EXHIBIT E

effort between proponents of GCLF and the SLRMWD to develop protocols for collection, handling and analysis of groundwater samples, with the SLRMWD selecting the contractors to perform those services, Gregory Canyon Ltd. will be required to make the arrangements with the selected contractors to perform these services at its expense. A copy of the 2004 supplemental SLRMWD Agreement is included in Appendix Q.

D.5.5 AQUEDUCT RELOCATION OPTION

It is possible that a portion of the existing First San Diego Aqueduct (also known as Pipelines No. 1 and 2) may be relocated further west of the landfill footprint on the western side of the canyon ridge. A new pipeline (Pipeline No. 6) is also proposed at this westerly location. Whether or not the pipelines are relocated, groundwater monitoring will be conducted to ensure that there are no impacts to groundwater or surface water adjacent to these pipelines. A determination as to whether to relocate the pipelines will be made in conjunction with the San Diego County Water Authority. Among the factors to be considered are impacts to the pipelines from earthquakes and blasting. The potential impact from earthquakes is discussed in Section C.2.2.2. The potential impact from blasting was analyzed in Section 4.6.3.4 of the EIR.

D.5.6 WATER USAGE

Existing beneficial uses and water quality objectives have been established by the RWQCB (1975 and 1994) for surface and groundwater in the vicinity of Gregory Canyon. The GCLF is located in the San Diego Hydrologic Basin. A Basin Plan was initially approved by the SWRCB in March 1975 and an update to the Plan was drafted in 1994 (RWQCB 1994). Beneficial uses of surface water in the Pala Hydrologic Subarea include municipal or domestic, agricultural, and industrial service supply. However, because surface water is generally seasonal and the supply is unreliable, beneficial uses for municipal and industrial service supply are restricted. In addition, surface waters provide beneficial uses for water- and non-water-contact recreation. Despite the unreliability of surface water, it provides a water supply to vegetation and maintains wildlife habitats. Surface water in the Pala Hydrologic Subarea provides warm-water habitat to sustain aquatic organisms.

Traditionally the Pala Basin groundwater has been used for agricultural and

San Diego County Water Authority
4677 Overland Avenue • San Diego, California 92123-1233
(858) 522-6600 FAX (858) 522-6568 www.sdcwa.org

February 23, 2011

Mr. Jim Henderson
Solid Waste Local Enforcement Agency
Department of Environmental Health
County of San Diego
5500 Overland Drive, Ste. 110
San Diego, CA 92123

Re: Solid Waste Facility Permit for the Proposed Gregory Canyon Landfill

Dear Mr. Henderson:

The San Diego County Water Authority (Water Authority) received the February 11, 2011 public notice for the above referenced permit. The Water Authority is the public agency responsible for providing the supplemental water supply to support over three million San Diego County residents and a $171 billion economy. The proposed Gregory Canyon landfill has the potential to directly affect the Water Authority's ability to safely and reliably provide necessary regional water supplies.

Because Gregory Canyon landfill construction and operation will affect several nearby major water distribution pipelines, the Water Authority reiterates concerns presented in an August 12, 2010 letter to Ms. Rebecca Lafrenier, which is attached hereto as formal comments on the current permit application. The Water Authority requests that those comments and recommendations be included in any Solid Waste Facility Permit issued for this project. Further, the Water Authority requests that all conditions related to protection of Water Authority facilities that were included in SWFP No. 37-AA-0032 (since withdrawn) be incorporated in any new permit for Gregory Canyon landfill.

Ensuring the continued safety and reliability of San Diego's water supply is of paramount importance to the Water Authority. Please transmit the proposed SWFP to the undersigned when it is drafted. If you have any questions or wish to discuss these comments in greater detail, please contact me at (858) 522-6752.

Sincerely,

Larry Purcell

Larry Purcell
Water Resources Manager

Attachment

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4677 Overland Avenue • San Diego, California 92123-1233
(858) 522-6600 FAX (858) 522-6568 www.sdcwa.org

August 12, 2010

Ms. Rebecca Lafrenier
Solid Waste Local Enforcement Agency
Department of Environmental Health
San Diego County
9325 Hazard Way
San Diego, CA 92123

Re: Gregory Canyon Landfill Project Solid Waste Facility Permit Application Package, dated June 24, 2010

Dear Ms. Lafrenier:

The San Diego County Water Authority (Water Authority) was notified that the County of San Diego, Department of Environmental Health, Solid Waste Local Enforcement Agency (LEA) received a solid waste permit application package for a new permit for the proposed Gregory Canyon Landfill project. On August 2, Department of Environmental Health provided the Water Authority a copy of the project's current solid waste facility permit application package, dated June 24, 2010.

The Water Authority has a real-property interest in the Gregory Canyon Landfill project site consisting of the pipeline right-of-way commonly known as the First San Diego Aqueduct. Within this right-of-way, the Water Authority owns and operates two large diameter water pipelines (Pipelines 1 and 2) and a pipeline maintenance road patrolled by Water Authority staff weekly. A third large diameter pipeline (Pipeline 6) has been approved for this same alignment, but has not yet been constructed. The continued operation of Pipelines 1 and 2 (and future operation of Pipeline 6) are essential to meet regional water demands, and the routine patrol of the right-of-way is necessary to provide a safe and reliable water supply to the Water Authority's 24-member agencies.

The voter approved Proposition C contemplated that there could be a conflict between the Water Authority's facilities and landfill operations on the Gregory Canyon Ltd. property and, as appropriate, identified the Water Authority as the entity to determine the extent and manner for protecting its water conveyance facilities. Proposition C - Gregory Canyon Landfill and Recycling Collection Center Ordinance; Section 3 - Description of the Project, subsection G - Protection of San Diego Aqueduct states: "The project will include work required to protect any San Diego Aqueduct pipelines to the extent and in the manner required by the San Diego County Water Authority" [emphasis added]. To date, the Water Authority has not entered into, and is not currently discussing terms for, an agreement with the project proponent that sets forth the extent or the manner for protecting San Diego Aqueduct pipelines as required by Proposition C.

In 2007 and 2008, representatives of Gregory Canyon Ltd. met with Water Authority staff and expressed their interest to not relocate the Water Authority's facilities, but protect them in place. In order to consider the request, the Water Authority requested Gregory Canyon Ltd. to provide an engineering study with specific scope-of-analysis. This study has not been provided. With only the existing technical studies and engineering plans to rely on, Water Authority staff cannot recommend to the Water Authority's Board of Directors that pipeline protection in place is prudent.

Therefore, LEA's issuance of the project's solid waste facility permit should be done with the expectation that San Diego Aqueduct pipeline relocation is a project component. The expired draft Gregory Canyon Landfill Solid Waste Facility Permit (Solid Waste Facility Permit #37-AA-0032, text dated 10/1/2004) included permit conditions that addressed some pipeline relocation matters; the permit conditions also referenced the corresponding mitigation measure numbers from the project's CEQA Mitigation Monitoring and Reporting Plan (MMRP).

