Report of Disposal Site Information/ Report of Waste Discharge/Preliminary Final Closure and Post-Closure Maintenance Plan: *CCR Title 27*

Joint Technical Document for Eastlake Sanitary Landfill, Clearlake, California

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01214263.09 | July 30, 2018

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PROFESSIONAL CERTIFICATION

Eastlake Sanitary Landfill County of Lake, California

This Updated Report of Disposal Site Information/Report of Waste Discharge/Preliminary Closure and Post-Closure Maintenance Plan (Joint Technical Document) for the County of Lake's Eastlake Sanitary Landfill, dated July 30, 2018, was prepared by or under the direct supervision of the individuals below and in accordance with CCR Title 27 Section 21585 and 21590 requirements. Information contained in this document, including design plans, fill sequencing plans, operating criteria, waste handling provisions, and preliminary final closure plans, was provided by others and to the best of our knowledge is true, accurate, and complete.

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LIST OF ACRONYMS

APCD	Lake County Air Pollution Control District
ADC	Alternate Daily Cover
APN	Assessor Parcel Number
BMP	Best Management Practice
CalRecycle	California Department of Resources Recycling and Recovery
CAT	Caterpillar
CCL	Constituent Concentration Limits
CCR	California Code of Regulations
CGS	California Geological Survey
CEQA	California Environmental Quality Act
CIWMB	California Integrated Waste Management Board (now CalRecycle)
COC	Constituents of Concern
CQA	Construction Quality Assurance
CRT	Cathode-ray tube
FEMA	Federal Emergency Management Agency
CARB	California Air Resources Board
CY	Cubic Yard
GCL	Geosynthetic Clay Liner
GCCS	Landfill Gas Collection and Control System
HDPE	High-Density Polyethylene
HHW	Household Hazardous Waste
JTD	Joint Technical Document
LCRS	Leachate Collection and Recovery System
LEA	Local Enforcement Agency
LFG	Landfill Gas
MMBtu	Million British Thermal Units
MPE	Maximum Probable Earthquake
MRP	Monitoring and Reporting Program
MSL	Mean Sea Level
MSW	Municipal Solid Waste
MW	Monitoring Well
NMOC	Non-Methane Organic Compounds

NOI	Notice of Intent
NSPS	New Source Performance Standards
OVA	Organic Vapor Analyzer
PCP	Preliminary Closure Plan
PCPCMP	Preliminary Closure and Post-Closure Maintenance Plan
PPCMP	Preliminary Post-Closure Maintenance Plan
PHGA	Peak Horizontal Ground Acceleration
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RDSI	Report of Disposal Site Information
ROWD	Report of Waste Discharge
RWQCB	Regional Water Quality Control
SMS	State Minimum Standards
SSM	Start-Up, Shutdown and Malfunction
SWFP	Solid Waste Facility Permit
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TPD	Tons Per Day
TPH-d	Total Petroleum Hydrocarbons as Diesel
TPY	Tons Per Year
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WDR	Waste Discharge Requirements

INTRODUCTION AND REGULATORY CONTEXT

27 CCR §21585, §21590, §21600 & §21710

This Report of Disposal Site Information (RDSI)/Report of Waste Discharge (ROWD)/Preliminary Closure and Post-Closure Maintenance Plan (Joint Technical Document, or JTD) for the Eastlake Sanitary Landfill (ESL) has been prepared in response to the request of the Central Valley Regional Water Quality Control Board (RWQCB), in a letter dated May 14, 2018, requiring an update to the ROWD per Water Code Section 13260. This JTD will be used to support revision of existing Waste Discharge Requirements (WDR) Order No. R5-2006-0108 for the Eastlake Sanitary Landfill (ESL), located in Clearlake, California. Provided herein is information on facility ownership, waste acceptance classification, waste management unit design and construction standards, operating criteria, waste handling, environmental controls and permits. A Preliminary Closure and Post-Closure Maintenance Plan (PCPCMP) for the landfill is also included in this JTD.

Landfills in California primarily are regulated by two state agencies: the State Water Resources Control Board (SWRCB) and its nine RWQCBs, and the California Department of Resources Recycling and Recovery (CalRecycle), formerly the California Integrated Waste Management Board. Until 1997, these agencies administered landfill regulations embodied in the California Code of Regulations (CCR) Title 14 and Title 23, respectively. Title 14 required landfill owner/operators to submit an RSDI report in order for CalRecycle to issue a solid waste facility permit. Title 23 required landfill owner/operators to submit an ROWD to the RWQCB in order for that agency to issue or revise the landfill WDRs.

In 1997, state regulations became effective that required the agencies to eliminate overlap, develop a streamlined permitting process, and consolidate landfill regulatory requirements. The requirements of CCR Title 14 and 23 were combined into one set of regulations and now embodied in CCR Title 27 (27 CCR). Among other things, the RDSI and ROWD are now submitted as a JTD.

The purpose of this JTD is to provide relevant information required by state and local agencies with jurisdiction over waste disposal at the ESL. RWQCB review and approval of this JTD (ROWD, Title 27 §21710) is required by WDR Order No. R5-2006-0108 Provision E.24 for submittal by July 30, 2018. Additionally, this JTD will be provided to CalRecycle for information and review.

This JTD specifically includes information and has been formatted in accordance with requirements embodied in CCR Title 27 for JTD reports. As required in §21590(c), a JTD Index cross-referencing CalRecycle requirements with the contents of this document is included in *Appendix A*. A similar index cross-referencing SWRCB requirements for the JTD is also provided in *Appendix A*, as required in §28585 and §20240 et seq.

Revised WDRs may be issued by the RWQCB as a general five-year update. Also, a revised Solid Waste Facility Permit (SWFP) may be issued by CalRecycle as a general five-year update. Requested minor modifications to the existing WDR Order No. R5-2006-0108, Monitoring and Reporting Program (MRP) Order No. R5-2006-0108, and existing SWFP for Facility No. 17-AA-0001 are described in detail herein and listed as follows:

LANDFILL OPERATIONS AND PERMIT CONDITIONS

This JTD has been also prepared in response to the Central Valley RWQCB letter dated May 14, 2018 requiring an update to the ROWD per Water Code Section 13260. The RWQCB specifically requested a summary of changes/improvements made at the Site since the adoption of the current WDRs.

No major changes are proposed to the current waste management unit(s) design or containment features, permitted daily tonnage, waste throughput limits or types of materials accepted, landfill footprint/waste management unit boundary areas, final grades, hours of operation, ultimate designed airspace capacity, or closure/postclosure maintenance provisions as part of this JTD. Nor are there any currently proposed changes within the next five- to ten-year timeframe that could impact water quality or public safety such as changes in wastes streams, new waste diversion processes (i.e., composting), or construction/operation of new landfill cells. However, there have been some facility improvements and operational changes since the last ROWD/JTD was issued, which are described herein. They include:

- Discharge of non-hazardous ash and wildfire debris to the lined Area II cell. This was necessary as part of emergency response and clean up to protect property and public safety as a result of the Valley, Rocky, Jerusalem, Clayton, Pawnee and Sulphur Fires (2015-18). The County applied for and received: (1) an emergency waiver of State Minimum Standards (SMS) for solid waste, as administered by the Lake County Health Services Department (Local Enforcement Agency, or LEA); and (2) a conditional waiver of WDRs for receipt of disaster-related wastes during a state of emergency. The County reserves the right to apply for future waivers, if emergency conditions warrant, in accordance with these agency programs.
- Installation and operation of a landfill gas (LFG) collection and control system (GCCS). The GCCS has been in operation since 2014. The GCCS was designed and is operated to protect public health and safety and to control subsurface combustible gas migration and landfill surface emissions. Monitoring, maintenance and reporting programs related to LFG control and GCCS have been put into effect under regulatory and permit conditions administered by the Lake County Air Quality Management District (AQMD) and the LEA.
- Implementation of an Evaluation Monitoring Program (EMP) and Site investigation and water quality monitoring programs in response to Cleanup and Abatement (CAO) R5-2015-0713, issued by the RWQCB, related to the release of volatile organic compounds (VOCs) to groundwater. Additional groundwater monitoring wells have been installed, and updated monitoring and sampling protocols are now in effect. In May 2018, the County submitted a work plan with a proposed remediation strategy for VOC control to the RWQCB. The County is committed to executing this plan in accordance with RWQCB conditions of approval.

This JTD assembled by SCS Engineers (SCS) on behalf of the County is based on landfill design and operation plans provided by the County. Specific information provided by the County includes background information and reports in support of waste management unit classification and siting; site topographic survey; landfill operating criteria; waste handling provisions; and preliminary final closure design plans. SCS independently estimated remaining airspace volume and site life, and previously prepared preliminary closure and postclosure cost estimates.

Note: The County is *considering* future expansion of the Eastlake Landfill to meet long-term community public service and waste disposal needs. However, this effort is in the early planning stages and no formal plans have been developed or subjected to environmental review under the California Environmental Quality Act (CEQA) as of this writing. The County will provide an amended or updated JTD at a later date, with any proposed changes related to landfill expansion as appropriate. Please know that new information on Site conditions (geology, hydrogeology, etc.) developed as part of the County's work related to Facility siting, screening and preliminary design/planning for landfill expansion, has been included in this JTD/ROWD as applicable.

1.0 GENERAL INFORMATION

1.1 FACILITY OVERVIEW

§21600(b)(1)(A)

The Eastlake Sanitary Landfill is operated under permits issued to the County of Lake Department of Public Services, 333 Second Street, Lakeport, CA 95453. Actual day to day operation of the site is conducted by County of Lake Department of Public Services. The facility is located on land owned by the County of Lake at 16015 Davis Avenue, Clearlake, CA. The location of the site is shown on *Figure 1*. The Eastlake Landfill is a Class III municipal solid waste (MSW) disposal facility as defined by 27 CCR Section 20200 and 23 CCR 2530-31.

Operation of this site as a sanitary landfill began in 1972. Prior to 1972, a legal burn dump was operated on a southern portion of the same property where the facility is located. Sometime around 1975, solid waste was placed in the upper end of the canyon and associated burn debris was removed from the lower canyon and disposed within the limits of the existing waste management unit (WMU). Eastlake Landfill is a typical canyon fill.

The original site development and operations plan described a fill in the entire canyon, proceeding from the upper end of the canyon down toward the lower end in four overlapping phases to the southern property boundary. A Periodic Site Review (PSR) written in 1988 recommended continuation of the original design and operation plan and predicted a remaining site life of forty-six years or until 2034. Federal Resource Conservation and Recovery Act (RCRA) Subtitle D and subsequent California regulations made the proposed design impractical. In 1993, the County's plans to fill into areas down the canyon to the south property boundary were abandoned. Permitted but previously unfilled areas on the west facing slope of the east ridge were recommended as a Subtitle D expansion area with a liner system. In 1998 the County's contract engineer submitted a plan for lateral expansion with a complete Subtitle D liner system. A permit revision for the project was approved by the California Integrated Waste Management Board (now CalRecycle) and the RWQCB.

The legal boundary and permitted disposal area acreage for the Landfill are encompasses approximately 80 acres and 34.7 acres, respectively. The balance of the property provides a buffer zone around operations with the largest portion on the western half of the property. The County also owns an additional approximately 100 acres northeast and south of the Landfill property. These additional parcels are not included in the permitted facility boundary.

Other site infrastructure and ancillary features include a paved two-lane access road from the landfill entrance to the scalehouse and "bagdump" areas, perimeter drainage control facilities, scalehouse and scale facilities, restroom building, bagdump facility, Recycling and Buy Back Center (privately operated under contract to the County); "Hazmat" building, equipment shop, and 2,500-gallon potable water tank. These features are shown on the site plan in *Figure 2*.

1.1.1 Description of the Operations Cycle

§21600(b)(1)(A)

The ESL is operated in accordance with 27 CCR requirements for waste placement, compaction, cover, and environmental controls. Detailed descriptions of waste receipt and handling, spreading and compacting, daily and intermediate cover placement, fill sequencing and salvage activities are provided in *Sections 5.10*, *6.1* through *6.3*, and *7.2* of this JTD.

The site is operated using the area fill method of landfill operations. Wastes are placed over discrete modules, and compacted and covered at the end of each day using on-site soils. Cover soil is obtained from within the site boundaries and is used to cover in-place compacted waste slopes and unloading surfaces that are not going to be filled over on the next operating day.

1.1.2 Existing Site Permits and Orders

The ESL has several permits that cover the landfill operation. The landfill is operated in accordance with the following other permits and requirements:

Department of Resources Recycling and Recovery (formerly California Integrated Waste Management Board)	SWFP #17-AA-0001
California Regional Water Quality Control Board, Central Valley Region	Waste Discharge Requirements R5-2006-0108 Cleanup and Abatement Order R5-2015-0713
Lake County Air Quality Management District	Authority to Construct 85-035 Designated Non-Major Stationary Source – Permit to Operate #P/O 2003-11
CalRecycle	Tire Program Identification #1103316-01
CAL EPA Department of Toxic Substances	USEPA Generator ID #CAH111000085
US - EPA - NPDES	Storm Water Permit
State Water Resources Control Board	WDID Permit #5817S014858
County of Lake	No permit required; General Plan Conformance Finding

Copies of the current permits are presented in *Appendix B*.

1.2 SITE PLAN

§21600(b)(1)(B); (§21750(d)(1)

Operation of this site as a sanitary landfill began in 1972. Prior to 1972, a legal burn dump was operated on a southern portion of the same property where the facility is located. Sometime around 1975, solid waste was placed in the upper end of the canyon and associated burn debris was removed from the lower canyon and disposed within the limits of the existing waste management unit (WMU). ESL is a typical canyon fill. The earliest available pre-disposal topography of the site in 1976 is shown in *Appendix C*.

The current waste management unit (WMU) submitted and approved by both regulatory agencies in 1998 is configured with two (2) contiguous disposal areas, identified herein as Area I and Area II. Area I represents the original disposal area that encompasses approximately 22.4 acres. As outlined above, disposal in this area commenced in 1975. Area I, which is unlined, is equipped with a leachate collection and removal system (LCRS) that conveys collected leachate to a Class II surface

impoundment located along the southern toe of the WMU. Area II, in turn, borders Area I to the south-southeast and encompasses approximately 12.3 acres. This area was developed in two (2) phases, with Module 1 (6.5 acres) being constructed in 1999, followed by Module 2 (4.8 acres) in 2003. In essence, both of these modules are completed within the same canyon, with Module 1 comprising the lower portion of Area II and Module 2 comprising the upper portion. Both Modules 1 and 2 are equipped with a composite base liner system and leachate collection system that meets the requirements of the Federal Subtitle D regulations (CFR, Parts 257 and 258) and 27 CCR Regulations.

As part of the design submitted and approved in 1998, Areas I and II have maximum elevations of 1,780 feet above mean sea level (MSL). Area III will consist of additional fill placement to elevations that cover both Areas I and II up to a maximum permitted height of 1,860 feet above MSL. Since the time the design was originally approved, construction and slope modifications have decreased the maximum achievable fill elevation to 1,827 above MSL. Additional information on landfill containment features is provided in Section 4 of this JTD.

A site plan is shown on Figure 2. A site map with facility boundaries, as well the boundaries of the permitted and final limits of the waste management unit (WMU) and the boundaries of the existing limits of the landfill, are shown on *Figure 2* and in *Appendix C*. Final Grading and Drainage Plans are shown in *Appendix C* and *Appendix D.* Fill placement plans are included under *Section 4.6.1*.

In addition to the WMU components described above, the Landfill is also equipped with a number of improvements and ancillary facilities in support of the site operations and materials management. These improvements, which are illustrated in *Figure 2*, include the following:

- Paved two-lane access road from the landfill entrance to the scalehouse and bagdump areas.
- Perimeter drainage control facilities.
- Dedicated borrow source area for daily soil cover (used only when the alternative daily cover (ADC) tarp is not being deployed).
- Scalehouse and scale facilities.
- Restroom building (masonry block construction with concrete slab) Bagdump facility.
- Recycling and Buy Back Center (operated by South Lake Refuse Company, LLC under contract to the County).
- Hazmat building (pre-engineered steel building), used for materials storage.
- Equipment shop (pre-engineered steel building).
- 2,500-gallon potable water tank.
- Leachate, unsaturated zone, groundwater and perimeter landfill gas (LFG) monitoring points.
- LFG collection and control system (GCCS), with the gas blower/flare station located at the north end of the site near the scalehouse.

1.3 HOURS OF OPERATION

§21600(b)(1)(C)

Hours the facility are in operation are 7:30 a.m. to 4:00 p.m., 7 days per week, except for 12 legal holidays or any other holiday declared by the Board of Supervisors pursuant to State law. The facility is operated 353 days per year. Public hours at the Eastlake Landfill for waste receipt are 7:30 a.m. to 3:00 p.m. The facility is open for limited hours for waste receipt from commercial franchise haulers on some holidays from 7:30 a.m. to 12:00 noon. On occasion, at the request of the Sheriff's office or as a result of an emergency situation, the hours may be extended with the approval of the Public Services Director to allow emergency debris removal or disposal of confiscated marijuana loads.

2.0 WASTE CLASSIFICATIONS AND MANAGEMENT

§21600(b)(2); §20200

2.1 WASTE TYPES

§20200(d); §21600(b)(2)(A); §21740

The landfill is permitted by the RWQCB as a Class III waste management unit. Under this designation, the waste types are accepted for disposal are as follows.

2.1.1 Non-Hazardous Waste

Eastlake Landfill receives mixed municipal wastes and construction/demolition debris. Customers with source-separated brush, yard waste and clean wood waste are directed to the recycling center, operated under contract by Southlake Refuse Company LLC, and located just inside the landfill gate. Other source-separated recyclable materials such as scrap metal, cardboard, paper, beverage containers, and other acceptable packaging are received and diverted for recycling at the recycling center.

Treated wood waste and non-friable asbestos have been added to the materials list for disposal with the approval of the CalRecycle and RWQCB.

2.1.2 High Liquid Content

§20200(d)(3)

Liquids or semi-solid waste (i.e. waste containing less than 50 percent solids, by weight), other than dewatered water treatment sludge, is not accepted. No sewage treatment sludge or septic tank wastewater is accepted.

2.1.3 Designated Waste

Designated waste is not accepted at the ESL.

2.1.4 Hazardous Waste

§20870

No hazardous waste is accepted for disposal. Pursuant to the Solid Waste Handling and Recycling Services Agreement, Southlake Refuse's recycling yard operations accepts lead-acid batteries, household batteries, appliances, cathode ray tubes (CRTs) and used oil which cannot be disposed in the landfill. Any other hazardous waste discovered that is not accepted at the recycling yard is stored in the Hazmat building on site until the next mobile collection date.

2.1.5 Medical Waste

§20880

No medical waste, unless treated and deemed to be solid waste, is accepted for disposal at the site. County staff has received training on how to recognize treated medical waste and what is not acceptable.

2.1.6 Dead Animals

§20890

The County Code does not allow dead animals to be accepted for disposal at the site except during emergencies as approved by the Public Services Director and the LEA.

2.1.7 Asbestos-Containing Waste

No friable asbestos-containing wastes (ACW) are accepted. Non-friable asbestos materials are accepted.

2.1.8 Motor Vehicles, Boats, and Trailers

No motor vehicles are accepted. Mobile homes, camper shells, boats, and trailers are accepted as long as all motors, appliances, and fuel tanks are removed. Tires also must be removed from mobile homes and trailers prior to disposal.

2.1.9 Fire Debris and Ash

Between 2015 and 2018, there were devastating wildfires in Lake County and surrounding areas. These fires included the Rocky, Jerusalem, Valley, Clayton, and Sulphur fires. A State of Emergency was declared by Governor of the State of California. Emergency response and cleanup was required to protect property and public safety. To allow for safe and proper disposal of waste and debris created in those wildfires, the County applied for and received:

- An emergency waiver of SMS for solid waste handling and disposal, as administered by the Lake County Health Services Department (Local Enforcement Agency, or LEA).
- A conditional waiver of WDRs for disaster-related wastes during a state of emergency within the Central Valley RWQCB.

Emergency waivers for disposal of waste associated with the above fires can be found in the Solid Waste Information System (SWIS) database for the ESL.

2.1.9.1 Emergency Waiver of State Minimum Standards

14CCR§17210.5

The SMS emergency waivers were approved by the Local Enforcement Agency (LEA) and suspended the daily landfill tonnage, vehicle limits, operating hours and the types of wastes accepted at the Eastlake Landfill, including fire-related debris. As part of the conditions of approval, and in accordance with CCR Title 14, Section 17210.5, the County has reported the following information to the LEA during these periods for the Eastlake Landfill:

- The daily amount of disaster debris received, diverted, and disposed at the facility.
- The jurisdiction of origin for the disaster debris received at the facility.
- The increase in tonnage or volume of waste received per day during the effective period of the activated waiver.
- The facilities used to process the disaster debris (Eastlake Landfill).

2.1.9.2 Conditional Waiver of Waste Discharge Requirements

Central Valley RWQCB Order No. R5-2013-0026 is a blanket order that allows conditional waiver of WDR requirements for discharging waste from clean-up of disaster-related debris from wildfires, floods, storms, and earthquakes. It applies throughout the entire Central Valley Region. The Order specifically waives the requirement for submittal of an ROWD when a State of Emergency is proclaimed. The County of Lake submitted a Notice of Intent (NOI) to comply with the terms of the Order and to allow disposal of wildfire related non-recyclable ash, debris and soils at the Eastlake Landfill. Wastes and debris were discharged only in the lined area of the site (Area II – with engineered composite liner and leachate collection and recovery system, or LCRS), as identified in the NOI.

The material changes in discharge undertaken by the County in response to management of wildfire debris have included the following, as specified in Order No. R5-2013-0026:

- Designation of a separate tipping area for disposal of fire-related debris, separate from the MSW tipping area.
- Creation of a temporary surface impoundment for the fire-debris discharge area, plumbed to the leachate pond.
- Wastes such as paint cans, solvents, household cleaners, electronic wastes and refrigerators, or potentially hazardous wastes other than ash were removed from the waste stream to the extent practical and transported to appropriately-licensed disposal facilities.

Per the conditions of the NOI, this ROWD/JTD submittal includes a completed Notice of Termination (NOT) form (*Appendix B, RWQCB Permits*) with information on the waste types accepted, location of discharge, and approximate volumes discharged in response to the Sulphur Fire event.

2.1.9.3 Other Waste Requiring Special Handling

Drop-off/Buyback Center

Pursuant to the Solid Waste Handling and Recycling Services Agreement, executed in 2015, Southlake Refuse operates a drop- off/buyback center just inside the outer gate of the Eastlake Landfill. The hours of operation are the same as public hours of operation for the landfill. The facility accepts recyclable materials and bulky items including appliances, green waste, e-waste, metals, used oil, and freon.

Bagdump Refuse

Small-quantity self-haul customers are provided the opportunity to dispose bagged refuse into dumpsters (roll off bins) immediately past the gatehouse instead of going to the tipping area. A grade break is provided by a Z-wall structure that allows customers to top- load directly into the bins, from

behind safety barriers. Accumulated waste and debris are transported to the landfill work face for disposal by County crews.

Non-Friable Asbestos

Small loads of non-friable asbestos are accepted by appointment.

Treated Wood Waste

The facility meets the requirements and has approval of the LEA and RWQCB to accept treated wood waste in its lined area.

2.2 CURRENT WASTE DISPOSAL RATES AND WASTE TYPES

§20200(c); §21600(b)(2)(A); §21740

27 CCR §21600(b)(2)(A) requires a description of current average daily tonnage and peak daily waste flows, as well as a 5-year projected waste flow.

The bulk of tonnage is determined with the use of scales, while small self-haul loads are measured by volume and/or count. The conversion factor for volume is 250 pounds per cubic yard based on extensive studies conducted at the Lakeport Transfer Station where total volume was compared to actual tons delivered by transfer station trucks. Additional studies of franchise hauler loads delivered to the landfill support the 250-pound conversion factor for loose loads and 750 pounds for compacted loads. These conversion factors are used for franchise hauler loads delivered on limited holiday hours when the scale may not be attended. Overall approximately 85% of tonnage received is weighed, while 15% of refuse received is converted from volume to tonnage.

The landfill is currently permitted for an average daily throughput of 200 tons per day (tpd) where the daily average is calculated weekly. Prior to the wildfires, the waste disposal rate at the Site was approximately 65,000 tons per year (tpy) (184 tpd). This total included approximately 20,000 tpy (57 tpd) that was imported from Mendocino County under a contract arrangement with the franchise hauler serving that area. The Mendocino County waste import contract terminated at the end of year 2016. Seasonal averages can fluctuate dramatically with less waste in the winter and more waste in the summer and construction months. Actual daily tonnage can near 200 tons during the heaviest periods.

As a result of fire debris and ash cleanup resulting from the 2015-2018 fires (Rocky, Jerusalem, Valley, Clayton, Sulphur, Pawnee), the amount of waste received at the ESL from 2015 to the first half of 2018 increased 150% to 340% over previous years. This additional waste was accepted under emergency waivers, and is not reflective of normal disposal rates defined in the SWFP.

Annual MSW disposal rates at the ESL for years 2013 through 2017 are provided below in *Table 1*. Based on information provided by the County, the disposal rates shown exclude source-separated recyclable materials deliveries to the landfill. The disposal tonnages are based on reported tonnages at the gate, recorded recycled tonnage, and resulting disposal rate. These rates include ash and fire debris.

Table 1. Waste Disposal Rates: Eastlake Sanitary Landfill

Year	Disposal Rate, Tons/year	Disposal Rate, Average Tons/day
2013	65,589	186
2014	64,403	182
2015	219,205[1]	621
2016	163,554[1]	463
2017	97,950[1]	277

[1] Includes ash and fire debris.

Over the 5-year period of 2013 through 2017, the average disposal rate ranged from 182 to 621 tpd, when the site was accepting ash and fire debris. This is based on the site operating 7 days per week, 353 days per year.

There have been no exceedances of the 200-tpd permitted maximum tonnage limit since the SWFP was issued in August, 1998, with the exception of the emergency waivers granted to allow disposal of ash and fire debris on 2015 and 2017-18. The current permitted 200-tpd peak is anticipated to be adequate for the next 5+ years.

Waste types that are typically received for disposal at the ESL include the following:

- *Commercial Waste* includes: office wastes - paper and plastic; restaurant wastes; manufacturing business wastes - non-recyclable papers, plastics and metals; and other amounts of paper, non-recyclable cardboard, wood construction debris, metals, and landscaping discards generated by public and commercial establishments.
- *Construction & Demolition Wastes* - construction related customer's wastes that include common building material wastes such as wood, metal, concrete, sheetrock, roofing material, and soil.
- *Roll-off box debris* includes: construction industry discards - wood, metal, paper, and plastic; residential and commercial clean-up materials; and other commercial enterprise generated wastes.
- *Self-hauled wastes* include home, garage and yard clean-up materials; contractor debris; and bulky items - couches, chairs, mattresses; and household garbage.
- *Treated Wood Waste* is permitted for acceptance and disposal at the ESL. The treated wood waste material is not placed in the wood waste stockpile which is recycled. This waste is landfilled the same day it is received. Customers having wood wastes are asked about contents of loads especially for treated wood waste in order to direct the customer to the proper location for waste unloading. Gate attendants will also observe the loads suspected of having treated wood waste. A log of estimated quantity of treated wood waste is recorded at the gate for future use in reporting to the California Department of Toxic Substances Control.

- Asbestos wastes delivered in required bags are acceptable as previously approved and included in the landfill's WDR's.

2.3 PROJECTED WASTE DISPOSAL RATES

§21600(b)(2)(A) and 21740(A)(1)

Prior to the wildfires, the waste disposal rate at the Site was approximately 65,000 tpy, excluding contributions from wildfire debris. This total included approximately 20,000 tpy that was imported from Mendocino County under a contract arrangement with the franchise hauler serving that area. The Mendocino County waste import contract terminated at the end of year 2016.

For purposes of estimating remaining site life, SCS assumed the baseline disposal rate (excluding fire debris), is between 40,000 ypy and 50,000 tpy over the next 5 years. The waste disposal rate is assumed to increase proportionally with population/economic growth forecasts, at 1.3% per year. This is the mid-range between actual population growth in Lake County over the period 2000-2015, and the Lake County General Plan forecast for years 2015-2030 (Matrix Design Group/Minter & Associates, September 2008). This growth rate was used as a basis for estimating future waste disposal rates, starting with a base of 40,000 tpy in 2017.

No change in the current site permit conditions for daily peak tonnage or annual tonnage ceiling appears to be necessary. *Table 2* presents the projected annual and average daily disposal rates for the period of 2018 through 2023.

Table 2. Projected Annual and Average Daily Disposal Rates, Eastlake Sanitary Landfill

Year	Projected Annual Tonnage	Projected Average Daily Disposal Rate Tons/day
2018	40,000	113
2019	40,520	115
2020	41,050	116
2021	41,580	118
2022	42,120	119
2023	42,670	121

Actual waste disposal rates may vary due to changes in population, housing, or economic conditions, recycling and waste diversion efforts, natural disasters, or other factors.

The peak daily disposal rate is forecasted to be 200 tpd. The peak daily disposal rate will accommodate special events, seasonal fluctuations due to construction or tourist activities, and other factors.

2.4 PROJECTED TRAFFIC VOLUME

§21600(b)(2)(A) and 21740(A)(1)

Traffic counts are anticipated to continue to increase proportionally as the service area grows. No change in the current site permit conditions for peak daily traffic appears to be necessary. *Table 3* presents the projected peak and average daily traffic count for the period of 2013 through 2018.

Table 3. Average Traffic Volume, Eastlake Sanitary Landfill

Year	Peak Vehicle Traffic, Vehicles/day	Average Daily Traffic, Vehicles/day
2013	46,094	128
2014	45,715	125
2015	62,589	173
2016	59,704	165
2017	56,704	157
2018	31,362	174[1]

[1] Based on approximately 6 months of 2018.

Vehicle traffic rates will vary based on time of the week, time of year, and special events. Vehicle traffic was dramatically impacted by ash and fire debris disposal associated with the fires of 2015-2018. Traffic counts during and after these events are not representative of permitted conditions, and exceedance beyond the permitted 300 vehicles per day were waived as part of the emergency waivers.

3.0 WASTE MANAGEMENT UNIT CLASSIFICATION AND SITING

§21600(b)(3)

3.1 WASTE MANAGEMENT UNIT CLASSIFICATION

§20200(d); §20240; §20260; §21600(b)(3)

The ESL is classified as a Class III waste management unit. Classification of a Class III landfill is based on the following site characteristics:

- Geologic setting is sufficient to ensure no impairment of beneficial uses of surface water or groundwater beneath or adjacent to the landfill. Factors to evaluate include: landfill's size; hydraulic conductivity and transmissivity of underlying soils; depth to groundwater and variations in depth to groundwater; background quality of groundwater; current and anticipated use of groundwater; and, annual precipitation.
- Not located in a 100-year floodplain or wetland.
- Not subject on or within 200-feet of a Holocene fault.
- The waste management unit's containment structure are designed, constructed and maintained to preclude failure due to rapid geologic change.

The waste types allowed to be discharged at a Class III landfill, per Title 27 §20220, are generally limited to "Nonhazardous Solid Waste," defined as: "all putrescible and non-putrescible solid, semi-solid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction waste, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semi-solid wastes and other discarded waste (whether of solid or semi-solid consistency); provided that such wastes do not contain waste which must be managed as hazardous wastes, or wastes which contain pollutants in concentrations which exceed applicable water quality objectives, or could cause degradation of water of the state (i.e., designated waste)."

3.2 AIRPORT SAFETY

§20270(e) and §21600(b)(3)(A)

Per 27 CCR §20270(e), existing MSW landfill units and lateral expansions located within 10,000 feet of any airport runway used by turbojet aircraft or within 5,000 feet of any airport runway used by only piston-type aircraft must demonstrate that the units are designed and constructed so as not to pose a bird hazard to aircraft.

The Lampson Field Airport is located approximately 15.6 miles (approximately 82,400 feet) west of the ESL. There are no new landfill waste management units or lateral expansions planned at this time that would be within 5,000 feet of an airport runway. The ESL meet the above siting requirements.

3.3 FLOODPLAINS

§20260(c), §21500(b)(4)(A) and §21750(d)

Per 27 CCR §20260(c), Class III landfills must be designed, constructed, operated and maintained to prevent inundation or washout due to floods with a 100-year return period. Similar requirements are embodied in federal Subtitle D regulations (40 CFR Part 258.11 (a)). Based on a review of Federal Emergency Management Agency (FEMA) flood insurance maps, as shown on *Figure 3*, the ESL is not located within a 100-year floodplain zone (SHN, 2015). The landfill is situated in a canyon area and is topographically elevated above the surrounding area. Thus the facility is consistent with state and federal floodplain siting criteria.

3.4 FAULT LOCATION

§20164 and §20260(e)

Per 27 CCR regulations, new Class III landfills or expansions of existing facilities shall not be located on a known Holocene fault. Based on the most recent available data and field investigation, no active or potentially active faults are reported to be present within the boundaries of the project site (SHN, 2018). Additional information on regional faulting and seismicity is provided in *Section 4.3* of this JTD.

3.5 GROUNDWATER OCCURRENCE

§20240(c)

27 CCR §20240(c) and federal Subtitle D regulations require that disposal facilities be sited, designed, constructed and operated to ensure that solid waste will be a minimum of five (5) feet above the highest anticipated elevation of underlying groundwater.

Landfill Area I (22.4 acres, unlined) was constructed and initially operated in 1975, long before 27 CCR and Subtitle D regulations became effective. The County estimates that the lowest elevation of MSW placement in Area I is at approximately 1,600 feet above MSL, in the lower reaches of the canyon fill. Groundwater elevations have been mapped at elevations ranging between 1,700 feet MSL at the northern end of the site (upper end of the canyon), to 1,575 feet above MSL near at the southern end of the landfill (SHN, 2018).

Landfill Area II, Module 1 was constructed with a groundwater underdrain system below the engineered composite base liner system. The underdrain system was designed as an engineered alternative to provide the required 5-foot separation between highest anticipated groundwater and waste.

Further details on hydrogeologic conditions are provided in Section 4.4 of this JTD.

3.6 VOLUMETRIC CAPACITY

§21600(b)(3)(B)

On behalf of the County, estimates of remaining airspace capacity and site life were prepared by SCS (2018). Estimates of remaining airspace capacity were made using AutoDesk Civil 3D software. Quantity take-off comparisons were made between: (1) existing grades (January 31, 2018 aerial topographic survey); (2) the final grading plan (EBA Engineering, July 2005, modified as described

herein (*Appendix D*); and (3) airspace consumed between the May 10, 2016 topography and the January 31, 2018 topography.

Between May 10, 2016 and January 31, 2018, approximately 205,050 cubic yards of airspace was consumed. During this period, approximately 214,372 tons of landfilled refuse was received, resulting in an effective density of 2,091 lb/cubic yard. This estimate is significantly higher than the landfill industry norm and likely accounts for the placement of wildfire debris (with high moisture, ash, and soil content). This high apparent density may also be the result of settlement of the 2016 landfill surface and the amount of compactive effort applied.

Taking into account airspace to be consumed by daily, intermediate, and final cover soil, it is estimated that approximately 659,200 cubic yards useable airspace capacity airspace remains, projected as of January 31, 2018. Details on the remaining capacity estimates are provided in *Appendix D.*

3.7 SITE LIFE ESTIMATES

§21600(b)(3)(C)

Forecasts of remaining site life were prepared using the remaining airspace estimate above, and assuming future disposal rates could range between 40,000 to 50,000 tpy, with the upper end of the range being conservative and used for planning purposes. Remaining site life is expected to be exhausted between approximately January 2024 and May 2025 for 50,000 tpy and 40,000 tpy disposal rates, respectively. Details are provided in *Appendix D*.

3.8 SITE LOCATION

§21600(b)(3)(D)

Eastlake Landfill is located in the County of Lake at 16015 Davis Street, Clearlake, CA 95422, along the eastern edge of the City of Clearlake. The location of the site is shown on *Figure 1*.

The Eastlake Landfill latitude and longitude are 38E, 57' N and 122E, 36' S and the property is located in the southern one-quarter of Section 23 and the northern half of Section 26 of Township13 North, Range 7 West, Mount Diablo Baseline and Meridian (MDB&M). Access to the Eastlake Landfill is from Davis Street via 40th Avenue, off of State Highway 53 in Clearlake, as shown on *Figure 2*.

The facility's approximate 35-acre permitted disposal area is located on Assessor's Parcel Numbers (APN) 10-008-030 and 10-053-130. The entire permitted facility of approximately 80 acres incorporates the additional parcels of 010-008-390, 041-224-40, 041-234-270, and 041-244-180. These parcels include a number of smaller parcels that were acquired in 1993 or earlier and have been merged into larger parcels. The County also owns additional adjacent property that is not included in the permitted boundaries of the facility, but provides additional buffer zones, including APN 010-053-120, a 23.35-acre parcel northeast of the facility, and 010-008-410, a 77.20-acre parcel south of the facility. *Table 4* presents parcels owned by the County. Parcel locations are shown on *Figure 4.*

Table 4. Eastlake Landfill Parcel Listing

Assessor Parcel Number	Area (Acres)	Owner	Jurisdiction	Current Use
041-224-400	23.3	Lake Co.	City of Clearlake	Landfill entrance road, Recycle Center, Maintenance/Hazmat Buildings
041-234-270	9.19	Lake Co.	City of Clearlake	Landfill Area 1 fill slope; Class II surface impoundment access
041-244-180	1.43	Lake Co.	City of Clearlake	Vacant; surface impoundment access
010-053-120 (See Note 1)	23.4	Lake Co.	Unincorp. Lake County	Vacant
010-053-130	18.1	Lake Co.	Unincorp. Lake County	Landfill Area 1; access road; landfill gas blower/flare station
010-008-030	40.0	Lake Co.	Unincorp. Lake County	Landfill Area 1 and 2; soil borrow area; access road and scale house; public drop-off (Z-wall structure); Class II surface impoundment
010-008-390	5.0	Lake Co.	Unincorp. Lake County	Class II surface impoundment
010-008-410 (See Note 1)	58.4	Lake Co.	Unincorp. Lake County	Vacant
010-008-350 (See Note 2)	40.0	BLM	Unincorp. Lake County/Federal	Vacant; easement for scale house

[1] County-owned property not part of current permitted Site boundary.

[2] BLM owned property.

3.9 SURROUNDING LAND AND GROUNDWATER USE

§21600(b)(4)(A); (§21750(b)(3)(E)

3.9.1 Surrounding Land Use

§21790(b)(2)

In accordance with 27CCR§21790(b)(2), *Figure 4* provides an aerial photograph which shows the locations of off-site structures within 1,000 feet of the property boundary. The boundary of the Waste Management Unit (WMU) is surrounded by approximately 45 acres of buffer zone property. *Figure 5* shows land use within a one-mile radius of the facility and includes residential, commercial, agricultural and open space. Further details regarding zoning designations and general land use on the adjoining properties are provided below.

- Properties west and southwest of the Landfill are comprised primarily of residential developments. These properties are zoned as Single Family Residential (R-1), which allows for single family houses of wood frame, manufactured or prefabricated.
- A portion of the land generally located northwest of the Landfill is zoned Neighborhood Commercial (C-1). This designation allows for personal services, offices, and other commercial uses. A larger and more significant portion of the land is designated as Resource Protection (RP). The purpose of the RP designation is to allow development in environmentally sensitive areas compatible with the environmental constraints of these parcels.
- The remaining adjoining properties to the north, east and south are comprised of unincorporated lands of the County that include the following zoning designations: Unclassified (U); Open Space (OS), Planned Development Commercial (PDC); Rural Lands (RL); and Agriculture Preserve (APZ). The United States Department of the Interior, Bureau of Land Management owns the land east of the Landfill. A portion of the BLM parcel was acquired in 2000 as a right-of-way to accommodate the location of the gatehouse and access road construction. The County owns the 77.2-acre parcel to the south of the facility.

3.9.2 Groundwater Use

The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply. Groundwater use in the area of the Eastlake Sanitary Landfill is not known to occur. Residences in proximity to the ESL are on domestic potable water provided by the City of Clearlake (SHN, 2018). Per the WDRs, there are 2 water supply wells within one mile of the ESL.

3.9.3 End Use

The proposed plan for the postclosure land use of ESL is to maintain the facility as non-irrigated open space.

3.10 ANCILLARY FACILITIES AND ON-SITE WATER USE

§21600(b)(3)(F); (§21750(h)

The landfill is equipped with other ancillary facilities in support of site operations and materials management. These ancillary facilities, which are illustrated in *Figure 2,* include the following:

- Perimeter drainage facilities.
- Dedicated borrow source area for daily soil cover (used only when the alternative daily cover (ADC) tarp is not being deployed).
- Scalehouse and scale facilities.
- Restroom building (masonry block construction with concrete slab).
- Bagdump facility.
- Recycling and Buy Back Center.
- Hazmat building (pre-engineered steel building).

- Equipment shop (pre-engineered steel building).
- Leachate, unsaturated zone, groundwater and perimeter landfill gas (LFG) monitoring points.
- 2,500-gallon potable water tank (galvanized steel).
- GCCS blower/flare station.

On-Site Water Use. Water (potable) is supplied by the City of Clearlake via a pump house at the bottom of Davis Street. Water is pumped line to a 1,000-gallon on-site holding tank. Water is supplied to three different buildings: the haz-mat building with two sinks, eye wash station and bathroom; the brick storage building with a sink and bathroom; and the gate house with sink, bathroom and filtered drinking water station. There is also a hose connection at the recycling yard.

Domestic wastewater is collected in septic tanks and discharged to leachfields located west of the gate house building and south of the haz-mat building.

3.11 WASTE MANAGEMENT UNIT CHARACTERISTICS

The ESL waste management unit (WMU) contains two facilities; a Class III landfill unit for waste disposal, and a Class II surface impoundment unit for leachate collection. Both units are classified by the Central Valley RWQCB in the current WDR Order No. R5-2006-0108.

3.11.1 Impairment Potential

§21750(a); §20400(b)

Under CCR 27 §21750 (a), an analysis is required describing how waters of the state could be affected if waste escapes from the unit. The RWQCB uses this information to determine the suitability of the WMU with respect to groundwater protection and avoidance of geologic hazards and to demonstrate it meets the classification criteria (in this case, Class III landfill).

Environmental controls at the ESL include:

- Composite-lined base liner and LCRS for Area 2.
- Interim cover materials to promote runoff, reduce erosion, and reduce infiltration into refuse fill.
- Interim drainage control system.
- Leachate collection and control system operation.
- Landfill gas collection and control system, including perimeter soil vapor extraction wells.

Municipal waste landfills can potentially affect groundwater through either leachate release or migration of LFG or gas condensate into the aquifer. In order for leachate to affect groundwater, it must migrate via gravity through the landfill containment systems, underlying vadose zone and into the saturated zone. Leachate seeps through interim cover can potentially come into contact with surface water. Leachate impacts to groundwater or surface water can include the presence of volatile organic compounds (VOCs), semi-volatile organic compounds, and increased concentrations of metals and minerals. LFG may affect groundwater by diffusion if gas migrates through the vadose zone and into the saturated zone. Gas impacts to groundwater can include increased VOCs, and changes in inorganic water chemistry due to contact with carbon dioxide and methane in the gas.

The County has implemented groundwater, leachate, vadose zone and surface water monitoring programs in accordance with WDR Order No. R5-2006-0108 and CAO R5-2015-0713. Water quality monitoring results are transmitted to the RWQCB on a semi-annual basis.

The CAO was issued based on detections of VOCs in groundwater. The presence of these compounds is thought to have been caused by the interaction of LFG with groundwater, in particular via subsurface gas migration from the unlined Area 1 portion of the landfill along its western perimeter. The VOC detections are most likely from LFG not captured by the existing GCCS. This conclusion is based on an Engineering Feasibility Study performed by the County under RWQCB oversight (SHN, September 2017). The County subsequently submitted a corrective action work plan to the RWQCB, for upgrading the GCCS to enhance VOC capture. As of this writing RWQCB review is pending.

3.11.2 Proposed Classification

§21750(b)

The ESL is currently classified as a Class III landfill with a Class II surface impoundment. Per WDR Order No. R5-2006- 0108, the landfill has sufficient site characteristics to meet this classification. It is not proposed to change the current landfill classification.

4.0 DESIGN AND CONSTRUCTION STANDARDS

§20310; §21600(b)(4); & §21760

The design reports and plans, which are part of the existing documentation that the current operating permits are based on, provide descriptions of facility design criteria and features. The design reports include but are not limited to:

These documents provide descriptions of liners and waste containment systems, leachate collection and removal systems, and precipitations and drainage control facilities. While the older reports provide a basis for landfill design consistent with past regulations, the more recent design reports are reflective of ESL operations under Title 27 standards. A discussion of the ESL design and construction standards as permitted are contained in the following subsections.

4.1 GENERAL DESIGN PARAMETERS

§21600(b)(4)(A)

An overview of how the site design accommodates different factors regarding this site is presented here. This information was developed by a registered civil engineer as required by the regulations.

4.2 CLIMATE

§21750(e)

The annual average rainfall for the city of Clearlake is 31.5 inches (US Climate Data, 2018). The mean pan evaporation is 60 inches per year. The ESL is not located in the 100-year flood zone (Figure 3). Evaluation of a 100-year 24-hour storm event for ESL is estimated as 6.98 inches of rain, with a 90% confidence interval (NOAA, 2018).

4.3 GEOLOGY

§20260; §21750(f)

A detailed description of the site geology is provided in this JTD, and in the WDR Order No. R5-2006-0108 background information issued by the RWQCB (December 5, 2008). The following narrative provides a summary of site geology based on the above documents and on other sources as cited (SHN, March 2018).

4.3.1 Regional Geology

The geologic sequence of the region consists predominantly of the Tertiary-age Cache Formation, which is unconformably underlain by bedrock of the Franciscan Formation. The Cache Formation generally consists of a thick sequence of poorly sorted gravel, silt, clay and sand. Locally occurring lenses of silty sand to clayey silts are located throughout the Cache Formation. At the site, the Franciscan bedrock is primarily comprised of a fractured, weathered fine to medium grained sandstone with some occurrences of siltstone.

4.3.2 Site Geology

Published geologic mapping and reports in the immediate vicinity of the ESL compiled by SHN (SHN, March 2018) indicates that the local basement rock consists of unnamed upper Cretaceous age sandstone. North of the site, Franciscan Complex bedrock composed of pervasively sheared and fractured metamorphosed sandstone, chert, and basalt is present. Bedrock encountered during drilling activities consists of predominantly fractured and weathered sandstone, with Interbedded shale. These materials are consistent with the type of material found in the Great Valley sequence.

Late Tertiary age Cache formation is overlying the basement rocks and is visible in localized outcrops at the site. The Cache formation consists of freshwater sediments comprised of coarse gravel, sand, silt, and clay, and basal strata of poorly sorted gravel with sand and silt, deposited in an alluvial environment. The slope of the contact between the Cache formation and the basement rock is toward the south at a moderately steep angle based on drill data. A southward dipping contact is consistent with the topography and a south-southwest groundwater gradient determined for the site. A site geologic and geomorphic map is shown on *Figure 6*.

4.3.3 Fault Identification and Proximity

Active faults are defined as faults that have had surface displacement in the Holocene epoch (in the past 11,000 years) based on CCR Division 2, Title 14, also known as the Alquist-Priolo Earthquake Fault Zoning Act (A-P Act). Potentially active faults are defined by the A-P Act as faults showing surface displacement during mid to late Quaternary time (about 1.6 million years before present) that have a relatively high potential for ground rupture. In general, Quaternary faults that do not record evidence of Holocene surface displacement are not considered as being active by the State of California. A Holocene fault map is shown on *Figure 7*.

4.3.4 Regional and Local Faults

Based on the most recent available data, no active or potentially active faults are reported to be present within the boundaries of the project site (SHN, March 2018) The Eastlake Landfill is not located within an A-P Earthquake Fault Hazard Zone (CDMG, 1982; CDMG, 1983; Jennings, 2010). Regional active faults within about 50 miles of the Eastlake Landfill include the Konocti Bay fault zone, Big Valley fault, Hunting Creek-Berryessa fault, the north section of the Maacama fault zone, San Andreas fault, Bartlett Springs fault (Bryant and Hart, 2007) and Great Valley 03 Mysterious Ridge blind thrust fault (United States Geological Survey [USGS] and California Geological Survey [CGS], 2018).

Hearn and others (1976) mapped the Clear Lake area in detail and depict an extremely complex pattern of faults (Hearn and others, 1995). From their mapping, they concluded that the Clear Lake area fits a system of deformation related to northwest-directed right-lateral strike-slip faulting that has locally been overprinted by features related to Quaternary volcanism. Subsequent researchers (Herd, 1982) suggested that faults in the Clear Lake area are primarily related to caldera subsidence and formation of the Clear Lake basin. SHN therefore interprets the identified local bedrock faults to be a product of earlier geologic processes which are no longer active in the areas proximal to the Eastlake Landfill.

The nearest Holocene age fault to the Eastlake Landfill is the seismically active Konocti Bay fault zone located 5 miles to the southwest at its closest point to the site (*Figure 7*). The Konocti Bay fault zone is comprised of multiple discontinuous fault segments that strike north-northwest to north-northeast and are located south and east of Mt. Konocti (CDMG, 1982; CDMG, 1983). The fault zone

ranges in width from about 1,500 feet to 10,000 feet. Readily evident displacements identified from field reconnaissance and aerial photographic analysis is mainly normal. Geomorphic features suggestive of Holocene activity such as backfacing scarps, sidehill benches, deflected drainages, and offset ridges are abundant along the principal northwest-trending faults. Focal-plane solutions from historic seismicity attributed to the Konocti Bay fault zone indicate strike-slip motion to be the primary fault mechanism at depth. Holocene age faulting is further attested to by the presence of a fault lineament beneath Konocti Bay, which is marked by a prominent line of gaseous springs that records displacement recent enough to have produced a 1-meter-high scarp preserved in the lake bottom sediments.

Table 5 summarizes the maximum probable earthquake (MPE) associated with regional active faults located within 25 miles of the site (SHN March 2018). The MPE is the design earthquake for Class III landfills, is typically defined as the maximum earthquake likely to occur in a 100-year period, and shall not be less than the maximum historical event. As shown in *Table 5*, the MPE for the listed faults in proximity to the Eastlake Landfill are capable of generating estimated peak horizontal ground accelerations (PHGA) of up to 0.7 g at the site (USGS, 2013).

Table 5. Summary of Active Faults in Proximity to Eastlake Sanitary Landfill

Fault Name	Style of Faulting	Distance from Landfill		MPE[2] Magnitude (M_w)[3]	MPE PHGA[4] (g)[5]
		Miles	Km[1]		
Konocti Bay Fault Zone	Strike-slip	5	8	unknown	0.55
Hunting Creek- Berryessa Fault Zone	Strike-slip	10	17	6.9	0.46
Great Valley 03 Mysterious Ridge	Reverse	15	24	7	0.56
Maacama	Strike-slip	23	37	7.1	<0.7
Bartlett Springs	Strike-slip	23	37	7.1	<0.7

[1] km: kilometers.

[2] MPE: maximum probable earthquake.

[3] Mw: moment magnitude.

[4] PHGA: peak horizontal ground acceleration.

[5] g: acceleration due to gravity.

4.4 HYDROGEOLOGY

§21750(g)

4.4.1 Site Groundwater Hydrology/Aquifer Characteristics

In the ESL site area, the primary aquifer unit is the permeable Cache formation and an upper fracture zone of the basement rock. Surface water infiltrates the weakly cemented and poorly consolidated sediments of the relatively permeable Cache formation, and migrates downward until encountering the less permeable basement rock. Due to weathering and fracturing in the upper

sections of the basement rock, a small percentage of the groundwater infiltrates into fractures in the bedrock. However, the contact between the Cache formation and underlying basement rock appears to act largely as a perching layer, which results in flow parallel to the contact beneath site (SHN, March 2018).

The permeability of the Cache formation is estimated to range between 1 x 10^{-4} centimeters per second (cm/sec) and 1 x 10^{-5} cm/sec (SHN, 1994). The permeability of the underlying basement rock has not been determined by laboratory testing, but is expected to be much less permeable due to its greater age, and greater degree of consolidation and cementation compared to that of the overlying Cache formation. Groundwater movement through planar discontinuities in the basement rock is evidenced by the presence of translocated clay within fractures (SHN, 1994). This suggests that groundwater in the Cache formation and the top of the underlying bedrock is hydraulically connected across a majority of the ESL.

For the purposes of this report, the "upper water bearing zone" is considered to be the Cache formation and the upper weathered portion of the basement rock. Groundwater elevations measured in site wells appear to reflect the presence of an open and unconfined aquifer, further indicating that the Cache formation and upper weathered bedrock section are hydraulically connected. Transmissivity in this water bearing zone is very low as demonstrated from recharge rates observed during well sampling activities. Poor recharge rates for most wells in this upper water bearing zone have required implementation of low-flow sampling methodologies in site wells.

A fracture flow analysis study was performed in January 2016 along the western boundary of ESL in open boreholes for groundwater monitoring wells MW-25 and MW-27(Norcal, 2016). Borehole geophysical logging of MW-25 extended to a depth of 140 feet below ground surface (BGS) and to a depth of 91 feet BGS in boring location MW-27. Each of these boring locations was placed adjacent to existing wells with the intent of having a deeper screen interval for a comparison of groundwater quality and depth-to-water. Well MW-25 is screened in the underlying bedrock 50 feet below the adjacent well MW-5, which is screened in the upper Cache formation. A comparison of water quality and depth-to- groundwater in these two wells shows a distinct difference, indicating separation and that the wells in this area are not hydraulically connected.

A fracture and flow analysis was completed for well MW-27 directly adjacent to well MW-26 (screened in upper zone). A comparison of water quality and depth-to-water in these two wells shows that this nested well pair is hydraulically connected at depths within the upper formation and the underlying fractured bedrock. Borehole geophysical logging identified a significant fracture zone at the 89 to 91 foot BGS depth in MW-27, which exhibited a high rate of transmissivity. This is the only boring location at ESL that has shown a high rate of groundwater flow.

The movement of groundwater through the native material is directed to the south-southwest with a gradient range from approximately 0.04 to 0.07 feet per foot (ft/ft). Most of the wells at the facility have been monitored for more than 20 years with historical depth-to-groundwater in wells ranging from 15 to 100 feet BGS. Groundwater depth is significantly greater on the ridges based on historical site monitoring observations. Seasonal variations in groundwater elevation beneath the site have been observed to vary up to 15 feet in some wells. Groundwater movement across the site has remained relatively consistent over historical site monitoring. Groundwater contour maps for two monitoring events completed in 2018 are shown on *Figure 8 (SHN, 2018)*.

Groundwater use in the area of the ESL is not known to occur. There is agriculture land use within 1/2-mile of the facility (upgradient) and residences in proximity to ESL are on domestic potable water provided by the City of Clearlake.

4.4.2 Groundwater Monitoring and Quality

§20400(b); §20405; §20415(b-e); §20420

Groundwater monitoring at the ESL is conducted in accordance with the WDRs and MRP No. R5-2006-0108, issued by the RWQCB. The well network is comprised of 33 monitoring wells that include background wells MW-3, MW-9a, and MW-9b; detection wells MW-1, MW-2, MW-5, through MW-8, and MW-11 through MW-32, and evaluation monitoring wells MW10 through MW13, as shown in *Table 6*. Well locations are shown on *Figure 9*. Wells are monitored for depth-to-water on a quarterly basis and sampled for water quality semiannually.

Background water quality has been established at ESL through implementation of MRP No. R5-2006-0108, issued by the RWQCB. The MRP contains groundwater and surface water sampling locations that are considered background and are sampled during site monitoring events. Constituent concentration limits are established from results of background sample locations and used for comparison purposes to evaluate results from downgradient and downstream sample locations.

Groundwater at the ESL has been impacted by VOCs based on analytical results from monitoring wells primarily located along the western and southern boundary of the waste unit (MW-5, MW-10, MW-13, MW-14, MW-15, MW-16, and MW-17). A review of historical groundwater VOC data collected at the site indicates the presence of VOCs consisting of:

- Chlorinated Solvents: 1,1-dichlorethane (1,1-DCA), cis 1,2-dichloroethene (cis 1,2-DCE), chloroethane, chloromethane, vinyl chloride (VC), trichloroethene (TCE), dichlorofluoromethane, and trichlorofluoromethane.
- Petroleum Constituents: benzene, toluene, methyl tertiary-butyl ether (MTBE), tertiary-butyl alcohol (TBA), and diisopropyl ether (DIPE).

Table 6. Groundwater Monitoring Well Details Eastlake Sanitary Landfill

Sample Location	Date Installed	Top of Casing Elevation (NAVD88)[1]	Well Diameter (inches)	Screened Interval (feet BGS)[2]
MW-1	10/26/84	1,571.80	2.0	20-40
MW-3	10/26/84	1,759.26	2.0	4-44
MW-5	05/29/87	1,632.90	2.0	39-69
MW-6	05/27/87	1,626.79	2.0	19-49
MW-8	11/16/95	1,680.31	2.0	91-121
MW-9a	11/14/95	1,746.81	2.0	17-27
MW-9b	11/13/95	1,746.93	2.0	43-48
MW-10	04/11/00	1,609.80	2.0	47-67
MW-11	04/11/00	1,560.71	2.0	14-34
MW-12	08/20/01	1,548.64	2.0	22-42
MW-13	10/08/02	1,603.91	2.0	35-60

Sample Location	Date Installed	Top of Casing Elevation (NAVD88)[1]	Well Diameter (inches)	Screened Interval (feet BGS)[2]
MW-14	10/08/02	1,593.23	2.0	27-52
MW-15	10/12/06	1,654.88	2.0	60-80
MW-16	10/16/06	1,704.41	2.0	75-95
MW-17	02/18/14	1,707.01	4.0	80-110
MW-18	02/19/14	1,687.79	4.0	90-120
MW-19	02/19/14	1,668.79	4.0	56-106
MW-20	02/20/14	1,573.11	4.0	15-30
MW-21	03/16/16	1,712.42	2.0	87-119
MW-22	02/29/16	1,653.09	2.0	24-44
MW-23	02/23/16	1,590.91	2.0	24-44
MW-24	02/24/16	1,591.23	2.0	94-114
MW-25	03/02/16	1,632.51	2.0	121-141
MW-26	03/03/16	1,595.00	2.0	21-41
MW-27	03/02/16	1,594.21	2.0	81-91
MW-28	07/26/17	1,732.48	2.0	160-170
MW-29	07/11/17	1,605.01	2.0	108-118
MW-30	07/18/17	1,732.48	2.0	30-50
MW-31	07/13/17	1,630.98	2.0	25-45
MW-32	07/14/17	1,629.63	2.0	67-87

[1] NAVD88: North American Vertical Datum of 1988.

[2] BGS: below ground surface.

Most VOC concentrations recorded for groundwater samples collected from site wells are relatively stable, follow decreasing trends, or fall below standard laboratory detection limits. However, cis 1,2-DCE and benzene concentrations recorded for monitoring wells MW-5 and MW-16 are interpreted to be following increasing trends.

Due to the VOC release to groundwater, the RWQCB issued Cleanup and Abatement Order (CAO) No. R5-2015-0713 for the ESL on July 30, 2015. Through implementation of the CAO program, the vertical and horizontal delineation of the VOC plume has been completed. Corrective action to address the VOC release to groundwater has yet to be implemented at ESL.

During February and March 2016, an investigation program was conducted at the ESL as part of the CAO EMP to delineate the extent of VOCs in groundwater. The scope of work presented in the EMP work plan (SHN, January 2016) was completed to provide information needed to meet the CAO objectives and included the following activities:

- Drilling seven soil borings using air rotary methodology.
- Conducting geophysical logging of select borings for fracture analysis determination.
- Installing temporary well points (TWPs) at each soil boring location for the collection and analysis of a grab groundwater sample.
- Converting TWPs to permanent groundwater monitoring wells (MW-21 through MW-27).
- Properly developing and surveying each newly installed well.

Results of well installation and testing program were provided in the EMP well installation report, submitted to the RWQCB on April 1, 2016 (SHN, April 2016). Lateral and vertical delineation of the distal edges of the plumes appeared to be defined by groundwater data from samples collected from monitoring wells MW-6, MW-23, and MW-24, results for which were recorded at below standard detection limits. Vertical delineation of the dissolved phase plumes at monitoring well MW-5 is provided by monitoring well MW-25. Vertical delineation of the plume at monitoring wells MW-13 and MW-17 has not been established.

A well installation work plan was submitted to the RWQCB on April 28, 2017, to address data gaps identified during the EMP (SHN, April 2017). In July 2017, an additional well installation and testing program was implemented at the ESL including:

- Drilling five soil borings using air rotary methodology.
- Installing groundwater monitoring wells at each soil boring location.
- Properly developing and surveying each newly installed well (MW-28 through MW-22).
- The collection and analysis of groundwater sample from newly installed wells.

The two deep zone monitoring wells (MW-28 and MW-29) were installed adjacent to existing monitoring wells MW-13 and MW-17; an upgradient well (MW-30) was installed north of well MW- 21; and two wells were located along the southern facility boundary (MW-31 and MW-32).

Historical groundwater analytical results reported during EMP site characterization activities and historical monitoring events provide evidence of the degree to which lateral and vertical delineation of dissolved phase impacts related to site conditions has been achieved. Some ESL monitoring wells outside the areas depicted have had detectable VOCs in groundwater, but at a less frequent occurrence and concentration.

Groundwater samples collected from ESL site monitoring wells MW-5 and MW-17 continue to exhibit a majority of peak VOC concentrations, along with newly installed monitoring well MW-30 (upgradient of MW-21). Monitoring well MW-10, located approximately 175 feet west and downgradient of well MW-5, currently contains only MTBE at low concentrations. No other VOCs were identified in groundwater samples collected from monitoring wells downgradient of well MW-5 (MW-6, MW-23, and MW-24). Monitoring wells located south and downgradient of wells MW-13 and MW-14 that showed no detectable concentrations of VOCs included MW-1, MW-12, MW-20, and MW-26.

The results of deep zone groundwater samples collected from CAO study area wells showed infrequent occurrence of VOCs consisting primarily of low levels of MTBE in wells MW-25 and MW-27. The occurrence of naphthalene was identified in well MW-25 during the recent events, and cis-1,2-dichloroethene (cis-1,2-DCE) has been detected at low levels in well MW-27. No detectable concentrations of VOCs were identified in deep zone wells MW-24, MW-28, and MW-29.

Most VOC concentrations recorded for groundwater samples collected from site wells are relatively stable, follow decreasing trends, or fall below standard laboratory detection limits. However, cis 1,2-DCE, benzene, and MTBE concentrations recorded for monitoring well MW-5 are interpreted to be following increasing trends. VOCs consisting of cis-1,2-DCE and benzene also appear to be on an

increasing trend for well MW-16 overtime; however, this well has been unable to be sampled due to no water being present since Fall 2015.

The extent of groundwater monitoring wells impacted by VOCs is described as a lobate-shaped plume that extends west, north and south from the general area of wells MW-16 and MW-17 (SHN, September 2017). VOC detections are suspected to have been caused by the interaction of LFG with groundwater in the western Site perimeter.

4.4.3 Water Quality Protection Standards and Concentration Limits

§20390, §20400

The constituent concentration limits (CCLs) for groundwater are updated following each semiannual monitoring event. Concentration limits are currently calculated in accordance with MRP No. R5-2008-0108, using existing background monitoring well data to perform a parametric statistical analysis for field measurements and laboratory-analyzed constituents of concern. Calculated CCLs for inorganics and general chemistry, and methodology used to derive those CCLS are presented in the most recent semi-annual monitoring report submitted to the RWQCB (SHN, January 2018). Background monitoring well data used in the analysis ranged from April 2010 through December 2017. CCLs will be updated as required in the WDRs and as supported by future monitoring data.

Per 27 CCR *§20390(b),* If a discharger is conducting a detection monitoring program in conjunction with a corrective action program for a Unit [pursuant to §20385(c), it is understood that the RWQCB may establish separate Water Standards for each program. The County is committed to developing reasonable and prudent standards that are protective of public health and safety, in conjunction with the RWQCB, and in response to results of ongoing corrective action(s).

4.4.4 Surface Water

§20415(c)

The ESL facility is situated within a pre-existing canyon in the headwaters of Molesworth Creek, a tributary to Clear Lake. The landfill is in the Clear Lake basin near the foothills of the Coast Range. The designated beneficial uses of Clear Lake, as specified in the Basin Plan, are municipal and domestic supply; industrial service supply; agricultural supply; water contact and non-contact water recreation; spawning, reproduction, and/or early development; warm fresh water habitat; cold fresh water habitat; and wildlife habitat.

The drainage area associated with the landfill is approximately 58 acres, including the waste cell area, the borrow area, access roads, and storage areas (*Figure 2*). Specific drainage areas for the facility have been mapped into separate zones based on surface water flow, which include the possible expansion areas abutting the north edge of the currently permitted refuse area and the disturbed borrow area. A majority of the drainage from the site discharges to Molesworth Creek to the west. The northeast area of the facility drains to the unnamed tributary to Cache Creek to the south. Both creeks are ephemeral streams that primarily carry surface water in the winter and early spring months. Molesworth Creek drains into Clear Lake, near the southwestern limit of the City of Clearlake and the unnamed tributary to Cache Creek eventually reaches the Sacramento delta.

Surface water monitoring at the ESL is conducted in general accordance with MRP No. R5-2006-0108 and the Industrial General Permit (IGP) Storm Water Pollution Prevention Plan (SWPPP). The MRP surface-water monitoring is performed at a sample location in Molesworth Creek just below the leachate storage pond, a downstream location in the unnamed tributary to Cache Creek, and

upstream in the unnamed tributary that is considered representative of background surface water quality.

In accordance with the SWPPP for the site, surface water that originates outside ESL is routed around the landfill footprint. Stormwater that falls within the landfill footprint is routed through rocked culverts and downdrains to Molesworth Creek. Stormwater that infiltrates into the landfill is captured and routed to the leachate collection pond for proper disposal. Monitoring for the SWPPP is conducted at discharge locations (DLs) where surface water leaves the site.

Due to the site predominantly having sloped surfaces that can limit infiltration, increased flow during storm events may have unintended impacts to the two tributaries at ESL. Current SWPPP monitoring at discharge locations from the site show elevated levels of iron and aluminum, which are consistent with naturally occurring metals in areas of volcanic deposits. Use of the sedimentation basin located at the site borrow area is essential for controlling suspended sediment in stormwater runoff prior to discharging from the site. Removal of this site feature will result in additional flow volume to Molesworth Creek with increased levels of suspended sediment leaving ESL. The affect can also increase erosion along discharge paths to Molesworth Creek and the unnamed tributary to Cache creek.

