers are often placed around sensitive areas to prevent contamination by sediment-laden water near areas such as wetlands, creeks, or storm drains.

The MREC will be constructed on relatively level ground; therefore, it is not considered necessary to place sediment barriers around the entire property boundary. However, barriers may be placed in locations where offsite drainage could occur to prevent sediment from leaving the MREC site. If used, sediment barriers will be properly installed (e.g., staked and keyed into the ground surface), then removed or used as mulch after construction. Runoff detention basins, drainage diversions, and other large-scale sediment traps are not considered necessary because of the MREC site's small size, level topography, and surrounding paved areas. Sediment barriers will be installed around the base of the soil stockpiles, and stockpiles will be stabilized and covered.

Mitigation measures, such as watering exposed soil surfaces, are used to reduce PM10 emissions during construction activities. The PM10 reduction efficiencies are taken from the South Coast Air Quality Management District (SCAQMD) CEQA Handbook (1993) and were used to estimate the effectiveness of the mitigation measures. Table 5.11-4 summarizes the mitigation measures and PM10 reduction efficiencies.

Table 5.11-4 Mitigation Measures for Fugitive Dust Emissions

Mitigation Measure	PM10 Emission Reduction Efficiency (percent)
Water active sites at least twice daily	34–68
Enclose, cover, water twice daily, or apply non-toxic soil binders, according to manufacturer's specifications, to exposed piles (gravel, sand, dirt) with 5 percent or greater silt content	30–74

Source: SCAQMD CEQA Handbook, Table 11-4 (1993)

5.11.4.2 Permanent Erosion Control Measures

Permanent erosion control measures on the MREC site may include graveling, paving, landscaping, and drainage systems, as appropriate.

5.11.5 Laws, Ordinances, Regulations, and Standards

Federal, state, county, and local LORS applicable to soils are discussed below and summarized in Table 5.11-5.

5.11.5.1 Federal LORS

Federal CWA Act

The CWA establishes requirements for discharges of stormwater or wastewater from any point source that would affect the beneficial uses of waters of the United States. Section 402 of the CWA effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with an NPDES permit. The State Water Resources Control Board (SWRCB) is the permitting authority in California and has adopted a statewide general permit for stormwater discharges associated with construction activity (General Construction Permit; SWRCB, 2012) that applies to projects resulting in 1 or more acres of soil disturbance. The MREC would result in disturbance of more than 1 acre of soil. Therefore, the project would need to be covered under the General Construction Permit and develop and implement a site-specific SWPPP to meet permit requirements. Requirements are described in greater detail in Section 5.15, Water Resources.

Table 5.11-5 Laws, Ordinances, Regulations, and Standards for Soils

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
Federal			
1972 Amendments to Federal Water Pollution Control (CWA, including 1987 amendments)	Regulates stormwater and non-storm water discharges from construction and industrial activities	RWQCB – Los Angeles Region (4) and SWRCB. EPA has oversight authority.	Section 5.11.5.1.1
NRCS (1983), *National Engineering Handbook*, Sections 2 and 3	Standards for soil conservation	NRCS	Section 5.11.5.1.2
State			
Porter-Cologne Water Quality Control Act	Regulates discharges to waste and state waters and to land	RWQCB – Los Angeles Region (4) and SWRCB	Section 5.11.5.2.1
Table 18-1-B of the Uniform Building Code (International Code Council, 1997)	Sets standards for defining expansive soils	CEC	Section 5.11.2.5.2
Local			
Ventura Countywide Stormwater Quality Management Program	Requirements for stormwater compliance for construction activities	Ventura County Surface Water Quality Section (County Stormwater Program) under the Public Works Agency	Section 5.11.5.3.1
Ventura County Grading Standards and Rules	Standards for grading, including permit requirements	Ventura County Public Works Agency, Water Resources and Development Department, Development and Inspection Services Division	Section 5.11.5.3.1

USDA Engineering Standards

Sections 2 and 3 of the USDA, NRCS National Engineering Handbook (NRCS, 1983) provide standards for soil conservation during planning, design, and construction activities.

5.11.5.2 State LORS

California Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (California Water Code, Division 7) provides for overall regulation under state law of water quality affecting all state waters, including both surface waters and groundwater. Under the Porter-Cologne Water Quality Control Act, the SWRCB has the ultimate authority over water quality policy, and nine Regional Water Quality Control Boards (Regional Boards) oversee water quality on a day-to-day basis at the local/regional level. The Los Angeles RWQCB controls surface water discharges in the MREC area, and the project would need to meet water quality standards that are identified in the Water Quality Control Plan for this region.

Uniform Building Code

Table 18-1-B of the Uniform Building Code (International Code Council, 1997) defines the criteria for expansive soils.

5.11.5.3 Local LORS

The Ventura Countywide Stormwater Quality Management Program was developed in compliance with the municipal NPDES permit issued by the State to Ventura County. Member agencies include the county of Ventura, the Ventura County Watershed Protection District, and all ten major cities within the county. The Clean Water Program requires that, for development projects resulting in 1 acre or more of impervious surfaces, treatment and source control measures must be developed and implemented, plus runoff flow must be controlled so that post-project runoff does not exceed estimated pre-project rates or durations. Requirements applicable to the MREC are described in the Ventura County Stormwater Quality Ordinance (Code No. 4450) available online (Ventura County, 2012).

The Ventura County Water Resources and Development Department of the Public Works Agency has standards for grading within their Land Development Manual (County of Ventura, 1995). Chapter 6 includes rules and regulations for grading. In addition, these standards are included as a part of the Ventura County Code – Article 5, Standards and Conditions (specifically 8175-5.17 – Grading and brush removal).

Appendix J of the Ventura County Building Code contains specific rules and regulations for grading within the County, and provides for approval of plans and inspection of grading construction (Ventura County, 2010). The Building Code also outlines the specifics of the soils and engineering reports that are to accompany a grading permit application.

5.11.6 Agencies and Agency Contacts

Applicable permits and agency contacts for soils are shown in Table 5.11-6.

Table 5.11-6 Permits and Agency Contacts for Soils

Permit or Approval	Agency Contact	Applicability
Ventura County Grading Permit	Jim O'Tousa Engineering Manager, Engineering Services Department County of Ventura 805-654-2034 jim.otousa@ventura.org	Grading permits

5.11.7 Permits and Permit Schedule

It is expected that all the required permits for grading can be secured as long as completed applications are provided to the appropriate agency a minimum of 6 months prior to construction. Other permits that relate to soils, such as the NPDES permit, are evaluated in other sections (See Section 5.15, Water Resources).

5.11.7 References

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