The Water Authority conducted a cursory comparison between the expired draft Gregory Canyon Landfill solid waste facility permit conditions and the information included in the current Gregory Canyon Landfill solid waste facility permit application package, and is concerned with the changes and omissions in the current application package. Specifically, Table 10-1 (MMRP for Project Impacts) included in the new application package omits the project's CEQA mitigation measures MM 4.4-1, MM 4.9-19g, MM4.9-19a, MM 4.7-3, and MM 4.13-12b associated with relocating and protecting the Water Authority's existing pipelines and easement. The corresponding expired Solid Waste Facility Permit #37-AA-0032, (text dated 10/1/2004) condition numbers are B.1.j(4); B.1.b(32); B.2.b(12); B.2.e(7), and B.2.e(11). These mitigation measures should remain in the project's MMRP and be included in any new solid waste facility permit issued for the project.

Table 10-1 does include CEQA mitigation measure MM 4.1-3 (expired permit condition number B.1.j(1)) that states: "Prior to commencing any construction work, the owner/operator shall provide the County Department of Environmental Health a copy of the executed agreement between Gregory Canyon, Ltd. and the San Diego County Water

Authority providing for relocation and protection of the San Diego Aqueduct pipelines." This must remain a condition of any solid waste facility permit to assure compliance with Proposition C.

The permit application package attachment SWFP-E purports to include the status of applicable permit applications and associated documentation. Attachment SWFP-E includes information that implies that a Water Authority right-of-way encroachment permit application is being processed by the Water Authority and includes a copy of correspondence from the Water Authority dated May 2, 2006. The application package does not include follow-up correspondence from the Water Authority dated May 16, 2006 (Enclosure 1), stating the Water Authority will not process plan reviews until a comprehensive agreement is reached addressing relocation and protection of all Water Authority facilities. Also, the application does not include additional correspondence between the Water Authority and Gregory Canyon Ltd., dated May 14, 2009 (Enclosure 2) that explicitly states there is no memorandum of understanding between the Water Authority and Gregory Canyon Ltd., that the Water Authority will not take an incremental approach to approval of the encroachment permit, and that the encroachment permit requires Water Authority Board of Directors' approval.

The Water Authority considers the relocated right-of-way and pipelines shown in the project's Environmental Impact Report as conceptual. The right of way as shown in Volume III of the permit package is also subject to change pending the outcome of an agreement between the Water Authority and project proponent. An alternative alignment other than that shown in the project's final EIR may require additional CEQA compliance.

The Water Authority agrees with LEA's rescission (email notice dated August 6, 2010) of the application completion determination because the actual physical scope of the project, and all applicable permit conditions, cannot be developed without the required Water Authority agreement under Proposition C. In addition, information contained in the permit application package attachment SWFP-E factually misrepresents the status of the Water Authority encroachment permit.

The Water Authority further recommends that the LEA consider the application package not ready for forwarding to the California Department of Resources Recycling and Recovery (CalRecycle) until there is an executed agreement between the Water Authority and Gregory Canyon Ltd. (or their successors interest) regarding the protection of the San Diego Aqueduct pipelines and facilities.

If you have questions or would like to discuss the Water Authority's concerns in more detail, please contact Larry Purcell at (858) 522-6752.

Sincerely,

FOR Ken Weinberg
Director of Water Resources

DC:tp
Enclosures (2)

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Enclosure 1

San Diego County Water Authority

4677 Overland Avenue • San Diego, California 92123-1233
(858) 522-6600 FAX (858) 522-6568 www.sdcwa.org

May 16, 2006

Mr. Jason Simmons
Consultants Collaborative, Inc.
160 Industrial Street, Suite 200
San Marcos, CA 92078

RE: Application to construct an access road for the Gregory Canyon Landfill Project across a San Diego County Water Authority Easement

Dear Mr. Simmons:

This letter is in response to your request for review of plans for an access road that will cross the Water Authority's easement within the Gregory Canyon Landfill Project. The Water Authority requires an appropriate agreement for the relocation and protection of its pipelines from all landfill activities to fulfill the conditions in the project's Solid Waste Facilities Permit. This requirement is contained in the Solid Waste Facility Permit approved by the California Integrated Waste Management Board in December 2004, and referenced in previous correspondence from the Water Authority to Gregory Canyon Ltd. (copy attached). The access road plans address only one aspect of the landfill project and do not address potential impacts to the Water Authority's pipelines at other locations. The Water Authority's plan review process will not begin until an agreement is executed that addresses relocation and protection of all Water Authority facilities.

Please contact Tad Brierton, Right of Way Supervisor, at 858-522-6915 to discuss the necessary agreements.

Sincerely,

William J. Rose

William J. Rose
Director of Right of Way

WJR/RS/tr
Enclosure

cc: Tad Brierton

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PRINTED ON RECYCLED PAPER

Mr. Jason Simmons
Consultants Collaborative, Inc.
May 16, 2006

Re: Application to build access road for the Gregory Landfill Project

bcc: Paul A. Lanspery

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EXHIBIT F

monitor capable of detecting gamma radiation. An audible alarm will sound if radiation is detected. The alarm point will be set at least twice the average local background levels as recommended in *Detection and Prevention of Radioactive Contamination in Solid Waste Facilities* (Conference on Radiation Control Program Directors, Inc.). Vehicles hauling materials which contain detectable levels of radioactive waste will be segregated and denied entry to the landfill.

To insure that radiation detectors are properly calibrated, each existing, new, or repaired monitor will be tested monthly with a check-source supplied by the radiation monitor manufacturer.

B.4.4.3 SPREADING AND COMPACTION

Once customers have disposed of their refuse at the designated unloading areas, a compactor or dozer will spread the waste over the working face in approximately two-foot thick layers. A compactor or dozer will then make repeated passes over the working face to thoroughly compact the refuse. The working face is typically sloped to a gradient of approximately 5:1 (horizontal to vertical) or less to maximize refuse compaction. Refuse is spread and compacted in this manner to minimize voids in the daily refuse cells, to inhibit vector propagation, to reduce windblown litter, and to maximize site capacity.

Large, bulky wastes may be separated to prevent bridging of the surrounding refuse, or may be placed in the lower portion of the advancing lift to be thoroughly crushed by the landfill compactor.

B.4.4.4 INCLEMENT WEATHER OPERATIONS

Rain and/or high winds are the predominant inclement weather conditions which may cause the operator to adjust on-site waste handling and disposal procedures. Landfill operations are typically not hampered by mild wet weather conditions; however, when heavy rains cause the unloading areas (commercial and private vehicles) to become muddy and unusable, operations will be moved to a designated wet weather area, generally near an improved internal road, to provide continuous operation during inclement weather. Traffic and vehicle access to the unloading areas will be provided by paved roads and/or tightly compacted dirt or base rock roads. The unloading area may also be improved by tightly compacting the dirt and/or placement of rock base material.

Stockpiles of soil material will be maintained near the designated alternative unloading area to ensure that an adequate supply of soil material will be available to cover all wastes. An approved ADC material may also be utilized minimizing the need to stockpile near the wet weather unloading area.