Collected leachate is designed to gravity drain into the 600,000-gallon leachate collection pond before being discharged into the local sanitary sewer system. The primary concern for the facility runoff continues to be elevated levels of suspended sediment.

4.5 BASE LINER SYSTEM

§20310; (§20320; §20330

Area I Liner

Area I, approximately 22.4 acres, is an unlined waste management unit. The module is equipped with an LCRS that gravity-drains to the leachate pond (surface impoundment) that is located below the southern toe of the WMU.

Module I, Area II Liner

The County submitted a Report of Waste Discharge in 1998 requesting approval of an engineered alternative to liner requirements. The RWQCB approved an engineered alternative liner system design for the Area II lined Unit in previous WDRs Order No. 98-159 using geosynthetic clay liner (GCL) in place of 2 feet of compacted clay. Module 1 of Area II (approximately 6.5 acres) was constructed during 1999 and included the entire base liner system for Area II, as well as the side slopes up to the first bench. The liner system for Module 1 of Area II consists of (from top to bottom):

- 24-inch thick operations layer.
- Geocomposite LCRS drainage layer.
- 60-mil high-density polyethylene (HDPE), textured both sides.
- GCL.
- Geocomposite Subdrain Layer.
- Prepared subgrade.

Module 2, Area II Liner

The liner system design and expansion for Module 2 of Area II (approximately 4.8 acres) had been previously approved in Order No. 98-159. However, in a letter dated April 17, 2001, the Executive Officer (RWQCB) notified Owners and Operators of Solid Waste Landfills that "the Board will require a demonstration that any proposed landfill liner system to be constructed after January 1, 2002 will comply with Title 27 performance standards." As a result, the County was required to submit a liner performance demonstration for RWQCB approval.

The County submitted a liner performance demonstration report dated September 24, 2002 for Module 2 of Area II, which is entirely within the upper side-slope area of Area II. The proposed design for Module 2 is the same as the previously approved liner system design that was used for Module 1, with the exception of the subdrain layer which the County evaluated and determined was not needed in the upper portion of the side-slope area. The liner system for Module 2 consists of (from top to bottom):

- 24-inch thick operations layer.
- Geocomposite LCRS drainage layer.
- 60-mil HDPE, textured both sides.
- GCL.
- Prepared subgrade.

As part of the liner performance demonstration, Golder Associates reported having performed detailed evaluations of the performance of single-composite liner systems for slopes ranging from 3H:1V to 2H:1V. These demonstrations were completed for the Class II Altamont Landfill (Alameda County), the Class II Western Regional Landfill (Placer County) and for the Class III Neal Road Landfill (Butte County). Each of the liner performance evaluations indicated that the leakage potentials on these steep side slopes are very low ranging from 2×10^{-4} gallons per acre per day (gpad) to 2×10^{-5} gpad based on leachate generation rates ranging from 25 gpad to 60 gpad. These estimated leakage rates were reported to be considered negligible. Cost- benefit analysis further demonstrated that additional liner components added significant cost, but provided no significant increase in benefit. Based on the information presented in the liner performance demonstration report submitted by the County, the RWQCB has found that the proposed side-slope single composite liner system meets the Class III performance standard required by 27 CCR.

Module 2 of Area II (the remainder of the side slope) was constructed in 2003. This expansion is an extension of the Area II liner system up the eastern side slope of Area II. The side slope is inclined at no less than 3H:1V (horizontal to vertical).

4.6 LEACHATE COLLECTION AND REMOVAL SYSTEM

§20340

Leachate collection was implemented for Area I of the ESL in 1975 through the installation of a series of plastic pipes set at the base of the unlined Unit to collect and remove leachate. Leachate and spring water commingled at the site of the collection. A cutoff wall was constructed at the base of the unlined Unit to collect the leachate. The leachate and spring water were discharged to Molesworth Creek. In 1982, the Regional Water Board advised the Discharger that a non-compliance condition existed at the landfill with respect to the discharge of leachate to Molesworth Creek. In March 1984, the Discharger began spray discharge of the leachate on a hillside. Leachate for spray discharge was collected from the cutoff wall and from an unlined surface impoundment located below the unlined landfill Unit. This practice was discontinued in 1997 with the completion of the

600,000-gallon Class II lined surface impoundment. Leachate continues to be collected from the cutoff wall and conveyed to the Class II surface impoundment.

Module 1 and 2 of Area 2 are constructed with a geocomposite LCRS drainage layer. Leachate is collected from the LCRS and discharged to the Class II Surface Impoundment.

The 600,000-gallon Class II surface impoundment liner system consists of an 80-mil HDPE geomembrane over a geonet and gravel LCRS. The secondary liner system consists of a 40-mil HDPE geomembrane and a GCL. The surface impoundment discharges the leachate to the sanitary sewer system that drains to the Southeast Regional Wastewater Treatment Plant.

4.7 PRECIPITATION AND DRAINAGE CONTROLS

§20365

The annual average rainfall for the city of Clearlake is 31.5 inches (US Climate Data, 2018) and the ESL is not located in the 500-year flood zone ((SHN, 2018). Evaluation of a 100-year 24-hour storm event for ESL is estimated as 6.98 inches of rain, with a 90% confidence interval (NOAA, 2018). The total quantity of stormwater generated by this storm over the approximately 58-acre drainage area is estimated at 1,472,000 cubic feet (ft3) of water during a 24-hour period (SHN, 2018).

Surface water that originates outside ESL is routed around the landfill footprint. Stormwater that falls within the landfill footprint is routed through rocked culverts and downdrains to Molesworth Creek (*Figure 10*). Stormwater that infiltrates into the landfill is captured and routed to the leachate collection pond for proper disposal. Monitoring for the SWPPP is conducted at discharge locations (DLs) where surface water leaves the site.

The existing drainage system consists of HDPE and corrugated metal pipes (CMP) that route stormwater to lined and unlined ditches at the perimeter of the waste cell (*Figure 10*). The ESL is an active facility with alterations and improvements to the drainage system made as necessary. Large areas of the site consist of bare earth and repair of erosion is regularly required. These repairs are generally accomplished by earth moving, hydroseeding of eroded areas, and the addition of rock slope protection as needed. Containment berms direct runoff from the active face to the leachate collection and storage pond and is effective in keeping stormwater that comes in contact with the active face from draining offsite.

Surface water controls are described in *Section 4.4.1*.

4.8 SEISMIC DESIGN

§20370

Title 27 requires seismic design for Class III units to be based on the Maximum Probable Earthquake (MPE), or the maximum earthquake likely to happen within 100 years. A seismic analysis (*Slope Stability Evaluation, 2004*, Golder & Associates) was prepared in 2004 for design of the filling (side-slopes and benches) and closure of the landfill based on current seismic information at that time. The seismic design for the closure of the landfill has been based on a PGA with a 50% probability of being exceeded in 75 years with a resulting PGA of 0.17g. This design meets the MPE since the resulting PGA would be likely to occur within a period of 100 years (greater than 50% probability of being exceeded).

The 2004 *Slope Stability Evaluation,* prepared by Golder & Associates, maintained the 3H:1V cover grade concept, but modified the maximum achievable fill elevation to 1,827 feet msl to

accommodate actual liner grades constructed in 1999 and 2003. It modified the eastern limits of the cover to exclude the scalehouse, bagdump area and associated access road, and it incorporated a 45-foot wide access road with an 8 percent grade that would allow two-way traffic including earthmoving equipment. This report was part of the PCPMP which was approved by the RWQCB in September 2006 and by the CIWMB in February 2007. A copy of the *Slope Stability Evaluation* is included in *Appendix E.*

In 2018, additional seismic analyses were performed as part of the non-water release corrective action plan as required under 27 CCR (SHN, March 2018). The objective was to assess potential earthquake-induced damage, including liquefaction, landsliding, surface fault rupture and permanent seismic deformation for the maximum credible earthquake (MCE) or an earthquake with a 2,475-year return period. The work entailed identification of the governing MCE ground motions, and a slope stability analysis under both static and seismic conditions. Conclusions of this analysis are as follows:

- For the most critical landfill slope section(s), the minimum factor of safety (FS) was calculated to be 2.1. The accepted minimum FS is 1.5.
- Under seismic conditions, a mean permanent deformation of less than 1 inch is predicted. This estimated seismic deformation is considered tolerable with little to no anticipated damage to the landfill slope or environmental containment features.

These results indicate proposed final slope configurations are expected to remain stable under both static and seismic conditions.

Results of these seismic analyses are provided in *Appendix E* (SHN, March 2018). Other elements of the non-water release corrective action plan are addressed in *Section 12.4* of this JTD.

4.9 ENVIRONMENTAL MONITORING

§20385; §20415 (a-e)

The ESL has an active landfill gas collection and removal system in place which operates 24 hours per day, 7 days per week, 365 days per year. This system is monitored on a regular basis to assure proper performance to control perimeter and surface migration of landfill gases.

Groundwater, leachate, and surface water monitoring program is specified by the RWQCB Order No. R5-2006-0108, *Waste Discharge Requirements for Lake County Public Services Department Eastlake Sanitary Landfill: Class III Landfill, Class II Surface Impoundment, Lake County.* No changes are planned to the monitoring system except as directed and approved by the RWQCB.

The groundwater monitoring well network is comprised of 33 monitoring wells that include background wells MW-3, MW-9a, and MW-9b; and detection wells MW-1, MW-5, MW-6, MW-8, and MW-10 through MW-35. Wells are monitored for depth-to-water on a quarterly basis and sampled for water quality semiannually.

Surface water monitoring at the ESL is conducted in general accordance with MRP No. R5-2006-0108 and the IGP SWPPP. The MRP surface-water monitoring is performed at a sample location in Molesworth Creek just below the leachate storage pond, a downstream location in the unnamed tributary to Cache Creek, and upstream in the unnamed tributary that is considered representative of background surface water quality.

4.10 DESIGN RESPONSIBILITY

§21600(b)(4)(B)

The design of ESL was performed under the direct supervision of the County of Lake, Director of Public Services. The designer utilized appropriate expert advice from persons in various specialized technical fields including but not limited to soils, geology, hydrogeology, and slope stability. Implementation of the design continues to be under the direction of the Director of Public Services.

4.11 CONSTRUCTION SEQUENCE PLANS

§21600(b)(4)(C)

4.11.1 Fill Sequencing

Phase I consisted of placing fill in the unlined Area I to an elevation of approximately 1,780 feet msl until 1999, when the newly-lined Area II was ready for disposal. The lower section of Area II was initially filled (Phase I) before the upper level was lined (Phase II) for disposal use. Once Phase II fill placement reached approximately the same elevation as Phase I, Phase III fill placement commenced and covered both previously filled areas. The County is currently filling Phase III, and will continue fill placement to achieve the final elevation of 1,827 feet msl.

The final elevation of 1,827 msl resulted from the 2004 *Slope Stability Evaluation* (Golder, 2004). The design conditions of the slope stability report maintained the 3H:1V cover grade concept, but modified the maximum achievable fill elevation to 1,827 feet msl to accommodate actual liner grades constructed in 1999 and 2003. The eastern limits of the cover were modified to exclude the scalehouse, bagdump area and associated access road, and a 45-foot wide access road with an 8 percent grade was incorporated that would allow two-way traffic including earthmoving equipment. A copy of the *Slope Stability Evaluation* is included in *Appendix E.*

SCS prepared an updated fill placement plan for Phase III of Area II. This plan is shown in *Appendix F*. This plan was prepared for grade controls, and in light of recent fire debris placement, this plan was prepared to assist in providing grade control to achieve final grades. Slight modifications to previous plan (EBA, 2005) were made to enhance future drainage and fill placement (i.e., provide for drainage benches, downchutes, etc.), and to optimize remaining airspace capacity within design constraints for the landfill footprint and slope stability design conditions.

4.11.2 Soil Balance

The ESL has adequate quantities of soil available for operational and final cover from sources within the landfill boundary. If additional soil is needed, the County owns parcels adjacent to the landfill boundary that may be used for soil borrow.

4.12 LANDFILL GAS MANAGEMENT

(§21600(b)(4)(E), §20919, & §20919.5)

At the ESL, gas emissions are controlled by passive and active measures. Passive landfill gas control measures include maintaining an appropriate interim cover soil thickness over the refuse fill, proper placement and compaction of the refuse, and repair of exposed refuse areas resulting from erosion. Active measures include operation of an LFG extraction and flare system.

4.12.1 LFG Collection and Destruction System

The GCCS has been in operation since January 2014 and consists of the following components:

- Twenty-one (21) vertical LFG extraction wells, designated GW-1 through GW-21 installed in the waste fill. These wells consist of 4-inch diameter polyvinyl chloride (PVC) extraction casing, installed in 24-inch diameter boreholes to depths ranging from 30 to 90 feet below ground surface (bgs).
- Nine (9) LFG horizontal collector (HC) trenches designated HC-1 and HC-3 through HC-10, installed in the top deck (active operations) area of the waste fill. Horizontal collectors were installed in areas where additional refuse lifts exceeding 20 feet vertical elevation were anticipated. Each 3-foot deep horizontal collector trench was excavated into waste fill, backfilled with gravel and fitted with 6-inch diameter perforated LFG collection pipe. Since installation, 20 to 30 feet of refuse fill has been placed over the trenches and they remain viable LFG extraction points.
- Above- and below-grade LFG header and lateral connection lines. An 8- inch diameter "loop" header system around the Landfill perimeter is employed.
- Components associated with LFG header and connection lines such as isolation valves, butterfly valves, blind flanges, and other various components.
- Four (4) pneumatically operated LFG condensate sumps (CS-1 through CS-4). Collected liquids discharge to the surface impoundment at the toe of the south-facing fill slope face. Accumulated liquids are in turn discharged to the sanitary sewer system that drains to the Southeast Regional Wastewater Treatment Plant.
- Extraction blowers and an enclosed ground flare (Blower Flare Station, or BFS) for thermal destruction of collected LFG. The flare has a rated heat capacity of 14 million BTU/hour. There are two blowers (primary and stand-by), each rated for LFG flow of 450 standard cubic feet per minute (scfm).
- BFS mechanical and electrical systems, including gas flow metering devices and controls.
- Four (4) perimeter vapor extraction wells, designated SVE-1 through SVE-4, installed in native soil materials northwest of the Area 1, near the Site entrance. These perimeter wells were installed in 2011 as part of a remedial action plan for control of subsurface combustible gas migration at the northwestern Site perimeter. These wells consist of 4-inch diameter PVC casing, installed in 12-inch diameter boreholes to depth 40 feet bgs. Collected soil gas was initially processed through a carbon filter system. The carbon system has been dismantled and the soil vapor extraction wells are now tied into the main GCCS header. The soil vapor wells remain operational. The perimeter system was effective in controlling LFG migration and the site has remained in compliance with state requirements for subsurface combustible gas migration control since its installation.

SCS prepared a *Construction Completion Report: Landfill Gas Collection and Control System Installation* dated March 4, 2014 (*Appendix F*). A Site plan showing current GCCS layout is shown on *Figure 11* and in *Appendix F.*

The GCCS is operated in accordance with Authority to Construct (ATC) issued by the Lake County Air Quality Management District (AQMD) issued August 2013, and the following regulatory requirements:

- California Air Resources Board (CARB) Landfill Methane Rule (27 CCR Title 17, Subchapter 10, Article 4, Subarticle 4). The Rule is part of statewide regulations to

reduce greenhouse gas emissions from industrial sources, including landfills. The Rule specifically requires that measures be undertaken to limit landfill methane emissions; methane is a primary greenhouse gas. Rule compliance is administered by the AQMD.

- 27 CCR Subchapter 4, Article 6, Section 20919 for subsurface combustible gas migration control and monitoring. These requirements are administered by the LEA.

Based on operations and monitoring system data and reports to the agencies, the GCCS is currently in compliance with the above permit and regulatory requirements for subsurface combustible gas migration and LFG emissions control.

4.12.2 VOCs in Groundwater Remediation Plan

The County submitted a *Work Plan for Landfill Gas Collection and Control System Upgrades* concluding that the most effective remedial strategy will require two elements: (1) removal and control of residual volumes of LFG present in soils west of the Landfill; and (2) enhanced source control by installation of additional extraction points in the unlined Area 1 portion of the waste fill (SCS May 2018).

These recommendations are consistent with concepts presented in the *Engineering and Feasibility Study* (SHN, 2017) as approved by the RWQCB. This Work Plan is under review by the RWQCB. The County is committed to implementing the remedial measures as approved by the RWQCB.

4.12.3 Perimeter Monitoring Probes

The landfill is equipped with a perimeter LFG monitoring network consisting of eight monitoring wells. The monitoring network was designed by a certified engineering geologist of SHN Consulting Engineers & Geologists. The LFG monitoring probes were drilled by a licensed drilling contractor near the waste deposit perimeter of the site but not within the refuse. An installation plan (SHN, April 22, 2009) for the last five monitoring probes was approved by the LEA and completed in 2009 to comply with 27CCR§20925. The lateral spacing of adjacent perimeter LFG probes does not exceed 1,000 feet. Up to three LFG probes are installed in each soil boring. An appropriate seal placed between each monitoring probe screen interval was installed in the same boring. The LFG probes were designed to be installed at shallow, intermediate, and deep depths in each soil boring in relation to the maximum depth of solid waste. Since all probes must be installed above the permanent low seasonal water table, above and below perched groundwater, and above bedrock, field conditions during drilling activities ultimately determined the actual depth placement of each probe's screen interval due to site geology and hydrogeology.

The ESL is a canyon fill disposal site, and the local geology and hydrogeology of the area may prove to act as a natural barrier for LFG migration. The native material beneath the landfill is cemented material that has been fractured, thus limiting the transfer of LFG from the waste cells. The depth to groundwater at the site can vary from approximately 10 to 110 feet BGS (below ground surface), with a seasonal fluctuation of up to 15 observed feet in some wells. Consequently, each boring was drilled to the target depth of maximum waste for evaluating subsurface conditions. Where conditions allow, the bottom of the shallow probe screen interval is placed at a depth of 10 feet BGS; the intermediate LFG probe screen interval is in installed at or near half the maximum depth of the waste; and the deep probe is set at the maximum depth of the waste. LFG probes that were not able to attain the target maximum waste due to groundwater were completed with a minimum separation of 10 feet between each probe screen as approved by the LEA. *Table 7* provides a summary of LFG monitoring well installation details. Perimeter LFG monitoring wells locations are shown on *Figure 11*.

Table 7. Perimeter LFG Monitoring Well Compliance Network, Eastlake Sanitary Landfill

Well No./ Probe Depth Reference	Year Installed	Approx. Ground Surface Elevation (ft MSL)	Probe Screen Interval (ft BGS)
GP-1R Shallow Intermediate	2009	1,744	5 – 10 25 – 30
GP-2RA Shallow Intermediate	2010	1,760	5 – 10 33 – 38
GP-3RA Shallow Intermediate	2010	1,755	5 – 10 38 – 43
GP-4A Shallow	2007	1,620	5 – 10
GP-5R Shallow	2010	1,613	5 – 10
GP-6R Shallow	2010	1,570	5 – 10
GP-7 Shallow	2006	1,690	5 – 10
GP-8 Shallow	2006	1,656	5 – 10

[1] ft MSL: Feet above Mean Sea Level.

[2] ft BGS: Feet below ground surface.

The County tests for combustible gas at these monitoring points on a quarterly basis. Summary reports are provided to the LEA.

4.12.4 Structure Monitoring

§20931

Both the gatehouse and the Hazmat building are equipped with continuous monitoring systems (Scout Safe Source II Toxic and Combustible Monitoring Systems) to allow for an accurate assessment of gas accumulation. These systems have audible alarms and are also connected to an alarm service for notification of after-hour alarm activation. Monitoring frequency, reporting, and control follow the same protocol as perimeter monitoring.

4.13 CONSTRUCTION QUALITY ASSURANCE PLAN

§20323; §20324

Construction of base liner systems for any new modules (not currently proposed) and final covers will be carried out in accordance with a Construction Quality Assurance (CQA) plan certified by a registered professional (civil engineer or certified engineering geologist). The CQA Plan shall specify:

- CQA personnel qualifications, responsibility and lines of authority.
- Inspection, monitoring and testing methods to verify that construction of liners, earthen structures and drainage features is undertaken in accordance with approved design plans and specifications, accepted engineering practice and regulatory requirements.
- Laboratory testing requirements.
- Recordkeeping and reporting provisions.

Design plans and a CQA Plan will be submitted to CalRecyle and the RWQCB at least 180 days prior to construction. The CQA Plan will be approved by the agencies prior to commencement of any construction work and must be prepared by a third party.

5.0 OPERATING CRITERIA

§21600(b)(5)

5.1 RECORDS

§21600(b)(5)(A), §20510, & §20515

Vehicles disposing municipal waste are measured by volume or weight depending on the capacity of the vehicle and are charge according to the fee schedule. Volume or weight, waste origin, and material type are entered into a computer program from which information is sent by modem to the administrative office on a nightly basis except for weekends which are sent the first business day of the week. Transfer trucks are also weighed and entered into the computer program. Daily records are kept at the landfill gatehouse of the weights and volumes received. Modemed information is used weekly by the Public Services staff to calculate average daily tonnage for the Eastlake Landfill. Records of weight/volume records are permanently stored at the Public Services administrative office and are held for a minimum of 3 years.

5.1.1 Disposal Site Records

§20510(f)

Permanent operating records are maintained and are available for inspection by authorized representative of the Enforcement Agency, the local health agency, and CalRecycle during normal business hours at the Public Services administrative office located at 333 Second Street in Lakeport across the street from the courthouse. Regular hours for the Public Services office are Monday through Friday, 8:00 a.m. to 5:00 p.m. Records of waste disposal are provided to CalRecycle and posted on the agency's Solid Waste Information System (SWIS) database.

5.1.2 Landfill Unit Operating Records

§20515

The Public Services office maintains the full Operating Record of the landfill including: inspections records, training procedures, notification procedures; gas monitoring results and any remediation plans for gas control, closure and postclosure maintenance plans, costs estimates and financial assurance documentation. The LEA is notified and/or provided a copy of the information as it becomes available and is included in the operating record. Gas monitoring results are mailed quarterly to the LEA as the permit specifies. The landfill has an abbreviated copy of the operating record on site, but may not include all of the required documentation.

5.1.3 Daily Log

§20500(c)

A daily log of special or unusual occurrences for the current calendar year is kept on the facility site to document the following: any loads refused entry to the facility; fires; vectors; injuries; property damage; inspections; and other occurrences as needed. The landfill supervisor or designee completes the log. The full log is transferred to the Public Services administrative office at the end of each calendar year for required record keeping. Incidents involving injuries, damages, or emergencies are also recorded on special forms for immediate submittal to the Public Services administrative office for appropriate follow-up and/or distribution.

5.1.4 Documentation of EA Approvals, Determinations, and Requirements

§20517

Any written approvals, determinations, and requirements received from the LEA are placed in the operating record for the landfill.

5.1.5 Subsurface Records

§20510(b)

Records are kept at the Department of Public Services office at 333 Second Street in Lakeport of any excavations which may affect the safe and proper operation of the site or cause damage to adjoining properties.

5.2 SECURITY

§21600(b)(5)(B) & §20530

For security purposes, a single public and paved entry road limits access to the landfill. A heavy angle-iron steel gate is located at the entrance to the landfill, and is unlocked for public hours by staff. Just inside the entry gate is a sign visible from the gate that provides a phone number of the Public Services office in the event of an emergency. The permitted boundary of the WMU is surround by a six-foot high cyclone fence and/or topographical constraints to discourage unauthorized persons or vehicles from entering. A secondary 7-foot field fence is also on the western side of the site perimeter fence and is posted with *No Trespassing* signs to prevent access by vehicles that can cause erosion on the undeveloped western section of the property. A 6-foot chain link fence is located south of the leachate pond on the WMU perimeter to prevent ingress. A separate 8-foot chain link fence surrounds the leachate pond. The recycling center is surrounded by a cyclone fence that doubles as a portion of the perimeter fence on the west side.

At least once a week the landfill supervisor or designee inspects the perimeter site fence and leachate pond fence for breaches or damage and makes immediate repairs. Any damage to the secondary fence is repaired as time and staffing allows. Hazardous materials that are found in the tipping area are stored in the Hazmat building that is locked and has a fire and motion alarm. The scalehouse also has an alarm system to monitor for fire, motion, and noise after hours.

All permanent site personnel are provided with hand-held radios which allows for effective and immediate communication should a security issue be discovered or arise. Gate attendants can announce visitors as appropriate to the supervisor or his designee. All visitors to the landfill are required to sign in at the gatehouse and state the reason for their visit. Visitors are also required to sign out when they leave. This sign-in/out process ensures management is aware of all on-site visitors in the event of an emergency.

Emergency numbers for fire and law and other key numbers are posted in the gatehouse for quick reference. Equipment fuel and oil compartments are secured with padlocks to prevent vandalism. The cabs remain unlocked since vandals would like break the equipment windows for access. Heavy equipment is parked end to end at night for additional security. However, the equipment ignition is locked. Site fuel tanks are padlocked and fuel use is monitored.

Twenty-four-hour security cameras monitor three areas: (1) the recycling yard and entrance area; (2) the scale and gatehouse area; and (3) the weighmasters window and cash register. These cameras are capable by being remotely rotated from the gatehouse to pan adjacent areas including the

access road and Hazmat building area. Film is on a continuous loop that allows reviewing, downloading and copying of the various angles for review of customer activities in the recycling yard, on the access road, and at the scale area. Lighting at the recycling yard and scalehouse area allow night filming as well. Additional small surveillance cameras with infrared capabilities for night monitoring are hidden on site. These cameras may be moved to address any specific areas of concern. Occasionally live surveillance is provided by staff and/or law enforcement.

The Hazmat building and the equipment maintenance building have locked roll-up doors to secure the premises and content. The scalehouse and Hazmat building have monitored entry, fire, and gas monitoring alarm systems to detect after-hour access or vandalism. In the event of alarm activation, Central Dispatch and the site supervisor is notified and an employee is sent to the site to check the situation and/or allow law enforcement or fire access. Any incidents of vandalism or security issues are recorded in the supervisor's daily log and on an incident report which is sent to the administrative office. Law enforcement officials from Clearlake Police Department and/or the Sheriff's Office are contacted regarding any vandalism, illegal entry or security issues.

5.3 SANITARY FACILITIES

§21600(b)(5)(C) & §20550

A restroom with hot and cold running water, a working toilet, handwashing facilities and proper supplies is provided in the gatehouse for employees. The Hazmat building has a similar restroom for employees. A third restroom is in a separate block building located at the north east corner of the site just inside the entrance gate. This restroom also has an emergency shower. All three restrooms have eyewash facilities stations. A portable toilet located near the bagdump area is available to the employees and the public and is supplied with toilet paper and handwashing facilities.

5.4 COMMUNICATION SYSTEMS

§21600(b)(5)(D) & §20570

Adequate communications are provided by phone and hand-held radios to facilitate operations and allow quick response to emergencies. Telephone service by AT&T is on the site with lines to the gatehouse/landfill office, the recycling yard, and the Hazmat building.

Communications during emergencies or for security purposes are addressed in the facility Business Plan which is kept on site. Aspects of notifications and call- out are addressed under various site control sections including Fire Control, Air Quality Control (7.11), Site Security (7.13), and Hazardous Waste Screening (7.14). Central Dispatch is provided with phone numbers for notification and call-outs during non-operational hours.

5.5 LIGHTING

§21600(b)(5)(E) & §20580

All operations are conducted during daylight hours. Landfill operations use no artificial lighting. Security light is provided at the facility entrance, scalehouse, Hazmat building, equipment maintenance building and in the recycling yard. In the event of declared emergencies where emergency debris removal is required, the LEA would be notified and approved portable lighting would be brought in near the working face to allow disposal operations.

5.6 SAFETY EQUIPMENT

§21600(b)(5)(F)

Site safety equipment is in place, supplied and/or required on several levels. All site personnel are required to wear a minimum level of personal protective equipment consisting of steel toe/steel shank work boots, full length work pants, safety orange or neon colored tee-shirts (yellow or green) and/or reflective safety vests. Safety goggles, hearing protection, dust masks and gloves are supplied by the operator and are used on an as needed basis by laborers, spotters, and equipment operators. Hard hats are not required but are available and recommended while performing various tasks on site. First aid kits and portable eye wash units are available at both the gate house and the mechanics yard and are available for use both employees and customers.

At a minimum, employees performing load checks are required to wear hazard level "D" protection, consisting of steel toe/shank boots, full length pants, and protective gloves. Load checkers performing inspections of waste loads are trained to perform their duties without physically walking on or in the trash loads; rather they observe as haulers unload the waste loads and/or the waste load is separated or spread by landfill equipment for inspection.

All landfill equipment is required to have safety equipment such as brakes, parking brakes, seatbelts, operating back-up alarms, and functioning fire extinguishers.

5.7 PERSONNEL REQUIREMENTS

§21600(b)(5)(G)

The landfill has adequate supervision and qualified personnel to ensure proper operation of the site in accordance with all applicable laws and regulations. The Landfill Supervisor, listed below, is responsible for all on-site activities, including supervision of employees and day-to-day activities. The Local Enforcement Agency (LEA) has been notified in writing of the name, address and telephone number of the Landfill Supervisor. A copy of this notification is included in the operating record.

Kris Byrd
County of Lake
16015 Davis Street
Clearlake, CA 95422
Telephone: (707) 994-5888

The County currently employs nine permanent full-time site personnel who work at the Eastlake Landfill. Site personnel at the landfill typically consists of a Landfill working supervisor who is qualified and can function as a truck driver/heavy equipment operator, two to four heavy equipment operators, and a weighmaster. On the days that the landfill supervisor is off, another employee is designated to supervise operations. The landfill can function with a minimum of two heavy equipment operators on holidays when it is only open to franchise haulers. During the quieter (low traffic) winter season, at least one additional staff serving as a weighmaster is required for public hours. The County may budget for an extra help heavy equipment operator for the construction season (May through October) for additional coverage. For unanticipated long-term absences, the County can hire additional extra help, can allow some employees the option of some overtime work or can utilize a qualified heavy equipment operator from another County department. The County has instituted a training program for interested and qualified weighmasters to become heavy equipment operators in order to provide additional backup and to allow for career advancement.

All field staff employees have traffic control responsibilities. On those days when traffic warrants and staffing allows, a staff member is assigned to direct customer traffic near the working face, but is not consistently required or available. When a designated traffic spotter is not available, heavy equipment operators can stop their equipment to direct traffic without leaving the equipment. The high vantage point provides them good visibility for traffic control. Weekend traffic control is frequently provided by community service workers.

5.8 PERSONNEL TRAINING

§21600(b)(5)(H) &§20610

County solid waste facility personnel are trained in subjects pertinent to site solid waste operations and maintenance, hazardous materials recognition and screening, use of mechanized equipment, environmental controls, emergency procedures, injury and illness prevention, safety, and other requirements of the Minimum Standards for Solid Waste Handling and Disposal.

The bulk of the training is done weekly in tailgate training sessions on a variety of subjects including solid waste operations, personnel safety, equipment safety, and regulations. Approximately once a year all personnel are given an update on hazardous materials, such as asbestos, medical waste, etc. Individuals are sent to various classes which cover a variety of topics such as First Aid, CPR, and how to deal with the public or irate customers. During the less busy winter months, some staff is scheduled for HAZWOPER training and/or refreshers. Tailgate training records are kept on site at the facility and copies are also sent to the Public Services administrative office to be incorporated into the facility's operating records and personnel files. All off-site or special individual training records are kept at the Public Services administrative office at 333 Second Street, Lakeport.

Heavy equipment operators are cross-trained on all mechanized equipment in order to be able to fill positions when someone is absent, ill or on vacation. The County has instituted a training program for interested and qualified weighmasters to become heavy equipment operators in order to provide additional backup and to allow for career advancement. Training includes the proper use of personal protective equipment.

Staff who work at the gate are trained to properly ask customers from where their refuse originates, if they are carrying any banned materials and to visually examine loads before they are tipped. Training in recognition is provided to all permanent staff for these banned materials include medical waste and asbestos-containing materials. All staff near the tipping area are trained to watch for hidden banned items that may be illegally dumped. Initial training for operating the gate is directly supervised by an experienced staff member and generally takes a minimum of two days. Gate staff are also provided with handouts and guides that list the hazardous or recyclable materials they need to watch for, and the proper disposal for each item. These education materials serve as references for gate attendants and are also available to customers. Community service and jail workers assigned to work at the Landfill are provided training through a handout of safety procedures which they read and sign. The handouts are available in English and Spanish, and the signed copies are retained on site. The workers are directly instructed, supervised and monitored by the Landfill supervisor or his designee for the specific task they are assigned which can include traffic direction, litter cleanup, or load monitoring. If they are tasked with load monitoring, they are provided verbal information on the types of hazardous materials or banned items they are to recognize and what to do if they find a banned item.

5.9 SUPERVISOR STRUCTURE

§21600(b)(5)(I) & §20615

One supervisor is scheduled for duty five days a week. The supervisor can also work as one of the heavy equipment operators at the landfill or train employees as necessary. The supervisor maintains his skill levels as a heavy equipment operator for additional coverage or work as staff or operational needs dictate. Every employee has a hand-held radio which allows the supervisor and employees to be in constant contact for information and direction, regardless of where they are on the facility. On days that the Landfill Supervisor is off, another employee is designated to supervise operations.

5.10 SPREADING AND COMPACTION

§21600(b)(5)(J) & §20640

Cell sequencing and construction: Cell sequencing and cell size is determined by the amount of refuse anticipated and received in a particular time period. Cells are generally built in a series of benches which are best suited for the canyon setting. Downdrains and/or drainage ditches border the benches to route runoff away from the tipping area. Cell size is built in increments that correspond to the size and number of tarps in use. Currently the 5-6 tarps in use generally translate to a cell approximately 100' long by 140-180' wide to allow tarp overlap and side slope coverage. The use of tarps means that summer cell depths may be approximately 30-40 feet thick, while winter cell depths may be approximately 25 feet thick prior to applying the interim dirt cover. The slope of the leading edge of the tipping area is approximately 5:1. Outside side slopes are 3:1 and receive a 3-foot thick outside slope at the cell edges which are compacted to assure slope stability. To insure proper compaction, cover material is applied and compacted in six-inch increments until the three-foot depth is achieved. Grade stakes are used to insure the proper thickness of the cell side slopes.

Compaction: Refuse is spread into 6-12" lifts over the entire cell, then compacted by 3 to 5 repeated passes over the waste with heavy equipment to minimize voids and achieve an estimated 1,200 lbs/cy compaction rate. The loose layer generally does not exceed one foot in depth before compaction. Spreading and compacting is accomplished as rapidly as practicable. The tipping area is generally sloped in a 4:1or 5:1 slope to allow optimum compaction and to provide stability for the equipment in use or repose as well as stability of materials such as dirt or rock that is dumped for spread. Cells are compacted into 20-25 foot lifts. Compaction has been assumed to be 1,200 lbs/cy by landfill engineers in airspace calculations for annual consumption rates.

Grading: Excavated borrow areas and covered surfaces of the disposal area are graded to promote lateral runoff of precipitation, prevent ponding, and accommodate future settlement of the fill surface.

Slope Stability: A slope stability analysis (Golder, 2004) of the final cover system was submitted with the Preliminary Closure Post-Closure Maintenance Plan (PCPMP). A copy of the corresponding report is enclosed in *Appendix E*. The scope of the analysis encompassed both final cover system and refuse slope stability. Findings from the analysis concluded that adequate factors of safety can be achieved for the cover veneer stability and overall refuse slope stability for the proposed 3H:1V final cover slopes. Maximum deformations under seismic loads are also within acceptable limits.

5.11 LANDFILL EMERGENCY RESPONSE PLAN

§21130; §21132

Appendix G provides a California Environmental Reporting System summary listing the approved plans the County has submitted. These plans include:

- Hazardous Material Inventory.
- Consolidated Emergency Response/Contingency Plan.
- Site Map.
- Evacuation route map.

6.0 COVER

§21600(b)(6)

6.1 DAILY COVER MATERIALS

§20705; §21600(b)(6)(A)

Soil, Posi-Shell® (a patented blend of clay binders, reinforcing fibers, and polymers that, when mixed with water or leachate, produces a spray-applied mortar that dries in the form of a thin durable stucco) or other approved ADC materials are applied over all surfaces of disposed solid waste at the end of every operating day to comply with cover performance standards to control vectors, fires, odors, blowing litter, and scavenging.

6.2 COVER FREQUENCY

§20680; §20685; & 21600(b)(6)(B)

Cover soils are required for placement over all sanitary landfills. Daily covering of the waste with Posi-Shell®, soil, or an approved ADC is mandatory to limit adverse environmental and health impacts, including leachate generation. A 1-foot thickness of soil cover is placed on intermediate slopes of the landfill. Interior slopes are covered on a daily basis using Posi-Shell® or at least 6 inches of soil, or other ADC material as allowed by 27 CCR §20690. Usually, Posi-Shell® is applied on the landfill working face at the end of the working day. The Posi-Shell® is broken up the following morning, and that day's waste is placed and compacted in direct contact with the previous day's trash. The procedure limits the amount of exposed refuse and decreases the amount of surface water infiltration during storms. Use of Posi-Shell® tarps also conserves landfill airspace.

6.3 INTERMEDIATE COVER

§20705; §21600(b)(6)(C)

When seasonal fill is completed, a minimum standard of 12 inches of soil is placed in areas where no additional waste will be deposited within 180 days to control vectors, fires, odors, blowing litter and scavenging. Cover and slopes are compacted and graded for traffic and drainage, then track-walked to help insure slope stability. Grading prevents ponding and promotes lateral drainage. Straw, straw waddles and/or hydroseeding is applied as appropriate to prevent erosion.

6.4 COVER SOIL EXCAVATING/STOCKPILING

§20705; §21600(b)(6)(C)

A borrow area is on-site and a short haul distance from the fill area.

The County also owns 23 adjacent acres northeast of the permitted boundary, 77 acres south, and 27 acres east of the permitted boundary (*Figure 4* and *Table 4*). Potential borrow areas have been identified in these areas should the need to import cover material be realized during the final years of operating and closure activities.

6.5 FINAL COVER

§20790(b)(8)(b)

The final cover will incorporate two different designs for Areas I and II. Both designs represent an engineered alternative design (EAD) to the prescriptive standard as out lined in 27CCR§21090(a). A summary of the final cover design for the respective areas is provided in *Section 9.2.6* of this JTD. The final cover configuration(s) were approved by the agencies as part of the previous PFCP submittal (EBA, 2005). No change is proposed at this time.

The final cover configuration(s) described in *Section 9.2.6* were approved by the agencies as part of the previous PFCP submittal (EBA, 2005). No change is proposed at this time. Note that the County subsequently prepared updated closure cost estimates for financial assurance purposes (SCS, 2017). Per CalRecycle requirements, these cost estimates included provisions to increase the foundation layer soil thickness to 24 inches. Thus, the County's financial assurance reserve is considered conservative with respect to the funding amount. Refer to *Section 12* of this JTD for details regarding closure cost estimates and financial assurance.

7.0 HANDLING

§21600(b)(7)

7.1 PUBLIC HEALTH DESIGN PARAMETERS

§21600(b)(7)(A)

ESL is operated to avoid nuisances such as air impacts, water impacts, noise, odor, public safety, and employee safety. The operational procedures in place also minimize propagation or harborage of flies, rodents, birds, or other vectors.

7.2 SALVAGING ACTIVITIES

§21600(b)(7)(B)

No scavenging is permitted or allowed at the landfill. No salvage rights are permitted to be exercised at the landfill except as may be provided by contract or agreement entered into with the Board of Supervisors. Currently the only salvaging consists of the removal of I-beams from mobile homes that could potentially damage equipment or the landfill liner. These salvaging measures are conducted in a planned and controlled manner so as to not interfere with other aspects of site operations, including entry and egress of vehicles on site.

Salvaged materials generated on site are temporarily placed away from the working face and in a manner to minimize risk of fire, health and safety hazard, vector harborage, or other hazard or nuisance. Storage is limited to small quantities prior to their removal by staff or pickup by recycling yard staff.

7.2.1 Non-Salvageable Items

§20730

Hazardous chemicals, poisons, paints, pesticides and other materials capable of impairing public health are removed, if discovered on the working face, if they are materials that are acceptable as part of the Hazmobile program approved by the EA and the local health agency. If these items can be easily and safely removed by landfill staff, the materials are temporarily placed in a secure location away from the tipping area. Depending on the quantity stockpiled, these items are removed weekly or sooner to the Hazmat building for eventual transport and disposal by the Hazmobile. Other non-salvageable items that are not acceptable by the Hazmobile are not removed without the knowledge and approval of the EA and the local health agency

7.3 VOLUME REDUCTION ACTIVITIES

§21600(b)(7)(C)

The ESL is operated as a traditional canyon fill, area-type fill. No baling or shredding of waste materials for volume reduction is performed. Operational methods and appropriate use of refuse compactor, results in industry standard refuse compaction in the 1,200 pound/cubic yard range.

7.4 EQUIPMENT

§21600(b)(7)(D)

The Landfill has equipment adequate in type, capacity and number, and sufficiently maintained to allow the facility to meet all minimum requirements. A walk-around inspection is performed every day the equipment is used and any problems are noted and quickly repaired.

The quantity and type of equipment are as follows:

(1) 1991 623E Caterpillar Scraper
(1) 2002 623G Caterpillar Scraper
(1) 2006 973C Caterpillar Track Loader
(1) 2009 973C Caterpillar Track Loader
(1) 2001 D7R Caterpillar Dozer
(1) 1981 826C Caterpillar Compactor (engine replacement Dec. 2004)
(1) 2001 826G Caterpillar Compactor
(1) 2016 826K Caterpillar Compactor
(1) 1990 Kenworth Water Truck
(1) 2011 Freightliner Water Truck
(1) 2006 310SG John Deere Backhoe
(1) 1988 Peterbilt Dump Truck
(2) 1991 Ingersoll compressors
(1) 2016 Ford F250 pickup
(1) 2008 F250 utility truck
(1) 2007 F250 utility truck
(1) 2002 Dodge Dakota
(1) 2007 ford Escape
(1) 1994 F150 site truck
(1) 1999 Laymor mechanized sweeper
(1) 2004 Tarp-o-matic tarping equipment
(1) 2006 Econoline Tilt Trailer
(1) 2016 Posi shell Hydro seeder

Additional or backup equipment such as graders or rollers is rented or contracted as needed.

Landfill heavy equipment is serviced for preventative maintenance daily, weekly and monthly by all operators. Weekly and/or monthly preventative maintenance service is normally scheduled on weekends when the operators do not need to spend as much time of the tipping area because of significantly lower refuse quantities received. On a regular schedule based on the number of incremental equipment hours based on industry standards, the heavy equipment is serviced by a qualified mobile contractor who also performs repairs as needed. Regular 90-day BIT inspections on

the water truck are performed by a qualified mechanic. Maintenance logs are kept for heavy equipment. Opacity tests on equipment emissions are performed and recorded, as required by the State, by qualified County staff.

If and when equipment is added or replaced, appropriate notification will be provided to the permitting agencies.

7.5 WASTE HANDLING

§21600(b)(7)(E) and §21740(a)(1)

The operation cycle for materials consists of two processes. Diversion opportunities for recyclables are provided to customers just inside the landfill gate for a number of materials that are either recyclable and/or banned from disposal. All other allowable materials are processed through landfill disposal operations. These include receipt, handling, processing, spreading, and compaction of materials consistent with State regulations.

7.5.1 Diversion

A multitude of recyclable materials are source-separated for diversion at the recycling center located immediately inside the landfill entrance. These recyclable materials include metal, paper, cardboard, plastic containers, glass, and aluminum or metal cans. Source separated brush, yard waste and clean wood waste is received for diversion at the on-site recycling center as well as tires, appliances, used oil, cathode ray tubes (CRTs) and other electronics, and automotive and household batteries. The drop-off/buy back facility is operated by South Lake Refuse, LLC, under contract to the County. Remaining mixed municipal solid wastes and construction/demolition materials are directed to the landfill gate for disposal.

7.5.2 Receipt

Customers are encouraged via on-site signs and public education to utilize the recyclable drop-off/buyback center located just inside of the landfill entrance to drop of a wide variety of materials. Customers then proceed to the scalehouse where vehicles with a capacity of five cubic yards or more drive up onto the lane that has an above ground scale. Vehicles with less capacity use the lane immediately adjacent to the scale house attendant window for volumetric measurement and/or a material count, if applicable. The weighmaster queries each customer for material origin, household hazardous waste or other banned items (see *Section 8.14* for more information on Hazardous Waste Screening Program) and checks to verify recyclable content does not exceed 25% of load through questions and when possible, visual inspection. If the customer has more than 25% recyclables, they are encouraged to return to the recycling center to remove the recyclables first. If the customer does not remove the recyclables, the customer is charged a non-recycling surcharge that doubles the cost of their load with a $15 minimum charge.

Scale customer loads are weighed for in-bound weight, the weight is entered into a computer program that stores the information until they exit on the out- bound scale. The entry and exit weights information is used to calculate the tonnage charge. If the customer has a charge account with the landfill, the customer proceeds to the tipping area. If the customer does not have a charge account, the customer is required to leave some kind of identification or collateral to ensure their return to weigh out and pay the appropriate charges. If large loose loads are not easily inspected for recyclable content, the weighmaster notifies staff in the tipping area by hand-held radio to check the load. Franchise haulers who bring in compactor loads are not subject to the non-recyclable

surcharge. Scale customers are charged and pay for their load after the out-bound weight is determined. Charge customers are required to sign the weight ticket which reflects the appropriate charge.

Customers with a vehicle capacity of less than five cubic yards, which includes most passenger vehicles and pickups, are measured by the weighmaster to determine volume and the appropriate fees are collected for the material. The information regarding material description, origin, and fees is entered into a computer program and is printed on their ticket. Charge customers are required to sign the ticket. All customers receive a copy of the ticket, and a duplicate is retained by the weighmaster. Customers with loose loads are directed to the tipping area. Customers with small quantities of bagged municipal waste are allowed to dispose of their bags in bins located past the gatehouse and in a paved area located prior to the tipping area (bagdump area).

7.5.3 Unloading

§26040

Customers are directed either to the bagdump area or to the tipping areas as determined by the type and quantity of their materials. Unloading of solid waste is confined to as small an area as possible to accommodate the number and type of vehicles using the area without resulting in traffic, personnel, or public safety hazards. Traffic is controlled by on-site personnel. The tipping area is split into two sections for safety purposes to separate large commercial vehicles from small personal vehicles and pickup trucks. During the wet weather season the fill and tipping area is relocated as near to the entrance road as possible and a hard, packed gravel surface is built to reduce impacts and provide all-weather access for customers.

7.5.3.1 Bagdump

Customers with small quantities of only bagged refuse are directed by the weighmaster to the paved bagdump area located adjacent to the gate where they can deposit their bags in the dumpsters provided. These three 40-yard dumpsters are in stalls that are partially recessed into the ground behind a Z-wall structure to allow easy access for customers. Low barrier fences provide safety for the customer while allowing them to easily throw the bags over the fence into the bin. As these dumpsters are filled, they are removed to the tipping area where they are emptied, then returned to their place through an arrangement with the contract recycling center operator. On average the bins are emptied approximately once a week, but that increases during summer when increased volumes fill the bins more frequently.

7.5.3.2 Tipping Area

The tipping area is split into two sections to separate large commercial vehicles from small personal vehicles and pickup trucks. The tipping area is kept small and traffic is controlled by on-site personnel. Typically, the commercial customer section is approximately 30-50 feet wide by 25 feet deep for backing up while the self-haul section is approximately 75 feet wide by 25 feet deep. During the summer months the entire tipping area may be up to 150 feet wide by 25 feet deep. Customers follow directions provided by the weighmaster to the current tipping area on roads that are demarcated with timbers and traffic cones. Staff near the tipping area direct traffic on the tipping pad to identify the appropriate location for unloading. Customers unload their waste in a tipping area adjacent to the current working face. During the wet weather season the fill and tipping area is relocated as near the paved access road as possible and a hard, packed gravel surface is built. Cover material is stockpiled nearby for convenient use, but out of the way of tipping operations.

7.5.4 Special Handling

7.5.4.1 Dropoff/Buyback Center

Recyclable materials accepted at no cost at the on-site dropoff/buyback center are: cardboard, mixed paper, all recyclable glass and plastic containers, film plastic, Styrofoam, tin and aluminum cans, and small amounts of scrap metal. Opportunities are provided to customers to source-separate these materials or to utilize a single-stream option. The facility pays CRV redemption value for separated plastic, glass or aluminum recyclables. The facility accepts lead-acid automotive batteries, household batteries and cathode ray tubes (CRTs) at no charge. Up to 15 gallons of used oil is accepted from customers who are entitled to a per gallon redemption fee.

Scrap metal over 4 cubic yards and loads of clean green and woodwaste is accepted at a cubic yard fee that is less than landfill disposal fees. Household appliances are accepted at a fee and old tire casings with and without rims are priced by size.

Household recyclables are transported by the contract operator to their facility in Lower Lake for further packaging and/or to their Materials Recovery Facility in St. Helena. Clean green and woodwaste materials are transported to the contractor's adjacent off-site facility for chipping and grinding to produce compost. Tires, used oil and batteries are picked up by qualified vendors for recycling at other off-site facilities. Appliances have their freon and mercury switches removed prior to transporting them to a scrap metal dealer along with other scrap metal. CRTs are palletized and transported to certified processors.

7.5.4.2 Bagdump Refuse

Three 40-yard dumpsters are partially recessed into a paved area so that customers can easily and safely throw their bagged garbage over a low rail into the dumpsters. No loose material is allowed in the bagdump. The dumpsters are property of the facility and are emptied through an arrangement with the recycling yard contractor who takes the bin to the tipping area for disposal of the contents whenever they are full.

7.5.4.3 Non-Friable Asbestos

Non-friable asbestos loads must be wrapped or bagged by the customer to prevent any possible release of particles. These loads are buried separately in a hole dug by staff to prevent compacting which could destroy the non- friable aspect of the material. The loads are generally scheduled for the end of an operations day to further prevent any accidental release of particulates. Friable asbestos is not accepted for disposal.

7.5.4.4 Treated Woodwaste

The facility has received approval to dispose treated woodwaste in its lined area without special handling.

7.5.4.5 Confiscated Marijuana

The Sheriff's Department occasionally brings loads of confiscated marijuana for disposal. These loads are either buried separately or unloaded from the transport vehicles and compacted with other refuse if doing so does not allow scavenging. These loads may be brought in after hours with appropriate approvals.

7.5.4.6 Banned Item Retrieval/Removal

Items banned from disposal such as CRTs, batteries, tires, or appliances which are discovered after tipping are removed from the tipping area and are either transported to the recycling yard by staff or by the franchise hauler. Other items that might damage the landfill line or equipment may be set aside for removal to the recycling yard, such as I-beams from mobile homes after they have been crush. These items are stockpiled out of the way of other operation for removal to the recycling yard or the Hazmat building.

7.5.4.7 Treated Medical Waste

Treated medical waste which is deemed to be solid waste is accepted by appointment to coordinate with the use of periodic use of dirt for daily cover.

8.0 LANDFILL CONTROLS

§21600(b)(8)

8.1 NUISANCE MANAGEMENT

§21600(b)(8)(A)

While proper operations and adherence to minimum standards minimize public health and nuisance concerns, the canyon design of the landfill facility creates a natural buffer and barrier that prevents the creation of a nuisance for neighboring properties. Additionally, the canyon design limits of active disposal area since cells are built on top of each other, thereby minimizing the attraction or propagation of flies, rodents or other vectors.

The isolated location of the facility minimizes nuisance occurrences with close neighbors. The nearest structure in a resident lot is southwest of the landfill. That structure is approximately 750 feet from the nearest landfill property boundary and approximately 1,250 feet from the nearest refuse fill area.

Strict operating practices also ensure the facility poses no nuisance to the community. Should the LEA receive a complaint, the facts and issues would be thoroughly investigated. Follow-up could consist of enforcement, modification of an operations procedure or other appropriate action. The County maintains a record of any written public complaints regard the Landfill received by the operator. The record includes the nature of the complaint, the date the complaint was received, the name, address and telephone number of the person(s) making the complaint (if available), and any actions taken to respond to the complaint.

8.2 FIRE CONTROL AND RESPONSE

§21600(b)(8)(B)

No intentional burning is allowed on site with the exception of firebreaks or vegetative control burns performed by the local fire authorities. The flanking ridges and hills around the landfill canyon have roads and fire breaks which are maintained with heavy equipment. Lake County Fire Protection District advises the Landfill Supervisor regarding fire safety.

Incoming loads and the working face are carefully monitored. Pursuant to PRC§44151, the facility maintains a clearance of flammable material for a minimum distance of 150 feet from the periphery of an exposed flammable solid waste. Should the facility accidentally receive burning wastes or experience accidental ignition of wastes in the tipping area, the following will occur:

- If burning wastes are received, they are not deposited in the fill. Instead they are deposited in a separate location at a sufficient distance from the fill area to prevent fire from spreading to the normal fill area. The material is spread in a single layer not exceeding one foot in thickness and immediately covered with a sufficient amount of earth or sprayed with sufficient fire retardant to extinguish all combustion. Final disposition of the material does not take place until the operation is certain that no further combustion will take place under any conditions. A five-pound dry chemical fire extinguisher is located on each piece of heavy equipment and in the site vehicles. Two 10-pound dry chemical bottles are located in the Hazmat building and another one is kept in the scalehouse. An extinguisher is also located at the recycling yard.

- If a fire originates within the fill, all the burning material is removed and extinguished as described above, or by in-situ practices approved by the LEA, in consultation with the local fire authority. Excavation of burning materials would be undertaken in a planned and controlled manner with sufficient firefighting equipment present to control any flare-ups which may occur as outside air reaches the burning materials. The LEA would be immediately notified of any fire.
- In either case, facility personnel will back-track the material delivery to alert the generator and eliminate future occurrences.
- If an on-site fire outside the working face area occurs, staff may use fire extinguishers and/or heavy equipment for containment and/or to extinguish.
- If the fire appears to be a greater threat, 911 will be called immediately for assistance from the Lake County Fire Department. The Lake County Fire Department main station is located approximately 2 miles from the Landfill. Heavy equipment operators may be able to isolate the material from other wastes to minimize the spread of the fire by depositing it in a safe area where the materials can be spread out and extinguished, or until help arrives.
- In the event of discharges resulting from the fire or fire extinguishing and following the protocol in the facility Business Plan, appropriate agencies are notified. These may include the RWQCB, DTSC, LEA and local Hazmat team.

8.3 LEACHATE MANAGEMENT

§21600(b)(8)(C)

Area I, the unlined portion of the WMU, is built with a series of plastic under- drains installed in the canyon floor beneath the landfill. Leachate and spring water commingle at the site of collection. A cutoff wall was constructed at the base of the unlined unit to collect the leachate and allows gravity flow to the surface impoundment. As part of the installation of Module I of the lined Area II in 1999, an approved LCRS was installed for leachate collection by gravity flow and conveyance to the surface impoundment.

Grading in and around the tipping area directs stormwater away from and around the tipping area to prevent it coming in contact with garbage. This diversion prevents customers from coming in contact with surface leachate as they dispose of their garbage. Customers are also not allowed on the active face where surface leachate could be produced when coming in contact with any water. The landfill is designed to allow liquid to percolate into the underground leachate system which transports leachate into the fenced surface impoundment.

The County designed and built a 600,000-gallon lined Class II surface impoundment in 1997 for collection of leachate generated from the landfill units. The surface impoundment liner system consists of an 80-mil HDPE geomembrane over a Geonet and gravel leachate collection and removal system (LCRS). The secondary line system consists of a mil HDPE geomembrane and a GCL. The surface impoundment discharges the leachate by pump to the sanitary sewer system that drains to the Southeast Regional Wastewater Treatment Plant. The system was approved by the RWQCB on October 31, 1997, and became operational November 1, 1997. The approved system consists of a Class II surface impoundment and a permitted discharge to the Southeast Regional Wastewater Treatment Plant. The system replaced an on-site spray field.

8.4 DUST CONTROL

§21090(a)(5)(B) and §21600(b)(8)(D)

Measures are taken to minimize the creation, emission or accumulation of excessive dust and particulates, and prevent other safety hazards to the public caused by obscured visibility. Unnecessary handling of wastes during processing prevents the creation of excessive dust. Staff has the capability to spray water on refuse loads that contain materials that would produce dust or other particulates during offloading or compacting activities.

The access road inside the landfill facility is paved from the facility entrance to the tipping area to prevent dust. Paving surrounds the gatehouse and the bagdump area. The road and bagdump area is rinsed approximately three times per month in the summer and two to five times per week in the winter by the facility 3,500-gallon water truck to remove accumulated dust, dirt and mud, and prevent dust and prevent off-site tracking of dust or dirt. The water truck is operated by staff, and the water is drawn from Clear Lake which is approximately 2 miles from the landfill. The road is also swept weekly by a regenerative sweeper to remove other dirt and/or debris that may fall from entering or exiting vehicles. Where visible tracking has occurred, a mechanical sweeper is utilized as needed.

At the point where the access road pavement ends at the entrance to the tipping area, temporary dirt roads to the current tipping road are kept graded and compacted. Road base material is added for stability as well as erosion and dust control and to prevent off-site tracking. The site water truck sprays these areas frequently during dry periods to control dust. Additionally, magnesium chloride may be applied by a commercial contractor on the dirt access roads to control dust.

Grading, scraping, loading and compacting operations are also supported by use of the water truck in the tipping area and the borrow area. The tarp, which is used for daily cover most days in lieu of dirt cover, reduces dust associated with dirt cover. When dirt stockpiles are used for cover material on days when the tarp is not used, they are kept close to the working face to reduce dust associated with the loading and hauling of these materials.

8.5 VECTOR CONTROL

§21600(b)(8)(E)

Vector and bird control is accomplished primarily with good landfill management practices which include daily cover operations by ADC and/or a minimum of 6 inches of dirt cover to eliminate the exposure of refuse that would attract them to the site after hours. In the event that more than five birds are present for a half hour or longer in the area where refuse is exposed during operating hours, a compressed air gun is fired to create noise to frighten and disperse the birds and discourage them from landing on or near the exposed refuse. Staff accelerates this process if seagulls are present. Should this method lose its effectiveness, other means would be considered and rotated to discourage their presence.

8.6 ODOR CONTROL

Odor control is accomplished with good landfill management practices including the application of daily cover materials. The Class II surface impoundment and pumping station are properly managed to avoid causing an odor nuisance to adjacent residents in compliance with County AQMD standards.

8.7 AIR QUALITY CONTROL

§20900

The landfill operates under a *Designated Non-Major Stationary Source* permit from the Lake County Air Quality Management District. Facility emissions are monitored regularly to comply with Air Quality Management District standards. Emissions of non-methane organic compounds (NMOC) are maintained below threshold levels of 50 megagrams per year (MG/yr). In 2014, a landfill gas collection and destruction system was installed.

Water, palliatives, asphalt or other surfacing materials are used on roads and other trafficked areas to control particulate emissions. Visible emissions are monitored at a weekly minimum for opacity for all excavation, loading, scraping and compacting operations as well as for diesel engine exhaust. Diesel equipment has been upgraded or replaced to meet emission requirements. No burning of any kind is permitted at the facility. Any accidental fires and breakdowns in process, monitoring, or emission control equipment is reported to the AQMD.

8.8 DRAINAGE AND EROSION CONTROL

§21090(c)(4) and §21600(b)(8)(F)

The drainage system is designed and maintained to (1) ensure the integrity of roads, structures, and gas monitoring and control systems; (2) prevent safety hazards; and (3) prevent exposure of waste. Perimeter ditches are built and maintained to divert surface run-of and run-off water away from the working face and finished fill areas. Side slopes are designed and built for stability and intermediate cover is placed and compacted to low permeability standards (required in WDRs). Side slopes are hydroseeded to prevent erosion associated with runoff. Typical intermediate slide slopes are over twelve feet in width. The main north perimeter ditch runs easterly and outfalls to the unnamed tributary to Cache Creek. This ditch moves surface runoff water from the upland north of the landfill away from the WMU's. Lower canyon surface runoff flows into the old Molesworth Creek channel. This ditch flows southerly out of the mouth of the canyon.

Supporting calculations for existing drainage and control, including perimeter ditches, is contained in the Slope Stability Report (*Appendix G)* completer in 2004 (Golder, 2004). *Section 4.4.4* of this JTD describes drainage and erosion controls applicable to the closure performance specifications. The design by Golder &Associates for the RCRA Subtitle D liner in Area II included specific drainage and erosion engineering for those areas. Grading of the fill area diverts water away from the tipping area for collection in perimeter ditches. Grading in the borrow area directs runoff to a sedimentation pond prior to its release into the unnamed tributary of Cache Creek on the eastern boundary of the property.

Winter preparations include establishment and preparation of an all-weather winter pad that is close to the canyon entrance to reduce the impact of traffic in the fill area. Construction of the winter pad includes grading to divert stormwater runoff above the pad into perimeter drainage ditches. The winter pad and access road to it are compacted with road base to prevent erosion and facilitate customer use. Perimeter ditches along roads and inside the fill area as well as sediment ponds and culverts are cleaned out to accept stormwater runoff. Slope maintenance includes grading, compacting, track walking, and the application of straw and/or hydroseeding in the borrow area and other appropriate slopes. Straw waddles may be placed to divert or direct runoff. Any signs of erosion are mitigated by appropriate means to stem and/or repair any signs of erosion or slope instability. Should weather or soil conditions preclude the use of heavy equipment to repair erosion or drainage issues, other interim measures are applied until such time that permanent repairs can be made. The

leachate pond level is monitored to maintain the integrity of the pond while time releases reduce impacts on the Southeast Regional Water Treatment Plant pipe system. Winter operations include careful monitoring of the site to verify the integrity of all drainage systems and slopes following any significant rainfall event. Any problems are reported, as appropriate, to the RWQCB and/or the LEA with the problems or issues identified and the repairs or planned repairs and their implementation.

8.9 LITTER CONTROL

§21600(b)(8)(G)

The landfill canyon tipping area is subject to frequent wind that can blow litter as it is being placed for disposal. Controls are in place to prevent accumulation, or off-site migration of litter in quantities that create a nuisance or cause other problems. The County owns the adjacent properties to the south, west and northeast of the facility to provide additional buffer zones that prevent litter nuisance issues for non-County neighbors. To reduce and control the off-site migration of loose material or litter, the working face is kept as compact as possible, and daily cover and compaction operations prevent blowing. Extreme wind conditions may lead the Landfill Supervisor to leave some of the ADC tarps in place for up to 72 hours to reduce the working face area and control windblown litter. Stationary litter fences have been erected near the bagdump, along the ridge of the eastern slope of Area II and along the southern edge of the WMU near the toe berm to prevent litter being blown from the working face.

Litter that accumulates along these litter fences, near the leachate pond, inside the Area II canyon, and along the access road from the landfill entrance to the tipping areas is routinely collected and disposed properly. Litter in the bagdump bays is cleaned whenever the dumpster is removed or weekly at a minimum. Litter at the recycling yard is policed daily. Staff and/or community service workers assigned by the courts are assigned litter pick up duties, when they are available. Off-site migration of litter is addressed at least quarterly or more often as needed by larger crews from Konocti Conservation Camp. The County contracts with the City of Clearlake for cleanup of litter that accumulates along the public roads that access the landfill from Highway 53.

8.10 NOISE CONTROL

§21600(b)(8)(H)

Noise is controlled through the use of exhaust systems for diesel powered heavy equipment to prevent safety hazards to customers using the site. Site employees are provided with earplugs. The remote location of the landfill and the adjacent buffer areas that surround the operating area generally eliminate noise issues for nearby residents.

8.11 TRAFFIC CONTROL

§21600(b)(8)(I)

Traffic flows from Davis Street on the paved entrance road to either the recycle center or the landfill gatehouse. In the recycle center, vehicles unload individually as directed by the recycle staff. At the landfill gatehouse, franchise hauler loads and large capacity vehicles are directed to a scale lane for entry weight. These vehicles also exit over another scale for an exit weight if a tare weight is not available. Traffic on the scale is controlled by traffic lights controlled by the weighmaster from inside the gatehouse. All other traffic enters an inside lane adjacent to the gatehouse where the load volume is measured, checked and charges calculated. The driver is then directed either to the

bagdump where individuals can unload bagged refuse or to the tipping area where the individuals unload their loose or mixed loads. Signs, flags, traffic cones, and/or barriers define the access from the gatehouse to the tipping area. This compacted road is wide enough to allow inbound and outbound traffic to pass. Community service workers (when available) or site staff service as traffic spotters and are normally near the tipping area to direct customers to an appropriate tipping site and to control traffic in such a way to avoid blocking or interfering with site operations and with other unloading or exiting vehicles. At the tipping area, every attempt is made to provide a separate area for large commercial loads to provide a safe environment.

Speed limit signs of 10 mph are posted on the paved access road, and speed bumps also control customer speeds. Stop signs are located at the exit of the recycling center, at the exit of the bagdump area, and at the exit of the landfill to allow customers to view traffic entering or exiting an adjacent private road that also uses Davis Street access.

8.11.1 Signs

§20540

The following signs are posted at the facility:

- At the point of access from the public road a clearly visible sign indicates the facility name, operator name and telephone number, and hours of operation.
- Upon entering the landfill site, signs provide customers with direction to the recycling center and to the landfill disposal site. A similar sign is visible from the exit of the recycling yard directing customers to the tipping area.
- The recycling yard has pricing signs and signs on each of the bins and/or disposal areas to identify the bin material. Segregated bins and single- stream bins are appropriately marked for customer information.
- Immediately prior to the gatehouse, a 4 x 8-foot sign is posted that indicates the schedule of charges and the general types of materials which will either be accepted or will not be accepted. Applicable surcharges are also listed.
- Immediately past the gatehouse, a sign directs customers to the bagdump facility and to the tipping area.
- Stop signs are posted at the exit from the recycling yard, at the gatehouse window, and near the exit from the landfill back onto the public road.
- Speed signs and “Bump” signs control traffic along the access road to the gatehouse.
- Stop lights are located on the inbound and outbound scales and are operated by the weighmaster to control flow on the scale.
- No Trespassing signs are posted on perimeter and secondary fences.
- No Smoking signs are posted at the landfill entrance and on the gate fee sign near the scalehouse.

8.12 HAZARDOUS WASTE CONTROL PROGRAM

§21600(b)(8)(J)

A list of items banned from disposal are posted as part of the price list sign located near the gatehouse entry lanes. Additional signs are posted near the gate attendant window and numerous flyers are frequently distributed for alternate programs for a variety of materials.

