Section 4.11

Geotechnical/Subsurface/Seismic/ Hazardous Materials

This section summarizes the existing geotechnical, seismic, and hazardous materials conditions within the project area and evaluates the potential for geotechnical, seismic, and hazardous materials impacts resulting from construction and operation of the proposed Eastside Transit Corridor Phase 2 Project alternatives. Information in this section is based on, and updated where appropriate from, the Geotechnical/Seismic/Hazardous Materials Technical Memorandum, which is incorporated into this Draft EIS/EIR as Appendix V.

4.11.1 Regulatory Framework/Methodology

4.11.1.1 Regulatory Framework

Regulations and programs relevant to geotechnical and seismic hazards include the Alquist-Priolo Earthquake Fault Zoning Act, the Seismic Hazards Mapping Act of 1990, and the 1990 Los Angeles County General Plan, Seismic Safety Element, among others. Federal, state, and local regulations and programs governing the use, storage, transport, and disposal of hazardous materials include the Resource Conservation and Recovery Act, Superfund Amendments and Reauthorization Act, Comprehensive Environmental Response, Compensation, and Liability Act, California Hazardous Waste Control Law, Unified Hazardous Waste and Hazardous Materials Management Regulatory Program, and Los Angeles County Fire Department, Health Hazardous Materials Division, among others. These are discussed in further detail in Appendix V, Geotechnical/Seismic/Hazardous Materials Technical Memorandum, of this Draft EIS/EIR.

4.11.1.2 NEPA Impact Criteria

The National Environmental Policy Act (NEPA) requires an evaluation of potential impacts related to hazardous materials, including:

- The potential to encounter existing hazardous materials during project activities; and
- The potential for the proposed project to generate new hazardous materials that would affect the surrounding human and natural environments.

4.11.1.3 CEQA Impact Criteria

The following thresholds of significance, derived from the *L.A. CEQA Threshold Guide* (City of Los Angeles 2006), were used in the evaluation of geologic hazards and hazardous materials for the Eastside Transit Corridor Phase 2 Project to determine the significance of impacts under the California Environmental Quality Act (CEQA).

A significant geologic hazards impact would occur for purposes of the CEQA evaluation if an alternative would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault, ii) Strong seismic ground shaking, iii) Seismic-related ground failure, including liquefaction, or iv) Landslides; or
- 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.

A significant impact on mineral resources would occur if an alternative would:

- 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; or
- 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.

Additionally, per Appendix G of the *CEQA Guidelines* (as revised), a significant impact with respect to hazardous materials would occur for purposes of the CEQA evaluation if an alternative would:

- Create a significant hazard to the public or environment through the routine transport, storage, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and, as a result, create a significant hazard to the public or the environment;
- Create a safety hazard for people residing or working in the project area for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, or a private airstrip;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Since the project is not located within an airport land use plan, or near a public airport or private airstrip, there would be no impacts related to that issue. In addition, the project is located in a highly developed urban area, therefore impacts from wildland fires are not applicable.

These thresholds have been incorporated into the analysis documented in this section.

4.11.1.4 Methodology

As detailed in Appendix V, Geotechnical/Seismic/Hazardous Materials Technical Memorandum, of this Draft EIS/EIR, the method for assessing the potential geologic, seismic, and hazardous materials impacts included reviewing available literature and reports for the project area. Documents reviewed for geotechnical/seismic issues included the safety elements of the general plans for the cities of Commerce, Montebello, Monterey Park, Pico Rivera, Rosemead, Santa Fe Springs, South El Monte, and Whittier and the County of Los Angeles; official Alquist-Priolo Earthquake Fault Zone Maps; official Seismic Hazard Zone Maps, geologic and topographic maps, and other publications by the California Geological Survey (previously California Division of Mines and Geology, U.S. Geological Survey, and California Division of Oil and Gas); and as-built drawings for the SR 60 Freeway construction and bridge crossings along the Rio Hondo and the San Gabriel River along Washington Boulevard. The information was reviewed to describe the environmental setting and the geologic hazards for impact analysis.

Information for the hazardous materials analysis was obtained from the Hazardous Materials Investigation and Analysis (Phase 1 Environmental Assessment) prepared for the project, which was based on a review of regulatory databases and

agency files; historical information, including Sanborn fire insurance maps, historical aerial photographs, and historical topographic maps of the area; information on oil and natural gas from California Department of Oil, Gas and Geothermal Resources maps and record reviews; and a visual survey of the current land uses, locations of properties of concern, and other potential gross hazardous materials usage or releases that were not otherwise identified from the database, records reviews, or aerial photographs.

Additionally, as requested by the U.S. Environmental Protection Agency (USEPA), three supplemental investigations involving literature review and modeling were conducted. These investigations included:

- A literature review and vibration modeling to determine slope stability at the Operating Industries, Inc. (OII) landfill site from train-related vibration;
- A literature review discussing the potential for air leakage into the OII remediation system causing underground fires beneath the OII landfill site; and
- Air dispersion modeling to determine risk to train passengers from exposure to the high temperature plume emitted from the OII remediation system stacks on the north side of SR 60.

A supplemental memorandum was prepared, and is included as Attachment 1 to Appendix V, summarizing the findings from previous studies conducted in the vicinity of the OII landfill site and the SR 60 LRT Alternative alignment, including the North Side Design Variation. The supplemental memorandum addresses the following objectives:

- Clarify the extent to which uncertainties regarding the limits and characteristics of waste, landfill gas concentrations, groundwater conditions, restoration of the monocover remedy, slope stability and erosion controls, and site access and security in the vicinity of the OII landfill affect the constructability and potential environmental impacts of the SR 60 LRT Alternative.
- Provide additional information to document minimal potential for landslide hazards in the vicinity of the OII landfill site, additional information about construction, and design modifications that would be necessary to ensure a safe and structurally sound SR 60 LRT Alternative.
- Identify environmental impacts associated with design modifications, and mitigation measures necessary to address any impacts.
- Identify structural, engineering, and environmental challenges and solution concepts pertaining to the SR 60 LRT Alternative and North Side Design Variation.

4.11.2 Affected Environment/Existing Conditions

The project area is located in the San Gabriel Valley and Gateway Cities areas, near the northwestern boundary of the Los Angeles Basin in the general vicinity of the Whittier Narrows, a prominent gap in the Puente Hills. The proposed corridor traverses the physiographic features known as the Montebello Plain and Montebello Hills, the Rio Hondo, and the San Gabriel River. Topography along the SR 60 LRT Alternative corridor ranges from gently sloping alluvial surface in the west and east, to moderate to steep hillsides where the corridor crosses the Montebello Hills. Elevations range from 220 to 500 feet. Topography along the Garfield Avenue and Washington Boulevard corridor of the Washington Boulevard LRT Alternative consists of gentle slopes along the side of the valley. Elevations range from 150 to 260 feet along this LRT Alternative corridor.

4.11.2.1 Regional Geology

On a regional scale, the project area lies within the Peninsular Ranges geomorphic province and adjacent to the Transverse Ranges geomorphic province. The Peninsular Range is bounded by the

San Jacinto fault zone to the east, the Pacific Ocean coastline to the west, and the Transverse Ranges geomorphic province to the north. The Peninsular Ranges province is characterized by northwest-trending mountain ranges and hills separated by sub-parallel, sediment-filled valleys. The northwest structural trend manifests in regional structures within the province, such as the Whittier, Newport-Inglewood, and Elsinore fault zones and the northwest trending Elysian Park anticline. Faults in the project vicinity are shown in **Figure 4.11-1**.

4.11.2.2 Faulting and Seismicity

4.11.2.2.1 Faulting

The primary seismic considerations are surface rupture of the earth materials along fault traces and damage to structures due to seismically-induced ground shaking. There are numerous faults in Southern California, including active, potentially active, and inactive faults. An active fault is one that has had surface displacement within Holocene time (approximately within the last 11,000 years). A potentially active fault is a fault that has demonstrated surface displacement of Quaternary age deposits (within the last 1.6 million years). Inactive faults have not moved in the last 1.6 million years.

A listing of active faults located within the vicinity of the project area is shown in **Table 4.11-1**.

The Holocene active fault with surface expression closest to the project area is the Whittier fault, located approximately two miles to the northeast of the eastern terminus of the proposed Washington Boulevard LRT Alternative corridor and 2.8 miles southwest of the eastern terminus of the SR 60 LRT Alternative alignment. The Alhambra Wash fault is considered the westernmost extension of the Whittier fault and it traverses the SR 60 LRT Alternative alignment east of the intersection with San Gabriel Boulevard. The Alhambra Wash fault does not traverse the Washington Boulevard LRT Alternative alignment.

4.11.2.2.2 Seismic Hazards

Historical evidence and current technology indicate that at least one moderate to severe earthquake will occur during the design life of the proposed project.

Table 4.11-1. Active Faults

Fault	Distance from SR 60 LRT Alternative Alignment (mi)	Distance from Washington Boulevard LRT Alternative Alignment (mi)
Alhambra Wash Fault	0	4
Whittier Fault	2.8	2.0
Raymond Fault	6	6
San Jose Fault	8.5	9.5
Hollywood Fault	8.8	8.8
Verdugo Fault	9.3	9.3
Sierra Madre Fault	9.3	10.7
Clamshell-Sawpit Fault	9.3	12
Newport-Inglewood Fault	11.8	10
Santa Monica Fault	15.3	15.3
Palos Verdes Fault	20	20
San Andreas Fault	>30	>30

Source: AECOM, CDM 2011.

During a moderate to severe earthquake occurring on the nearby faults, strong ground shaking of the project site would probably occur. In addition to ground shaking, effects of seismic activity on a project site may include surface fault rupture, soil liquefaction, seismically-induced differential settlement of structures, land sliding, earthquake-induced flooding, seiches, and tsunamis.

Earthquake-induced flooding could affect portions of the project area if the Santa Fe Dam, Puddingstone Dam, Garvey Reservoir, or Whittier Narrows Dam were to fail due to an earthquake. However, catastrophic failure of a dam as a result of an earthquake is considered unlikely.

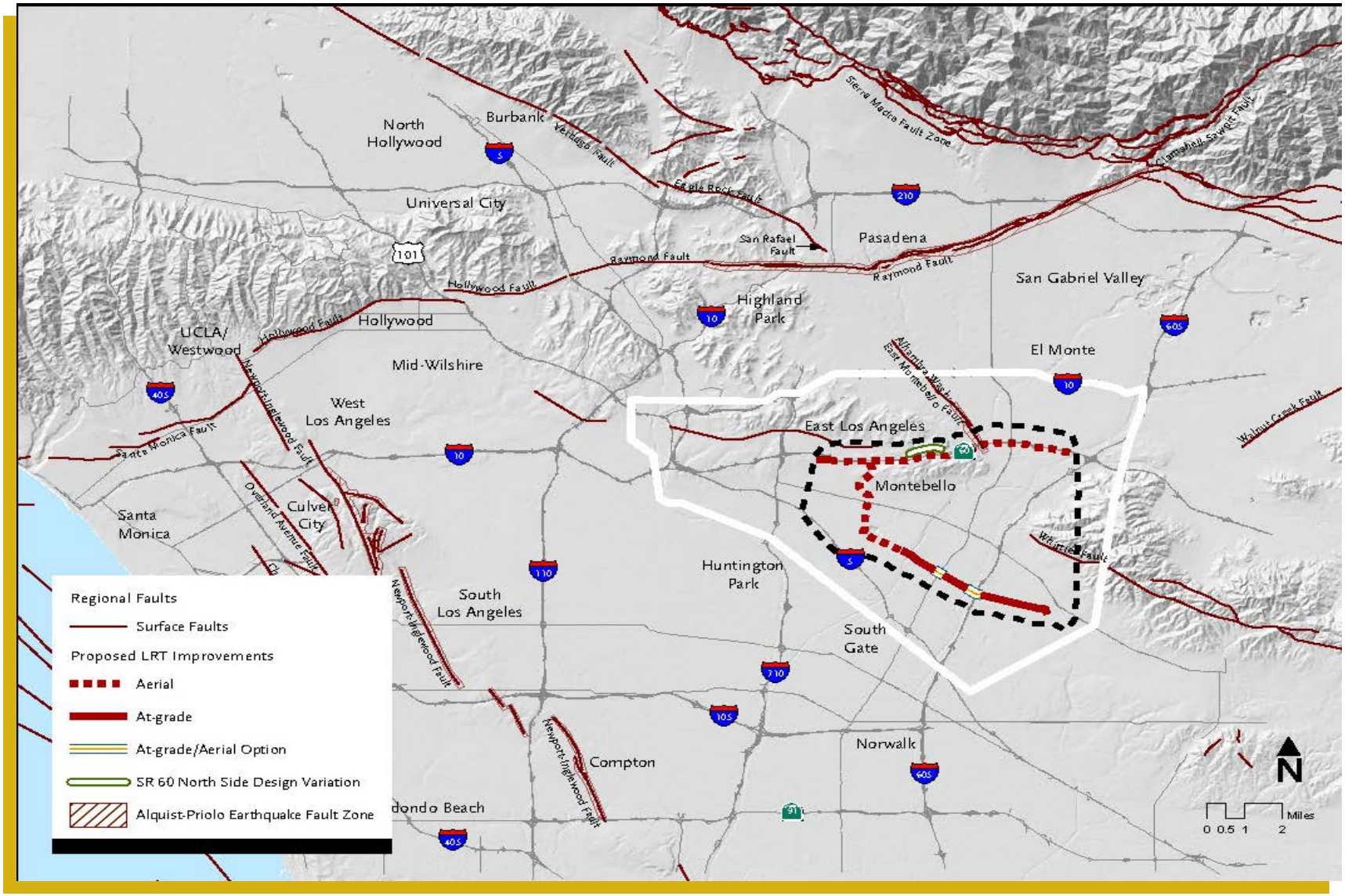


Figure 4.11-1. Regional Faults

Therefore, hazards associated with earthquake-induced dam breaches and seiches are not further discussed. In addition, tsunamis are not a hazard, as the project area is more than 20 miles from the Pacific Ocean.

A portion of the project area lies within the California Geologic Survey's identified liquefaction zone, as shown in **Figure 4.11-2**. Liquefaction refers to the process by which saturated, unconsolidated sediments are transformed into a substance that acts like a liquid. Earthquakes can cause soil liquefaction where loosely packed, water-logged sediments come loose from the intense shaking of the earthquake. Seismically-induced settlement consists of compression of the dry soils above groundwater and liquefaction-induced settlement of the liquefiable soils below groundwater. These settlements occur primarily within the loose to moderately dense sandy soils due to volume reduction during or shortly after an earthquake event.