The landfill access road bridge has been designed to prevent overtopping of the road deck in a 100 year, 24-hour storm event. As a result, it is not expected that access to the landfill by waste collectors or other vehicle traffic would be impaired except in a very extreme storm event. If monitoring of weather conditions suggests such an extreme event is possible, the operator will monitor rainfall totals and current and projected river flows. In the event there is a reasonable potential that waters could overtop the bridge deck, landfill operations will be temporarily halted. Waste collectors will be notified and collection vehicles will be redirected using the same early warning system procedures as provided in Section B.5.5.

When high wind conditions occur, the unloading areas (commercial and private vehicles) will typically be reduced in size and, whenever possible, placed in a portion of the facility that affords protection from the wind. Additional equipment may be utilized to expedite the spreading and compacting of the refuse as soon as it unloaded. Cover operations may also be implemented earlier in the day to reduce the area of exposed waste on the working face. In addition, portable litter fencing may also be utilized downwind around the working face. Litter control procedures are discussed in Section B.5.3.3.

B.4.4.5 DAILY COVER PLACEMENT

The purpose of daily cover soil or an equivalent ADC approved by the EA, is to provide a suitable barrier to the emergence of flies, prevent windblown trash and debris, minimize the escape of odors, prevent excess infiltration of surface water, and hinder the progress of potential combustion within the landfill. Daily cover in the form of soil material compacted to a minimum thickness of six inches or an ADC, such as a geosynthetic blanket or PGM, will be placed over all exposed refuse at the end of each working day. Cover material will be transported by scrapers to the working face where it will be spread and compacted by either the scrapers or a dozer.

reported in 1995. The fifth phase was the hydrogeologic study completed by GLA in 1997 and the sixth phase, also completed by GLA (1998), addressed geotechnical issues. GLA has also completed supplemental reports to address specific concerns relating to the hydrogeology of the site. Specifically, these studies include a report entitled "Phase 5 Supplemental Investigation Results of Pumping Tests" by GLA (2001) conducted to better characterize the hydraulic properties of the bedrock aquifer beneath the site, and a report summarizing a two dimensional groundwater flow model (GLA, 1995) to assess impacts of a release from the landfill to the Pala Basin. Each of these reports has been incorporated into one "master" Geologic, Hydrogeologic, and Geotechnical Investigations Report (GLA, 2003) and included as Appendix C.

Finally, following RWQCB review of the May 2004 JTD, the RWQCB requested that the groundwater monitoring network be installed and tested to demonstrate that the proposed monitoring network will be able to provide the earliest detection of a release of waste constituents from the proposed solid waste management unit at Gregory Canyon. In response to this request, GLA drilled, logged, constructed, and tested seven bedrock groundwater monitoring wells across the mouth of Gregory Canyon (at the downgradient limit of the proposed landfill); modified two wells (GLA-2 and GLA-10) to grout up the lower open hole sections of these wells; and drilled, logged and constructed two replacement alluvial wells for the groundwater monitoring network. Results of this drilling and aquifer testing program are summarized in a supplemental report to the Geologic, Hydrogeologic and Geotechnical Investigations Report (GLA, 2003) and are included in Appendix C-1.

B.5.1.3.1 GROUNDWATER MONITORING WELL LOCATIONS

Based on hydrogeologic investigations, the alluvial and shallow bedrock systems are interconnected and groundwater freely communicates between them, although the quantity of water transmitted to the alluvial aquifer from the fractures in the bedrock is minor relative to the volume of water transmitted through the alluvium. Though the alluvial system represents the zone with the highest overall hydraulic conductivity, these materials will be removed within the landfill footprint (i.e., the landfill will be underlain by bedrock and engineered fill), and a release from the landfill would be detectable in the fractured bedrock flow system first. As a result, a dual detection monitoring system, which includes dedicated wells in both the alluvial and the bedrock fracture flow systems was installed. The DMP will include downgradient wells to collect representative samples of groundwater at the downgradient limit of the landfill, or "point of compliance", and upgradient wells to collect samples of groundwater that are representative of "background" conditions. In addition, cross-hole testing has been performed following well construction to verify that there is hydraulic connectivity between wells and that the monitoring wells, as currently constructed, would be capable of detecting a contaminant because all fractures are recharged from the same source. Further discussion of the cross-hole pumping tests performed along the point of compliance is provided in Appendix C-1.

The groundwater monitoring system at the GCLF was initially designed to include a total of 20 wells, 16 of which monitor the weathered and unweathered bedrock fractured flow system. Additional groundwater monitoring wells have been proposed to reflect Dr. Huntley's recommendations (Appendix C-2), and the revised workplan is included in Appendix G-2. As shown in the following table, the proposed groundwater monitoring network will include 14 fractured bedrock wells, six weathered bedrock wells, and three alluvial wells. In addition, the groundwater monitoring network includes two alluvial "sentry" wells, downgradient of the point of compliance, and designated to intercept groundwater flows as predicted by computer modeling that simulates a release from the landfill to the Pala Basin (Section B.5.1.1.4, and Appendix C). Groundwater level measuring stations have been established in three fractured bedrock wells, and five weathered bedrock wells. The proposed groundwater monitoring network is presented on Figure 10C.

Groundwater Detection Monitoring Network

Monitored Zone	Well Name	Designation	Well Position
Fractured (Unweathered) Bedrock	GLA-4, GLA-5, GLA-11, and GLA-18*	Monitoring Well	Upgradient (Background)/ Cross-gradient
	GLA-1D*, GLA-2, GLA-12, GLA-13, GLA-A GLA-BD*, GLA-CD*, GLA-D, GLA-E and GLA-F		Downgradient (Compliance)
	GMW-4, GLA-1 and GLA-8	Water Level Measuring Station	Not Applicable
Weathered Bedrock	GMW-1, GLA-B, GLA-C, GLA-G, GLA-14 and GLA-19*	Monitoring Well	Downgradient (Compliance)
	GLA-3, GLA-7, GLA-10, GMW-2 and GMP-2	Water Level Measuring Station	Not Applicable
Alluvium	Lucio #2R	Monitoring Well	Background
	GMW-3 and GLA-2A*		Downgradient (Compliance)
	GLA-16, SLRMWD #34R		Downgradient/Sentry

* Proposed well; not currently constructed.

B.5.1.6.6 AFFECTS OF GROUNDWATER

Generally, no impacts are expected from groundwater on the waste management unit since the landfill is situated above the highest anticipated groundwater elevation. However, in the unanticipated event that groundwater was to rise significantly, the landfill design also includes a subdrain system in the floor areas of the landfill to convey any groundwater away from the landfill by gravity. A discussion of the subdrain system is included in Section B.5.1.2 – Subdrain System.

B.5.1.6.7 AFFECTS OF SURFACE WATER

Surface water run-on and storm water discharges affects on the landfill unit could include:

- Erosion of daily, intermediate, and final cover.
- Exposure of wastes thus increasing vectors and nuisances and potential offsite surface water impacts.
- Infiltration of water which increases the potential for the production of leachate and potential for groundwater impairment.

