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## 4.0 ENVIRONMENTAL IMPACT ANALYSIS

### 4.7 GEOLOGY AND SOILS

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The following section addresses slope stability and erosion control. Impacts with respect to seismicity, liquefaction, and subsidence/expansive soils are less than significant and no further analysis is required. A copy of the Initial Study is provided in Appendix A-3

#### ENVIRONMENTAL SETTING

##### Existing Conditions

##### *Local and Regional Geology*

The Bradley Landfill and Recycling Center (BLRC) is located in the northeast portion of the San Fernando Valley Basin adjacent to the Verdugo Mountains. The San Fernando Valley is an elliptical alluvium-filled basin approximately 23 miles long and 12 miles wide within the Transverse Ranges geomorphic province. Alluvium has been deposited from streams and rivers that have carried erosional debris from the surrounding upland areas. Specifically, the site lies within the Hansen Subarea of the San Fernando Valley Basin near the northwest tip of the Verdugo Mountains. The geologic units underlying the Hansen subarea are from the youngest to the oldest (1) Holocene Alluvium, (2) Pleistocene Alluvium, (3) Miocene sedimentary formations, and (4) Pre-Cretaceous crystalline and metamorphic rocks.

The Holocene deposits of alluvial and sediments derived from the San Gabriel and Verdugo Mountains, were transported and deposited primarily by the washes draining Tujunga and La Tuna Canyons. These deposits consist primarily of uncemented light grey subangular boulders, gravel and sand; are approximately 50 to 75 feet thick, essentially unweathered, and do not have a significant soil horizon. The Pleistocene deposits consist of brownish to reddish-grey silty sand, cobbles and boulders and are more than 500 feet thick based on the logs of water wells 4916 and 4916A, located approximately 1,000 feet south of the Bradley West Extension.

The Miocene sedimentary rocks include the middle Miocene Topanga Formation and the upper Miocene Modelo Formation. Both formations consist of marine shales, siltstones, sandstones and occasional conglomerates. The Topanga Formation also contains volcanic flows and breccia<sup>1</sup>. The pre-Cretaceous crystalline and metamorphic rocks are primarily granitic rocks with dikes.

The Holocene and Pleistocene alluvial deposits exposed in the excavated pit walls at the BLRC are mainly accumulations of subangular boulders, gravel and sands. The deposits are uncemented but are apparently so tightly packed that they stand at 1:1 or steeper slopes. There is no associated change in materials at the transition between the Holocene and Pleistocene deposits. The separation between these deposits is based on a slight color change between the light grey Holocene alluvium and the light brown to reddish grey Pleistocene deposits.<sup>2</sup> Logs of site water wells yielded subsurface information that generally agrees with the regional geologic formation: primarily boulders, gravel and sand with occasional interbedded silt and clay layers.

### **Seismicity**

The project site is not located in an Alquist-Priolo Special Study zone; however, it is located in a Fault Rupture Study Area.<sup>3</sup> Two faults are located in the vicinity of the landfill: the Tujunga segment of the San Fernando-Sierra Madre Fault and the Verdugo Fault. The Tujunga segment of the San Fernando-Sierra Madre Fault is an active fault located approximately 2.5 miles north of the site. The most recent activity reported along the Tujunga segment of the San Fernando-Sierra Madre Fault was the San Fernando (Sylmar) earthquake of Moment Magnitude 6.6, which occurred on February 9, 1971.

The Verdugo Fault is a reverse fault, approximately 21 kilometers, near the communities of Sun Valley, Burbank, and Glendale. It has a slip rate of roughly 0.5 millimeters/year and a probable magnitude of 6.0 to 6.8.<sup>4</sup> The Verdugo Fault trace was mapped by LeRoy Crandall and Associates in 1985 and 1986 on the southernmost portion of the property, immediately west of Well 4916C and west of Well 4916. The Verdugo Fault roughly parallels San Fernando Road and is not known to have been active in Holocene time.<sup>5</sup> The most important characteristic of this fault is that it acts as a barrier to the southwesterly movement of groundwater in the site area. This fault forms a partial barrier to groundwater movement by having offset Upper Pleistocene deposits.<sup>6</sup> The elevation of groundwater to the west of the fault

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<sup>1</sup> Breccia is formed in a very similar fashion to conglomerate. The difference between the two rocks is that breccia's rock fragments are sharp and angular. These rock fragments have not been transported by water, wind, or glaciers long enough to be rounded and smoothed like in the conglomerate. The cementing agents silica, calcite (CaCO<sub>3</sub>), and iron oxides are the same as in conglomerate. <http://volcano.und.nodak.edu/vwdocs/vwlessons/lessons/Slideshow/Serocks/Sedrock3.html>, July 20, 2004.