Staff who work at the gate are trained to properly ask customers if they are carrying any banned materials and to visually examine loads before they are tipped. Training in recognition is provided to all permanent staff for these banned materials including medical waste, PCBs and asbestos-containing materials. Initial training for operating the gate is directly supervised by an experienced staff member and generally takes a minimum of two days. Gate staff are also provided with handouts and guides that list the hazardous materials and recyclable materials they need to watch for, and the proper disposal for each item. These educational materials serve as references for gate attendants and are also available to customers.

The weighmaster verbally asks each driver if they have any hazardous waste or banned items such as batteries, tires, paint, appliances, or oil. Weighmasters visually review arriving loads physically and/or by overhead camera for any obvious banned items or excessive recyclable materials. Banned or hazardous materials as well as excessive recyclable materials are rejected and customers are provided information on the proper disposal, then directed to the appropriate location. Loads with excessive recyclables (over 25%) are given the option of either returning to the recycling center to remove those materials or to pay an additional surcharge for the load.

All loads arriving at the tipping area are generally surveyed for banned items by staff in the vicinity. If banned materials are found and the customer is still present, the material is rejected and the customer is provided with information for correct disposal. If the customer has left, but can be identified, they are called to return and retrieve the material. If the customer has left and cannot be identified, the material is removed by trained staff from the tipping area. It may be temporarily set aside for retrieval by a returning customer, or it may set aside to be transported to either the recycling yard or Hazmat building as is appropriate. Generally, the quantity and/or type of material determines how long the material will be held, but it is generally not held more than 30 days before being handed over to the Hazmobile for appropriate disposal. Hazmobile events are held on average once a month.

Random loads are given more thorough inspections by the gate attendant by removing or moving materials to ascertain what is underneath. These load checks are conducted at least once a week and are recorded on an inspection form with information on what was found and what the customer was told to do or did with the banned items. If weighmasters have any concerns that there may be banned items in the load they cannot see or about items customers were told could not be dumped, they radio the tipping area to allow a closer visual load check before or while they are being offloaded.

Random loads are segregated near the tipping area or bagdump for more thorough load checks. During these load checks bags may be opened and emptied for inspection, and content/materials may be spread, using appropriate hand tools and personal protective equipment, to ascertain any evidence of banned materials. The customer remains with the load until the inspection is complete, and if no banned materials are discovered, landfill staff will dispose the materials at the tipping area. When load checks for small loads of bagged materials are conducted, the loads are opened at the bagdump area and emptied into a site pickup for easy transport after the inspection. For load checks conducted near the tipping area, the loads are deposited at a distance from the tipping area, then pushed to the tipping area if no banned materials are discovered.

Records of these inspections are maintained on site, then forwarded to the administrative office for inclusion in the Operating Record.

8.13 OPERATIONS PLAN

§21750 (b)

Dischargers are required to submit operation plans describing landfill WMU operations which could affect water quality, including treatment, storage and disposal methods; and contingency plans for breakdown of waste containment systems. Leachate management provisions are described in *Section 8.3*. Provisions for handling hazardous materials are described in *Section 8.12*.

9.0 PRELIMINARY CLOSURE AND POST-CLOSURE MAINTENANCE PLAN

9.1 PRELIMINARY CLOSURE PLAN

This JTD section provides a Preliminary Closure Plan (PCP) for the Eastlake Sanitary Landfill (ESL) located near the City of Clearlake, in Lake County, California (see *Figure 1*). The landfill, which is owned and operated by the County of Lake (County), is a Class II solid waste disposal facility with a refuse footprint of approximately 35 acres. This PCP was developed as an update to the existing PCP dated August 2005 (EBA Engineering [EBA], 2005) and serves to address closure of the ESL in accordance with 27CCR, Division 2, Subdivision 1.

9.1.1 Regulatory and Permit Requirements

27 CCR §20950, §21090, §21769, §21790, and §21800

Preliminary closure plans are to be prepared in accordance with 27 CCR requirements and submitted to the RWQCB, the LEA and CalRecycle. This PCP contains all required items pursuant to 27 CCR §21790(b)(1) through (b)(8).

All provisions of this plan are designed toward achievement of the closure performance standards as required by 27 CCR, Division 2, Chapter 3, Subchapter 5, Article 2. Implementation of the improvements described in this PCP will ensure that the ESL is closed in such a manner as to protect the public health, safety and the environment and ensure that adequate resources are available to properly accomplish final closure.

Specifically, 27 CCR requirements for a preliminary closure plan addressed herein include:

- A description of the final cover alternatives and procedures to be used to install the selected cover system.
- An estimate of the area of the landfill requiring a final cover at any time during the active life when the extent and manner of operation would make closure the most expensive.
- An estimate of the maximum inventory of waste ever on-site over the active landfill life.
- A schedule of tasks/cost estimates for a third party to complete all necessary closure work.

In accordance with 27CCR§21769(b) this preliminary closure plan provides a reasonable estimate of the maximum expected cost that would be incurred at any time during the unit's projected life for a third part to closure the unit.

Per RWQCB directives, the site WDRs are scheduled to be updated in 2018. The 5-year update of the SWFP is also scheduled for 2018. Information contained in this section is intended to satisfy closure for re-issuance of these permits.

9.1.2 Preliminary Closure Description

27 CCR §21790(b)

The following sections provide a description of the preliminary closure conditions.

9.1.3 Preliminary Final Closure Area

The area designated for closure is approximately 35 acres, encompassing both the unlined Area 1 and the lined Area 2 (Modules I and II). Fill placement plans and final grading configuration are provided in *Section 4* and *Appendix D* of this JTD. At closure, the Modules I and II will be contiguous. The entire limits of waste (approximately 35 acres plan area) have been designated for preliminary final closure as part of this JTD.

9.1.3.1 Location Maps

27 CCR §21790(b)(2) and (4)

In accordance with 27 CCR §21790 (2) and (4), the following site plans and maps are provided in this JTD:

- A site location map is shown in *Figure 1*.
- A site plan with property boundaries, existing limits of waste placement, permitted disposal area boundaries, and entry roads is presented in *Figure 2*.
- A final grading plan with proposed final limits of waste placement is shown in *Appendix C* and *Appendix D,* Drawing 1.
- A site plan with land uses within 1,000 feet of the disposal facility boundary is provided in *Figure 4*.
- The existing LFG control and monitoring systems layout are shown in *Figure 11* and *Appendix F*.

9.1.3.2 Topographic Map

27 CCR §21769(b)(2)(B)

A topographic map of the site illustrating pertinent aspects of the proposed final closure activities is presented in *Appendix C* and *Appendix D*, Drawing 1. Details on this map include the following:

- Final limits of waste placement (no change from current conditions).
- Boundary of the ESL and associated areas to be encompassed by the final closure operations.
- Projected final contour grades for the ESL and surrounding areas.
- Pertinent surface drainage patterns and features.

9.1.3.3 Postclosure Land Uses

27 CCR §21790(b)(5)

Postclosure land use currently proposed for the Landfill will be non-irrigated open space. The area will be returned to a natural setting with the exception of all necessary access roads, monitoring/ control facilities, and drainage structures. A final cover postclosure maintenance program will be instituted to ensure that the final cover retains its integrity and effectiveness. Should future postclosure land use of the Landfill be modified, approval will be requested and the required information will be submitted to the appropriate regulatory agencies.

9.1.3.4 Estimate of the Maximum Extent Requiring Closure

27 CCR §21790(b)(6)

As illustrated in *Figure 2*, *Appendix C*, and *Appendix D*, the ESL encompasses approximately 35 acres. This area, which represents the maximum area requiring closure as part of this Preliminary Closure Plan, was used to prepare the preliminary closure cost estimate presented in *Section 12* of this document.

9.1.3.5 Estimated Closure Date

27 CCR §21790(b)(7)

As previously outlined in *Subsection 3.7*, the estimated closure date for the Landfill is between January 2024 and May 2025. This estimate is based on 2018 site life calculations performed by SCS. A copy of SCS's report (2018) is enclosed in *Appendix D*.

9.1.3.6 Preliminary Closure Construction Schedule

27 CCR §21790(b)(7)

Final closure construction will be conducted in accordance with the Final Closure Plan, which will be submitted a minimum of two (2) years prior to termination of waste disposal activities. A preliminary schedule for the anticipated closure activities is presented in *Table 8*. Since the actual closure date for the Landfill will be dictated by disposal rates realized throughout the remaining operating period of the facility, only estimated durations and a relative chronology for closure activities are presented herein.

Table 8. Preliminary Closure Construction Schedule

Task Description	Duration (Months)	Months Total
Pre-Construction Activities/Approvals:		
FCPCMP[1] Preparation	3	1 – 3
Regulatory Review and Approval	9[(a)]	4 – 12
Construction Bidding/Contract Execution	3	13 – 15
Contractor Mobilization-Site Preparation[(b)]	1	16
Final Cover Construction	3	17 – 19
Drainage System Installation	1	20
Revegetation and Slope Protection	1	21
Site Security Improvements	1	22
CQA[2] Certification Report	2	23 – 24

[1] FCPCMP: Final Closure and Postclosure Maintenance Plan.

[2] CQA: Construction Quality Assurance.

[(a)] Assumes an initial 6-month regulatory review period, followed by a 1-month response to comments period and a 2-month final regulatory review and approval period.

[(b)] Includes removal of structures (as applicable), clearing and grubbing.

Certification of the final closure construction process will be included in the CQA Certification Report as specified in the CQA Plan. Submittal of the CQA Certification Report will be made within 60 days of the completion of all construction activities.

9.1.3.7 Final Cover and Grading

27 CCR §21790(b)(8)(B), §21140, and §21142

This section describes the proposed final grading contours for proposed closure. In accordance with 27CCR§21090(b) and §21142, the final grading will be designed, graded, and maintained to reduce impacts to health and safety to control vectors, fire, odor, litter and LFG migration, prevent ponding, and accommodate anticipated future settlement. Construction will promote lateral run-off of surface water which will minimize the effects of settlement. Access roads will be used to maintain the final cover area and environmental control systems throughout the postclosure maintenance period. In general, the final grades have been designed to promote run-off and minimize erosion due to run-off during storm events, as well as maintaining stability and allowing for the occurrence of settlement after installation of the final cover system.

SCS prepared a revision to the fill placement and grading plan (*Appendix F*, SCS, 2018) to account for current filling operations and relocation of existing fire debris to continue at the Site, and to provide grading control of refuse placement for site operations. SCS performed the following:

- Revised the permitted grading plan, prepared by EBA (July 2005), to enable use with the Site's equipment based GPS system and better delineate drainage benches so that refuse placement operations and grading control may be adequately performed for the Site moving forward.
- Performed a site visit to determine current fill areas, areas where buried fire refuse will be relocated; and, to incorporate landfill operator input to the draft fill grading plan. SCS prepared a revised fill sequencing plan for the Site.
- Provided a fill plan to increase airspace compared to the previously approved permitted fill plan (EBA, 2005) to maximize anticipated site life.
- Prepared a revised air space and site life estimate for the proposed fill sequencing plan.

The proposed final grading and fill placement plan is presented on *Figure 12* and in *Appendix D*, and cover system details are provided in *Appendix C*. The final grading and fill placement revisions are consistent with the conditions of the slope stability Analysis (Golder, 2004a and 2004b) and the basic design criteria for the final grading configuration did not change. This revision was to assist in operations, and does not represent a change to the permitted conditions presented in the 2005 PCPCMP or the 2010 RDSI, or the current facility permits. The revised grading and fill sequencing plan was prepared in accordance with prudent landfill engineering practices and 27 CCR requirements, including:

- Perimeter waste fill slopes at 3:1 (H:V) or less.
- Minimum 5 percent slope across the top deck areas.
- The final top deck has adequate width for landfill operations (waste placement, compaction and daily cover) to complete fill sequencing to design grades.
- Installation of 20-ft wide benches (drainage benches or access roads) at spacing of 50 feet vertical height or less.
- V-ditches and overside drains (downdrains) installed in benches to reduce run-off velocities and protect the final cover from soil erosion. The drainage ditches will have an overall gradient typically up to three percent in order to convey storm water to the bench down drain inlets and/or perimeter drainage channels.
- Final maximum elevation of the landfill is approximately 1,827 feet MSL.
- Access roads are provided at the landfill perimeter (off of existing and proposed fill areas) and to the top deck surface.

9.1.3.8 Proposed Final Cover Design

27 CCR §21090 and §21790(b)(8)(B)

The proposed final cover will incorporate two different designs for Areas I and II. Both designs represent an engineered alternative design (EAD) to the prescriptive standard as outlined in 27CCR, §21090(a), and have previously been approved by the agencies. A summary of the final cover design for the respective areas, as described in ascending order, is provided below.

Area I

The proposed final cover system will consist of the following (bottom to top):

- Foundation layer consisting of a 12-inch-thick compacted soil layer.
- Low-hydraulic conductivity (LHC) barrier layer consisting of a 60-mil minimum thickness, textured (both sides), HDPE geomembrane liner, covered with a geonet composite drainage layer.
- Erosion-resistant layer consisting of a 24-inch-thick vegetative soil layer compacted to a firm consistency to prevent erosion and provide protection for the underlying components.

Area II (including portion that overlaps Area 1)

The proposed final cover system will consist of the following (bottom to top):

- Foundation layer consisting of a 12-inch-thick compacted soil layer.
- LHC barrier layer consisting of a reinforced GCL, overlain by a 60-mil minimum thickness, textured (both sides), HDPE geomembrane liner and geonet composite drainage layer.
- Erosion-resistant layer consisting of a 24-inch-thick vegetative soil layer compacted to a firm consistency to prevent erosion and provide protection for the underlying components.

As outlined above, the two designs are essentially the same with exception to the inclusion of a GCL component as part of the LHC layer for Area II. The basis for this difference corresponds to

requirements set forth in 27CCR, §21090(a)(2) that require the final cover system's LHC layer to have a hydraulic conductivity equal to that of the corresponding base liner system. The base liner system for Area II includes both a GCL and 60-mil HDPE geomembrane liner component. Since Area I is unlined, its LHC layer must simply meet the minimum hydraulic conductivity specification of 1 x 10-6 centimeters per second (cm/sec) or less.

The final cover designs presented herein are consistent with those proposed in the August 2005 PCPMP (EBA, 2005) and approved by CalRecycle and the RWQCB. The respective thicknesses of the foundation and erosion-resistant layers have been chosen to enhance the overall performance and stability of the final cover system (Golder, 2004b). In general, the thickness of the erosion-resistant layer has been increased from 12 to 24 inches to further minimize the potential clogging of the geonet composite drainage layer with vegetative roots. The foundation layer, in tum, has been reduced to 12 inches.

A general description of the various layers anticipated for use as the composite lined final cover is provided below.

Foundation Layer

The foundation layer will be 12 inches in thickness. However, since 12 inches of interim cover soil will be placed on refuse slopes upon reaching final grades, the foundation layer will already be in place at the time of closure construction operations. Whereas the foundation layer will have to be scarified and re-compacted in preparation for placement of the remaining final cover system components, significant quantities of additional soil will not be required for final preparation of the foundation layer. Minimal amount of soil will be needed to construct drainage features and access roads. This amount of soil will be available from the onsite borrow source. The foundation layer will be graded to a uniform shape and maintained in good condition until it is covered by the barrier layer. The actual thickness of the finished foundation layer will be verified by appropriate field measurements. Foundation soil layer specifications, preconstruction source testing and construction testing frequencies will be in accordance with the Final Cover/Closure Construction Quality Assurance Plan to be prepared with the Final Closure Plan.

Barrier Layer (Low Hydraulic Conductivity Layer)

Materials proposed to construct the barrier layer will include a GCL and textured 60-mil HDPE structural geomembrane with high interface friction and integral drainage layer. The GCL is a specialty product specifically manufactured for waste disposal site uses. The bentonite content of the GCL has a hydraulic conductivity of 1 x 10^{-9} cm/sec or lower. The bentonite is encased in two layers of geotextile. The sandwiched layer is then bonded together using a process called needle punching.

The 60-mil HDPE geomembrane will be textured on both sides. Texturing increases interface frictional resistance against sliding—thereby increasing the stability of the final cover system. The geomembrane will be purchased from a national manufacturing company, specializing in solid waste landfill products.

The total area that the GCL and geomembrane layers will cover during closure construction of ESL is 1,578,000 square feet (34.7acres, plan area, 36.2 acres with slope correction). All synthetic liner materials and application procedures will be in accordance with requirements contained in the Final Cover/Closure Construction Quality Assurance Plan to be prepared with the Final Closure Plan. This document will be appropriately updated and incorporated into the Final Closure Plan when prepared and submitted.

Drainage Layer

To ensure that the vegetative layer is properly drained, a geocomposite drainage layer will be installed between the barrier layer and the vegetative layer. Drainage of the vegetative layer will increase the stability of the vegetative layer against sliding under static and dynamic (earthquake) conditions and will also facilitate plant growth. The geocomposite material will consist of geonet encased between two layers of non-woven geotextile.

Vegetative Layer

Soil used for vegetative layer will consist of suitable properties to provide long- term protection to the barrier layer. The soil will be able to support vegetation, which will assist in impeding erosion and promote evapotranspiration and surface runoff. A total of approximately 117,000 bank cubic yards, required for the 2- foot thick vegetative soil layer, is available from on-site borrow areas or soil stockpiles. Vegetative soil layer specifications, preconstruction source testing, and construction testing frequencies will be outlined in the Final Cover/Closure CQA Plan. Vegetation to be used includes a variety of drought tolerant native grasses and small shrubs consistent with the neighboring open space properties. Vegetation will be applied by hydroseeding methods initially with subsequent manual reseeding, as needed.

9.1.3.9 Final Cover Source Materials

27 CCR §21090 and §21790(b)(8)(B)

As stipulated in 27CCR, §21090(b)(8)(B), the volume or amount of borrow source material required for construction of the respective final cover system components must be estimated to ensure adequate supply at the time of closure. As previously stated, the 1-foot thick foundation layer will be comprised of the existing 1-foot thick interim cover soil layer, and the foundation layer will already be in place at the time of closure construction operations. Significant quantities of additional soil will not be required for final preparation of the foundation layer. With the exception of minor quantities of borrow soil needed for construction of miscellaneous drainage facilities and access roads, borrow source requirements for final cover construction will be primarily limited to construction of the 24-inch-thick erosion-resistant layer, which equates to approximately 117,000 bank cubic yards.

Soil for construction of the final cover system will be obtained from the existing borrow source area located southeast and adjacent to the ESL. In the event the volume of soil available from this area is not sufficient to accommodate final cover system construction, additional borrow soil will be obtained on-site from areas west and/or south of the ESL. These areas are sufficient in size to accommodate any supplemental borrow soil needs that may be required, including any unforeseen soil requirements that may arise during the course of construction. Further evaluation of the existing borrow area's capacity and the possible need to develop new borrow areas (including associated grading plans) should be performed during preparation of the Final Closure Plan.

9.1.3.10 Stability Analyses

27 CCR §21090(a)(6), §21145 and §21750(f)(5)

27 CCR §21145 requires that landfill operators ensure the integrity of final slopes under both static and dynamic conditions to protect public health and safety and prevent damage to postclosure land uses, roads, and LFG and leachate control systems, and prevent exposure to waste.

A slope stability analysis of the final cover system presented herein was performed by Golder in September 2004 (*Appendix E*). The scope of the analysis encompassed both final cover system and refuse slope stability. Findings from the analysis concluded that adequate factors of safety can be

achieved for the cover veneer stability and overall refuse slope stability for the proposed 3H:1V final cover slopes. Maximum deformations under seismic loads are also within acceptable limits. Therefore, the 3H:1V final cover slopes meet the minimum requirements of 27CCR.

As stipulated in the slope stability analysis report, the conclusions are only valid for the assumed cover section profiles and final cover grades. Additional slope stability analyses should be completed if future closure grades vary from the final grading plan and/or if different cover system components are selected. Furthermore, since available construction materials and standards of practice may change between now and the time of closure, the analysis on database literature values for design strength parameters in lieu of actual test data. Based on these circumstances, the slope stability analysis should be revisited during preparation of the Final Closure Plan and supplemented with actual material test data to verify the findings. Further evaluation of the hydraulic capabilities of the geonet composite drainage layer and precautionary measures against clogging should also be performed to ensure adequate long-term performance and slope stability.

In 2018, additional seismic analyses were performed as part of the non-water release corrective action plan as required under 27 CCR (SHN, March 2018). The objective was to assess potential earthquake-induced damage, including liquefaction, landsliding, surface fault rupture and permanent seismic deformation for the maximum credible earthquake (MCE) or an earthquake with a 2,475-year return period. The results of this study indicate proposed final slope configurations are expected to remain stable under both static and seismic conditions. Details and results of these seismic analyses are provided in *Section 4.4.5* and *Appendix E* (SHN, March 2018). Other elements of the non-water release corrective action plan are addressed in Section 12.4 of this JTD.

9.1.3.11 Grading, Drainage and Erosion Control

27 CCR §21090(b)(3), §21750, §21790(b)(8)(D) and §20365

27 CCR, §20365 specifies that waste management units and containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, flooding, infiltration, erosion, slope failure, washout, and overtopping under the 100-year, 24-hour precipitation. The final permanent stormwater diversion and control facilities will be designed to accommodate a calculated 100-year, 24-hour design storm.

The site is not located within the 100-year flood plain for the area (*Figure 3*). As a result, special provisions are not required to accommodate potential flooding conditions. In light of these circumstances, the design focused on meeting the criteria specified in the latter two bullet items outlined above. Details regarding the proposed drainage system and erosion control provisions are presented in the following subsections.

Run-off Control

The proposed final grades of the Landfill have been designed to promote run-off and minimize erosion during storms. The final cover system design includes maximum 3H:1V slopes for Areas I and II, starting at the existing grade and ascending to an elevation of 1,827 feet MSL. This design will aid in the prevention of erosion while promoting run-off and minimizing percolation into the underlying soil cover and liner system. These grades are also designed to compensate for potential settlement, maintain slope integrity, and to minimize ponding of water on the surface.

Drainage System

Run-off from the final cover will be conveyed off site through a series of drainage control feature consisting of drainage channels, downdrains, culverts and drop inlets. Drainage channels will be located along the perimeter of the ESL and on the inboard side of benches. Drainage features

designed as part of the FCP will incorporate existing drainage patterns. In the final design, the drainage channels will direct run-off from the final cover system to existing drainage systems. Please refer to *Appendix C* for the general locations of drainage routes.

The drainage channels, which will consist of trapezoidal and/or V-ditch design, will be constructed in sections, with each section of drainage channel being designed to handle the predicted run-off. The slope of drainage channels will be designed to follow existing grades where possible. Based on this criteria, drainage channels will experience various degrees of slope. Even though relatively slow discharge velocities are expected, channel linings (asphalt or approved equivalent) may be needed in areas where significant slope changes occur. Details of miscellaneous drainage facility components are presented in *Appendix C*.

Run-off collected by the drainage facility components will eventually be discharged to either Molesworth Creek or the unnamed tributary to Cache Creek that borders the site to the east-southeast (see *Figure 10* and *Appendix C*). Discharge to these drainages is approved under the facility's existing NPDES Permit.

It should be noted that the facility's existing storm water management system includes two (2) small temporary sedimentation basins located near the southern toe of the ESL and the southeast margin of the borrow area. Since the final drainage system will include engineered facilities designed to minimize resulting sediment loads in run-off, utilization of these basins may not be necessary as part of the final drainage system installed at the time of closure. However, this provision should be further evaluated as part of the Final Closure Plan to ensure compliance with the facility's SWPPP during the postclosure maintenance period.

The design criteria for the drainage improvements will be based on the 100-year, 24-hour storm conditions of 4.5 inches of precipitation. The drainage calculations resulted in recommendations for overside drains to be minimum 12-inch diameter, and drainage ditches with minimum 12-inch depth minimum for the final surface water drainage system channels.

Erosion Control

Erosion control on the final landfill slopes will be accomplished by having no final slope grades exceeding 3:1 (H:V), installation of benches at every 50 feet of landfill elevation gain and establishing vegetative growth on all areas of the landfill exclusive of the perimeter access road. All final landfill slopes and surface will be seeded with shallow rooting, drought tolerant, native grasses and herbaceous perennials. Hydroseeding will be used for initial application of the grass seed and fertilizer/mulch mix on slopes and top deck areas. An application rate and seed mulch mixture will be determined as part of the Final Closure Plan. For the purposes of the closure cost estimate, it is anticipated that a seed application rate of approximately 50 lbs/acre will be sufficient to establish adequate ground cover for erosion protection. Straw mulch, fertilizer and tackifier will be applied as needed.

Hydroseeding will take place prior to the onset of winter to take advantage of the moisture necessary to germinate the seed and enhance vegetative growth. The tackifier used in the hydroseeding process should function to hold moisture from the hydroseeding process and improve soil structure to create an improved medium for vegetative development.

As a mechanism to evaluate the adequacy of the erosion-resistant layer design with respect to potential erosion, a soil loss analysis will be performed as part of the FCP, for a 2-year, 6-hour precipitation event for subsequent comparison to United States Environmental Protection Agency (USEPA) guidelines (USEPA, 1982). These guidelines recommend less than 2.0 tons per acre for this particular precipitation event. Soil loss has been determined to be 1.5 tons per acres. Calculations are provided in *Appendix H*.

9.1.3.12 Site Security, Structure Removal, and Decommissioning of Environmental Controls

27 CCR §21790(b)(8)(A) and §21137

Site security measures, including 'installation of signs and securing points of access to the monitoring and control systems and Class II surface impoundment, will be implemented during final closure in accordance with 27CCR, §21135.

In regards to on-site structures and equipment, the Recycling and Buy Back Center, scalehouse and scale facilities, Hazmat building, LFG flare, equipment shop will be left in place at the time of closure. This is consistent with the currently-approved PCPCMP (EBA, 2005). No change is proposed.

The overhead power line will remain intact to provide electricity to the LFG flare system.

At this time, there are no plans to decommission any of the environmental control systems at closure or throughout the postclosure maintenance period. If deemed necessary, any decommissioning of LFG wells, ground water monitoring wells, or other features will be conducted in accordance with the appropriate regulatory agency requirements.

9.1.3.13 Environmental Control and Monitoring Systems

27 CCR §21790(b)(8)(E-F)

The environmental control and monitoring systems for the purpose of this Preliminary Closure Plan include LFG monitoring and control system pursuant to §20920 and the leachate monitoring and control pursuant to §21160. These systems are described in *Section 4* of this JTD. These systems will remain in operation during and after final closure. During final cover placement, precautions will be taken to ensure that the integrity of LFG leachate extraction and piping systems are not compromised, as described below.

9.1.3.14 LFG Monitoring and Control System

27 CCR §20425(d)(3), §20920 and §21790(h)(8)(3)

An active LFG extraction and flaring system has been installed in accordance with CCR Title 27 and Lake County Air Pollution Control District (APCD) requirements. A description of the LFG control system is provided in *Section 4.7* of this JTD.

The LFG system is expected to be in-place at the time of final closure. During construction of the final cover, LFG well heads, laterals, headers and appurtenances will be protected-in-place or temporarily disconnected during construction. Construction of the final cover may require portions of the LFG control system to be temporarily disconnected. All construction activities will be made in accordance with AQMD notification and permitting procedures.

9.1.3.14.1 Leachate Monitoring and Control System

27 CCR §21090(c)(2), §21790(b)(8)(F) and §21160

The ESL is equipped with a LCRS (both Areas I and II) that drains collected leachate by gravity flow to the 600,000 gallon lined Class II surface impoundment located along the southern toe of the ESL. The Class II impoundment discharges leachate to the Southeast Regional Wastewater Treatment Plant. Leachate monitoring point LS-1, which monitors the presence/absence of liquids beneath

Area II's LCRS sump, and the Class II surface impoundment serve as the primary leachate monitoring points for current site operations, and will continue to serve as the primary leachate monitoring points during the postclosure maintenance period. As a result, no new leachate control or monitoring facilities or provisions are proposed as part of final closure.

The LCRS systems in-place at the time of final closure and will be maintained throughout the closure and postclosure period. LCRS sumps and surface impoundments are or will be outside of the limits of closure work and will not be affected by closure construction.

The ESL is already equipped with a LCRS that encompasses the entire waste footprint. Based on these circumstances, no additional leachate control provisions are proposed as part of final closure.

9.1.3.15 Site Security

27 CCR §21600(b)(8)(A)and §21135

The ESL has provisions in place to discourage unauthorized access by persons or vehicles, including gates and fencing. These provisions are described in *Section 5.2* of this JTD. These provisions will remain in effect during the landfill closure and postclosure periods, and no changes in site security measures are proposed.

In accordance with 27 CCR §21135, appropriate signs will be placed at the site indicating the intended date of last receipt of waste at the landfill. These signs will be installed not less than 60 days prior to the anticipated last waste deliveries and for a period of not less than 180 days after the last shipment of waste.

Ten days prior to closure, a sign will be posted indicating where the Final Closure and Postclosure Maintenance Plan is kept for review by the public. The sign will also provide a local or toll free telephone number for emergency notification.

Within 10 days of the final placement of waste, the County will notify the LEA, CalRecycle, AQMD, and the RWQCB. Within 10 days of notification, the LEA or CalRecycle will inspect the site for compliance with this section. Landfill operations equipment will not be removed from the site prior to this inspection.

9.1.4 Surveys and Final Topography

27 CCR §20950(d) and §21090(e)(1)

In order to monitor the future settlement of the landfill, settlement and survey monuments will be installed on the landfill in accordance with 27CCR §20950 (d). A minimum of two permanent monuments will be placed in the 35-acre area in accordance with 27CCR§20950(d) to provide both horizontal and vertical control points to allow monitoring of settlement of the final fill contours during the postclosure maintenance period.

An aerial photographic survey of the site will be performed and provided to the RWQCB and CalRecycle upon completion of closure activities in accordance with 27CCR§21090(e)(1). The settlement monuments will be surveyed upon completion of all closure construction activities.

9.1.5 Construction Quality Assurance

27 CCR §20323 and §20324, §21600(b)(8)(C) and §21790(b)(8)(C)

The final closure activities will be carried out in accordance with an approved CQA Plan certified by an appropriately registered professional to satisfy the requirements of 27CCR, §20324. The CQA Plan will be included as part of the Final Closure Plan submittal. This plan will provide specific CQA procedures that will be implemented during construction to verify and document that the construction procedures and materials are in compliance with the Plans and Specifications. As required by 27CCR, §20324(c), the contents of the enclosed CQA Plan will include the following:

- A description of the CQA management organization and reporting protocol.
- A description of CQA testing protocols for pre-construction, construction, and post construction testing, including:
  - Procedures and equipment to be utilized for field testing and sampling.
  - Location, method, and frequency of sampling.
  - Laboratory testing procedures to be used during construction.
  - Pass/fail criteria for sampling and testing methods.
  - Frequency of performance audits.
  - Inspection frequencies.

Closure construction will be administered by a qualified consultant or a County Registered Civil Engineer, acting as Project Manager and CQA Officer. The Project Manager will supervise the execution and overall progress of the project. He or she will be assisted by a Project Engineer, an Inspector, a Land Surveyor, independent soil and geosynthetic testing laboratories, and a consulting design and construction management firm, if necessary. The construction work will be done by a licensed construction contractor who will be selected through a public bidding process.

9.1.6 Closure Documentation

Closure will be conducted under the supervision of the CQA Officer. Inspection, field and laboratory data sheets, and other relevant closure activity documentation will include the following information:

- Unique identification numbers.
- Date.
- Project name and location.
- The signature of an individual reporting directly to the CQA Officer.

The closure documentation will include Daily Summary Reports, Acceptance Reports, and a CQA Certification Report. Further details regarding the nature and scope of these reporting documents are provided below.

9.1.6.1 Daily Summary Reports

Daily record keeping will include the preparation of a "Daily Summary Report" that contains inspection data sheets, as well as "Non-Conformance/Corrective Action" reports. Daily Summary Reports shall provide a chronological framework for identifying and recording all other reports. Inspection data sheets shall contain all observations (e.g. notes, charts, sketches or photographs) and a record of field and/or laboratory tests. Non-Conformance/Corrective Action reports shall include detailed descriptions of materials and/or workmanship that do not meet specified design

requirements and shall be cross-referenced to specific inspection data sheets where the problem was identified and corrected.

9.1.6.2 Acceptance Reports

All reports will be assembled and summarized in "Acceptance Reports" to verify that the materials and construction processes comply with the specified design. This report will include Daily Summary reports, inspection data sheets, and Non-Conformance/Corrective Action reports.

9.1.6.3 CQA Certification Report

§20324(d)(l)(C)

At the completion of the project, a CQA Certification Report prepared and certified by the CQA Officer will be submitted to the LEA, RWQCB and CalRecycle. This report will meet the requirements of 27CCR, §20324(d)(l)(C) and contain the following information:

- A general description of the closure activities and significant related events.
- Construction quality control program test results.
- A detailed description and discussion of all deviations from the approved Final Closure Plan, Plans and Specifications and approved revisions.
- As-built descriptions of all environmental containment, monitoring, and control systems to remain during the postclosure maintenance period.
- Construction record drawings.

The CQA Certification Report shall be a self-standing document and contain all subordinate reports. It will also contain a certification that the information presented therein is accurate to the best of the CQA Officer's knowledge, as well as a professional opinion by the CQA Officer as to whether the closure met the requirements and intent of the approved plan and associated construction documents. The certificate of closure will include a statement by the Operator, under penalty of perjury, that with the exception of deviations due to reasonably unforeseeable circumstances, the ESL was closed in accordance with the approved Final Closure Plan.

A topographic map of the completed final grades will be produced at a minimum scale of 1 inch to 100 feet and accompany the CQA Certification Report.

A copy of the CQA Certification Report, as well as all original closure construction documents, will be stored at the County's Administrative Office and maintained throughout the postclosure maintenance period in a protected location that is accessible to CalRecycle personnel during normal business hours. Please refer to *Section 9.2.2 (Responsible Parties and Contact information)* of the Preliminary Postclosure Maintenance Plan for location and contact information for the County's offices.

9.1.7 Record Keeping

§21170, 21880

Closure construction will be conducted under the supervision of a CQA Officer who will be a registered civil engineer in the State California. The CQA Officer will direct and certify closure reports

for submission to the LEA, CalRecycle, the RWQCB, and the County Recorder's office, in accordance with 27 CCR §21170 and 21880. Reporting will contain, at minimum, the following:

- Description of the closure activities and significant events.
- Construction record drawings.
- Test results.
- Date of closure construction completion.
- Description and discussion of all deviations from the approved closure plan.
- Topographic map.
- Information where the closure plan and emergency response plan can be obtained.
- Drawings, specifications, and approved revisions.

The reports will contain a certification that the information presented is accurate to the best of the CQA officer's knowledge, a professional opinion as to whether the closure meets the requirements and intent of the approved final closure plan, and associated construction documents.

9.2 PRELIMINARY POST-CLOSURE MAINTENANCE PLAN

§20950(A)(2), 21769(c)

This section presents a Preliminary Post-Closure Maintenance Plan (PPCMP) for the ESL, and has been prepared in accordance with applicable requirements of 27 CCR, Chapters 3 and 4. The purpose of this Preliminary PPCMP is to ensure that the environmental control and containment systems in these areas are properly monitored and maintained to minimize impacts to public health and safety and the environment.

Postclosure maintenance activities will consist of: LFG monitoring and maintenance, groundwater monitoring and maintenance, final cover inspection and maintenance, settlement monitoring and maintenance, access road maintenance, surface water drainage control system monitoring and maintenance, and site security inspection and maintenance. These activities are currently performed under the active operation of the landfill, and will continue as such until the entire site commences the 30-year postclosure care period.

The SWRCB performance goal for postclosure maintenance, per 27CCR§20950(A)(2), is to assure that the closed landfill is maintained in such a way to minimize water infiltration into the waste and minimize the production of leachate and gas. The postclosure activities described in this section are intended to meet this performance goal.

The County will be responsible for administration of each aspect of postclosure maintenance. As required under 27CCR§21769(c), this Preliminary PCMP provides a basis for estimating costs for a third party to maintain monitoring and inspect the closed landfill area.

9.2.1 Regulatory and Permit Requirements

§21769(b), 21825 (b)(1), and 21180

All provisions of this plan are designed to meet the state postclosure maintenance requirements. State requirements for postclosure maintenance plans and activities are specified in 27CCR§21769(b), §21825 (b)(1) and §21180, respectively.

9.2.2 Responsible Parties and Contact Information

The Landfill is owned and operated by the County. The County will be responsible for all aspects of postclosure maintenance. *Table 9* provides pertinent contact information for these entities.

Table 9. Responsible Parties and Contact Information

Entity	Address	Telephone No.
Landfill Owner: County of Lake	333 North 2nd Street Lakeport, CA 95453	(707) 262-1760
Landfill Operator: County of Lake	333 North 2nd Street Lakeport, CA 95453	(707) 262-1760

9.2.3 Post-Closure Maintenance Period

27 CCR §20380(c) – (c)(2) and §21180(a)

The ESL shall be maintained and monitored for a period not less than thirty years, or until the RWQCB verifies that the remaining waste in the ESL will not pose a threat to water quality.

Should the County elect to conduct closure in discrete phases, any areas where final cover is placed prior to the closure of the entire landfill shall be maintained in accordance with the approved postclosure maintenance plan, but the thirty year postclosure monitoring period shall not commence until closure of the entire landfill is complete.

9.2.4 Description of Monitoring and Control Systems

The following subsections provide an as-built description of the current monitoring and control systems at the Landfill. These systems include provisions for the monitoring and/or control of LFG, leachate, the unsaturated zone, groundwater and surface water. Please refer to *Appendix C* for the locations of the respective monitoring and control systems presented herein.

9.2.4.1 Landfill Gas

As previously outlined in Subsection 4.7.3, the Landfill's existing perimeter LFG monitoring network is comprised of eight (8) monitoring points identified as GP-1 through GP-8. As shown in *Appendix F*, the monitoring points are distributed at various locations along the Landfill's property boundary.

9.2.4.2 Leachate

Areas I and II of the ESL are each equipped with an LCRS. The LCRS for Area I consists of series of plastic pipes located at the base of the unit that collects and conveys leachate via gravity flow to the Class II surface impoundment. The LCRS for Area II is comprised of a 1-foot-thick gravel layer that is located above the LHC layer's GCL and HDPE geomembrane liner. Leachate collected by this LCRS is also conveyed via gravity flow to the Class II surface impoundment. The LCRS sump for Area II is equipped with an access riser pipe that serves as a leachate monitoring point (LS-1). The purpose of LS-1 is to allow for monitoring of liquids buildup in the LCRS as a mechanism to assess system performance.

As outlined above, leachate collected from the ESL is discharged to the Class II surface impoundment. The Class II surface impoundment has an approximate 600,000-gallon capacity and includes the following base liner construction characteristics (in descending order): 80- mil HDPE geomembrane liner; geonet and gravel LCRS; 40-mil HDPE geomembrane liner; GCL; and a sand bed overlying a compacted subgrade. A moisture sensitivity probe is installed in the LCRS that is used to detect leaks.

Leachate discharged to the Class II surface impoundment is subsequently pumped into a sanitary sewer manhole where it is conveyed to the Southeast Regional Wastewater Treatment Plant for treatment and disposal. The leachate pump, which is located at the southern end of the Class II surface impoundment, is controlled by a float switch. A fence surrounds the Class II surface impoundment to prevent uncontrolled access.

9.2.4.3 Unsaturated Zone

The unsaturated zone monitoring system consists of one (1) pan lysimeter identified as LS-2. The pan lysimeter, which is completed beneath Area II's LCRS sump, is designed as a leachate detection monitoring system beneath Area II's base liner system. The access point for LS-2 is located near the southern footprint of Area II.

9.2.4.4 Groundwater

The Landfill's groundwater monitoring network is discussed in *Section 4.4* of this JTD.

The monitoring wells, which are completed at depths ranging from approximately 20 to 121 feet BGS, are designed to monitor first encountered groundwater beneath the site. Each of the monitoring wells is constructed of 2-inch diameter, Schedule 40 PVC slotted and blank PVC casing. Well construction information for the respective monitoring wells is summarized in *Table 6*. Well locations are shown on *Figure 9*. These wells will be maintained during the postclosure period. Water quality monitoring will be continued in accordance with the current program, or as modified by the RWQCB.

9.2.4.5 Surface Water

Three (3) monitoring stations have been established to monitor surface water at the Landfill. These monitoring stations are identified as SWMS-1 through SWMS-3. The following explanation summarizes the locations of the respective monitoring stations:

- *SWMS-1:* Molesworth Creek downstream from the Class II surface impoundment.
- *SWMS-2:* Downstream at an unnamed tributary to Cache Creek.
- *SWMS-3:* Upstream of the unnamed tributary to Cache Creek (used to represent background surface water quality for the site).

Surface water flows in both Molesworth Creek and the unnamed tributary are ephemeral in nature. During the postclosure period, surface water monitoring will be continued in accordance with the current program, or as modified by the RWQCB.

9.2.5 Inspection and Maintenance

27 CCR §21090(c), §21180, §21769(b) and §21825(b)(2)

This section describes the inspection and maintenance procedures and methods to be implemented following closure. These procedures will be used for the final cover, LFG management system, leachate management system, unsaturated zone monitoring systems, groundwater monitoring systems, and surface water management system.

An inspection program will be implemented to monitor and inspect the Landfill during the postclosure maintenance period. The nature and frequency of facility inspections will coincide with requirements set forth in the Landfill's MRP adopted at the time of final closure. The following provides a summary of the proposed inspection program based on the Landfill's existing MRP (R5-2006-0108).

The operator shall continue to operate the LFG collection and destruction system as long as LFG is produced or as required by AQMD permit conditions, or groundwater is impacted by VOCs associated with LFG. The LCRS as long as leachate is generated and detected, maintain the monitoring systems and monitor the ground water, surface water, and the unsaturated zone, prevent erosion and related damage of the final cover due to drainage, and protect and maintain surveyed monuments.

9.2.5.1 Facility Inspection

A facility inspection will be performed annually, at a minimum, for the entire postclosure maintenance period to evaluate the overall condition of the Landfill. The facility inspection will include *Standard Observations* as defined in the Landfill's WDRs, which correspond to routine inspections of the ESL, perimeter areas, and receiving waters to evaluate the general integrity of these components and identify potential problem conditions. The facility inspection will be performed prior to the rainy season, but no later than September 30th of each calendar year.

9.2.5.2 After Major Storm Events

The final cover system and drainage facilities will be inspected within seven (7) days after *major storm events* for damage.

Inspections will be performed by the County and/or a qualified consultant. Whereas the facility inspection frequency stated above is annually per the MRP, quarterly facility inspections will be performed during the initial two (2) years of the postclosure maintenance period to monitor and evaluate the performance of the newly constructed closure facility components. This will be followed by three (3) years of semi-annual inspections, whereupon the annual inspection frequency will be implemented thereafter.

Findings from the inspections will be recorded on a "Postclosure Inspection Form" or an approved equivalent.

9.2.6 Final Cover and Grading

27 CCR §21090(a)(4) and §21769(c)(2)(H)

The purpose of the completed final cover is to minimize stormwater infiltration into and through the closed landfill, minimize the venting of gas generated in the facility, isolate the buried wastes from the surface, promote drainage, minimize erosion or abrasion of the cover, and accommodate settlement and subsidence so that cover integrity is maintained.

The final cover will be inspected on a quarterly basis for the first 3 years of the postclosure care period and then semi-annually thereafter. The inspections will include observations of the following:

- Evidence of erosion.
- Areas where vegetation has died off.
- Visible depressions.
- Ponded water.
- Evidence of odor.
- Exposed refuse.
- Evidence of cracks.
- Differential settlement and subsidence.
- Slope failure.
- Leachate seeps.
- Areas where underlying layers of the cover are exposed.
- Areas damaged by equipment operation.
- Animal damage.

In addition to routine inspections conducted on a quarterly basis, the site will be inspected following any major storm event, seismic event or natural disaster for improper operation and resultant effects on the surrounding final cover.

All inspections will be documented in a report issued to the LEA, RWQCB and CalRecycle on a semi-annual basis.

9.2.7 Final Cover Maintenance Procedures

All final cover repair and/or reconstruction activities shall be conducted in a manner to maintain the integrity of the as-built final cover system. Maintenance of the final cover system may include:

- Re-grading and/or replacement of vegetative soil cover.
- Replacement of sections of the geomembrane and underlying GCL if damaged (for the prescriptive final cover system alternative).
- Re-vegetation of sections of the landfill surface if needed.

All soil fill used to repair the final cover will be placed, compacted and graded consistent with the procedures outlined in the Final Closure Plan and CQA Plan.

Maintenance of vegetative cover may include: re-seeding of the vegetative layers if the vegetation is damaged or disturbed; removing unacceptable vegetation species; and providing fertilizer and water where needed to improve the vegetative growth.

9.2.7.1 Erosion or Ponded Water

Repairs to erosional channels or areas susceptible to ponding will be accomplished through the placement of additional soil cover material to restore the problem area to original grade. In the event heavy equipment is needed to implement the repairs, appropriate precautions will be taken to protect the integrity of underlying LHC layer components (i.e., geonet composite drainage layer, HDPE geomembrane liner, and/or GCL). Work of this nature will be performed as weather permits. In the event the weather prohibits the immediate implementation of repairs, temporary berms, ditches, and/or straw mulch will be used as needed to prevent further erosion damage to the soil cover areas until site conditions permit replacement of eroded soil and reseeding of vegetation. Such action

should preclude problems associated with leachate generation due to infiltration of surface water, LFG venting through the final cover, odor emissions, and vector attraction by exposed refuse.

9.2.7.2 Odors

Odors will most likely be caused by cracks in the final cover, by exposed refuse, or by erosion. Elimination of odors will be accomplished by repairing cracks and by covering exposed refuse accordingly.

9.2.7.3 Exposed Refuse

Exposed refuse will likely be the result of slope failure or erosion. In addition to either removing or covering the exposed refuse, the corresponding corrective action for this condition will be directed to the specific cause of the exposure to prevent a repeated occurrence in the future.

9.2.7.4 Cracks

Most cracks in the final cover will be repaired by re-grading the area. If necessary, more extensive repairs may include filling cracks with additional soil or scarifying and recompacting the cracked area.

9.2.7.5 Settlement

Areas of differential settlement will be repaired through the placement and compaction of earthfill material in the area in question, as well as regrading of the area, as appropriate. Work of this nature will be performed as weather permits. In the event the grades of the settlement repairs need to be confirmed, a level survey of the repair area will be performed using the Landfill's permanent survey monuments (off landfill surface). The locations of the survey monuments are shown in *Appendix C*.

9.2.7.6 Slope Failure

In the event of a slope failure, initial repair work will include the removal and/or covering of any exposed refuse, followed by reconstruction of the final cover system components (i.e., foundation layer, LHC layer, erosion-resistant layer, etc.) in accordance with 27CCR. The area will also be regraded, as necessary, to protect against erosion. Finally, a geotechnical specialist will also be consulted to determine the cause of the slope failure, followed by implementation of the corresponding recommended mitigation measures.

9.2.7.7 Leachate Seeps

Leachate seeps will be mitigated through the construction of temporary berms, sumps and/or trenches, and, if possible, by eliminating the source of the seep. Leachate collected while the seep is active will be transferred to the Class II surface impoundment.

9.2.8 Vegetative Cover

27CCR, §21090(c)(l)

The erosion-resistant layer's vegetative cover will be monitored to ensure that the landfill's final cover system retains its integrity. Accordingly, the vegetative cover will be inspected for the following conditions as evidence of potential problem conditions:

- Stressed vegetation.
- Stunted vegetative growth.
- Wilting of vegetation.
- Color changes.
- Bare spots.

The initial response to any of the above conditions will be to evaluate whether the cause is LFG related. This will be accomplished by monitoring the area for methane surface emissions using a portable methane gas analyzer. If LFG is determined to be the cause, then further assessment will be performed to identify an appropriate remedy to mitigate the problem. Conversely, if LFG is not the cause, the corresponding mitigation measure will likely involve reseeding of the area(s) in question. Amendments may also be added to the soil if deemed appropriate, though special precautions will be employed to ensure that the integrity of the underlying LHC layer is not compromised by these activities. Implementation of the reseeding and/or amendment provisions will be conducted in the fall season to enhance proper germination of the seed application.

9.2.9 Drainage and Erosion Control Structures

27CCR, §21090(c)(4)

Postclosure maintenance of the surface-water management system is intended to ensure adequate performance of the system. The drainage and surface water control systems will be inspected on a quarterly basis for the first three years of the postclosure period and on a semi-annual basis thereafter. An inspection report shall be prepared following each inspection giving a detailed description and approximate location of deficiencies. Corrective measures taken to remedy each deficiency shall also be described in the inspection report.

9.2.10 Drainage and Erosion Inspection Procedures

9.2.10.1 Bench Channels

The benches will be constructed 20 feet wide to allow vehicle access. The existing vertical alignment will remain at approximately 50-foot intervals. The benches/access roadways will be graded inward to collect and convey stormwater along inner swales. The drainage swales will have an overall gradient to convey storm water to the bench down drain inlets and/or perimeter drainage channels. Bench inspections will include checking for erosion ruts, settlement cracks, and proper grading to verify the integrity of the bench channels and culverts.

9.2.10.2 Overside Drains (Downdrains)

The overside drains convey storm flow from the top deck and bench drains into a perimeter drainage channel. These overside drains are constructed on the exterior face of the finished slopes. An inlet apron will be constructed of concrete around each inlet to serve as a non-erodible approach for deck and bench runoff. A visual inspection of each downdrain will be conducted to identify any of the following deficiencies: joint separation; invert failure; structural failure; and presence of silt and/or debris.

9.2.10.3 Perimeter Channels

A visual inspection of each perimeter channel will be conducted to identify any of the following deficiencies: erosion, standing water, formation of gullies and erosion channels, settlement, joint separation or cracks; structural failure; presence of silt and/or debris; and damage to diversion berms.

9.2.11 Drainage and Erosion Maintenance Procedures

Maintenance of the surface water drainage control system during the postclosure period will include:

- Removal of silt and debris from drainage channels and sedimentation basins.
- Re-grading of bench areas which have been subjected to differential settlement. A grader, dozer, and compactor will be utilized to grade the benches, repair erosion ruts, and maintain the integrity and compaction of bench roads.
- Repairing as necessary connections and anchors of the overside drains and discharge points.
- Repair of cracks in asphalt or concrete ditch lining.
- Re-vegetation of grass-lined ditches.
- Reconstruction of earth berms.

9.2.12 LCRS

27 CCR §21160(c and d)

Leachate collection and management systems expected to be in place at closure include lined and unlined modules with leachate collection and removal systems. Collected leachate will be discharged to the 600,000-gallon leachate surface impoundment, and ultimately discharged to the Southeast Regional Wastewater Treatment Plant.

During the closure/postclosure maintenance period, leachate collection and control will be managed to prevent public contact and control vectors, nuisances, and odors. For the purposes of this PPCMP, it is assumed that the frequency of monitoring and testing to be performed will continue as described in the current WDRs.

9.2.13 Groundwater Monitoring System

27 CCR §20380(a)

For the purposes of this PPCMP, it is assumed that the frequency of groundwater monitoring and testing will continue in accordance with WDRs and CAO issued by the RWQCB. ESL currently has detection, and corrective action monitoring programs in effect.

The groundwater monitoring network will be inspected each time groundwater samples are collected from the wells. The sampling technician will inspect well caps, casings, and protective post-structures for signs of damage or deterioration and missing padlocks.

Depending upon the extent of deterioration or damage, the monitoring well will be either repaired or replaced as soon as practical after detecting the problem. Damaged or inoperative caps and locks will be replaced as required. Other repairs, including possible well abandonment and redrilling, will be conducted in accordance with regulatory standards.

9.2.14 LFG Control and Monitoring Systems

27 CCR §21160(a) and 40 CFR § 258.61(a)(4)

Federal and state regulations specify that LFG control and monitoring systems be operated and maintained during the 30-year postclosure maintenance care period. It is assumed that the current LFG monitoring and maintenance procedures will remain in effect during the postclosure care period.

All surface emission monitoring and component leak monitoring shall be conducted in accordance with AQMD and AB32 Landfill Methane Rule regulations, and the applicable provisions of the Title V operating permit.

9.2.14.1 LFG Control System

The LFG control system will be inspected with a focus on well head assemblies, pipeline couplings, connections, pipeline leaks (which may be indicated by a gas odor, hissing sounds, elevated gas concentrations in surface air samples or elevated oxygen readings in the collection system), pipeline breakage, cracking, abnormalities, or deformations. Regular inspections of the blower/flare station mechanical and electrical system components will also be performed to ensure adequate and safe operation.

Maintenance procedures for elevated subsurface temperatures pertain to surface emissions monitoring and preventing air intrusion into the subsurface. Well head monitoring of the LFG temperature and composition serves as an indicator of elevated subsurface temperatures. Well head readings with methane contents below 40 percent (by volume), temperatures at or above the 120 to 130°F range, or oxygen contents greater than 4 to 5 percent indicate possible excessive oxygen intrusion and elevated subsurface temperatures.

Routine inspection and maintenance of the LFG extraction system will include adjustment to valves, testing of well pressures, checking for gas leakage at the well head, and checking the integrity of well penetrations through the final cover. Gas well head flows can be reduced or completely shut off by valve adjustments to reduce oxygen intrusion and therefore lower subsurface temperatures.

Cracked, broken, or malfunctioning portions of the LFG collection system will be repaired upon detection. LFG well repairs are dependent on the nature and extent of damages to the LFG collection system and may include removal and replacement of solid-wall sections of header pipe, soil backfill, and/or bentonite grout. If it is determined that LFG wells are damaged beyond repair, they will be abandoned and/or re-drilled. Repairs to the LFG headers may include removal and replacement of damaged header pipe. These repair activities will be conducted in compliance with applicable AQMD and CalRecycle regulations and permit conditions.

9.2.14.2 LFG Monitoring System

The LFG monitoring system consists of a network of 8 wells installed in native soils at the property boundary. It is assumed this monitoring network will remain in place during the postclosure care period (see *Figure 11)*.

Visual inspections of the LFG monitoring probes will be conducted until and during the postclosure maintenance period with attention to broken probes, end caps, sampling ports and valve boxes. Repairs will be conducted as needed upon detection. Monitoring probes may be re-drilled if they have sustained excessive damage.

LFG monitoring until and during the postclosure maintenance period will consist of testing the perimeter gas monitoring probes on a quarterly basis. During the postclosure period, probes that show "zero" combustible gas readings for 1 year will then be monitored on an annual basis.

All monitoring probes and on-site structures will be sampled for methane. The results of LFG monitoring will be submitted to the LEA and CalRecycle within 90 days of sampling unless compliance levels are exceeded. If compliance levels required by 27CCR §17783(a) are exceeded, immediate steps will be taken to protect public health and safety and the environment and written notification to LEA and CalRecycle will be made within 5 days.

9.2.14.3 LFG Condensate Inspection and Maintenance Procedures

The LFG condensate management system components including condensate sumps, piping and air compressor, will be inspected monthly, in conjunction with the monthly inspections of the LFG collection system. Gas condensate piping will be visually inspected for leaks or breakage, and condensate pumps will be checked for proper operation. Detection of odor and evidence of condensate or minor spills are indicators of the malfunctioning of the LFG condensate management system.

Maintenance and repairs to the LFG condensate management system will be made upon detection. Cracked, broken, or malfunctioning portions of the LFG condensate management system will be repaired as required.

9.2.15 Other Ancillary Facilities

The following provides other miscellaneous ancillary facilities that will require inspection, maintenance and repair during the postclosure maintenance period.

9.2.15.1 Access Roads

The condition of on-site access roads will be inspected to ensure their integrity. Conditions of concern will include: evidence of erosion; areas of ponding or rutting that prohibit vehicle passage; loss of aggregate base rock or asphalt (as applicable); and damaged road crossings for drainage culverts. Repairs to problem areas identified by the inspection activities will be repaired as soon as practical to minimize future damage and to either maintain or reinstate vehicle accessibility.

9.2.15.2 Perimeter Fencing

The perimeter fencing for the Landfill and Class II surface impoundment will be evaluated as part of the facility inspection to confirm their condition and integrity. Any damaged sections of fencing identified during the inspection will be recorded and repaired accordingly.

9.2.15.3 Security Locks

The presence and condition of security locks on gated points of access to the Landfill will be verified on a routine basis. Similarly, the presence and condition of security locks for standpipes/vault boxes for environmental monitoring probes and wells will be confirmed at the time of scheduled monitoring activities. Damaged or missing locks identified during the inspections will be replaced accordingly.

9.2.16 Five-Year Iso-Settlement Map

27 CCR §21090(e)

Once the entire site is closed, a photogrammetric survey of the site will be made. Using this survey, a base topographic map will be produced at a scale of 1-inch to 200 feet (i.e., 1:2,400) and at a maximum contour interval of 2 feet. Subsequently, an aerial photographic survey will be completed every five years throughout the thirty-year postclosure maintenance period. These updates will be used to allow analysis of the changes in elevation between consecutive aerial surveys of the landfill. The iso-settlement maps will be submitted to the LEA, CalRecycle and the RWQCB.

9.3 POST-CLOSURE USE

27 CCR §21790(b)(5)

Postclosure land use for the Landfill will be non-irrigated open space. The area will be returned to a natural setting with the exception of all necessary access roads, monitoring/control facilities, and drainage structures. A final cover postclosure maintenance program will be instituted to ensure that the final cover retains its integrity and effectiveness. Should future postclosure land use of the Landfill be modified, approval will be requested and the required information will be submitted to the appropriate regulatory agencies.

9.4 EMERGENCY RESPONSE PLAN

27 CCR §21830(1), §21130(a) and §21132

Appendix G provides a California Environmental Reporting System summary listing the approved plans the County has submitted. These plans include:

- Hazardous Material Inventory.
- Consolidated Emergency Response/Contingency Plan.
- Site Map.
- Evacuation route map.

9.5 CHANGE OF OWNERSHIP

27 CCR §21200, 21630(a)

If a change in ownership occurs prior to or during the postclosure maintenance period, the County will notify the new owner concerning the existence of the conditions, regulatory standards and requirements relating to postclosure maintenance of the ESL, and signed agreements that are in place to assure continuous compliance. The County will notify LEA and CalRecycle of the change in title within thirty days and shall provide the name, firm, mailing address, and telephone number of the new owner.

Per 27 CCR §21630(a), owners and/or operators of a facility who plan to sell, encumber, transfer or convey the ownership or operation of the facility or land to a new owner or operator, or who plan to change their address shall notify CalRecycle 45 days prior to the anticipated transfer.

9.6 PRELIMINARY CLOSURE AND POST CLOSURE COST ESTIMATES AND FINANCIAL ASSURANCE

9.6.1 Closure Cost Estimates

27CCR §20950(f), §21790(b)(1), §21815, §21820(a), §22207 and 40 CFR§258.71(a)

Cost estimates were prepared for the final closure of the approximately 35-acre permitted area in accordance with the above-cited regulations. These regulations require an estimate, of the cost of hiring a third party to close the landfill in accordance with the submitted closure plan.

The estimate for has been prepared under the oversight of a licensed civil engineer and are summarized in *Table 10*. The cost estimates reflect current landfill industry unit costs, use of prevailing wage labor rates, and SCS's best engineering judgment based on our understanding of site conditions.

Table 10. Preliminary Closure Cost Estimate, Eastlake Sanitary Landfill

Item	Estimated Cost ($2017)
Structure Removal	N/A
Pre-Field Activities	$184,000
Final Grading and Cover Placement	$3,772,300
CQA – Soil and Liner Placement	$235,500
Revegetation	$90,500
LFG Monitoring and Control System	$232,450
Leachate Control	N/A
Final Drainage	$521,100
Engineering/Surveys/Documentation	$239,000
Subtotal	**$5,274,900**
20% Contingency	$1,055,000
Total	**$6,329,900**

Details on the closure capital cost estimate, including worksheets and key underlying assumptions, are provided in *Appendix I*. Cost estimates include design, materials, equipment, labor, administration and quality assurance for the closure work. A contingency amount is provided as required by regulation.

The cost estimates above and detailed in *Appendix I* were submitted to CalRecycle in 2017 (SCS, April 2017). The estimates were approved by CalRecycle; the agency also determined that the cost estimates and financial reserve (enterprise fund) are adequately funded (CalRecycle, January 2018, *Appendix J)*.

9.6.2 Post-Closure Costs

27CCR §21840 and 40 CFR §258.72

State regulations require written costs of hiring a third party to perform postclosure maintenance of the entire landfill.

For purposes of this PPCMP, inspection, monitoring and maintenance expenses were estimated in accordance applicable requirements above. The estimates reflect costs in current dollars for hiring a third party to inspect, monitor, and maintain the closed landfill and environmental control features. Postclosure monitoring and maintenance cost estimates are provided for the currently- approved prescriptive cover system. This estimate is summarized in *Table 11*.

Table 11. Preliminary Postclosure Monitoring and Maintenance Cost Estimate, Eastlake Sanitary Landfill

Item	Estimated Cost, $/Year ($2017)
Final Cover Maintenance	$21,200
Drainage System Maintenance	$15,600
Leachate Collection/Disposal	$13,700
LFG System Operation and Maintenance	$89,400
Inspections and Surveys	$2,800
Water Quality Monitoring	$78,200
Site Security	$5,000
Subtotal, Annual Cost	**$225,900**
Total, 30-Year Cost	**$6,777,000**

Details on the inspection, monitoring, and maintenance expenses for the landfill postclosure period, including worksheets and key underlying assumptions, are provided in *Appendix I.*

The postclosure cost estimates above and detailed in *Appendix I* were submitted to CalRecycle in 2017 (SCS, April 2017). The estimates were approved by CalRecycle; the agency also determined that the cost estimates and financial reserve (enterprise fund) are adequately funded (CalRecycle, January 2018, *Appendix J*).

9.6.3 Financial Assurance Responsibility and Mechanism

27 CCR §22205-07, §22210, §22212 and §22225

State regulations require that the owner demonstrate the availability of financial resources to conduct closure and postclosure maintenance activities. Financial responsibility is essential for providing long-term assurance that the site will be closed and maintained during the thirty-year postclosure period in a manner that protects public health and safety, and the environment from pollution due to disposal of solid waste at the ESL.

The County of Lake, a government jurisdiction, is the owner and operator of record of the ESL and retains responsibility for closure, postclosure maintenance and corrective action. The mechanism for financial assurance being used by the County is a Closure/Postclosure/Corrective Action Fund (in the form of Enterprise Fund), which was started in 1991.

Future payments will be made in accordance with 27 CCR §22225. Appropriate documentation will be submitted by the County to regulatory agencies, as appropriate, under separate cover. As approved by CalRecycle, the County will submit updated Enterprise Fund balance information on the 15th of December each calendar year (CalRecycle, January 2018, *Appendix J*).

9.6.4 Schedule for Financial Mechanism Disbursement

27 CCR §21800(d) and §22234

27CCR§21800(d) requires that the Final Closure Plan shall include a detailed schedule for disbursement of funds for closure construction activities from a Trust or Enterprise Fund, or other financial mechanism including identification of advance payments for final closure activities to be performed in accordance with the Final or Partial Final Closure Plan. The Final Closure Plan disbursement of funds will occur during the landfill final closure over an estimated 24-month period. However, if the accrued balance in the County's Enterprise Fund exceeds the remaining final closure cost estimate with contingency, funds may be requested by County for withdrawal.

This Preliminary Final Closure Plan and Postclosure Maintenance Plan requires no near-term disbursement of closure funds.

10.0 COMPILATION OF APPROVALS

§21600(b)(9)

The existing WDR Order No. R5-2006-0108 was issued by the Central Valley RWQCB in 2006; the Revised MRP No. R5- 2006-0108 was also issued in 2006. Review of the existing WDR and update of the JTD are required by Provision E.24 to be submitted by July 30, 2018. This submittal is expected to result in issuance of a revised WDR Order and MRP issued by the Central Valley RWQCB as part of a general 5-year update, and will incorporate information contained in this JTD report.

The ESL is referenced as site No. 17-AA-0001 in the Solid Waste Information System database. A SWFP under this same number was issued on August 5, 1998.

The landfill is also operated in accordance with the other permits and requirements issued by the Central Valley RWQCB, Lake County AQMD and California Air Resources Board. These permits are listed in *Section 1.1.2* of this report. Copies of all current permits and associated regulatory agency approvals are presented in *Appendix B*.

Requested modifications to the existing WDR Order No. R5-2006-0108, MRP Order No. R5-2006-0108, and existing SWFP for Facility No. 17-AA-0001 described in the *Introduction Section* of this JTD. Revised WDRs may be issued by the RWQCB as general 5-year update. Also, a revised SWFP may be issued by CalRecycle as a general 5-year update.

11.0 CALRECYCLE REQUIREMENTS FOR JTD/RDSI AMENDMENTS

§21600(a)

11.1 CEQA INFORMATION

§21570(f)(3)(4)

CEQA information in included in *Appendix B*. As shown, the Lake County Community Development Department previously determined that existing Eastlake Sanitary Landfill operations are categorically exempt from CEQA. No changes to the facility design or operation proposed in this JTD should prompt a CEQA review.

11.2 CONFORMANCE FINDING INFORMATION

§21570(f)(5)

The ESL is identified in the Lake County Integrated Waste Management Plan (COIWMP, May 1998) and the facility is consistent with the County of Lake General Plan Land Use Element Solid Waste Disposal Policy (General Plan, 2008). Refer to *Appendix B* for documentation. No changes have occurred to those documents.

11.3 CLOSURE/POST-CLOSURE MAINTENANCE PLAN

§20950; §21090; §21120; §21570(f)(6); §21769

An updated Preliminary Final Closure and Postclosure Maintenance Plan, as part of this JTD, have been prepared for submittal to the LEA, CalRecycle and RWQCB for review, comment, and approval. The updated closure document is intended to establish the design and installation criteria for partial closure of landfill areas that are viable for partial closure during the life of the landfill operation.

11.4 OPERATING LIABILITY INSURANCE

§22215 & §22216

The County as operator of ESL carries operating liability insurance and provided such documentation to CalRecycle. Additionally, the County demonstrated acceptable Certificate of Insurance and Risk Management for operating liability as approved by CalRecycle (CalRecycle, January 2018) (see *Appendix J*).

11.5 LAND USE AND CONDITIONAL USE PERMIT

§21570(f)(9)

Land use surrounding the ESL property is shown on *Figure 5*. Documentation of General Plan and Land Use conformity is included in *Appendix B*.

12.0 FINANCIAL ASSURANCES

12.1 CLOSURE FUNDING REQUIREMENTS

§22205; §22207

The County has established a Closure and Post-Closure Maintenance Fund as a financial assurance mechanism in anticipation of future closure obligations. Annual contributions to the fund are made based on anticipated closure and postclosure maintenance costs, interest rates, inflation and anticipated site life. The annual fund contribution amount and balance statements are submitted to CalRecycle by the County on an annual basis and conformance approval provided by CalRecycle.