Elimination or reduction of the amount of surface water that enters the landfill unit is important in the design and operation of the unit because surface water is the major contributor to the total volume of leachate. Storm water run-on from the surrounding areas will not be allowed to enter the unit and storm water discharges will not be allowed to accumulate on the surface of the landfill. Section B.5.4 – Drainage and Erosion Control discusses control methods which aid in the minimization of run-on/run-off and surface water intrusion and Section C.2.8 – Drainage Control System discusses the drainage control measures which aid in removal of surface water run-off and prevention of surface water run-on.

B.5.1.7 <u>ESTIMATED COST FOR REASONABLY FORESEEABLE RELEASE MITIGATION</u>

In accordance with 27 CCR, §20380(b), the GCLF will establish and maintain assurance of financial responsibility for initiating, and completing corrective action for all reasonably foreseeable releases from the GCLF. As shown in Table 8, costs have been estimated to implement a Correction Action Program associated with a release to the underlying bedrock as described in Section B.5.1.6.4 above. The cost estimate is intended to provide a basis for the compliance with 27 CCR, Article 1 financial assurance requirements.

TABLE 8
GREGORY CANYON LANDFILL
ESTIMATED MITIGATION COSTS

ITEM	UNIT COST	UNITS	TOTAL COST
Construction Costs			
Corrective Action Well Construction (1)	$10,700	8	$85,600
Extraction Pumps	$4,000	8	$32,000
Electrical Conduit	$15	4200	$63,000
Conveyance Piping	$40	4200	$168,000
Water Treatment System	$800,000	1	$800,000
R/O System (3) (5) (5A)	$540,000	1	$540,000
Surface Water Impact Mitigation (6)	$500,000	LS	$500,000
Regulatory Liaison/Project Management (7)	$125,000	LS	$125,000
Engineering/CQA	$60,000	LS	$60,000
Construction Management (2)	$30,000	LS	$30,000
		Sub-Total	**$2,403,600**
	Contingency	10%	$240,360
	Construction Sub-Total		**$2,643,960**
Operational Costs	**COST/YEAR**	**YEARS**	**TOTAL COST**
Extraction Well Maintenance (8)	$10,700	3	$32,100
Laboratory Analyses (4)	$21,400	30	$642,000
Groundwater Monitoring and Reporting	$40,000	30	$1,200,000
Regulatory Liaison/Project Management	$20,000	30	$600,000
Granular Activated Carbon Treatment System Annual Maintenance	$50,000	30	$1,500,000
Surface Water Mitigation (9)	$1,000,000	LS	$1,000,000
	Operation Cost Sub-Total		**$4,974,100**
		Total Cost	**$7,618,060**

Updated January 2011

Assumptions:

1. Corrective action wells will be permitted by the San Diego County Dept. of Environmental Health ($150/well), and are assumed to be five-inch diameter wells to 100 feet, with stainless steel screens (~$100/ft.). Each well will be developed following construction (~4 hours @ $130/hour).
2. Construction management will include logging of borings, observation of well construction, well development, and documentation.
3. A R.O. system for water treatment will be installed at the onset of the project development. Therefore, the cost for the R.O. system is not necessary as part of the cost estimate for reasonably foreseeable release mitigation. Costs include only those associated with addition of GAC to treat volatile organic compounds in groundwater.
4. Laboratory analyses include monthly influent and effluent analyses (~$250/month), and quarterly (~$1500) and semiannual (~$2050) analyses for NPDES monitoring. Analyses also include staff time for sample collection (~1 hour/month @ $50/hour).

5. The R.O. system will be installed during initial construction per an agreement with the San Luis Rey Water District and be available for impacted groundwater treatment along with the water treatment system described in Section B.5. Therefore, the capital cost of $540,000 for the R.O. system is not included in the reasonably foreseeable release cost estimate.
5A. The R.O. system may be used for surface water clean-up. The surface water impact mitigation cost includes evaluation and determination of corrective action, and implementation of surface water clean-up as well as determination if operational cost for the R.O. system should be utilized for surface water clean-up.
6. Surface water impact mitigation is for unanticipated releases from the waste management unit to the natural drainage ways including the San Luis Rey River during the active operation and post-closure maintenance period. Any release occurring during active operations will be mitigated with operational revenues generated from tipping fees.
7. Includes preparation of an ROWD, EMP/AMP, EFS/ACM, SOR and CAP documents in response to identification of release and coordination with RWQCB during CAP construction.
8. Operational cost estimate assumes replacement of one extraction well every 10 years.
9. The operation and maintenance of the R.O. system is included in the line item for "Surface Water Mitigation" cost.

B.5.1.8 GROUNDWATER TREATMENT SYSTEMS

Reverse Osmosis

The Agreement between the San Luis Rey Municipal Water District and the applicant requires the installation of a RO system. The RO system will be installed in the southwestern portion of the ancillary facilities area. The RO equipment and interconnecting piping will be constructed above ground inside a concrete containment area, which will be secured with a slatted chain link fence.

The purpose of the RO system is to provide a groundwater treatment facility that is in place in the event that groundwater impacts are identified. As currently configured, the primary constituent that the RO system would remove is total dissolved solids (TDS) and has the capability to treat 50 gpm. The system can be modified to handle organic compounds or other contaminants, as necessary.

Based on a typical release, VOCs are generally the constituents that are associated with landfills which need removal and treatment. Due to the high cost of operations for an R/O system, a granular activated carbon system was included as the impacted groundwater treatment system for purposes of 27CCR reasonably foreseeable release. The GAC is discussed in the following section and O&M costs associated with this treatment option are included in Table 8.

The RO treatment involves the separation of TDS from water by applying pressure to a feed stream passing over a semi-permeable membrane, thereby has blown off-site in objectionable quantities. Project-related litter will not be allowed to accumulate along roads, fences, or in vegetation.

B.5.3.4 NOISE CONTROL

Site operations will be conducted in compliance with Cal-OSHA regulations and the County Noise Ordinance. Noise levels of on-site equipment will be controlled by installation and proper maintenance of mufflers on all motorized vehicles. In the event that excavation operations necessitate additional measures beyond use of traditional heavy equipment, controlled blasting may be employed. Written notice will be provided to residents within a one-mile radius of the blast site at least 24 hours in advance of any on-site blasting. Site personnel will be provided with hearing protection (e.g., ear plugs or muffs) to reduce exposure from continued on-site noise levels. Rock crushing and tire shredding will occur at least 1,500 feet from the nearest residences unless other forms of noise attenuation, such as berms or acoustical curtains, are used to reduce combined landfill noise levels to below the County Noise Ordinance limit.

B.5.3.5 FIRE CONTROL

The GCLF is located in a somewhat remote area, therefore, fire prevention and control measures are of great importance and will be diligently pursued by the operator. Burning of refuse will not be allowed at the landfill facility, which minimizes the chance of above ground fires. Fire protection services are expected to be provided by the San Diego County Fire Authority. The landfill property is within the boundaries and jurisdiction of the Authority. As an alternative fire protection may be provided by the North County Fire Protection District through contract or annexation into the District. The entity providing fire protection services would also enforce the requirements of the 2009 Consolidated Fire Code, as applicable.