Mapped liquefaction zones as well as the upper soils along the proposed at-grade alignment segment of the Washington Boulevard LRT Alternative, which consist of predominantly young alluvial fan deposits, have the potential to experience seismically-induced settlement as well as settlement due to traffic loading from operational vibration on the at-grade track.

As shown in Figure 4.11-2, a portion of the project area also lies within an earthquake-induced landslide zone, according to the State of California Seismic Hazard Zones map.

4.11.2.3 Mineral Resources

The project area traverses areas underlain by geologic materials such as sand and gravel that may be considered mineral resources and could be used as construction aggregates. These materials have not been previously mined along the project alignments. Mining of these materials in an urbanized environment is not considered economical, and there are no locally important mineral resource recovery sites delineated on a local general plan, specific plan, or other land use plan for the project area. Therefore, no significant impact on mineral resources would occur, and such impacts are not further discussed.

4.11.2.4 Hazardous Materials

4.11.2.4.1 Properties of Concern

A database search was conducted to identify potential properties of concern within the vicinity of each project alternative. A total of 33 sites were identified as properties of concern due to their proximity to the alignments (within one-quarter mile of either build alternative or a proposed maintenance yard site); being listed on the Cortese, Spills, Leaks, Investigations, and Cleanups (SLIC), Leaking Underground Storage Tank (LUST), EnviroStor, or Geotracker database; having a confirmed release to soil or groundwater; having a regulatory case that is open, pending, or undetermined; or having a probable impact to soil, groundwater, or soil gas based on the type and/or intensity of the land use. **Table 4.11-2** lists the identified properties of concern, which are mapped in **Figure 4.11-3.**

4.11.2.4.2 Superfund Sites

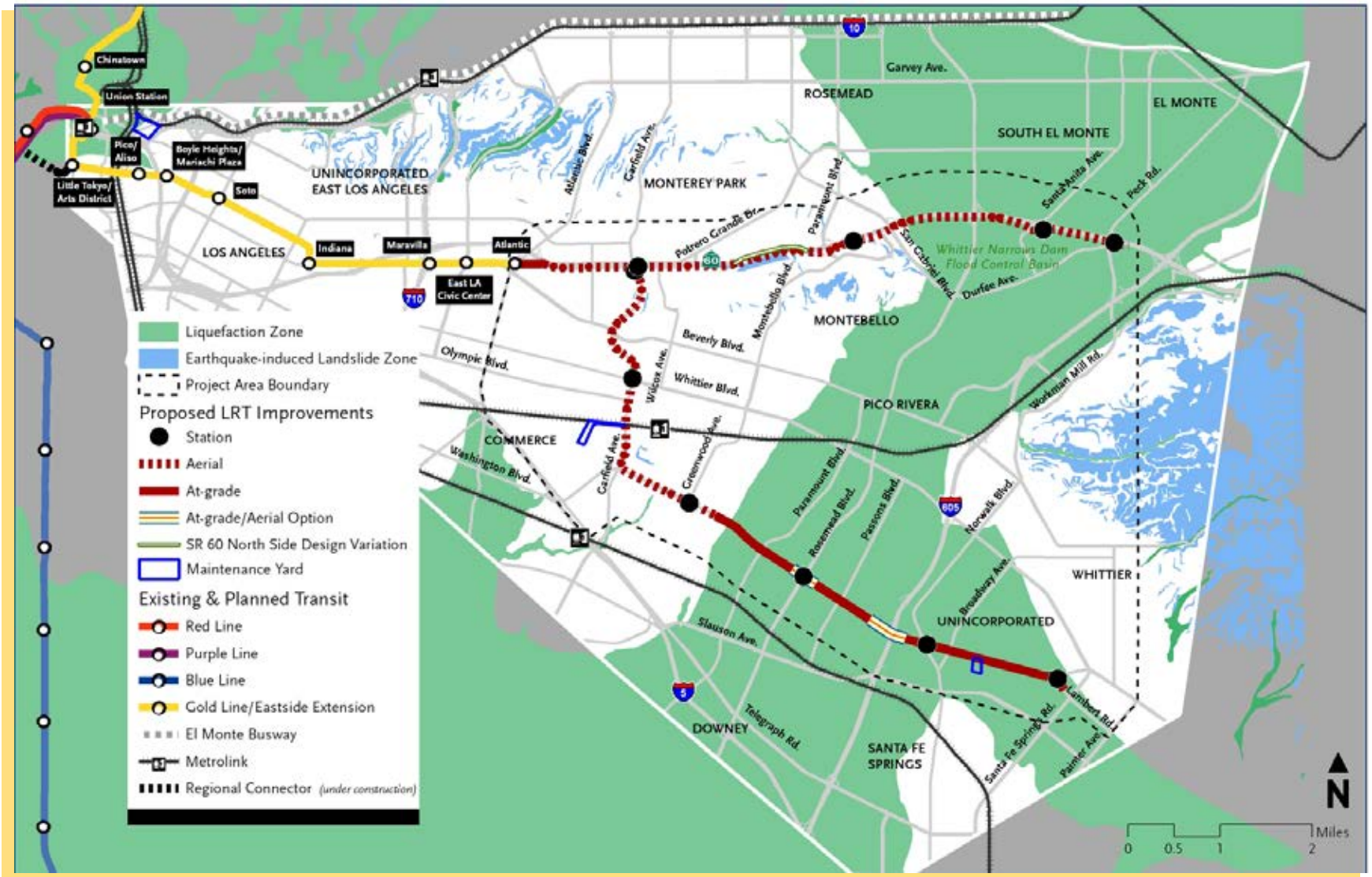
Among the properties of concern are four USEPA Superfund sites, as shown in **Figure 4.11-4**. These sites include:

- OII Landfill
- San Gabriel Valley, South El Monte OU, and Whittier Narrows OU
- Omega Chemical OU1 and OU2
- Waste Disposal, Inc.

These Superfund sites are each associated with large groundwater and/or soil gas plumes, and may pose significant concern for the project due to the extent of contamination and the complexity of various agency involvements in the investigation and remediation of contamination.

OII Landfill

The OII Landfill, in the city of Monterey Park, is located about 10 miles east of downtown Los Angeles and consists of a 190-acre site.



Source: CDMG, Seismic Hazard Zone Maps for El Monte, Los Angeles, South Gate, and Whittier 7.5 Minute Quadrangles, Details below.

Figure 4.11-2. Liquefaction and Landslide Hazard

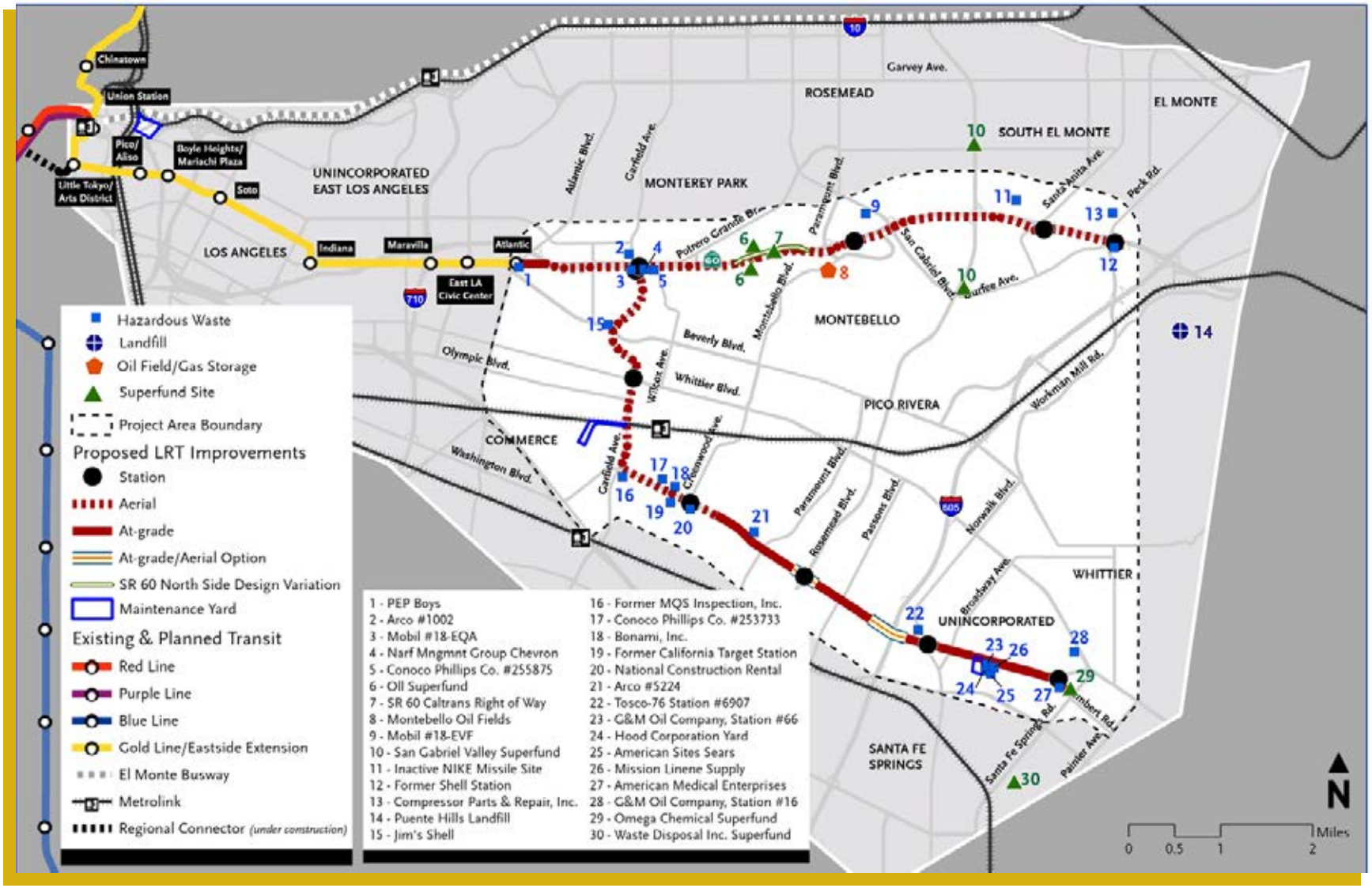
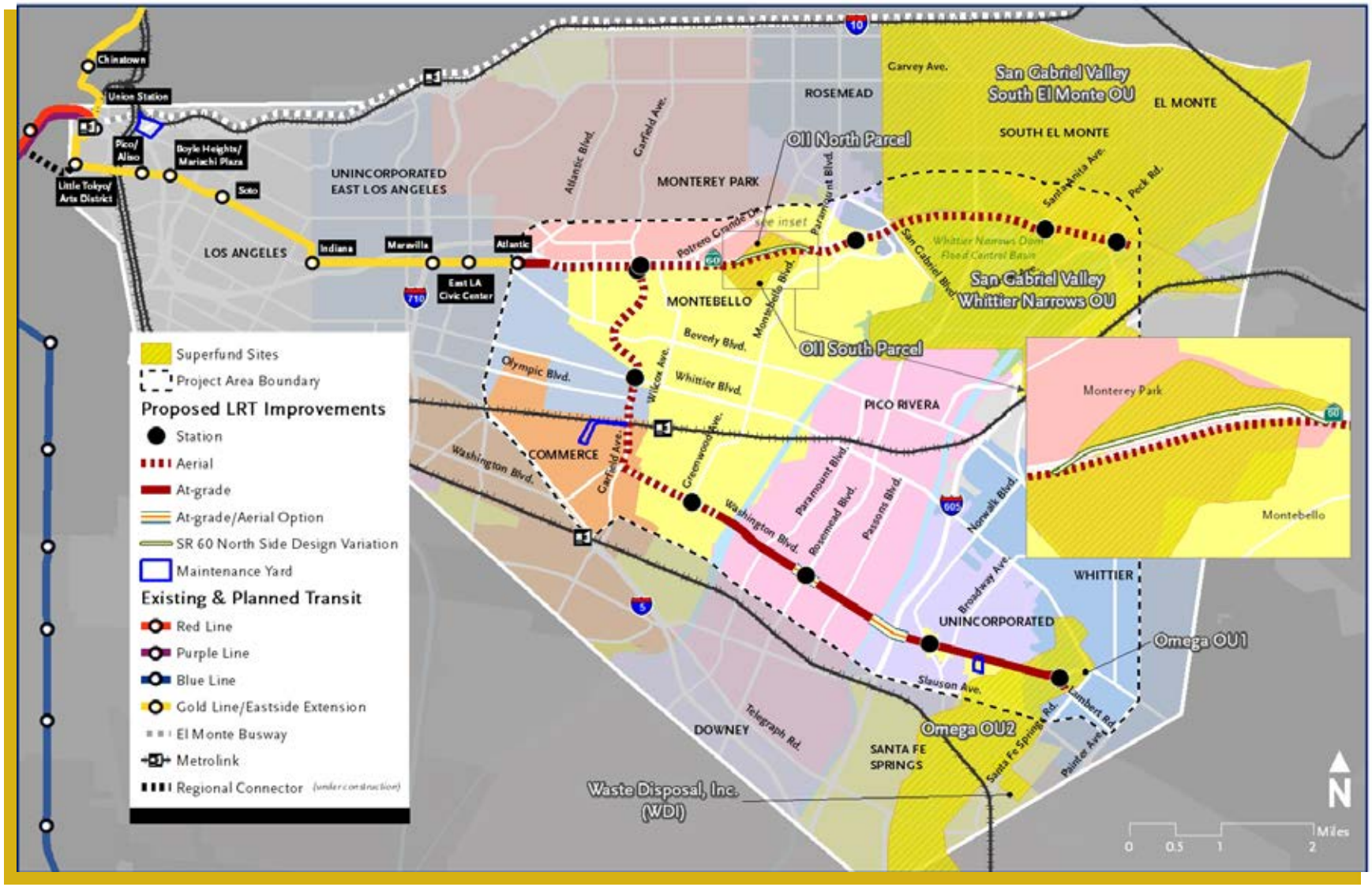


Figure 4.11-3. Properties of Concern within 0.25 Mile of the SR 60 and Washington Boulevard LRT Alternative Alignments