The most recent fund balance statement reflected these revised cost estimates and was submitted to CalRecycle Financial Assurances Section for year 2017 and approved by CalRecycle on January 22, 2018. Documentation of the current fund obligations and balance statement is provided in *Appendix J.*

As approved by CalRecycle, the County will submit updated Enterprise Fund balance information on the 15th of December each calendar year (CalRecycle, January 2018).

12.2 POSTCLOSURE FUNDING REQUIREMENTS

§22212(a)

The County has established a Closure and Postclosure Maintenance Enterprise Fund as a financial assurance mechanism and as described above in Section 12.1.

The most recent fund balance statement reflected these revised cost estimates and was submitted to CalRecycle Financial Assurances Section for year 2017 and approved by CalRecycle on January 22, 2018. Documentation of the current fund obligations and balance statement is provided in *Appendix J*.

As approved by CalRecycle, the County will submit updated Enterprise Fund balance information on the 15th of December each calendar year (CalRecycle, January 2018).

12.3 FORESEEABLE RELEASE AND CORRECTIVE ACTION FUNDING REQUIREMENT

§20380(b); §22222

Owners and operators of solid waste disposal facilities are required to demonstrate financial responsibility for addressing known or reasonably foreseeable releases to groundwater from the facility.

The facility is currently under a CAO to address groundwater impacts. Cost estimates for corrective action has been addressed in the Work Plans submitted to the RWQCB.

12.4 NON-WATER RELEASE CORRECTIVE ACTION PLAN AND COST ESTIMATE FUNDING REQUIREMENT

§22101(b); §22102

SHN has prepared a Non-Water Release Corrective Action Plan and Cost Estimate for the ESL. The Non-Water Release Corrective Action Plan and Cost Estimate will be provided to the RWQCB and CalRecycle as required by regulation and permit conditions. The Non-Water Corrective Action Plan is presented in *Appendix K*.

13.0 REFERENCES

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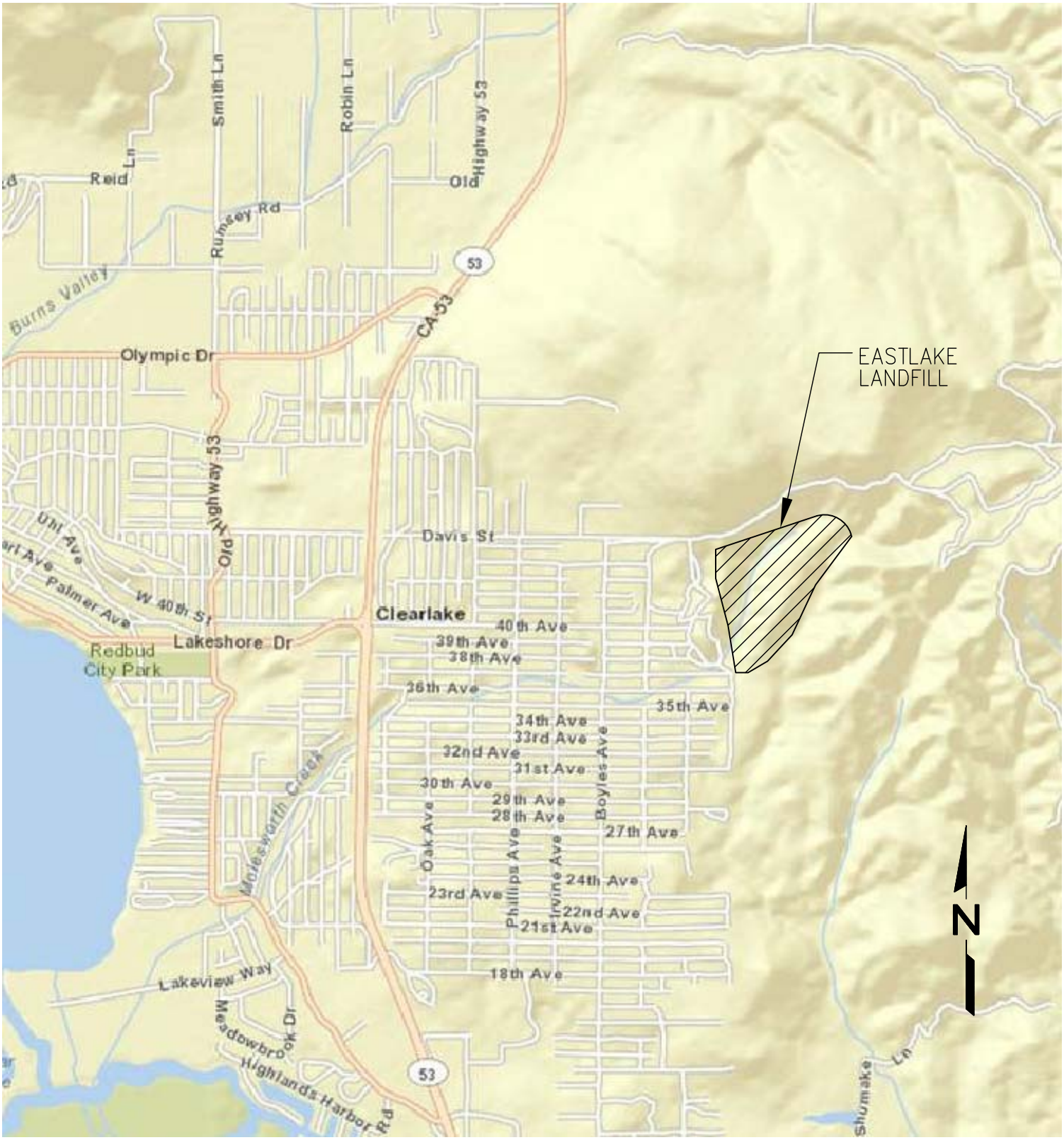
Figures



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PROJ. NO.	DWN. BY:	ACAD FILE:
01214263.00 T9	MJE	FIG-1..SL_041015
DSN. BY: MJE	CHK. BY: AAM	APP. BY: AAM

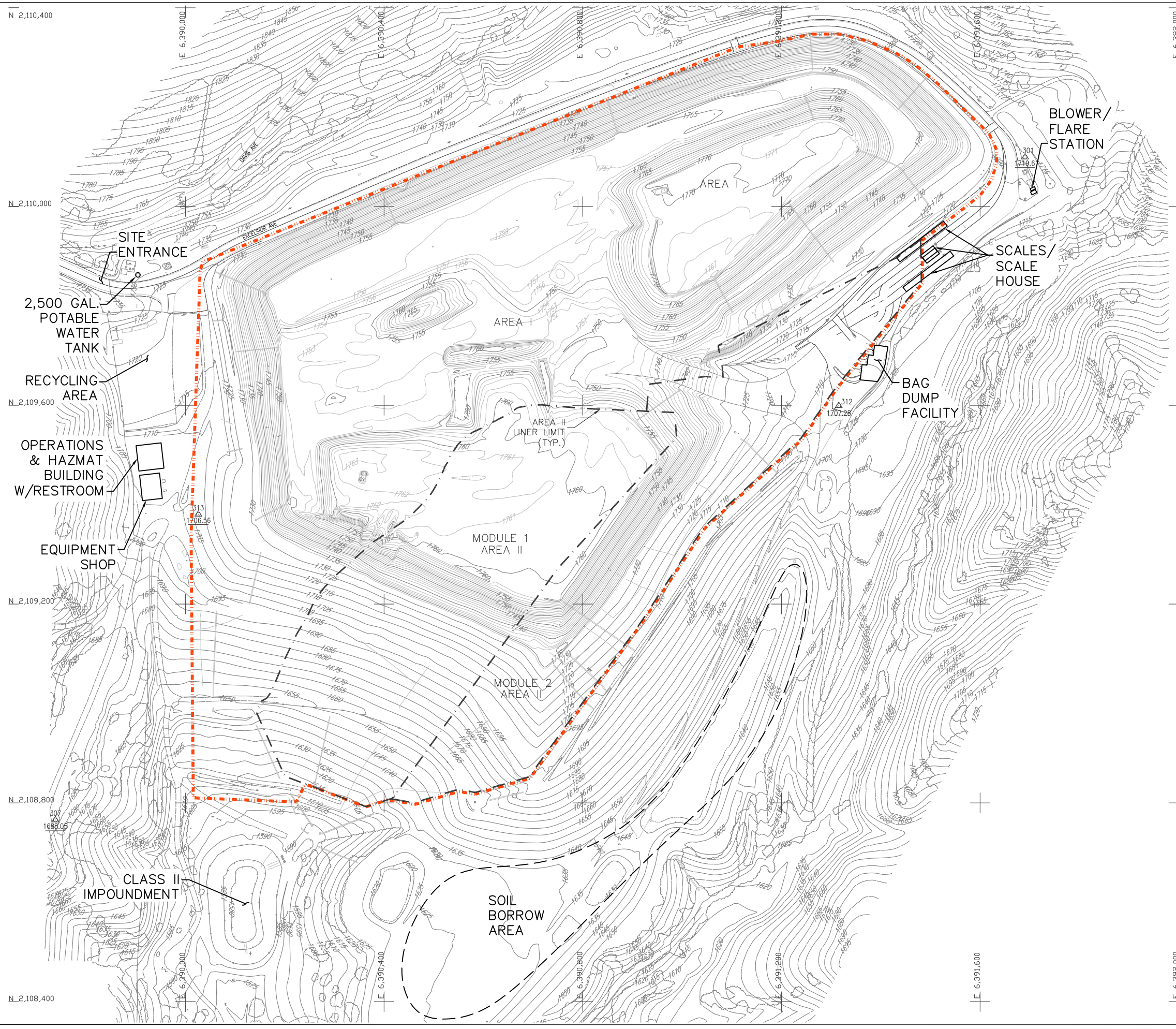
SHEET TITLE
SITE LOCATION PLAN

PROJECT TITLE
EASTLAKE LANDFILL
CLEARLAKE, CALIFORNIA

DATE: 7-25-18

SCALE: N.T.S

FIGURE NO.: 1



50 0 50 100 150

SCALE 1"=100'

DRAWING IS HALF-SIZE AT 11x17

LEGEND

- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS (LANDFILL TOP DECK AREA)
- APPROXIMATE PERMITTED REFUSE LIMIT
- AREA II LINED MODULE LIMIT
- SURVEY CONTROLS

COORDINATE SYSTEM/DATUM INFO

COORDINATE SYSTEM:
CALIFORNIA STATE PLANE, ZONE 2.

HORIZONTAL DATUM: NAD 83

VERTICAL DATUM: NAVD 88

TOPOGRAPHICAL NOTES

1. AERIAL FLIGHT DATE 1-31-18 PERFORMED BY GEOMAPS; TOPOGRAPHIC & SURVEY DATA PROVIDED BY SHN LAND SURVEYING.

2. TOPOGRAPHY SHOWN IS A PORTION OF THE ENTIRE FLIGHT AREA AND IS BEING PRESENTED TO FOCUS ON THE PERMITTED FILL AREA. ENTIRE TOPOGRAPHY WILL BE SENT UNDER DIFFERENT COVER.

GEOMAPS
3362 MATHER FIELD RD
RANCHO CORDOVA, CA 95670
TEL (916) 361-9133 FAX (916) 361-9517

CLIENT	SHN LAND SURVEYING		
LOCATION	EASTLAKE LANDFILL		
JOB NO.	35015	PHOTO DATE	1-31-2018

NO.	REVISION	DATE

SHEET TITLE: SITE PLAN 2018 TOPOGRAPHY

PROJECT TITLE: EASTLAKE LANDFILL LAKE COUNTY, CALIFORNIA

EASTLAKE SANITARY LANDFILL
COUNTY OF LAKE
CLEARLAKE, CALIFORNIA

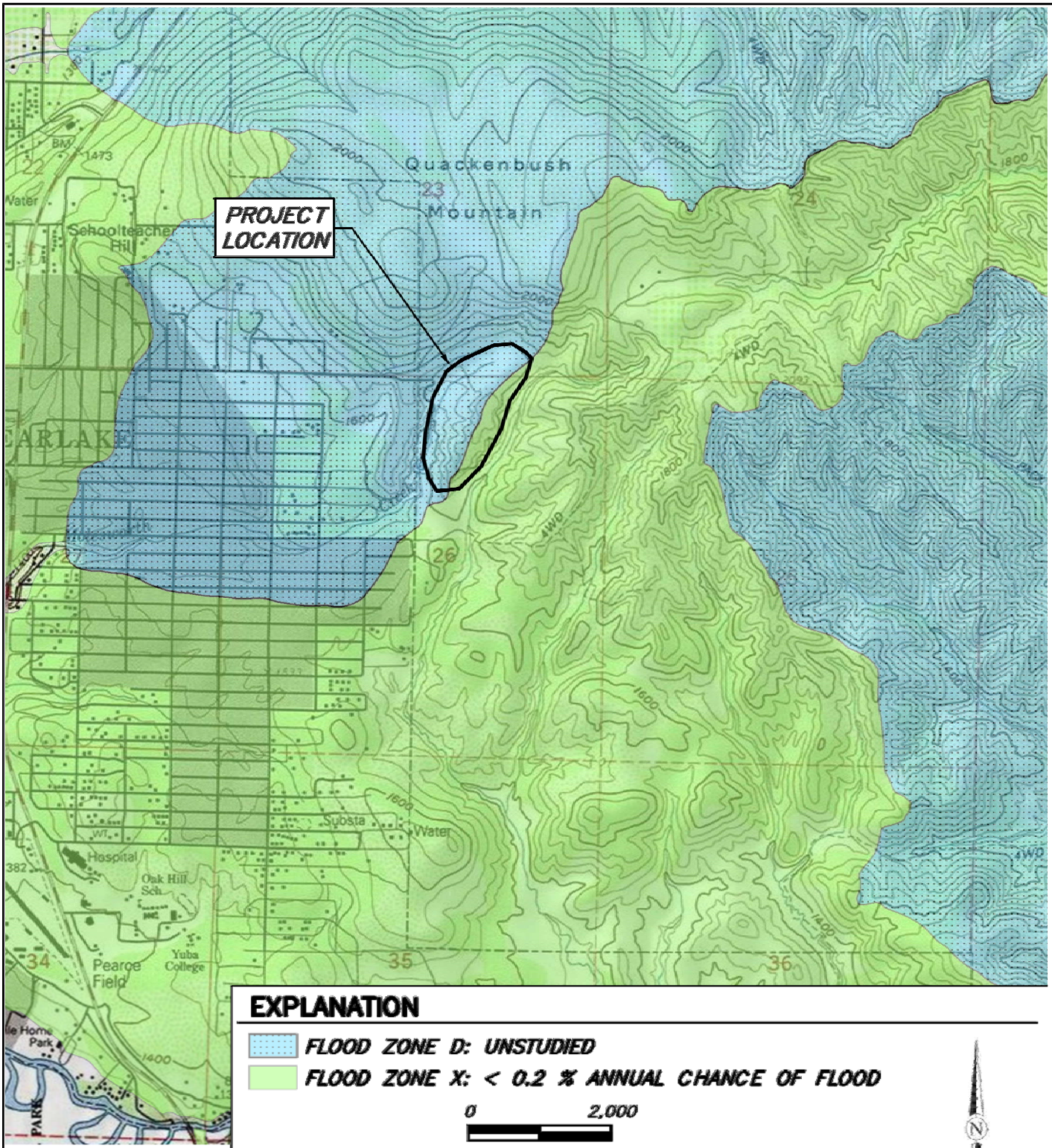
SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
CONSULTING ENGINEERS & CONTRACTORS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CA 95827 FAX (916) 361-1899
(916) 361-1297

PROJ. NO. 01214263.06 T9 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: JJM | CAD FILE: FIG-2_SP_072618 | APP. BY: WM

DATE: 5-25-18

SCALE: AS SHOWN

FIGURE: 2



EXPLANATION

FLOOD ZONE D: UNSTUDIED

FLOOD ZONE X: < 0.2 % ANNUAL CHANCE OF FLOOD

0 2,000

FEET

DATA SOURCE: FLOOD ZONE DATA (FEMA, 1990)

SOURCE:
FEMA FLOOD ZONES
FROM SHN CONSULTING ENGINEERS & GEOLOGIST, INC
ON MARCH 2018

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CALIFORNIA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

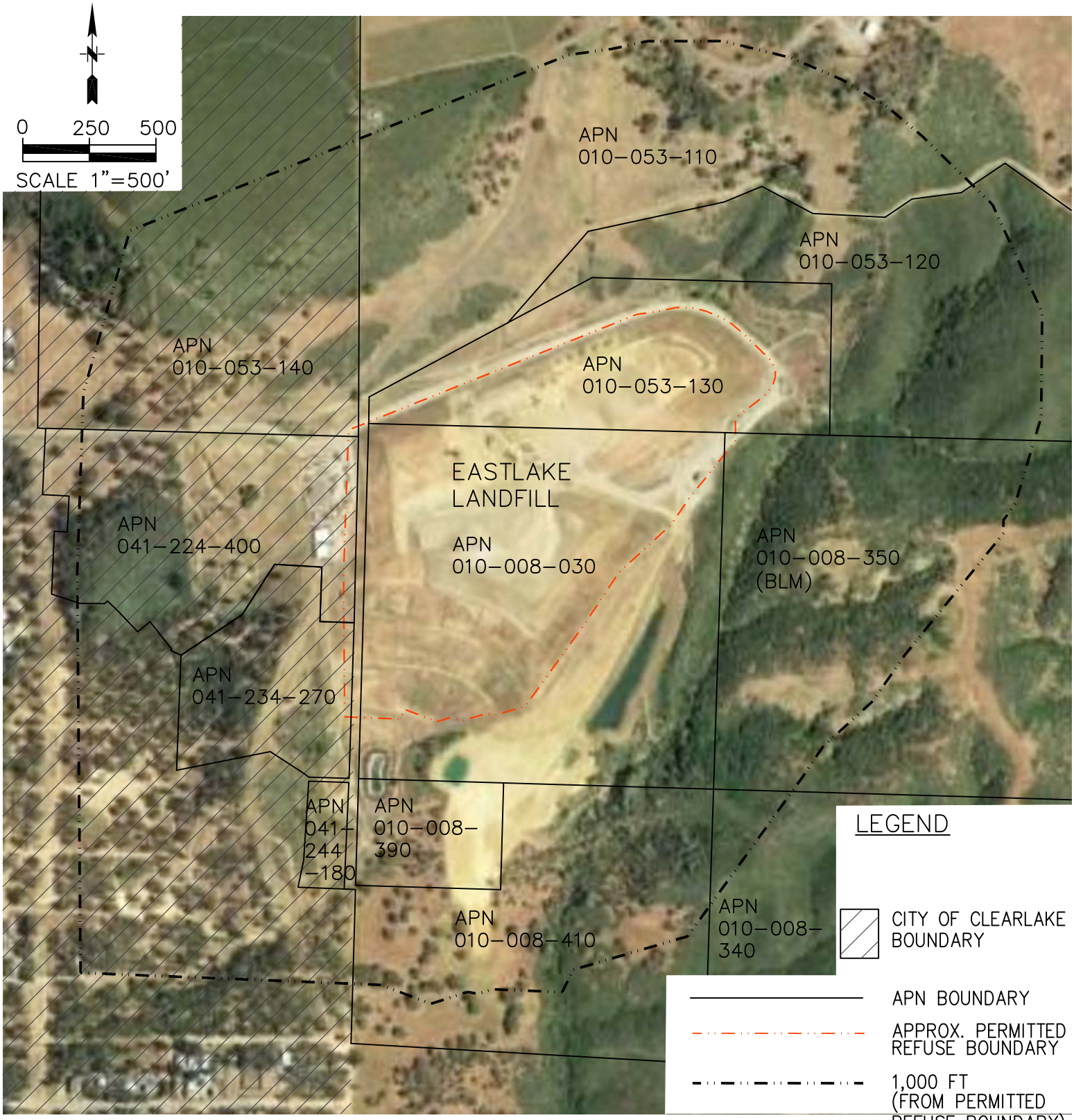
PROJ. NO.:	DWN. BY:	ACAD FILE:
01214263.09	ATV	FIGURE 3
DATE: 7/27/18	CHK. BY: WLM	APP. BY: JJM

SHEET TITLE: FEMA FLOOD ZONES

PROJECT TITLE: EASTLAKE LANDFILL
LAKE COUNTY, CALIFORNIA

SCALE: AS NOTED

FIGURE NO.: 3



SOURCE: GOOGLE EARTH PRO, 2017

SCS ENGINEERS

STERNS, CONRAD, AND SCHMIDT
CONSULTING ENGINEERS & CONTRACTORS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

PROJ. NO.	DWN. BY:	ACAD FILE:
01214263.06 T9	MJE	FIG-4..SP_062518
DSN. BY: MJE	CHK. BY: JJM	APP. BY: WM

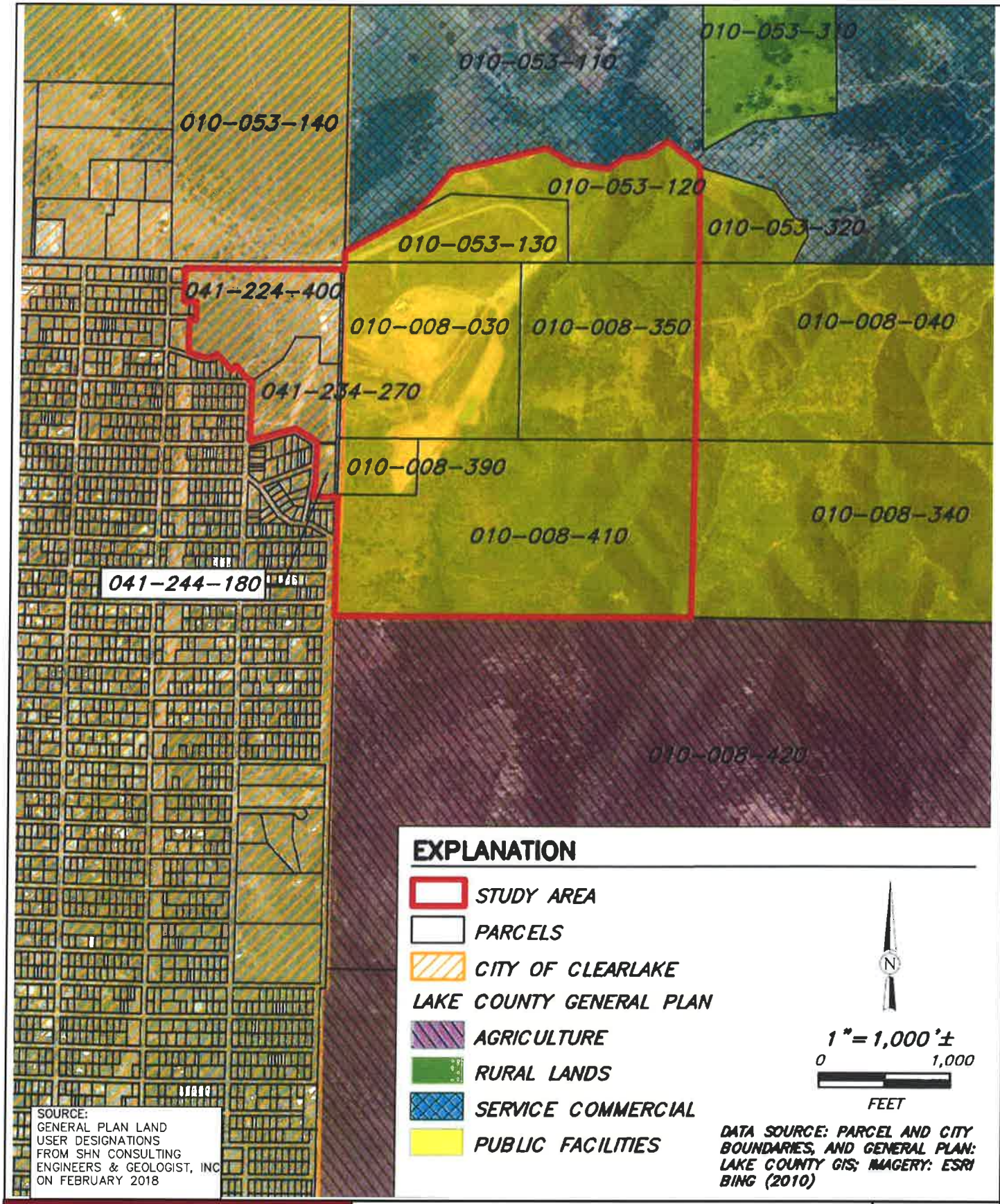
SHEET TITLE
STUDY AREA
SITE PLAN/PARCELS

PROJECT TITLE
EASTLAKE LANDFILL
CLEARLAKE, CALIFORNIA

DATE: 6-25-18

SCALE: AS SHOWN

FIGURE NO.: 4



SCS ENGINEERS

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PROJ. NO.:	DWN. BY:	ACAD FILE:
01214263.09	ATV	FIGURE 5
DATE:	CHK. BY:	APP. BY:
7/27/18	WLM	JJM

SHEET TITLE: GENERAL PLAN LAND USER DESIGNATIONS

PROJECT TITLE: EASTLAKE LANDFILL
LAKE COUNTY, CALIFORNIA

SCALE: AS NOTED

FIGURE NO.: 5

EXPLANATION

al — **Alluvium (Holocene)**—Flood-plain, channel, and lake deposits of clay, silt, sand, and gravel. Locally may include youngest part of the basin deposits of Clear Lake (bcl)

co — **Colluvium (Holocene)**—Slope deposits of silt, sand, and coarser angular clasts. Mapped only where extensive or where covers critical contact of bedrock units

ls — **Landslide deposits (Holocene and Pleistocene)**—Unsorted angular blocks and soil. Largest landslide deposit is on the west side of Mount Konocti; consists of the dacite of Benson Ridge (dbr) and rhyodacite of Soda Bay (dsb) and has an inferred maximum thickness of at least 250 m. Contact between adjacent landslide deposits on map separates landslides of different age or direction of movement

dhi — **Dacite of Clearlake Highlands (Pleistocene)**—Flows of moderately porphyritic dacite; lacks diabasic-textured mafic inclusions. Interbedded with and overlain by the Lower Lake Formation (ll). Age of 0.52±0.06 Ma. Maximum exposed thickness 50 m

ll — **Lower Lake Formation (named by Rymer, 1981; includes basin deposits of Wildcat Canyon of Hearn and others, 1976) (Pleistocene)**—Lacustrine, marsh, fluvial, pyroclastic, and volcaniclastic deposits in an ancestral Clear Lake basin. West of and at Lower Lake, composed of dominantly sandstone and siltstone and lesser amounts of claystone, diatomaceous siltstone, conglomerate, and tuff; conglomerate contains pebbles and cobbles of chert, andesite, dacite, the rhyodacite of Diener Drive (dd), and, rarely, obsidian. Near Lower Lake, unit contains beds of pebbly fossiliferous limestone up to 1 m thick and numerous beds of tuff and lapilli tuff of mafic to silicic composition up to 1.3 m thick (Rymer, 1981). North of Lower Lake, unit contains siliceous siltstone and mudstone, which commonly have root casts and diatom and gastropod fossils, and also contains 0.3–3-m-thick beds of orange limonitic mudstone that are especially prominent within Redbank Gorge, 0.5–2-m-thick beds of tan to gray, surgelike lapilli tuff of basaltic andesite, and rare beds of carbonaceous mudstone. Unconformably overlies the Cache Formation (QTc); adjacent to and overlies the rhyodacite of Diener Drive (dd); interbedded with and overlies the dacite of Clearlake Highlands (dhi); overlain by the dacites of Thurston Lake (dt), Pinkeye Lake (dpl), and Cache Creek (dcc), and flow (brf) of the basaltic andesite of Roundtop Mountain. Probable age range from 0.4 to 0.65 Ma. Thickness 0–25 m in upper Wildcat Canyon, thickness of tilted sequence at Lower Lake at least 200 m, exposed thickness in Redbank Gorge 20 m

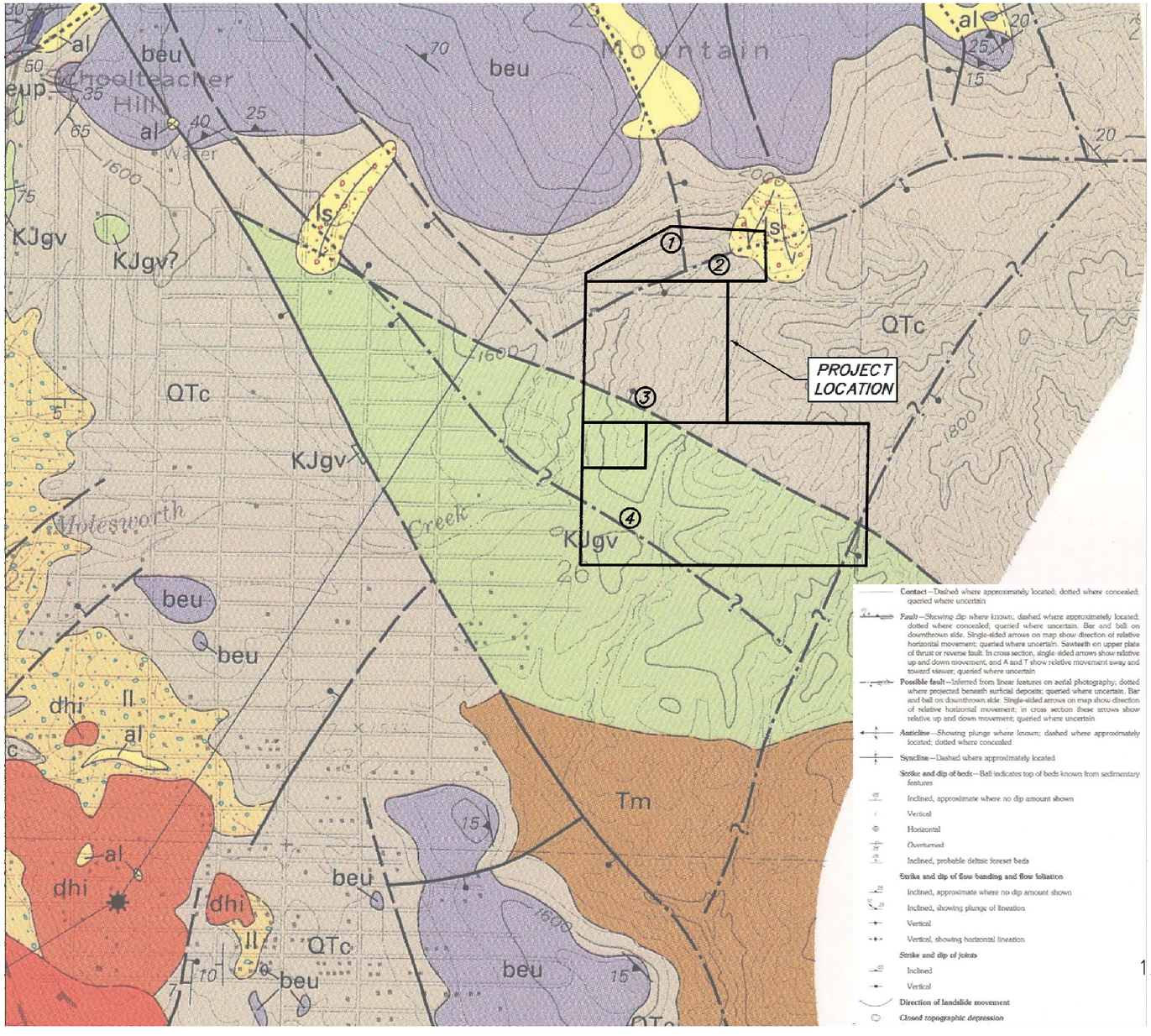
beu — Undivided—Dominantly flows; lesser pyroclastic deposits and intrusive rocks

beup — Pyroclastic deposits—Bomb, block, and lapilli tephra, pyroclastic breccia, lapilli tuff

QTc — **Cache Formation (revised by Rymer, 1981) (Pleistocene and Pliocene)**—Siltstone, sandstone, conglomeratic sandstone, and tuff. Fluvial and locally lacustrine origin; deposited in fault-bounded basin that is older than and separate from the Clear Lake basin. In map area, contains 5–15 percent of 1–5-cm-diameter pebbles mainly of chert, vein quartz, and greenstone, and contains 1 percent or less of pebbles of graywacke, shale, and serpentinite. Contains late Pliocene mammalian fossils (Rymer, 1981). Blackeye Canyon section (Rymer, 1981) contains rhyolitic(?) tuff as much as 3.5 m thick and lapilli tuff and pyroclastic breccia (beup) of the early basaltic rocks unit as much as 2.7 m thick. Generally lacks pebbles of the Clear Lake Volcanics, except from the early basaltic rocks units (beu, beup) from nearby sources. See Anderson (1936), Brice (1953), and Rymer (1981) for more detailed descriptions of this unit. Forms dissected topography with grass-covered slopes and lag gravel on the surface. Probably derived mainly from the north and east. As mapped here, the upper part contains interbedded early basaltic rocks (beu) near Clearlake Highlands, and the lower or middle part contains interbedded and intrusive early basaltic rocks (beui, beu) near the Bartlett Springs fault zone; also intruded by and overlain by the early basaltic rocks (beu, beup, beui). Age of unit is late Pliocene and early Pleistocene (Rymer, 1981). Maximum thickness unknown, but minimum thickness is 1,600 m (Rymer, 1981)

Tm — **Martinez Formation (Paleocene)**—Marine sandstone and lesser amounts of mudstone and conglomerate; see Brice (1953) and Swe and Dickinson (1970) for further description

KJgv — **Great Valley sequence (Upper Cretaceous to Upper Jurassic)**—Shale, siltstone, graywacke, conglomerate, greenstone, and chert. See Brice (1953), Swe and Dickinson (1970), and McLaughlin and others (1990) for more detailed descriptions and subdivisions of this unit



SOURCE: GEOLOGIC MAP WITH REGIONAL AND LOCAL FAULTS (Hearn et. al, 1995) FROM SHN CONSULTING ENGINEERS & GEOLOGIST, INC ON FEBRUARY 2018

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CALIFORNIA 95827
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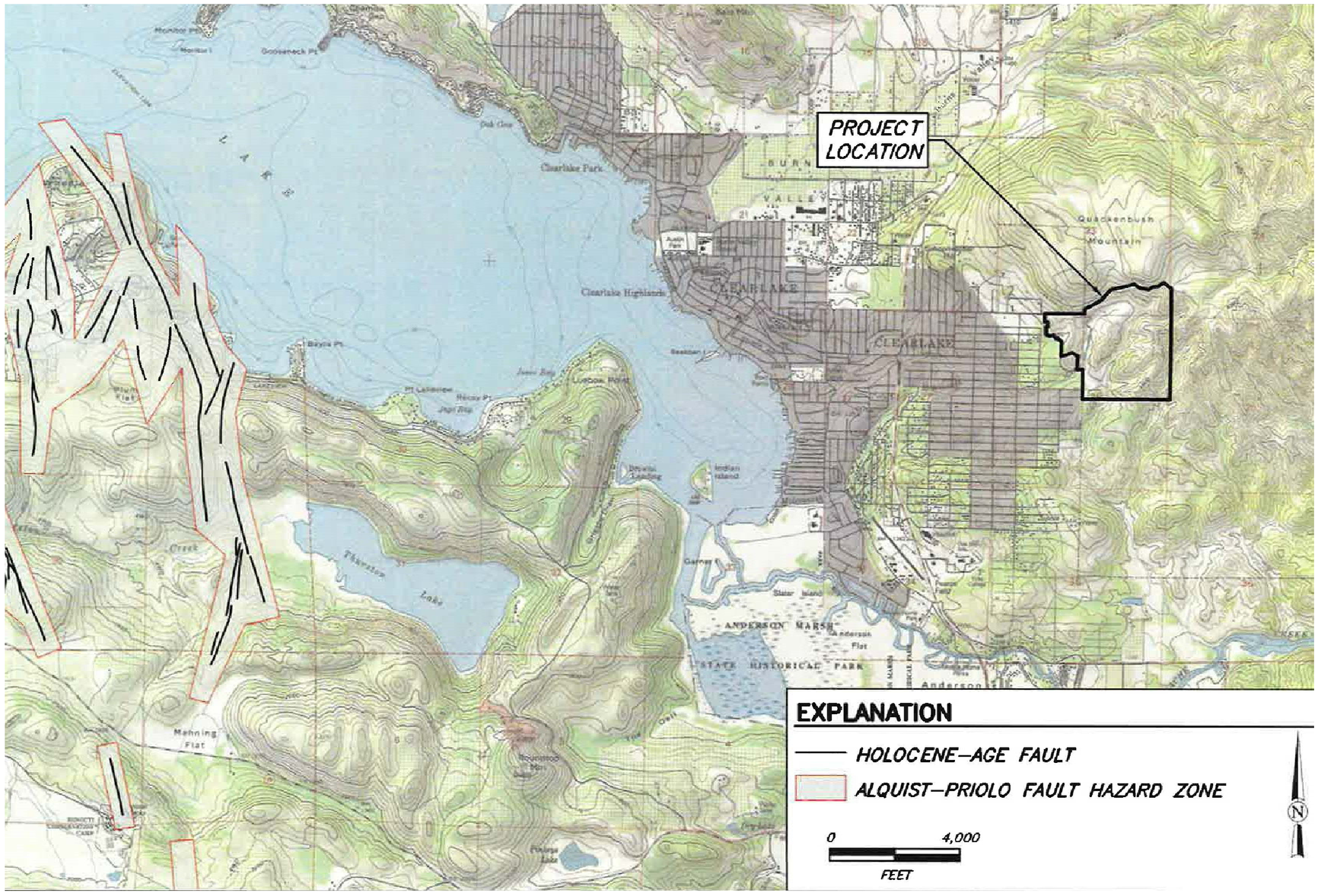
PROJ. NO.	DWN. BY:	ACAD FILE:
01214263.09	ATV	FIGURE 6
DSN. BY:	CHK. BY:	APP. BY:
WLM	WLM	JJM

GEOLOGIC & SEISMIC SITTING ASSESSMENT
LAKE COUNTY, CALIFORNIA

SHEET TITLE: GEOLOGIC MAP WITH REGIONAL AND LOCAL FAULTS (Hearn et. al, 1995)

PROJECT TITLE: EASTLAKE LANDFILL
LAKE COUNTY, CALIFORNIA

DATE: 07/27/2018
SCALE: AS SHOWN
FIGURE: 6



SOURCE: ALQUIST–PRIOLO FAULT HAZARD ZONE MAP FROM SHN CONSULTING ENGINEERS & GEOLOGIST, INC ON FEBRUARY 2015

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CALIFORNIA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

PROJ. NO.	DWN. BY:	ACAD FILE:
01214263.09	ATV	FIGURE 7
DSN. BY: WLM	CHK. BY: WLM	APP. BY: JJM

GEOLOGIC & SITTING ASSESSMENT
LAKE COUNTY, CALIFORNIA

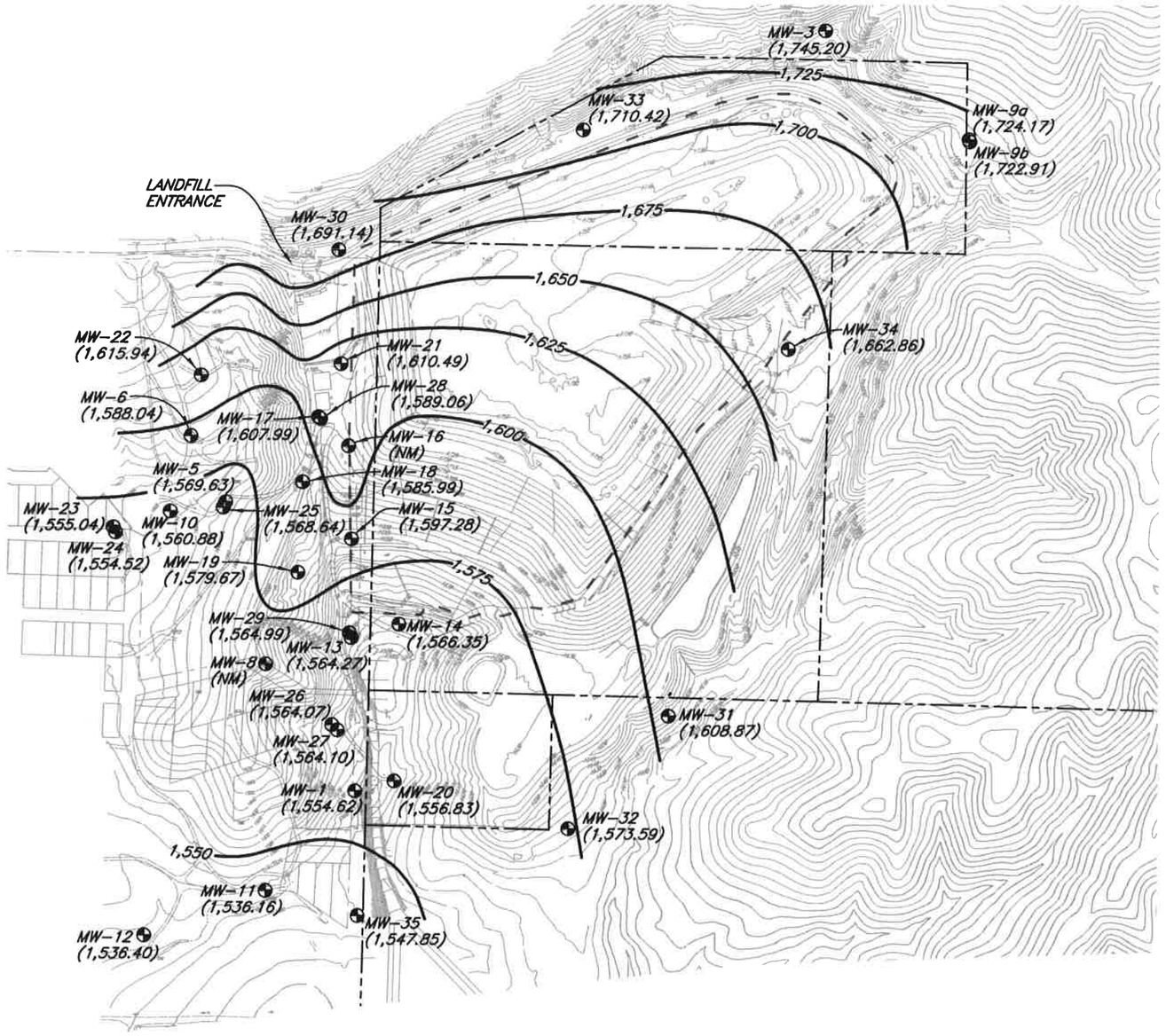
SHEET TITLE: EARTHQUAKE FAULT ZONES MAP

PROJECT TITLE: EASTLAKE LANDFILL
LAKE COUNTY, CALIFORNIA

DATE: 07/27/2018

SCALE: AS SHOWN

FIGURE: 7



NOTES:

1. BASE MAP A COMBINATION OF PARCEL LINES FROM LAKE COUNTY, AERIAL SURVEY FROM SCS ENGINEERS, "SITE PLAN," DATED 09-26-17, AND SURVEY DONE BY SHN ENGINEERS, 2017.
2. DATA FROM WELL MW-25 AND MW-28 NOT USED TO GENERATE GROUNDWATER CONTOURS.

EXPLANATION

MW-31	MONITORING WELL LOCATION AND DESIGNATION
(1,562.28)	GROUNDWATER ELEVATION (FEET NAVD88)
—1,725—	GROUNDWATER CONTOUR (FEET NAVD88)
(NM)	NOT MEASURED
— —	APPROXIMATE PERMITTED REFUSE LIMIT
—1700—	EXISTING TOPOGRAPHIC CONTOUR IN FEET

N

400 0 400

SCALE IN FEET

SOURCE: APPROXIMATE GROUNDWATER CONTOURS MARCH 8, 2018 FROM SHN CONSULTING ENGINEERS & GEOLOGIST, INC ON MARCH 2018

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CALIFORNIA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

PROJ. NO. 01214263.09	DWN. BY: ATV	ACAD FILE: FIGURE 8
DSN. BY: WLM	CHK. BY: WLM	APP. BY: JJM

EASTLAKE SANITARY LANDFILL
LAKE COUNTY, CALIFORNIA

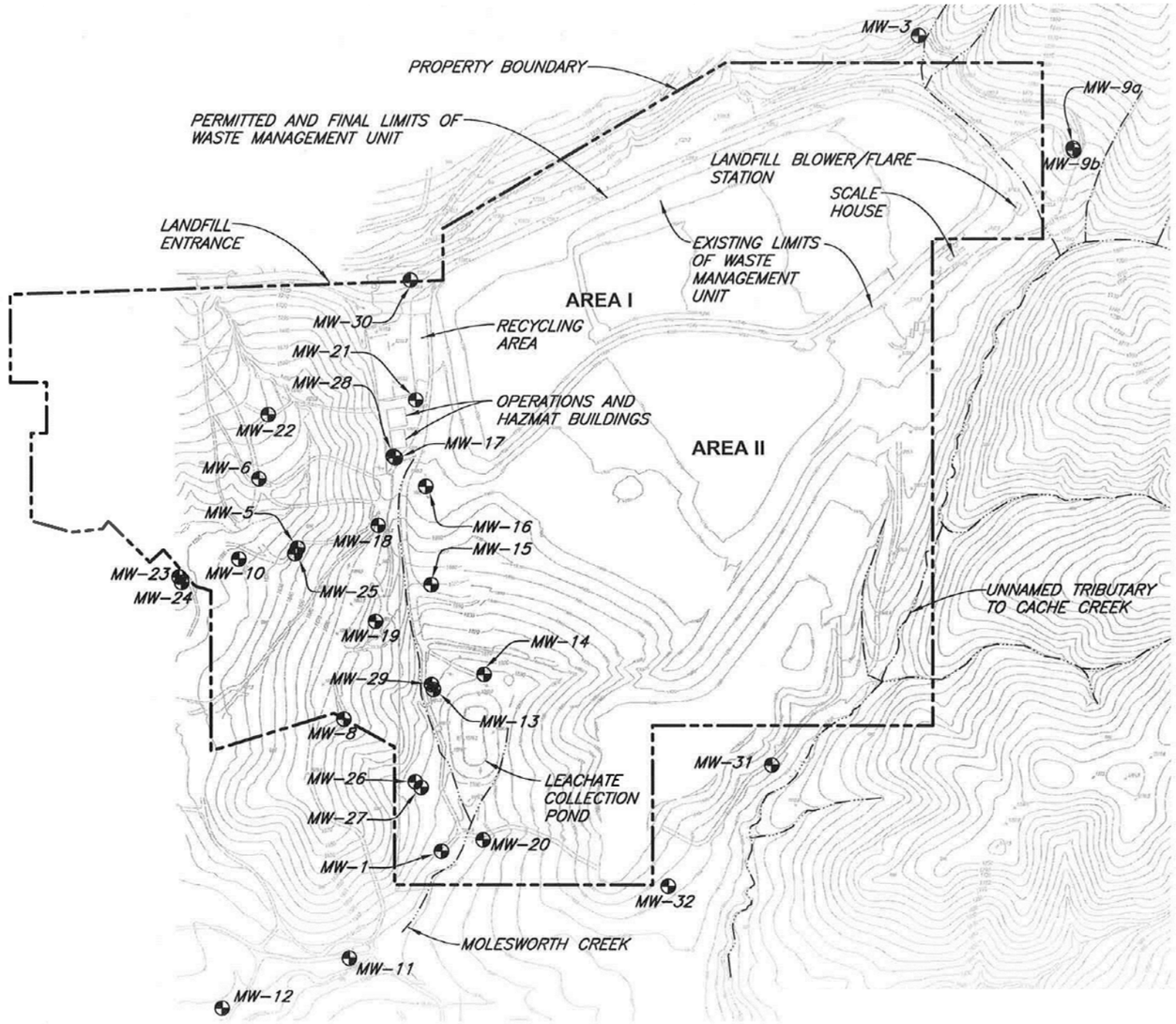
SHEET TITLE: APPROXIMATE GROUNDWATER CONTOURS MARCH 8, 2018

PROJECT TITLE: EASTLAKE LANDFILL, LAKE COUNTY, CALIFORNIA

DATE: 07/27/2018

SCALE: AS SHOWN

FIGURE: 8



EXPLANATION

MW-19 MONITORING WELL LOCATION AND DESIGNATION

N

400 0 400

SCALE IN FEET

SOURCE: SITE PLAN FROM SHN CONSULTING ENGINEERS & GEOLOGIST, INC ON JANUARY 2018

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CALIFORNIA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

PROJ. NO. 01214263.09	DWN. BY: ATV	ACAD FILE: FIGURE 9
DSN. BY: WLM	CHK. BY: WLM	APP. BY: JJM

EASTLAKE LANDFILL
LAKE COUNTY, CALIFORNIA

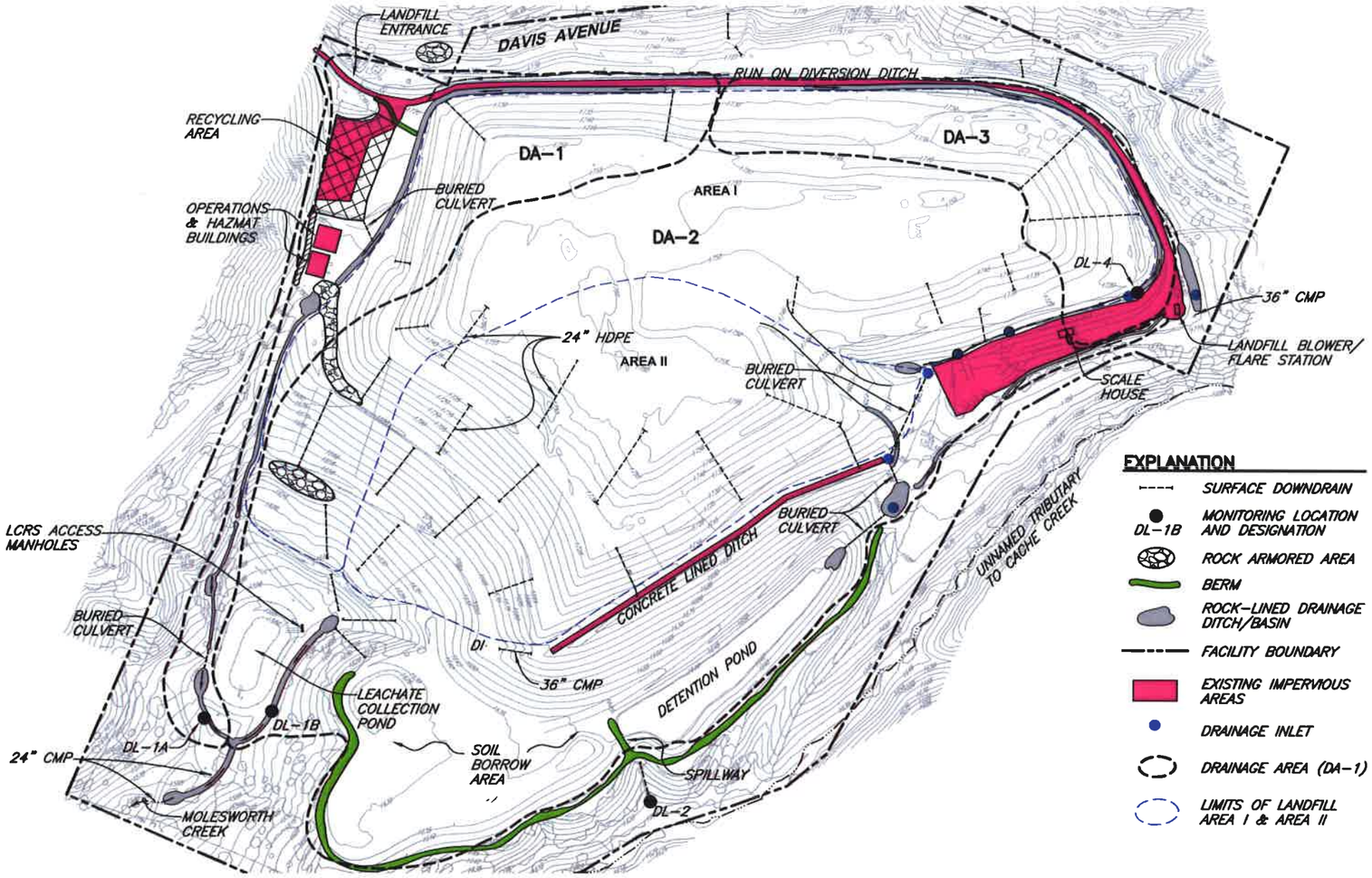
SHEET TITLE: GROUNDWATER WELL LOCATIONS

PROJECT TITLE: EASTLAKE LANDFILL
LAKE COUNTY, CALIFORNIA

DATE: 07/27/2018

SCALE: AS SHOWN

FIGURE: 9



NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASE MAP FROM SCS ENGINEERS, "SITE PLAN," DATED 06-03-16.

SOURCE:
SITE DRAINAGE
FROM SHN CONSULTING ENGINEERS & GEOLOGIST, INC
ON MARCH 2018

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CALIFORNIA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

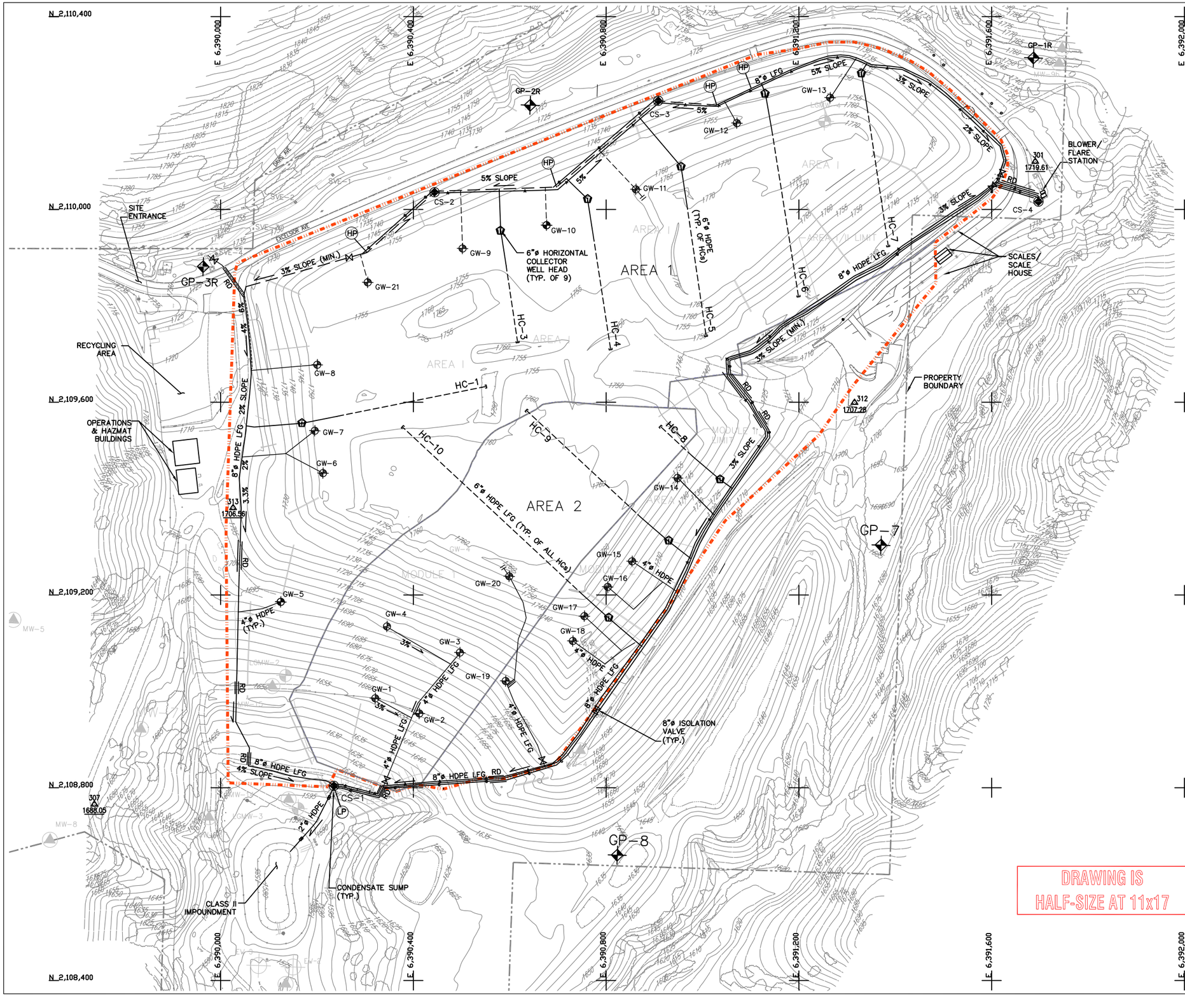
PROJ. NO.	DWN. BY:	ACAD FILE:
01214263.09	ATV	FIGURE 10
DSN. BY: WLM	CHK. BY: WLM	APP. BY: JJM

EASTLAKE LANDFILL
LAKE COUNTY, CALIFORNIA

SHEET TITLE: SITE DRAINAGE

PROJECT TITLE: EASTLAKE LANDFILL
LAKE COUNTY, CALIFORNIA

DATE: 07/27/2018
SCALE: AS SHOWN
FIGURE: 10



LEGEND

- EXISTING MAJOR CONTOURS
- APPROXIMATE PERMITTED REFUSE LIMIT
- AREA II, MODULE 1 AND 2 LIMIT
- 8"ø — ABOVE GRADE 8"ø HDPE SDR 17 LFG HEADER
- 8"ø — BELOW GRADE 8"ø HDPE SDR 17 LFG HEADER
- 4"ø — ABOVE GRADE 4"ø HDPE SDR-17 LFG LATERAL
- 4"ø — BELOW GRADE 4"ø HDPE SDR-17 LFG LATERAL
- HC-5 — BELOW GRADE 6"ø HDPE SDR-11 HORIZONTAL COLLECTOR
- RD — ROAD CROSSING
- CONDENSATE FLOW DIRECTION
- GW-3 — LFG EXTRACTION WELL
- CS-2 — CONDENSATE SUMP
- HEADER/LATERAL ISOLATION VALVE
- HORIZONTAL COLLECTOR WELL HEAD
- 2" DIA. HDPE SDR 9 AIR LINE
- 2" DIA. HDPE SDR 11 CONDENSATE LINE
- 2" DIA. HDPE SDR 11 CONDENSATE DRAIN LINE
- (LP) LFG HEADER LOW POINT
- (HP) LFG HEADER HIGH POINT
- LS-1 — EXISTING LEACHATE SUMP
- LGMW-3 — EXISTING LFG MONITORING WELL
- GP-1R — EXISTING LFG PROBE
- 312 1707.28 / 301 1719.61 / 313 1706.56 — SURVEY CONTROLS

DRAWING IS HALF-SIZE AT 11x17

COORDINATE SYSTEM/DATUM INFO

COORDINATE SYSTEM:
CALIFORNIA STATE PLANE, ZONE 2.

HORIZONTAL DATUM: NAD 83

VERTICAL DATUM: NAVD 88

TOPOGRAPHICAL NOTES

1. AERIAL FLIGHT DATE 1-31-18 PERFORMED BY GEOMAPS; TOPOGRAPHIC & SURVEY DATA PROVIDED BY SHN LAND SURVEYING.

2. TOPOGRAPHY SHOWN IS A PORTION OF THE ENTIRE FLIGHT AREA AND IS BEING PRESENTED TO FOCUS ON THE PERMITTED FILL AREA. ENTIRE TOPOGRAPHY WILL BE SENT UNDER DIFFERENT COVER.

NO.	REVISION	DATE
	SCS INTERNAL REVIEW	5/21/18

SHEET TITLE: EXISTING LFG SYSTEM PLAN

PROJECT TITLE: EASTLAKE LANDFILL
LFG CONTROL PLAN
LAKE COUNTY, CALIFORNIA

EASTLAKE SANITARY LANDFILL
COUNTY OF LAKE
CLEARLAKE, CALIFORNIA

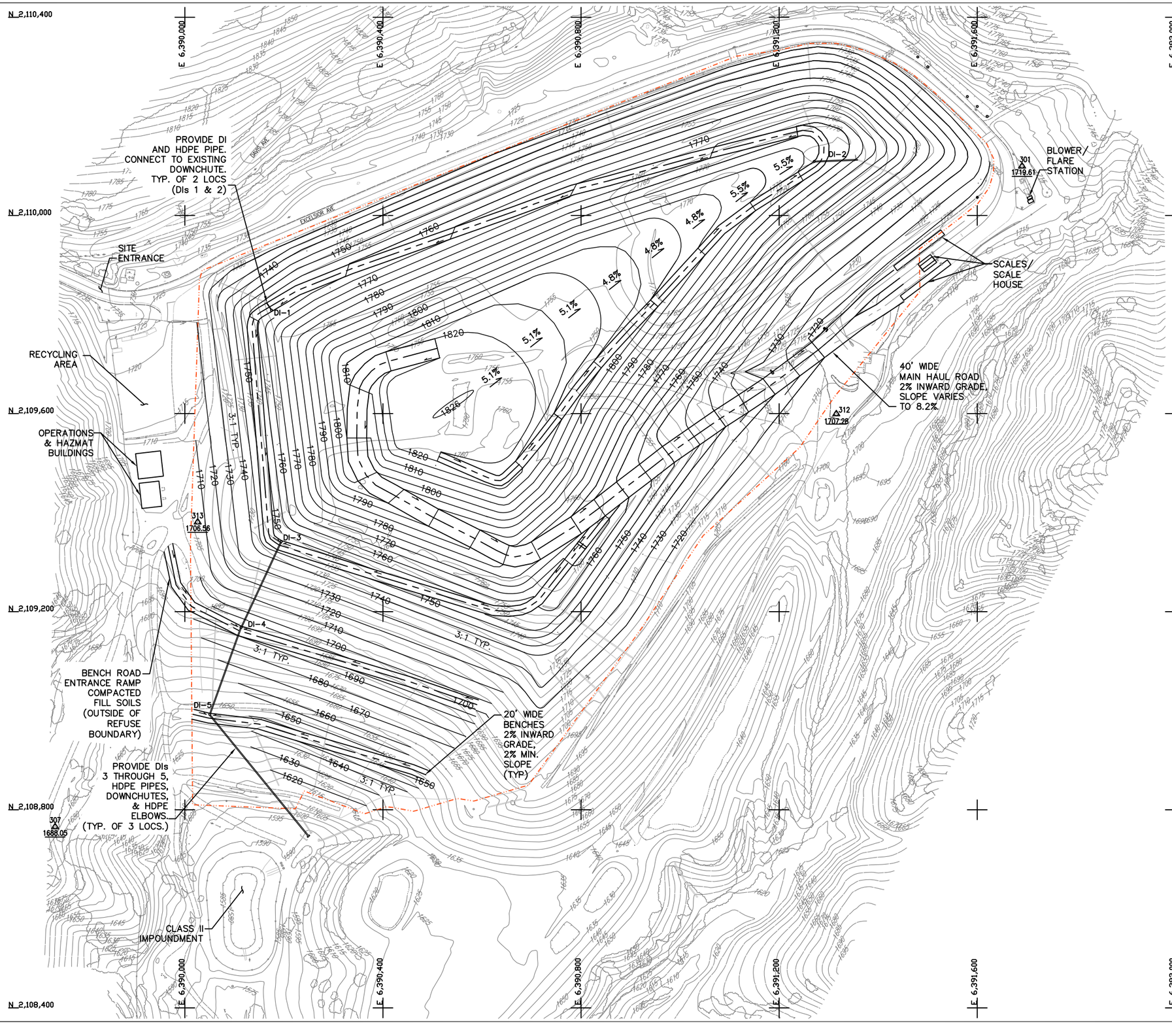
SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
CONSULTING ENGINEERS & CONTRACTORS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

PROJ. NO. 01214263.08 T1 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: AAM | ACAD FILE: LFG SYS 062518 | APP. BY: JJM

DATE: 6-25-18

SCALE: AS SHOWN

FIGURE: 11



50 0 50 100 150
SCALE 1"=100'

DRAWING IS HALF-SIZE AT 11x17

LEGEND

- EXISTING MAJOR CONTOURS (1770)
- REVISED PERMITTED FILL GRADES (MODIFIED FOR NEW TOPO) (1810)
- APPROXIMATE PERMITTED REFUSE LIMIT
- DRAINAGE DOWNCHUTE (CORRUGATED HDPE) DIAMETER TBD.
- DI-2 DROP INLET (DI) (48"ø HDPE) H-20 STEEL GRATE COVERS
- DRAINAGE FLOW DIRECTION
- 301 1719.61 SURVEY CONTROLS
- 312 1707.28
- 313 1706.56

GENERAL NOTES

1. FINAL PERMITTED GRADES SHOWN WERE REVISED BY SCS AT THE DIRECTION OF THE COUNTY (DATED, MAY 2018) AND MODIFIED BASED UPON THE APPROVED PERMITTED FILL GRADING PLAN DESIGNED BY EBA ENGINEERING (EBA) IN 2005.

2. REVISED FINAL PERMITTED GRADING INDICATES A MAXIMUM SITE ELEVATION OF 1826 FEET MEAN SEA LEVEL (FT. MSL).

3. DRAINAGE DOWNCHUTE LOCATIONS ARE APPROXIMATE, SHOWN FOR INFORMATIONAL PURPOSES, AND MAY CHANGE DUE TO FINAL GRADING CONSIDERATIONS.

COORDINATE SYSTEM/DATUM INFO

COORDINATE SYSTEM:
CALIFORNIA STATE PLANE, ZONE 2.

HORIZONTAL DATUM: NAD 83

VERTICAL DATUM: NAVD 88

TOPOGRAPHICAL NOTES

1. AERIAL FLIGHT DATE 1-31-18 PERFORMED BY GEOMAPS; TOPOGRAPHIC & SURVEY DATA PROVIDED BY SHN LAND SURVEYING.

2. TOPOGRAPHY SHOWN IS A PORTION OF THE ENTIRE FLIGHT AREA AND IS BEING PRESENTED TO FOCUS ON THE PERMITTED FILL AREA. ENTIRE TOPOGRAPHY WILL BE SENT UNDER DIFFERENT COVER.