The primary fire prevention measure will be a firebreak between the refuse and the undisturbed natural areas surrounding the landfill. In compliance with the requirement to maintain a minimum clearance of 150 feet from the periphery of any exposed flammable solid waste (California Public Resources Code Section 4373), refuse placed within 150 feet of the landfill perimeter will be placed using the following procedures:

- Clearance of brush and vegetative debris from around the active disposal area.
- As operations move into the 150-foot zone, the operator will place soil cover regularly throughout the day.
- At no time during operational hours will refuse be exposed for more than four hours.

The potential of subsurface fires is reduced through the application of daily and intermediate soil cover placement, which will limit the amount of oxygen available for combustion. The primary measures for fire control include load checking for smoldering or burning wastes and separation of these wastes if spotted by a dozer and the covering of the fire with soil. While water could be sprayed over burning wastes, this is generally not done to avoid the introduction of liquids into the waste prism.

Additional fire prevention measures will occur on site. The landfill gas control system will be operated so as not to introduce excessive amounts of oxygen into the refuse prism. The extraction wells will be monitored for temperature and oxygen content to determine if a subsurface fire is present. All equipment with internal combustion engines will be equipped with approved spark arrestors and any flammable debris will be removed from the under carriages and engine compartments of heavy equipment on a regular basis. Fire extinguishers will be available at the entrance facilities, in the administration and operations trailers, and in landfill equipment and vehicles. Hazardous materials, collected as part of the HWEP, will be stored in fire proof containers located in the ancillary facilities area.

Site personnel will also be observant of wildfires that may occur along the perimeter of the site and will help in suppression efforts. Additional wildfire suppression forces are available from the San Diego County Fire Authority, California Department of Forestry (CDF) station, the North County Fire Protection District, and the Pala Reservation fire station, among others. Fire prevention measures, which will be adhered at the GCLF, meet current local fire code standards. The GCLF site is located within a state responsibility area. The San Diego County Fire Authority operates a fire station in the general vicinity of the landfill property, and it is expected that the Authority will be constructing a fire station at a location close to the landfill property. In addition, the North County Fire Protection District operates a station five miles from the landfill site and is a party to a reciprocal aid agreement with other fire protection agencies, including the San Diego County Fire Authority.

Tire storage can result in fires. To reduce the risk of fires from tire storage, tires will be stored within the landfill footprint in compliance with the State and local fire codes, as well as 14 CCR, Section 17354. Tires will be shredded a minimum of every six months. Section B.1.5.2.3 provides additional detail on tire acceptance, storage, processing, and disposal.

The risk of fire from blasting operations will be reduced through the use of a screening material placed above the blasting area that will prevent the escape of rock fragments, dust or other solid debris. The screening is designed so that only gases can escape through the screen.

B.5.3.6 ODOR CONTROL

The primary means of controlling odor from refuse at the site is the landfill gas control system and the placement of daily, ADC (i.e., geosynthetic blankets) or intermediate soil cover over all exposed refuse at the end of each operating day. The active working face will be confined to as small an area as practicable to help control odors. In addition, a landfill gas control system will be installed to further control odors.

B.5.4 DRAINAGE AND EROSION CONTROL

The primary function of the surface water drainage and erosion control system is to minimize erosion, to divert and convey stormwater flows in a controlled manner, and to inhibit the potential infiltration of surface water run-on or precipitation into the refuse disposal areas and to minimize hydromodification of the San Luis Rey River. The goal of hydromodification prevention is to mimic both the frequency of volume of storm water flows to the river to those occurring under the pre-existing natural condition. The surface water drainage control system for the GCLF is designed to accommodate a 100-year, 24-hour storm event run-off volumes and the volume of water caused by a simultaneous rupture of the existing Pipeline 1 and 2 and the future Pipeline 6. Section C.2.8 contains information on the interim and final drainage control features.

The drainage control system for the GCLF will consist of a variety of treatment BMP's, which may include perimeter drainage systems for the open channels (for

C.2 PROPOSED DISPOSAL SITE DESIGN FEATURES

C.2.1 INTRODUCTION

A description of the GCLF's disposal site design features is included in the following sections. The long-term development of the GCLF includes construction of a 183-acre refuse footprint. The three relocated SDG&E transmission lines are located along the eastern edge of the refuse footprint. The groundwater protection system for the GCLF refuse footprint will include a subdrain system, a composite liner system, an LCRS, and a protective layer. The GCLF will also be constructed with an interim and final surface water control system, as well as environmental control/monitoring systems. The GCLF will also be capped with a final cover system designed in accordance with applicable regulatory requirements. The proposed final closure design features and post-closure maintenance activities were developed in accordance with 27 CCR and are included in Parts E and F of this JTD.

All of the engineering plans reflecting the landfill are conceptual in nature and subject to change. The composite liner system design, which is a component of the overall waste containment system, exceeds the prescriptive standard design criteria specified in 40 CFR, 258.40. As required by 27 CCR, Section 21760, detailed as-built plans and quality assurance reports of the containment system will be prepared and submitted to the RWQCB, upon completion of containment system construction for each area of development.

C.2.2 EXCAVATION PLANS

C.2.2.1 GENERAL DESCRIPTION

In order to maximize site capacity, development of the GCLF refuse disposal area will include the mass excavation of a substantial volume of native materials. The excavation plan shown on Figure 12 presents final subgrade contours and limits of excavation. The overall interior slope gradient will be 2:1 and the flatter bottom areas will have a minimum gradient of 5 percent. As discussed in the following sections, once the excavation is complete, a subdrain system, composite liner system and LCRS will be installed. As noted earlier, the landfill

C.2.5.4 LCRS DESIGN

Due to the relatively flat grade along the base liner system, a minimum one foot thick gravel layer will be installed over the majority of the bottom liner areas. In addition, the bottom base gravel blanket will host perforated LCRS lateral collectors and mainline pipes that will lead to the leachate outfall. The outfall pipe will discharge to two 10,000-gallon leachate collection storage tanks located in the southwest corner of the ancillary facilities. The LCRS pipes will be placed in V-shaped gravel trenches constructed within the top of the liner system. To minimize the potential for clogging, bio-fouling and piping, 85 percent of the gravel will be larger than the diameter of the perforations in the pipe. The bottom area LCRS gravel pack will be overlain by geotextile fabric to prevent clogging of gravel from the operations layer soil material.

Details of the pipe designs will be prepared prior to construction of the individual landfill phases. Based on preliminary analysis, it is anticipated that an HDPE pipe with a six-inch inside diameter and a sidewall to diameter ratio (SDR) of 11 will be adequate to carry the anticipated liquid volume and resist crushing under the anticipated refuse loads.

Regulations require that the LCRS layer extend up the side slopes of the excavation. However, a 12-inch thick gravel layer will not be constructed on slope because it could not be kept stable. Rather, the LCRS design for those areas with a slope gradient of 5:1 or steeper will consist of a permeable drainage gravel pack surrounded or wrapped with a geotextile fabric placed over the liner at the toe of the interior cut slope benches. Any leachate contacting the slopes will flow along the operations layer/refuse-interface to the bench collectors. Slotted HDPE pipe will be placed in the gravel pack to allow for liquid collection and distribution to the LCRS mainlines (see Figure 15).

Annual testing methods and procedures for the performance of the LCRS are discussed in Section B.5.1.1.2.