Source: USEPA Geospatial Data Access Project, 2010

Figure 4.11-4. Superfund Sites within the Project Area

Table 4.11-2. Summary of Hazardous Materials Properties of Concern

Site	Location	Description	Distance (feet)	Level of Concern
SR 60 LRT Alternative/Washington Boulevard LRT Alternative Shared Alignment				
PEP Boys	256 S. Atlantic Blvd., Los Angeles	Open site assessment for oil release to soil. Adjacent to alignment.	45	Low
ARCO #1002	2439 S. Garfield Avenue, Monterey Park	Open site assessment for hydrocarbon release to soil.	270	Low
Texaco Service Station	892 Garfield Ave, Montebello	LUST; two cases, both completed - cases closed.	0	Low
Mobil #18-EQA (Mobil Oil Corp SS 11EQA)	897 N. Garfield Avenue, Montebello	Open case for gasoline release to groundwater. Groundwater flow appears to be away from the alignment. Site is located about 320 feet from Garfield Avenue station.	75	Low
NARF Management Group Chevron	2633 W. Via Campo, Montebello	Open case for gasoline release to groundwater. Groundwater flow appears to be away from the SR 60 LRT Alternative alignment and toward the Washington Blvd. LRT Alternative alignment. Site is near Garfield Avenue station for both alignments, especially Washington Blvd.	75 (SR 60) 10 (Washington Blvd.)	Low (SR 60) High (Washington Blvd.)
SR 60 LRT Alternative				
Conoco Phillips Co. #255875	879 N. Wilcox Avenue, Montebello	Recent fuel release to shallow groundwater. Site characterization is incomplete.	80	Medium
OII Superfund Site, North and South Parcel	900 Potrero Grande Drive, Monterey Park	Former municipal/industrial solid waste and liquid hazardous waste landfill that is presently a capped USEPA Superfund site undergoing remedy.	60	High
SR 60 California Department of Transportation (Caltrans) Right-Of-Way (ROW)	SR 60 ROW at OII landfill	Caltrans ROW bounds OII landfill on north and south. Residual landfill material likely present. Associated landfill gas and groundwater impacts are also likely.	0	High
Mobil #18-EVF	939 N. San Gabriel Blvd., Rosemead	Gasoline release to groundwater 600 feet up-gradient of SR 60.	575	Medium
San Gabriel Valley Superfund Site - South El Monte and Whittier Narrows Operable Units (OUs)	South El Monte and Whittier Narrows	Region-wide USEPA Superfund site with volatile organic compounds (VOC)-impacted groundwater beneath SR 60.	0	High

Table 4.11-2. Summary of Hazardous Materials Properties of Concern (continued)

Site	Location	Description	Distance (feet)	Level of Concern
Inactive NIKE Missile Site	1201 Potrero Avenue, South El Monte	Open site assessment with potential effects to drinking water aquifer per database. Records not discovered.	775	Medium
Former Shell Station #204-7389-0232	1130 N. Peck Road, South El Monte	Gasoline release to groundwater 500 feet up-gradient of SR 60. Reportedly closed 10/29/09. Site is located about 290 feet up-gradient of Peck Road station.	310	Medium
Compressor Parts & Repair, Inc.	1501 Peck Road, South El Monte	VOC contamination to groundwater. Remediation began in 1987.	970	Low
Puente Hills Landfill	1955 Workman Mill Road, Whittier	Active Class III municipal landfill.	3,975	Low
Jim's Shell	2900 W. Beverly Blvd., Montebello	Active investigation for gasoline release to soil.	45	Low
Washington Boulevard LRT Alternative				
AMPT Montebello Inc.	500 Garfield Ave., Montebello	LUST; case is closed	0	Low
MQS Inspection, Inc. (Former)	6800 E. Washington Blvd., Commerce	Chlorinated solvent release to soil and groundwater undergoing remediation. Plume previously extended beneath Washington Blvd.	65	High
Conoco Phillips Co. #253733	1628 Washington Blvd., Montebello	Gasoline leak affecting groundwater. Open site assessment. Groundwater flow appears to be toward the alignment.	50	High
Bonami, Inc.	1436 Washington Blvd., Whittier	Hydrocarbon release affecting soil. Open site assessment.	40	Low
California Target #100	869 Washington Blvd., Montebello	Open case for gasoline leak affecting groundwater with reported flow direction away from alignment. Site is located about 45 feet from the Greenwood Ave. station.	40	Medium
National Construction Rental	1045 Greenwood Avenue, Montebello	Open case under assessment for a waste oil release to soil.	410	Low
ARCO #5224	8351 Washington Blvd., Pico Rivera	Open case for soil and groundwater impacts from gasoline with active remediation. Groundwater flow appears to be away from the alignment.	55	Low

Table 4.11-2. Summary of Hazardous Materials Properties of Concern (continued)

Site	Location	Description	Distance (feet)	Level of Concern
TOSCO 76 Station #6907	11025 Washington Blvd., Santa Fe Springs	Hydrocarbon release to groundwater, with a direction of flow potentially toward alignment. Active case. Site is located about 365 feet from Norwalk Blvd. station.	45	High
G & M Oil Co. Station #66	11770 Washington Blvd., Santa Fe Springs	Gasoline leak affecting groundwater. Case is open and under remediation. Groundwater flow appears to be parallel to alignment, and one well located in Washington Blvd. contains VOCs at low concentrations.	50	Medium
Hood Corporation Yard	8201 S. Sorensen Avenue, Santa Fe Springs	Diesel leak into soil. Case is open and under remediation. Groundwater flow is toward the southwest. Impact to alignment unlikely.	375	Low
American Site Sears	8230 Sorensen Avenue, Whittier	Open case for hydrocarbon leak affecting groundwater. Groundwater flow appears to be away from alignment.	1,020	Low
Mission Linen Supply	11920 E. Washington Blvd., Whittier	VOCs in groundwater associated with former industrial laundry. Groundwater flow direction appears to be away from alignment.	55	Low
Chevron #9-7441	12376 Washington Blvd., Whittier	LUST; completed, case is closed	0	Low
American Medical Enterprises	12508 E. Lambert Road, Whittier	Waste oil leak affecting groundwater. Case is open and under remediation. Groundwater flow appears to be away from alignment.	0	Medium
G & M Oil Company Station #16	12559 Lambert Road, Whittier	Open case under remediation for gasoline leak affecting groundwater. Direction of flow appears to be away from alignment.	375	Low
Omega Chemical Superfund Site	12504 E. Whittier Blvd., Whittier	USEPA Superfund site with VOC-impacted groundwater beneath Washington Blvd.	0	High

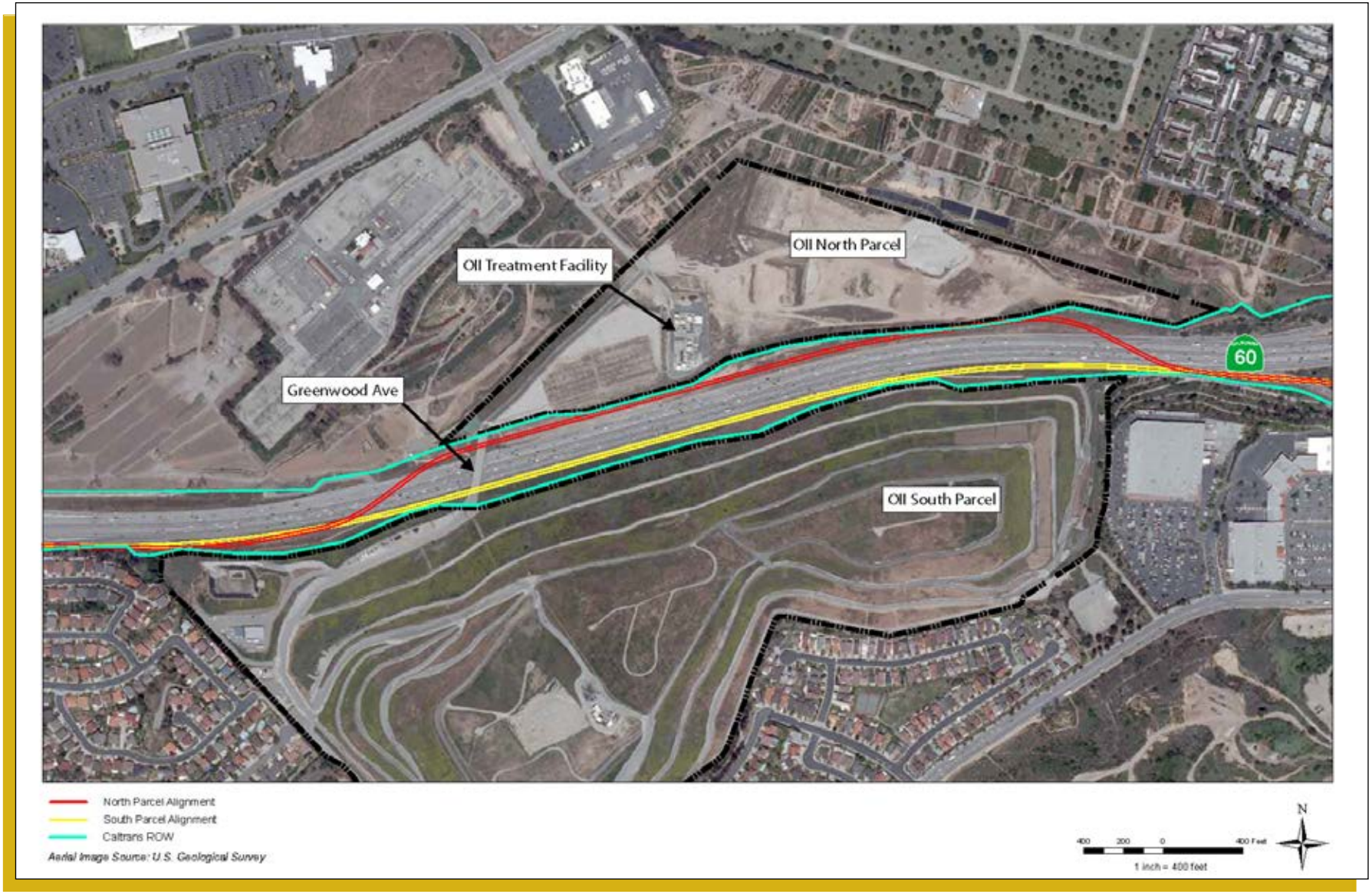
Table 4.11-2. Summary of Hazardous Materials Properties of Concern (continued)

Site	Location	Description	Distance (feet)	Level of Concern
Waste Disposal Inc. Superfund Site	Santa Fe Springs Road and Los Nietos Road, Santa Fe Springs	USEPA Superfund site south of Washington Blvd. terminus.	5,435	Low
Mission Junction Maintenance Yard				
	1430 Bolero Lane	Releases of petroleum hydrocarbons, VOCs, and metals; property is under "open–site assessment" as of June 13, 2000.	<1320	Medium
	490, 496, and 498 Bauchet Street	Former manufactured gas plant; soils reportedly impacted by petroleum hydrocarbons, VOCs, metals, polynuclear aromatic hydrocarbons; soils remediation complete; groundwater remediation not complete.	<1320	Medium
	Keller Yard south of Caesar Chavez	Former manufactured gas plant; soils impacted by petroleum hydrocarbons, VOCs, metals, polynuclear aromatic hydrocarbons; remediation has not been completed.	<1320	Medium

Source: AECOM, CDM Smith 2011, CDM Smith 2010.
Note: The Level of Concern (LOC) rankings are highly subjective and are intended to be relative to other sites listed in the table. The factors below were considered during the assignment of LOC rankings for each site; however, the identification of actual site conditions is limited in most cases by the amount and quality of the data available. Actual conditions may represent a higher or lower LOC:

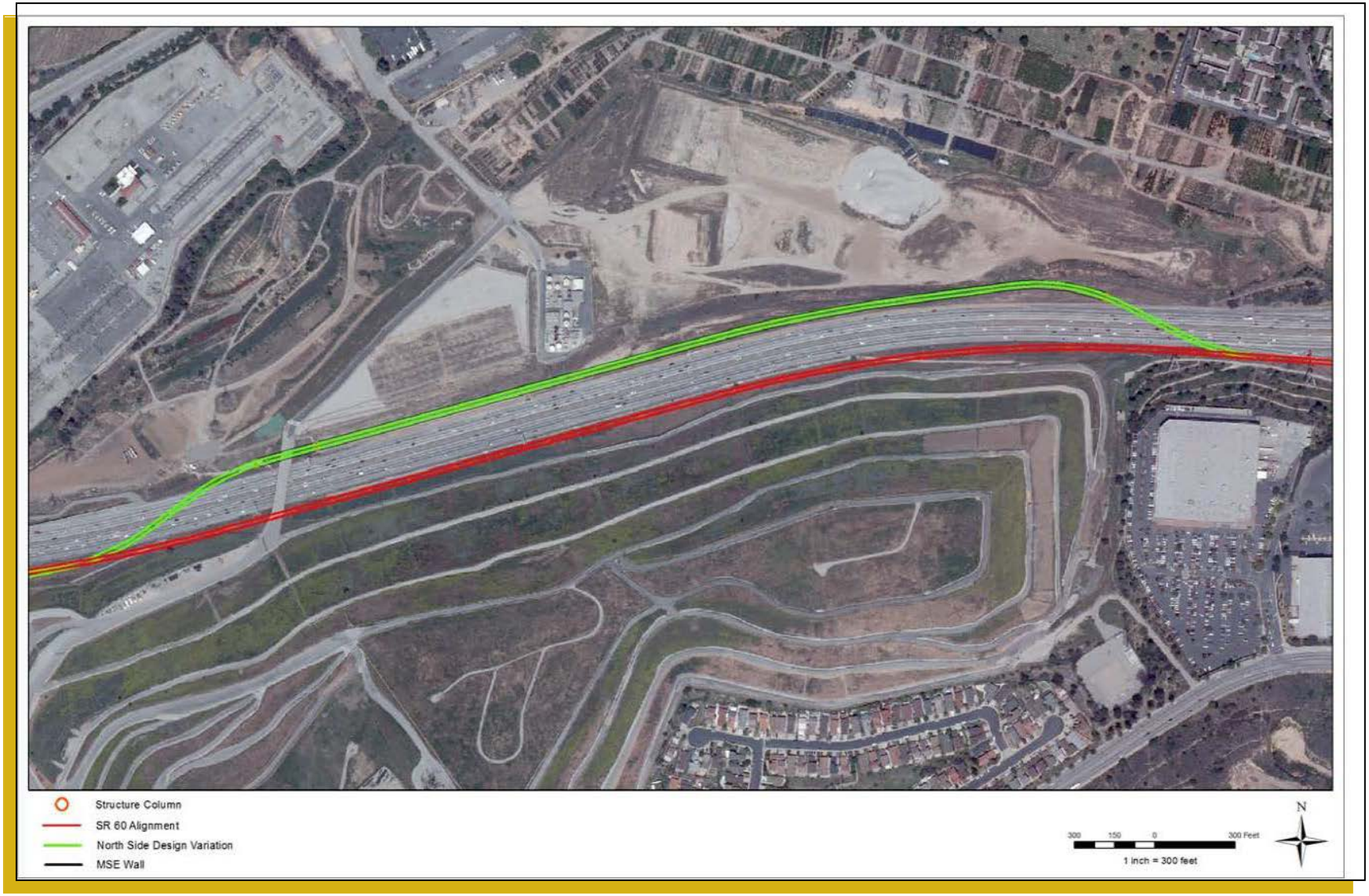
- *Low LOC, sites with: soil-only impacts or impacted groundwater with a flow direction that is away from the alignment, greater distance from the alignment and stations, low mobility contaminants (e.g., waste oil), old or closed cases, relatively complete case files, relatively complete site characterization, and/or greater depth to groundwater.*
- *High LOC, sites with: known or likely soil, groundwater, or soil vapor impacts beneath or near the alignment, groundwater impacts with a flow direction toward the alignment, shallow groundwater, proximity to the alignment/stations, recent releases, and/or incomplete characterization.*
- *Medium LOC, sites with expected conditions intermediate to the Low or High level, or with significant uncertainty.*