NO.	REVISION	DATE
1	CLIENT DELIVERABLE	5/2/18

SHEET TITLE: FINAL GRADING & DRAINAGE PLAN

PROJECT TITLE: EASTLAKE LANDFILL AERIAL/AIR SPACE LAKE COUNTY, CALIFORNIA

EASTLAKE SANITARY LANDFILL
COUNTY OF LAKE
CLEARLAKE, CALIFORNIA

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
CONSULTING ENGINEERS & CONTRACTORS
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PROJ. NO. 01214263.07 T3 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: AAM | APP. BY: AAM | ACAD FILE: EXH-1 PGP 050218

DATE: 4-24-18

SCALE: AS SHOWN

DRAWING: 12

Appendix A

CalRecycle/SWRCB – JTD Cross Reference Index

Joint Technical Document Index
CIWMB Requirements

CIWMB JTD Requirements	CIWMB Section No.	SWRCB Section No.	JTD Page(s)
General			
Name of Facility, Site Operator and Owner	21600(b)(1)(A)		6
Description of the Operation Cycle	21600(b)(1)(A)		6
Site Plan Including Boundaries, Acreage, and Buffer Zones	21600(b)(1)(B)		7
Hours of Operation	21600(b)(1)(C)		9
Waste Classification and Management			
Types and Quantities of Waste	21600(b)(2)(A)	21740(a)(1)	10-11
Waste Management Unit Classification and Siting			
Airport Safety	21600(b)(3)(A)		17
Volumetric Capacity	21600(b)(3)(B)		18
Site Life Estimate	21600(b)(3)(C)		19
Site Location (vicinity map)	21600(b)(3)(D)		19
Surrounding Land Use and Zoning (plot plan)	21600(b)(3)(E)	21750(h)4	20
Ancillary Facilities (include on plot plan)	21600(b)(3)(F)		21
Design and Construction Standards for All Waste Management Units			
Design Responsibility *{Describe how the site design provides for the surrounding physical setting}*	21600(b)(4)(A)	21750(a-h)	36
Design Responsibility *{New disposal sites shall be designed under a civil engineer}*	21600(b)(4)(B)		36
Construction Sequencing Plans	21600(b)(4)(C)		36
Grading Plan *{Include existing and proposed final contours for disposal area and borrow area}*	21600(b)(4)(D)	21090(b)-(b)(3)	36
Gas Management Plan *{Demonstrate the ability to comply with T27 20919, 20919.5 and gas control for closure plans}*	21600(b)(4)(E)		36
Operating Criteria {Demonstrate the ability to comply with the following:}			
Disposal Site Records	21600(b)(5)(A)		41
Site Security	21600(b)(5)(B)		42
Sanitary Facilities	21600(b)(5)(C)		43
Communications Systems	21600(b)(5)(D)		43

Joint Technical Document Index
CIWMB Requirements

CIWMB JTD Requirements cont'd	CIWMB Section No.	SWRCB Section No.	JTD Page(s)
Operating Criteria, cont'd. {Demonstrate the ability to comply with the following:}			
Lighting {for facilities which operate during darkness}	21600(b)(5)(E)		43
Safety Equipment	21600(b)(5)(F)		44
Personnel Requirements	21600(b)(5)(G)		44
Personnel Training	21600(b)(5)(H)		45
Supervisory Structure	21600(b)(5)(I)		46
Spreading and Compacting	21600(b)(5)(J)		46
Cover			
Cover Materials	21600(b)(6)(A)		48
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Handling			
Public Health Design Parameters	21600(b)(7)(A)		50
Salvaging Activities	21600(b)(7)(B)		50
Volume Reduction Activities	21600(b)(7)(C)		50
Equipment	21600(b)(7)(D)		51
Special Waste Handling	21600(b)(7)(E)	21740(a)(1)	52
Environmental Controls			
Nuisance	21600(b)(8)(A)		56
Fire Control	21600(b)(8)(B)		56
Leachate Control (for purposes of public health)	21600(b)(8)(C)		57
Dust Control	21600(b)(8)(D)	21090(a)(5)(B)	58
Vector Control	21600(b)(8)(E)	20425(d)(3)	58
Drainage & Erosion Control	21600(b)(8)(F)	21090(c)(4)	59
Litter Control	21600(b)(8)(G)		60
Noise Control	21600(b)(8)(H)		60
Traffic Control (within the facility)	21600(b)(8)(I)		60
Hazardous Waste/Loadchecking	21600(b)(8)(J)		62

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CIWMB Requirements

CIWMB JTD Requirements cont'd	CIWMB Section No.	SWRCB Section No.	JTD Page(s)
APPROVALS			
Compilation of Approvals	21600(b)(9)		91

CIWMB - Requirements for JTD/RDSI amendments and/or complete application package [21600(a)]	CIWMB Section No.	SWRCB Section No.	JTD Page(s)
CEQA Information	21570(f)(3)(4)		92
Conformance Finding Information	21570(f)(5)		92
Complete Closure/Postclosure Maintenance Plan	21570(f)(6)		92
Financial Assurances Operating Liability Information	21570(f)(7 and 8)		92
Land Use and/or Conditional Use Permits	21570(f)(9)		92

CIWMB - Closure/Postclosure Maintenance Plan Requirements if part of JTD - PRELIMINARY Closure Plans	CIWMB Section No.	SWRCB Section No.	JTD Page(s)
Closure Cost Estimate	21790(b)(1)	20950(f)	88
Location Maps	21790(b)(2 & 4)		65
Post-Closure Land Uses	21790(b)(5)		65, 87
Estimate of Required Closure	21790(b)(6)		65
Estimated Closure Date	21790(b)(7)		65
Closure Activities	21790(b)(8)	21090(d)	65
Site Security and Structure Removal	21790(b)(8)(A)		73
Final Cover and Grading	21790(b)(8)(B)	21090(a)-(a)(2), (a)(6), (b)-(b)(3), 21750 (f)(5)	67, 80
Construction Quality Assurance	21790(b)(8)(C)		75
Drainage and Erosion Control	21790(b)(8)(D)	21090(a)(3)-(a)(3)(B)	71, 83
Gas Monitoring	21790(b)(8)(E)	20425(d)(3)	73, 85
Leachate Monitoring	21790(b)(8)(F)	21090(c)(2)	73, 84

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CIWMB – Closure/Postclosure Maintenance Plan Requirements if part of JTD – FINAL Closure Plans	CIWMB Section No.	SWRCB Section No.	JTD Page(s)
Items Under 21790 (Preliminary Plans)	21800(c)	20425(d)(3), 20950(f), 20909(a)-(a)(3)(A)(3), 21090	66 - 73
Sequence of Closure Stages With Dates	21800(c)	21090(a)-(a)(2), (d)	66
Schedule for Disbursement	21800(d)		90

CIWMB - Closure/Postclosure Maintenance Plan Requirements if part of JTD - PRELIMINARY Postclosure Maintenance Plans	CIWMB Section No.	SWRCB Section No.	JTD Page(s)
Description of Planned Uses per 21190	21825(b)(1)	21769(b)	87
Description of Maintenance per 21180	21825(b)(2)	21769(b)	80

CIWMB - Closure/Postclosure Maintenance Plan Requirements if part of JTD - FINAL Postclosure Maintenance Plans	CIWMB Section No.	SWRCB Section No.	JTD Page(s)
Emergency Response Plans per 21130	21830(b)(1)	21769(c)	87
List of Responsible Parties	21830(b)(2)	21769(c)	78
Post-Closure Planned Uses per 21190	21830(b)(3)	21769(c)	65, 87
As-builts for Monitoring and Control Systems, etc.	21830(b)(4)	21769(c)	84 – 85
Description of Maintenance per 21180	21830(b)(5)	21769(c)	78
Operations and Maintenance plan for Gas Control System	21830(b)(6)	21769(c)	86
Plan to Report Results of Monit./Control per 21180	21830(b)(7)	21769(c)	77, 80-81, 84-86
Postclosure Mtce. Cost Estimates per 21840	21830(b)(8)	21769(c)	89

NOTE: For submitting amendments of Closure and Postclosure Maintenance Plans as part of a JTD, use Section 21780 and include the requirements of Section 21865 (b)(1)-(4).

SWRCB JTD Index

SWRCB Requirement	SWRCB Citation	Related CIWMB Citation	JTD Page Range(s) Fulfilling SWRCB Citation
Chapter 1. General Article 1. Purpose, Scope and Applicability of this Subdivision			
ə20080. General Requirements. [engineered alternatives to prescriptive standards]	20080(b-c)		If proposed: NA
Chapter 3. Criteria for All Waste Management Units, Facilities, and Disposal Sites ** Subchapter 2. Siting and Design ** Article 2. SWRCB - Waste Classification and Management ** ə20200. SWRCB - Applicability and Classification Criteria.			
Concept (& describes possible exemption)	20200(a)		if proposed: NA
Demonstration proposing to allow discharge of a particular waste to a particular landfill of lower classification	20200(a)(1)		if proposed: NA
Dedicated units/cells for certain wastes	20200(b)-(b)(2)(C)		if proposed:
Waste characterization	20200(c)		10-15
Management of liquids	20200(d)-(d)(3)		10
ə20220. Nonhazardous Solid Waste.			10
Demonstration by discharger	20220(b)-(b)(2)		-
Dewatered sludge (describes conditions for discharge)	20220(c)-(c)(3)		If sludge: NA
Ash (allows discharge of non-hazardous ash to Class III landfills w/o determining of ash is designated waste)	20220(d)		If ash: 11-13
Article 3. Waste Management Unit, Facility, or Disposal Site Classification and Siting **			
ə20240. Classification and Siting Criteria.	20240		17
ə20250. Class II: Waste Management Units for Designated Waste.	20250		If Class II: 17
ə20260. Class III: Landfills for Nonhazardous Solid Waste.	20260		If Class III: 17
Article 4. SWRCB - Waste Management Unit Construction Standards **			
ə20310. General Construction Criteria.	20310		-
ə20320. General Criteria for Containment Structures.	20320		-
ə20323 & ə20324. CQA Plan & Requirements	20323 & 20324		-
ə20330. Liners.	20330		32

SWRCB Requirement	SWRCB Citation	Related CIWMB Citation	JTD Page Range(s) Fulfilling SWRCB Citation
ə20340. Leachate Collection and Removal Systems (LCRS).	20340		33
ə20360. Subsurface Barriers.	20360		If proposed: NA
ə20365. Precipitation and Drainage Controls.	20365		34
ə20370. Seismic Design.	20370		34
ə20375. Special Requirements for Surface Impoundments.	20375		If LF facility has SI:
Subchapter 3. Water Monitoring ** Article 1. SWRCB - Water Quality Monitoring and Response Programs for Solid Waste Management Units ** ə20380. SWRCB - Applicability.			
Corrective action financial assurance	20380(b)		-
Duration of applicability	20380(c)-(c)(2)	21900	-
Limitations on engineered alternatives	20380(e)-(e)(3)		-
ə20385. Required Programs.	20385		-
ə20390. Water Quality Protection Standard (Water Standard).	20390		21
ə20395. Constituents of Concern (COCs).			
COCs	20395(a)		-
MSW COCs	20395(b)		-
ə20400. Concentration Limits.			
Proposing COCs	20400(a)-(a)(3)		-
Adoption of concentration limits	20400(b)-(b)(3)		-
Establishing a CLGB (for corrective action only)	20400(c-h)		-
Decreasing a CLGB (in DMP following a CAP)	20400(i)		-
ə20405. Monitoring Points and the Point of Compliance.	20405(a-b)		28
ə20410. Compliance Period.	20410(a-c)		-
ə20415. General Water Quality Monitoring and System Requirements.			
Section applies to all monitoring programs	20415(a)		-
G.W. Mon. System (general)	20415(b)-(b)(4)(D)		28
Sfc. Water Mon. (general)	20415(c)-(c)(2)(D)		If any: -
U.Z. Mon. (general)	20415(d)-(d)(4)		If any: -
Mon. systems designed by RG or RCE	20415(e)(1)		-
	20415(e)(2)-		-

SWRCB Requirement	SWRCB Citation	Related CIWMB Citation	JTD Page Range(s) Fulfilling SWRCB Citation
Logging of borings	(e)(2)(C)		
Shared monitoring system demonstration for contiguous Units	20415(e)(3)		If contig. Units: -
Monitoring sample QA/QC	20415(e)(4)-(e)(4)(D)		-
Sampling & analytical methods (perf. std. for)	20415(e)(5)		-
Monitoring data procurement, analysis, and submittal	20415(e)(6)-(c)(15)		-
ə20420. Detection Monitoring Program.	20420		-
ə20425. SWRCB - Evaluation Monitoring Program.	20425	re &(d)(3): 20919 et seq., 21600(b)(8)(E), 21790(b)(8)(E), 21800(c)	If newly-found release:
ə20430. Corrective Action Program.	20430		If treating a release: 28-31
Subchapter 4. Criteria for Landfills and Disposal Sites Article 2. CIWMB - Daily and Intermediate Cover			
ə20705. Standards for Daily and Intermediate (Interim) Cover.	20705		48
Subchapter 5. Closure and Post-Closure Maintenance ** Article 1. General Standards For All Waste Management Units **			
ə20950. General Closure and Post-Closure Maintenance Standards Applicable to Waste Management Units (Units) for Solid Waste.	20950	re &(f): 21780(a)(3), 21790(b)(1), 21800(c), 21820, 21840	64, 77
Article 2. Closure and Post-Closure Maintenance Standards for Disposal Sites and Landfills ə21090. Closure and Post-Closure Maintenance Requirements for Solid Waste Landfills.			
Final cover requirements (general)	21090(a)-(a)(2)	21140, 21790(b)(8)(B), 21800(c)	49
Erosion control layer	21090(a)(3)-(a)(3)(A)3.	21140, 21150, 21790(b)(8)(D), 21800(c)	49
Maintenance (& plan for)	21090(a)(4)-(a)(4)(D)		64-90
Discharges of liquids to covers (leachate & condensate)	21090(a)(5)(A)		-
Discharges of liquids to covers (other liquids)	21090(a)(5)(B)	20800, 21600(b)(8)(D)	-
Stability analysis	21090(a)(6)	21145,	34

SWRCB Requirement	SWRCB Citation	Related CIWMB Citation	JTD Page Range(s) Fulfilling SWRCB Citation
		21790(b)(8)(B)	
Grading requirements (performance standards)	21090(b)-(b)(3)	20650, 21142(a), 21150, 21600(b)(4)(D), 21790(b)(8)(B)	67
General post-closure duties	21090(c)-(c)(5)	**re (c)(2):** 21150, 21160, 21180, 21790(b)(8)(F) // **re (c)(4):** 21600(b)(8)(F)	78-87
Landfill closure deadline & extension	21090(d)	21110, 21790(b)(8), 21800(c)	66
Final cover survey(s)	21090(e)-(e)(4)	21142(b)	74
Optional clean closure	21090(f)-(f)(2)	21810	NA
ə21132. Landfill Emergency Response Plan Review.	ə21132		87
ə21400. Closure Requirements for Surface Impoundments.	ə21400		If LF facility has SI: -
ə21410. SWRCB - Closure Requirements for Waste Piles.	ə21410		If LF facility has WP: NA
Chapter 4. Documentation and Reporting For Regulatory Tiers, Permits, WDRs, and Plans Subchapter 3. Development of Waste Discharge Requirements (WDRs) and Solid Waste Facility Permits Article 2. CIWMB - Applicant Requirements.			
ə21585. SWRCB - Joint Technical Document (JTD). [format for submittal of ə21710, ə21750, ə21760 information]	21585		7-94
Article 4. SWRCB - Development of Waste Discharge Requirements (WDRs) **			
ə21710. SWRCB - Report Of Waste Discharge (ROWD) and Other Reporting Requirements. [see also ə21585]	21710	re &(c)(1-2): 21145(b), 21200, 21630	7-15, 17-40
ə21720. SWRCB - Waste Discharge Requirements (WDRs).	21720(d-f)	re &(f): 20510, 20515	-
ə21730. SWRCB - Public Participation. [proposed listing of potentially interested parties]	21730(a)		-
ə21740. SWRCB - Waste Characteristics.	21740	re & (a)(1): 21600(b)(2)(A) & (b)(7)(E)	10-13
ə21750. SWRCB - Waste Management Unit (Unit) Characteristics and Attributes to be Described in the ROWD.			
		21600(b)(4)(A)	6-8, 10-13, 17-40

SWRCB Requirement	SWRCB Citation	Related CIWMB Citation	JTD Page Range(s) Fulfilling SWRCB Citation
Analysis of potential for impairment	21750(a)		22
Support for proposed Unit classification	21750(b)	21600(b)(4)(A)	17
Listing & incorporation of supporting documents	21750(c)	21600(b)(4)(A)	7, 91
Topographic map	21750(d)(1)	21600(b)(4)(A)	65
Floodplain analysis	21750(d)(2)-(d)(2)(C)2.	21600(b)(4)(A)	18
Climate	21750(e)-(e)(6)	21600(b)(4)(A)	24
Geology	21750(f)-(f)(7)	21600(b)(4)(A) // re (f)(5): 21145, 21790(b)(8)(B)	24-25
Hydrogeology	21750(g)-(g)(7)(D)	21600(b)(4)(A)	26-28
Land/Water Use	21750(h)-(h)(5)	21600(b)(4)(A) re ¶(h)(4): 21600(b)(3)(E)	21, 26
Preliminary closure plan	21750(i)		64-90
ə21760. SWRCB - Design Report and Operations Plan.			
Design Report X preliminary and as-built plans	21760(a)(1)		-
Design Report	21760(a)(3)-(a)(4)		-
Operation Plan	21760(b)-(b)(3)		-
Subchapter 4. Development of Closure/Post-Closure Maintenance Plans ə21769. SWRCB - Closure and Post-Closure Maintenance Plan Requirements.			
Prelim. Cl/P-Cl Plan X purpose	21769(b)(1)		64, 77
Prelim. Cl/P-Cl Plan Contents X cost analysis	21769(b)(2)-(b)(2)(B)5.		88
Final Cl/P-Cl Plan	21769(c)-(c)(2)(H)3.		64-90
Chapter 5. Enforcement Article 4. Enforcement by Regional Water Quality Control Board (RWQCB) **			
ə22190. SWRCB - Mandatory Closure (Cease and Desist Orders).	22190(b)		If early closure mandated:
Chapter 6. Financial Assurances at Solid Waste Facilities and at Waste Management Units for Solid Waste Subchapter 2. Financial Assurance Requirements Article 1. Financial Assurance for Closure			
ə22207. SWRCB - Closure Funding Requirements.	22207(a)		89

SWRCB Requirement	SWRCB Citation	Related CIWMB Citation	JTD Page Range(s) Fulfilling SWRCB Citation
Article 2. Financial Assurance for Postclosure Maintenance			
ə22212. SWRCB - Post-Closure Funding Requirements.	22212(a)		89
Article 4. Financial Assurance Requirements for Corrective Action			
ə22222. SWRCB - Corrective Action Funding Requirements.	22222		93-94

Appendix B

Existing Permits and Approvals

SOLID WASTE FACILITY PERMIT

Facility Number: 17 - AA - 0001

1. Name and Street Address of Facility:	2. Name and Mailing Address of Operator:	3. Name and Mailing Address of Owner:
EASTLAKE SANITARY LANDFILL 16015 Davis Avenue Clearlake California	COUNTY OF LAKE Public Services Dept. 333 North Second Street Lakeport, CA 95453	SAME SA OPERATOR

4. Specifications:

a. Permitted Operations:
- ☒ Solid Waste Disposal Site
- ☐ Transfer/Processing Facility (MRF)
- ☐ Composting Facility (MSW/green material/C&G)
- ☐ Transformation Facility
- ☐ Other: _____

b. Permitted Hours of Operation: Receipt of Refuse/Waste: **07:30 A.M. to 3:00 P.M. seven days per week; closed on legal holidays**

Ancillary Operations/Facility Operating Hours: _____

c. Permitted Maximum Tonnage: **200** Tons per Day **(daily average calculated weekly)**

d. Permitted Traffic Volume: **300** Vehicles per Day

e. Key Design Parameters (Detailed parameters are shown on site plans bearing EA and CalRecycle validations):

	Total	Disposal	Transfer/Processing	Composting	Transformation
Permitted Area (in acres)	80	31			
Design Capacity (cu.yds)		6,000,000			
Max. Elevation (Ft. MSL)		1860			
Max. Depth (Ft. MSL)					
Estimated Closure Year		AD 2027			

Upon a significant change in design or operation from that described herein, this permit is subject to revocation or suspension. The attached permit findings and conditions are integral parts of this permit and supersede the conditions of any previously issued solid waste facility permit.

5. Approval:

Raymond Ruminski

Approving Officer Signature
Raymond Ruminski
Environmental Health Director

6. Enforcement Agency Name and Address:

COUNTY OF LAKE
Department of Health Services
Environmental Division
922 Bevins Court
Lakeport, CA 95453

7. Date Received by CalRecycle: June 01, 1998

8. CalRecycle Concurrence Date: July 31, 1998

9. Permit Issued Date: August 05, 1998

10. Permit Review Due Date: March 26, 2015

11. Owner/Operator Transfer Date:

SOLID WASTE FACILITY PERMIT

Facility/Permit Number:
17-AA-0001

12. Legal Description of Facility (attach map with RFI):
SE 1/4 of section 23 and N 1/2 of section 26 T13N, R7W Mt. Diable baseline & meridian

13. Findings:

a. This permit is consistent with the County Solid Waste Management Plan or the County-wide Integrated Solid Waste Management Plan (CIWMP). Public Resources Code, Section 50000.

b. This permit is consistent with standards adopted by the California Integrated Waste Management Board (CIWMB). Public Resources Code, Section 44010.

c. The design and operation of the facility is in compliance with the State Minimum Standards for Solid Waste Handling and Disposal as determined by the LEA.

d. The following local fire protection district has determined that the facility is in conformance with applicable fire standards as required in Public Resources Code, Section 44151.

e. An initial evaluation was completed and a notice of exemption for this permit action was filed.

f. A County-wide Integrated Waste Management Plan has not been approved by the CIWMB.

g. The following authorized agent has made a determination that the facility is consistent with, and designated in, the applicable general plan: Public Resources Code, Section 50000.5(a). Lake County Community Development Department, Planning Division.

h. The following local governing body has made a written finding that surrounding land use is compatible with the facility operation, as required in Public Resources Code, Section 50000.5(b). Lake Conty Planning Commission.

14. Prohibitions:

The permittee is prohibited from accepting any liquid waste sludge, non-hazardous waste requiring special handling, designated waste, or hazardous waste unless such waste is specifically listed below, and unless the acceptance of such waste is authorized by all applicable permits.

The permittee is additionally prohibited from the following items:
open burning, scavenging, large dead animals without enforcement agency approval, bio-medical waste

15. The following documents also describe and/or restrict the operation of this facility (insert document date in space):

	Date	Date
[x] Report of Facility Information	May 1998	
[x] Waste Discharge Requirements	1996	
[x] Air Pollution Permits and Variances		
[x] Local & County Ordinances		
[x] Preliminary Closure/Post Closure Plan	1996	

SOLID WASTE FACILITY PERMIT

Facility/Permit Number:
17-AA-0001

16. Self Monitoring:

a. Results of all self-monitoring programs as described in the Report of Facility Information, will be reported as follows:

Program	Reporting Frequency	Agency Reported To
monitoring and reporting program No. 96-287 (from the Waste Discharge Requirements) leachate, ground water, surface water	quarterly, semi-annually, annually, every 5 years	California Regional Water Quality Control Board, Central Valley Region
weight and volume	quarterly	LEA
vehicles per day records	quarterly	LEA
volume in place/remaining capacity calculations and aerial mapping report	annually	LEA
waste diversion records (quantities and types of recycled material being diverted from landfill)	quarterly	Local solid Waste Task Force

SOLID WASTE FACILITY PERMIT	Facility/Permit Number: 17-AA-0001

17. LEA Conditions:

a. This solid waste facility permit is subject to review by the LEA and may be suspended, revoked or modified at any time for sufficient cause.

b. No significant change in design or operation of this facility shall be undertaken without prior approval by the LEA.

c. Additional information related to compliance with this permit and state minimum standard for disposal sites shall be furnished to the LEA upon request. Additional information concerning the design and operation of the facility shall be furnished to LEA upon request.

d. All recyclable materials diverted from the waste stream shall be handled and stored as described in the most recent approved Report of Disposal Site Information or Joint Technical Document.

e. Wood and brush processing operations shall be conducted as described in the most recent Report of Disposal Site Information or Joint Technical Document. *The LEA may require more frequent removal or processing of wood waste material.*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2013-0026

CONDITIONAL WAIVER OF WASTE DISCHARGE REQUIREMENTS FOR DISASTER-RELATED WASTES DURING A STATE OF EMERGENCY WITHIN THE CENTRAL VALLEY REGION

WHEREAS, the California Regional Water Quality Control Board, Central Valley Region (hereinafter Central Valley Water Board), finds that:

1. Fires, floods, storms, earthquakes, mass mortality of animals, and other emergencies can create large amounts of waste that must be removed for disposal or recycling in order to restore property and public services facilities, repair and reopen highways, protect public health and the environment, or otherwise prevent or mitigate an emergency. These cleanup activities often necessitate temporary waste staging areas on land or at regulated waste management facilities, may involve wastes that wouldn't normally be accepted at a particular regulated waste management facility, and can create unusually large amounts of waste for landfills to handle in a short amount of time. Wastes from fires (particularly ash) may contain one or more metals at concentrations that exceed criteria in a landfill's waste discharge requirements (WDRs). Mass mortality of animals may necessitate discharge to emergency landfills when transportation offsite is determined to be a significant threat to public health and/or other animals by government agencies such as the United States Department of Food and Agriculture, the California Department of Food and Agriculture, or local county health departments. Discharges of ash, animal carcasses, or the temporary staging of large amounts of waste at regulated waste management facilities could cause a violation of the facility's WDRs unless coverage under the Conditional Waiver is obtained and its conditions are met.

APPLICABILITY, CONDITIONS, AND NOTICE OF INTENT

2. **Applicability and Conditions -** This Order conditionally waives the legal requirement for persons (including any city, county, district, or other entity) discharging waste from cleanup of an emergency or disaster area ("Dischargers") to submit a report of waste discharge (ROWD) and for the Central Valley Water Board to prescribe WDRs for the following types of emergencies and discharges of wastes:

    a. Discharges necessary to protect life or property during emergency cleanup actions following fires, floods, storms, earthquakes, or mass mortality of animals in a disaster area in which a state of emergency has been proclaimed by the Governor (Declared Disaster Areas). The requirements for obtaining coverage under this Conditional Waiver and the conditions applicable to each type of discharge are as follows:

        i. **Discharges to Regulated Landfills -** Disaster related and mass mortality wastes disposed at regulated waste disposal facilities and for which such

discharge would or could otherwise cause a violation of the WDRs for the facility. Refer to Finding 3 below and **Section B** of this Conditional Waiver on page 9.

ii. **Discharges to Temporary Waste Piles at Regulated Facilities -** Disaster related and mass mortality wastes discharged to temporary waste piles located at regulated waste disposal facilities. Refer to Finding 3 below and **Section C** of this Conditional Waiver on page 11.

iii. **Discharges to Temporary Waste Piles Not at Regulated Facilities -** Disaster related wastes discharged to temporary waste piles not located at regulated waste disposal facilities. Refer to Finding 3 below and **Section D** of this Conditional Waiver on page 12.

iv. **Discharges to Temporary Surface Impoundments Not at Regulated Facilities -** Disaster related wastes discharged to temporary surface impoundments not located at regulated waste disposal facilities. Refer to Finding 3 below and **Section E** of this Conditional Waiver on page 14.

v. **Discharges of Diseased Mass Mortality Wastes to Emergency Landfills -** Mass mortality wastes discharged to emergency landfills not located at regulated waste disposal facilities (only applicable to disease-related emergencies). Note: Dischargers are required to submit a site-specific ROWD within 30 days of filling any permanent emergency landfill. Refer to Finding 3 below and **Section F** of this Conditional Waiver on page 17.

b. Discharges of waste due to cleanup actions to prevent or mitigate an emergency that is **not in a Declared Disaster Area**. Refer to Finding 4 below and **Section G** of this Conditional Waiver on page 20.

General conditions applying to <u>all</u> discharges under this Conditional Waiver are included in **Section A** of this Conditional Waiver, on page 7.

3. **Notice of Intent for Wastes from a Declared Disaster Area -** Dischargers desiring coverage under this Conditional Waiver when a state of emergency is declared by the Governor must submit a Notice of Intent (NOI) to the Central Valley Water Board, as described in the conditions of this Conditional Waiver, that has been completed with the required information, and signed by the owner or authorized representative of the entity proposing to discharge. To terminate coverage, Dischargers must send a completed and signed Notice of Termination (NOT) to the Central Valley Water Board, as described in the conditions of this Conditional Waiver. For permanent emergency landfills for mass mortality wastes, the Discharger must additionally submit a ROWD within **30 days** of submitting the NOI to create an emergency landfill, as described in the conditions of this Conditional Waiver. The NOI and NOT forms are included in Attachments A and B of this Conditional Waiver.

4. **Notice of Intent for Wastes Not from a Declared Disaster Area -** Dischargers desiring coverage under this Conditional Waiver for emergencies not in a Declared Disaster Area (i.e., declared by the Governor) must either:

    a. Submit a Notice of Intent to the Central Valley Water Board and obtain a Notice of Enrollment from the Executive Officer **prior to** commencing the discharge pursuant to **Section G.1.a** of this Conditional Waiver, or

    b. Notify the Central Valley Water Board by e-mail, telephone (or voicemail if after business hours) of the location, type of discharge, and contact information before commencing the discharge and submit a Notice of Intent to the Central Valley Water Board **within 10 days after** commencing the discharge. In this instance, the Notice of Intent must include documentation that the Discharger has met the conditions described in **Section G.1.b** regarding the emergency being declared by a state or local government agency and an Incident Commander working through the Statewide Incident Management System and the California Emergency Management Agency directs that waste be discharged to mitigate the emergency.

    Refer to **Section G**. for more information on obtaining coverage under this Conditional Waiver for emergency wastes not from a Declared Disaster Area. The Discharger shall also comply with **Section A** of this Conditional Waiver and the appropriate **Sections B through F** of this Conditional Waiver that are applicable to the particular discharge.

5. When applicable, Dischargers with coverage under this Conditional Waiver must also apply for coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (State Water Board Order No. 2009-0009-DWQ) and comply with its requirements. Compliance with the requirements in the General Storm Water Permit should prevent construction pollutants from contacting storm water and prevent products of erosion from moving off site into receiving waters, and are relevant and appropriate to apply to temporary waste staging areas.

REGULATORY AND LEGAL CONSIDERATIONS

6. The discharge of waste to land in the Central Valley Region is an action subject to restrictions adopted in individual or general WDRs by the Central Valley Water Board. Alternatively, the Central Valley Water Board may adopt a conditional waiver of WDRs for properties where waste management practices meet specified conditions.

7. Water Code section[1] 13260(a)(1) requires that any person (including any city, county, district, or other entity) discharging, or proposing to discharge, wastes within the Central Valley Region that could affect the quality of waters of the state, other

[1] All section references in this Order are to the California Water Code unless otherwise noted.

than into a community sewer system, to file a ROWD with the Central Valley Water Board.

8. Unless waived, section 13263(a) requires that the Central Valley Water Board prescribe discharge requirements for any existing or proposed waste discharges within its area of jurisdiction, except discharges into a community sewer system, even if no ROWD has been filed.

9. Under emergency conditions, there is usually not time for those performing cleanup of disaster related wastes to prepare a formal ROWD and for the Central Valley Water Board to process applications and adopt new WDRs or conditional waivers, or to revise existing WDRs or waivers. Upon notification to the Central Valley Water Board, section 13269(c) waives the formal process for immediate emergency work necessary to protect life or property, immediate emergency repairs to public service facilities necessary to maintain service, or repair of existing highways, as a result of a disaster in a disaster-stricken area in which a state of emergency has been proclaimed by the Governor. However, section 13269(c) requires that the Central Valley Water Board be notified in advance of any emergency waste discharge not covered by WDRs. Furthermore, sections 13269(c) and (d) allow the Central Valley Water Board to determine not to waive WDRs or to add conditions to the statutory waiver section 13269(c).

10. Section 13269 gives the Central Valley Water Board the authority to conditionally waive the requirement to file a ROWD under 13260(a)(1) and/or the requirement to prescribe WDRs under 13263(a) for a specific discharge or specific type of discharge where such a waiver is consistent with the applicable Basin Plan, in the public interest, and the following conditions are met: 1) the waiver is conditional; 2) monitoring is conducted, except for discharges that are determined not to pose a significant threat to water quality; 3) the discharge complies with the waiver conditions; and 4) a public hearing is held.

11. According to section 13350(a)(2), any person who discharges waste in violation of any waiver condition shall be liable civilly, and remedies may be proposed, in accordance with section 13350(d) or (e).

12. A conditional waiver for a specific discharge or specific type of discharge may be terminated at any time by the State Water Board or the Central Valley Water Board. A conditional waiver is not required to be used by the Central Valley Water Board. Even if a discharger complies with all the conditions of a conditional waiver, the Central Valley Water Board may choose to regulate any specific discharge with waste discharge requirements.

13. The Central Valley Water Board has found that it is desirable to provide a conditional waiver of WDRs for cleanup of wastes following fires, floods, storms, earthquakes, or mass mortality of animals when a state of emergency has been proclaimed by the Governor, and to conditionally waive WDRs in other cases where the cleanup is necessary due to an emergency. The formal process of dischargers preparing a

ROWD and the Central Valley Water Board adopting WDRs is a several month long process that would unduly delay cleanup after these types of emergencies. Therefore, issuance of this Conditional Waiver is in the best interest of the Central Valley Water Board, the dischargers, and the public.

14. For purposes of this Conditional Waiver for the Central Valley Region, the "Basin Plan" is one of the following:

    a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*, or

    b. *The Water Quality Control Plan for the Tulare Lake Basin, Second Edition*.

15. The designated beneficial uses of groundwater in the Central Valley Region, as specified in the Basin Plan, are municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.

16. The beneficial uses of surface water in the Central Valley Region are specified in each Basin Plan for specific water bodies including major rivers, creeks, and lakes, and also apply to tributaries to these water bodies. These beneficial uses potentially include municipal and domestic supply; agricultural supply; industrial service supply; industrial process supply; groundwater recharge; freshwater replenishment; navigation; hydropower generation; water contact recreation; non-contact water recreation; commercial and sport fishing; aquaculture; warm freshwater habitat; cold freshwater habitat; estuarine habitat; wildlife habitat; preservation of biological habitats of special significance; preservation of rare, threatened, or endangered species; migration of aquatic organisms; spawning, reproduction, and/or early development; and shellfish harvesting. Refer to the appropriate Basin Plan for beneficial uses of surface water for a given body of water in the Central Valley Region.

17. The Conditional Waiver is consistent with State Water Board Resolution No. 68-16 (*Statement of Policy with Respect to Maintaining High Quality Waters in California*), the state's "Antidegradation Policy." The Central Valley Water Board must maintain high quality waters of the state unless it is demonstrated that any degradation will be consistent with the maximum benefit to the people of the state, will not unreasonably affect beneficial uses, and will not result in water quality worse than that described in the Central Valley Water Board's policies. The Conditional Waiver includes conditions that require dischargers to minimize or eliminate discharges of pollutants that can have adverse impacts on the water quality that supports beneficial uses of waters of the state. This Order imposes conditions on discharges described in Finding 2.a (Declared Disaster Areas) that would not otherwise apply following the appropriate notification to the Central Valley Water Board. All discharges regulated under this Conditional Waiver are short-term and are not expected to cause degradation of water quality. Coverage under the Conditional Waiver can be terminated if waiver conditions are not met.

18. The California Environmental Quality Act (CEQA) defines emergency as follows: "'Emergency' means a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services. 'Emergency' includes such occurrences as fire, flood, earthquake, or other soil or geologic movements, as well as such occurrences as riot, accident, or sabotage." [Public Resources Code section 21060.3.] Specific actions necessary to prevent or mitigate an emergency are exempt from CEQA. Emergency activities do not include long-term projects undertaken for the purpose of preventing or mitigating a situation that has a low probability of occurrence in the short-term. [Title 14 California Code of Regulations, section 15259(c).] For purposes of this Order, "emergency" has the same meaning as under CEQA.

19. Waivers of reports of waste discharge and waste discharge requirements for emergencies in a Declared Disaster Area are not subject to CEQA because section 13269(c) already waives such reports and requirements upon notification to the Central Valley Water Board. In addition, this Order is exempt from CEQA because the waiver and the conditions of this Order will apply only to emergency activities in a disaster area in which a state of emergency has been proclaimed by the Governor [Title 14, California Code of Regulations, section 15269(a) and Public Resources Code section 21080(b)(4)]. For emergencies that are not in a Declared Disaster Area, this Order is exempt from CEQA because the waiver and the conditions of this Order will apply only to activities necessary to prevent or mitigate an emergency, as defined by CEQA [Title 14, California Code of Regulations, section 15269(c) and Public Resources Code section 21080(b)(4)].

20. Water Code section 13267(b) provides that: "In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of having discharge or discharging, or who proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had discharged, discharges, or is suspected of having discharged or discharging, or who proposed to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. The technical reports required by this Conditional Waiver are necessary to assure compliance with its conditions.

21. The Central Valley Water Board notified interested agencies and persons of its intent to conditionally waive discharge requirements when a state of emergency has been proclaimed by the Governor, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

22. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the Conditional Waiver of discharge requirements.

23. Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with section 13320 of the California Water Code and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of the Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

THEREFORE, IT IS HEREBY ORDERED, that pursuant to California Water Code sections 13263(a), 13267, and 13269, that Order No. R5-2008-0093 is rescinded and that the Central Valley Water Board waives the requirement to submit a report of waste discharge and the requirement to establish waste discharge requirements for discharges of wastes resulting from cleanup during or after fires, floods, storms, earthquakes, and mass mortality of animals in a Declared Disaster Area, or for other discharges of wastes resulting from cleanup of emergencies, as defined above, that are not in a Declared Disaster Area, when the following conditions are met:

A. General Waiver Conditions that Apply to <u>All</u> Discharges of Emergency/Disaster Related Wastes Covered Under this Conditional Waiver

1. For dischargers seeking coverage for discharges of disaster related wastes from a Declared Disaster Area (listed under Finding 2.a), this Conditional Waiver does not become active and available until the Governor of California issues a proclamation, pursuant to Government Code sections 8625 and 8558(b), identifying area where the disaster related waste originate as being in a state of emergency. This Conditional Waiver then becomes available only for disaster related wastes from that area of the Central Valley Region which is under a state of emergency, or for any regulated landfill located in the Central Valley Region that is accepting disaster related wastes from an area within California which is under a state of emergency.

2. This Conditional Waiver applies only to disaster related waste streams from Declared Disaster Areas, or from other emergency discharges that are exempt from CEQA.

3. All conditions of this Conditional Waiver remain applicable until they have been met and Discharger submits a complete Notice of Termination, or the discharge becomes covered under WDRs or a site-specific waiver of WDRs. However, authorization to discharge under this Conditional Waiver is only in effect temporarily and shall expire under the following conditions, whichever is earliest, unless otherwise provided in writing by the Central Valley Water Board:

a) If applicable, the Governor or the Legislature terminates the state of emergency pursuant to California Government Code section 8629; or

b) The Central Valley Water Board terminates enrollment of individual Dischargers/Units[2], or all Dischargers/Units temporarily enrolled under the Conditional Waiver for a particular emergency, or terminates this Conditional Waiver in its entirety; or

c) If applicable, six (6) months have elapsed since the Governor issued a proclamation of the state of emergency in question; or

d) Six (6) months have elapsed since emergency activities began.

4. Emergency/disaster related waste management and cleanup activities must minimize or eliminate the discharge of any pollutants that could adversely affect the quality or beneficial uses of the waters of the state.

5. The Discharger shall prevent the direct or indirect discharge of emergency/disaster related wastes to any surface waters of the state (including ephemeral streams and vernal pools).

6. Emergency/disaster related waste management operations shall not be performed in a manner that creates, or contributes, to a condition of pollution or nuisance.

7. Emergency/disaster related waste management operations shall not be performed in a manner that creates, or contributes, to conditions which violate the waste discharge prohibitions promulgated in the applicable Basin Plan.

8. Emergency/disaster related wastes shall not be managed in a manner that causes corrosion, decay, or otherwise reduces or impairs the integrity of containment structures at any waste management unit.[3]

9. Emergency/disaster related wastes shall not be managed in a manner that mixes or commingles other wastes that can produce a violent reaction (including heat, pressure, fire or explosion), that can produce toxic byproducts, or that can produce any reaction products requiring a higher level of containment, or results in the mixture being classified as a restricted waste.[4]

[2] "Units" in this context refers to any regulated landfill, temporary waste pile, temporary surface impoundment, or mass mortality emergency landfill being covered under this Conditional Waiver.
[3] Pursuant to California Code of Regulations Title 27, section 20200(b)(1)
[4] Pursuant to California Code of Regulations Title 27, section 20200(b)(2)

10. Inert wastes[5] that are suitable for reuse or recycling do not require permanent disposal at a classified waste management or disposal facility (i.e., permitted landfill).

11. Waste streams covered under this Conditional Waiver shall only originate from disaster-impacted areas. These waste streams shall be discharged for treatment or permanent disposal **only** into:

    a) Liquid waste management or treatment units as allowed by waste discharge requirements issued by the Central Valley Water Board, or

    b) Solid waste management units or disposal facilities (e.g., Class III MSW landfills underlain with engineered composite liners and leachate collection systems that satisfy the requirements of State Water Board Resolution No. 93-62, and that have WDRs); or

    c) Emergency landfills established in accordance with the conditions of this Conditional Waiver; and

    d) Other categories of waste management units regulated under WDRs issued by the Central Valley Water Board that allow that type of waste.

B. Specific Waiver Conditions for Disaster Related and Mass Mortality Wastes Disposed at Regulated Waste Disposal Facilities

1. Dischargers that are owners/operators of regulated waste management or disposal facilities proposing to discharge waste from disaster-impacted areas to the regulated waste disposal facility and for which such discharge would or could otherwise cause a violation of the WDRs for the facility, shall submit a Notice of Intent to the Central Valley Water Board **within 30 days after** the initial discharge of any disaster related wastes for Declared Disaster Areas (or by schedule required in Condition G for emergencies not in a Declared Disaster Area). The Notice of Intent shall contain the information listed in Attachment A of this Conditional Waiver.

2. The Discharger shall comply with all applicable conditions in **Section A** of this Conditional Waiver.

3. Wastes (not otherwise suitable for recycling or reuse) derived from cleanup of emergency/disaster-impacted areas and managed under provisions of this Conditional Waiver shall only be discharged for permanent disposal into units that are underlain with an engineered **composite liner system and a leachate**

[5] "Inert waste" as Defined in California Code of Regulations Title 27, section 20230

collection system meeting the requirements of California Code of Regulations, title 27 (Title 27), and State Water Board Resolution No. 93-62.

4. Wastes derived from cleanup of disaster-impacted areas and discharged into regulated waste disposal facilities shall be isolated, to the extent practicable, from areas of the facility that are not lined.

5. Food wastes, animal carcasses, and other putrescible wastes derived from cleanup of disaster-impacted areas shall be discharged for disposal in compliance with conditions of this waiver and covered expeditiously.

6. Inert wastes derived from cleanup of disaster-impacted areas shall be separated and recycled when appropriate and practicable.

7. Wastes such as paint cans, gas cans, solvents, poisons, household cleaners, drums with unknown contents, electronic wastes, refrigerators, or any potentially hazardous wastes (other than ash from fire disaster areas) shall be removed from the disaster related waste stream to the extent practicable and managed in accordance with the applicable regulatory requirements.[6]

8. Disposal of large numbers of animal carcasses, and other high moisture waste streams from mass mortality (e.g., natural disaster, agricultural disease, etc.), may cause wastes to exceed moisture-holding capacity at regulated MSW landfills. To limit the impacts from such a large an additional moisture content associated with a mass mortality waste load, the owner/operator responsible for the regulated waste disposal facility should implement the following procedures:

    a) Discharge high-moisture wastes (animal carcasses, animal related wastes, etc.) only in areas of the composite lined unit with a considerable thickness of other waste.

    b) Cover each layer of high-moisture wastes (e.g., animal carcasses, animal related wastes, etc.) with at least three feet of absorbent wastes or soil.

    c) For disaster related mass mortality wastes streams that are in a liquid form (e.g. raw eggs, etc.), reduce the moisture content prior to discharge by mixing with an absorbent material (e.g., saw dust, mulch, soil, etc.).

9. The Discharger shall manage **temporary waste piles** located at a regulated disposal facility in accordance with the specific conditions in **Section C** of this Conditional Waiver, below.

[6] Requirements for hazardous waste are provided in California Code of Regulations Title 23 chapter 15 and/or Title 22 division 4.5.

10. **Within 30 days after** the completion of discharges for each emergency, the owner/operator of a regulated waste disposal facility that accepted waste from disaster-impacted areas shall submit an amendment to their Report of Waste Discharge (ROWD) (amendment to the facility's Joint Technical Document) describing the material change to their discharge, pertaining to the temporary acceptance, management, and disposal of the waste. The ROWD shall include a completed Notice of Termination form (Attachment B) and information about the waste types accepted, location of the discharge including a map, and approximate volumes discharged.

C. Specific Waiver Conditions for Disaster Related and Mass Mortality Wastes Discharged to Temporary Waste Piles Located at Regulated Waste Disposal Facilities

1. Owners/operators of regulated waste management or disposal facilities proposing to accept discharges of waste from disaster-impacted areas to a temporary waste staging area located at a regulated waste disposal facility shall submit a Notice of Intent to the Central Valley Water Board **within 30 days after** the initial discharge of any disaster related wastes for Declared Disaster Areas (or by schedule required in Section G for emergencies not in a Declared Disaster Area). The Notice of Intent shall contain the information listed in Attachment A of this Conditional Waiver.

2. The Discharger shall comply with all applicable conditions in **Section A** of this Conditional Waiver.

3. Owners/operators of regulated waste management or disposal facilities shall prevent surface runoff/runon from contacting wastes derived from cleanup of disaster-impacted areas and shall prevent erosion and transport of soils containing disaster related wastes or waste constituents by surface runoff from all temporary waste piles. The facility owner/operator shall implement management measures (MMs) and/or best management practices (BMPs) for storm water conveyance and control.

4. All wastes derived from disaster-impacted areas shall be placed at least 100 feet from any surface water of the state.

5. All waste derived from disaster-impacted areas shall be protected from flooding and inundation, in compliance with the current WDRs for the affected unit, or units, at the regulated waste disposal facility.

6. Owners/operators of regulated waste management or disposal facilities shall manage temporary waste piles for disaster related mass mortality wastes as follows:

a) Temporary waste piles for mass mortality wastes can only be located in landfill areas underlain by a composite liner system and a significant thickness of other types of solid wastes.

b) The owner/operator shall implement a plan to prevent wild animals (e.g., birds, mammals, reptiles, etc.) from coming into contact with mass mortality wastes (e.g., provide and maintain adequate cover for temporary waste piles).

c) The owner/operator shall ensure that all temporary waste piles containing mass mortality wastes are discharged into landfill prior to the end of the working day, unless sufficient information is provided to demonstrate that a proposed alternative is protective of water quality and human health for a given temporary waste pile.

d) The owner/operator shall ensure that all mass mortality wastes are covered with soil or other waste immediately after it is discharged into the landfill.

e) The owner/operator shall ensure that any storm water runoff that comes into contact with the disaster related wastes or containing waste constituents is managed as leachate.

7. Disaster related and mass mortality wastes discharged to temporary waste piles at regulated waste management or disposal facilities temporarily enrolled under this Conditional Waiver, together with any materials used to contain the temporary waste piles, shall be removed from the temporary discharge site **no later than 60 days after** authorization to discharge under this Order has expired (refer to Section A.3), or as required by the Central Valley Water Board. Alternatively, the facility owner/operator shall file an amended ROWD (Joint Technical Document) and obtain amended WDRs from the Central Valley Water Board for any waste piles that will continue to exist after authorization to discharge under this Order has expired.

8. Owners/operators of regulated waste management or disposal facilities shall submit a Notice of Termination to the Central Valley Water Board **within 10 working days** of completing removal of all disaster related wastes and restoring the site to its original condition. The Notice of Termination shall contain the information listed in Attachment B of this Conditional Waiver.

D. Specific Waiver Conditions for Disaster Related Wastes Discharged to Temporary Waste Piles <u>NOT</u> Located at Regulated Waste Disposal Facilities

1. Dischargers proposing to establish a temporary waste pile not located at a regulated waste disposal facility shall submit a Notice of Intent to the Central Valley Water Board **within 30 days after** the initial discharge of any disaster

related wastes from a Declared Disaster Area (or by schedule required in Section G for emergencies not in a Declared Disaster Area). The Notice of Intent shall contain the information listed in Attachment A of this Conditional Waiver.

2. The Discharger shall comply with all applicable conditions in **Section A** of this Conditional Waiver.

3. Owners/operators of temporary waste piles not at regulated facilities shall ensure that they are sited, designed, constructed, operated, and maintained to ensure compliance the following minimum prescriptive and performance standards:

   a) The bottom of a temporary waste pile shall be placed at least 5 feet above the highest historically known or anticipated level of groundwater, and more than 100 feet from any surface water of the state.

   b) Temporary waste piles shall be protected from inundation or washout.

   c) Temporary waste piles shall not be located on a known Holocene fault.

   d) Temporary waste piles shall not be located in areas of potential rapid geologic change (*e.g.,* landslides, debris flows, flash flood areas, *etc.*).

   e) Temporary waste piles shall be adequately covered when rainfall, wind, or other conditions exist or are predicted to exist in order to prevent rainwater infiltration and runoff, and to control fugitive dust, vectors, odors, blowing litter, and scavenging. The cover shall not consist of or contain material classified as a designated waste.[7]

   f) Temporary waste management operations that include wastes with a liquid content exceeding its moisture-holding capacity and/or containing free liquids shall comply with requirements for temporary surface impoundments in accordance with the specific conditions in Section E of this Conditional Waiver, below.

   g) Temporary waste piles shall be designed, constructed and operated to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, and washout. Surface drainage from outside of the temporary waste pile shall be diverted from the location of the temporary waste pile through implementation of MMs/BMPs for storm water control and conveyance.

[7] "Designated waste" as defined in California Code of Regulations Title 27, section 20210

4. When applicable, owners/operators of temporary waste piles not located at a regulated waste disposal facility shall obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities, and prepare a Storm Water Pollution Prevention Plan to obtain coverage under this Conditional Waiver.

5. Owners/operators of temporary waste piles not on regulated facilities shall discharge any return water or ponded water contained within the temporary waste pile to a sanitary sewer system, a regulated facility permitted to receive the wastewater, or a temporary surface impoundment managed in accordance with the specific conditions in Section E of this Conditional Waiver, below.

6. Owners/operators of temporary waste piles not on regulated facilities shall post at least one clearly visible sign listing the following minimum information: a) project name, b) brief project description, and c) operator name and phone number. The sign or signs shall be in English and any other language common in the local community to more effectively communicate the minimum contact information. The sign(s) shall be maintained as required to keep them legible and shall remain in place while temporary waste piles remain on site.

7. Solid wastes discharged to temporary waste piles not at regulated waste management or disposal facilities temporarily enrolled under this Conditional Waiver, together with any materials used to contain the temporary waste piles, shall be removed from the site as expeditiously as possible and the site shall be restored to its original state.

8. Owners/operators of temporary waste piles not on regulated facilities shall submit a Notice of Termination to the Central Valley Water Board **within 10 working days** of completing removal of all disaster related wastes and restoring the site to its original condition. The Notice of Termination shall contain the information listed in Attachment B of this Conditional Waiver.

E. Specific Waiver Conditions for Disaster Related Wastes Discharged to Temporary Surface Impoundments NOT Located at Regulated Waste Disposal Facilities

1. Dischargers proposing to establish a temporary surface impoundment not located at a regulated waste disposal facility shall submit a Notice of Intent to the Central Valley Water Board **within 30 days after** the initial discharge of any disaster related wastes from a Declared Disaster Area (or by schedule required in Condition G for emergencies not in a Declared Disaster Area). The Notice of Intent shall contain the information listed in Attachment A of this Conditional Waiver.

2. The Discharger shall comply with all applicable conditions in **Section A** of this Conditional Waiver.

3. Owners/operators of temporary surface impoundments not on regulated facilities shall ensure that they are sited, designed, constructed, operated, and maintained to ensure compliance with the following minimum prescriptive and performance standards:

    a) The bottom of a temporary surface impoundment shall be placed at least 5 feet above the highest historically known or anticipated level of groundwater, and more than 100 feet from any surface water of the state.

    b) Temporary surface impoundments shall be protected from inundation or washout.

    c) Temporary surface impoundments shall not be located on a known Holocene fault.

    d) Temporary surface impoundments shall not be located in areas of potential rapid geologic change (*e.g.,* landslides, debris flows, flashflood areas, *etc.*).

    e) Temporary surface impoundments shall be underlain by a temporary impermeable barrier (*e.g*., heavy gauge plastic with water-tight seams) or a relatively impermeable surface (*e.g.,* competent asphalt, concrete, *etc.*). The liner shall be installed prior to establishing a temporary surface impoundment and shall protect all natural geological materials from contact with the waste.

    f) Berms and containment structures of temporary surface impoundments shall be constructed of materials that minimize leakage of the wastewater and shall be composed of inert materials that will not cause adverse reactions (*e.g*., corrosion, decay, or otherwise reduce or impair the integrity of the containment structure) when placed in contact with the liquid wastes stored within the temporary surface impoundment.

    g) Temporary surface impoundments shall be designed, operated and maintained to ensure that liquid wastes are at least two feet below the top of the impoundment (measured vertically from the surface of the liquid up to the point on the surrounding lined berm or dike having the lowest elevation), and shall be designed and constructed to prevent overtopping as a result of wind conditions likely to accompany precipitation conditions.

    h) Direct pipeline discharges of liquid can occur only into temporary surface impoundments with automatic or manually operated fail-safe systems to prevent overfilling.

i) Temporary surface impoundments shall be designed and constructed to prevent scouring of containment structures at the points of liquid discharge into the impoundments.

j) Temporary surface impoundments shall be designed, constructed and operated to limit, to the greatest extent possible, inundation, erosion, slope failure, and washout. Surface drainage from outside of the temporary surface impoundments shall be diverted from the location of the temporary surface impoundment through implementation of MMs/BMPs for storm water control and conveyance.

4. Liquid hazardous wastes or "restricted hazardous wastes"[8] shall not be discharged to temporary waste piles or temporary surface impoundments.

5. When applicable, owners/operators of temporary surface impoundments not located at a regulated waste disposal facility shall obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities, and prepare a Storm Water Pollution Prevention Plan to obtain coverage under this Conditional Waiver.

6. Owners/operators of temporary surface impoundments not on regulated facilities shall ensure that only disaster related waste streams are discharged into temporary surface impoundments.

7. All visible portions of synthetic liner systems in temporary surface impoundments shall be inspected weekly, or daily as necessary, until all free liquid is removed from the surface impoundment as part of closure.[9] If, during the active life of the temporary surface impoundment, the wastes are removed and the bottom of the impoundment is cleaned down to the liner, an inspection shall be made of the bottom of the liner prior to refilling the impoundment.

8. Owners/operators of temporary surface impoundments not on regulated facilities shall post at least one clearly visible sign listing the following minimum information: a) project name, b) brief project description, and c) operator name and phone number. The sign or signs shall be in English and any other language common in the local community to more effectively communicate the minimum contact information. The sign(s) shall be maintained as required to keep them legible and shall remain in place while temporary surface impoundments remain on site.

9. Wastes discharged to temporary surface impoundments not at regulated waste management or disposal facilities, together with any materials used to contain

[8] Defined in California Health and Safety Code section 25122.7
[9] Pursuant to California Code of Regulations Title 27, section 21400(a)

the temporary surface impoundments, shall be removed from the site as expeditiously as possible and the site shall be restored to its original state.

10. Owners/operators of temporary surface impoundments not on regulated facilities shall submit a Notice of Termination to the Central Valley Water Board **within 10 working days** of completing removal of all disaster related wastes and restoring the site to its original condition. The Notice of Termination shall contain the information listed in Attachment B of this Conditional Waiver.

F. Specific Waiver Conditions for Mass Mortality Wastes Discharged to Emergency Landfills NOT Located at Regulated Waste Disposal Facilities (only applicable to disease-related emergencies)

1. Dischargers proposing to establish an emergency landfill for mass mortality wastes not located at a regulated waste disposal facility shall submit a Notice of Intent to the Central Valley Water Board **within 30 days after** the initial discharge of wastes from a Declared Disaster Area (or by schedule required in Condition G for emergencies not in a Declared Disaster Area). The Notice of Intent shall include a copy of a letter from the California Department of Food and Agriculture or other Federal, State, or local government agency stating that the mass mortality wastes cannot be transported to a rendering plant or regulated landfill due to health concerns (e.g., disease). The notice shall also include an explanation stating why other options than onsite disposal, such as onsite composting, are not feasible. In addition, the Notice of Intent shall contain the information listed in Attachment A of this Conditional Waiver.

2. The Discharger shall comply with all applicable conditions in **Section A** of this Conditional Waiver.

3. Owners/operators of mass mortality emergency landfills not on regulated facilities shall ensure that they are sited, designed, constructed, operated, and maintained to ensure compliance the following minimum prescriptive and performance standards:

   a) The bottom of an emergency landfill shall be placed at least 10 feet above the highest historically known or anticipated level of groundwater, and more than 500 feet from any surface water of the state.

   b) Emergency landfills shall be protected from inundation or washout due of floods with a 100-year return period.

   c) Emergency landfills shall not be located on a known Holocene fault.

   d) Emergency landfills shall not be located in areas of potential rapid geologic change (*e.g.,* landslides, debris flows, flashflood areas, *etc.*).

e) Emergency landfills shall not be located in areas underlain by fractured bedrock aquifer or highly permeable soils (*e.g.,* gravels, sands, and loamy sands) or in facilities that are characterized by such deposits (*e.g.,* gravel quarry).

f) For disaster related mass mortality wastes streams that are in a liquid form (e.g., raw eggs, etc.), the owner/operator shall reduce the moisture content prior to discharge by mixing with an absorbent material (e.g., saw dust, mulch, soil*, etc*.)*.*

g) The thickness of each layer of mass mortality wastes shall be limited to less than two feet, or the thickness of one animal carcass if greater than two feet.

h) Lime (or another liquid abatement material) shall be added to each layer to help reduce the generation of liquid by the mass mortality wastes.

i) Each layer of lime-covered mass mortality wastes shall be covered by at least three feet of soil, or an alternative material approved by Central Valley Water Board staff, before adding another layer of mass mortality wastes. Alternative materials shall not increase threat to underlying groundwater relative to using three feet of clean soil.

j) Mass mortality wastes shall be discharged for disposal in compliance with the conditions of this Conditional Waiver and covered at the end of each working day.

k) The final layer of disaster related mass mortality wastes discharged into the emergency landfill shall be overlain by a final layer of not less than three feet of soil, or an equivalent alternative approved by Central Valley Water Board staff. The final soil layer shall be placed in a mound configuration so that the final soil layer: 1) Overlaps the mass mortality wastes by several feet on each edge of the emergency landfill; 2) is at least three feet thick over all portions of the mass mortality wastes; and 3) is sloped to provide good drainage that does not impair the integrity of the emergency landfill. Side slopes shall not be steeper than 4 (horizontal) to 1 (vertical).

l) The owner/operator should also evaluate, implement, and document other effective waste isolation methods (and waste moisture reducing methods) in conjunction with the procedures identified above.

4. The mass mortality emergency landfill shall be designed, constructed, and operated to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, and washout. The owner/operator shall protect the

integrity of the final cover from adverse impacts due to erosion by installing and maintaining MMs/BMPs, including:

a) Installation of runon control features on the upgradient side of the emergency landfill to divert offsite storm water from the emergency landfill.

b) Installation of an effective runoff collection and conveyance ditch.

c) Grading and maintenance of the final cover to eliminate ponding of water over the emergency landfill.

d) Installation and maintenance of erosion control measures on the cover of the emergency landfill (*e.g.,* install straw mulch and/or a vegetative cover).

e) Installation of a deer fence (or equivalent) around the perimeter of the emergency landfill to discourage digging into the waste by carnivores.

5. Owners/operators of mass mortality emergency landfills not on regulated facilities shall post at least one clearly visible sign (in English) listing the following minimum information: a) clearly identify the area as an emergency landfill for animal and agricultural wastes, b) a warning against trespass, c) a description of the reason for the emergency landfill (e.g., Exotic Newcastle, Avian Flu, etc.), the type(s) of waste buried at the site (e.g., types of carcasses, egg wastes, manure, etc.), and d) the name and telephone number of the current property owner. The facility owner/operator shall post additional signs as necessary (in languages other than English) to more effectively communicate the minimum contact information (listed above) to the local community. The sign(s) shall be maintained as required to keep them legible and shall remain in place while the emergency landfill remains on site.

6. Owners/operators of mass mortality emergency landfills not on regulated facilities shall submit a ROWD to the Central Valley Water Board and apply for WDRs (using Form 200 available at www.waterboards.ca.gov/publications_forms/forms/docs/form200.pdf), and submit a filing fee for threat and complexity rating 3-C for Title 27 WDRs, currently $3,040 including the ambient water monitoring surcharge (subject to periodic change). The ROWD and application for WDRs and filing fee shall be provided to the Central Valley Water Board **within 30 days** of submitting the NOI to create an emergency landfill for disposal of disaster related mass mortality wastes. At a minimum, the ROWD shall include the following information:

a) A short description of the emergency conditions that made the emergency landfill necessary.

b) The identity, physical address, mailing address and telephone number of the current landowner.

c) Photographs taken to document the location of the emergency landfill, practices used for placement of wastes and soil layers, and the appearance of the emergency landfill after installation of the final cover.

d) A map showing the location and perimeter of the emergency landfill, its location relative to local topographical, geographical, biological, and cultural features (e.g. roads, streams, etc.), and provide Geographical Information System (GIS) data as available.

e) A simple cross section of the emergency landfill and a description of the construction (thickness of layers, distance from bottom of landfill to first groundwater, and thickness and type of final cover).

f) Estimated depth from the ground surface to first groundwater and source of the information.

g) An estimate of the amount of wastes (*e.g.,* in pounds or tons) discharged into the emergency landfill.

h) A description of measures taken to ensure that wastes and waste constituents do not migrate outside the emergency landfill or into groundwater.

i) Any other site-specific or discharger related information requested by the Central Valley Water Board.

7. Following evaluation of the ROWD, Central Valley Water Board staff may prepare WDRs if the landfill will become permanent. A monitoring and reporting program may also be issued, and may require groundwater monitoring. Clean closure of the landfill may be required if the ROWD indicates a significant potential to impact groundwater, and if the disease threat has abated to allow transportation of the mass mortality waste.

G. Specific Waiver Conditions for Discharges from Emergencies Not Within a Declared Disaster Area

1. In the event of an emergency <u>not</u> within a disaster area declared by the Governor, this Conditional Waiver may be used for waste discharges necessary to mitigate an emergency under either of the following conditions:

   a. The Discharger submits a Notice of Intent to the Central Valley Water Board **before** commencing discharges pursuant to this Conditional Waiver. Discharge of wastes in a manner requiring coverage under this Conditional

Waiver shall not occur until the Executive Officer provides the Discharger a written Notice of Enrollment stating that the proposed discharge is eligible and approved for coverage under this Conditional Waiver.

b. An emergency is declared by a state or local government agency and an Incident Commander working through the Statewide Incident Management System and the California Emergency Management Agency directs that waste be discharged to mitigate the emergency.

2. A Discharger who seeks coverage under **Section G.1.a** shall submit a ROWD **before** commencing the proposed discharges if the Executive Officer determines that a proposed discharge is not eligible for coverage under this Conditional Waiver.

3. A Discharger who seeks coverage under **Section G.1.b** shall notify the Central Valley Water Board by e-mail or telephone (or voicemail if after business hours) of the location, type of discharge, and contact information **before** commencing the discharge. The Discharger shall also submit a Notice of Intent to the Central Valley Water Board **within 10 days after** commencing the discharge, along with documentation that the Discharger has met the conditions described in Section G.1.b.

4. The Discharger shall comply with **Section A** of this Conditional Waiver and the appropriate **Sections B through F** of this Conditional Waiver that are applicable to the particular discharge.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 12 April 2013.

Original sigend by
_____
PAMELA C. CREEDON, Executive Officer

WLB

ATTACHMENT A TO ORDER NO. R5-2013-0026

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Sacramento Office:	Fresno Office:	Redding Office:
11020 Sun Center Drive #200	1685 E Street	364 Knollcrest Drive, Suite 205
Rancho Cordova, CA 95670	Fresno, CA 93706	Redding, CA 96002

NOTICE OF INTENT

TO COMPLY WITH
CONDITIONAL WAIVER OF WASTE DISCHARGE REQUIREMENTS
FOR DISASTER-RELATED WASTES DURING A STATE OF EMERGENCY
WITHIN THE CENTRAL VALLEY REGION

I. PROPERTY/FACILITY INFORMATION

Property/Facility Name:			
Property/Facility Contact:			
Property/Facility Address:			
City:	County:	State:	Zip:
Telephone:	Fax:	Email:	
Assessor Parcel Number(s):			

II. PROPERTY/FACILITY OWNER INFORMATION

Property/Facility Owner Name:			
Property/Facility Owner Mailing Address:			
City:	County:	State:	Zip:
Telephone:	Fax:	Email:	

III. PROPERTY/FACILITY OPERATOR INFORMATION

Property/Facility Operator Name:			
Mailing Address:			
City:	County:	State:	Zip:
Telephone:	Fax:	Email:	

IV. DESCRIPTION OF DISCHARGE

Describe the discharge (i.e., source(s) of discharge, pollutants of concern, period and frequency, etc.). Use additional pages as needed. Provide a map of the property/facility.

V. DESCRIPTION OF MANAGEMENT MEASURES AND BEST MANAGEMENT PRACTICES

Describe what management measures (MMs) and best management practices (BMPS) will be implemented to minimize or eliminate the discharge of pollutants to waters of the state. Use additional pages as needed. Provide a map of the property/facility showing locations of MMs/BMPs if necessary.

VI. ADDITIONAL INFORMATION

Please provide additional information, as needed or required, about the discharge and/or how the discharger intends to comply with the conditions of the Conditional Waiver (see Section A and appropriate applicable Sections under B through G). Use additional pages as needed.

VII. MAILING INFORMATION

The Notice of Intent form must be mailed to the appropriate Central Valley Water Board office (Sacramento, Fresno, or Redding). See www.waterboards.ca.gov/centralvalley/board_info/region_map/region5map.pdf for the correct office for your location, and www.waterboards.ca.gov/centralvalley/about_us/contact_us/ for our current addresses. Our addresses are also listed at the beginning of this form.