C.2.8.3.2 PERIMETER STORM DRAIN (PSD) SYSTEM

The PSD system will consist of a reinforced concrete trapezoidal drainage channels placed around (outside) the refuse footprint. A portion of the eastern channel will be constructed during the initial construction phase (Phase I) to accommodate flows from the upper eastern slopes of the canyon. Earthen berms will also be used to divert run-on from adjacent slopes and the up-canyon areas of the undisturbed footprint into the perimeter storm drains. Construction of a portion of the western perimeter channel along the lower portion of the canyon will be installed concurrent with the initial construction phase (Phase I) to divert run-on from the east facing slopes, west of the footprint.. The PSD channels will be completed moving up canyon as the landfill is developed. The PSD is intended to control run-on (from adjacent areas to the landfill) that might otherwise flow onto the landfill. The stormwaters conveyed by the PSD system will discharge into percolation areas at approximately the same discharge point as the eastern and western desilting basins, located near the ancillary facilities. Energy dissipaters will be utilized to match pre-development flow velocities. A PSD detail is shown on Figure 19.

The western perimeter trapezoidal channel crosses the existing First San Diego Aqueduct easement as it flows to its discharge point. At this location, the perimeter channel will have a cut-off wall on the upstream and downstream side of the crossing to prevent water from undermining the aqueduct. The crossing will be reinforced with extra concrete and steel.

C.2.8.3.3 OTHER STORM DRAIN FACILITIES

Intermediate deck drains and downdrains will be required, extended and upgraded as waste filling progresses, or as required, to satisfy the ultimate design presented in the final drainage plan.

Drainage from the facilities area will be directed into a bio-swale located to the west of the facilities area with structural media filtration at the end of the bio-swale prior to discharge, as shown in Attachment B, Figure 1 of the SWPPP in Appendix D and in Figures 3 and 4 of the Evaluation of Hydrogeomorphology and Potential Beneficial Uses at Gregory Canyon in Appendix I-1. Drainage from the main landfill access road and landfill access road bridge will be to bio-swales located on the east and west sides of the road and bridge, with structural media filtration. The location of these facilities is shown in Attachment B, Figure 1 of the SWPPP in Appendix D and in Figures 3 and 4 of the Evaluation of Hydrogeomorphology and Potential Beneficial Uses at Gregory Canyon in Appendix I-1.

C.2.8.3.4 STORMWATER DESILTING BASIN

The primary function of a desilting basin is to collect and store sediment before it can be transported offsite. However, desilting basins are passive systems that rely on settling soil particles out of the water in a finite time period, and are not 100 percent efficient in entrapping sediment. Therefore, desilting basins are typically only designed to function as a secondary system to help minimize transport of sediment offsite. The primary erosion control measures are BMPs which are designed to control sediment transport at the source. The use of BMPs and their use throughout disposal operations are discussed in Section C.2.8.3.5, below.

When designing desilting basins, the capacity is based on the potential volume of silt generated from the contributing watershed area which is determined based on the Universal Soil Loss Equation (USLE). One of the coefficients in the USLE is an empirical value that is a summation of individual storm products of the kinetic energy of rainfall, in hundreds of foot-tons per acre, and the maximum rainfall intensity, in inches per hour of all significant storms on an average annual basis. As discussed above, the GCLF is designed to include two separate drainage control systems, one to handle storm water flows from surrounding areas and undisturbed areas within the refuse footprint, and the second to handle run-off from the disturbed areas within the refuse footprint. Therefore, only flows from the disturbed areas within the refuse footprint would be directed to the desilting basins, dramatically reducing silt potential.

The 10-year, 6-hour rainfall data along with a 0.02mm particle size was used to calculate the efficiency of the desilting basins pursuant to the California Storm Water Best Management Practice Handbook (2009). As presented in Appendix I, the post-development flows for the GCLF are less than the pre-development flows for the 100-year, 24-hour storm. No attenuation of the peak flows are required, thus, the basins are sized to reduce the downstream sediment loading. The 0.02mm entrapment particle size was based on site conditions. These factors were considered acceptable by the RWQCB as the project design basis. Utilizing this particle size, the calculated efficiency of the basins would be approximately 75 acres of disturbed landfill area at any given time over the life of the project. The results of the basin efficiency calculations are included in Appendix J. The following design criteria/parameters were utilized:

- maximum disturbed acreage for three particle sizes of 0.01, 0.02, and 0.05 mm;
- the Rational Method Hydrology Computer Model run for the 10-year, 6-hour storm event;
- Table 8.1 of the Erosion and Sediment Control Handbook showing settling velocities for various grain sizes; and
- ACOE information.

The 0.02mm grain size and resulting calculations are considered to be conservative because the excavated side slope areas will consist primarily of hard rock and will contribute very little if any sediment to the basins.

The desilting basins will be located just east and west of the ancillary facilities (see Figure 17). The grading plans for the eastern and western desilting basins are shown on Figure 20. The desilting basins are intended to control the amount of silt ultimately discharged from the landfill as well as the rate of discharge. The basins are designed to settle out material in the coarse silt range and will not retain water. Table 9B presents some of the characteristics of the desilting basins.

The eastern desilting basin and western desilting basin will outlet to percolation areas shown in Attachment B, Figure 1 of the SWPPP in Appendix D and in Figures 3 and 4 of the Evaluation of Hydrogeomorphology and Potential Beneficial Uses at Gregory Canyon in Appendix I-1. However, if the aqueduct easement is relocated further west and pipelines are moved west, then the western desilting basin will discharge to a pipe located at the access road crossing to reduce the number of structures crossing the aqueduct easement. The desilting basins will be constructed during initial refuse liner construction with Phase I. Also as part of Phase I, a temporary desilting basin will be constructed as shown on Figure 21.

C.2.9.2.5 DRAINAGE CONTROL DEVELOPMENT

Interim drainage control facilities will be constructed as required to control storm flows and prevent the inundation of the active face. Drainage control facilities will be placed along the interior benches above the lined slopes and direct flow into one of the perimeter channels and ultimately to the basins located at the north end the landfill. Two desiltation basins and a portion of the perimeter storm drain channels will be constructed during the Phase I development. The surface water falling directly within the Phase I footprint will be directed, via grading and downdrains, to the buried perimeter drainage pipes. All drainage control facilities will be sized to carry the water from a 24-hour, 100-year storm event and a simultaneous rupture of the existing Pipeline Nos. 1 and 2 and the future Pipeline No. 6. Hydroseeding of final fill contours will be conducted to establish native vegetation. Once an area reaches 70 percent coverage (based on pre-development conditions) then storm water flows will be diverted to the perimeter channels. Section C.2.8.3.5 presents additional detail on stormwater management.

C.2.9.2.6 LANDFILL ACCESS ROAD/MAIN HAUL ROAD/BRIDGE

The GCLF project includes construction of an access road and bridge as well as widening of SR 76 near the access road entrance. The main access road from SR 76 will be a two or three lane paved road, approximately 32 to 36 feet wide. The road will extend through the abandoned Lucio dairy to the ancillary facilities area. The access road from SR 76 to the bridge will be wide and 910 linear feet with two 12-foot travel lanes and a four-foot shoulder on each side. The access road from the bridge into the ancillary facilities will be about 985 linear feet and will be 36 feet wide, with three lanes (two travel lanes and a center lane) with a four-foot shoulder on each side. The access road will be paved with asphalt curbs.