As shown in **Figure 4.11-5**, the SR 60 Freeway divides the site into two parcels: the South Parcel and the North Parcel. The South Parcel consists of 145 acres located south of the SR 60 Freeway and the North Parcel consists of 45 acres located north of the SR 60 Freeway. A portion of the SR 60 LRT Alternative would travel adjacent to the South Parcel of the OII landfill site, south of the SR 60 Freeway, within Caltrans ROW between the edge of the eastbound traffic lanes and the Caltrans ROW line. The North Side Design Variation would traverse within Caltrans ROW north of the SR 60 Freeway and would be adjacent to the North Parcel of the OII Landfill. With this variation, instead of running along the South Parcel of the OII Landfill, the LRT alignment would transition from the south side to the north side of SR 60 Freeway, just west of Greenwood Avenue, and return to the south side of SR 60 approximately one-quarter mile west of Paramount Boulevard, as shown in **Figure 4.11-6**.



Source: USEPA Geospatial Data Access Project, 2010

Figure 4.11-5. OII Landfill Site



Source: AECOM/CDM Smith 2013

Figure 4.11-6. North Side Design Variation Alignment

South Parcel Monocover

In 1997, the construction of the cover, referred to as the "monocover", began. The basic cover design for the steep north slope of the South Parcel included the following elements.

- The monocover was constructed by placing a two-foot thick layer of coarse foundation material at the base and then placing fine-grained cover material in compacted lifts.
- To provide additional strength, geogrid material was placed horizontally every five feet on slopes between 30.4 degrees and 33.7 degrees, and horizontally at intervals of every ten feet for slopes between 26.5 degrees and 30.4 degrees.
- Site access roads and drainage structures on the north slope were constructed as the monocover was placed.
- A revised perimeter and interior landfill gas control system was installed on the South Parcel. The gas collection lines are routed to a thermal destruction facility located on the North Parcel (Refer to Figure 4.11-4 above).

In addition to preventing precipitation infiltration, the monocover also works in concert with the gas collection system to prevent gas leakage.

North Parcel Remedial Actions

Figure 4.11-7 shows a cross-section of the North Parcel area in the vicinity of the North Side Design Variation, including the monocover on the North Parcel. The elements of the North Parcel remedy consisted of:

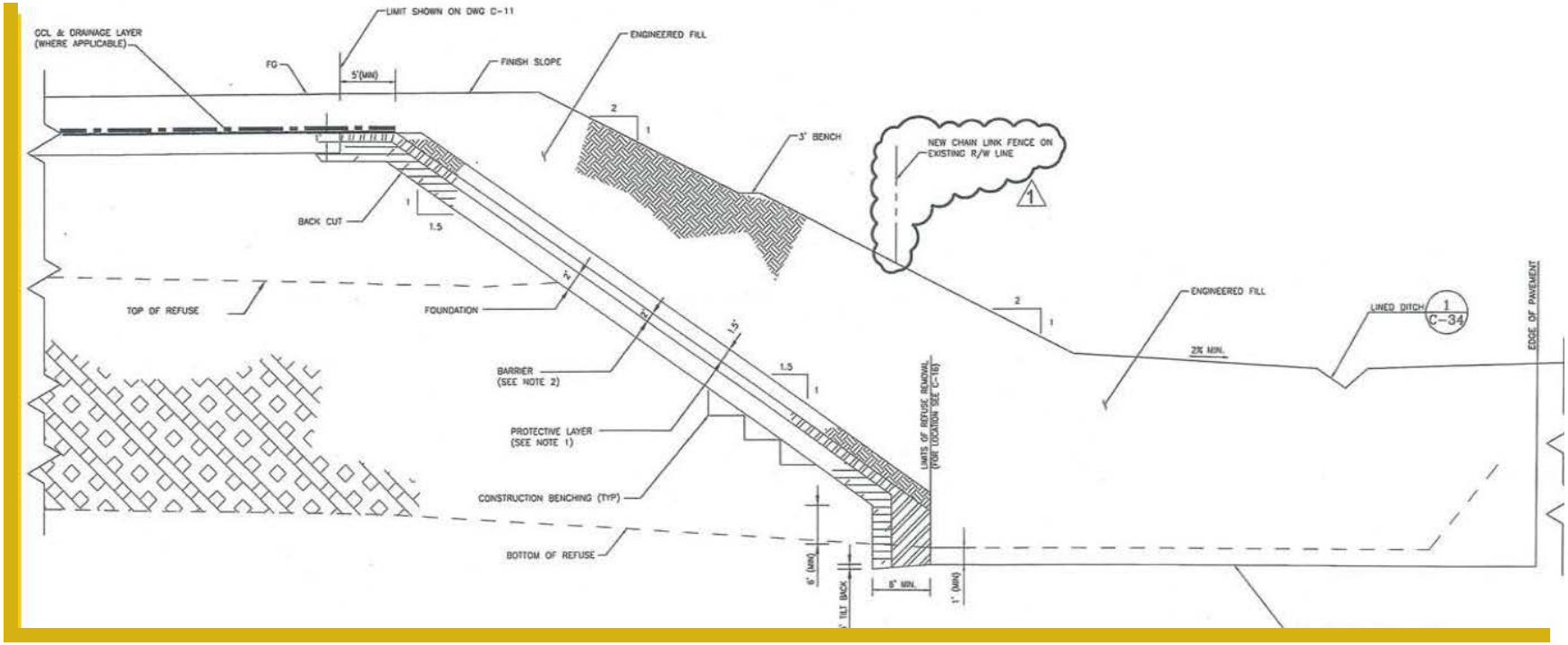
- Removal of waste existing within the Caltrans ROW south of a 73-foot offset line measured northwards from the edge of the traveled way. Waste excavation extended to a depth of 12 inches below the limits of the waste prism. The waste prism was defined as materials containing more than ten percent waste by volume as established by means of visual observations.
- Berm removal within the Caltrans ROW from the vicinity of the Greenwood Avenue Bridge to the Paramount Boulevard over-crossing.
- Removal of aerially deposited lead in soil having a concentration in excess of 255 milligrams per kilogram (mg/kg), as shown in **Figure 4.11-8**.
- A cover (consisting of a low-permeability barrier layer) was constructed over exposed waste on the backcut north of the 73-foot offset line. A vertical low-permeability soil barrier layer was provided in the vicinity of the edge of the shoulder, where the waste extends under the current SR 60 Freeway.
- Imported fill from multiple borrow sites was selected from sites documented via Environmental Data Resources, Inc. record searches to have no industrial or waste use histories, and was tested for organic contamination prior to acceptance.
- Treatment facility consisting of landfill gas treatment and leachate treatment system.
- Grading and drainage system to manage surface water runoff.

Mapped Landslides

Landslide deposits are mapped along the SR 60 Freeway corridor in the vicinity of the OII Landfill site to the west of Greenwood Avenue. The mapped landslides were investigated during preparation of the supplemental memorandum.

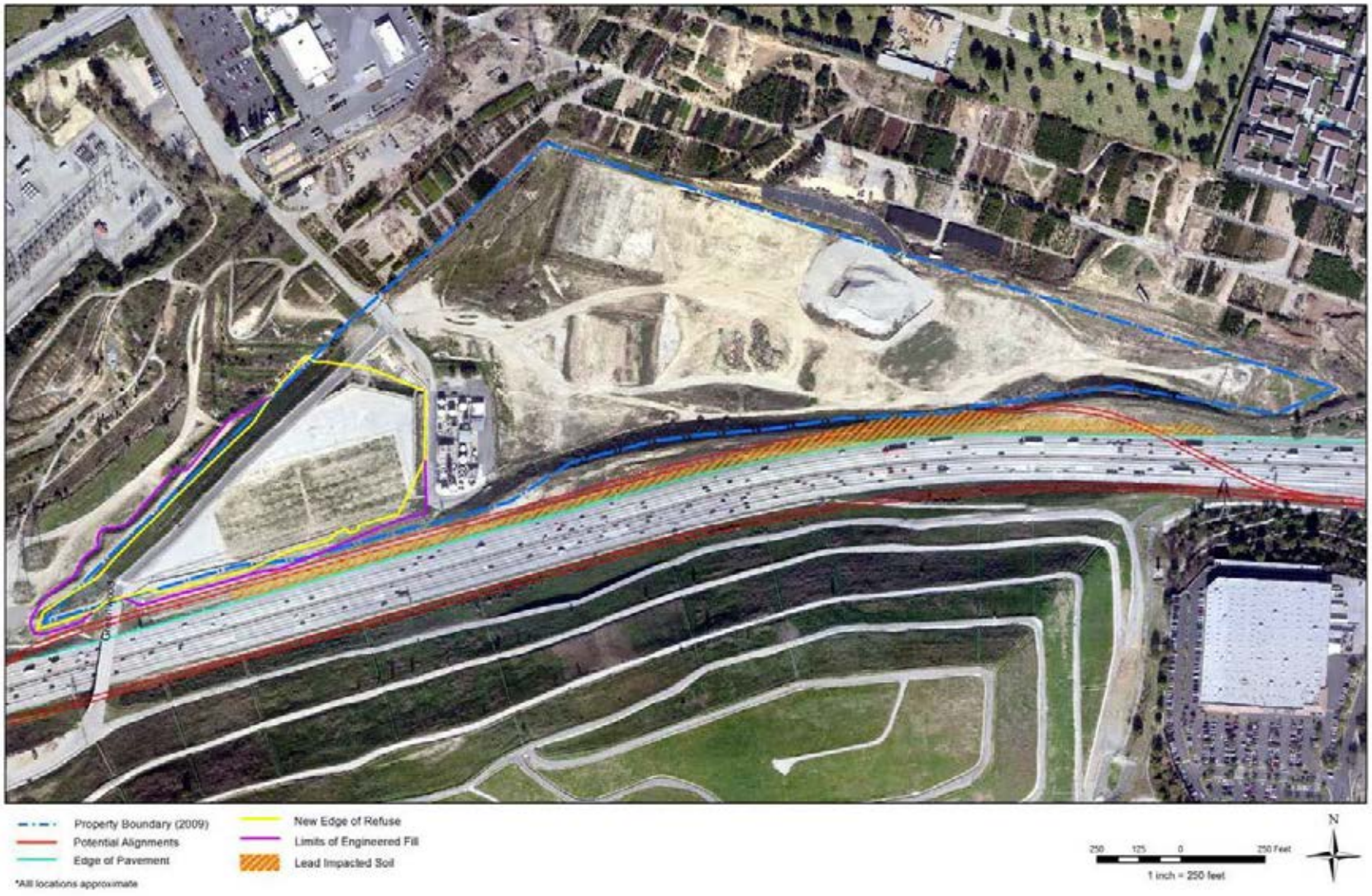
South Parcel:

Maps show landslide over the SR 60 Freeway and extending to the north side of the freeway in the vicinity of the OII Landfill. Mapped landslides in the area to the south of the freeway and west of Greenwood Avenue may have been a likely valid hazard zone prior to the freeway construction. Other landslide maps show areas of significant grading related to OII Landfill and possibly the SR 60 Freeway.



Source: AECOM/CDM Smith 2013

Figure 4.11-7. OII North Parcel Cross Section



Source: AECOM/CDM Smith 2013

Figure 4.11-8. Removal of Lead Impacted Soil on North Parcel

Predesign reports associated with the OII Landfill provide the most detailed information regarding historic landslides in the area, since information was based on site-specific data. The predesign report shows ancient slides near the toe of the OII landfill slope on the south side of the SR 60 Freeway. These ancient slides have been either removed, truncated, or buried under various earthwork and landfill activities of relatively recent times as described below.

Aerial photographs and U.S. Geological Survey (USGS) maps show the presence of large and small scale landsliding at the northwest corner of the South Parcel and a prominent northeast trending, north facing, linear ridge paralleling the now buried natural drainage between the North and South Parcels.

- The larger of the slides measures at least 1,000 feet wide and was delineated in an embayment area along the ridge. The slide appears to have occurred many thousands of years ago and subsequently most of the slide mass was removed by erosion and later debris flows. Most, if not all, of the slide mass was removed during the quarrying operations prior to construction of the landfill.
- A second landslide up to 400 feet across was also located on aerial photographs and USGS maps at the northwest corner of the South Parcel. This slide has been modified by grading (removals) off-site. Portions of the slide scar are still exposed above (south) of the SR 60 Freeway and may require further characterization during the final design phase of the project.
- The approximately 120-foot high ridge has been greatly modified by grading or has been completely removed.

North Parcel:

The toe of the ancient slides described above extended to the south edge of the North Parcel. As discussed above for the South Parcel, these ancient slides have been removed and/or no longer pose a threat.

The north side of the SR 60 Freeway does not pose stability concerns because of the limited slope height given the existing topography. The original grades to the west of Greenwood Avenue were lower, meaning a higher slope existed to the south of the current freeway area. The freeway construction placed approximately 20 feet of fill in this area, and as much as 40 feet of fill further west of this area. This fill is buttressing the slope to the south, with hardly any slope left to the north.

Limits of Waste

The OII landfill received an estimated 38 million cubic yards of solid and liquid wastes before its closure in 1984.