<sup>2</sup> Waste Management, Bradley Landfill and Recycling Center Report of Disposal Site Information, August 2002.

<sup>3</sup> Los Angeles Planning Department Citywide Division, Environmental and Public Facilities Maps: Alquist-Priolo Special Study Zones and Fault Rupture Study Areas in the City of Los Angeles, September 1, 1996.

<sup>4</sup> Southern California Earthquake Data Center, [www.data.scec.org/fault\\_index/verdugo.html](http://www.data.scec.org/fault_index/verdugo.html), August 4, 2005.

<sup>5</sup> Report of Disposal Site Information, Bradley Landfill and Recycling Center, 1996.

<sup>6</sup> 1974 Bradley Environmental Impact Report. Document on file at the City of Los Angeles Planning Department.

(approximately 315 feet) is approximately 100 feet lower than the elevation of groundwater to the east (approximately 180 to 230 feet) of the fault.<sup>7</sup>

During a power outage, the BLRC gas plant will engage auxiliary power operations. Auxiliary power for the gas plant will consist of an appropriately sized diesel generator to power Flares 1 and 3, the condensate disposal system and the continuous data recording hardware from compliance records. Gas from Flare 2 would be routed to Flare 1, which has excess capacity. Backup power to the control room is already in place.

Upon a power outage, the control room will “call out” to the plant operator, notifying of the power outage and plant shutdowns. The operator will go to the gas plant to engage the auxiliary power generator, inspect and reset all alarm codes, restart Flares 1 and 3 and ensure the continued operation of the continuous data hardware. When full power is restored, the plant will resume normal operations.

### ***Bradley Landfill and Recycling Center Existing Design and Operations***

#### *Landfill*

Landfilling operations have been completed on Bradley East area and the majority of the Bradley West area. Current landfilling operations occur on Bradley West and West Extension and are conducted pursuant to the Final Grading Plan.<sup>8</sup> The Final Grading Plan requires 3 to 1 (horizontal to vertical) perimeter slope grades and approximately four percent slopes on the top deck area. The proposed Final Grading Plan for BLRC is contained in Appendix H to this EIR and will not result in any changes to the perimeter slope or the top deck grades. Additionally, no changes to landfilling operational procedures are proposed as part of Phase I of the Proposed Project.

#### *Greenwaste/Wood Waste and Recyclables*

Vehicles carrying recyclables, such as woodwaste or greenwaste enter the site from the main entrance and proceed to the scale. After being weighed, these vehicles proceed to the discharge area for either the woodwaste or greenwaste recycling facility. These operations do not involve any earth movement activities.

### **Regulatory Requirements/Zone Variance Conditions Applicable to the Existing Landfill Operation**

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<sup>7</sup> Waste Management, *Bradley Landfill and Recycling Center Report of Disposal Site Information*, August 2002.

<sup>8</sup> *Ibid*

According to Zone Variance (Case No. ZA 94-0792 (ZV)(PAD)) from the City of Los Angeles dated June 2, 1998, the following measures must be implemented at the Bradley Landfill and Recycling Center in regards to geology and soils impacts:

23. The necessary permits shall be obtained from the Department of Building and Safety for all grading operations. Grading operations shall conform with all requirements of the City's Building Code.
27. Proper dust abatement procedures shall be employed in connection with the operations in accordance with SCAQMD Rule 403 to prevent creating a dust nuisance. Adequate and properly protected sanitary toilet facilities shall be made available on the premises.
29. Delivery and dumping of solid waste shall not occur between the hours of 8 p.m. and 6 a.m. The delivery of clean soils and other inert cover materials and their distribution for cover, clean soil operations and other earthwork may occur 24 hours daily.
30. At the expiration of each day or when landfilling activities are suspended or completed in any given area, all exposed solid waste shall be covered with a thick layer of good earth which shall be wetted down if necessary, and firmly compacted and/or covered with a daily cover in accordance with the provisions of Solid Waste Permits 19-AR-0004 and 19-AR-0008. The operations shall be so conducted as to include complete protection against rodent and vermin infestation in accordance with CCR Title 14, Solid Waste Conditions, the City of Los Angeles Environmental Affairs Department, and the County of Los Angeles Department of Health Services.
33. The final closure of the landfill shall be performed in accordance with the Final Closure Plan(s) as approved by the City of Los Angeles Environmental Affairs Department, Regional Water Quality Board and the California Integrated Waste Management Board, and in accordance with the CCR Title 14 and 23.
34. At the expiration of this grant, the premises shall be left in a neat and orderly manner with no uncovered materials, debris or waste products on the premises. It shall be understood that the property may be maintained in a park-like appearance, but in any event, weeds shall be occasionally plowed under or cultivated, or controlled to the satisfaction of the City Fire Department.

### **Existing Permitted Levels of Operation**

The BLRC (including Bradley West/West Extension and Bradley East) currently operates under a Zone Variance granted by the City of Los Angeles (Case No. ZA 94-0792(ZV)(PAD)). Bradley West/West Extension currently operate under a SWFP issued by the City of Los Angeles Department of Environmental Affairs Solid Waste LEA and concurred by the California Integrated Waste Management Board (CIWMB) (Permit No. 19-AR-0008). The City Zone Variances are valid until April 14, 2007. The SWFP has no expiration date.

Under its current permits, the landfill may accept up to 10,000 tons of MSW for disposal per day, seven days per week. In addition, the landfill is permitted to accept inert debris and soil for internal road base, wet weather areas, cover and other beneficial uses. However, the landfill currently accepts approximately 1,500 tpd for disposal, on average.

Operations on Bradley East are addressed in SWFP No. 19-AR-0004 and City Zone Variance ZA 94-0792(ZV)(PAD). Bradley East last received MSW in 1980. Current operations on Bradley East consist of green and wood waste processing operations, an intermittent MRF, and landfill gas collection and flaring, along with electricity generation using landfill gas.

## **ENVIRONMENTAL IMPACTS**

### **Thresholds of Significance**

Appendix G of the State CEQA Guidelines states that a Proposed Project may have significant geology and soils impacts if it would

- Result in substantial soil erosion or the loss of topsoil, and/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 landslides, lateral spreading, subsidence, liquefaction or collapse.

Additionally, the City of Los Angeles has established thresholds for erosion and slope stability in its Draft L.A. CEQA Thresholds Guide dated May 14, 1998. Therefore, the Proposed Project may have a significant impact if it would:

- Constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or
- Accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition which would not be contained or controlled on-site.

### **Project Impacts and Mitigation**

## Phase I

### *Transitional Vertical Expansion*

Under Phase I of the Proposed Project, the applicant proposes to increase the maximum height of the landfill from 1,010 to 1,053 feet above msl, in order to allow time for transition to the TS/MRF operation.

#### **Impact 4.7-1: The proposed transitional vertical expansion of the landfill could increase the potential for soil erosion to occur. (Significant)**

Washout of cover materials and waste could result if there were inadequate drainage, particularly uncontrolled high-velocity flows. Earthwork associated with landfilling activities exposes areas of bare earth (finished slopes) and loose soil (from stockpiling and covering activities) to wind and water erosion. These, in turn, could result in incremental increase in debris loading and siltation of downstream drainage conveyances.

Because the landfill footprint is not changing and there are no proposed excavation areas or changes to operational landfilling procedures, no new drainage control measures are needed. Construction and extension of existing landfill slopes upward will be accommodated by additional benching and extension of existing down drains. These will be properly designed and maintained to prevent wind and water erosion, and/or washout of cover material, thereby preventing degradation of water quality (see Section 4.8 for a discussion of water quality impacts).