As the access road enters the ancillary facilities area, the access road will cross over the existing First San Diego Aqueduct. Two reinforced concrete slabs will be placed at grade, one centered over each pipeline. Each slab will be approximately 28 feet wide and 64 feet in length placed on top of a layer of polystyrene. The three to four foot deep soldier beams at each end of the slab

D.2 SITE TOPOGRAPHY

D.2.1 INTRODUCTION

Topographic information is provided in the following sections as required under 27 CCR. Topographic information was obtained from an aerial survey flown in 1991 (Figure 27A). The proposed final grading plan for the landfill was prepared in accordance with 27 CCR, Sections 21090(b) and 21142(a) and is shown on Figure 9.

D.2.2 TOPOGRAPHIC SETTING

The GCLF occupies a portion of the San Luis Rey River valley and surrounding canyon, ridge, and mountain systems. Natural surface elevations on the property range from approximately 1,200 feet above mean sea level (amsl) at the head of the canyon at the south, to 300 feet amsl at the mouth of the canyon in the San Luis Rey River drainage. Much of the canyon is steep, rugged terrain containing numerous boulder outcrops on the eastern side with only a few isolated boulders on the west canyon wall. The canyon flattens somewhat at the mouth where it meets the alluvial deposits of the San Luis Rey River drainage. A prominent knoll extends into the drainage channel on the west side of the canyon mouth.

The existing slopes on the lower area of Gregory Canyon are approximately 5:1 (horizontal:vertical), becoming 2:1 at the east edge of the landfill footprint, and are 1:1 and steeper on the upper part of the eastern slope. The western flank of the canyon is defined by a rounded ridgeline, with rather uniform slopes at inclinations of 2:1 to 3:1. Topography within one mile of the site is presented on Figure 30A. Additional topographic information can be found in the Geologic, Hydrogeologic and Geotechnical Investigation Report included in Appendix C.

D.2.3 FLOODPLAIN

As required by 27 CCR, Section 21750, an operator must determine whether the facility is located within a 100-year floodplain. The proposed landfill footprint and borrow/stockpile areas are not located within the designated boundaries of a 100-year floodplain (Reference: FEMA Flood Insurance Rate Maps, June 1997) (Figure 30B). The access road/bridge would be located within the designated boundaries of the 100-year and 500-year floodplains. However, the lowest elevation of the access road/bridge would be 312.0 while the 100-year floodplain at the upstream face is 310.7 feet. Therefore, the access road/bridge is designed to be above the highest record elevation of the 100-year floodplain so that no significant flooding impacts would occur during operations. The landfill perimeter drainage network would collect all surface drainage entering onto the site. Surface water run-on would then be directed to the on-site desilting basins which will discharge to the natural drainage course and into the San Luis Rey River.

D.3 SITE CLIMATOLOGY

D.3.1 GENERAL

The climate of San Diego County can be best characterized by warm, dry weather during the summer months and cool, seasonal wet weather during the winter months. A semi-permanent, high-pressure cell located over the Pacific Ocean dominates the area. This high-pressure cell maintains clear skies for much of the year. Seasonally, summer temperatures typically average between the low 60sº and low 80sº F. Winter temperatures range between the low 40sº and low 60sº F.

D.3.2 PRECIPITATION

There are no long-term precipitation gauging stations in the vicinity of the GCLF site. Therefore, precipitation information for the site must be extrapolated from weather data available within the region with sufficient precipitation histories, generally 10 to 20 miles from the site, including gauging stations in Escondido to the south, Fallbrook to the west and Lake Henshaw to the east. The rainy season at the GCLF extends from October through April with the most significant rain events occurring December through March. A variety of factors affect the extrapolation of this data, including the distance of the station from the ocean and GCLF, elevation of the station, and local climactic and rainfall patterns. Moreover, rainfall amounts within Gregory Canyon are expected to vary, given the increase in elevation from the north to the south. Average annual rainfall within Gregory Canyon is expected to be in the range of 17.5 to 25.27 inches. Figure 28A shows the isohyetal contours for the proposed project and surrounding area in accordance with 27 CCR, Section 21750 (e)(1). Available evapotranspiration data for Escondido indicate the mean is 4.84 inches, while the minimum (2.52 inches) occurs in December and the maximum (7.33 inches) occurs in July.

A hydrologic evaluation was performed (November 2003 and October 2004) for the site to provide sizing and location information for the site's storm drain facilities. The hydrologic analysis was conducted using the Rational Method

Computer program (in accordance with the San Diego Manual Criteria) to determine the peak flows discharged from the Gregory Canyon watershed under pre-developed conditions. For computer modeling, the watershed (i.e., tributary area) was divided into six sub-basins. The model simulated a 100-year recurrence, 24-hour storm to obtain a peak discharge rate. A run-off coefficient of 0.4 was used for the pre-development analysis since the landfill and surrounding areas are currently in a natural state. The resulting peak flow rate for the pre-developed condition is approximately 765 cubic feet per second (cfs). The program also determined that the post-development peak flows from the site would be approximately 807 cfs, which is a minimal increase of 42 cfs or less than six percent over the flow rate for pre-development conditions.

The run-on and run-off control systems at the GCLF are designed to intercept and convey the calculated 24-hour, 100-year storm event water volumes to desilting basins prior to discharge into off-site natural drainage courses. For more information regarding surface water control, refer to Section C.2.8.

Additional modeling was conducted in 2008 to review and update the storm water management plan for the facility using the Unit Hydrograph Method Analysis (HEC-1). Storm water control facilities were updated to meet newer standards set forth in the RWQCB's MS-4 permit, and to prevent hydromodification impacts to the San Luis Rey River, as provided in the Storm Water Management Report (Appendix I-1) and the SWPPP (Appendix D).

D.3.3 WIND

Figure 28 shows the annual wind speed and directions as recorded at the nearest meteorological station. As indicated, predominant winds are from the west quadrant with an annual mean speed of 6.60 miles per hour (see Figure 28). Winds from the southwest and west-northwest are also common. Weather data is recorded at the McClellan-Palomar Airport.

Locally, the airflow within Gregory Canyon results from a combination of regional wind patterns, subregional land/sea breezes and local up-canyon/down-canyon flows. The land/sea breeze is primarily easterly/westerly while the canyon topography is oriented north/south. Winds within the canyon are above, the analysis indicated a static factor of safety of 1.53 if the tensile strength of the geomembrane is ignored, and 1.69 when considering the tensile strength of the LLDPE.