South Parcel:

It is estimated that the thickness of refuse on the South Parcel ranges from a few feet near the shoulder of the SR 60 Freeway, to approximately 325 feet in its thickest portions. Borings that predate construction of the SR 60 Freeway and the later monocover revealed 25 feet of fill material located near the Greenwood Avenue bridge abutment on the South Parcel. The fill was described as general rubbish, trash, tires, and power poles, mixed with sand, gravel, and earth fill. Caltrans is believed to have excavated much of this landfill debris from the ROW in order to construct the SR 60 Freeway on a firm base.

North Parcel:

The estimated thickness of refuse on the North Parcel ranges from a few feet near the shoulder of the SR 60 Freeway, to approximately 55 feet in its thickest portion.

Landfill debris was removed from two large excavation areas (Areas 1 and 2) in the Caltrans ROW along the south side of the North Parcel. In addition to the debris removal, aerially deposited lead in soil with a concentration in excess of 255 mg/kg was also removed from the ROW. The proposed SR 60 North Side Design Variation

would be located entirely outside of the edge of this refuse.

Landfill Gas

South Parcel:

Following the construction of the monocover on the South Parcel, a revised perimeter and interior landfill gas control system was installed. The system includes a series of active landfill gas (LFG) extraction wells and passive gas monitoring probes (GPs). The LFG wells are connected to a system of gas collection lines that are routed to a LFG and leachate treatment facility located on the North Parcel. The LFG collection system prevents the buildup and off-site migration of methane and other toxic or explosive LFGs generated by waste decomposition beneath the monocover. Landfill gas migration from the OII landfill site to off-site locations, including the Caltrans ROW, is presently controlled by the OII gas collection system and an air break system located adjacent to residential properties.

North Parcel:

Following completion of the North Parcel remedy, remedy compliance testing was conducted to demonstrate the effectiveness and compliance of the cover system, gas management and conveyance systems, and the surface water. The compliance tests demonstrated the North Parcel remedy met the USEPA's third partial Consent Decree (CD-3) scope of work and prevention of off-site gas migration.

Groundwater

The estimated depth to groundwater ranges from about 40 feet below the surface of SR 60 Freeway near the east end of the landfill to 50 feet below the SR 60 Freeway near the Greenwood Avenue bridge, and about 60 feet below SR 60 Freeway at the west end of the landfill. The predominant direction of groundwater flow in the vicinity is toward the southwest. Groundwater elevations are depressed beneath the center of the South Parcel in order to prevent contact between the groundwater and the waste.

Data compiled for the OII Landfill remedial investigation revealed that organic compounds in OII Landfill South and North Parcels perimeter groundwater monitoring wells exceed their drinking water maximum containment levels (MCLs) for several compounds. Organic compounds detected in the wells at concentrations greater than their MCL included the volatile organic compounds (VOCs) tetrachloroethene (PCE), trichloroethene (TCE), and benzene, as well as vinyl chloride.

San Gabriel Valley, South El Monte Operable Unit (OU) and Whittier Narrows OU

The San Gabriel Valley, South El Monte OU, and Whittier Narrows OU encompass an area of contaminated groundwater over four miles long and one and one-half miles wide. The VOC groundwater plume beneath the two OUs is essentially one continuous plume. The SR 60 LRT Alternative alignment, including the SR 60 North Side Design Variation, would traverse over the Whittier Narrows OU.

Omega Chemical OU1 and OU2

This site involves high concentrations of chlorinated solvents in subsurface soil and groundwater. The eastern end of the Washington Boulevard LRT Alternative alignment overlies a portion of the Omega OU2 groundwater plume. Of principal concern are contact with, and disposal of, contaminated groundwater encountered during construction and the potential intrusion of vapors from the groundwater plume into structures.

Waste Disposal, Inc.

The Waste Disposal, Inc. site is located approximately one mile south of the Washington Boulevard LRT Alternative alignment and involves contaminants present in soil and soil gas.

4.11.2.4.3 Other Hazardous Materials

As shown in **Figure 4.11-9**, several oil fields are located in the project area. Figure 4.11-9 identifies which wells are active, buried, idle, new, or plugged. Migration of subsurface gases, such as methane and hydrogen sulfide, may be expected in excavations not only within the oil field, but also in areas outside of this and other mapped oil fields. Natural petroleum hydrocarbons may also be encountered in oil-bearing sediments in the vicinity of active oil fields.

Herbicide and pesticide use may have occurred during previous agricultural activities in some areas. Specifically, orchards were present to the north and south of Washington Boulevard between the Rio Hondo and the east end of the Washington Boulevard LRT Alternative alignment. According to historical maps, orchards were present between 1947 and 1953, which is when widespread use of organochlorine pesticides began. Organochlorine pesticides can leave hazardous residues in soil.

Other potential concerns include transformers located above and below grade along the alignments that may contain polychlorinated biphenyls (PCBs). Lead may also be present in surface soil from historic emissions of leaded fuel from vehicles on adjacent roadways. Since most soil along the proposed alignment is covered by asphalt or concrete, exposure to these hazardous materials is unlikely.

Buildings along the proposed alignments that were constructed prior to 1979 may contain asbestos-containing materials (ACM), and buildings constructed prior to 1978 may contain lead-based paint (LBP) that could be released during demolition. These hazardous materials would present a concern for the proposed project, as exposure to these materials at certain levels may cause adverse health effects to workers and the general public.

4.11.3 Environmental Impacts/Environmental Consequences

The following section summarizes the analysis and conclusions for each project alternative, as discussed in detail in Appendix V, Geotechnical/Seismic/Hazardous Materials Technical Memorandum, of this Draft EIS/EIR. Impacts are summarized in **Table 4.11-3**.

Table 4.11-3. Summary of Potential Geotechnical/Subsurface/Seismic/ Hazardous Materials Impacts

Alternative	Geotechnical/ Subsurface/Seismic Hazards Impacts	Hazardous Materials Impacts
No Build	None	None
TSM	None	None
SR 60 LRT[1]	Not adverse after mitigation/Less than significant after mitigation	Not adverse after mitigation/Less than significant after mitigation
Washington Boulevard LRT	Not adverse after mitigation/Less than significant after mitigation	Not adverse after mitigation/Less than significant after mitigation

Notes:
[1] Includes the SR 60 North Side Design Variation.

4.11.3.1 No Build Alternative

4.11.3.1.1 Impact Analysis

There would be no new transit construction or new operations under the No Build Alternative. Therefore, the No Build Alternative would not result in adverse construction or operational effects under NEPA or significant impacts under CEQA associated with geotechnical, subsurface, seismic hazards, or hazardous materials.

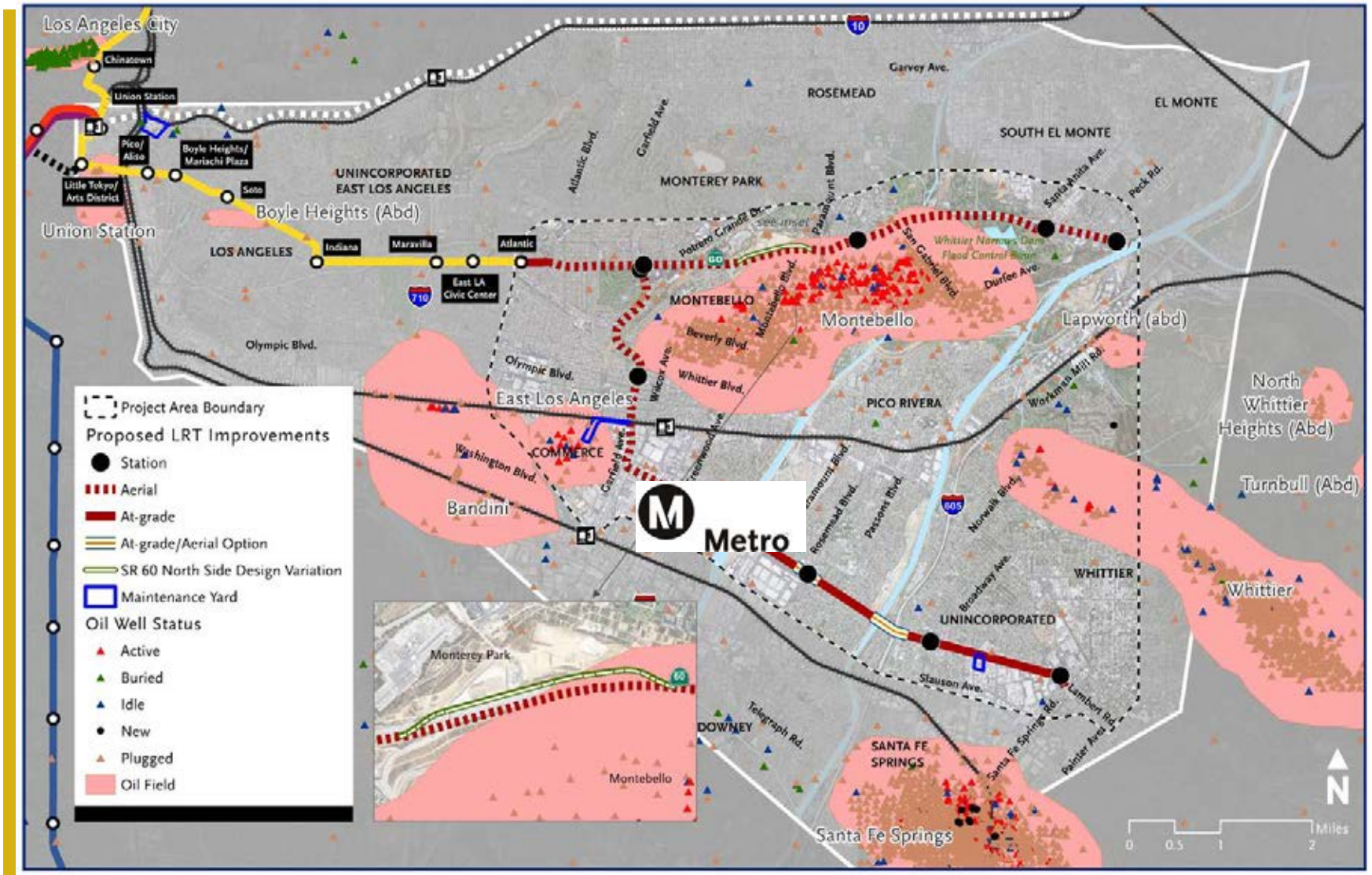


Figure 4.11-9. Oil Fields within the Project Area

4.11.3.1.2 Mitigation Measures

Since the No Build Alternative would have no geotechnical, subsurface, seismic hazards, or hazardous materials impacts, no mitigation measures are required.

4.11.3.1.3 Impacts Remaining After Mitigation

NEPA Finding

There would be no geotechnical, subsurface, seismic hazards, or hazardous materials effects under the No Build Alternative.

CEQA Determination

There would be no geotechnical, subsurface, or seismic hazards or hazardous materials impacts under the No Build Alternative.

4.11.3.2 TSM Alternative

4.11.3.2.1 Impact Analysis

Construction Impacts

The TSM Alternative enhances and improves upon the existing services, and would not require any excavation or earthwork that would potentially impact the geotechnical and subsurface conditions, encounter hazardous materials in soil and/or groundwater, or release hazardous materials to the environment. Therefore, during construction, the TSM Alternative would not result in an adverse effect under NEPA or a significant impact under CEQA related to geotechnical, subsurface, seismic, or hazardous materials.

Operational Impacts

The TSM Alternative improves upon the existing bus services and would not include activities that would result in any impacts related to seismic hazards associated with fault rupture, liquefaction, or seismically-induced settlement during a seismic event. Changes in operation under the TSM Alternative would not change the existing types of hazardous materials used, stored, or transported. Like current operations, operation of the TSM Alternative would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school, and would not impair adopted emergency response plans or emergency evacuation plans. Therefore, during operation the TSM Alternative would not result in an adverse effect under NEPA or a significant impact under CEQA related to geotechnical, subsurface, seismic, or hazardous materials.

4.11.3.2.2 Mitigation Measures

Since the TSM Alternative would have no geotechnical, subsurface, seismic hazards, or hazardous materials impacts, no mitigation measures are required.

4.11.3.2.3 Impacts Remaining After Mitigation

NEPA Finding

There would be no effect to geotechnical, subsurface, seismic hazards, or hazardous materials resources under the TSM Alternative.

CEQA Determination

There would be no impact to geotechnical, subsurface, seismic hazards, or hazardous materials resources under the TSM Alternative.

4.11.3.3 SR 60 LRT Alternative

4.11.3.3.1 Impact Analysis

Construction Impacts

Aerial structures would be required to support the LRT for both the SR 60 LRT Alternative and the North Side Design Variation. A part of the SR 60 LRT Alternative alignment is located along the toe of the OII Landfill's north-facing slope. The SR 60 LRT Alternative would be supported on deep foundations penetrating the monocover and refuse, and founded in competent material beneath. The proposed SR 60 North Side Design Variation would consist of a mechanically stabilized earth (MSE) wall to support the LRT tracks. The MSE wall is the most viable option given the topography of the land and the lower

construction costs compared to an aerial structure.

Due to the different constraints applicable to the South and North Parcels, different foundation options have been considered for each alignment. The construction method will be determined during the final design phase of the project.

Three foundation options have been identified for the South Parcel as follows:

Option A – Cast in Drilled Hole (CIDH) Pile Foundation: CIDH method would consist of a single, large diameter pile. Excavation of the pile would be performed inside a steel casing.

Option B – Foundation in Monocover: This alternative entails a pile cap cast on top of a conventional driven or torqued-in pile foundation. The individual piles could be driven H-piles, driven precast concrete piles, or torque-down, closed-end steel pipe piles. The primary advantage of this concept is that the entire foundation element can be constructed within the monocover and without encountering contaminated materials. To do so would require a pile cap that is situated as high as possible, within the monocover. In order to avoid air entry pathways, this alternative would require a seal system at the piles, as well as around the pile cap substructure.

Option C - Foundation below Refuse: This alternative would be beneficial if the refuse tapers out at the edge of SR 60 Freeway. It may then be possible to create excavation access from SR 60 Freeway, removing the refuse as it is encountered. On the uphill side, a sheet pile system would be provided to support the excavation into the refuse. This alternative has the advantage of eliminating or reducing the need for sealing at the pile cap, since the refuse would be removed for the most part and soil settlement would not be a significant concern. Air entry from the top would be controllable by finishing the ground surface and sheet piles (if left in place) with monocover.