The following drainage and erosion control measures will continue to be implemented to mitigate erosion and siltation potential at the project site:

- Continue using siltation fences installed at intervals in on-site drainage facilities.
- Continue replacing the siltation fences on an as needed basis.
- Continue using drainage ditches lined with appropriate erosion resistant materials (e.g., concrete, clay, synthetic alternative [ABS, PVC, HDPE]) to convey run-off in areas prone to erosion.
- Continue using appropriate water conveyance devices and materials (e.g., CMP culverts, ABS pipes, etc.) to pass water under temporary roads and down steep slopes.
- Continue maintaining fill slope benches for proper drainage, including adequate sizing for maximum anticipated flow conditions. In addition, bench ditches should be constructed with adequate soil depth to prevent washout of underlying waste.
- Continue seeding the slope face with grasses to aid in controlling erosion.
- Properly grade all slopes to convey run-off to the lined channels.

- Line steep drainage channels with appropriate erosion resistant materials.
- Continue controlling the velocity of run-off with energy dissipators, particularly in the perimeter channels.
- Continue diverting all surface water from the landfill to the lined on-site sedimentation basin/retention structure in the southwest portion of the site (see Figure 3-3 in Section 3.0 of this EIR). This basin will hold flows from a 50-year, 96-hour storm event. This existing design ensures that no storm water or sediments leave the site and that the capacity and quality of water in the down stream urban storm water system is not impacted by the landfill.
- Complete surface grading prior to the rainy season.
- Construct temporary berms prior to the rainy season to divert surface run-off around the working area to preclude contact with exposed waste. (Only rain falling directly onto the working face would be allowed to seep into the waste material.)
- Continue proper maintenance (both during the active life of the landfill and after closure) of slopes, drainage courses, and culverts. Maintenance includes removal of accumulated sediments from traps, basins, and other drainage works as necessary. Removal of accumulated sediments would be performed more than once per year.
- Continue regular inspections, particularly following rainfall, to determine the effectiveness of the maintenance program.
- Update and continue implementing the site's Storm Water Pollution Prevention Plan (SWPPP) including annual assessments and revisions to the Plan as needed.

Use of such existing drainage and erosion control measures would ensure that any water-borne erosion impacts would be less than significant.

In addition, activities associated with the movement of soil in conjunction with continuing landfill operations as part of the transitional vertical expansion could expose soils to potential wind-borne erosion. Therefore, the potential for wind-borne erosion associated with the proposed transitional vertical expansion would be significant.

**Mitigation:** The following mitigation measures shall be implemented to reduce significant wind-borne erosion impacts.

- 4.7-1 All soil disturbance and travel on unpaved surfaces shall be suspended if winds exceed 25 miles per hour.

- 4.7-2 Mitigation measures defined in Section 4.4, Air Quality, of this EIR related to site watering and watering of unpaved roads to prevent wind-borne erosion.

**Impact 4.7-2: The proposed transitional vertical expansion of the landfill could cause increased slope instability. (Less Than Significant)**

Grading operations at the existing landfill are required to conform to requirements of the City's Building Code related to assuring the stability of engineered slopes. In addition, slope construction is required to be conducted in accordance with the requirements of the Final Grading Plan which will be submitted along with a slope stability analysis as part of the Joint Technical Document (JTD) for the SWFP revision. This documentation will be reviewed and approved by the LARWQCB, the LEA, and the CIWMB for compliance with Title 27 slope stability requirements. These requirements would continue to apply to operations on the landfill under the proposed increase in maximum permitted height. Therefore, these activities would not occur on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in collapse. Impacts related to slope stability resulting from the proposed transitional vertical expansion of the landfill would be less than significant.

**Mitigation:** No mitigation measures are required.

***Transfer Station/MRF Construction***

Under Phase I of the Proposed Project, a 4,000 tpd TS and 1,000 tpd MRF are proposed to be constructed to replace the current landfill operation. The construction activities will occur near the end of Phase I (2006-2007) and will include the importation of approximately 163,500 cy of fill dirt to provide a pad for constructing the foundation of the TS/MRF, associated grading activities, installation of paving and curbing, and erection of the pre-engineered metal building for the TS/MRF.