The seismic induced permanent displacement due to the postulated seismic exposure of the site was then calculated using the procedure described by Makdisi and Seed (1978). The procedure first requires calculation of yield acceleration (k_y), the acceleration value for which a pseudo-static analysis yields a factor of safety of 1.0. K_y was evaluated and found to be equal to 0.185g. The ratio k_y/k_{max}, where k_{max} is the maximum ground acceleration at the site (0.40g), was then calculated. The value of the estimated permanent displacement was then read from a chart developed by Makdisi and Seed normalized for the period of the waste and related to the magnitude of the earthquake event. Using this procedure, the calculated seismic-induced permanent displacement for the final cover during the postulated maximum credible earthquake at the landfill ranges from 1.7 to 5.1 inches depending on the thickness of the waste prism. Using the methods of Bray and Rathje (1998), the estimated seismic displacement under the loading of the MCE ranges from 0.5 to 3.7 inches, depending on the waste thickness. These estimated displacements are less than the commonly acceptable range of seismic displacement of 6 inches to 12 inches (Seed and Bonaparte, 1992) and would not be expected to inhibit the functional integrity of the cover. In addition, damage to the cover should be evident in post-earthquake inspection and can be easily and quickly repaired as a part of post-earthquake maintenance. The seismic-induced permanent displacement calculations for the prescriptive final cover are provided in Attachment 5 of the GLA (2003) report, included in Appendix C.

D.4.7 GEOLOGIC HAZARDS DUE TO SURFACE AND NEAR SURFACE PROCESSES

Landslides

The potential for landsliding was evaluated by WCC (1995) based on review of stereo aerial photographs and field reconnaissance study and geologic or geomorphic features characteristic of landslides were not observed in or adjacent to the landfill site. However, the natural slopes will be modified by the project and the stability of these man-made cut slopes are of potential concern.

The three most common types of cut-slope failures are block-slip failures, wedge-slip failures, and circular failures. Block-slip failures are most common in slopes that are underlain by bedrock with distinctive partings (e.g., fractures) that dip in the same direction but at a shallower angle than the cut. Wedge-slip failures occur when the bedrock has two or more partings (e.g., a weathered dike and a joint) with orientations such that their line of intersection dips at a shallow angle in the direction of the cut. Finally, circular failures develop where the substrate is loosely consolidated and comparatively homogeneous.

As stated in Section D.4.6, a stability assessment was performed using a kinematic analysis (Norrish and Wyllie, 1996), to see if movement along one or more of the main discontinuity planes is possible. The kinematic analysis shows that large-scale block-slip movement and wedge-failure are not likely given the geometry of the dominant directions of discontinuity in Gregory Canyon. However, mapping should be performed and this conclusion reevaluated as the excavation proceeds. It is also possible that small-scale, localized block falls may occur when fractures daylight the cut or where a higher density of fractures are encountered during excavation.

As previously indicated, circular failures develop where the substrate is loosely consolidated and comparatively homogeneous. All the rocks exposed at Gregory Canyon are compact and cohesive, even when weathered, so a circular failure of the cut slopes is similarly unlikely. As a result, the proposed cut slopes are anticipated to be stable and no significant impacts are anticipated.

Rockfalls

Rockfalls are abrupt movements of independent blocks of rock that become detached from steep slopes. Falling rocks can reach the base of a slope by free-falling, bouncing, rolling down the slope surface, or by some combination of the above. There is clear evidence that rockfalls have occurred at the site during mass wasting of Gregory Mountain located east of the proposed project.

A first scenario was calculated by GLA (1998) for elastic bouncing trajectories, which yield the maximum encroachment of a bouncing rock fragment into the footprint of the landfill. The encroachment distance from the edge of refuse was estimated at 300 feet, and the travel time from the top of the profile to its final resting point was estimated at 22 seconds. GLA (1998) calculated a second scenario, incorporating the more realistic condition that some of the kinetic energy of the falling rock fragment would be dampened by impact. The bouncing rock would stop within a few feet after reaching the limit of refuse with an estimated travel time of 23 seconds. The analysis of this scenario indicated that the bouncing trajectories become smaller in length and traveling height as the bouncing rock fragment moves from the medial to the lower reaches of the slope. A third scenario addressed rolling particles, and suggested that rolling rock fragments could travel as much as 360 feet onto the landfill if unchecked.

Based on this analysis, construction of a "catching" wall or other diversion structure near the edge of the landfill is recommended to effectively mitigate the risk of rock fragments rolling onto the landfill. Rockfall trajectories can reasonably be expected to be even shallower and shorter for profiles with gentler slopes. The conclusions reached through the analysis of this profile are of general application throughout the eastern slope of the landfill site. Siting and design of any rockfall mitigation structure(s) will be performed during the design of the eastern perimeter storm drain channel, and may consist of flexible barriers, drapery or anchored mesh systems. Details as to the design of these systems will be included in the design report required prior to construction of the drainage facilities. Figure 36 shows typical rockfall protection designs.

Debris flows

Earth, mud, and debris flows form when a mass of unconsolidated sediment is mobilized by sudden ground vibration (e.g., an earthquake) or by a sudden increase in weight and pore water pressure (e.g., after soaking of the soil by heavy rains). The initial movement of a flow is enhanced by steep topography and deforestation, but once mobilized flows can spread over gently sloping terrain.

Debris flows cannot be forecasted, but the susceptibility for formation of debris flows on any given site can be estimated by looking for evidence of previous flow events. GLA (1998) reviewed aerial photographs of the site, and concluded that there is a deposit of poorly-sorted colluvium that could have been formed as a debris flow deposit (Figure 29). The deposit forms a landform with a rough lobate shape and comparatively steep boundaries, but lacks levees or pressure ridges, and so could also have been formed by erosion of an older colluvial fan.

The natural development of vegetation will reduce potential debris flow hazards. Special precautions such as diversion structures near the upper reaches would need to be taken if vegetation is destroyed. The diversion structures should be built so as to be permeable, allowing almost free draining of runoff, but should capture high viscosity earth-, mud- or debris.

E.3.5 FIRE AND/OR EXPLOSIONS

The following procedures will be followed during incidents of fire and/or explosions:

- Contact the appropriate fire protection agency, with the San Diego County Fire Authority, of which the GCLF is within the sphere of influence, or the County of San Diego, to provide fire protection, even if on-site capabilities are deemed adequate to extinguish fires or control future explosions. On-site landfill personnel will be instructed to follow the fire department's directions and give their full cooperation.
- In the event of an off-site fire near the landfill, such as a structural fire, the operator will lend its personnel and equipment, if available, to the Fire Department to fight the fire.

E.3.6 FLOOD

The landfill footprint and borrow/stockpile areas are not located within the designated boundaries of a 100-year floodplain. The access road/bridge would be located within the designated boundaries of the 100-year and 500-year floodplains. However, the lowest elevation of the access road/bridge would be 312.0 while the 100-year floodplain at the upstream is 310.7 feet. Therefore, the access road/bridge is designed to be above the highest record elevation of the 100-year floodplain so that no significant flooding impacts would occur during operations. The landfill perimeter drainage network would collect all surface drainage flowing toward the landfill footprint.

The following procedures will be followed if flood waters occur at the GCLF in excess of the handling capability of the stormwater control system:

- Earthen berms may be constructed in areas prone to flooding.
- If berming is ineffective, the operator may cut a diversion channel to avoid inundation of the refuse cell.
- Sand bags may be used in conjunction with berms or diversion channels.