Foundations for the SR 60 North Side Design Variation are expected to encounter the following types of conditions:

- A few piers at the western end of this alternative would be at the same locations as the South Parcel alternative piers. Based on the locations of these piers with respect to available information on the refuse limits for the South Parcel, they would be free of refuse, but there is the possibility of encountering minimal amounts of refuse. Further explorations would provide more definitive information. If, based on such explorations, refuse becomes an issue at these locations, then the alternatives and methodologies discussed under South Parcel would apply to the few pier locations at the western limit of the North Side Design Variation, if applicable.
- For the transition areas supported on elevated structures, the piers would be in areas free from refuse since they are in the median or the shoulder area of SR 60 Freeway, which would have been cleaned out during the original highway construction.
- The stretch adjacent to the North Parcel is proposed to be supported on earth fill retained by MSE walls with shallow foundations bearing on a zone of compacted fill. This area is expected to be free from refuse based on available information. The MSE wall system is the only alternative being considered for this area.

Geotechnical, Subsurface, and Seismic Hazards

Landslide/Slope Stability:

Based on evaluation of the OII Landfill contained in Appendix V, Geotechnical/Seismic/Hazardous Materials Technical Memorandum, of this Draft EIS/EIR, there does not appear to be a natural geologic landslide hazard because extensive grading activities have occurred on the South Parcel. Historical landslides no longer appear to exist based on review of available documentation for the vicinity; however, in the event the SR 60

LRT Alternative is selected as the preferred alternative, further characterization and delineation of the landslide remnants would be completed during final design. It is anticipated that no adverse effect would occur under NEPA and impacts would be less than significant under CEQA with regards to landslides on the South Parcel.

The proposed LRT structures, as part of the SR 60 LRT Alternative, would not have an adverse effect or significant impact on the stability of the existing slope, and would not reduce the static or the seismic safety factors below that which now exists. The introduction of deep foundations associated with construction of the SR 60 LRT Alternative would only serve to strengthen the slope, since the deep foundations would act as dowels through the toe of the slope.

However, there could be seismic slope stability issues related to man-placed materials. There is a potential for slope failure within the landfill, due to temporary construction conditions. Examples of this would be excavations on the slope, in general, and excavations downslope of the buttress wall in the eastern part of the OII slope specifically. Other examples would include potential surcharge loads imposed on the slope due to temporary access embankments, and/or surcharge from heavy construction equipment on the slope. This would need to be confirmed during the design phase if the SR 60 LRT Alternative is selected as the locally preferred alternative (LPA). Therefore, an adverse effect would occur under NEPA and a significant impact would occur under CEQA before mitigation with regards to slope stability of man-placed materials on the South parcel. Mitigation measures are available (see below) to reduce these impacts.

Based on evaluation of the OII Landfill contained in Appendix V, Geotechnical/Seismic/Hazardous Materials Technical Memorandum, of this Draft EIS/EIR, there does not appear to be a natural geologic landslide hazard on the North Parcel because of the topography and the grading activities which took place in this area. Historical landslides no longer exist on the North Parcel as discussed above.

Regarding slopes on the north side of the SR 60 Freeway, there is no seismic slope stability issue anticipated because of the limited slope height. Therefore, as for the North Side Design Variation, no adverse effects would occur under NEPA and impacts would be less than significant under CEQA with regards to landslides and slope stability on the North parcel under the North Side Design Variation.

Hazardous Materials

Superfund Sites:

The SR 60 LRT Alternative alignment is located directly along the South Parcel of the OII Landfill, as shown in Figure 4.11-4. Construction of the SR 60 LRT Alternative would occur within the Caltrans ROW, which passes through the OII Landfill. The North Side Design Variation would be located adjacent to the North Parcel of the OII Landfill, which is also located within the Caltrans ROW.

This analysis considers a worse case condition that refuse would exist at all pier locations.

Another Superfund Site, the San Gabriel Valley, South El Monte OU and Whittier Narrows OU, encompasses an area of contaminated groundwater over four miles long and one and one-half miles wide. Groundwater contamination beneath the two OUs is essentially one continuous plume. The SR 60 LRT Alternative alignment traverses the southern side of SR 60 over the Whittier Narrows OU. The depth of contaminated shallow groundwater in this area ranges from 35 to 55 feet below the ground surface (bgs). Installation of support foundation pilings for the aerial alignment would entail excavation up to 100 feet deep. Therefore, an adverse effect under NEPA and a potentially significant impact under CEQA would occur if contaminated groundwater were encountered during construction. Mitigation measures

specified below would address these potential impacts.

Other Properties of Concern:

During construction of the SR 60 LRT Alternative, there is the potential to encounter hazardous materials related to other properties of concern along the proposed SR 60 LRT Alternative alignment, as listed in Table 4.11-2 and shown in Figure 4.11-3. For both the at-grade and aerial sections of the SR 60 LRT Alternative, construction would entail the disturbance of soil and/or shallow groundwater. Construction of the at-grade portions of the SR 60 LRT Alternative alignment would entail clearing and grading of shallow soil, and potential shallow excavation for installation and/or relocation of utility lines, during which shallow groundwater could also be encountered.

During construction, release of hazardous materials in contaminated soil and/or groundwater at these properties of concern could result in exposure to workers, the public and sensitive receptors, such as schools within one-quarter mile. This could occur through the release of dust or vapors from exposed soil and/or groundwater.

Hazardous materials in the project area also include petroleum gases in the subsurface associated with oilfields. Adverse effects under NEPA and potentially significant impacts under CEQA would also occur from release of ACM or LBP during building demolition, or the accidental release of construction-related materials such as fuels.

In addition, construction could involve the transport of soil or other media contaminated with hazardous materials to a disposal facility located away from the project area. As such, there is potential for adverse effects under NEPA and potentially significant impacts under CEQA from the accidental release of these hazardous materials.

Compliance with federal, state, and local laws and regulations regarding hazardous materials would be required during construction of the SR 60 LRT Alternative and the North Side Design Variation. Based on future evaluation of depth to groundwater along the SR 60 LRT Alternative alignment, dewatering may be necessary during the construction process. Groundwater encountered during construction dewatering would require testing, and either on-site treatment and discharge in accordance with applicable standards or transport to a treatment and/or disposal facility. Additional details about dewatering are provided in the Water Resources Technical Memorandum (Appendix X).

A Contaminated Soil/Groundwater Management Plan would be implemented during construction to establish procedures for sampling, analysis, and proper handling, storage, transport, and disposal of contaminated materials in coordination with the appropriate regulatory agency.

In addition, a Worker Health and Safety Plan would be implemented prior to the start of construction to establish procedures to be followed if contamination is encountered. This would include required training prior to the start of work, personal protective equipment, and emergency procedures.

Best Management Practices (BMPs) would also be implemented to reduce adverse effects under NEPA from the accidental release of hazardous materials and/or wastes used or generated during construction to less than adverse, and to ensure that potentially significant impacts under CEQA would be less than significant.

Table 4.11-4 captures the critical topics and issues associated with construction of the SR 60 LRT Alternative and North Side Design Variation in the vicinity of the OII Landfill. The table also summarizes the key findings from the supplemental memorandum prepared in response to USEPA comments and contained in Attachment 1 to Appendix V, of this Draft EIS/EIR.

Table 4.11-4. Summary of Potential Geotechnical/Subsurface/Seismic/ Hazardous Materials Impacts Associated with the OII Landfill – During Construction

No.	Topic/Issue	SR 60 LRT Alternative	North Side Design Variation
1.	Method of Foundation Construction	A) Single CIDH Pile. B) Pile Foundation with Pile Cap in Monocover. C) Pile Foundation with Pile Cap below the Refuse.	Mechanically Stabilized Earth (MSE) wall along North Parcel; CIDH or pile foundations in transition zones.
2.	Landfill Fire Risk Issues	• Penetration of the monocover would create gas leakage pathways that could allow the ingress of atmospheric gas, which would result in an adverse effect under NEPA and significant impact under CEQA before mitigation. • Issue would require coordination with New Cure Inc. (NCI) to balance gas flow during construction, and monitoring post construction. Alternatives A and C would likely have a reduced operational risk since refuse would be removed from beneath the foundation.	• Refuse is not expected to be encountered. Therefore hazardous waste impacts associated with refuse would not be adverse under NEPA and less than significant under CEQA. • Landfill fire risk is considered not adverse under NEPA and less than significant under CEQA compared to construction adjacent to the South Parcel.
3.	Solid Waste Management Issues	• Health and safety impacts associated with removing and disposing of landfill waste or contaminated earth materials would be adverse under NEPA and significant under CEQA before mitigation. • Alternative B would generate a lesser volume of solid waste compared to construction Alternatives A or C.	• Refuse is expected to have been cleaned out of most of the work areas. MSE wall construction would likely not generate solid waste beyond construction debris. • Beyond the MSE wall, risk of encountering refuse for elevated structure foundations is considered minimal. • The need for handling solid and liquid wastes is not expected to be as significant as for the South Parcel. Therefore, no adverse effects under NEPA and no significant impacts under CEQA would occur. • It is noted small amounts of residual landfill waste material may have been missed during the North Parcel remedy actions and could be encountered during construction. A soil management plan would be developed prior to construction that would identify activities for residual waste monitoring, identification, segregation, and disposal.

Table 4.11-4. Summary of Potential Geotechnical/Subsurface/Seismic/ Hazardous Materials Impacts associated with the OII Landfill – During Construction (Continued)

No.	Topic/Issue	SR 60 LRT Alternative	North Side Design Variation
4.	Groundwater Management Issues	• There are health and safety risks associated with removing, possibly treating, and/or disposing of contaminated groundwater. • Significant groundwater management issues exist with the CIDH construction method, which would result in an adverse effect under NEPA and significant impact under CEQA before mitigation. • Contaminated groundwater, if encountered, would require treatment prior to disposal or discharge.	Dewatering is not anticipated under this design variation. MSE wall is not expected to introduce groundwater management issues. If groundwater is encountered for deep foundations in transition zones, it is expected to be a much lesser concern than for the South Parcel. Therefore, no adverse effects under NEPA and no significant impacts under CEQA would occur.
5.	Landfill Gas Issues	• Significant landfill gas issues are associated with health and safety and loss of gases. Penetration of the monocover would create gas leakage pathways, which would result in an adverse effect under NEPA and significant impact under CEQA before mitigation. • This issue is partially mitigated by existing OII LFG extraction system that would tend to pull gases inward toward the wells that are located on the OII landfill. Monitoring and additional control measures would be required.	MSE wall construction or other work on this alignment is not expected to have landfill gas issues as the North Side Design Variation would be constructed outside the boundaries of the OII Landfill and would not penetrate the monocover. Therefore, no adverse effects under NEPA and no significant impacts under CEQA would occur. Nonetheless, a gas management plan would be developed as part of the health and safety program and gas monitoring would be conducted during any excavation or grading activities.

Table 4.11-4. Summary of Potential Geotechnical/Subsurface/Seismic/ Hazardous Materials Impacts associated with the OII Landfill – During Construction (Continued)

No.	Topic/Issue	SR 60 LRT Alternative	North Side Design Variation
6.	Slope Stability Issues	• There could be seismic slope stability issues related to man-placed materials. There is a potential for slope failure within the landfill, which would result in an adverse effect under NEPA and significant impact under CEQA before mitigation. • The global stability of the refuse slope would be confirmed if this alignment is selected as the LPA. • The stability of the slope as influenced by foundation construction (cuts, shoring, equipment surcharge, etc.) would be further evaluated if this alignment is selected as the LPA. • Stability of existing features on the slope (buttress wall, utilities, etc.) as influenced by foundation construction would be evaluated if this alignment is selected as the LPA.	The topography is relatively flat. Therefore, effects under NEPA would not be adverse and impacts under CEQA would be less than significant related to slope stability.
7.	Vibration Issues	A detailed review of vibration impacts during construction was performed and is included as an attachment to Appendix V of this Draft EIS/EIR. Based on the anticipated level of vibrations during construction, it was determined that there would not be an adverse effect under NEPA or a significant impact under CEQA.	The same review of vibration impacts during construction was performed for the North Side Design Variation. Work in the vicinity of the North Parcel is not expected to have adverse vibration impacts during construction give the low vibration levels that would be generated. No adverse effects under NEPA or significant impacts under CEQA are anticipated during construction.

Source: AECOM/CDM Smith 2013.

Operational Impacts

Geotechnical, Subsurface, and Seismic Hazards

A segment of the SR 60 LRT Alternative east of San Gabriel Boulevard is located within the Alquist-Priolo Earthquake Fault zone. Accordingly, there is a potential for fault rupture along this portion of the SR 60 LRT Alternative alignment, which would be an adverse effect under NEPA and a potentially significant impact under CEQA.

A portion of the SR 60 LRT Alternative alignment between Muscatel Avenue and the eastern terminus of the alignment, including the Santa Anita Avenue and Peck Road stations, is mapped in areas potentially susceptible to liquefaction. In addition, the Mission Junction Maintenance Yard Option is located in an area potentially susceptible to liquefaction. The segment, maintenance yard site, proposed stations, and park and ride facility mapped within the potentially liquefiable zone and/or underlain by uncertified fill may be susceptible to seismically-induced settlement, which would be an adverse effect under NEPA and a potentially significant impact under CEQA.

As discussed above, historical landslides have been mapped in the area along the SR 60 Freeway west of Greenwood Avenue in the vicinity of the OII Landfill. While there does not appear to be a natural geologic landslide hazard in this area because of the extensive grading activities which took place on the South Parcel, additional characterization and delineation of the historic landslides would be completed during final design. Adverse effects are not anticipated to occur under NEPA and impacts would be less than significant under CEQA with regards to landslides on the South Parcel.

As for the North Side Design Variation, there does not appear to be a natural geologic landslide hazard on the North Parcel because of the topography and the grading activities which took place in this area. Historical landslides no longer exist on the North Parcel. Therefore, no adverse effect would occur under NEPA and impacts would be less than significant under CEQA for the North Side Design Variation.

The potential impact of vibration from rail operation on the integrity of the landfill was reviewed, and findings from the Noise and Vibration Technical Memorandum (Appendix T) did not identify vibration as a concern. Therefore, there would be no adverse operational effects under NEPA from landslides, and impacts under CEQA would be less than significant.

A portion of the SR 60 LRT Alternative corridor along Via Campo from approximately 600 feet west of Garfield Avenue to 450 feet east of Wilcox Avenue, and from the Rio Hondo crossing to the eastern terminus, are mapped within the Flood Inundation Hazard Area. The SR 60 LRT Alternative alignment is generally in an urbanized area with well-developed drainage infrastructure. The project would not increase the risk of flooding. In addition, the SR 60 LRT Alternative corridor would be on an elevated aerial structure and the impact during operation from flooding is considered low.