VIII. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature (Owner or Authorized Representative)	Date
Print Name	Title
Telephone Number	Email

ATTACHMENT B TO ORDER NO. R5-2013-0026

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Sacramento Office:	Fresno Office:	Redding Office:
11020 Sun Center Drive #200	1685 E Street	364 Knollcrest Drive, Suite 205
Rancho Cordova, CA 95670	Fresno, CA 93706	Redding, CA 96002

NOTICE OF TERMINATION

OF COVERAGE UNDER
CONDITIONAL WAIVER OF WASTE DISCHARGE REQUIREMENTS
FOR DISASTER-RELATED WASTES DURING A STATE OF EMERGENCY
WITHIN THE CENTRAL VALLEY REGION

I. FINAL WASTE DISPOSAL INFORMATION

Final Disposition of Waste: ☐ Off-site/Landfill Disposal ☐ On-site Reuse/Disposal ☐ Off-site Reuse/Disposal ☐ Other: _____			
Property Owner/Discharger Name:			
Property Owner/Discharger Contact and Title:			
Property Owner/Discharger Mailing Address:			
City:	County:	State:	Zip:
Telephone:	Fax:	Email:	
Assessor Parcel Number(s):			
Date(s) Waste Disposed:			
Quantity of Waste Disposed: (in cubic yards, tons, or gallons for each disposal date. Attach additional information as needed.)			
Disposal Location(s): (Attach information including a map of the disposal area(s) with locations, approximate volumes, waste types, and dates of disposal. For temporary waste piles or surface impoundments, attach information including photographs showing that all wastes have been removed and the site has been restored to its original condition.)			

II. FINAL DISPOSAL CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature (Owner or Authorized Representative)	Date
Print Name	Title

17 April 2013

NOTICE OF ADOPTION
OF
UPDATED CONDITIONAL WAIVER OF WASTE DISCHARGE REQUIREMENTS
FOR DISASTER-RELATED WASTES DURING A STATE OF EMERGENCY
WITHIN THE CENTRAL VALLEY REGION

The California Regional Water Quality Control Board, Central Valley Region adopted Order No. R5-2013-0026, *Conditional Waiver of Waste Discharge Requirements for Disaster-Related Wastes During a State of Emergency Within the Central Valley Region* (Emergency Waiver) at its meeting on 12 April 2013. The updated Emergency Waiver is available on our website at www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders under the topic "Waivers".

The Emergency Waiver provides a mechanism for management and disposal of emergency/disaster related wastes resulting from fires, floods, storms, earthquakes, and mass mortality of animals. The Emergency Waiver is available for dischargers who operate landfills that accept emergency/disaster related wastes or mass mortality wastes, dischargers operating a temporary waste pile or temporary surface impoundment in a disaster-stricken area, or dischargers constructing an emergency landfill for mass mortality wastes within the Central Valley Region. Instructions on use of the Emergency Waiver for various types of emergency discharges can be found in the "Applicability, Conditions, and Notice of Intent" section of the Emergency Waiver (Findings 2 through 5). Notice of Intent and Notice of Termination forms are included in Attachments A and B of the Emergency Wavier, respectively.

If you have any questions, please call Bill Brattain at (916) 464-4622.

ROBERT D. BUSBY, M.S., P.G., C.E.G.
Supervising Engineering Geologist

cc: Gary Brickler, United States Department of Agriculture - Veterinary Services, Sacramento
Patrick Pulupa, Office of Chief Counsel, State Water Resources Control Board, Sacramento
Leslie Graves, State Water Resources Control Board, Sacramento
John Menke, State Water Resources Control Board, Sacramento
Scott Walker, California Department of Resources Recycling and Recovery, Sacramento
Bob Holmes, California Department of Resources Recycling and Recovery, Sacramento
Jeff Woled, California Department of Toxic Substances Control, Sacramento
Dennis Wilson, California Department of Food and Agriculture, Sacramento
John Rowden, California Department of Food and Agriculture, Sacramento
Richard Breitmeyer, California Department of Food and Agriculture, Sacramento
Mark Johnson, California Emergency Management Agency, Sacramento

James Glover, California Department of Public Health, Sacramento
Ben Sun, California Department of Public Health, Sacramento
Michael Guzzelta, California Air Resources Board, Sacramento
Mee Ling Tung, Alameda County Department of Environmental Health, Alameda
Michael Israel, Amador County Environmental Health Services, Jackson
Brad Banner, Butte County Health Department, Oroville
Brian Moss, Calaveras County Department of Environmental Health, San Andreas
Martin Winston, Colusa County Environmental Health Division, Colusa
Marilyn Underwood, Contra Costa Health Services Department, Concord
Greg Stanton, El Dorado County Health Department, Placerville
Tim Casagrande, Fresno County Department of Community Health, Fresno
Mike Cassetta, Glenn County Health Services Department, Willows
Matthew Constantine, Kern County Environmental Health Services Department, Bakersfield
Jeff Taber, Kings County Environmental Health Department, Hanford
Ray Ruminski, Lake County Environmental Health Department, Lakeport
Doug Ames, Lassen County Health Department, Susanville
Jill Nishi, Madera County Environmental Health Department, Madera
Jeff Palsgaard, Merced County Division of Environmental Health, Merced
Greg Pirie, Napa County Local Enforcement Agency, Napa
Daniel Chatigny, Nevada County Department of Environmental Health, Nevada City
Wesley Nicks, Placer County Department of Environmental Health, Auburn
Jerry Sipe, Plumas County Environmental Health, Quincy
Lisa Todd, Sacramento County Environmental Management Dept., Sacramento
Robert Shingai, San Benito County Health Department, Hollister
Donna Heran, San Joaquin County EHD, Stockton
Russ Mull, Shasta County Division of Environmental Health, Redding
Mike Moses, Siskiyou County Public Health Department, Yreka
Ricardo Serrano, Solano County Department of Resource Management, Fairfield
Janis Mein, Stanislaus County Environmental Resources, Modesto
Tim Potanovic, Tehama County Department of Environmental Health, Red Bluff
Lawrence Dwoskin, Tulare County Department of Health Services, Visalia
Brenda Faw, Tuolumne County Health Department, Sonora
Leslie Lindbo, Yolo County Environmental Health Department, Woodland
Tejinder Maan, Yuba County Environmental Health Department, Marysville
Alameda County Public Works, Hayward
Alpine County Public Works, Markleeville
Amador County Public Works, Jackson
Mike Crump, Butte County Department of Public Works, Oroville
Calaveras County Department of Public Works, San Andreas
James A. Belt, Colusa County Dept. of Public Works, Colusa
Contra Costa County Public Works Department, Martinez
El Dorado County Public Works, Placerville
Fresno County Dept. of Public Works, Fresno
Glenn County Planning and Public Works, Willows
Kern County Planning and Public Works Department, Bakersfield
Lake County Dept. of Public Works, Lakeport
Lassen County Department of Public Works, Susanville
Madera County Planning and Public Works Department, Madera
Mariposa County Department of Public Works, Mariposa
Dana Hertfelder, Merced County Dept. of Public Works, Merced

Modoc County Dept. of Public Works, Alturas
Steven E. Lederer, Napa County Department of Public Works, Napa
Steve Castleberry, Nevada County Department of Public Works, Nevada City
Ken Grehm, Placer County Department of Public Works, Auburn
Robert A. Perreault, Plumas County Public Works Department, Quincy
Sacramento County Public Works Agency, Sacramento
Sacramento County Office of Emergency Services, McClellan
W. Michael Carrol, San Joaquin County Public Works, Stockton
Shasta County Public Works Department, Redding
Tim Beals, Sierra County Dept. of Public Works, Downieville
Sisikyou County Public Works Dept., Yreka
Solano County Public Works, Fairfield
Rob Mancha, Stanislaus County Public Works, Modesto
Douglas Gault, Sutter County Public Works Department, Yuba City
Tehama County Public Works, Gerber
Tulare County Public Works Department, Tulare
Tuolumne County Public Works Department, Sonora
John Bencomo, Yolo County Planning and Public Works, Woodland
Michael Lee, Yuba County Public Works, Marysville
Kevin Kidd, City of Anderson Public Works, Anderson
City of Angels Camp Public Works, Angels Camp
Ron Bernal, City of Antioch Public Works, Antioch
City of Arvin Public Works, Arvin
City of Atwater Public Works Department, Atwater
Bernie Schroeder, City of Auburn Public Works Department, Auburn
Melissa Whitten, City of Avenal Dept. of Public Works, Avenal
Kevin Barnes, City of Bakersfield Dept. of Public Works, Bakersfield
Balwinder Grewal, City of Brentwood Dept. of Public Works, Brentwood
City of Chico, Public Works Dept, Chico
City of Chowchilla Public Works, Chowchilla
City of Citrus Heights, Department of Public Works, Citrus Heights
City of Clearlake Public Works, Clearlake
Alan Weaver, City of Clovis, Clovis
Michael Leonardo, City of Clovis Public Utilities, Clovis
City of Colfax Department of Public Works, Colfax
Patty Hickel, City of Colusa Public Works, Colusa
City of Corcoran Public Works, Corcoran
Bob Weir, City of Davis Public Works Department, Davis
Roman Dowling, City of Delano Public Works, Delano
City of Dixon Public Works, Dixon
City of Elk Grove, Department of Public Works, Elk Grove
Juston Collins, City of Escalon Public Works, Escalon
David Miller, City of Folsom Public Works, Folsom
City of Fresno Public Works, Fresno
City of Galt Public Works, Galt
Timothy Kiser, City of Grass Valley Public Works, Grass Valley
City of Hanford Public Works Department, Hanford
Don Myshrall, City of Ione Public Works, Ione
City of Jackson Public Works, Jackson
City of Lakeport Public Works, Lakeport

Glenn Gebhardt, City of Lathrop Department of Public Works, Lathrop
City of Lincoln Department of Public Works, Lincoln
Humberto Molina, City of Livingston Public Works, Livingston
City of Lodi Public Works, Lodi
City of Los Banos Public Works, Los Banos
City of Madera Public Works, Madera
Mark Houghton, City of Manteca Public Works, Manteca
David Lamon, City of Marysville Public Works, Marysville
Pete Kampa, McCloud Community Services District, McCloud
City of Merced Department of Public Works, Merced
Dennis Turner, City of Modesto Public Works, Modesto
City of Nevada City Public Works, Nevada City
Art da Rosa, City of Oroville Public Works, Oroville
City of Paradise Public Works, Paradise
Mike Willett, City of Patterson Department Public Works, Patterson
City of Placerville Public Works, Placerville
James Murphy, City of Portola, Portola
Cyrus Abner, City of Rancho Cordova, Rancho Cordova
Bruce Henz, City of Red Bluff Public Works, Red Bluff
John McClain, City of Redding Public Works, Redding
David Melilli, City of Rio Vista Public Works, Rio Vista
Ted Johnston, City of Ripon Department of Public Works, Ripon
City of Rocklin, Department of Public Works, Rocklin
Ron Herndon, City of Roseville Public Works, Roseville
City of Sacramento, Sacramento
City of Selma Public Works, Selma
City of Shafter Public Works, Shafter
City of Shasta Lake Public Works, Shasta Lake
City of Sonora Public Works, Sonora
Gordon MacKay, City of Stockton Public Works Department, Stockton
Kevin Tobeck, City of Tracy Public Works, Tracy
City of Tulare Public Works, Tulare
City of Turlock Public Works, Turlock
Earl Neilson, City of Visalia Public Works, Visalia
Dale Pfeiffer, City of Vacaville Department of Public Works, Vacaville
Paul Paris, City of Wasco Public Works, Wasco
William T. Panos, City of West Sacramento Public Works Department, West Sacramento
Larry Panteloglow, City of Wheatland Public Works, Wheatland
City of Williams Public Works, Williams
City of Willows Public Works, Willows
City of Winters Public Works, Winters
City of Woodland Public Works, Woodland
City of Yuba City Public Works, Yuba City
Rick King, Anderson Landfill, Inc., Anderson
Paul Turek, Chemical Waste Management, Inc., Kettleman City
Jonathan Mitchell, Calaveras County Department of Public Works, San Andreas
Kevin Basso, Forward Inc., Stockton
Jeff Mills, L and D Landfill, Sacramento
David Jones, Madera Disposal Systems, Inc., Madera
Doug Landon, Kern County Waste Management Dept., Bakersfield

Caroline Chavez, Lake County Public Services Department, Lakeport
Paul Philleo, Sacramento County Waste Management & Recycling, Sacramento
Alfred Cathey, Shasta County, Redding
Roger Cummins, Siskiyou County, Yreka
Alan Abbs, Tehama County/Red Bluff Landfill Management, Red Bluff
Doug Wilson, Tulare County Resource Management Agency, Visalia
Bill Gilmour, Waste Management of Alameda County, Oakland
Linda Sinderson, Yolo County Planning and Public Works Dept., Woodland
Greg Pryor, Recology Hay Road Landfill, Inc., Vacaville
Phillip Graham, Recology Ostrom Road Landfill, Wheatland
Dick Caglia, Orange Avenue Disposal, Inc., Fresno
Michael Payne, University of California at Davis, Davis
Michael Fan, UC Davis, Davis
Jami Aggers, Stanislaus County Department of Environmental Resources, Modesto
Stephanie Ulmer, Western Placer Waste Management Authority, Auburn
Chuck White, Waste Management, Inc., Sacramento
Yvette Gomez Agredano, Solid Waste Association of North America, Sacramento
Kevin Abernathy, California Dairy Campaign, Turlock
Michael L.H. Marsh, Western United Dairymen, Modesto
Bill Van Dam, Alliance of Western Milk Producers, Sacramento
Robert Vandenheuvel, Milk Producers Council, Chino
William Mattos, California Poultry Federation, Modesto
Tad Bell, Pacific Egg and Poultry Association, Sacramento
Debbie Murdock, Pacific Egg and Poultry Association, Sacramento
Matt Bryne, California Cattlemen's Association, Sacramento
Ria de Grassi, California Farm Bureau Federation, Sacramento
Lesa Eidman, California Pork Producers Association, Sacramento
Charles Corsiglia, Foster Farms, Delhi
Ross Hamilton, Darling International, Inc., San Francisco
Sierra Club, Mother Lode Chapter, Sacramento
Sierra Club, Kern-Kaweah Chapter, Bakersfield
Bill Jennings, California Sportfishing Protection Alliance, Stockton
Ric Murphy, Deltakeeper, Stockton
Californians Against Waste, Sacramento

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2006-0108

WASTE DISCHARGE REQUIREMENTS
FOR
LAKE COUNTY PUBLIC SERVICES DEPARTMENT
EASTLAKE SANITARY LANDFILL
CLASS III LANDFILL
CLASS II SURFACE IMPOUNDMENT
CONSTRUCTION, OPERATION, AND CORRECTIVE ACTION
LAKE COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Water Board) finds that:

1. The County of Lake, Lake County Public Services Department (hereafter Discharger) owns and operates the Eastlake Sanitary Landfill, a municipal solid waste landfill located on Davis Road at the eastern edge of the City of Clearlake, in Section 26, T13N, R7W, MDB&M, as shown in Attachment A, which is incorporated herein and made part of this Order by reference.

2. The facility consists of one existing unlined waste management unit (Unit) covering 22.4 acres (Area I) and a lined Unit covering 12.3 acres (Area II) of which 6.5 acres was lined during 1999 (Module 1) and 4.8 acres was lined during 2003 (Module 2), as shown in Attachment B, which is incorporated herein and made part of this Order by reference. A 1.0-acre area of Area II, Module 2 remains to be constructed. The facility is comprised of Assessor's Parcel Numbers (APN) 41-221-14,15; 41-222-34; 41-223-24; 41-224-39; 41-225-25; 41-226-17,22,23,24,25; 41-233-28; 41-234-01,23,24; 41-235-11,13,14; 41-244-18; 10-006-84, and 10-008-03,39.

3. The Discharger submitted an 11 July 2006 amended Report of Waste Discharge (RWD) and a 4 August 2006 Report of Disposal Site Information as part of the Joint Technical Document (JTD) for the landfill requesting approval to begin accepting treated wood waste in the lined Area II landfill unit, and to begin accepting non-friable asbestos. The information in the RWD/JTD has been used in writing these waste discharge requirements (WDRs). The RWD/JTD contains the applicable information required in Title 27, California Code of Regulations (CCR), Chapter 4, Subchapter 3, Article 4.

4. On 24 July 1998, the Regional Water Board issued Order No. 98-159, in which the both the unlined and lined landfill Units were classified as a Class III waste disposal site for the discharge of municipal solids waste in accordance with the regulations in effect when the Order was issued. On 6 December 2002, the Regional Water Board rescinded Order No. 98-159 and issued Order No. R5-2002-0217, which approved the Discharger's liner performance

demonstration for the Module 2 side slope liner system for the Area II lined landfill unit that was constructed during 2003. The current Order continues to classify the Units as a Class III landfill that accepts municipal solid waste in accordance with Title 27, CCR §20005, et seq. (Title 27).

5. The facility also includes a 600,000 gallon lined Class II surface impoundment for collection of leachate generated from the landfill Units. The surface impoundment liner system consists of an 80-mil high-density polyethylene (HDPE) geomembrane over a Geonet and gravel leachate collection and removal system (LCRS). The secondary liner system consists of a 40-mil HDPE geomembrane and a geosynthetic clay liner (GCL). The surface impoundment discharges the leachate to the sanitary sewer system that drains to the Southeast Regional Wastewater Treatment Plant.

SITE DESCRIPTION

6. The geologic sequence at the site consists predominantly of the Tertiary-age Cache Formation, which is unconformably underlain by bedrock of the Franciscan Formation. The Cache Formation generally consists of a thick sequence of poorly sorted gravel, silt, clay and sand. Locally occurring lenses of silty sand to clayey silts are located throughout the Cache Formation. At the site, the Franciscan bedrock is primarily comprised of a fractured, weathered fine to medium grained sandstone with some occurrences of siltstone.

7. The closest Holocene faults are approximately two miles northwest (Cross Springs Fault) and two miles west (Clover Valley Fault) of the site. The Maximum Credible Earthquake for these faults range between 6.5 and 6.7 on the Richter scale with a resulting Peak Ground Acceleration (PGA) of 0.58g.

8. Land uses within 1-mile radius of the facility are zoned residential, commercial, agricultural, and open space.

9. The facility receives an average of 27 inches of precipitation per year. The mean pan evaporation is 60 inches per year.

10. The 100-year, 24-hour precipitation event is estimated to be 5.9 inches, based on Lakeport gage, 13N/7W-20, Department of Water Resources "Rainfall Analysis for Drainage Design, No. IA", Bulletin No. 195, October 1976.

11. The waste management facility is not within a 100-year flood plain.

12. There are two domestic groundwater supply wells within one mile of the site.

WASTE AND SITE CLASSIFICATION

13. The Discharger discharges nonhazardous solid waste, including mixed municipal solid waste, construction/demolition debris, and dewatered water treatment sludge to lined and unlined Class III waste management units at the landfill. These classified wastes may be discharged only in accordance with Title 27, CCR, Resolution No. 93-62, and the Code of Federal Regulations, Title 40, Part 258 as required by this Order. The Discharger also discharges landfill leachate to a lined Class II surface impoundment at the landfill. Sewage treatment sludge and septic tank wastewater are not accepted.

14. The Discharger proposes to accept treated wood waste at the lined portion (Area II) of the landfill. "Treated wood" means wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). Existing law regulates the control of hazardous waste, but exempts from the hazardous waste control laws, wood waste that is exempt from regulation under the federal Resource Conservation and Recovery Act of 1976, as amended (RCRA), if (a) the wood waste is disposed of in a municipal landfill that meets certain requirements imposed pursuant to the Porter-Cologne Water Quality Control Act for the classification of disposal sites, and (b) the landfill meets other specified requirements outlined in Sections 25143.1.5 and 25150.7 of the Health and Safety Code. Section 25150.8 of the Health and Safety Code also provides that if treated wood waste is accepted by a solid waste landfill that manages and disposes of the treated wood waste in the manner specified, the treated wood waste shall be deemed to be a solid waste, and not a hazardous or designated waste. The Discharger has indicated that all treated wood waste accepted at the landfill will be handled and disposed of in accordance with the provisions outlined in Sections 25143.1.5, 25150.7, and 25150.8 of the Health and Safety Code.

15. The Discharger also proposes to accept non-friable asbestos at the landfill consisting of asbestos waste with less than one percent (<1%) friable asbestos.

SURFACE AND GROUND WATER CONDITIONS

16. The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.

17. Surface water from the facility drains to Molesworth Creek which is tributary to Clear Lake.

18. The landfill is in the Clear Lake basin near the foothills of the Coast Range. The designated beneficial uses of Clear Lake, as specified in the Basin Plan, are municipal and domestic supply; industrial service supply; agricultural supply; water contact and non-contact water

recreation; spawning, reproduction, and/or early development; warm fresh water habitat; cold fresh water habitat; and wildlife habitat.

19. The first encountered groundwater is about 10 to 30 feet below the native ground surface. The groundwater is unconfined. The depth to groundwater fluctuates seasonally as much as 10 feet.

20. Background monitoring data at MW-3 and MW-9b indicates background groundwater has an electrical conductivity (EC) ranging between 115 and 866 μmhos/cm, with total dissolved solids (TDS) ranging between 134 and 467 mg/l.

21. The direction of groundwater flow is toward the southwest (toward Molesworth Creek). The average groundwater gradient is approximately 0.07 feet per foot.

22. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply.

OTHER SITE INFORMATION

23. Prior to 1972, a burn dump operated to the west of the present location of the unlined landfill Unit, as shown on Attachment B. The area of the burn dump covered approximately three acres. During 1990, the burn dump was excavated and the material was placed in the unlined landfill Unit.

24. Previously, the landfill accepted empty pesticide containers for disposal at two separate areas, as shown on Attachment B. The first area was used during the early 1970's. During 1989, numerous pesticide containers and contaminated soil were excavated from the pesticide container area. This material was disposed off-site at the Kettleman Hills disposal facility. Confirmation soil samples were collected during 1989 and during additional excavation performed during 1990; the samples indicated pesticides were not present in the surrounding soils. The second pesticide container disposal area accepted triple-rinsed containers until 1988, at which time the area was capped.

25. Leachate collection was implemented at the landfill in 1975 through the installation of a series of plastic pipes set at the base of the unlined Unit to collect and remove leachate. Leachate and spring water commingled at the site of the collection. A cutoff wall was constructed at the base of the unlined Unit to collect the leachate. The leachate and spring water were discharged to Molesworth Creek. In 1982, the Regional Water Board advised the Discharger that a non-compliance condition existed at the landfill with respect to the discharge of leachate to Molesworth Creek. In March 1984, the Discharger began spray discharge of the leachate on a hillside. Leachate for spray discharge was collected from the cutoff wall and from an unlined surface impoundment located below the unlined landfill Unit. This practice was discontinued in 1997 with the completion of the Class II lined

surface impoundment. Leachate continues to be collected from the cutoff wall and conveyed to the Class II surface impoundment where it is stored for discharge to the sanitary sewer.

26. Surface water monitoring is conducted at the site to comply with the Monitoring and Reporting Program and with the General Industrial Storm Water Permit for the facility.

GROUNDWATER MONITORING

27. The groundwater monitoring system for the landfill Units consists of two background wells (MW-3 and MW-9b), two detection monitoring wells (MW-6 and MW-10), and six evaluation/corrective action monitoring wells (MW-1, MW-5, MW-8, MW-11, MW-12, and MW-13). The Point of Compliance wells are MW-5, MW-6, MW-13, and MW-14. Former background monitoring well MW-9a is screened in a different geologic unit than the detection monitoring wells; therefore, the data from this well is not used for calculation of concentration limits.

28. Monitoring wells MW-11 and MW-12 were installed to define the extent of an inorganic plume from the facility consisting primarily of sulfate and high TDS; however, the high sulfate was later found to be naturally occurring based on results of a detailed isotope analysis submitted by the Discharger. Monitoring well MW-10 was installed to define the extent of low levels of 1,1-dicholorethane and chloroethane present in MW-5. Monitoring well MW-13 was installed to evaluate groundwater quality between the unlined portion of the landfill and the Class II surface impoundment. Monitoring well MW-14 was installed as a detection monitoring wells for the lined portion of the landfill. Groundwater degradation is discussed in more detail in later Findings of this Order.

29. The unsaturated zone monitoring system consists of a pan lysimeter located beneath the sump in the lined Area II landfill Unit.

30. Volatile organic compounds (VOCs) are often the primary waste constituents detected in groundwater beneath a municipal solid waste landfill in cases of a release. Since volatile organic compounds are not naturally occurring and thus have no background value, they are not amenable to the statistical analysis procedures contained in Title 27 for the determination of a release of wastes from a Unit.

31. Sections 20415(e)(8) and (9) of Title 27 provide for the non-statistical evaluation of monitoring data that will provide the best assurance of the earliest possible detection of a release from a Unit in accordance with §20415(b)(1)(B)2.-4. of Title 27. However, Title 27 does not specify a specific method for non-statistical evaluation of monitoring data.

32. The Regional Water Board may specify a non-statistical data analysis method pursuant to Section 20080(a)(1) of Title 27. Section 13360(a)(1) of the California Water Code allows the Regional Water Board to specify requirements to protect underground or surface waters

from leakage from a solid waste site, which includes a method to provide the best assurance of determining the earliest possible detection of a release.

33. In order to provide the best assurance of the earliest possible detection of a release of non-naturally occurring waste constituents from a Unit, this Order specifies a non-statistical method for the evaluation of monitoring data.

34. The specified non-statistical method for evaluation of monitoring data provides two criteria (or triggers) for making the determination that there is an indication of a release of non-naturally occurring waste constituents from a Unit. The presence of two non-naturally occurring waste constituents above their respective method detection limit (MDL), or one non-naturally occurring waste constituent detected above its practical quantitation limit (PQL), indicates that a release of waste from a Unit may have occurred. Following an indication of a release, verification testing will be conducted at the same location to determine whether there has been a release from the Unit or the detection was a false detection. Although the detection of one non-naturally occurring waste constituent above its MDL is sufficient to provide for the earliest possible detection of a release, the detection of two non-naturally occurring waste constituents above the MDL as a trigger is appropriate due to the higher risk of false-positive analytical results and the corresponding increase in sampling and analytical expenses from the use of one non-naturally occurring waste constituent above its MDL as a trigger.

GROUNDWATER DEGRADATION, INVESTIGATION, AND CORRECTIVE ACTION

35. Groundwater at the facility has been degraded from landfill activities. Groundwater downgradient from the facility contains low levels of several VOCs and elevated concentrations of chloride and TDS. Elevated concentrations of sulfate are also present downgradient; however, the elevated sulfate and the resulting portion of the elevated TDS have been found to be naturally occurring. The Discharger has been under a corrective action program for the elevated levels of chloride since October 2004 consisting of periodic trend analysis to determine whether chloride concentrations are decreasing as predicted by the Discharger.

36. Low levels of VOCs are currently present in four groundwater monitoring wells at concentrations of less than one microgram per liter. This situation became significantly more evident during 2005 when the VOCs increased significantly in number, and were detected in four wells (MW-5, MW-8, MW-13, and MW-14) up from previously being detected in two wells (MW-5 and MW-13). At the request of Regional Water Board staff, the Discharger began investigating the source and transport mechanism for the VOCs during the Fall of 2005. Although the results showed that soil gas inside and outside of the unlined landfill unit contained high levels of methane and up to 30 VOCs, the Discharger concluded that there was not a clear correlation between the presence of VOCs in soil gas and those in groundwater. During June 2006, Regional Water Board staff approved a work plan

submitted by the Discharger to conduct another investigation to more precisely determine the transport mechanism of VOCs to groundwater (leachate, landfill gas, or both). The investigation consists of installing two groundwater monitoring wells and two landfill gas probes within the unlined landfill and monitoring them quarterly for a one-year period. Following this investigation, the Discharger will analyze the results and assess corrective action options to control the source of the VOCs and remediate impacted groundwater. This Order includes a time schedule for the Discharger to assess the transport mechanism of the VOCs and to implement source control and groundwater remediation.

LINER PERFORMANCE DEMONSTRATION

37. On 15 September 2000 the Regional Water Board adopted Resolution No. 5-00-213 Request For The State Water Resources Control Board To Review The Adequacy Of The Prescriptive Design Requirements For Landfill Waste Containment Systems To Meet The Performance Standards Of Title 27. The State Water Board responded, in part, that "a single composite liner system continues to be an adequate minimum standard" however, the Regional Water Board "should require a more stringent design in a case where it determines that the minimum design will not provide adequate protection to a given body of groundwater."

    In a letter dated 17 April 2001, the Executive Officer notified Owners and Operators of Solid Waste Landfills that "the Board will require a demonstration that any proposed landfill liner system to be constructed after 1 January 2002 will comply with Title 27 performance standards. A thorough evaluation of site-specific factors and cost/benefit analysis of single, double and triple composite liners will likely be necessary. This demonstration will be required regardless of any expansion previously authorized in current waste discharge requirements."

38. The Discharger constructed Module 2 of Area II during 2003. This expansion is an extension of the Area II liner system up the eastern side slope of Area II. The side slope is inclined at no less than 3H:1V (horizontal to vertical). The liner system design and expansion had been previously approved in Order No. 98-159; however, the Discharger was required to submit a liner performance demonstration for Regional Water Board approval as described in the previous Finding, above.

39. The Discharger submitted a liner performance demonstration report dated 24 September 2002 for Module 2 of Area II which is entirely within the upper side-slope area of Area II. The proposed design for Module 2 of Area II is the same as the previously approved liner system design that was used for Module 1, with the exception of the subdrain layer which the Discharger evaluated and determined was not needed in the upper portion of the side-slope area. Therefore, the liner system for Module 2 of Area II consists of (from top to bottom):

    - Two-foot thick soil operations layer;
    - LCRS drainage geocomposite;

- 60-mil thick HDPE geomembrane (double-sided textured);
- Geosynthetic clay liner;
- Prepared subgrade

As part of the liner performance demonstration, the consultant for the Discharger reported having performed detailed evaluations of the performance of single-composite liner systems for slopes ranging from 3H:1V to 2H:1V. These demonstrations were completed for the Class II Altamont Landfill, the Class II Western Regional Landfill and for the Class III Neal Road Landfill. Each of the liner performance evaluations indicated that the leakage potentials on these steep side slopes are very low ranging from 2×10^{-4} gallons per acre per day (gpad) to 2×10^{-5} gpad based on leachate generation rates ranging from 25 gpad to 60 gpad. These estimated leakage rates were reported to be considered negligible. Cost-benefit analysis further demonstrated that additional liner components added significant cost, but provided no significant increase in benefit. Based on the information presented in the liner performance demonstration report submitted by the Discharger, the Regional Water Board has found that the proposed side-slope single composite liner system meets the Class III performance standard required by Title 27.

SEISMIC DESIGN

40. Title 27 requires seismic design for Class III units to be based on the Maximum Probable Earthquake (MPE), or the maximum earthquake likely to happen within 100 years. Seismic design for the base liner system at the Eastlake Landfill conducted in 1998 was based on a Peak Ground Acceleration (PGA) with 10% probability of being exceeded in 250 years with a resulting PGA of 0.58g. This seismic design exceeds the required MPE. A different seismic analysis conducted in 2004 was used for design of the filling (side-slopes and benches) and closure of the landfill based on new seismic information at that time. The seismic design for the closure of the landfill has been based on a PGA with a 50% probability of being exceeded in 75 years with a resulting PGA of 0.17g. This design meets the MPE since the resulting PGA would be likely to occur within a period of 100 years (greater than 50% probability of being exceeded).

CONSTRUCTION AND ENGINEERED ALTERNATIVE

41. On 17 June 1993, the State Water Resources Control Board adopted Resolution No. 93-62 implementing a State Policy for the construction, monitoring, and operation of municipal solid waste landfills that is consistent with the federal municipal solid waste regulations promulgated under Title 40, Code of Federal Regulations, Part 258 (Subtitle D).

42. Resolution No. 93-62 requires the construction of a specified composite liner system at new municipal solid waste landfills, or expansion areas of existing municipal solid waste landfills, that receive wastes after 9 October 1993.

43. Resolution No. 93-62 also allows the Regional Water Board to consider the approval of engineered alternatives to the prescriptive standard. Section III.A.b. of Resolution No. 93-62 requires that the engineered alternative liner systems be of a composite design similar to the prescriptive standard.

44. Section 20080(b) of Title 27 allows the Regional Water Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with §20080(c)(1) and (2), the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in §20080(b), or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative liner system is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with §20080(b)(2) of Title 27.

45. Section 13360(a)(1) of the California Water Code allows the Regional Water Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.

46. The Discharger proposes a liner system which will be designed, constructed, and operated in accordance with the criteria set forth in Title 27, and the provisions in State Water Resources Control Board Resolution No. 93-62 for municipal solid wastes.

47. The Discharger submitted a Report of Waste Discharge during 1998 requesting approval of an engineered alternative to liner requirements. The Regional Water Board approved an engineered alternative liner system design for the Area II lined Unit in previous WDRs Order No. 98-159 using GCL in place of two-feet of compacted clay. Module 1 of Area II was constructed during 1999 and included the entire base liner system for Area II, as well as the side slopes up to the first bench. Module 2 of Area II (the remainder of the side slope) was constructed in 2003. The Regional Water Board has routinely approved the substitution of GCLs for the low permeability layer of a landfill liner or cover system. The Discharger was not required to repeat the demonstrations listed in Finding No. 44 because there are no significant differences in the characteristics of already approved GCLs and the low permeability layer substitution proposed for the Area II Unit. Furthermore, GCLs are more suitable for steep side slopes such as the Module 2 side-slope liner extension at the Eastlake Landfill because of the difficulties in compacting a clay liner on a steep side-slope. The issuance of these WDRs constitutes continued Regional Water Board approval of the GCL engineered alternative.

48. The Discharger adequately demonstrated that construction of a Subtitle D prescriptive standard liner would be unreasonable and unnecessarily burdensome when compared to the

proposed engineered alternative design. The Discharger has demonstrated that the proposed engineered alternative is consistent with the performance goals of the prescriptive standard and affords equivalent protection against water quality impairment.

CLOSURE, POST-CLOSURE MAINTENANCE, AND FINANCIAL ASSURANCE

49. The Discharger submitted an updated Preliminary Closure and Post-Closure Maintenance Plan (PCPCMP) dated August 2005. The PCPCMP includes information required by Title 27 CCR Section 21769(b), and includes a lump sum estimate of the cost of carrying out all actions necessary to close each Unit, to prepare detailed design specifications, to develop the final closure and post-closure maintenance plan, and to carry out the first thirty years of post-closure maintenance. The total amount of the closure cost estimate is $4,366,215 and the amount of the post-closure maintenance cost estimate is $1,401,805 (for the first 30 years of post-closure maintenance). The Regional Water Board hereby approves these cost estimates. This Order requires that the Discharger maintain financial assurance with the CIWMB in at least the amount of these cost estimates.

50. The Discharger has also submitted a cost estimate for corrective action of all known or reasonably foreseeable releases as required by Title 27 Section 22221. The amount of the approved cost estimate is $128,300 (approved by the Executive Officer on 21 July 2000). This Order requires that the Discharger maintain financial assurance with the CIWMB in at least the amount of this cost estimate.

51. Title 27 CCR Sections 21780(c)(3) and (d)(1) [sections promulgated by the CIWMB] require the Discharger to submit the final closure and post-closure maintenance plan, or for the closure of discrete units, the partial final closure and post-closure maintenance plan, at least two years prior to the anticipated date of closure. This Order requires that the Discharger obtain WDRs from the Regional Water Board with closure and post-closure maintenance requirements prior to closure.

52. For purposes of estimating closure costs and performing a slope stability analysis as required by Title 27, the August 2005 PCPCMP includes proposed final cover systems, which are as follows:

    a. For the Area I unlined landfill (from bottom to top): a 12-inch thick compacted soil foundation layer, a 60-mil textured HDPE geomembrane, a geonet composite drainage layer, and a 24-inch thick vegetative soil layer.

    b. For the Area II lined landfill (from bottom to top): a 12-inch thick compacted soil foundation layer, a GCL layer, a 60-mil textured HDPE geomembrane, and a 24-inch thick vegetative soil layer.

    The Discharger's proposed final cover systems include 12-inches of additional soil in the vegetative layer beyond the minimum requirement in Title 27, but 12-inches less in the

foundation layer. Since the purpose of the foundation layer is to provide a stable surface upon which to compact the low permeability compacted clay layer (CCL), and since the Discharger proposes to substitute a geomembrane or GCL for the CCL, a full 24-inch foundation layer is not needed. The Discharger has proposed that this soil should be used for a thicker vegetative layer instead that will, among other things, reduce the probability of failure due to over-saturation and reduce the potential for roots clogging the underlying drainage layer. The Regional Water Board hereby approves the August 2005 PCPCMP.

53. The PCPCMP estimates the final closure of the landfill will occur during the year 2027. Title 27 requires that the Discharger submit the Final Closure and Post-Closure Maintenance Plan (FCPCMP) at lease two years before the anticipated closure of the landfill. Closure WDRs should be considered by the Regional Water Board following receipt of the FCPCMP.

CEQA AND OTHER CONSIDERATIONS

54. The County of Lake, Community Development Department, Planning Division certified a Notice of Exemption for the Eastlake Landfill on 30 January 1998 in accordance with the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) and CEQA guidelines (14 CCR Section 15000 et seq.). The Notice of Exemption stated that the project consists of a plan for continued operation of an existing facility, and revisions will not result in new significant adverse environmental impacts.

55. The action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code §21000, et seq., and the CEQA guidelines, in accordance with Title 14, CCR, §15301.

56. This order implements:

    a. The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition;

    b. The prescriptive standards and performance goals of Chapters 1 through 7, Subdivision 1, Division 2, Title 27, of the California Code of Regulations, effective 18 July 1997, and subsequent revisions;

    c. The prescriptive standards and performance criteria of RCRA Subtitle D, Part 258; and

    d. State Water Resources Control Board Resolution No. 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993.

57. Section 13267(b) of California Water Code provides that: "In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had

discharged, discharges, or is suspected of discharging, or who proposed to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports."

58. The technical reports required by this Order and the attached "Monitoring and Reporting Program No. R5-2006-0108" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

59. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.

60. The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written comments and recommendations.

61. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

62. Any person affected by this action of the Regional Water Board may petition the State Water Resources Control Board to review the action in accordance with Sections 2050 through 2068, Title 23, California Code of Regulations. The petition must be received by the State Water Resources Control Board, Office of Chief Counsel, P.O. Box 100, Sacramento, California 95812, within 30 days of the date of issuance of this Order. Copies of the laws and regulations applicable to the filing of a petition are available on the Internet at http://www.waterboards.ca.gov/water_laws/index.html and will be provided on request.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that Order No. R5-2002-0217 is rescinded, and that the Lake County Public Services Department, its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of 'hazardous waste' is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in Title 23, California Code of Regulations, Section 2510 et seq.

2. The discharge of 'designated waste' anywhere at the facility other than the Class II surface impoundment is prohibited. For the purposes of this Order, the term 'designated waste' is as defined in Title 27.

3. The discharge of wastes outside of a Unit or portions of a Unit specifically designed for their containment is prohibited.

4. The discharge of waste to a closed Unit is prohibited.

5. The discharge of waste constituents to the unsaturated zone or to groundwater is prohibited.

6. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.

B. DISCHARGE SPECIFICATIONS

1. Nonhazardous wastes shall be discharged to either:

   a. The Area I unlined Unit; or

   b. To the Area II lined Unit which is equipped with a composite liner containment system and a leachate collection and removal system.

2. The discharge shall remain within the designated disposal area at all times.

3. "Treated wood" wastes may be discharged, but only to an area equipped with a composite liner and leachate collection and removal system, as described in Construction Specification D.2, and only if the wastes are handled in accordance with California Health and Safety Code Sections 25143.1.5 and 250150.7. "Treated wood" means wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). This may include but is not limited to waste wood that has been treated with chromated copper arsenate (CCA), pentachlorophenol, creosote, acid copper chromate (ACC), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), or chromated zinc chloride (CZC).

4. Treated wood must be managed to ensure consistency with Sections 25143.1.5 and 25150.7 of the Health and Safety Code. If a verified release is detected from the waste management unit where treated wood is disposed, the disposal of treated wood shall be terminated at the unit with the verified release until corrective action ceases the release.

5. Discharge Specifications B.3 and B.4, above, apply only to treated wood waste that is classified as a hazardous waste solely due to the presence of a preservative in the wood, and is not subject to regulation as a hazardous waste under the federal act.

C. FACILITY SPECIFICATIONS

1. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order.

2. The Discharger shall immediately notify the Regional Water Board of any flooding, unpermitted discharge of waste off-site, equipment failure, slope failure, significant erosion, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.

3. The Discharger shall maintain any disturbed areas, including side-slopes, to prevent erosion in accordance with the Storm Water Pollution Prevention Plan for the landfill.

4. The Discharger shall repair erosion damage or slope failure in a timely manner, and shall immediately provide interim repairs to such damaged areas if permanent repair is not immediately feasible due to wet conditions.

5. Water used for facility maintenance shall be limited to the minimum amount necessary for dust control and construction.

6. The Discharger shall maintain in good working order any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.

7. Methane and other landfill gases shall be adequately vented, removed from the Units, or otherwise controlled as needed to prevent adverse health effects, nuisance conditions, degradation, or the impairment of the beneficial uses of surface water or groundwater due to migration through the unsaturated zone.

8. Surface drainage within the waste management facility shall either be contained on-site or be discharged in accordance with applicable storm water regulations.

9. The Discharger shall maintain a *Storm Water Pollution Prevention Plan* and *Monitoring Program and Reporting Requirements* in accordance with State Water Resources Control Board Order No. 97-03-DWQ, or retain all storm water on-site.

Surface Impoundment Specifications

10. Surface impoundments shall consist of, described from top to bottom, a 80-mil HDPE geomembrane primary liner, a geonet LCRS on the sidewalls of the pond with a one foot layer of drainage gravel on the bottom of the pond, a 40-mil HDPE geomembrane liner with geosynthetic clay liner (GCL) composite secondary liner, and an appropriate bedding layer. The leachate is drained from the impoundment using a gravity drainage system from the base of the sump.

11. Surface impoundments shall be designed, constructed, and operated to maintain at least two feet of freeboard. At no time shall the freeboard of an impoundment be less than two feet.

12. Surface impoundments shall be designed, constructed, and maintained to prevent scouring and/or erosion of the liners and other containment features at points of discharge to the impoundments and by wave action at the waterline.

13. Leachate removed from a surface impoundment LCRS shall be discharged to the impoundment from which it originated.

14. Solids that accumulate in any surface impoundments shall be periodically removed to maintain minimum freeboard requirements and to maintain sufficient capacity for landfill and surface impoundment leachate and for the discharge of wastes. Prior to removal of these solids, sufficient samples shall be taken for their characterization and classification pursuant to Title 27, Division 2, Subdivision 1, Chapter 3, Article 2. The rationale for the sampling protocol used, the results of this sampling, and a rationale for classification of the solids shall be submitted to Regional Water Board staff for review. The solids may be discharged to the Class III landfill units only if Regional Water Board staff determine that the solids qualify for classification as 'nonhazardous solid waste' or 'inert waste'.

D. CONSTRUCTION SPECIFICATIONS

1. The Discharger shall submit for review and approval **prior to** construction, design plans and specifications for new Units and expansions of existing Units, that include the following:

    a. A Construction Quality Assurance Plan meeting the requirements of §20324 of Title 27; and

    b. A geotechnical evaluation of the area soils, evaluating their use as the base layer; and

    c. An unsaturated zone monitoring system, which is demonstrated to remain effective throughout the active life, closure, and postclosure maintenance periods of the Unit,

which shall be installed beneath the composite liner system in accordance with §20415(d) of Title 27.

2. The liner system for Module 2 of the Area II Unit shall be constructed in accordance with the following composite liner design (from top to bottom):

   a. a two-foot thick soil operations layer;
   b. LCRS drainage geocomposite;
   c. 60-mil thick HDPE geomembrane (double-sided textured);
   d. a geosynthetic clay liner that shall exhibit appropriate strength characteristics (hydrated) to accommodate stresses associated with specific landfill design parameters, with particular attention to interface, long-term creep shear, and bearing capacity;
   e. a subdrain geocomposite drainage layer (if necessary);
   f. prepared subgrade that is prepared in an appropriate manner using accepted engineering and construction methods so as to provide a smooth surface that is free from rocks, sticks, or other debris that could damage or otherwise limit the performance of the GCL or the HDPE geomembrane.

3. The Discharger may propose changes to the liner system design prior to construction, provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed liner system results in the protection of water quality equal to or greater than the design prescribed by Title 27 and this Order. The proposed changes may be made following approval by the Executive Officer. Substantive changes to the design require reevaluation as an engineered alternative and approval by the Regional Water Board.

4. Construction shall proceed only after all applicable construction quality assurance plans have been approved.

5. Following the completion of construction of a Unit or portion of a Unit, and prior to discharge onto the newly constructed liner system, the final documentation required in §20324(d)(1)(C) of Title 27 shall be submitted for review and approval. The report shall be certified by a registered civil engineer or a certified engineering geologist. It shall contain sufficient information and test results to verify that construction was in accordance with the design plans and specifications, and with the prescriptive standards and performance goals of Title 27.

6. A third party independent of both the Discharger and the construction contractor shall perform all of the construction quality assurance monitoring and testing during the construction of a liner system.

7. If monitoring reveals substantial or progressive increases of leachate generation above the design leachate flow volume for the Unit or portion of the Unit (landfill or surface impoundment), such that the depth of fluid on any portion of the LCRS (excluding the leachate removal pump sump) exceeds 30 cm, the Discharger shall immediately notify the Regional Water Board in writing within seven days. The notification shall include a timetable for remedial or corrective action necessary to achieve compliance with the leachate depth limitation.

8. The landfill shall be filled with final side slopes with steepness no greater than 3H:1V (3 horizontal to 1 vertical) and shall include, at a minimum, one 15 foot wide bench for every 50 feet in vertical height.

9. Closure shall not proceed without the adoption of closure waste discharge requirements.

E. DETECTION MONITORING SPECIFICATIONS

1. The Discharger shall submit for review and approval a groundwater detection monitoring program demonstrating compliance with Title 27 for any Unit expansion.

2. The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program No. R5-2006-0108. A detection monitoring program for a new Unit shall be installed, operational, and one year of monitoring data collected prior to the discharge of wastes [Title 27 CCR Section 20415(e)(6)].

3. The Discharger shall provide Regional Water Board staff a minimum of **one week** notification prior to commencing any field activities related to the installation, repair, or abandonment of monitoring devices, and a minimum 48 hour notification prior to the collection of samples associated with a detection monitoring program, evaluation monitoring program, or corrective action program.

4. The Discharger shall comply with the Water Quality Protection Standard as specified in this Order, Monitoring and Reporting Program No. R5-2006-0108, and the Standard Provisions and Reporting Requirements, dated April 2000.

5. The Water Quality Protection Standard for organic compounds which are not naturally occurring and not detected in background groundwater samples shall be taken as the detection limit of the analytical method used (i.e., US-EPA methods 8260 and 8270). The repeated detection of one or more non-naturally occurring organic compounds in samples above the Water Quality Protection Standard from detection monitoring wells is evidence of a release from the Unit.

6. The concentrations of the constituents of concern in waters passing the Point of Compliance shall not exceed the concentration limits established pursuant to Monitoring and Reporting Program No. R5-2006-0108.

7. For each monitoring event, the Discharger shall determine whether the landfill is in compliance with the Water Quality Protection Standard using procedures specified in Monitoring and Reporting Program No. R5-2006-0108 and Title 27 CCR Section 20415(e).

8. The Discharger shall submit for review and approval a Sample Collection and Analysis Plan. The Sample Collection and Analysis Plan shall at a minimum include:

    a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;

    b. Sample preservation information and shipment procedures;

    c. Sample analytical methods and procedures;

    d. Sample quality assurance/quality control (QA/QC) procedures; and

    e. Chain of Custody control.

9. For any given monitored medium, the samples taken from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be taken **within a span not to exceed 30 days**, unless a longer time period is approved, and shall be taken in a manner that ensures sample independence to the greatest extent feasible. Specific methods of collection and analysis must be identified. Sample collection, storage, and analysis shall be performed according to the most recent version of USEPA Methods, such as the latest editions, as applicable, of: (1) Methods for the Analysis of Organics in Water and Wastewater (USEPA 600 Series), (2) Test Methods for Evaluating Solid Waste (SW-846, latest edition), and (3) Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and in accordance with the approved Sample Collection and Analysis Plan.

10. If methods other than USEPA-approved methods or Standard Methods are used, the exact methodology shall be submitted for review and approval prior to use.

11. The **methods of analysis and the detection limits** used must be appropriate for the expected concentrations. For the monitoring of any constituent or parameter that is found in concentrations which produce more than 90% non-numerical determinations (i.e., “trace” or “ND”) in data from background monitoring points for that medium, the analytical method having the lowest method detection limit (MDL) shall be selected from

among those methods which would provide valid results in light of any matrix effects or interferences.

12. **"Trace" results** - results falling between the MDL and the practical quantitation limit (PQL) - shall be reported as such, and shall be accompanied both by the estimated MDL and PQL values for that analytical run.

13. **MDLs and PQLs** shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific analytical procedure and equipment used by the lab, rather than simply being quoted from USEPA analytical method manuals. In relatively interference-free water, laboratory-derived MDLs and PQLs are expected to closely agree with published USEPA MDLs and PQLs.

14. If the laboratory suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged accordingly, along with estimates of the detection limit and quantitation limit actually achieved. The **MDL shall always be calculated such that it represents the lowest achievable concentration associated with a 99% reliability of a nonzero result**. The PQL shall always be calculated such that it represents the lowest constituent concentration at which a numerical value can be assigned with reasonable certainty that it represents the constituent's actual concentration in the sample. Normally, PQLs should be set equal to the concentration of the lowest standard used to calibrate the analytical procedure.

15. All **QA/QC data** shall be reported, along with the sample results to which they apply, including the method, equipment, analytical detection and quantitation limits, the percent recovery, an explanation for any recovery that falls outside the QC limits, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and qualifications of the person(s) performing the analyses. Sample results shall be reported unadjusted for blank results or spike recoveries. In cases where contaminants are detected in QA/QC samples (i.e., field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged.

16. Unknown chromatographic peaks shall be reported, flagged, and tracked for potential comparison to subsequent unknown peaks that may be observed in future sampling events. Identification of unknown chromatographic peaks that recur in subsequent sampling events may be required.

17. The statistical method shall account for data below the practical quantitation limit (PQL) with one or more statistical procedures that are protective of human health and the environment. Any PQL validated pursuant to Title 27 CCR Section 20415(e)(7) that is used in the statistical method shall be **the lowest concentration (or value) that can be**

reliably achieved within limits of precision and accuracy specified in the WDRs for routine laboratory operating conditions that are available to the facility. The Discharger's technical report, pursuant to Title 27 CCR Section 20415(e)(7), shall consider the PQLs listed in Appendix IX to Chapter 14 of Division 4.5 of Title 22, CCR, for guidance when specifying limits of precision and accuracy. For any given constituent monitored at a background or downgradient monitoring point, an indication that falls between the MDL and the PQL for that constituent (hereinafter called a "trace" detection) shall be identified and used in appropriate statistical or nonstatistical tests. Nevertheless, for a statistical method that is compatible with the proportion of censored data (trace and ND indications) in the data set, the Discharger can use the laboratory's concentration estimates in the trace range (if available) for statistical analysis, in order to increase the statistical power by decreasing the number of "ties".

18. Background for water samples or soil-pore gas samples shall be represented by the data from all samples taken from applicable background monitoring points during that reporting period (at least one sample from each background monitoring point). The Discharger may propose an alternate statistical method [to the methods listed under Title 27 CCR Section 20415(e)(8)(A-D)] in accordance with Title 27 CCR Section 20415(e)(8)(E), for review and approval.

19. The Discharger may propose an alternate statistical method [to the methods listed under Title 27 CCR Section 20415(e)(8)(A-D)] in accordance with Title 27 CCR Section 20415(e)(8)(E), for review and approval. Upon receiving written approval, alternate statistical procedures may be used for determining the significance of analytical results for common laboratory contaminants (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate). Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Regional Water Board staff.

20. The Discharger shall use the following non-statistical method for all analytes that are detected in less than 10% of the background samples. The non-statistical method shall be implemented as follows:

    a. From the constituent of concern or monitoring parameter list, identify each analyte in the **current** sample that exceeds either its respective MDL or PQL. The Discharger shall conclude that the exceedance provides a preliminary indication of a release or a change in the nature or extent of the release, at that monitoring point, if ***either:***

        1) The data contains two or more analytes that are detected in less than 10% of background samples that equal or exceed their respective MDLs; or

        2) The data contains one or more analyte that equals or exceeds its PQL.

b. **Discrete Retest** [Title 27 CCR Section 20415(e)(8)(E)]:

1) In the event that the Discharger concludes (pursuant to paragraph 20.a., above) that there is a preliminary indication of a release, then the Discharger shall immediately notify Regional Water Board staff by phone or e-mail and, within 30 days of such indication, shall collect two new (retest) samples from the monitoring point where the release is preliminarily indicated.

2) For any given retest sample, the Discharger shall include, in the retest analysis, **only the laboratory analytical results for those analytes detected in the original sample**. As soon as the retest data are available, the Discharger shall conclude that there is measurably significant evidence of a release if two or more analytes equal or exceed their respective MDLs or if one or more analyte equals or exceeds its PQL and shall:

a) **Immediately** notify the Regional Water Board about any constituent or constituents verified to be present at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of validation; and

b) Comply with ¶21, below if any constituent or constituents were verified to be present.

3) Any analyte that is confirmed per this method shall be added to the monitoring parameter list such that it is monitored during each regular monitoring event.

21. If the Discharger determines that there is measurably significant evidence of a release from the Unit at any monitoring point, the Discharger shall **immediately** implement the requirements of **XI. Response To A Release, C. Release Has Been Verified**, contained in the Standard Provisions and Reporting Requirements.

F. PROVISIONS

1. The Discharger shall maintain a copy of this Order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.

2. The Discharger shall comply with all applicable provisions of Title 27 and 40 Code of Federal Regulations Part 258 (Subtitle D) that are not specifically referred to in this Order.

3. The Discharger shall comply with Monitoring and Reporting Program No. R5-2006-0108, which is incorporated into and made part of this Order.

4. The Discharger shall comply with the applicable portions of the Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 and/or Subtitle D (27 CCR §20005 et seq. and 40 CFR 258 et seq.), dated April 2000, which are hereby incorporated into this Order.

5. In the event the Discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the Discharger shall notify the appropriate Regional Water Board office by telephone **as soon as** it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing **within two weeks**. The written notification shall state the nature, time, and cause of noncompliance, and shall describe the measures being taken to prevent recurrences and shall include a timetable for corrective actions.

6. All reports and transmittal letters shall be signed by persons identified below:

    a. For a corporation: by a principal executive officer of at least the level of senior vice-president.

    b. For a partnership or sole proprietorship: by a general partner or the proprietor.

    c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.

    d. A duly authorized representative of a person designated in a, b or c above if;

        1) The authorization is made in writing by a person described in a, b, or c of this provision;

        2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a Unit, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

        3) The written authorization is submitted to the Regional Water Board.

    e. Any person signing a document under this Section shall make the following certification:

        "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are

significant penalties for submitting false information, including the possibility of fine and imprisonment."

7. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature, extent, and impact of the noncompliance.

8. The owner of the waste management facility shall have the continuing responsibility to assure protection of waters of the state from discharged wastes and from gases and leachate generated by discharged waste during the active life, closure, and postclosure maintenance period of the Unit(s) and during subsequent use of the property for other purposes.

9. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order shall not be regarded as a defense for the Discharger's violations of the Order.

10. To assume ownership or operation under this Order, the succeeding owner or operator must apply in writing to the Regional Water Board requesting transfer of the Order within 14 days of assuming ownership or operation of this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Regional Water Board, and a statement. The statement shall comply with the signatory requirements contained in Provision F.6. and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer of this Order shall be approved or disapproved by the Regional Water Board.

11. The Discharger shall establish cost estimates for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill, and submit these estimates for review and approval.

12. The Discharger shall obtain and maintain assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill in the amount of the approved cost estimate. The Discharger shall submit the approved cost estimate and proposed financial assurance mechanism meeting the requirements of Chapter 6, Title 27 to the Financial Assurances Section of the California Integrated Waste Management Board (CIWMB). If the CIWMB determines that either the amount of coverage or the mechanism is inadequate, then within 90 days of notification, the Discharger shall submit an acceptable mechanism for at least the amount of the approved cost estimate.

13. The Discharger shall update the preliminary closure and post-closure maintenance plan (PCPCMP) any time there is a change that will increase the amount of the closure and post-closure maintenance cost estimate. The updated PCPCMP shall be submitted to the Regional Water Board, the Local Enforcement Agency, and the CIWMB. The PCPCMP shall meet the requirements of Title 27 CCR Section 21769(b), and include a lump sum estimate of the cost of carrying out all actions necessary to close each Unit, to prepare detailed design specifications, to develop the final closure and post-closure maintenance plan, and to carry out the first thirty years of post-closure maintenance. A final (or partial final) closure and post-closure maintenance plan shall be submitted prior to closure and closure shall not be conducted in the absence of closure WDRs.

14. The Discharger shall obtain and maintain assurances of financial responsibility for closure and post-closure maintenance costs in the amount of the cost estimates in the approved preliminary or final closure and post-closure maintenance plan, as applicable. The Discharger shall submit a proposed financial assurance mechanism for closure and post-closure maintenance meeting the requirements of Chapter 6, Title 27 to the Financial Assurances Section of the CIWMB. If the CIWMB determines that either the amount of coverage or the mechanism is inadequate, then within 90 days of notification, the Discharger shall submit an acceptable mechanism for at least the amount of the approved cost estimate.

15. The Discharger shall complete the tasks contained in these waste discharge requirements in accordance with the following time schedule:

Task	Compliance Date
A. Construction Plans	
Submit construction and design plans for Executive Officer review and approval. (see Construction Specification D.1)	**Prior to construction**
B. Construction Report	
Submit a construction report upon completion demonstrating construction was in accordance with approved constructed plans for review and approval. (see Construction Specification D.5)	**Prior to discharge**

Task	Compliance Date
C. Assessment of Transport Mechanism of VOCs	
Submit a technical report presenting the results of the groundwater and soil/landfill gas investigation conducted per the May 2006 work plan and an assessment of the transport mechanism of VOCs to groundwater. The report shall use the data and information available at the time to conclude whether the transport mechanism of VOCs to groundwater is leachate, landfill gas, or both and estimate the relative contribution of each to VOCs being detected in groundwater monitoring wells at the site.	**3 December 2007**
D. Engineering Feasibility Study (EFS)	
Pursuant to Section 20420(k)(6) of Title 27, submit an EFS containing a detailed description of the potential corrective action measures that could be taken to achieve background concentrations (non-detect) for all VOCs in groundwater at and beyond the Point of Compliance wells (MW-5, MW-6, MW-13, and MW-14). The EFS shall consider source control as a potential corrective action measure.	**3 March 2008**
E. Corrective Action Program (CAP)	
Pursuant to Section 20430 of Title 27, submit a CAP to implement corrective action measures to achieve background concentrations (non-detect) for all VOCs in groundwater at all Monitoring Points throughout the zone at and beyond the Point of Compliance wells (MW-5, MW-6, MW-13, and MW-14). If applicable, corrective action measures shall include source control.	**31 July 2008**

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 22 September 2006.

_____

PAMELA C. CREEDON, Executive Officer

WLB: 9/22/2006

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2006-0108
FOR
LAKE COUNTY PUBLIC SERVICES DEPARTMENT
EASTLAKE SANITARY LANDFILL
CLASS III LANDFILL
CLASS II SURFACE IMPOUNDMENT
CONSTRUCTION, OPERATION, AND CORRECTIVE ACTION
LAKE COUNTY

The Discharger shall comply with this Monitoring and Reporting Program, with Title 27, California Code of Regulations, Section 20005, et seq. (hereafter Title 27), and with the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 and/or Subtitle D (27 CCR §20005 et seq. and 40 CFR 258)*, dated April 2000, as ordered by Waste Discharge Requirements Order No. R5-2006-0108.

A. REQUIRED MONITORING REPORTS

	Report	Due
1.	Groundwater Monitoring (Section D.1)	**See Table I**
2.	Annual Monitoring Summary Report (Section E.5.)	**Annually**
3.	Unsaturated Zone Monitoring (Section D.2)	**See Table II**
4.	Leachate Monitoring (Section D.3)	**See Table III**
5.	Surface Water Monitoring (Section D.4)	**See Table IV**
6.	Facility Monitoring (Section D.5)	**As necessary**
7.	Response to a Release (Standard Provisions and Reporting Requirements)	**As necessary**

B. REPORTING

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required in Order No. R5-2006-0108 and the

Standard Provisions and Reporting Requirements. Reports which do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the waste discharge requirements. In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Data shall also be submitted in a digital format acceptable to the Executive Officer.

Each monitoring report shall include a compliance evaluation summary as specified in E. Reporting Requirements, below.

Field and laboratory tests shall be reported in each monitoring report. Monthly, quarterly, semiannual, and annual monitoring reports shall be submitted to the Board in accordance with the following schedule for the calendar period in which samples were taken or observations made.

Sampling Frequency	Reporting Frequency	Reporting Periods End	Report Date Due
Monthly	Quarterly	Last Day of Month	**by Semiannual Schedule**
Quarterly	Quarterly	31 March	**30 April**
		30 June	**31 July**
		30 September	**31 October**
		31 December	**31 January**
Semiannually	Semiannually	30 June	**31 July**
		31 December	**31 January**
Annually	Annually	31 December	**31 January**
5-Year	Every 5 years	31 December	**31 January**

The Discharger shall submit an **Annual Monitoring Summary Report** to the Board covering the previous monitoring year. The annual report shall contain the information specified in E. Reporting Requirements, below, and a discussion of compliance with the waste discharge requirements and the Water Quality Protection Standard.

The results of **all monitoring** conducted at the site shall reported to the Board in accordance with the reporting schedule above for the calendar period in which samples were taken or observations made.

C. CONSTITUENTS OF CONCERN, MONITORING POINTS, CONCENTRATION LIMITS, POINT OF COMPLIANCE AND COMPLIANCE PERIOD

1. Constituents of Concern

The constituents of concern include all the waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit. The constituents of concern for all Units at the facility are those listed in Tables I through IV for the specified monitored medium, and Table VI. The Discharger shall monitor all constituents of concern every five years, or more frequently as required in accordance with a Corrective Action Program.

a. Monitoring Parameters

Monitoring parameters are constituents of concern that are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a Unit. The monitoring parameters for all Units are those listed in Tables I through V for the specified monitored medium.

2. Monitoring Points

Groundwater:

The **background** Monitoring Points for groundwater shall be monitoring wells MW-3 and MW-9b as shown on Attachment B, and any other background wells installed after the adoption of this Order.

The **detection** Monitoring Points for groundwater are monitoring wells MW-6, and MW-10 as shown on Attachment B, and any other detection monitoring wells installed after the adoption of this Order.

The **evaluation/corrective action** Monitoring Points for groundwater are monitoring wells MW-1, MW-5, MW-8, MW-11, MW-12, MW-13, and MW-14 as shown on Attachment B, and any other evaluation or corrective action monitoring wells installed after the adoption of this Order.

Surface Water:

The **background** surface water Monitoring Point shall be SWMS-3 shown on Attachment B.

The **detection** surface water Monitoring Point shall be SWMS-1 shown on Attachment B.

Unsaturated Zone:

The **detection** unsaturated zone Monitoring Point shall be the pan lysimeter located beneath the sump for the Area II lined landfill Unit.

3. Concentration Limits

For a naturally occurring constituent of concern, the concentration limit for each constituent of concern shall be determined as follows:

a. By calculation in accordance with a statistical method pursuant to §20415 of Title 27(e)(8); or

b. By an alternate statistical method meeting the requirements of §20415(e)(8)(E) of Title 27.

Concentration limits shall be updated semi-annually as new background data becomes available for each COC and shall be listed in each semi-annual monitoring report.

4. Point of Compliance

The Point of Compliance for the water standard at each Unit is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the Unit. The Point of Compliance wells are MW-5, MW-6, MW-13, and MW-14.

5. Compliance Period

The compliance period for each Unit shall be the number of years equal to the active life of the Unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the Unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program.

D. MONITORING

The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, in accordance with Detection Monitoring Specification E.2 and E.4 of Waste Discharge Requirements, Order No. R5-2006-0108. All monitoring shall be conducted in accordance with a Sample Collection and Analysis Plan, which includes quality assurance/quality control standards, that shall be submitted for review and approval.

All Point of Compliance monitoring wells established for the detection monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All detection monitoring program groundwater monitoring wells, unsaturated zone monitoring devices, leachate, and surface water monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern as indicated and listed in Tables I through IV.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those which cannot be quantified and/or specifically identified. Metals shall be analyzed in accordance with the methods listed in Table VI.

The Discharger may use alternative analytical test methods, including new USEPA approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this Monitoring and Reporting Program.

1. Groundwater

The Discharger shall operate and maintain a groundwater detection monitoring system that complies with the applicable provisions of §20415 and §20420 of Title 27 in accordance with an approved Detection Monitoring Program. The detection monitoring system shall be certified by a California-licensed professional civil engineer or geologist as meeting the requirements of Title 27. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan.

The Discharger shall determine the groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional zone of saturation monitored pursuant to this Monitoring and Reporting Program, and report the results semiannually, including the times of highest and lowest elevations of the water levels in the wells.

Hydrographs of each well shall be submitted showing the elevation of groundwater with respect to the elevations of the top and bottom of the screened

interval and the elevation of the pump intake. Hydrographs of each well shall be prepared quarterly and submitted annually.

Groundwater samples shall be collected from the point-of-compliance wells, background wells, and any additional wells added as part of the approved groundwater monitoring system. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and frequency specified in Table I.

The monitoring parameters shall also be evaluated each reporting period with regards to the cation/anion balance, and the results shall be graphically presented using a Stiff diagram, a Piper graph, or a Schueller plot. Samples for the constituents of concern specified in Table I shall be collected and analyzed in accordance with the methods listed in Table VI every five years.

2. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection monitoring system that complies with the applicable provisions of §20415 and §20420 of Title 27 in accordance with an approved Detection Monitoring Program. The Discharger shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the approved Sample Collection and Analysis Plan.

Unsaturated zone samples shall be collected from the monitoring devices and background monitoring devices of the approved unsaturated zone monitoring system. The collected samples shall be analyzed for the listed constituents in accordance with the methods and frequency specified in Table II. All monitoring parameters shall be graphed so as to show historical trends at each monitoring point. Samples for the constituents of concern specified in Table II shall be collected and analyzed in accordance with the methods listed in Table VI every five years.