**Impact 4.7-3: Construction activities associated with the TS/MRF could expose soils to potential erosion. (Significant)**

Activities associated with the grading and movement of soil required to construct the proposed TS/MRF could expose soils to potential wind- and water-borne erosion. Therefore, the potential for wind-borne erosion during construction of the proposed TS/MRF would be significant.

There is also potential for erosion to occur during the grading process during periods of heavy precipitation. Construction of the proposed TS/MRF would result in potentially significant impacts related to water-borne erosion. These impacts would be addressed through adherence to the requirements of the General Construction Activity Storm Water Permit that applies to all construction projects involving sites of one acre or greater. A complete discussion of hydrology and drainage and associated impacts related to water-borne erosion can be found in Section 4.8, Hydrology and Water Quality.

**Mitigation:** Mitigation Measures 4.7-1 and 4.7-2 listed above shall be implemented during construction of the TS/MRF to reduce potentially significant erosion impacts.

**Impact 4.7-4: Construction activities associated with the new TS/MRF could result in slope instability on the project site. (Less Than Significant)**

The new TS/MRF facility would be located within the facility boundaries of the existing BLRC, on the west side of the existing landfill in a reclaimed sand and gravel mine. Approximately 163,500 cy of fill dirt would be imported to fill the sand and gravel pit and provide an engineered base for the concrete slab foundation. All grading activities would be required to occur under a grading permit issued by the City of Los Angeles Department of Building and Safety, in the process of fulfilling its ministerial responsibilities under the City of Los Angeles Municipal Code, and would conform to the requirements of the City's Building Code. In order to obtain the necessary permits, a slope stability report and a geotechnical subsurface investigation report are required. As part of the final design for the TS/MRF, a stability analysis will be performed and submitted to the City along with the Grading Plan, as required by the City's Building Code. As such, proposed construction of the TS/MRF facility would not be permitted on a geologic unit or soil that is unstable or would become unstable as a result of the project, and potentially result in collapse. Impacts of this component of the Proposed Project would be less than significant.

**Mitigation:** In order to ensure adherence to the requirements of the City Building Code with respect to site preparation and grading, the following measure shall be incorporated as a Condition of Approval for the Proposed Project:

- 4.7-3 All grading activities shall be performed in accordance with the provisions of Chapter IX, Division 70, of the City of Los Angeles Building Regulations Code, Title 14 of the California Code of Regulations and with the rules and regulations established by the City Department of Building and Safety.

**Impact 4.7-5: No potential impacts related to erosion or slope stability would occur as a result of the Phase I green and wood waste or existing MRF operations. (No Impact)**

***Green and Wood Waste Operations***

The proposed change to the green and wood waste operation would be an increase in the permitted operation to 2,500 tpd, an increase of 1,240 tpd over the existing level of operation. This increase would provide additional capacity to process green and wood waste materials that are currently processed at another facility in the Sun Valley area (Community Recycling and Resource Recovery). Green and wood waste operations do not require any earth-moving activities and therefore would have no potential impacts related to erosion and slope stability.

***MRF***

The proposed change to the existing MRF operation would increase processing of recyclable materials to a maximum of 99 tpd. MRF operations do not require any earth-moving activities and therefore would have no potential impacts related to erosion and slope stability.

**Mitigation:** No mitigation measures are required.

**Phase II**

***Landfill Closure and Post-Closure Maintenance***

Phase II of the Proposed Project would encompass activities associated with closing the landfill pursuant to an approved closure plan. These would include: (1) installing a 4-foot soil cap over all surfaces of the landfill; (2) planting vegetation on all slopes, as well as the landfill deck; and (3) constructing permanent surface water control structures. The importation of a total of approximately 500,000 cy of soil and up to 500 tons of inert materials per day would be associated with the closure of the landfill (see Table 3-12).

**Impact 4.7-6: Landfill closure/post closure could increase the potential for soil erosion to occur. (Less Than Significant)**

Landfill closure activities would have the potential to expose large areas to the potential effects of soil erosion due to earth movement activities associated with installing the four-foot soil cap over the landfill. The Final Closure Plan for the BLRC will be submitted for review and approval by the LARWQCB, the LEA, and the CIWMB for compliance with, among other things, Title 27 erosion control requirements. The permanent drainage conveyance structures will be designed to accommodate a 50-year, 96-hour storm event. In addition, the following drainage and erosion control measures will continue to be implemented during Closure activities and post-closure maintenance as applicable to mitigate erosion and siltation potential at the project site:

- Continue using siltation fences installed at intervals in on-site drainage ditches.