Due to the location of portions of the SR 60 LRT Alternative within an Alquist-Priolo Earthquake Fault zone and a liquefaction zone, there could be adverse operational effects under NEPA and potentially significant impacts under CEQA associated with seismic hazards due to fault rupture, liquefaction, and seismically-induced settlement that would require further evaluation during design. Mitigation would be implemented in accordance with standard design specifications to reduce adverse operational effects under NEPA to less than adverse and reduce potentially significant operational impacts under CEQA to less than significant.

The SR 60 North Side Design Variation is not located within the Alquist-Priolo Earthquake Fault zone, or located in an area mapped as susceptible to liquefaction or flooding. In addition, the SR 60 North Side Design Variation alignment would be located within the Caltrans ROW north of the freeway, where landfill refuse has been removed and replaced with engineered

fill. Accordingly, the SR 60 North Side Design Variation would not have any impact on the integrity of the landfill. In summary, there would be limited adverse effects under NEPA and potentially significant impacts under CEQA related to geotechnical, subsurface, and seismic hazards during operation; however, mitigation would reduce these to not adverse and less than significant, respectively.

Hazardous Materials

Accidental Release:

Operation of the SR 60 LRT Alternative would involve the use, storage, and transport of hazardous materials such as fuels, paints, lubricating fluids, and solvents for maintenance. Compliance with hazardous materials laws and regulations would be required, including hazardous materials inventory and emergency response planning, risk planning and accident prevention, employee hazard communication, public notification of potential exposure to specific chemicals, and storage of hazardous materials, as described in Appendix V. Adherence to existing laws and regulations would reduce the potential for adverse operational effects under NEPA to not adverse and potentially significant impacts under CEQA to a less than significant level. Furthermore, if long-term operation of the project requires groundwater to be collected and discharged, compliance with discharge permit standards would be required; therefore, operational effects under NEPA would be reduced to not adverse and potentially significant impacts under CEQA from operation would be less than significant.

Subsurface Oilfield Gases:

The potential presence of hydrogen sulfide and methane in the project area poses long-term operational concerns if these gases are allowed to accumulate in subsurface facilities. However, the SR 60 LRT Alternative does not involve underground segments, and no stations are to be located underground. Therefore, there would be no adverse operational effects under NEPA, impacts from oilfield gases under CEQA would be less than significant, and no mitigation is required.

Electromagnetic Fields (EMF):

Operation of the SR 60 LRT Alternative would introduce new sources of low level EMF associated with the overhead catenary lines and traction power substations. Compared to existing overhead power lines, the LRT would produce weak EMF. Anticipated EMF levels at locations of human exposure within and adjacent to the LRT would be well below exposure guidelines established by the American Conference of Governmental Industrial Hygienists and the International Commission on Non-Ionizing Radiation Protection. Therefore, there would be no adverse effects under NEPA and no significant impacts under CEQA from exposure to EMF.

Additional OII Investigations

Table 4.11-5 summarizes the critical topics and issues associated with operation of the SR 60 LRT Alternative and North Side Design Variation in the vicinity of the OII Landfill. Table 4.11-5 also summarizes the key findings from the supplemental memorandum prepared in response to USEPA comments and contained in Attachment 1 to Appendix V, of this Draft EIS/EIR.

4.11.3.3.2 Mitigation Measures

Construction Mitigation Measures

The construction contractor and Metro shall be responsible for assuring the implementation of the following mitigation measures.

Table 4.11-5. Summary of Potential Hazardous Materials Impacts associated with the OII Landfill – During Operation

No.	Topic/Issue	SR 60 LRT Alternative	North Side Design Variation
1.	Slope Stability	Based on the low level of vibrations, the depth of pile foundations, as well as the stabilizing influence of proposed piles intercepting potential slope failure surface, it was determined that this issue would not cause a reduction in the slope stability factor of safety. No adverse effects under NEPA or significant impacts under CEQA are anticipated during operation.	No slope stability issues are anticipated for the North Parcel alignment. No adverse effects under NEPA or significant impacts under CEQA are anticipated during operation.
2.	Cover Maintenance	Subject to further discussions, Metro would participate in the existing NCI maintenance and integrity of the cover in the immediate vicinity of the LRT piers, if this alternative is selected as the LPA.	No cover inspection is applicable to the North Parcel.
3.	Gas Management	As described above, the future LRT design details for the South Parcel would also include permanent seals and restoration of the monocover to prevent long-term gas leakage during LRT operation. The flexible leak-resistant seal would need to be capable of withstanding landfill settlement, LRT vibration, erosion, and physical damage.	No significant issues are expected for the North Parcel.

Table 4.11-5. Summary of Potential Hazardous Materials Impacts associated with the OII Landfill – During Operation (Continued)

No.	Topic/Issue	SR 60 LRT Alternative	North Side Design Variation
4.	Vibration Issues	A detailed review of vibration impacts during operation was performed and is included as an attachment to Appendix V of this Draft EIS/EIR. Based on the anticipated level of vibrations during operations, it was determined that there would not be an adverse effect under NEPA or a significant impact under CEQA. In accordance with the FTA guidelines, there is no potential for annoyance due to vibration at the South Parcel because there are no vibration-sensitive land uses (such as residences, schools, churches, parks, etc.) in the area. For the SR 60 LRT Alternative alignment, the potential for slope instability due to vibrations is not likely due to the low level of vibrations generated from train operations. The elevated concrete track structure would attenuate the train-induced vibration and transfer residual vibration levels down to the bedrock. It is also noted that the deep foundations would have a slope stabilizing effect. No adverse effects under NEPA or significant impacts under CEQA are anticipated during operation.	Operation of the North Side Design Variation in the vicinity of the North Parcel is not expected to have adverse vibration impacts given the low vibration levels that would be generated. No adverse effects under NEPA or significant impacts under CEQA are anticipated during operation.

Table 4.11-5. Summary of Potential Hazardous Materials Impacts associated with the OII Landfill – During Operation (Continued)

No.	Topic/Issue	SR 60 LRT Alternative	North Side Design Variation
5.	Air Quality Issues	The proposed alignment of the SR60 LRT Alternative elevated track along the south side of the SR 60 Freeway would place the Metro trains at roughly the same elevation as the top of the LFGTS thermal oxidizer stacks. At the nearest point, the proposed SR 60 LRT track along the south side of the SR 60 Freeway would be approximately 360 feet south of the southern LFGTS thermal oxidizer. Results of the thermal plume study, contained in Appendix V of this Draft EIS/EIR, indicate that maximum temperatures at the approximate elevation of the LRT tracks for either the southern alignment or the North Side Design Variation would increase only three to four degrees above ambient temperature, even with worst-case meteorology and ambient temperatures of 110 degrees Fahrenheit. No adverse effect under NEPA or significant impact under CEQA would occur from the existing oxidizer stacks on the proposed alignment.	The North Side Design Variation would be primarily at-grade or on additional engineered fill on retaining walls and would place the Metro trains within 150 feet of the stacks, but at a much lower elevation compared to the SR 60 LRT Alternative. Results of the thermal plume study, contained in Appendix V of this Draft EIS/EIR, indicate that maximum temperatures at the approximate elevation of the LRT tracks for either the southern alignment or the North Side Design Variation would increase only three to four degrees above ambient temperature, even with worst-case meteorology and ambient temperatures of 110 degrees Fahrenheit. No adverse effect under NEPA or significant impact under CEQA would occur from the existing oxidizer stacks on the proposed alignment
6.	Operability and Sustainability	Maintenance and upkeep programs for the monocover would be needed. Inspection, upkeep, and if necessary, replacement of the seal system.	Maintenance requirements would be routine. The monocover would not be affected; thus there would be no need to change current maintenance practices.
7.	Liability Risks	Likely to be significantly higher than the North Side Design Variation alignment.	Expected to be less than the SR 60 LRT Alternative alignment.

Source: AECOM/CDM Smith 2013.

Geotechnical, Subsurface, and Seismic Hazards

Implementation of the following mitigation measure during construction of the SR 60 LRT Alternative would reduce adverse effects under NEPA related to geotechnical, subsurface and seismic hazards to not adverse, and potentially significant impacts under CEQA to less than significant levels:

4.11-i The worst case potential for slope stability impacts are discussed and disclosed above. If the SR 60 LRT Alternative is selected as the LPA, the following would be undertaken to confirm slope stability of man-placed materials on the OII Landfill site:

- Global stability of the refuse slope would be confirmed.
- Stability of the slope as influenced by foundation construction (cuts, shoring, equipment surcharge, etc.).
- Stability of existing features on the slope (buttress wall, utilities, etc.) as influenced by foundation construction.

Hazardous Materials

Implementation of the following mitigation measures during construction of the SR 60 LRT Alternative would reduce adverse effects under NEPA related to hazardous materials to not adverse, and potentially significant impacts under CEQA to less than significant levels. Where noted, mitigation measures unique to the North Side Design Variation would apply; otherwise the mitigation measures listed below apply to the SR 60 LRT Alternative with or without the North Side Design Variation:

4.11-ii As part of solid waste management during construction adjacent to the South Parcel of OII Landfill, the following measures would be implemented for construction options A, B, or C by the construction contractor:

- Prior to construction anticipated solid (and liquid) wastes would be characterized, classified, and profiled for future handling, transportation and disposal/treatment purposes. The waste classification would be based on the results of sampling to identify the waste characteristics. The sampling and profiling would be conducted during pre-construction waste characterization, during which exploratory boreholes would be advanced at the CIDH column locations and waste, soil, and groundwater samples would be collected. In addition to collecting samples for waste characterization, the thickness and volume of the materials, the depth to groundwater, and the gas content in the subsurface would be identified.
- None of the solid waste removed from the construction may be placed in the OII Landfill, therefore the solid waste would require loading, transportation, and ultimately reuse or disposal. Waste segregation would likely be conducted based on the pre-construction classification.
- Removal of water-saturated soil would require runoff controls such as plastic sheeting drained to the toe of the landfill slope with liquid collection. Wet soil could require stabilization prior to transport. Stabilization could include mixing with a sorbent material during loading.
- If, through sampling, removed soil is found to contain hazardous materials, soil handling would be in compliance with applicable federal, state, and local laws and regulations regarding the handling of hazardous materials.

- Given that this is a Resource Conservation and Recovery Act (RCRA) and California hazardous waste project, full hazardous materials training, contractor licensing, and health and safety plans and programs would be required. Exposure to the public, workers and the environment from harmful materials would be prevented by developing the future design details appropriately, and by careful executing the future construction activities.
- Depending on the characterization of each waste stream, a number of disposal options exist. RCRA, non-RCRA, and California hazardous waste solids waste may be transported to a Class 1 hazardous waste treatment and disposal facility for treatment and/or permanent waste isolation.
- A disposal facility may be required to provide the following services for all or some of the OII Landfill waste stream:
  - Hazardous waste disposal.
  - Stabilization of inorganic wastes (e.g., metals).
  - Chemical oxidation treatment of organic waste.

4.11-ii North Side Design Variation: Small amounts of residual landfill waste material may have been missed during the North Parcel remedy actions and could be encountered. As a contingency for this, a soil management plan would be developed prior to construction that would identify activities for residual waste monitoring, identification, segregation, and disposal.

4.11-iii A Contaminated Soil/Groundwater Management Plan would be implemented during construction to establish procedures to follow if contamination is encountered. The plan would include the following procedures to be implemented by the construction contractor:

- Notification procedures and contact information for appropriate regulatory agencies;
- Procedures for sampling and analysis of soil and/or groundwater known or suspected to be impacted by hazardous materials;
- Procedures for the proper handling, storage, transport, and disposal of contaminated soil and/or groundwater, in consultation with regulatory agencies;
- Procedures for the proper containment of refuse or other contaminated soil and/or groundwater during construction to ensure that contamination is not transported vertically or laterally;
  - Dust control measures (e.g., soil wetting, wind screens) for contaminated soil; and
  - Groundwater collection, treatment, and discharge procedures and applicable standards.

4.11-iv In addition to mitigation measure 4.11-iii, as part of liquid waste and groundwater management during construction adjacent to the South Parcel of OII Landfill, the following measures would be implemented for construction option A by the construction contractor (assuming displacement piles are used, dewatering would not be necessary for construction options B or C):

- Pre-construction characterization, which would include solid waste, geotechnical, and aquifer testing, would be required.
- The method of dewatering would be determined as part of the construction planning; however, the objective would be to generate as little water as possible and to capture all water for offsite transport and treatment or recycling. The dewatering effort could include temporary tankage, followed by tank truck transportation to a permitted treatment and/or recycling facility.

- No water would be discharged to the landfill, and no untreated water would be discharged to local storm or sewer drains.

4.11-v Prior to construction, a gas monitoring program would be developed to establish levels of response based on monitoring criteria developed by Metro in conjunction with USEPA and New Cure Inc. (NCI). The construction monitoring program would specify monitoring frequency, constituents and methods. It would also include a communications plan identifying the process for informing and obtaining consent from USEPA and NCI for any changes proposed to the existing gas collection activities based on observed monitoring results.

The expected levels of construction gas mitigation would be:

Level 1 - Gas Monitoring:

- Baseline and routine gas monitoring would be conducted at all existing LFG probes and GP locations. The frequency would be established in the construction monitoring program document. Monitoring data would be tracked and compared to established action levels. Example target limits for a construction gas monitoring program are provided below:
  - Gas temperature in excess of 140° F.
  - Gas temperature rise in excess of three percent per week.
  - Oxygen content in excess of ten percent.
  - Carbon monoxide in excess of 100 ppm.

Level 2 - Gas Flow Reduction or Shutdown:

- Should any of the agreed-to action levels be exceeded, the expected Level 2 response would be to reduce or eliminate LFG extraction at the affected well in addition to those on either side of the well. Gas flow rates could be controlled by the existing LFG extraction well valves.
- Monitoring of the nearest GP would then be increased in order to measure methane, CO2 and pressure to ensure that methane and other LFGs that would otherwise be collected from the LFG extraction wells are not increasing. Note that even with the flow reduction or shutdown of the perimeter LFG extraction wells, gas migration in the vicinity of the LRT construction project would still likely be toward active interior LFG extraction probes, where it would be eventually captured.
- In addition, increased methane and carbon monoxide (CO) health and safety monitoring would be conducted at the construction site, as the reduction or shutdown of the extraction wells could reduce gas protection for the workers.