The pan lysimeters shall be checked monthly for liquid and monitoring shall also include the total volume of liquid removed from the system. Unsaturated zone monitoring reports shall be included with the corresponding semiannual groundwater monitoring and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

3. Leachate/Seep Monitoring

All landfill and surface impoundment leachate collection and removal system

sumps shall be inspected monthly for leachate generation. Upon detection of leachate in a previously dry leachate collection and removal system, leachate shall be sampled **immediately** and analyzed for the constituents listed in Table III. Leachate shall then be sampled and analyzed annually during the fourth quarter thereafter, with a retest during the following second quarter if constituents are detected that have not been previously detected. Leachate samples shall be collected and analyzed for the listed constituents in accordance with the methods and frequency specified in Table III. The constituents of concern list shall include all constituents listed in Table VI. The quantity of leachate pumped from each sump shall be measured and reported monthly as Leachate Flow Rate (in gallons).

Leachate which seeps to the surface from the Unit shall be sampled and analyzed for the Monitoring Parameters and Constituents of Concern listed in Table III upon detection. The quantity of leachate shall be estimated and reported as Leachate Flow Rate (in gallons/day). Also, refer to Section E.4, below.

4. Surface Water Monitoring

The Discharger shall install and operate a surface water detection monitoring system where appropriate that complies with the applicable provisions of §20415 and §20420 of Title 27 in accordance with an approved Detection Monitoring Program.

For all monitoring points and background monitoring points assigned to surface water detection monitoring, samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and frequency specified in Table IV. All surface water monitoring samples shall be collected and analyzed for the constituents of concern specified in Table IV every five years. All monitoring parameters shall be graphed so as to show historical trends at each sample location.

5. Facility Monitoring

a. **Facility Inspection**

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control system, groundwater monitoring equipment (including wells, etc.), and shall include the Standard Observations contained in Section F.4.f., below. Any necessary construction, maintenance, or repairs shall be completed by **31 October**. By **15 November** of each year, the Discharger shall submit

an annual report describing the results of the inspection and the repair measures implemented, including photographs of the problem and the repairs.

b. **Storm Events**

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage **within 7 days** following *major storm events*. Necessary repairs shall be completed **within 30 days** of the inspection. The Discharger shall report any damage and subsequent repairs within 45 days of completion of the repairs, including photographs of the problem and the repairs.

E. REPORTING REQUIREMENTS

1. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained throughout the life of the facility including the postclosure period.

   Such legible records shall show the following for each sample:

   a. Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;

   b. Date, time, and manner of sampling;

   c. Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;

   d. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;

   e. Calculation of results; and

   f. Results of analyses, and the MDL and PQL for each analysis.

2. A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including

any references to previously submitted time schedules, is contained in the accompanying report.

3. Each monitoring report shall include a compliance evaluation summary. The summary shall contain at least:

   a. For each monitoring point and background monitoring point addressed by the report, a description of:

      1) The time of water level measurement;

      2) The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;

      3) The method of purging (the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; the calibration of the field equipment; results of the pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water) to remove all portions of the water that was in the well bore while the sample was being taken;

      4) The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and

      5) A statement that the sampling procedure was conducted in accordance with the approved Sampling and Analysis Plan.

   b. A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.

   c. For each groundwater body, a description and graphical presentation of the gradient and direction of groundwater flow under/around the Unit, and the groundwater flow rate, based upon water level elevations taken prior to the collection of the water quality data submitted in the report.

   d. Laboratory statements of results of all analyses evaluating compliance with requirements.

   e. An evaluation of the effectiveness of the leachate monitoring and control facilities, and of the run-off/run-on control facilities.

   f. A summary and certification of completion of all **Standard Observations** for the Unit(s), for the perimeter of the Unit, and for the receiving waters. Standard observations for ACTIVE landfill units shall be conducted **weekly** during the wet season (1 October to 30 April) and **monthly** during the dry season (1 May to 30 September). Standard observations for INACTIVE or CLOSED landfill units shall

be conducted **monthly** during the wet season (1 October to 30 April) and **quarterly** during the dry season (1 May to 30 September). Standard The Standard Observations shall include:

1) For the Unit:

   a) Evidence of ponded water at any point on the facility (show affected area on map);

   b) Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and

   c) Evidence of erosion and/or of day-lighted refuse.

2) Along the perimeter of the Unit:

   a) Evidence of liquid leaving or entering the Unit, estimated size of affected area, and flow rate (show affected area on map);

   b) Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and

   c) Evidence of erosion and/or of day-lighted refuse.

3) For receiving waters:

   a) Floating and suspended materials of waste origin - presence or absence, source, and size of affected area;

   b) Discoloration and turbidity - description of color, source, and size of affected area;

   c) Evidence of odors - presence or absence, characterization, source, and distance of travel from source;

   d) Evidence of water uses - presence of water-associated wildlife;

   e) Flow rate; and

   f) Weather conditions - wind direction and estimated velocity, total precipitation during recent days and on the day of observation.

g. The quantity and types of wastes discharged and the locations in the Unit where waste has been placed since submittal of the last such report.

4. The Discharger shall report by telephone any seepage from the disposal area **immediately** after it is discovered. A written report shall be filed with the Regional Water Board **within seven days**, containing at least the following information:

    a. A map showing the location(s) of seepage;

    b. An estimate of the flow rate;

    c. A description of the nature of the discharge (e.g., all pertinent observations and analyses);

    d. Verification that samples have been submitted for analyses of the Monitoring Parameters and Constituents of Concern listed in Table III of this MRP, and an estimated date that the results will be submitted to the Regional Water Board; and

    e. Corrective measures underway or proposed, and corresponding time schedule.

5. The Discharger shall submit an **Annual Monitoring Summary Report** to the Regional Water Board covering the reporting period of the previous monitoring year. This report shall contain:

    a. All monitoring parameters and constituents of concern shall be graphed so as to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent or parameter, the scale for background plots shall be the same as that used to plot downgradient data. Graphical analysis of monitoring data may be used to provide significant evidence of a release.

    b. All historical monitoring data, including data for the previous year, shall be submitted in tabular form as well as in a digital file format. The Regional Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [Title 27 CCR Section 20420(h)], in that this facilitates periodic review by the Regional Water Board.

    c. A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.

    d. A map showing the area and elevations in which filling has been completed during the previous calendar year and a comparison to final closure design contours.

e. A written summary of the monitoring results, indicating any changes made or observed since the previous annual report.

f. An evaluation of the effectiveness of the leachate monitoring/control facilities including the results of the annual testing of leachate collection and removal systems required under VIII.P of the Standard Provisions and Reporting Requirements.

The Discharger shall implement the above monitoring program on the effective date of this Program.

Ordered by:_____
PAMELA C. CREEDON, Executive Officer

22 September 2006
(Date)

WLB: 9/22/2006

TABLE I

GROUNDWATER DETECTION MONITORING PROGRAM

Parameter	Units	Frequency
Field Parameters		
Groundwater Elevation	Ft. & hundredths, M.S.L.	Quarterly
Temperature	^{o}C	Semiannual
Electrical Conductivity	µmhos/cm	Semiannual
pH	pH units	Semiannual
Turbidity	Turbidity units	Semiannual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semiannual
Chloride	mg/L	Semiannual
Carbonate	mg/L	Semiannual
Bicarbonate	mg/L	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual
Sulfate	mg/L	Semiannual
Calcium	mg/L	Semiannual
Magnesium	mg/L	Semiannual
Potassium	mg/L	Semiannual
Sodium	mg/L	Semiannual
Volatile Organic Compounds (USEPA Method 8260, see Table V)	µg/L	Semiannual
Constituents of Concern (see Table VI)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years

TABLE II

UNSATURATED ZONE DETECTION MONITORING PROGRAM

SOIL-PORE GAS

Parameter	Units	Frequency
Monitoring Parameters		
Volatile Organic Compounds (USEPA Method TO-14)	µg/cm^3	Semiannual
Methane	%	Semiannual

PAN LYSIMETERS (or other vadose zone monitoring device)

Parameter	Units	Frequency
Field Parameters		
Electrical Conductivity	µmhos/cm	Semiannual
pH	pH units	Semiannual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semiannual
Chloride	mg/L	Semiannual
Carbonate	mg/L	Semiannual
Bicarbonate	mg/L	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual
Sulfate	mg/L	Semiannual
Calcium	mg/L	Semiannual
Magnesium	mg/L	Semiannual
Potassium	mg/L	Semiannual
Sodium	mg/L	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, see Table V)	µg/L	Semiannual
Constituents of Concern (see Table VI)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides	µg/L	5 years

(USEPA Method 8151A)		
Organophosphorus Compounds	µg/L	5 years
(USEPA Method 8141A)		

TABLE III

LEACHATE DETECTION MONITORING PROGRAM

Parameter	Units	Frequency
Field Parameters		
Total Flow	Gallons	Monthly
Flow Rate	Gallons/Day	Monthly
Electrical Conductivity	µmhos/cm	Monthly
pH	pH units	Monthly
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Annually
Chloride	mg/L	Annually
Carbonate	mg/L	Annually
Bicarbonate	mg/L	Annually
Nitrate - Nitrogen	mg/L	Annually
Sulfate	mg/L	Annually
Calcium	mg/L	Annually
Magnesium	mg/L	Annually
Potassium	mg/L	Annually
Sodium	mg/L	Annually
Volatile Organic Compounds (USEPA Method 8260B, see Table V)	µg/L	Annually
Constituents of Concern (see Table VI)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years

TABLE IV

SURFACE WATER DETECTION MONITORING PROGRAM

Parameter	Units	Frequency
Field Parameters		
Temperature	^{o}C	Semiannual
Electrical Conductivity	µmhos/cm	Semiannual
pH	pH units	Semiannual
Turbidity	Turbidity units	Semiannual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semiannual
Carbonate	mg/L	Semiannual
Bicarbonate	mg/L	Semiannual
Chloride	mg/L	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual
Sulfate	mg/L	Semiannual
Calcium	mg/L	Semiannual
Magnesium	mg/L	Semiannual
Potassium	mg/L	Semiannual
Sodium	mg/L	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, see Table V)	µg/L	Semiannual
Constituents of Concern (see Table VI)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years

TABLE V

MONITORING PARAMETERS FOR DETECTION MONITORING

Surrogates for Metallic Constituents:

pH
Total Dissolved Solids
Electrical Conductivity
Chloride
Sulfate
Nitrate nitrogen

Constituents included in VOC:

USEPA Method 8260B
Acetone
Acrylonitrile
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- l ,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC-12)
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1,1 -Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Di-isopropylether (DIPE)
Ethanol
Ethyltertiary butyl ether
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Hexachlorobutadiene

TABLE V

MONITORING PARAMETERS FOR DETECTION MONITORING

Continued

Hexachloroethane
Methyl bromide (Bromomethene)
Methyl chloride (Chloromethane)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Methyl ethyl ketone (MEK: 2-Butanone)
Methyl iodide (Iodomethane)
Methyl t-butyl ether
4-Methyl-2-pentanone (Methyl isobutylketone)
Naphthalene
Styrene
Tertiary amyl methyl ether
Tertiary butyl alcohol
1,1,1,2-Tetrachloroethane
1,1.2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloethane (Methylchloroforrn)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride
Xylenes

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Inorganics (dissolved):	**USEPA Method**
Aluminum	6010
Antimony	7041
Barium	6010
Beryllium	6010
Cadmium	7131A
Chromium	6010
Cobalt	6010
Copper	6010
Silver	6010
Tin	6010
Vanadium	6010
Zinc	6010
Iron	6010
Manganese	6010
Arsenic	7062
Lead	7421
Mercury	7470A
Nickel	7521
Selenium	7742
Thallium	7841
Cyanide	9010B
Sulfide	9030B

Volatile Organic Compounds:

USEPA Method 8260

Acetone
Acetonitrile (Methyl cyanide)
Acrolein
Acrylonitrile
Allyl chloride (3-Chloropropene)
Benzene
Bromochloromethane (Chlorobromomethane)
Bromodichloromethane (Dibromochloromethane)
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Chloroprene
Dibromochloromethane (Chlorodibromomethane)

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC 12)
1,1 -Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1, l-Dichloroethene; Vinylidene chloride)
cis- l ,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- l ,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- l ,3-Dichloropropene
Di-isopropylether (DIPE)
Ethanol
Ethyltertiary butyl ether
Ethylbenzene
Ethyl methacrylate
Hexachlorobutadiene
Hexachloroethane
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl t-butyl ether
Methyl methacrylate
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
Tertiary amyl methyl ether
Tertiary butyl alcohol
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene
1,2,4-Trichlorobenzene
1,1,1 -Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Semi-Volatile Organic Compounds:

USEPA Method 8270 - base, neutral, & acid extractables

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
Bis(2-ethylhexyl) phthalate
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methyethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether
Butyl benzyl phthalate (Benzyl butyl phthalate)
Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

4-Chlorophenyl phenyl ether
Chrysene
o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimehtylphenol (m-Xylenol)
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorocyclopentadiene
Hexachloropropene
Indeno(1,2,3-c,d)pyrene

TABLE VI

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

Isodrin
Isophorone
Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
N-Nitrosodi-n-butylamine (Di-n-butylnitrosamine)
N-Nitrosodiethylamine (Diethylnitrosamine)
N-Nitrosodimethylamine (Dimethylnitrosamine)
N-Nitrosodiphenylamine (Diphenylnitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine)
N-Nitrosomethylethylamine (Methylethylnitrosamine)
N-Nitrosopiperidine
N-Nitrosospyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
o-Toluidine
Toxaphene
2,4,5-Trichlorophenol
0,0,0-Triethyl phosphorothioate

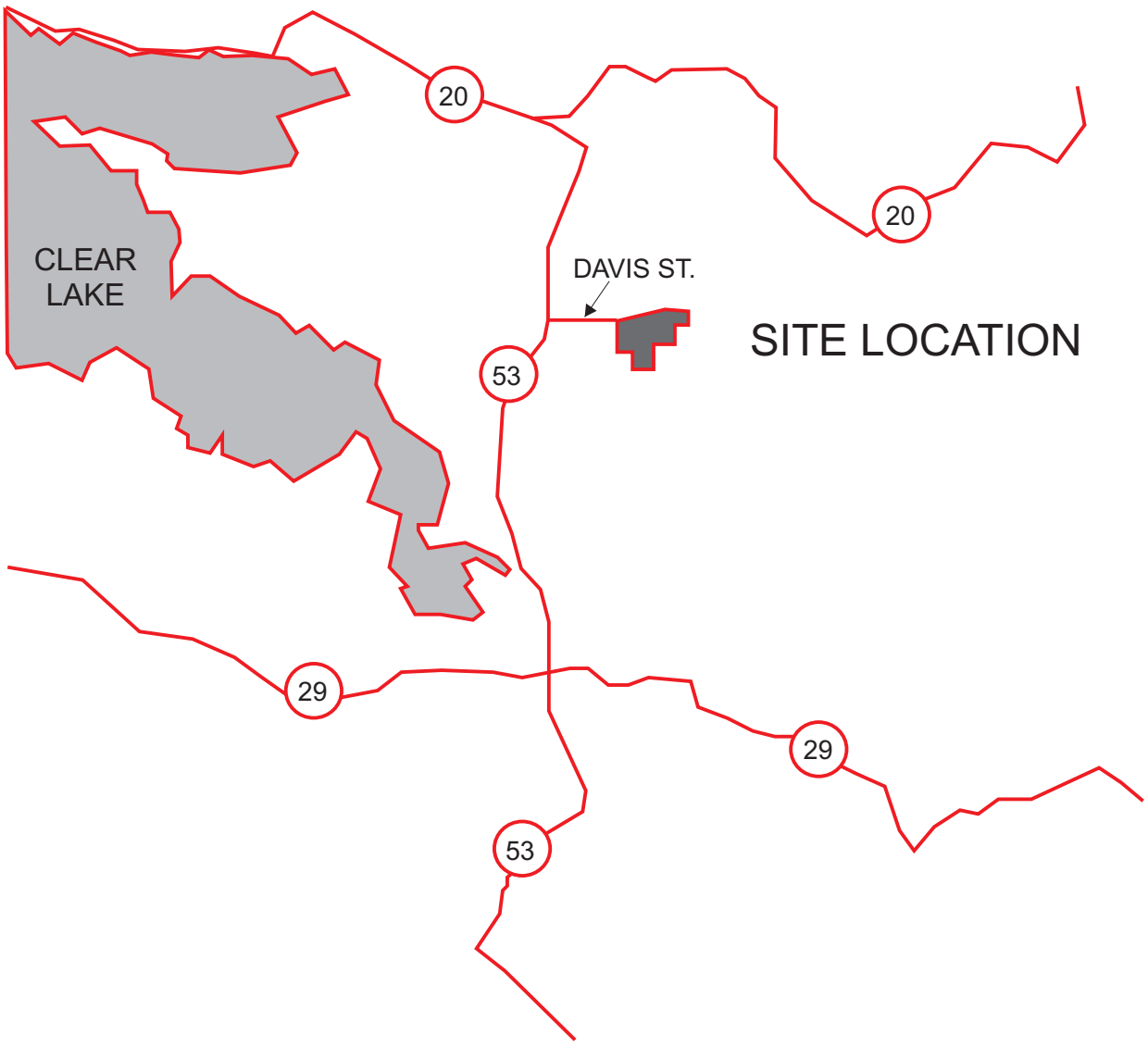
sym-Trinitrobenzene

Chlorophenoxy Herbicides:

USEPA Method 8l51A
2,4-D (2,4-Dichlorophenoxyacetic acid)
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Organophosphorus Compounds:

USEPA Method 8141A
Atrazine
Chlorpyrifos
0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)
Diazinon
Dimethoate
Disulfoton
Ethion
Methyl parathion (Parathion methyl)
Parathion
Phorate
Simazine



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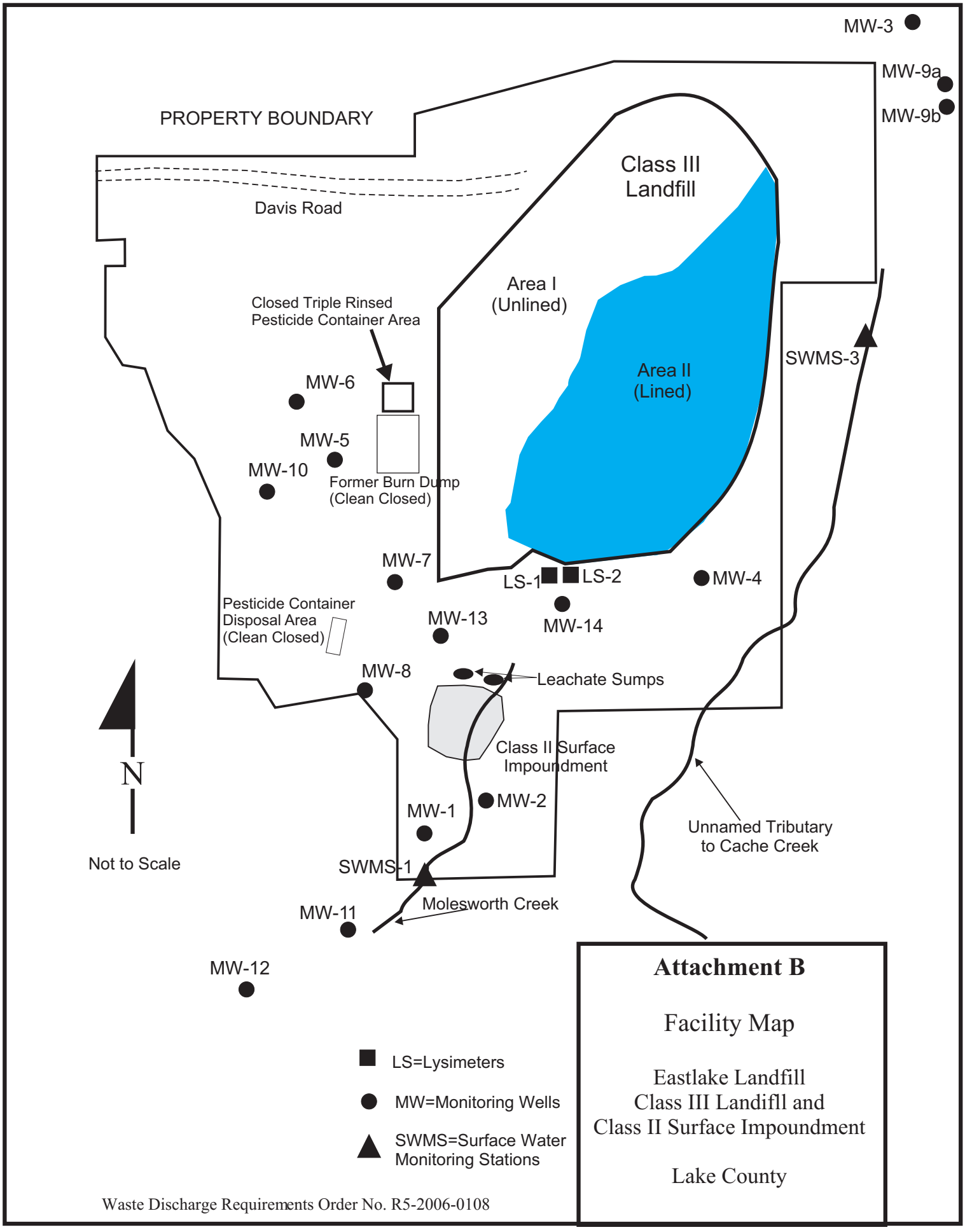
Not to Scale

Attachment A

Site Location Map

Eastlake Landfill
Class III Landifll and
Class II Surface Impoundment

Lake County



Attachment B

Facility Map

Eastlake Landfill
Class III Landifll and
Class II Surface Impoundment

Lake County

INFORMATION SHEET

ORDER NO. R5-2006-0108
LAKE COUNTY PUBLIC SERVICES DEPARTMENT
EASTLAKE SANITARY LANDFILL
LAKE COUNTY

Lake County Public Services Department (Discharger) owns and operates the Eastlake Sanitary Landfill located at the eastern edge of the City of Clearlake in Lake County. Approximately 35-acres are dedicated to refuse disposal. The facility serves all of Lake County and has been in operation as a landfill since 1972. The facility consists of an unlined Class III landfill unit, a lined Class III landfill unit and a lined Class II surface impoundment used for leachate storage. Other site features include a clean closed burn dump, a clean closed empty pesticide container area, and a closed triple-rinsed empty pesticide container area.

During 1998, the Board approved an engineered alternative single composite liner system design that uses a geosynthetic clay liner in place of two-feet of compacted clay for the lined Area II landfill unit that is immediately adjacent to the unlined Area I landfill unit. The Discharger installed the approved liner system in Module 1 of the Area II landfill during 1999. Module 1 includes the entire base liner system for Area II and the side-slope liner up to the first bench. The Discharger installed Module 2 (which is entirely an extension of the side slope liner) during 2003 following Regional Water Board approval of the liner performance demonstration for the Module 2 in 2002.

During July 2006, the Discharger proposed to begin accepting treated wood waste and non-friable asbestos at the landfill. This Order allows the discharge of treated wood waste provided it is handled and disposed of in accordance with the provisions outlined in Sections 25143.1.5, 25150.7, and 25150.8 of the Health and Safety Code, and is discharged only to the Area II landfill that is equipped with a composite liner system and an leachate collection and removal system. This Order also allows the discharge to non-friable asbestos at the landfill.

Low levels of volatile organic compounds (VOCs) are currently present in four groundwater monitoring wells at concentrations of less than one microgram per liter. This situation became significantly more evident during 2005 when the VOCs increased significantly in number, and were detected in four wells (MW-5, MW-8, MW-13, and MW-14) up from previously being detected in two wells (MW-5 and MW-13). At the request of Regional Water Board staff, the Discharger began investigating the source and transport mechanism for the VOCs during the Fall of 2005. Although the results showed that soil gas inside and outside of the unlined landfill unit contained high levels of methane and up to 30 VOCs, the Discharger concluded that there was not a clear correlation between the presence of VOCs in soil gas and those in groundwater. During June 2006, Regional Water Board staff approved a work plan submitted by the Discharger to conduct another investigation to more precisely determine the transport mechanism of VOCs to groundwater (leachate, landfill gas, or both). The investigation consists of installing two groundwater monitoring wells and two landfill gas probes within the unlined landfill and monitoring them quarterly for a one-year period. Following this investigation, the Discharger will analyze the results and assess corrective action options to control the source of the VOCs and remediate impacted groundwater. This Order includes a time schedule for the Discharger to assess the transport mechanism of the VOCs and to implement source control and groundwater remediation.

Surface water drainage from the landfill is to Molesworth Creek that is tributary to Clear Lake.

WLB

PARTIAL TABLE OF CONTENTS
FOR
STANDARD PROVISIONS AND REPORTING REQUIREMENTS
for Title 27 (27 CCR §20005, et seq.) and Subtitle D (40 CFR 258)
April 2000

Section **Page**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

STANDARD PROVISIONS AND REPORTING REQUIREMENTS FOR WASTE DISCHARGE REQUIREMENTS FOR NONHAZARDOUS SOLID WASTE DISCHARGES REGULATED BY TITLE 27 AND/OR SUBTITLE D (27 CCR §20005 et seq. and 40 CFR 258)

APRIL 2000

I. APPLICABILITY

A. These Standard Provisions and Reporting Requirements are applicable to nonhazardous solid waste disposal sites that are regulated pursuant to the provisions of Title 27 of the California Code of Regulations, §20005 et seq. (27 CCR or Title 27), and municipal solid waste landfills that are subject to the Federal Subtitle D regulations contained in 40 CFR 258 in accordance with State Water Resources Control Board, Resolution No. 93-62.

B. "Order," as used throughout this document, means the Waste Discharge Requirements to which these Standard Provisions and Reporting Requirements are incorporated.

C. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, and do not protect the Discharger from liabilities under federal, state, or local laws. This Order does not convey any property rights or exclusive privileges.

D. The provisions of this Order are severable. If any provision of this Order is held invalid, the remainder of this Order shall not be affected.

E. If there is any conflicting or contradictory language between the Waste Discharge Requirements (WDRs), the Monitoring and Reporting Program (MRP), or the Standard Provisions and Reporting Requirements (SPRR), then language in the WDRs shall govern over either the MRP or the SPRR, and language in the MRP shall govern over the SPRR.

F. Unless otherwise stated, all terms are as defined in §13050 of the California Water Code (CWC) and in §20164 of Title 27.

II. TERMS AND CONDITIONS

A. Failure to comply with any waste discharge requirement, monitoring and reporting requirement, or Standard Provisions and Reporting Requirement, or other order or prohibition issued, reissued, or amended by the Regional Board or the State Water Resources Control Board, or intentionally or negligently discharging waste, or causing or permitting waste to be deposited where it is discharged into the waters of the state and creates a condition of pollution or nuisance, is a violation of these waste discharge requirements and the California Water Code, which can result in the imposition of civil monetary liability [CWC §13350(a)]

B. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to [CWC §13381]:

1. Violation of any term or condition contained in this Order;

2. Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts;

3. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge; or

4. A material change in the character, location, or volume of discharge.

C. Before initiating a new discharge or making a material change in the character, location, or volume of an existing discharge, the Discharger shall file a new report of waste discharge, or other appropriate joint technical document, with the Regional Water Quality Control Board (hereafter Board) [CWC §13260(c) and §13264(a)]. A material change includes, but is not limited to, the following:

1. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements;

2. A significant change in disposal method, location, or volume (e.g., change from land disposal to land treatment); or

3. A change in the type of waste being accepted for disposal.

D. Representatives of the Board may inspect the facilities to ascertain compliance with the waste discharge requirements. The inspection shall be made with the consent of the owner or possessor of the facilities or, if the consent is refused, with a duly issued warrant. However, in the event of an emergency affecting the public health or safety, an inspection may be made without consent or the issuance of a warrant [CWC §13267(c)].

E. The Board will review this Order periodically and will revise these waste discharge requirements when necessary [CWC §13263(e) and 27 CCR §21720(b)].

F. Except for material determined to be confidential in accordance with California law and regulations, all reports prepared in accordance with terms of this Order shall be available for public inspection at the offices of the Board [CWC §13267(b)]. Data on waste discharges, water quality, geology, and hydrogeology shall not be considered confidential.

G. A discharge of waste into the waters of the state is a privilege, not a right. No discharge of waste into waters of the state, whether or not the discharge is made pursuant to waste discharge requirements, shall create a vested right to continue the discharge [CWC §13263(g)].

III. GENERAL PROVISIONS

A. In the event of any change of ownership or responsibility for construction, operation, closure, or post-closure maintenance of the waste discharge facilities described in this Order, the Discharger shall notify the Board prior to the effective date of the change and shall include a statement by the new Discharger that construction, operation, closure, or post-closure maintenance will be in compliance with this Order and any revisions thereof [27 CCR §21710(c)(1)].

B. The Discharger shall notify the Board of a material change in; the types, quantity, or concentrations of wastes discharged; site operations and features; or proposed closure procedures, including changes in cost estimates. This notification shall be given a reasonable time before the changes are made or become effective. No changes shall be made without Board approval following authorization for closure pursuant to the site Notification of Closure [27 CCR §21710(a)(4)].

C. The Discharger shall maintain legible records of the volume and type of each waste discharged at each waste management unit (Unit) or portion of a Unit, and the manner and location of discharge. Such records shall be maintained by the Discharger until the beginning of the post-closure maintenance period. These records shall be on forms approved by the State Water Resources Control Board or Regional Board and shall be maintained at the waste management facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the State Water Resources Control Board or Regional Board at any time during normal business hours. At the beginning of the post-closure maintenance period, copies of these records shall be sent to the Regional Board [27 CCR §21720(f)].

IV. FINANCIAL ASSURANCE PROVISIONS

A. The Discharger shall obtain and maintain assurances of financial responsibility for initiating and completing corrective action for all known and reasonably foreseeable releases from the Unit [27 CCR §20380(b) and §22222].

B. The Discharger shall establish an irrevocable fund for closure and post-closure maintenance to ensure closure and post-closure maintenance of each classified Unit in accordance with an approved closure and post-closure maintenance plan [27 CCR §20950(f) and §22207(a)].

V. GENERAL PROHIBITIONS

A. The discharge of liquid or semi-solid waste (i.e., waste containing less than 50 percent solids) is prohibited, except dewatered sewage or water treatment sludge as described in 27 CCR §20220(c) above a composite liner with a leachate collection and removal system [27 CCR §20200(d)(3)].

B. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the waste management unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products, which, in turn:

1. require a higher level of containment than provided by the unit; or

2. are ‘restricted wastes’; or

3. impair the integrity of containment structures;

is prohibited [27 CCR §20200(b)].

C. Internal site drainage from surface or subsurface sources shall not contact or percolate through wastes. Surface and subsurface drainage from outside of a waste management unit shall be diverted from the Unit [27 CCR §20365(e)].

D. New Units or lateral expansions of existing Units shall not be sited in a “wetland” [as defined in 40 CFR 232.29(r)] unless there is no practical alternative; steps have been taken to assure no net loss of wetland; the Unit will not degrade the wetland; the Unit will not jeopardize threatened or endangered species or produce adverse modification of a critical habitat or violate any requirement of the Marine Protection, Research, and Sanctuaries Act of 1972 [40 CFR 258.12].

VI. DISCHARGE SPECIFICATIONS

A. The Discharger is responsible for accurate characterization of wastes, including a

determination of whether or not wastes will be compatible with containment features and other wastes at the Unit and whether or not the wastes are required to be managed as a hazardous waste [27 CCR §20200(c)] or designated waste [27 CCR §20210].

B. All Units shall be designed, constructed, and operated to ensure that wastes will be a minimum of 5 feet above the highest anticipated elevation of underlying groundwater [27 CCR §20240(c)], including the capillary fringe.

C. The Discharger shall submit operation plans describing those Unit operations which could affect water quality, including, but not limited to [27 CCR §21760(b)]:

1. A description of proposed treatment, storage, and disposal methods;

2. Contingency plans for the failure or breakdown of waste handling facilities or containment systems, including notice or any such failure, or any detection of waste or leachate in monitoring facilities, to the Board, local governments, and water users downgradient of the Unit(s); and

3. A description of inspection and maintenance programs which will be undertaken regularly during disposal operations and the post-closure maintenance period.

D. Leachate and landfill gas condensate collected from a Unit shall be discharged to the Unit from which it came, or discharged to an appropriate waste management unit in accordance with Title 27 and in a manner consistent with the waste classification of the liquid [27 CCR §20200(d) and §20340(g)].

E. The discharge of leachate or gas condensate is restricted to those portions of a Unit that has a composite liner system and leachate collection and removal system meeting the Federal Subtitle D requirements. A Unit shall not receive leachate or gas condensate from another Unit [40 CFR 258.28].

F. Any discharge of waste outside the portion of the landfill that was already covered with waste as of the Unit's respective Federal Deadline constitutes a "lateral expansion" and requires the installation of an approved composite liner system and leachate collection and removal system [40 CFR 258.40(b)].

G. The Discharger shall notify the Board that a closure and post-closure maintenance plan has been prepared in accordance with Closure and Post-Closure Specification IX. G., and placed in the operating record by the date of initial receipt of waste at any new Unit or lateral expansion of any existing Unit [40 CFR 258.60(d)].

VII. FACILITY SPECIFICATIONS

A. Surface and subsurface drainage from outside of a Unit shall be diverted from the

Unit [27 CCR §20365(e)].

B. Intermediate cover consisting of compacted earthen material of at least twelve (12) inches shall be placed on all surfaces of the fill where no additional solid waste will be deposited within 180 days [27 CCR §20700(a)].

C. Interim cover over wastes discharged to a landfill shall be designed and constructed to minimize percolation of liquids through the wastes [27 CCR §20705(b)].

D. The Discharger shall promptly notify the Board of any slope failure occurring at a Unit. Any failure which threatens the integrity of containment features or the Unit shall be promptly corrected in accordance with an approved method [27 CCR §21710(c)(2)].

VIII. CONSTRUCTION SPECIFICATIONS

A. All containment structures shall be designed by, and construction shall be supervised by, a California registered civil engineer or a certified engineering geologist, and shall be certified by that individual as meeting the prescriptive standards, or approved engineered alternative design, in accordance with this Order prior to waste discharge. Units shall receive a final inspection and approval of the construction by Board staff before use of the Unit commences [27 CCR §20310(e)].

B. Any report, or any amendment or revision of a report, that proposes a design or design change that might affect a Unit's containment features or monitoring systems shall be approved by a registered civil engineer or a certified engineering geologist [27 CCR §21710(d)].

C. Materials used in containment structures shall have appropriate chemical and physical properties to ensure that such structures do not fail to contain waste because of pressure gradients, physical contact with waste or leachate, chemical reactions with soil or rock, climatic conditions, the stress of installation, or because of the stress of daily operations [27 CCR §20320(a)].

D. Units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping [27 CCR §20365(a)].

E. All Units shall be designed to withstand the maximum probable earthquake without damage to the foundation or to the structures that control leachate, or surface drainage, or erosion, or gas [27 CCR §20370(a)].

F. All landfills shall be sited where soil characteristics, distance from waste to groundwater, and other factors will ensure no impairment of beneficial uses of surface water or of groundwater beneath or adjacent to the landfill [27 CCR §20260(b)].

G. New Units and expansions of existing Units shall not be located on a known Holocene fault [27 CCR §20260(d)].

H. Liners shall be designed and constructed to contain the fluid, including landfill gas, waste, and leachate [27 CCR §20330(a)].

I. Hydraulic conductivities shall be determined primarily by appropriate field test methods in accordance with accepted civil engineering practice. The results of laboratory tests with both water and leachate, and field tests with water, shall be compared to evaluate how the field permeabilities will be affected by leachate. It is acceptable for the Discharger to use appropriate compaction tests in conjunction with laboratory hydraulic conductivity tests to determine field permeabilities as long as a reasonable number of field hydraulic conductivity tests are also conducted [27 CCR §20320(c)].

J. Hydraulic conductivities specified for containment structures other than the final cover shall be relative to the fluids (leachate) to be contained. Hydraulic conductivities for the final cover shall be relative to water [27 CCR §20320(b)].

K. A test pad for each barrier layer and final cover shall be constructed in a manner duplicating the field construction. Test pad construction methods, with the designated equipment, shall be used to determine if the specified density/moisture-content/hydraulic conductivity relationships determined in the laboratory can be achieved in the field with the compaction equipment to be used and at the specified lift thickness [27 CCR §20324(g)(1)(A)].

L. Performance requirements for geosynthetic membranes shall include, but are not limited to, a need to limit infiltration of water, to the greatest extent possible; a need to control landfill gas emissions; mechanical compatibility with stresses caused by equipment traffic, and for final covers the result of differential settlement over time and durability throughout the post-closure maintenance period [27 CCR §20324(i)(1)].

M. Leachate collection and removal systems are required for Class II landfills and surface impoundments, municipal solid waste landfills, and for Class III landfills which have a liner or which accept sewage or water treatment sludge [27 CCR §20340(a)].

N. All new Units or lateral expansions of existing Units that require a leachate collection and removal system shall have a blanket-type leachate collection and removal system that covers the bottom of the Unit and extends as far up the sides as possible. The leachate collection and removal system shall be of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and by any equipment used at the Unit [27 CCR §20340(e)].

O. The leachate collection and removal system shall be designed, constructed,

maintained, and operated to collect and remove twice the maximum anticipated daily volume of leachate from the Unit [27 CCR §20340(b)].

P. Leachate collection and removal systems shall be designed and operated to function without clogging through the scheduled closure of the Unit and during the post-closure maintenance period. The systems shall be tested at least annually to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions [27 CCR §20340(d)].

Q. The depth of fluid over any portion of the leachate collection and removal system shall not exceed 30 cm [40 CFR 258.40(a)(2)]. The leachate collection sump may be designed to include a small limited area for the leachate removal pump where the fluid depth may exceed 30 cm. The leachate removal pump sump can be no larger or contain a fluid depth greater than the minimum needed for efficient pump operation [27 CCR §20340(c)].

R. All construction of liner systems and final cover systems shall be performed in accordance with a Construction Quality Assurance Plan certified by a registered civil engineer or a certified engineering geologist [27 CCR §20323] and approved by the Executive Officer.

S. The Construction Quality Assurance (CQA) program shall be supervised by a registered civil engineer or a certified engineering geologist who shall be designated the CQA officer [27 CCR §20324(b)(2)].

IX. CLOSURE AND POST-CLOSURE SPECIFICATIONS

A. The Discharger shall carry out both mandatory closure and normal closure of a Unit or a portion of a Unit in accordance with a closure and post-closure maintenance plan approved by the Board [27 CCR §20950(a)(1)] through the issuance of closure waste discharge requirements.

B. The Discharger shall notify the Board in writing that a Unit or portion of a Unit is to be closed either at the same time that the California Integrated Waste Management Board is notified or **180 days** prior to beginning any final closure activities, whichever is sooner [27 CCR §21710(c)(5)]. The notice shall include a statement that all closure activities will conform to the most recently approved closure plan and that the plan provides for site closure in compliance with all applicable federal and state regulations.

C. The final closure and post-closure maintenance plan for the Unit shall include at least the following: an itemized cost analysis, closure schedule, final treatment procedures, map; changes to the Unit description presented in the most recent ROWD; federal requirements for a municipal solid waste facility; and land use of the closed Unit [27 CCR §21769(c)].

D. Closure of each Unit shall be under the direct supervision of a registered civil engineer or certified engineering geologist [27 CCR §20950(b)].

E. The final cover of closed landfills shall be designed, graded, and maintained to prevent ponding and soil erosion due to high run-off velocities [27 CCR §21090(b)(1)(A)].

F. The final grading design shall be designed and approved by a registered civil engineer or certified engineering geologist [27 CCR §21090(b)(1)(C)].

G. In addition to the applicable provisions of Title 27, the closure and/or the post-closure maintenance plan shall include the following:

1. A final cover design with a minimum 1-foot thick erosion resistant layer [27 CCR §21090(a)(3)(A)];

2. An estimate of the largest area of the Unit(s) ever requiring a final cover at any time during the active life of the Unit(s) [40 CFR 258.60(c)(2)];

3. An estimate of the maximum inventory of wastes ever on-site over the active life of the waste management facility [40 CFR 258.60(c)(3)];

4. Initiation of closure activities within 30 days of final waste receipt, or within one year of receipt of most recent waste if additional capacity remains [40 CFR 258.60(f)];

5. Completion of closure activities within 180 days of the beginning of closure activities [40 CFR 258.60(g)];

6. Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by wind or water shall be designed and constructed to prevent such erosion [27 CCR §21090(b)(2)];

7. Closed Units shall be provided with at least two permanent surveying monuments, installed by a licensed land surveyor or by a registered civil engineer, from which the location and elevation of all wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period [27 CCR §20950(d)]; and

8. Notifying the Executive Officer that the deed to the landfill facility property, or some other instrument that is normally examined during a title search, has been recorded and a copy placed in the operating record. The notation on the deed shall in perpetuity notify any potential purchaser of the property that the land has been used as a landfill facility and that use of the land is restricted to

the planned used described in the post-closure maintenance plan [27 CCR §20515(a)(4) and §21170, and 40 CFR 258.60(c)(2)].

H. Construction or repair of the final cover system's low-hydraulic conductivity layer is to be carried out in accordance with an approved construction quality assurance (CQA) plan [27 CCR §21090(b)(1)(E)].

I. For landfills closed after 18 July 1997, The Discharger shall incorporate into the closure and post-closure maintenance plan a cover-integrity monitoring and maintenance program which includes at least the following: a periodic leak search, periodic identification of other problem areas, prompt cover repair, and vegetation maintenance [27 CCR §21090(4)]. For these landfills, the Discharger shall complete final cover surveys. The final cover surveys shall include an initial survey and map and a five-year iso-settlement map [27 CCR §21090(e)].

J. The post-closure maintenance period shall continue until the Board determines that wastes remaining in the Unit(s) no longer pose a threat to water quality [27 CCR §20950(a)(1)].

K. Within 30 days of completion of all closure activities, the Discharger shall certify that all closure activities were performed in accordance with the most recently approved final closure plan and in accordance with all applicable regulations. The Discharger shall also certify that closed Units shall be maintained in accordance with and approved post-closure maintenance plan [27 CCR §21710(c)(6)].

L. Throughout the post-closure maintenance period, the Discharger shall maintain the structural integrity and effectiveness of all containment structures, maintain the final cover as necessary to correct the effects of settlement and other adverse factors, continue to operate the leachate collection and removal system as long as leachate is generated and detected, maintain the monitoring systems, prevent erosion and related damage of the final cover due to drainage, and protect and maintain surveyed monuments [27 CCR §21090(c)].

X. MONITORING SPECIFICATIONS

A. Technical and monitoring reports specified in this Order are requested pursuant to the California Water Code [§13267(b)]. Failure to furnish the reports by the specified deadlines or falsifying information in the reports, are misdemeanors that may be liable civilly in accordance with §13268(b) of the California Water Code [CWC §13268(a)].

B. The water quality monitoring program shall include appropriate and consistent sampling and analytical procedures and methods designed to ensure that monitoring results provide a reliable indication of water quality at all monitoring points and background monitoring points [27 CCR §20415(e)(4) and 40 CFR §258.53(b)].

C. All monitoring systems shall be designed and certified by a registered geologist or a registered civil engineer [27 CCR §20415(e)(1)].

D. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport [27 CCR §20415(b)(4)(A)].

E. All sample chemical analyses of any material shall be performed by a laboratory certified by the California Department of Health Services [CWC §13176(a)].

F. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative groundwater samples [27 CCR §20415(b)(4)(B)]. Groundwater samples shall not be field-filtered prior to laboratory analysis [40 CFR §258.53(b)].

G. Groundwater elevations shall be measured in each well immediately prior to purging, each time groundwater is sampled. The owner or operator shall determine the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same waste management area shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction [40 CFR §258.53(d)].

H. Monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to design specifications throughout the life of the monitoring program [40 CFR §258.51(c)(2)].

I. All borings are to be logged during drilling under the direct supervision of a registered geologist or registered civil engineer with expertise in stratigraphic well logging [27 CCR §20415(e)(2)].

J. Soils are to be described according to the Unified Soil Classification System [27 CCR §20415(e)(2)(A)]. Rock is to be described in a manner appropriate for the purpose of the investigation [27 CCR §20415(e)(2)(B)].

K. The water quality protection standard shall consist of the constituents of concern (COC), concentration limits, and the point of compliance. The water quality protection standard shall apply during the active life of the Unit, closure period, post-closure maintenance period, and any compliance period under §20410 of Title 27 [27 CCR §20390].

L. The point of compliance at which the water quality protection standard applies is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the Unit [27 CCR §20405).

M. The compliance period is the minimum period of time during which the Discharger shall conduct a water quality monitoring program and is the number of years equal to the active life of the Unit plus the closure period [27 CCR §20410(a)].

N. The groundwater monitoring system shall include a sufficient number of monitoring points, installed at appropriate locations, to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater that has not been affected by a release from the Unit [27 CCR §20415(b)(1)(A)].

O. The detection monitoring program shall include a sufficient number of monitoring points, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater passing the point of compliance to allow the detection of a release from the Unit [27 CCR §20415(b)(1)(B)1.].

P. Additional monitoring points shall be added as necessary to provide the best assurance of the **earliest possible detection** of a release from the Unit [27 CCR §20415(b)(1)(B)2.].

Q. The detection monitoring program shall also include a sufficient number of monitoring points installed at appropriate depths and locations to yield groundwater samples from other aquifers or perched zones not already monitored to provide the **earliest possible detection** of a release from the Unit [27 CCR §20415(b)(1)(B)3. and 4., and §20420(b)].

R. A surface water monitoring system shall be established to monitor each surface water body that could be affected by a release from the Unit [27 CCR §20415(c)].

S. An unsaturated zone monitoring system shall be established for each Unit [27 CCR §20415(d)].

T. The Discharger shall notify the Board **within seven days** if fluid is detected in a previously dry leachate collection and removal system, unsaturated zone monitoring system, or if a progressive increase is detected in the volume of fluid in a leachate collection and removal system [27 CCR §21710(c)(3)].

U. Driller's logs for all monitoring wells shall to be submitted to the Board and the Department of Water Resources [CWC §13751 and 27 CCR §20415(b)(3)].

V. Groundwater elevation, temperature, electrical conductivity, turbidity, and pH are to be accurately measured at each well each time groundwater is sampled [27 CCR §21415(e)(13)].

W. The groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation being monitored shall be determined at least quarterly [27 CCR §20415(e)(15)].

X. For each Unit, the Discharger shall collect all data necessary for selecting appropriate data analysis methods for establishing background values for each constituent of concern and for each monitoring parameter [27 CCR §20420(c)]. The Discharger shall propose a data analysis method that includes a detailed description of the criteria to be used for determining "measurably significant" evidence of a release from the Unit and determining compliance with the water quality protection standard [27 CCR §20415(e)(6) and (7)].

Y. For statistical analysis of data, the Discharger shall use one of the methods described in §20415(e)(8)(A)-(E) of Title 27. A non-statistical data analysis method can be used if the method can achieve the goal of the particular monitoring program at least as well as the most appropriate statistical method [27 CCR §20415(e)(8)]. The Discharger shall use a statistical or nonstatistical data analysis method that complies with §20415(e)(7, 8, 9, and 10) of Title 27, to compare the downgradient concentration of each constituent of concern or monitoring parameter with its respective background concentration to determine whether there has been a "measurably significant" evidence of a release from the Unit. For any given monitoring point at which a given constituent has already exhibited a measurably significant indication of a release at that monitoring point, the Discharger may propose to monitor the constituent, at that well, using a concentration-versus-time plot.

Z. The Discharger shall graph all analytical data from each monitoring point and background monitoring point and shall submit the graphs to the Board annually [27 CCR §20415(e)(14)].

AA. **Verification Procedure.** If the data analysis procedures above indicate that a release has tentatively been identified from the Unit, the Discharger shall implement a verification procedure/retest option, in accordance with §20415(e)(8)(E) and §20420(j)(2) of Title 27. The new sample(s) shall be obtained **within 30 days** of the original indication [27 CCR §20415(e)(3)]. For any indicated monitoring parameter or constituent of concern, if the retest results of either (or both) of the retest data suites confirms the original indication, the Discharger shall conclude that a release has been discovered and shall carry out the requirements of Section XI, Response To A Release, below. All retests shall be carried out only for those monitoring point(s)

at which a release is tentatively indicated, and only for the constituents of concern or monitoring parameter which triggered the indication there, as follows:

1. **Statistical Retest Method**. The statistical test method used by the Discharger to analyze the monitoring data shall include a procedure to verify that there is "measurably significant" evidence of a release from the Unit. The verification procedure shall include either a single "composite" retest (i.e., a statistical analysis that augments and reanalyzes the data from the monitoring point that indicated a release) or shall consist of at least two "discrete" retests (i.e., statistical analyses each of which analyzes only newly-acquired data from the monitoring point that indicated a release) [27 CCR §20415(e)(8)(E)]. The verification procedure shall comply with the requirements of §20415(e)(8)(E) of Title 27 in addition to the performance standards of §20415(e)(9) of Title 27.

XI. RESPONSE TO A RELEASE

A. Monitoring Point Evidence of a Release

1. If the Discharger determines that there is "measurably significant" evidence of a release from the Unit (i.e. the initial statistical comparison or nonstatistical comparison indicates, for any constituent of concern or monitoring parameter, that a release is tentatively identified), the Discharger shall [27 CCR §20420(j)]:

   a) **Notification — immediately notify Board staff verbally** of the finding and provide written notification by certified mail **within seven days** of such determination. The notification shall, for each affected monitoring point, identify the monitoring parameters and constituents of concern that have indicated "measurably significant" evidence of a release from the Unit [27 CCR §20420(j)(1)];

   b) **Retest Optional** — can immediately initiate the verification (retest) procedure pre-approved by the Board [pursuant to §20415(e)(8)(E) of Title 27] to verify that there is "measurably significant" evidence of a release from the Unit for a parameter or constituent which has indicated a release at a monitoring point [27 CCR §20420(j)(2)]; and

   c) **Next Step** — immediately following detection of a release [or after completing the retest pursuant to b) above and confirming the existence of a release], shall comply with the requirements of C.

(Release Has Been Verified) below [27 CCR §20420(j)(3)].

B. **Physical Evidence of a Release**

1. If the Discharger determines that there is a significant **physical** evidence of a release, the Discharger shall notify the Board **by certified mail within 7 days** of such determination, and within 90 days shall submit an amended report of waste discharge to make any appropriate changes to the detection monitoring program [27 CCR §20420(l)(1) & (2)].

C. **Release Has Been Verified**

1. If the detection was made based upon sampling and analysis for monitoring parameters, **immediately** sample all monitoring points in the affected medium at that Unit and determine the concentration of all constituents of concern. Because this constituent of concern scan does not involve statistical testing, the Discharger need collect and analyze only a single water sample from each monitoring point in the affected medium [27 CCR §20420(k)(1)].

2. The Discharger, **within 90 days** of determining "measurably significant" evidence of a release, shall submit an amended report of waste discharge to establish an evaluation monitoring program meeting the requirements of §20425 of Title 27 [27 CCR §20420(k)(5)].

3. The Discharger, **within 180 days** of determining "measurably significant" evidence of a release, shall submit to the Board an initial engineering feasibility study for a corrective action program necessary to meet the requirements of §20430 of Title 27. At a minimum, the engineering feasibility study shall contain a detailed description of the corrective action measures that could be taken to achieve background concentrations for all constituents of concern [27 CCR §20420(k)(6)].

4. If the Discharger determines that there is "measurably significant" evidence of a release from the Unit at any monitoring point, the Discharger may demonstrate that a source other than the Unit caused the evidence of a release or that the evidence is an artifact caused by an error in sampling, analysis, or statistical evaluation or by natural variation in groundwater, surface water, or the unsaturated zone. The Discharger may make a demonstration pursuant to §20420(k)(7) of Title 27 in addition to or in lieu of submitting both an amended report of waste discharge or an engineering feasibility study; however, the Discharger is not relieved of the requirements of §20420(k)(6) & (7) of Title 27 unless the demonstration successfully shows that a source other than the Unit caused the evidence of a release or that the evidence resulted from error in sampling, analysis, or statistical evaluation or from natural variation in groundwater, surface water, or the unsaturated zone. In

making this demonstration, the Discharger shall notify the Board by certified mail of the intent to make the demonstration **within seven days** of determining "measurably significant" evidence of a release. The report shall be submitted to the Board **within 90 days** of determining "measurably significant" evidence of a release demonstrating that a source other than the Unit caused the evidence [27 CCR §20420(k)(7)].

5. The Discharger, **within 90 days** of establishing an Evaluation Monitoring Program, shall conduct an evaluation monitoring program used to assess the nature and extent of the release from the Unit and to design a corrective action program meeting the requirements of §20430 of Title 27. At a minimum, an evaluation monitoring program for a Unit shall include:

   a) An assessment of the nature and extent of the release from the Unit. This assessment shall include a determination of the special distribution and concentration of each constituent of concern throughout the zone affected by the release. The Discharger shall submit this assessment to the Board **within 90 days** of establishing an evaluation monitoring program [27 CCR §20425(b)].

   b) For MSW landfills, the Discharger shall comply with the additional notification and monitoring system requirements incorporated by reference into State Water Resources Control Board Resolution No. 93-62, regarding notification and monitoring relative to offsite or potential off-site migration of waste constituents [see 40 CFR 258.54, 40 CFR 258.55, and 27 CCR §20425(b)].

   c) Update the initial engineering feasibility study for corrective action based on the data collected to delineate the release and from the ongoing monitoring program. The Discharger shall submit this updated engineering feasibility study to the Board **within 90 days** of establishing an evaluation monitoring program [27 CCR §20425(c)].

   d) For MSW landfills, the Discharger shall discuss the results of the updated engineering feasibility study, prior to the selection of a remedy, in a public meeting with interested and affected parties [40 CFR 258.56(d)].

   e) Submit an amended report of waste discharge to establish a corrective action program meeting the requirements of §20430 of Title 27 based on the data collected to delineate the release and on the updated engineering feasibility study. The Discharger shall submit this report to the Board **within 90 days** of establishing an evaluation monitoring program [27 CCR §20425(d)].

6. The Discharger, **within 14 days** of determining "measurably significant" evidence of a release, shall notify all persons who own the land or reside on the land that directly overlies any portion of the plume of contamination if contaminants have migrated off-site if indicated by sampling of detection monitoring wells [40 CFR 258.55(g)(1)(iii)].

XII. STORM WATER PROVISIONS

A. New and existing Class III landfills shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return period [27 CCR §20260(c)].

B. New and existing Class II landfills shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return period [27 CCR §20250(c)].

C. MSW landfills located in a 100-year floodplain shall demonstrate that the Unit will not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human health or the environment [40 CFR 258.11(a)].

D. The Discharger of an MSW landfill shall design, construct, and maintain the Unit to include a run-off control system from the active portion of the landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm [40 CFR 258.26(a)].

E. Units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping under the precipitation conditions for the unit [27 CCR §20365(a)].

F. Precipitation on landfills or waste piles which is not diverted by covers or drainage control systems shall be collected and managed through the leachate collection and removal system, which shall be designed and constructed to accommodate the precipitation conditions for each class Unit [27 CCR §20365(b)].

G. Diversion and drainage facilities shall be designed, constructed, and maintained to [27 CCR §20365(c)]:

1. accommodate the anticipated volume of precipitation and peak flows from surface runoff and under the precipitation conditions for the Unit:

2. effectively divert sheet flow runoff laterally, via the shortest distance, into the drainage and collection facilities;

3. prevent surface erosion;

4. control and intercept run-on, in order to isolate uncontaminated surface waters from water that might have come into contact with waste; and

5. take into account:

   a) for closed Units and for closed portions of Units, the expected final contours of the closed Unit, including its planned drainage pattern;

   b) for operating portions of Units other than surface impoundments, the Unit's drainage pattern at any given time;

   c) the possible effects of the Unit's drainage pattern on and by the regional watershed;

   d) the design capacity of drainage systems of downstream and adjacent properties by providing for the gradual release of retained water downstream in a manner which does not exceed the expected peak flow rate at the point of discharge if there were no waste management facility; and

6. preserve the system's function. The Discharger shall periodically remove accumulated sediment from the sedimentation or detention basins as needed to preserve the design capacity of the system.

H. Collection and holding facilities associated with precipitation and drainage control systems shall be emptied immediately following each storm or otherwise managed to maintain the design capacity of the system [27 CCR §20365(d)].

I. Surface and subsurface drainage from outside of a Unit shall be diverted from the Unit [27 CCR §20365(e)].

J. Cover materials shall be graded to divert precipitation from the Unit, to prevent ponding of surface water over wastes, and to resist erosion as a result of precipitation [27 CCR §20365(f)].

K. Any drainage layer in the final cover shall be designed and constructed to intersect with the final drainage system for the Unit in a manner promoting free drainage from all portions of the drainage layer [27 CCR §20365(f)].

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CLEANUP AND ABATEMENT ORDER R5-2015-0713
FOR
LAKE COUNTY PUBLIC SERVICES DEPARTMENT
EASTLAKE SANITARY LANDFILL
LAKE COUNTY

This Order is issued to County of Lake, Lake County Public Services Department (Discharger) based on provisions of Water Code section 13304, which authorizes the California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board or Board) to issue a Cleanup and Abatement Order (CAO), and Water Code section 13267, which authorizes the Board to require the submittal of technical reports.

The Assistant Executive Officer of the Central Valley Water Board finds, with respect to the Discharger's acts, or failure to act, the following:

1. The County of Lake, Lake County Public Services Department owns and operates the active Eastlake Sanitary Landfill (Facility). The Facility is located at the eastern edge of the City of Clearlake in Section 26, T13N, R7W, MDB&M, and consists of 34.7 acres comprised of Assessor's Parcel Numbers 41-221-14,15; 41-222-34; 41-223-24; 41-224-39; 41-225-25; 41-226-17,22,23,24,25; 41-233-28; 41-234-01,23,24; 41-235-11,13,14; 41-244-18; 10-006-84, and 10-008-03, 39.

2. Waste Discharge Requirements (WDRs) Order R5-2006-0108 was adopted by the Central Valley Water Board on 22 September 2006 to regulate the construction, operations, and corrective action at the Facility. Among other things, the WDRs implement Title 27 of the California Code of Regulations (Title 27).

3. According to the WDRs, the Facility consists of one existing unlined waste management unit covering 22.4 acres (Area I) and a lined waste management unit covering 12.3 acres (Area II). Both of the lined and the unlined units are classified as Class III waste disposal units that accept municipal solid waste in accordance with Title 27.

4. The Facility discharges its leachate into a 600,000 gallon lined Class II Surface Impoundment.

5. Finding 36 of the WDRs states that volatile organic compounds (VOCs) have been detected in groundwater monitoring wells MW-5, MW-8, MW-13, and MW-14.

6. Provisions F.15.C, F.15.D, and F.15.E of the WDRs require that the Discharger submit a VOC site investigation report with an assessment of the VOC transport mechanism, an Engineering Feasibility Study for potential corrective actions, and a Corrective Action Program to address the VOCs in groundwater.

VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER

7. The Discharger submitted a VOC investigation report[1] in 2007 and an engineering feasibility study[2] in 2008. However, the reports did not meet the requirements of the WDRs[3].

8. Based on duplicate samples obtained during three semiannual sampling events in 2011 and 2012, Water Board staff informed the Discharger that their laboratory was not able to meet the detection limits required by the WDRs[4], and therefore it was not possible to determine whether groundwater contamination was still present. Subsequently, the Discharger was required to submit a revised sample collection and analysis plan and to select a laboratory that could meet the requirements of the WDRs.

9. Until the sampling and analysis procedures could be resolved, Water Board staff agreed to temporarily defer further site investigation work and a revised engineering feasibility study pending the implementation of a sample collection and laboratory analysis plan that could meet the requirements of the WDRs. In November 2012 the Discharger's newly-selected laboratory was able to meet the reporting requirements specified in the WDRs, and was therefore technically capable of reporting "trace" VOCs to the concentrations required by the WDRs.

10. On 26 April 2013, the Water Board requested an updated Site Investigation Workplan to define the vertical and lateral extent of VOC contamination in groundwater.

11. On 29 July 2013, the Discharger submitted the *VOC Investigation Workplan*, which proposed the installation of two wells to determine if a former burn pit was a source of VOC contamination in groundwater. In addition, two replacement wells[5] were proposed to replace wells MW-2 and -7, which had historically produced insufficient water to obtain samples, even after re-development.

12. Wells MW-17, MW-18, MW-19, and MW-20 were installed and sampled in the spring of 2014.

13. On 1 October 2014, the Discharger submitted their *Volatile Organic Compounds Investigation Report of Findings*, which showed that new well MW-17 also exhibited concentrations of fuel-related hydrocarbons as well as VOCs. The VOCs detected at

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[1] *VOC Investigation Report* (17 Oct 2007)
[2] Feasibility Study Workplan (3 Oct 2008)
[3] 20 October 2007 letter from Water Board staff stating that reports were incomplete.
[4] Detection Monitoring Specifications E.11 and E.12 of the WDRs state "*The methods of analysis and the detection limits used must be appropriate for the expected concentrations. . . . .*" and "*Trace" results - results falling between the MDL and the practical quantitation limit (PQL) - shall be reported as such, and shall be accompanied both by the estimated MDL and PQL values for that analytical run*", respectively
[5] Well MW-19 and MW-20.

MW-17 include 1,1-dichloroethane, cis-1,2-dichloroethene, benzene, methyl-tert-butyl ether, and tert-butyl alcohol.

14. In April 2015, all site monitoring wells were sampled, and the table below provides a summary of wells with VOC detections during that sampling event. The Discharger reported VOC detections at wells MW-5, MW-10, MW-13, MW-14, and MW-17, with wells MW-5 and MW-17 exhibiting the most detections. The concentrations of benzene at wells MW-5 and MW-17 exceed the health-based California Primary Maximum Contamination Level of 1 mg/L. At well MW-10, methyl-tert-butyl ether was first detected in November 2012, and as of April 2015 it continues to be detected. At well MW-8, there have been no reported detections of VOCs since November 2012.

VOC Detections in Groundwater During April 2015 Sampling Event

	Trichloroethene and Daughter Products (ug/L)				Fuel-Related Hydrocarbons (ug/L)			
Well ID	TCE	1,1-DCA	cis-1,2-DCE	Chloroethane	Benzene	DIPE	MTBE	TBA
MW-5	*0.26J*	*0.14J*	*2.6*	*0.35*	*1.9*	*0.42*	*2.2*	*15*
MW-17	ND	*0.11J*	*0.98*	ND	*1.3*	ND	3.7	*46*
MW-14	ND	*0.17J*	ND	ND	ND	*0.47*	*1.2*	*29*
MW-13	ND	*0.24J*	ND	ND	ND	ND	*1.7*	*13*
MW-10	ND	ND	ND	ND	ND	NE	*0.31*	ND
MW-8	ND	ND	ND	ND	ND	ND	ND	ND

Legend: *J*: "trace" concentrations, as reported by the laboratory. 1,1-DCA: 1,1-Dichloroethane. cis-1,2 DCE: cis-1,2 Dichloroethene. DIPE: Di-isopropyl ether. MTBE: Methyl-tert-butyl ether. TBA: tert-Butyl alcohol. TCE: Trichloroethene.

15. Three landfill gas monitoring wells (LGMW-1, LGMW-2, and LGMW-3) were installed in November 2005 as part of an evaluation monitoring program[7]. LGMW-1 and LGMW-2 were installed within the limits of the landfill, and LGMW-3 was installed outside the limits of the landfill and adjacent to groundwater monitoring well MW-14. The Discharger's 2007 *VOC Investigation Report of Findings* indicates that all three wells were sampled for VOCs in 2005, and that wells LGMW-1 and LGMW-2 were sampled in 2006. The number of VOC constituents in each sample ranged from 25 to 39 VOCs, with fuel-related products, tetrachloroethene and reductive degradation products, and refrigerants (e.g., Freon-12) reported in all samples.

16. Based on Water Board staff's review of the data and the site investigation reports, the landfill is the source of the VOC releases to groundwater, and has impacted the beneficial uses of groundwater.

17. The VOC plume has not been fully defined because the vertical extent has not been investigated, and the lateral extent has not been defined at MW-17, MW-10, and MW-13.

18. Wells without detectable concentrations of VOCs have not been installed upgradient and downgradient of MW-17 and downgradient of MW-10 and MW-13.

19. On 12 May 2015, Board staff met with the Discharger to discuss the extent of VOC contamination. Based on those discussions and as outlined in the above Findings, it was determined that the lateral and vertical extent of the VOC plume has not been fully defined, and that further investigation to delineate the release is required.

20. The facility is regulated under waste discharge requirements which implements Title 27. Sections 20420 and 20425 of Title 27 specific actions when a release has been confirmed, including (1) establishment of an Evaluation Monitoring Program to assess the nature and extent of the release, (2) submittal of results and assessment of the Evaluation Monitoring Program, (3) an updated Engineering Feasibility Study for Corrective Action, and (4) implementation of the Corrective Action. This Order requires the Discharger to complete these items.

REGULATORY CONSIDERATIONS

21. Prohibition A.3 of the WDRs prohibits the discharge of wastes outside of a Unit or portion of a Unit specifically designed for their containment. Groundwater and landfill gas monitoring data confirm that a release has taken place.

22. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Board. Pursuant to Water Code section 13263(a), waste discharge requirements must implement the Basin Plan.

23. Surface water from the Facility drains to Molesworth Creek, which is tributary to Clear Lake.

24. The designated beneficial uses of Clear Lake, as specified in the Basin Plan, are municipal and domestic supply; industrial service supply; agricultural supply; water contact and non-contact water recreation; spawning, reproduction, and/or early development; warm fresh water habitat; cold fresh water habitat; and wildlife habitat.

25. The designated beneficial uses of groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply.

26. Water Code section 13304(a) states, in relevant part:

> *Any person who has discharged or discharges waste into the waters of this state in violation of any waste discharge requirement or other order or prohibition issued by a regional board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be,*

> *discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the regional board, clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts.*

27. The State Water Resources Control Board (hereafter State Board) has adopted Resolution No. 92-49, the *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304*. This Policy sets forth the policies and procedures to be used during an investigation or cleanup of a polluted site and requires that cleanup levels be consistent with State Board Resolution No. 68-16, the *Statement of Policy With Respect to Maintaining High Quality of Waters in California*. Resolution No. 92-49 and the Basin Plan establish the cleanup levels to be achieved. Resolution No. 92-49 requires the waste to be cleaned up to background, or if that is not reasonable, to an alternative level that is the most stringent level that is economically and technologically feasible in accordance with Title 23, California Code of Regulations (CCR) Section 2550.4. Any alternative cleanup level to background must (1) be consistent with the maximum benefit to the people of the state; (2) not unreasonably affect present and anticipated beneficial use of such water; and (3) not result in water quality less than that prescribed in the Basin Plan and applicable Water Quality Control Plans and Policies of the State Board.