- Continue replacing the siltation fences on an as needed basis.
- Continue using drainage ditches lined with appropriate erosion resistant materials (e.g., concrete, clay, or synthetic alternative [ABS, PVC, HDPE]) to convey run-off in areas prone to erosion.
- Continue using appropriate water conveyance devices and materials (e.g., CMP culverts, ABS pipe, etc) to pass water under temporary roads and down steep slopes.
- Continue maintaining fill slope benches for proper drainage, including adequate sizing for maximum anticipated flow conditions. In addition, bench ditches should be constructed with adequate soil depth to prevent washout of underlying waste.
- Properly grade all slopes to convey run-off to the lined channels.
- Line steep drainage channels with appropriate erosion resistant materials.
- Continue controlling the velocity of run-off with energy dissipators, particularly in the perimeter channels.
- Continue diverting all surface water from the landfill to the on-site sedimentation basin/retention structure in the southwest portion of the landfill. This basin will hold flows from a 50-year, 96-hour storm event. This ensures that no storm water or sediments leave the site and that the capacity and quality of water in the down stream urban storm water system is not impacted by the landfill.
- Complete surface grading prior to the rainy season.
- Continue proper maintenance of slopes, drainage courses, and culverts. Maintenance includes removal of accumulated sediments from traps, basins, and other drainage works as necessary.
- Continue regular inspections, particularly following, to determine the effectiveness of the maintenance program.
- Continue routine implementation of the Site's Storm Water Pollution Prevention Plan.

Use of such existing and proposed drainage and erosion control measures would ensure that any erosion impacts would be less than significant during the closure and post-closure period of the Proposed Project.

In addition, activities associated with the movement of soil in conjunction with landfill closure and soil cap installation could expose soils to potential wind-borne erosion. Therefore, the potential for wind-borne erosion associated with landfill closure activities would be significant.

**Mitigation:** Mitigation Measures 4.7-1 and 4.7-2 listed above shall be implemented during landfill closure operations to reduce potentially significant wind-borne erosion impacts.

**Impact 4.7-7: Landfill closure and post-closure maintenance activities could result in slope instability. (Less Than Significant)**

As mentioned earlier, a slope stability analysis will be submitted as part of the JTD for the vertical expansion and reviewed and approved by the LARWQCB, the LEA and the CIWMB. In addition, prior to Final Closure, a Final Closure Plan for the BLRC will be submitted for review and approval by the agencies for compliance with, among other things, Title 27 slope stability requirements. This review and approval process ensures that adequate engineering measures will be taken to provide an adequate safety margin for slope stability. Therefore, impacts resulting from the Phase II Closure construction activities or Post-Closure maintenance component of the Proposed Project would be less than significant.

**Mitigation:** No mitigation measures are required.

**Impact 4.7-8: No potential impacts related to erosion and slope stability would occur as a result of TS/MRF operations. (No Impact)**

***Transfer Station/MRF Operations***

Under Phase II, the applicant proposes to operate a 4,000 tpd TS and 1,000 tpd MRF to replace the current landfill operation. TS/MRF operations do not involve any earth-moving activities and therefore would have no potential impacts related to erosion and slope stability.

**Mitigation:** No mitigation measures are required.

**CUMULATIVE IMPACTS**

Development of the Proposed Project in conjunction with the related projects listed in Section 2.0 of this EIR would result in further “infilling” of various land uses in the Sun Valley community of the City of Los Angeles. Geotechnical hazards are site-specific and there is no cumulative relationship between development of the Proposed Project and the related projects. As such, construction of the related projects is not anticipated to result in cumulatively considerable impacts related to erosion and slope stability.

**LEVEL OF SIGNIFICANCE AFTER MITIGATION**

With implementation of the mitigation measures listed above, impacts related to wind-borne soil erosion would be less than significant. All other impacts related to erosion and slope stability would be less than significant.