Level 3 - Construction Site Engineering Controls:

- Should temperatures continue to increase, or remain elevated prior to the completion of construction and the installation of the permanent seal/cover restoration, temporary engineering controls would be initiated at the exposed construction sites in order to prevent air leakage. Controls would be further developed during the LRT detailed design process, and may include:
  - Temporary flexible membrane seals that are installed around the pilings or casing during installation.
  - Temporary flexible membrane seals that are installed over the construction pad, should the pad be cut into the landfill. Spray on foam, visqueen, gunnite, bentonite or other similar material could also be utilized to temporarily seal the construction area from gas intrusion.

4.11-v-NSDV Landfill gas is not anticipated to be a significant issue for construction associated with the North Side Design Variation as the LRT would be constructed entirely outside of the boundaries of the OII landfill and would

not penetrate the monocover. Prior to construction, a gas management plan would nonetheless be developed by the construction contractor as part of the health and safety program and gas monitoring would be conducted during any excavation or grading activities.

4.11-vi A Worker Health and Safety Plan would be developed prior to the start of construction activities. All workers would be required to review the plan, receive training if necessary, and sign the plan prior to starting work. The plan would, at a minimum, identify the following:

- Properties of concern and the nature and extent of contaminants that could be encountered during excavation activities;
- All appropriate worker, public health, and environmental protection equipment and procedures;
- Emergency response procedures, including the most direct route to a hospital; and
- Site Safety Officer.

Operational Mitigation Measures

Geotechnical, Subsurface, Seismic Hazards

Implementation of the following mitigation measures during operation of the SR 60 LRT Alternative would reduce adverse effects under NEPA associated with geotechnical, subsurface and seismic hazards to not adverse, and potentially significant impacts under CEQA to less than significant levels:

4.11-vii To address hazards associated with liquefiable soils and seismically-induced settlement, further evaluation would be conducted to determine the need for mitigation based on standard design specifications. Mitigation, such as replacement of liquefiable soils with engineered fill or ground improvement methods such as grouting, would be implemented to meet design specifications. Allowable differential seismically-induced settlement up to 1 inch and 2 inches is considered appropriate for structures and embankment, respectively.

4.11-viii For the portion of the alignment within an Alquist-Priolo Fault Zone, during the final design phase of the project, Metro would perform a fault investigation to further delineate the location of the fault zone and provide appropriate setback for the foundation support. In general, a minimum setback of 50 feet is commonly used for structures intended for human occupancy, according to the Alquist-Priolo Earthquake Fault Zoning Act.

Hazardous Materials

Implementation of the following mitigation measure during operation of the SR 60 LRT Alternative would reduce adverse effects under NEPA associated with hazardous materials to not adverse, and potentially significant impacts under CEQA to less than significant levels:

4.11-ix To address hazards associated with landfill gases at the South Parcel of the OII Landfill site, permanent seals would be incorporated and the monocover restored as necessary to prevent long-term gas leakage from the OII landfill. Additionally, as part of the long term operation of the LRT, Metro would develop operations and maintenance procedures to inspect, test, and repair the integrity of the LRT foundation seals during existing quarterly cap inspection and maintenance program conducted by NCI.

4.11-ix-NSDV No cover inspection is applicable to the North Parcel. Should future subsurface explorations and the detailed design alter this assumption, measures similar to those mentioned under South Parcel could be considered in limited areas of the North Parcel Alignment, as appropriate.

4.11.3.3.3 Impacts Remaining After Mitigation

NEPA Finding

During construction, mitigation would reduce potential adverse effects on the OII Landfill slope stability and the potential for landfill gas exposure to not adverse under NEPA. In addition, mitigation would reduce potential adverse effects from encountering contaminated soil and/or groundwater at Superfund sites and other properties of concern, and potential impacts from the accidental release of hazardous materials and/or wastes used or generated during construction to not adverse under NEPA

Potential adverse operational effects with respect to liquefaction, seismically-induced settlement, and hazardous materials would be reduced to not adverse under NEPA through implementation of mitigation measures.

CEQA Determination

Potential impacts associated with OII Landfill slope stability during construction would be less than significant with the implementation of mitigation. In addition to compliance with federal, state, and local laws and regulations regarding hazardous materials, mitigation would reduce potential impacts from encountering and/or accidental release of hazardous materials during construction to a less than significant level.

Potential impacts associated with liquefaction, seismically-induced settlement, landslides, and hazardous materials would occur during project operation. Compliance with federal, state, and local laws and regulations regarding hazardous materials would reduce many of these impacts to a less than significant level. In addition, implementation of mitigation measures would reduce impacts related to geotechnical, subsurface, seismic hazards and hazardous materials, including those related to liquefaction, settlement, potential presence of subsurface gases, ACM, and LBP, to less than significant.

4.11.3.4 Washington Boulevard LRT Alternative

4.11.3.4.1 Impact Analysis

Construction Impacts

Geotechnical, Subsurface, Seismic Hazards

Unlike the SR 60 LRT Alternative, the Washington Boulevard LRT Alternative alignment would not involve construction near the OII landfill. There would be no adverse effects under NEPA or potentially significant impacts under CEQA associated with geotechnical, subsurface, and seismic hazards.

Hazardous Materials

Construction impacts related to hazardous materials for the Washington Boulevard LRT Alternative are similar to those for the SR 60 LRT Alternative. The differences among the two build alternatives relate to the properties of concern that are known to occur along the two alignments, as shown in Figure 4.11-3.

Superfund Sites

The Washington Boulevard LRT Alternative alignment avoids construction near the OII Superfund site, where hazardous materials are known to occur within the Caltrans ROW. Construction of the Washington Boulevard LRT Alternative would not occur directly within any Superfund site as shown in Figure 4.11-4, although the eastern end of the alignment overlies a portion of the Omega OU2 groundwater plume, where high concentrations of VOCs occur in groundwater at depths of 30 to 100 feet bgs (CDM Smith 2010). Construction of the Washington Boulevard LRT Alternative at-grade alignment in this area would entail shallow excavation of five to ten feet. Therefore, contaminated groundwater associated with the Omega OU2 is not likely to be encountered during construction of the Washington Boulevard LRT Alternative.

However, since the Washington Boulevard LRT Alternative would be constructed at-grade within the Omega OU2 groundwater plume, there is potential for intrusion of vapors from the

groundwater plume into at-grade structures. During the final design phase of the project, further investigation of soil vapor concentrations at proposed station locations and park and ride areas would be warranted to confirm the presence of vapor intrusion of VOCs into buildings. Mitigation measures listed below are available to reduce these potential impacts.

Other Properties of Concern

As with the SR 60 LRT Alternative, construction of the Washington Boulevard LRT Alternative would occur within or near other contaminated sites that are not classified as Superfund sites. Additional data gathering and/or site-specific soil, groundwater, and/or soil gas investigation activities (e.g., Phase II ESA testing), are warranted for several of the properties of concern located along the Washington Boulevard LRT Alternative alignment to further delineate potential areas of contamination and guide construction activities.

Compared with the SR 60 LRT Alternative, there would be a greater potential for impacts to sensitive receptors from a release of hazardous materials in contaminated soil and/or groundwater, as the Washington Boulevard LRT Alternative would be located within residential neighborhoods in close proximity to schools and other sensitive receptors. Mitigation would reduce adverse effects under NEPA during construction to not adverse and potentially significant impacts under CEQA to a less than significant level.

Hazardous materials could also include petroleum gases in the subsurface. Adverse effects under NEPA and potentially significant impacts under CEQA may also occur from release of ACM or LBP during building demolition, or the accidental release of construction-related materials such as fuels.

In addition, construction could involve the transport of soil or other media contaminated with hazardous materials to a disposal facility located away from the project area. As such, there is potential for adverse effects under NEPA or potentially significant impacts under CEQA from the accidental release of these hazardous materials.

Compliance with federal, state, and local laws and regulations regarding hazardous materials would be required during construction of the Washington Boulevard LRT Alternative. BMPs would be implemented to reduce adverse effects under NEPA from the accidental release of hazardous materials and/or wastes used or generated during construction to not adverse, and potentially significant impacts under CEQA to less than significant. In addition, mitigation would be implemented to reduce all adverse effects under NEPA related to hazardous materials during construction to not adverse, and to ensure that potentially significant impacts under CEQA are less than significant.

Operational Impacts

Geotechnical, Subsurface, Seismic Hazards

Seismic hazards are anticipated during operation of the Washington Boulevard LRT Alternative. The Washington Boulevard LRT Alternative does not cross any known fault; however, there is the potential for liquefaction in the portion of the proposed alignment along Washington Boulevard underlain by young alluvial fan deposits, from South Bluff Road to the eastern terminus of the alignment. The proposed Santa Fe Springs Maintenance Yard Option at the intersection of Washington Boulevard and Allport Avenue, proposed stations at Rosemead Boulevard, Norwalk Boulevard, and Lambert Road, and the associated park and ride facility are within a mapped liquefaction zone. Thus, in these portions of the Washington Boulevard LRT Alternative alignment there would be potential for adverse effects under NEPA from liquefaction and seismically-induced settlement and potentially significant impacts under CEQA; however, proposed mitigation would reduce these to not adverse and less than significant, respectively.

The Washington Boulevard LRT Alternative is located in an urbanized area covered with

impervious surfaces and includes generally well-developed drainage infrastructure. The proposed project would not increase the risk of flooding. However, two segments of the Washington Boulevard LRT Alternative alignment are within the flood inundation zone: Via Campo from approximately 600 feet west of Garfield Avenue to the Garfield Avenue intersection, and continuing southward on Garfield Avenue to the intersection of Hay Street; and Washington Boulevard from the Rio Hondo to approximately 1,150 feet west of Sorensen Street. These segments of the Washington Boulevard LRT Alternative alignment may be subject to stringent drainage impact review by the Los Angeles County Department of Public Works. The elevated portion of the Washington Boulevard LRT Alternative alignment is not subject to adverse effects under NEPA or potentially significant impacts under CEQA related to flooding.

The at-grade segment of the Washington Boulevard LRT Alternative alignment is underlain by young alluvial fan deposits that are potentially loose and compressible when subjected to additional loading. Therefore, there would be adverse operational effects under NEPA and potentially significant operational impacts under CEQA related to liquefaction, seismically-induced settlement, and settlement due to rail/track loading which would require further evaluation during design. Mitigation would be implemented in accordance with standard design specifications to reduce adverse operational effects under NEPA to not adverse and impacts under CEQA to a level that is less than significant.

Hazardous Materials

As with the SR 60 LRT Alternative, an accidental release of hazardous materials used during operation could occur. Adherence to existing laws and regulations, as described in Appendix V, would reduce adverse operational effects under NEPA to not adverse and potentially significant operational impacts under CEQA to a less than significant level.

An additional operational adverse effect under NEPA and impact under CEQA could occur under the Washington Boulevard LRT Alternative due to its at-grade configuration. Specifically, there is potential for vapor intrusion into any newly constructed buildings on contaminated soil and/or groundwater at locations near the Omega Chemical OU1 and OU2 site. This adverse effect under NEPA and potentially significant impact under CEQA would require further investigation prior to construction of any new buildings at-grade to determine whether conditions are such that vapor intrusion could occur and create a public health risk. Based on these investigations, vapor barriers or other design elements would be put in place to reduce adverse effects under NEPA from vapor intrusion to not adverse and potentially significant impacts under CEQA to less than significant.

The Washington Boulevard LRT Alternative would be located near residences, businesses, schools, and other human-occupied structures along its entire length, whereas the SR 60 LRT Alternative would be located adjacent to a freeway. However, levels of EMF would be well below exposure guidelines. Therefore, there would be no adverse effects under NEPA or impacts under CEQA from exposure to EMF from the Washington Boulevard LRT Alternative.

4.11.3.4.2 Mitigation Measures

Construction Mitigation Measures

The construction contractor and Metro shall be responsible for assuring the implementation of the following mitigation measures.

Geotechnical, Subsurface, Seismic Hazards

Since there would be no adverse construction effects under NEPA or impacts under CEQA related to geotechnical, subsurface, or seismic hazards for the Washington Boulevard LRT Alternative, no mitigation measures are required.

Hazardous Materials

Mitigation measures 4.11-iii and 4.11-vi, identified above in Section 4.11.3.3.2 for the SR 60 LRT Alternative and summarized in

Table ES-2, would apply to the Washington Boulevard LRT Alternative during construction related to hazardous materials.

Operational Mitigation Measures

Geotechnical, Subsurface, Seismic Hazards

Mitigation measure 4.11-vii, identified above in Section 4.11.3.3.2 for the SR 60 LRT Alternative and summarized in Table ES-2, would apply to the Washington Boulevard LRT Alternative during operation related to geotechnical, subsurface and/or seismic hazards.

Hazardous Materials

Implementation of the following mitigation measure during operation of the Washington Boulevard LRT Alternative would reduce adverse effects under NEPA associated with hazardous materials to not adverse, and potentially significant impacts under CEQA to less than significant levels:

4.11-x To address hazards associated with vapor intrusion from contaminated soil and/or groundwater at locations near the Omega OU1 and OU2 sites, further investigation would be conducted during final design to determine the need for mitigation based on human health risk-based criteria established by the California Department of Toxic Substances Control. If required, any new buildings would be constructed with vapor barriers or other design elements to reduce adverse effects under NEPA from vapor intrusion to not adverse and ensure that impacts under CEQA are less than significant.

4.11.3.4.3 Impacts Remaining After Mitigation

NEPA Finding

No adverse effects associated with geotechnical, subsurface, or seismic hazards are anticipated during construction of the Washington Boulevard LRT Alternative. Mitigation would be required to reduce potential adverse effects from encountering contaminated soil and/or groundwater at properties of concern, and to reduce potential impacts from the accidental release of hazardous materials and/or wastes used or generated during construction to not adverse.

Potential adverse effects with respect to liquefaction and seismically-induced settlement during operation would be reduced to not averse through implementation of mitigation measures. Mitigation would also be required to reduce hazards associated with vapor intrusion from contaminated soil and/or groundwater at locations near the Omega OU1 and OU2 sites to not adverse.

CEQA Determination

There would be no impacts associated with geotechnical, subsurface, or seismic hazards during construction of the Washington Boulevard LRT Alternative. Compliance with federal, state, and local laws and regulations regarding hazardous materials, as well as mitigation, would be required to reduce potential impacts from encountering and/or accidental release of hazardous materials during construction to a less than significant level.

Impacts associated with liquefaction, seismically-induced settlement, and hazardous materials could occur during project operation. Compliance with federal, state, and local laws and regulations regarding hazardous materials would reduce many of these impacts to a less than significant level. In addition, implementation of mitigation measures would ensure that all impacts related to geotechnical, subsurface, seismic hazards, and hazardous materials would be less than significant.