28. Water Code section 13267 subdivision (b)(1) states, in relevant part:

> *In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region … shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.*

29. The technical reports required by this Order are necessary for staff to evaluate compliance with this Order and WDRs Order R5-2006-0108, and are required to ensure the protection of water quality. Lake County owns and operates the Facility that discharges waste subject to this Order and WDRs Order R5-2006- 0108.

30. The issuance of this Order is being taken for the protection of the environment and as such is exempt from provisions of the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) pursuant to California Code of Regulations, title 14, sections 15061 subdivision (b)(3), 15306, 15307, 15308, and 15321 subdivision (a)(2).

IT IS HEREBY ORDERED that, pursuant to Water Code sections 13304 and 13267, Lake County shall cleanup and abate the Eastlake Landfill release to groundwater in accordance with the scope and schedule set forth below in order to return to compliance with WDRs Order R5-2006- 0108.

1. The Discharger shall comply with all aspects of WDRs Order R5-2006-0108 including complying with Detection Monitoring Specifications E.11 and E.12 of the WDRs[6].

2. **By 31 August 2015**, the Discharger shall submit an *Updated Evaluation Monitoring Work Plan* to define the horizontal and lateral extent of volatile organic compound impacts in groundwater in all aquifer zones affected by the release. This shall be completed through collection of grab groundwater samples followed by installation of permanent monitoring wells, or a series of installations of permanent monitoring wells. The *Updated Evaluation Monitoring Work Plan* shall include the information outlined below.

   Contents of the Updated Evaluation Monitoring Work Plan

   Definition of the extent of the plume may be accomplished in either of the following ways: (1) collect grab groundwater samples, analyze them on a 24-hour turnaround, continue moving sample points outward or downward and collecting grab samples until no VOCs are detected, and then install permanent groundwater monitoring wells at the edge of the release. Or (2), install permanent monitoring wells, develop within 72 hours, then collect groundwater samples within 24 hours, and analyze on a 24-hour turn around. If VOCs are detected, then install additional permanent monitoring wells outward or downward and the process continued until no VOCs are detected. The installation of permanent monitoring wells shall not delay the step-out/step-down program.

   The plan shall include the following elements:

   - Timeline showing that work, including well development, sampling, and analysis will be completed during the first quarter of 2016.
   - Procedures to develop wells within 72-hours of installation.
   - In order to propose the location of the grab groundwater samples or permanent monitoring wells:
     i. A discussion of the elevation of the fractured bedrock and the orientation of the fractures.
     ii. Plan-view maps showing current groundwater VOC iso-concentration lines for each individual constituent of concern.
     iii. A plan-view map showing the locations of planned grab groundwater samples or permanent monitoring wells, existing wells, abandoned wells, and the direction of groundwater flow.

[6] In this regard, the Discharger's laboratory must report "trace" concentrations falling between the method detection limits (MDLs) and practical quantitation limits (PQLs). These concentrations must closely agree with published values, and the MDLs and PQLs must be approved by Water Board staff.

iv. Cross-section maps showing the depth of existing wells and depth of planned grab groundwater samples.

- For the grab/groundwater samples:
  i. A description of how the grab groundwater samples or permanent monitoring wells will be collected.
  ii. A step-out plan and decision tree, which includes a time-line to efficiently delineate the vertical and horizontal extent of contamination.
  iii. Procedures to obtain grab/groundwater samples and to perform field and analytical tests. The proposed constituents to be analyzed, detection limits, and laboratory turn-around times shall be included.
  iv. Procedures to address drilling refusal.
  v. Procedures to have 24-hour hour turn-around time for VOC analytical results.

- For the installation of permanent monitoring wells:
  i. Procedures to develop wells and sample within 72-hours of installation and to obtain VOC analytical results within 24 hours of sampling.
  ii. Procedures to immediately drill new wells if any VOCs are detected.
  iii. A description of how the location of the monitoring wells will be determined.
  iv. A monitoring well installation work plan, which shall follow the requirements in Attachment A to this Order.

- All new monitoring wells, and existing wells MWs-8, -10, 13, -14, -15, and -17, shall be sampled for three quarters, beginning with the First Quarter 2016. Groundwater shall be sampled as follows: (1) the first sampling event shall include the Field and Monitoring Parameters in Table I of the MRP and the five year constituents of concern in Table VI of the MRP, and (2) the second and third sampling events shall include the Field Parameters and Monitoring Parameters in Table I of the MRP. After that point, quarterly sampling may cease, and all wells (including the new ones) shall be incorporated into the Monitoring and Reporting Program and sampled per the WDRs.

3. By **1 March 2016**, the Discharger shall submit a Well Installation Report which includes the information outlined in the second section of Attachment A for the monitoring wells installed for compliance with this Order. In addition, the Report shall include a demonstration, which is supported by water quality data, that the extent of contamination, both laterally and vertically, as defined in Item #2 of this Order, is complete.

4. By **30 November 2016**, the Discharger shall submit an *Updated Evaluation Monitoring Report of Results*, which shall include the results of the quarterly groundwater monitoring, and a determination of the spatial distribution and concentration of each constituent of concern throughout the zone(s) affected by the release. The report must provide discussions and correlated illustrations, both plan view and cross-section, that depict the vertical and lateral extent of the contamination for zones affected by the release.

5. By **28 February 2017**, the Discharger shall submit an *Updated Engineering Feasibility Study* that evaluates different corrective action measures to remediate the groundwater VOC plume. Corrective action measures for the fuel related hydrocarbons shall be evaluated separately from the corrective action measures for the other VOC compounds. For each corrective action measure that is evaluated, there shall be an estimation of the length of time to clean up the release. This study shall be based on the data collected to delineate the release as well as the data collected from the ongoing monitoring program required under the WDRs. The *Updated Engineering Feasibility Study* shall propose additional corrective action measure(s) to be implemented.

6. By **30 June 2017**, the Discharger shall submit an *Additional Corrective Action Implementation Report* documenting that the proposed corrective action(s) have been implemented.

7. The Discharger shall submit quarterly *Corrective Action Progress Reports* containing (a) an evaluation of the effectiveness of the site-wide corrective action measures, (b) an estimation of the length of time to clean up the release, and (c) a discussion of whether additional corrective actions, or fine-tuning of existing corrective actions, are necessary. The first *Progress Report* is due by **15 October 2015.** Thereafter, the quarterly progress reports shall be submitted by **15 January, 15 April, 15 July, 15 October** of each year. The *Progress Reports* shall be submitted separately from the monitoring reports required by the WDRs and shall continue to be submitted quarterly until this Order is rescinded.

Additional Requirements

8. All data, technical reports and plans, and monitoring reports prepared by the Discharger after the date of this Order shall be uploaded to the State Water Resources Control Board's web-based Geotracker database system (http://geotracker.waterboards.ca.gov), in compliance with the requirements of Title 23 Section 3890 et seq. This includes uploading all reports, plans, and data required under this Order and under any Order or permit issued by the State Water Quality Control Board.

9. As required by the California Business and Professions Code sections 6735, 7835, and 7835.1, all reports shall be prepared by, or under the supervision of, a California Registered Engineer or Professional Geologist and signed by the registered professional. Each technical report submitted by the Discharger shall contain the professional's signature and/or stamp of the seal.

10. As required by Provisions F.6.c and F.6.d of WDRs Order R5-2006- 0108, all reports and transmittal letters shall be signed by either a principal executive officer, ranking elected or appointed official, or a duly authorized representative, and any person signing a document which is submitted to comply with this Order shall make the following certification:

> *I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all*

attachments and that, based on my knowledge and on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

If the Discharger is unable to perform any activity or submit any document in compliance with the schedule set forth herein, or in compliance with any work schedule submitted pursuant to this Order and approved by the Assistant Executive Officer, the Discharger may request, in writing, an extension of the time specified. The extension request shall include justification for the delay. Any extension request shall be submitted as soon as a delay is recognized and prior to the compliance date. An extension may be granted by revision of this Order or by a letter from the Assistant Executive Officer.

If the Discharger fails to comply with the provisions of this Order, the Assistant Executive Officer may refer this matter to the Attorney General for judicial enforcement or may issue a complaint for administrative civil liability. Failure to comply with this Order may result in the assessment of administrative civil liability up to $10,000 per violation per day, pursuant to the Water Code sections 13268, 13350, and/or 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

This Order is effective upon the date of signature.

Original signed by

ANDREW ALTEVOGT, Assistant Executive Officer

July 30, 2015

(Date)

Attachment A: Monitoring Well Installation Workplan Requirements

ATTACHMENT A
REQUIREMENTS FOR
MONITORING WELL INSTALLATION WORKPLANS AND REPORTS

Prior to installation of any groundwater monitoring wells, the Discharger shall submit a workplan containing, at a minimum, the information listed in Section 1 below. Wells may be installed after staff concurs with the workplan. Upon installation of the monitoring wells, the Discharger shall submit a well installation report which includes the information contained in Section 2 below. All workplans and reports must be prepared under the direction of, and signed by, a registered geologist or civil engineer licensed by the State of California.

SECTION 1 - Monitoring Well Installation Workplan

The monitoring well installation workplan shall contain the following minimum information:

A. General Information

- Purpose of the well installation project,
- Brief description of local geologic and hydrogeologic conditions,
- Proposed monitoring well locations and rationale for well locations,
- Topographic map showing facility location, roads, and surface water bodies,
- Site map showing all existing on-site wells, proposed wells, surface drainage courses, surface water bodies, buildings, waste handling facilities, utilities, and major physical and man-made features.

B. Proposed Well Numbers

The proposed well numbers for each well must be provided in the text and on the site map.

C. Drilling Details

- On-site supervision of drilling and well installation activities,
- Description of drilling equipment and techniques,
- Equipment decontamination procedures,
- Continuous soil sampling and logging,
- Logging methods shall comply with ASTM D2488-93 *Method for Visual Classification, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) for field work*.

D. Monitoring Well Design – Diagram and Narrative

The well design must be provided in both a narrative description and in a diagram, which must include the proposed well construction details:

- Borehole diameter,
- Casing and screen material, diameter, and centralizer spacing (if needed),
- Type of well caps (bottom cap either screw on or secured with stainless steel screws),
- Anticipated depth of well, length of well casing, and length and position of perforated interval,
- Thickness, position and composition of surface seal, sanitary seal, and sand pack,
- Anticipated screen slot size and filter pack.

E. Well Development

Well development must be performed at least 48 hours and no more than 72 hours after the sanitary seal has been placed, and must include

- Method of development to ensure maximum removal of fines from the vicinity of the screen and to ensure free-flow of fluids (i.e., over-pumping, air-lift, surge block and bailer, jetting, etc.),
- Parameters to be monitored during development and the record keeping procedures,
- Method of determining when development is complete,
- Disposal of development water.

F. Well Survey - Horizontal and Vertical Coordinates

- Name of the Licensed Land Surveyor or Civil Engineer,
- Datum for survey measurements,
- List of well features to be surveyed, including the top of casing, ground surface, and horizontal and vertical coordinates,
- Accuracy: Horizontal must be within $\pm$0.1 foot and Vertical within $\pm$0.01-foot.

G. Water Level Measurement

- The elevation reference point at each monitoring well must be within 0.01-foot,
- Ground surface elevation at each monitoring well must be within 0.01-foot,
- Method and time of water level measurement must be specified

H. Sampling and Laboratory Analysis

Groundwater samples must be obtained immediately upon development, with VOC analysis to have a 24-hour turn-around time. Groundwater sampling must be performed after the well is developed, and analytical results must be included with the monitoring well installation report. Groundwater sampling, field tests, and laboratory analysis must comply with the requirements in the Cleanup and Abatement Order, Monitoring and Reporting Program, and Standard Provisions. All Method Detection Limits, Practical Quantitation limits, and “trace” concentrations must be reported on the laboratory reports.

I. Proposed Schedule for Completion of Work

SECTION 2 - Monitoring Well Installation Report

Forty-five days after completion of the well installation, a monitoring well installation report must be submitted which provides the information listed below.

A. General Information

1. Purpose of the well installation project,
2. Brief description of local geologic and hydrogeologic conditions encountered during installation of the wells,
3. Number of monitoring wells installed and copies of County Well Construction Permits,
4. Topographic map showing facility location, roads, surface water bodies,
5. Scaled site map showing all previously existing wells, newly installed wells, surface water bodies, buildings, waste handling facilities, utilities, and other major physical and man-made features.

B. Drilling Details – Narrative and Graphic

1. On-site supervision of drilling and well installation activities,
2. Drilling contractor and driller's name,
3. Description of drilling equipment and techniques,
4. Equipment decontamination procedures,
5. Soil sampling intervals and logging methods,
6. Well boring log:
    a. Well boring number and date drilled
    b. Borehole diameter and total depth
    c. Total depth of open hole (same as total depth drilled if no caving or back-grouting occurs)
    d. Depth to first encountered groundwater and stabilized groundwater depth
    e. Detailed description of soils encountered, using ASTM D2488-93 *Method for Visual Classification, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) for Field Work*.

C. Well Construction Details – Diagram and Narrative

1. The Discharger must verify that boring logs and well construction data have been uploaded to the State's GeoTracker system.
2. Well construction details
    a. Well number, date started, date completed, geologist's name
    b. Total depth drilled
    c. Drilling Contractor and driller name and address
    d. Depth of open hole (same as total depth drilled if no caving occurs)
    e. Method and materials of grouting excess borehole
    f. Footage of hole collapsed
    g. Length of slotted casing installed

h. Depth of bottom of casing
i. Depth to top of sand pack
j. Thickness of sand pack
k. Depth to top of bentonite seal
l. Thickness of bentonite seal
m. Thickness of concrete grout
n. Boring diameter
o. Casing diameter
p. Casing material
q. Size of perforations
r. Well elevation at top of casing
s. Initial and stabilized depth to groundwater
t. Date of water level measurement
u. Monitoring well number
v. Date drilled

D. Well Development

1. Date(s) and method of development of each well,
2. Method of development,
3. How well development completion was determined,
4. Volume of water purged from well and method of development water disposal,
5. Field notes from well development.

E. Well Survey

1. Coordinate system, epochs, bench marks, horizontal controls, accuracy, and precision,
2. Survey results of casing elevation with the cap removed (vertical to 1/100th foot) and the ground surface,
3. California Registered Civil Engineer or Licensed Surveyor's report, field notes, and stamp/signature in an appendix,
4. Description of the measuring points (i.e. ground surface, top of casing, etc.),
5. Tabulated survey data with well numbers and horizontal and vertical coordinates.
6. Verification that survey data has been uploaded to the State's GeoTracker system.

F. Laboratory Analytical Results

Laboratory analytical results must be included with the well installation report. All analytical reports prepared for the Discharger's facility must contain, at a minimum, the information within this section.

1. Tabulated field and analytical data with sample location identification numbers, water quality goals, field/analytical results, and highlighted data that is outside water quality goals,
2. Appendix with laboratory reports, COCs, and laboratory signatures on reports,

3. Laboratory reports showing results, reporting units, MDLs, PQLs, “trace” results, flagged results, matrix effects, and QA/QC results,
4. Discussion of results including, but not limited to, discussion of violations, exceedances, if all field and monitoring parameters were sampled and analyzed, description of groundwater flow direction, comparison of analysis and field sampling results to background and water quality goals, list of potential constituents of concern at each sampling location, and other relevant discussions.

ATTACHMENT B TO ORDER NO. R5-2013-0026

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Sacramento Office: 11020 Sun Center Drive #200 Rancho Cordova, CA 95670
Fresno Office: 1685 E Street Fresno, CA 93706
Redding Office: 364 Knollcrest Drive, Suite 205 Redding, CA 96002

NOTICE OF TERMINATION

OF COVERAGE UNDER
CONDITIONAL WAIVER OF WASTE DISCHARGE REQUIREMENTS
FOR DISASTER-RELATED WASTES DURING A STATE OF EMERGENCY
WITHIN THE CENTRAL VALLEY REGION

I. FINAL WASTE DISPOSAL INFORMATION

Final Disposition of Waste:	☐ Off-site/Landfill Disposal	☒ On-site Reuse/Disposal	
	☐ Off-site Reuse/Disposal	☐ Other: _____	
Property Owner/Discharger Name:	Lake County Eastlake Sanitary Landfill		
Property Owner/Discharger Contact and Title:	Lars Ewing, Public Services Director		
Property Owner/Discharger Mailing Address:	333 Second Street		
City: Lakeport	County: Lake	State: CA	Zip: 95453
Telephone: 707-262-1618	Fax:	Email: lars.ewing@lakecountyca.gov	
Assessor Parcel Number(s):	010-006-08; 010-008-39; 010-053-13; 041-224-40; 041-234-27; 041-244-18		
Date(s) Waste Disposed:	October 2015 - July 2018		
Quantity of Waste Disposed: 340,429 tons (in cubic yards, tons, or gallons for each disposal date. Attach additional information as needed.)			
Disposal Location(s):	Eastlake Sanitary Landfill; wildfire ash,soil, and debris cleanup deposited in lined area of landfill shown on attached map. Quantity is the total for all 2015-2017 wildfires (Rocky, Jerusalem, Valley, Clayton, Sulphur, Redwood) (Attach information including a map of the disposal area(s) with locations, approximate volumes, waste types, and dates of disposal. For temporary waste piles or surface impoundments, attach information including photographs showing that all wastes have been removed and the site has been restored to its original condition.)		

II. FINAL DISPOSAL CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature (Owner or Authorized Representative)	Date 7/11/18
Lars Ewing	Lake County Public Services Director
Print Name	Title

N 2,110,400 | N 2,110,000 | N 2,109,600 | N 2,109,200 | N 2,108,800 | N 2,108,400

E 6,390,000 | E 6,390,400 | E 6,390,800 | E 6,391,200 | E 6,391,600 | E 6,392,000

SITE ENTRANCE

RECYCLING AREA

OPERATIONS & HAZMAT BUILDINGS

313 1706.56

307 1688.05

CLASS II IMPOUNDMENT

BLOWER/ FLARE STATION

301 1719.61

SCALES/ SCALE HOUSE

312 1707.28

Approximate area of debris placement

50 0 50 100 150

SCALE 1"=100'

DRAWING IS HALF-SIZE AT 11x17

LEGEND

1770 EXISTING MAJOR CONTOURS

1756 EXISTING MINOR CONTOURS

301 1719.61 SURVEY CONTROLS

312 1707.28

313 1706.56

COORDINATE SYSTEM/DATUM INFO

COORDINATE SYSTEM:
CALIFORNIA STATE PLANE, ZONE 2.

HORIZONTAL DATUM: NAD 83

VERTICAL DATUM: NAVD 88

TOPOGRAPHICAL NOTES

1. AERIAL FLIGHT DATE 1-31-18 PERFORMED BY GEOMAPS; TOPOGRAPHIC & SURVEY DATA PROVIDED BY SHN LAND SURVEYING.

2. TOPOGRAPHY SHOWN IS A PORTION OF THE ENTIRE FLIGHT AREA AND IS BEING PRESENTED TO FOCUS ON THE PERMITTED FILL AREA. ENTIRE TOPOGRAPHY WILL BE SENT UNDER DIFFERENT COVER.

GEOMAPS
3362 MATHER FIELD RD
RANCHO CORDOVA, CA 95670
TEL (916) 361-9133 FAX (916) 361-9517

CLIENT	SHN LAND SURVEYING
LOCATION	EASTLAKE LANDFILL
JOB NO. 35015	PHOTO DATE 1-31-2018

NO.	REVISION	DATE

SHEET TITLE: 2018 TOPOGRAPHY

PROJECT TITLE: EASTLAKE LANDFILL AERIAL/AIR SPACE LAKE COUNTY, CALIFORNIA

EASTLAKE SANITARY LANDFILL
COUNTY OF LAKE
CLEARLAKE, CALIFORNIA

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
CONSULTING ENGINEERS & CONTRACTORS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CA 95827 FAX (916) 361-1299
PROJ. NO. 01214263.06 T1 DSN. BY: MJE DWN. BY: MJE CHK. BY: AAM APP. BY: JJM
ACAD FILE: 35015_SCS.031418

DATE: 3-14-18

SCALE: AS SHOWN

FIGURE: 1

LAKE COUNTY AIR QUALITY
MANAGEMENT DISTRICT
885 Lakeport Blvd
Lakeport, CA 95453
Phone (707) 263-7000
Fax (707) 263-0421

Douglas G. Gearhart
Air Pollution Control Officer
dougg@lcaqmd.net

August 12, 2013

Ms. Caroline Chavez
County of Lake Dept. of Solid Waste Mgmt.
333 Second Street
Lakeport, CA 95453

Subject: A/C 2013-14 Permit Issuance - Eastlake Municipal Landfill
Landfill Gas Collection and Control System - 16015 Davis Street, Clearlake, CA 95422

Dear Ms. Chavez:

Please find the enclosed Authority to Construct permit for the facility project as specified. I have attached a copy of the permitting assessment for your reference.

Be advised, District Rule 620 requires you post the permit or a facsimile at the site to be available for District staff inspection. If you have questions, please feel free to contact the District at (707) 263-7000.

Sincerely,

Elizabeth Knight, Sr. AQS

EAK/DGG

Atts: (2)
Permit Card
Permitting Assessment

CC: Permit File
Chron

AUTHORITY TO CONSTRUCT

Permit # A/C 2013-14

Lake County Air Quality Management District

885 Lakeport Blvd. Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

By: _____
Douglas G. Gearhart, APCO

Type of Issuance: Original *Issuance Date:* 8/12/2013 *Valid through:* 10/31/2013 *Category:* VII

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact:	Ms. Caroline Chavez	*Facility:*	Eastlake Municipal Landfill
Owner:	County of Lake Dept. of Solid Waste Mgmt.	*Location:*	16015 Davis Street
Mailing Address:	333 Second Street Lakeport, CA 95453		Clearlake, CA 95422

Name and Equipment Description: **Landfill Gas Collection and Control System**

One (1) Landfill Gas Collection and Control System consisting of nineteen (19) or more extraction wells, ten (10) or more horizontal collection lines, a PEI enclosed Landfill Gas Flare (or equivalent) rated for 80 to 450 scfm gas, header and lateral piping, a blowers, and condensate collections sumps and automated control systems.

Permit Conditions

Condition 1: Emissions

A. All equipment and components shall be regularly maintained in good working order pursuant to the manufacturer's recommendations and operated in a manner to prevent and/or minimize air emissions. The extraction wells, horizontal collectors, and landfill gas control systems shall be maintained in a vapor tight, leak free, and odor free condition during periods of operation. The control system shall operate within the manufacturer's specifications to ensure emission requirements.

B. Air emissions shall be directed to and abated by the landfill gas enclosed flare and destruction efficiency shall be 99% or better abatement for methane, 98% or better for NMOC and shall reduce NMOC concentrations to 20 parts per million by volume, or less, as hexane, dry basis at three (3) percent oxygen (O_2) or less, and shall reduce hydrogen sulfide (H_2S) to less than 0.03 parts per million. Total collection system emissions including air emissions from tanks, processing leaks and other fugitives shall not exceed one percent of influent methane concentration, nor one (1) pound per hour total non-methane volatile organic compounds (VOC's).

C. Visible emissions shall not exceed the values listed below for more than 3 minutes in any one (1) hour:

- Ringelmann 0.25 (5% opacity) from the flare stack;
- Ringelmann 1 (20% opacity) from all construction activities, equipment, and vehicle travel; and
- Ringelmann 1 (20% opacity) from diesel engine exhaust.

D. Automatic restart and/or shutdown controls shall be incorporated into the sysstem to prevent unabated landfill gas emissions. The system shall be set to shutdown upon the flare temperature dropping below 1,400 degrees F. Restarts and/or shutdowns shall be recorded in the system log and the control system shall be set to notify the operator should restart fail or of a system shutdown.

Condition 2: Administrative

A. This permit has been issued and is valid for a Landfill Gas Control System as specified in the permit application and supporting documentation.

B. The extraction system shall be operated under vacuum conditions and in conformance with the operating parameters specified in the application, approved design plan, and approved alternative compliance options, which are incorporated by reference.

C. County of Lake Department of Solid Waste Management (COLDOSWM) shall comply with the requirements of the Air Toxics "Hot Spots" Information and Assessment Act as specified in Sections 44300 - 44394 of the California Health and Safety Code (H&SC).

D. Within 180 days of steady state operation, COLDOSWM shall apply for a Permit to Operate, and prove compliance with these conditions.

E. COLDOSWM shall maintain all operational and monitoring records for the previous five (5) years on-site or in the Public Services Office. Records must be available for review at the Landfill within four (4) hours of request. Easily readable copies of original documents meets this requirement.

(Conditions 3 through 6 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

Condition 3: Notification, Records, and Reporting
A. The Lake County Air Quality Management District (LCAQMD) shall be promptly notified should equipment breakdown or upon failure to meet the required emission limits.
B. COLDOSWM shall forward all air emissions test data taken during the first 180 days of operation to the LCAQMD, and demonstrate the emission control equipment meets emission limits for total VOC's and methane. Initial test results shall be provided within 45 days of sampling meeting both H&SC 95470(b)(3) and 40 CFR 60.756(g) and 40 CFR 60.8.
C. COLDOSWM shall submit an Annual report meeting the requirements of H&SC Section 95470(b)(3), to the LCAQMD upon request, and by March 15 of each year. Annual reports shall be submitted for the reporting period covering January 1 through December 31 and shall include the following: Landfill name, owner, operator, address, SWIS number; total volume of gas collected (CF), average composition of the lanfill gas collected during the reporting period (percent methane and percent carbon dioxide by volume); gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each device; the date the gas collection and control system was installed and in full operation, the percent methane destruction efficiency of each gas control device, type and amount of supplemental fuels burned with the landfill gas in each device; the total volume of landfill gas shipped off-site, with composition and the recipient of the gas; the most recent topographic map of the site showing areas with final cover, geomembrane, and other areas with corresponding percentages over the landfill surface; all gas collection system downtime exceeding five calendar days (including individual well shutdown, disconnection times, and the reason for the downtime); all gas control system downtime in excess of one hour, the reason for such, and the length of time the system was shutdown; expected gas generation flow rate per H&SC Section 95471(e); records of all instantaneous surface readings of 200ppmv or greater (methane), all exceedances of the 500 ppmv limit for methane from any gas collection system component under positive pressure, all exceedance of 500ppmv methane in surface monitoring, other than non-repeatable, momentary readings, as determined by the instantaneous surface emissions monitoring, exceedances of the average methane concentration limit of 25 ppmv methane as determined by integrated surface emissions monitoring, include the location of the leaks (or grid location), leak concentration in ppmv, date and time of measurement, the action taken to repair the leak, date of repair, any required re-monitoring and the re-monitoring concentration in ppmv, and wind speed during the surface sampling; the installation date and location of each well installed as part of a gas collection system expansion; records of any positive wellhead gauge pressure measurements, the date of the measurements, the well identification number, and corrective action taken; annual solid waste acceptance rate and the current waste in place; results of any source test, records for the enclosed flare temperature monitoring device and gas flow measuring device.
D. COLDOSWM shall submit a SemiAnnual report meeting the requirements of 40CFR 60.757(f), to the LCAQMD upon request, and by October 31 of each year. The initial report shall include the initial performance test report. All reports shall include reportable exceedance of system performance and surface monitoring, value and length of time for exceedance; description and duration of all periods when gas stream is diverted from the control device; description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the device was not operating; all periods when the collection system was not operating in excess of 5 days; the location of each exceedance of the 500ppm methane concentration during instantaneous surface monitoring and the concentration recorded at each location for which an exceedance was recorded in the previous monitoring event; and the date of installation and the location of each well or collection system expansion added, and the total hours of operation.
E. COLDOSWM shall maintain a written log indicating dates and times of operation, inspection and testing, and any maintenance or changes of operation. Said log shall be available at the site, entries made in ink, signed by the operator or his agent, and available to the LCAQMD immediately upon request.

Condition 4: Modification
A. COLDOSWM shall apply for and receive an Authority to Construct permit prior to the addition of new equipment, or significantly modifying the operational parameters.

Condition 5: Monitoring and Testing
A. Upon initial operation of the unit, the system and each well head shall be inspected and monitored for methane, O_2, and gas flow daily for the first week, and weekly thereafter for the first month. Within one hundred and eighty days (180) of initial operation or sixty (60) days of continuous steady state operation, samples shall be collected at the influent and effluent streams of the enclosed flare. Samples shall be sent to a certified laboratory for analysis of total VOC's and methane. Local readings shall be compared to laboratory data. Alternative monitoring may be required upon receipt of laboratory analysis.
B. The system components shall be regularly inspected and tested (at least monthly) to verify system performance and emission control. Monthly monitoring shall include: measuring the gauge pressure in the gas collection header, monitoring nitrogen or oxygen concentrations, and monitoring temperature in the landfill gas at each wellhead.
C. Annual influent vapors to the flare station and flare effluent air stream samples shall be collected and sent to a certified laboratory for analysis of the parameters listed in Condition 5A, unless an alternate testing plan is approved in writing by the Air Pollution Control Officer. After three (3) years of source testing showing compliance with emissions limits, COLDOSWM may request to source test every three (3) years. Local readings shall be compared to laboratory data.
D. The LCAQMD shall be notified at least 72 hours in advance of any compliance test and provided an opportunity to observe and collect duplicate samples.
E. All effluent air stream monitoring and sample collection shall be collected prior to any system modifications or adjustments.
F. COLDOSWM shall have performed quarterly surface emissions monitoring for instantaneous and integrated monitoring requirements. Any instantaneous readings exceeding 500ppmv methane or any integrated readings exceeding 25ppmv methane shall be checked and verified, COLDOSWM shall notify the LCAQMD within one (1) business day and COLDOSWM shall initiate corrective action per H&SC Section 95469.
G. Any closed or inactive areas that have had no monitored exceedance for four (4) consecutive quarterly monitoring periods may request in writing to monitor annually.
H. The herein permitted facility shall not cause a public nuisance nor make a measurable contribution to any Ambient Air Quality Standard exceed. Should this facility result in odor or health complaints, the LCAQMD may require under Sections 430 and 670, monitoring, testing and mitigation by COLDOSWM to abate said condition.

Condition 6: Identification and Access
A. This permit shall be posted at the equipment site and be available for COLDOSWM's reference and LCAQMD staff inspection. If locks or unmanned gates are used to secure the project area, the LCAQMD or its representative will be given free access of entry for the purposes of monitoring or inspecting.

LAKE COUNTY
AIR QUALITY MANAGEMENT DISTRICT

885 Lakeport Blvd., Lakeport, CA 95453

AUTHORITY TO CONSTRUCT
PERMITTING ASSESSMENT

COUNTY OF LAKE DEPARTMENT OF SOLID WASTE MANAGEMENT
LANDFILL GAS COLLECTION AND CONTROL SYSTEM
EASTLAKE MUNICIPAL LANDFILL
16015 DAVIS AVE., CLEARLAKE, CA 95422
A/C 2013-14

By Douglas Gearhart, APCO and Elizabeth Knight, Sr. AQS
August 8, 2013

LAKE COUNTY AIR QUALITY MANAGEMENT DISTRICT
AUTHORITY TO CONSTRUCT PERMITTING ASSESSMENT

COUNTY OF LAKE DEPARTMENT OF SOLID WASTE MANAGEMENT
LANDFILL GAS COLLECTION AND CONTROL SYSTEM
EASTLAKE MUNICIPAL LANDFILL
16015 DAVIS AVE., CLEARLAKE, CA 95422
A/C 2013-14

Introduction

On May 16, 2013, the Lake County Air Quality Management District (LCAQMD) received an application (See Attachment 1) for an Authority to Construct from the County of Lake Department of Solid Waste Management (COLDOSWM) to install a Landfill Gas (LFG) Collection and Control System. The site is located at the Eastlake Municipal Landfill located at 16015 Davis Ave., Clearlake (See Map 1). The overall purpose of the LFG Collection and Control System is to comply with the California Air Resources Board (CARB) Landfill Methane Rule (See Attachment 2) and the National Emissions Standards for Hazardous Air Pollutants (NESHAP). The method of compliance is the installation of a landfill gas collection and control system for the active and inactive areas of the landfill.

Landfill Gas Collection and Control System

COLDOSWM has proposed to install a system using an enclosed flare as the primary abatement method. LFG is pulled from extraction wells and horizontal collection trenches located within the landfill, using a multistage centrifugal blower capable of operating at 500 scfm. The blowing action will create a vacuum, pulling LFG into the collection system. The LFG will be collected at the extraction wells, piped through a manifold and liquid separator, and treated with the enclosed flare. The regenerative blowers, valves and controls are operated by electrical line power. The flare shall be installed with propane fuel to assist in startup and if necessary for supplemental operations.

The LFG migration control unit will be installed near the entrance weigh station. The unit will treat landfill gas with a 99% destruction efficiency for methane and a 98% destruction efficiency for Non-Methane Organic Carbons (NMOC).

COLDOSWM estimates the landfill gas is approximately 50% methane, 50% carbon dioxide, and trace amounts of other gases. The gas is saturated with

moisture and is potentially combustible. The emission limits for this project are 99% destruction for Methane entering the flare, and 98% destruction efficiency for NMOC, less than 1 lb/day of Vinyl Chloride and Mercury, and less than 0.03 PPM Hydrogen Sulfide.

During the first month of operation, the system will be monitored daily for the first week and weekly thereafter for the remainder of the 30-day start up. Monitoring should include analysis for methane and oxygen at the system's influent streams and at each wellhead and horizontal collector wellhead. Within one hundred and eighty days of startup initial startup or 60 days of continuous steady state operation (which ever is shorter), laboratory samples shall be collected from the influent gas and flare exhaust gas sample locations and sent to a certified lab for analysis using EPA method for VOC/landfill gas analysis (TO-15 and methane). Local readings should be taken at the same time and compared to lab data to determine monitoring accuracy. The equipment will be checked for functional operation and influent vapor monitoring monthly thereafter, unless monitoring or operational information indicates a need for more frequent checks.

Laboratory analysis shall at a minimum be performed annually for the first three years of operation to verify compliance with permit conditions and accuracy of monthly readings, unless an alternate method is requested and approved by the Air Pollution Control Officer (APCO) in writing. After three years of continuous operation and compliance with emissions limits COLDOSWM may pursuant to CA H&SC 95464 (b)(4), request to conduct source testing every three years.

Appropriately trained and/or certified individuals with properly calibrated/certified equipment shall perform monitoring. At a minimum, methane, oxygen, temperature, and flow rate shall be checked at each monitoring session. Additional parameters, such as vinyl chloride may be required once source testing results are received and reviewed. COLDOSWM shall provide sample ports for monitoring at a minimum on the influent line between the blower and flare, and in the exhaust stack of the flare. An additional sample port near the condensate knock out is recommended.

Construction Emissions

The installation of the landfill gas collection and control system will require significant earthwork and soil surface disturbance. Adequate dust controls shall be utilized to prevent significant fugitive dust emissions during construction and operation of the system. Water, palliative treatments, or vegetative covers are typical methods used to prevent dust generation.

All construction equipment to be used for this project must meet CARB or LCAQMD requirements. Off-road construction equipment must be currently registered in DOORS and be complaint with the applicable regulations. All on-road diesel powered equipment must be compliant with the applicable regulations and appropriately registered.

Emissions

The construction and operation of the landfill gas collection and control system will result in emissions of methane, non-methane organic carbons, PM-10, PM-2.5, and other air contaminants. Based on calculations provided for the flare, with an expected gas flow rate of 450 scfm, and using the average concentrations of compounds found in landfill gas, the maximum expected criteria pollutants are carbon monoxide at 12 tons per year, nitrogen oxides as 3.6 tons per year, and sulfur dioxide at 3 tons per year. Hazardous air pollutants are expected to be less than 0.06 tons per year.

Applicable Rules

The project is subject to several rules (See Attachment 3). The most restrictive of the permitting rules is the requirement for Best Available Control Technology (Rule 602). The LCAQMD has performed an analysis of potential impact using New Source Review guidelines, along with the use of experience from similar projects to conclude that causing or contributing to a violation of any applicable Ambient Air Quality Standards or nuisance condition should not occur.

Conclusion

The APCO, after a review of the application, emissions potential, LCAQMD Rules and Regulations, COLDOSWM Compliance Plan (See Attachment 4), and COLDOSWM Alternate Compliance Options (See Attachment 5), has concluded that COLDOSWM can and will be issued an Authority to Construct Permit, as conditioned (See Attachment 6). This review is based on information provided by COLDOSWM who is expected to use good management practices and judgment to avoid problems and/or violations. In the APCO's opinion, such issuance will be in compliance with LCAQMD Rules and Regulations.

MAP 1
EASTLAKE MUNICIPAL LANDFILL
16015 DAVIS AVE., CLEARLAKE, CA 95422

ATTACHMENT 1

Lake County Air Quality Management District
885 Lakeport Blvd.
Lakeport, CA 95453
707-263-7000 / fax 263-0421

RECEIVED
MAY 16 2013
LAKE COUNTY AQMD

Douglas G. Gearhart
Air Pollution Control Officer
dougg@lcaqmd.net

APP# 2013-15
A/C# 2013-141

Application For An Authority To Construct (& Attached List and Criteria)

Type of Application: ☐ New Facility ☑ Modification ☐ Existing Facility, Not Previously Permitted

Contact Name: Ms. Caroline Chavez
Business Name: County of Lake, Dept. of Public Services
Mailing Address: 333 Second Street
Lakeport, CA 95453

Facility Name: Eastlake Municipal Landfill
Facility or Project Name: Gas collection and control system
Permit #: 2003-11 Category: VII

Description of the Process/Purpose of the Facility: Municipal solid waste landfill

Equipment Location/Legal Description: Please see Appendix B of Application.

Estimated Construction dates:
Start - July 2013 Completion - Jan. 2014

Description of equipment by make, model, size and type: Diagram/Plot Plan of Facility Enclosed? ☑ Yes ☐ No

Comprehensive landfill gas collection and control system with vertical and horizontal extraction wells, an enclosed flare, header and lateral piping, blowers, condensate collection sumps. Please see application text and Appendix B, which contains drawings for the proposed GCCS for additional information.

Additional List and Criteria Data Attached: Yes ✓ **No** ___ (List and Criteria are attached)

If no give reason: ___

Operating Schedule: 24 Hours/Day 7 Days/Week 52 Weeks/Year Lat•N: 38.9531

Production Rates: 14mmbt /Hour, ___ /Day, ___ /Year (Specify Units) Long•W: -122.59969

Amount, nature, and duration of emissions: Please see Tables 1 and 2

Attach a Facility and Equipment Diagram, Specification Sheet(s), and Process Flow Diagram. Show the location and distance to adjacent residences, businesses, schools and hospitals.

Type and efficiency of air pollution control equipment: Enclosed flare, please see application and Table 1

Type and Estimated Quantity of fuel use: LFG NA gal/yr (%S): Tbl. 1

Ten year projected expansion plans: There are no plans to expand flare capacity beyond current. There are no plans to construct new landfill cells. Fill operations will continue over existing constructed cells until the site reaches final design grades.

I have read and understand the LCAQMD's List and Criteria for Authority to Construct Permits. I understand that I am responsible for any information listed herein or requested pursuant to this application. Based on information and belief formed after reasonable inquiry, the statements and information presented in this application and supplemental documentation are true, accurate, and complete.

Caroline C Chavez
Signature of authorized representative of firm

Date: 5/14/13

Name: Caroline Chavez Title: Public Servs. Director Telephone: (707) 262-1760
FAX: (707) 262-0973

Ek 3/2009

ATTACHMENT 1

Environmental Consultants
and Contractors

3843 Brickway Boulevard
Suite 208
Santa Rosa, CA 95403-8226

707 546-9461
FAX 707 544-5769
www.scsengineers.com

SCS ENGINEERS

TO: Lake County Air Quality Management District			**DATE: 5-15-13**
STREET: 885 Lakeport Blvd.			**JOB NO.: 01209155.06 T2**
City: Lakeport			**ATTENTION: Doug Gearhart**
State: CA	**Zip:** 95453		**Re: Eastlake Sanitary Landfill, Clearlake**
We are Sending You:	☐ **Attached**	☒ **Report**	☐ **Under separate cover via ____**
☐ **Shop drawing**	☐ **Other ____**	☐ **Plans**	☐ **____**

COPIES	DATE	DESCRIPTION
1	May 2013	Authority to Construct Application for a Gas Collection and Control System

THESE ARE TRANSMITTED as checked below

☐ **For approval**	☐ **Approved as submitted**	☐ **Resubmit ____ copies for approval**
☐ **For your use**	☐ **Approved as noted**	☐ **Submit ____ copies for distribution**
☐ **As required**	☐ **Returned for corrections**	☐ **Return ____ corrected prints**
☒ **For review and comment**	☐ **____**	☐ **____**
☐ **FOR BIDS DUE : ____**	☐ **PRINTS RETURNED AFTER LOAN TO US**	

Mr. Gearhart:

Please find enclosed a Authority to Construct Application for a Gas Collection and Control System for Eastlake Sanitary Landfill. Please direct any questions or comments to Leslie Bove at 707-486-0803.

Regards,
Michelle Hoffmann
Project Administrator

cc: Ms. Caroline Chavez, Public Services Director, County of Lake

SCS ENGINEERS

Authority to Construct Application for a Gas Collection and Control System for Eastlake Sanitary Landfill Clearlake, California

Presented to:

County of Lake

Department of Public Services

333 Second Street

Lakeport, California 95453

For Submittal to:

Lake County Air Quality Management District

885 Lake Boulevard

Lakeport, CA 95453

Presented by:

SCS ENGINEERS

3117 Fite Circle, Suite 108

Sacramento, California

(916) 361-1297

May 2013

File No. 01209155.06, Task 2

Offices Nationwide

www.scsengineers.com

Authority to Construct Application for Gas Collection and Control System for Eastlake Sanitary Landfill Clearlake, California

Presented To:

County of Lake

Department of Public Services

333 Second Street

Lakeport, California 95453

For Submittal to:

Lake County Air Quality Management District

885 Lake Boulevard

Lakeport, CA 95453

Presented By:

SCS ENGINEERS

3117 Fite Circle, Suite 108

Sacramento, California

(916) 361-1297

May 2013

File No. 01209155.06, Task 2

ATTACHMENT 1

Table of Contents

List of Tables

No.

Appendices

1 INTRODUCTION

On behalf of the County of Lake, Department of Public Services (County), SCS Engineers (SCS) has prepared this application for an Authority to Construct (ATC) for a gas collection and control system (GCCS) at the Eastlake Sanitary Landfill (Eastlake, Landfill, or Site) for submittal to the Lake County Air Quality Management District (LCAQMD or District).

1.1 SOURCE DESCRIPTION

The Eastlake Landfill is permitted as a Class III Municipal Solid Waste (MSW) disposal facility under Solid Waste Facility Permit (SWFP) No. 17-AA-0001 by the Lake County Department of Health Services, the local enforcement agency (LEA) for California Department of Resources, Recycling and Recovery (CalRecycle). The facility is owned and operated by the County of Lake, Department of Public Services. Eastlake also has a Designated Non-Major Stationary Source permit to operate (PTO No. 2003-11) issued by the LCAQMD (Appendix A).

According to the Site's SWFP, the permitted disposal capacity is approximately 6 million cubic yards (CY). As of 2012, it is estimated that there are approximately 2.2 million CY of waste in place. The Landfill accepts nonhazardous solid waste, including mixed MSW, construction/demolition debris, and dewatered water treatment sludge. The maximum permitted throughput is 200 tons per day (tpd) according to the SWFP (Appendix A).

The Landfill consists of one existing unlined waste management unit (WMU) covering 22.4 acres (Area I) and a lined WMU covering 12.3 acres (Area II). Filling began in Area I in 1972 and continued until 1999. A compacted and graded interim cover has been placed over Area I. Landfilling operations began in Area II in 1999. Filling in Area II, which consists of Modules 1 and 2, is complete. Current filling operations have begun in Area III, which is on top of the two previously established footprint areas (Areas I and II). No further lateral expansion beyond the Area I/II footprint is planned. Areas I and Area II are equipped with a leachate collection and removal system (LCRS). The LCRS is constructed of a series of plastic pipes along the base of the Units and gravity-drains to a 600,000-gallon lined Class II surface impoundment located below the southern toe of the Area I. Excerpts from the design drawings for the proposed GCCS are presented Appendix B. Drawing 2 shows the existing site layout.

A landfill gas (LFG) migration control system consisting of four (4) migration control wells and two activated carbon units currently operates to control migration along the northwestern portion of the Landfill (Figure 2). The system was installed and is operated to meet California Code of Regulations (CCR) Title 27 regulations for subsurface combustible gas control.

1.2 PROJECT LOCATION

The Landfill is located at 16015 Davis Avenue in Clearlake, California. The facility is situated east of the City of Clearlake, in Section 26, Township 13 North, Range 7 West, of the Mount Diablo Base and Meridian (MDB&M). Land uses within a one-mile radius of the Landfill are zoned residential, commercial, agricultural, and open space (Appendix B, Drawing 1).

1.3 BACKGROUND

A GCCS has not historically been required at the Site, and landfill gas is not currently collected from any area of the landfill. However, the Site recently became subject to the California Air Resources Board (CARB) Landfill Methane Rule (LMR; CCR Title 17, Subchapter 10, Article 4, Subarticle 6), based on having greater than 450,000 tons of waste-in-place, and a LFG heat input capacity greater than 3.0 million British thermal units per hour (MMBTU/hr).

The CARB regulation differs from federal Landfill New Source Performance Standards (NSPS), the National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements, and local air district rules in that it generally applies to smaller landfills and has more stringent requirements for methane collection and control, component leak testing, and surface emissions monitoring. Since the requirements of the CARB regulation are more stringent, they do not conflict with or impede compliance with existing federal and local air district requirements. In accordance with LMR requirements, SCS prepared and submitted, on behalf of the County, a proposed GCCS Design Plan (Plan) for compliance with the LMR. CARB approved the proposed Plan in July, 2012. Per CARB requirements, a GCCS must be designed, installed and operating by January, 2014, within 18 months of approval of the Plan.

2 PROJECT DESCRIPTION

As discussed in the previous section, the Site does not have a GCCS in place. The Landfill's SWFP and the current regulatory status with respect to 27 CCR and the NSPS do not specifically require a GCCS. However, as previously mentioned, because the Site has greater than 450,000 tons of waste-in-place and has a landfill gas heat input capacity greater than 3.0 MMBTU/hr, a GCCS is required under the LMR. The proposed installation of a GCCS will result in a significant decrease in fugitive LFG emissions. The proposed project will result in emissions associated with the combustion of the LFG in the enclosed flare. Emissions associated with the proposed flare are presented in Section 3 of this application.

2.1 DESCRIPTION OF PROPOSED GCCS

The County proposes to install a comprehensive GCCS in accordance with the LMR requirements. Excerpts of the project design plans, including proposed GCCS layout, details, schematic flow diagram and mechanical system layout and details are provided in Appendix B (9 Drawings). The GCCS will initially consist of sixteen vertical extraction wells and horizontal collectors, an enclosed LFG flare and associated blowers, and a system of header and lateral pipes to convey the extracted LFG. The proposed GCCS layout is shown in Appendix B, Drawing 3. Extraction well and horizontal collector details are shown in Appendix B, Drawings 4 and 5.

Condensate will gravity-drain through the collection headers to a network of 5 collection sumps. The condensate will then be pumped to a central storage tank located near the blower/flare station (BFS) via condensate return lines, or to the Class II Leachate Surface Impoundment (See Appendix B, Drawing 2 for condensate system layout and Drawing 6 for details).

A BFS will be installed northeast of the scalehouse/office building. The BFS will consist of an enclosed flare, skid-mounted extraction blowers, moisture separators and controls, condensate storage tank, air compressor, and associated piping and electrical service. The BFS location is shown in Appendix B, Drawing 2. A process flow diagram is provided in Appendix B, Drawing 8. The BFS layout section and details are provided in Appendix B, Drawings 9 and 10. The flare will have a rated capacity of approximately 14 MMBTU. Specifications for the proposed flare are presented in Appendix B. Two 450-standard cubic feet per minute (scfm) blowers will be installed. The flare will operate on one blower, and the other will serve as a backup.

The GCCS component design is based upon the anticipated current and maximum LFG generation rates (Appendix C). The LFG controls installed will meet the regulatory requirements of the LMR, but will also be compatible with future fill operations and Site closure. A detailed discussion of regulatory requirements applicable to the GCCS is presented in Section 4.0.

2.2 PROPOSED OPERATION

The proposed GCCS will run 24 hours per day, seven days per week, 52 weeks per year, as required by Section 95464(2)(b)(1)(a) of the LMR.

2.3 DESIGN BASIS

The design gas flow rate for the proposed enclosed flare is based on the maximum LFG generation (Appendix B) and an average collection rate efficiency of 75%.

Specifications for the proposed flare are provided in Appendix C. A brief summary of the flare specifications is provided below.

Manufacturer:	Perennial Energy (or equivalent)
Type:	Enclosed Flare
Gas Stream Temperature:	100-130 degrees Fahrenheit (F)
Inlet Flow Rate Range:	80 to 450 scfm
Approximate Maximum Height of the Outlet:	34 feet

3 EXPECTED EMISSIONS

3.1 CHEMICAL NATURE OF AIR POLLUTION EMISSIONS

LFG is the product of the natural decomposition of organic materials (e.g. food, yard waste, etc.) deposited in a landfill environment. At a typical municipal landfill site, LFG contains about 40 to 50 percent methane (CH4) and 30 to 45 percent carbon dioxide (CO2) by volume. LFG is also comprised of residual amounts of nitrogen (N2), oxygen (O_2) and a number of trace constituents, including non-methane organic compounds (NMOC), volatile organic compounds (VOC), and hazardous air pollutants (HAP). NMOC emissions from LFG occur as either

fugitive emissions (from the approximately 25 percent of the generated LFG that is not captured by the GCCS) or point-source emissions from the flare stack (the fraction of the NMOCs /VOCs/HAPs contained in the approximately 75 percent of the generated LFG that is collected which is not destroyed during combustion in the flare). The Waste Industry Air Coalition (WIAC) and Environmental Protection Agency's (EPA's) "Compilation of Air Pollution Emission Factors" (AP-42) were used for emission estimates flare emissions. According to AP-42, Section 2.4.4.2, 75% of the LFG generated can reasonably be collected from a comprehensive gas system. With proper design and operation, it is estimated that approximately 75 percent of the LFG that is generated will be collected and combusted at the LFG flare.

For permitting purposes, LFG flare emissions consist of secondary criteria and toxic pollutant emissions from LFG combustion. Criteria pollutants include Oxides of Nitrogen (NOx), Carbon Monoxide (CO), Sulfur Dioxide (SO2), and Particulate Matter (PM), which is assumed to be both PM less than 10 microns (PM10) and 2.5 microns (PM2.5), since it is combustion derived.

It is our understanding that the LCAQMD does not have an offsets program because the District remains in attainment with the Nation Ambient Air Quality Standards (NAAQS) and the California (CAAQS).

3.2 EMISSIONS

Calculated emissions for the proposed enclosed flare are provided in terms Potential to Emit (PTE). Criteria air pollutant (CAP) emissions from LFG combustion (NO_x, CO, PM, SOx and VOCs/NMOCs) generated from the enclosed flare were determined using the manufacturer's guaranteed performance specifications, Best Available Control Technology (BACT), or NSPS standards) (Table 1). For flare emissions, PM less than 10 microns in diameter (PM10) and less than 2.5 microns (PM2.5) were considered to be equivalent. As stated previously, with proper design and operation of the GCCS, it is estimated that approximately 75 percent of the LFG generated will be collected and combusted at the LFG flare. A detailed emissions analysis is provided in Table 2 attached.

Table 1. Flare Emissions Factors and Emissions

Pollutant	Flare	Emissions (tpy)
NOx	0.06 lb/MMBtu (Manufacturer's Guarantee)	3.59
CO	0.20 lb/MMBtu (Manufacturer's Guarantee)	11.98
SOx	150 ppmv (BACT)	2.95
NMOC/VOC	98% or 20 ppmv outlet as hexane at 3% oxygen (NSPS/BACT)	2.29
PM-10/PM2.5	0.001 lb/hr/scfm LFG (AP-42, BACT)	0.99

tpy – tons per year
BACT – Best Available Control Technology

4 REGULATORY ANALYSIS

The following section describes how the proposed project will comply with each requirement in the LMR and potentially applicable District rules and regulations.

4.1 LANDFILL METHANE RULE

4.1.1 Section 95464(b)(1)

Gas Collection and Control System Requirements

The GCCS will be operated to l ensure the collected LFG is routed to the flare and the gas collection and control system will be operated continuously except as provided in sections 95464(d) and 95464(e).

The GCCS will be operated so that there is no landfill gas leak that exceeds 500 ppmv, measured as methane, at any GCCS component under positive pressure.

The GCCS has been designed and will be operated to draw all the LFG toward the flare.

4.1.2 Section 95464(b)(2)

Requirements for Flares

The proposed enclosed flare meets the following requirements:

1. Achieves a methane destruction efficiency of at least 99 percent by weight.
2. Is equipped with automatic dampers, an automatic shutdown device, a flame arrester, and continuous recording temperature sensors.
3. During restart or startup there must be a sufficient flow of propane or commercial natural gas to the burners to prevent unburned collected methane from being emitted to the atmosphere.
4. The gas control device must be operated within the parameter ranges established during the initial or most recent source test.

4.1.3 Section 95464(b)(3) Source Test Requirements

The County will conduct an annual source test for the enclosed flare, which is subject to the requirements of sections 95464(b)(2)(A) using the test methods identified in Section 95471(f) of the LMR. An initial source test will be conducted within 180 days of initial start-up of the gas collection and control system. Each succeeding complete annual source test will be conducted no later than 45 days after the anniversary date of the initial source test.

If the enclosed flare remains in compliance after three consecutive source tests the County will conduct the source test every three years. If a subsequent source test shows the gas collection and control system is out of compliance, the source testing frequency will return to annual.

4.1.4 Section 95469 Monitoring Requirements

The GCCS will be operated to comply with the applicable monitoring requirements in Sections 95469(a), (b), and (c) of the LMR.

4.1.5 Section 95469 Record Keeping Requirements

The County will comply with the record keeping and reporting requirements in Sections 95470(a) and (b) of the LMR.

4.1.6 Section 95471Test Methods and Procedures

The County will comply with the applicable test methods and procedures in Sections 95471(a) through (h) of the LMR.

4.2 LCAQMD RULES AND REGULATIONS

4.2.1 Chapter II, Prohibitions and Standards

Article I Visible Emissions

Section 400

As long as the enclosed flare is properly maintained and operated, visible emissions are not expected to exceed 20% opacity for a period or periods aggregating more than 3 minutes in any one hour. Compliance with the provisions of this rule is expected.

Article II Particulate Matter Emissions

Section 410

As long as the flare is properly maintained and operated, it is not expected to create a public nuisance, and compliance with the provisions of this rule is expected.

Article IV Other Emissions or Contaminants

General - Section 430

The County will not discharge contaminants or other material that may cause injury, detriment, nuisance, or annoyance to any considerable number of persons to cause injury or damage or have natural tendency to cause injury or damage to business or property.

Sections 440 and 441

The Landfill's has uncontrolled emissions less than 50 megagrams per year (Mg/yr) non-methane organic compounds (NMOC). As such, the NSPS for MSW Landfills (40 Code of Federal Regulation (CFR), Part 60, Subpart Cc) is not applicable.

Section 450

The Landfill is not subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for MSW Landfills, codified as 40 CFR Part 63 Subparts A and AAAA. Eastlake is not a major source as defined in 40 CFR 63.2 of subpart A, it is not collocated with a major source as defined in 40 CFR 63.2 of subpart A and has uncontrolled emissions less than 50 Mg/yr of NMOC.

4.2.2 Chapter III, Maintenance, Malfunction, Evasion and Inspection

Article I Maintenance

Section 500

The Landfill will report each scheduled maintenance event to the Air Pollution Control Officer (APCO) at least 24 hours prior to the scheduled shutdown.

Article II Malfunction

Section 501

The Landfill will determine whether excess emissions resulting from an upset or a breakdown are beyond the reasonable control of the source operator; all conditions specified in Section 501, subparagraphs A-J will be implemented.

4.2.3 Chapter IV, Permits

Article I Authority to Construct

Section 600

The County acknowledges the requirement that a written ATC shall be required to construct, erect, alter or replace any equipment which may cause, potentially cause, reduce, control or eliminate the issuance of air contaminants. The County understands that a single Authority to Construct may be issued for all components of an integrated system or process, and plans and specifications drawn in accordance with acceptable engineering practices will be required before issuance of an ATC. The County has begun the process to obtain an ATC with the submittal of this application. The GCCS collection system's components can and will be modified, changed, or increased, but as long as PTE emissions for the flare do not change, then subsequent ATCs should not be required for adding wells for otherwise modifying the GCCS.

Section 601

The County acknowledges the limitations in Section 601 that an ATC shall be valid for a period of one (1) year from the date of issuance, or until a Permit to Operate is required, whichever occurs first. An ATC may be renewed annually for a maximum period of four (4) years.

Sections 602 and 602.3

The operation of the proposed GCCS will not result in the violation or measurable contribution to the continued violation of any local, state, or national ambient air quality standard. The proposed enclosed flare meets BACT, as defined in Section 208.1 of Chapter I, Article II. The installation of the GCCS is a requirement of the LMR to reduce methane emissions. Per AP-42, Section 2.4.4.2, 75% of the LFG generated at a landfill can reasonably be collected from a comprehensive gas system resulting in a significant reduction of fugitive landfill VOC emissions. The proposed flare incorporates the latest technology available to control emissions thus making the violation of, or measurable contribution to the continued violation of, any local, state, or national Ambient Air Quality Standards (AAQS) highly unlikely. Please see Table 1 for flare emissions factors.

The Landfill, including the proposed GCCS, will not emit 10 tons per year (tpy) or more of any HAP or 25 tpy for two or more HAPs; as such, the requirements of Maximum Achievable Control Technology (MACT) standard are not applicable, and the facility is not a major HAP source.

Section 605

Eastlake has provided the information required in subsections A through E in this application: Please see below:

A. The nature and amount of emissions, location, design, construction and operation of the source, and additional supporting documentation are included herein.

B. There are no plans to expand flare capacity beyond current. There are no plans to construct new landfill cells. Fill operations will continue over existing constructed cells until the site reaches final design grades.

C. The proposed modification of installing a GCCS is required by the LMR to control methane emissions. As such, air contaminant emissions for the proposed GCCS are not expected to impact air quality in the vicinity of the Landfill within the Air Basin and within adjoining air basins. The GCCS collection system's components can and will be modified, changed, or increased, but as long as PTE emissions for the flare do not change, then subsequent ATCs should not be required for adding wells for otherwise modifying the GCCS.

D. This application and supporting documentation will be available for public inspection at the District office, and will include the information submitted by applicant, the Air Pollution Control Officer's analysis of the effect of the source on air quality, and the preliminary decision to grant or deny the ATC. This will include all relevant information except that protected as a trade secret.

E. MACT requirements are not applicable. Please see previous section.

Article V Source Emission Testing

Section 650

In the unlikely event that emissions occur, or are likely to occur, which exceed regulatory limits, or if the nature of the source requires emissions testing or emissions premise monitoring, the County will comply with Subsections A through D, as applicable.

Please note that County is required conduct an annual source test for the enclosed flare, using the test methods identified in Section 95471(f) of the LMR. An initial source test will be conducted within 180 days of initial start-up of the gas collection and control system. If the enclosed flare remains in compliance after three consecutive source tests the County will conduct the source test every three years. If a subsequent source test shows the GCCS is out of compliance, the source testing frequency will return to annual.

Section 651

The Landfill understands that any ambient air quality monitoring, meteorological monitoring or air dispersion testing that may be required to be conducted in the Lake County Air Basin, which is intended to be utilized by the District in the permit assessment of a project, proposed within the Lake County Air Basin or in the development of District rules will be mutually agreed upon by the LCAMD and the Landfill prior to the installation of any equipment intended for such data acquisition.

Section 655

In accordance with Section 655, the County will prepare a Performance Plan (Plan) or protocol prior to any required source testing. The Plan/protocol will include the following requirements, as applicable:

A. The frequency and method of sampling process parameters and constituents (e.g., flow rates, etc.);

B. The frequency and method of determining the amount of abatement achieved by the abatement system(s);

C. The frequency and method of calibration;

D. The frequency and method of emission source testing;

E. Data logging requirements, good scientific practices, detailing actions, changes in calibration, changes in process control, inspections, mishaps, etc.;

F. The locations of all logs and source test records; and

G. A process for notifying and reporting to the District documents, which establishes compliance with the performance plan.

The County acknowledges that changes to the Plan will not take effect until copies of the revised plan(s) are filed at the District office and acknowledged in writing by the District. Compliance with the approved plan of performance shall constitute compliance with the applicable emissions limitation. The County will comply with the performance plan.

4.3.3 Chapter XII, Permitting Requirements for Sources Subject to Title V and Non-Major Stationary Source

Article VIII Designated Non-Major Stationary Source

Section 12.800

The Landfill is a designated Non-Major Stationary Source and is not subject to major source review. Eastlake is applying for a modification consistent with the procedures of Chapter IV Section 12.820(b).

Section 12.820

This application is for a modification to a Designated Non-Major Stationary Source Operating Permit and the proposed modification will not increase the potential to emit above those of a

major source. This application is being submitted in accordance with LCAQMD Rules and Regulations, Chapter IV.

5 FORMS

The following required permit application form is provided in Appendix D:

- ATC Form

6 PERMIT PROCESSING FEES (ARTICLE VI)

The County understands that fees will be based on actual District staff time required for the application review. The County requests that upon final determination of fees by the District, an invoice be sent to the following address:

Ms. Caroline Chavez
Public Services Director
County of Lake
Public Services Department
333 North Second Street
Lakeport, California 95453
(707) 262-1760
caroline_c@co.lake.ca.us

ATTACHMENT 1

TABLES

ATTACHMENT 1

TABLE 2. POTENTIAL TO EMIT FLARE EMISSIONS
EASTLAKE MUNICIPAL LANDFILL
CLEARLAKE, CALIFORNIA

CAS NUMBER	COMPOUNDS	Molecular Weight (g/Mol)	Ave. Concentration of Compounds Found in LFG (ppmv)[2]	Pollutant Flow Rate to Flare (tons/yr)	Flare Destruction Efficiency (%)[3]	Maximum Emissions from Flare (lbs/hr)	Maximum Emissions from Flare (lbs/day)	Maximum Emissions from Flare (lbs/yr)	Maximum Emissions from Flare (tons/yr)
Hazaroud Air Pollutants (HAP)[1]									
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	133.42	0.1680	6.88E-03	98.0%	3.14E-05	7.54E-04	2.75E-01	1.38E-04
79-34-5	1,1,2,2-Tetrachloroethane	167.85	0.0700	3.61E-03	98.0%	1.65E-05	3.95E-04	1.44E-01	7.22E-05
107-06-2	1,1-Dichloroethane	98.97	0.7410	2.25E-02	98.0%	1.03E-04	2.47E-03	9.01E-01	4.50E-04
75-35-4	1,1-Dichloroethene	96.94	0.0920	2.74E-03	98.0%	1.25E-05	3.00E-04	1.10E-01	5.48E-05
107-06-2	1,2-Dichloroethane	98.96	0.1200	3.65E-03	98.0%	1.67E-05	4.00E-04	1.46E-01	7.29E-05
78-87-5	1,2-Dichloropropane	112.98	0.0230	7.98E-04	98.0%	3.64E-06	8.75E-05	3.19E-02	1.60E-05
67-63-0	2-Propanol (isopropyl alcohol)	60.11	7.9080	1.46E-01	99.0%	3.33E-04	8.00E-03	2.92E+00	1.46E-03
107-13-1	Acrylonitrile	53.06	0.0360	5.87E-04	99.0%	1.34E-06	3.21E-05	1.17E-02	5.87E-06
71-43-2	Benzene	78.11	0.9720	2.33E-02	99.0%	5.32E-05	1.28E-03	4.66E-01	2.33E-04
75-25-2	Bromodichoromethane	163.83	0.3110	1.56E-02	98.0%	7.15E-05	1.71E-03	6.26E-01	3.13E-04
75-15-0	Carbon disulfide	76.13	0.3200	7.48E-03	99.0%	1.71E-05	4.10E-04	1.50E-01	7.48E-05
56-23-5	Carbon tetrachloride	153.84	0.0070	3.31E-04	98.0%	1.51E-06	3.62E-05	1.32E-02	6.61E-06
463-58-1	Carbonyl sulfide	60.07	0.1830	3.38E-03	99.0%	7.71E-06	1.85E-04	6.75E-02	3.38E-05
108-90-7	Chlorobenzene	112.56	0.2270	7.85E-03	98.0%	3.58E-05	8.60E-04	3.14E-01	1.57E-04
75-45-6	Chlorodifluoromethane (Freon 22)	86.47	0.3550	9.43E-03	98.0%	4.30E-05	1.03E-03	3.77E-01	1.89E-04
75-00-3	Chloroethane (ethyl chloride)	64.52	0.2390	4.74E-03	98.0%	2.16E-05	5.19E-04	1.89E-01	9.47E-05
67-66-3	Chloroform	119.39	0.0210	7.70E-04	98.0%	3.52E-06	8.44E-05	3.08E-02	1.54E-05
74-87-3	Chloromethane (methyl chloride)	50.49	0.2490	3.86E-03	98.0%	1.76E-05	4.23E-04	1.54E-01	7.72E-05
106-46-7	Dichlorobenzene	147.00	1.6070	7.26E-02	98.0%	3.31E-04	7.95E-03	2.90E+00	1.45E-03
75-43-4	Dichlorodifluoromethane	120.91	1.7510	6.50E-02	98.0%	2.97E-04	7.13E-03	2.60E+00	1.30E-03
75-71-8	Dichlorofluoromethane	102.92	2.6200	8.28E-02	98.0%	3.78E-04	9.08E-03	3.31E+00	1.66E-03
75-09-2	Dichloromethane (methylene chloride)	84.94	3.3950	8.86E-02	98.0%	4.04E-04	9.71E-03	3.54E+00	1.77E-03
64-17-5	Ethanol	46.08	118.6180	1.68E+00	99.0%	3.83E-03	9.20E-02	3.36E+01	1.68E-02
100-41-4	Ethylbenzene	106.16	6.7890	2.21E-01	99.0%	5.05E-04	1.21E-02	4.43E+00	2.21E-03
106-93-4	Ethylene dibromide	187.88	0.0460	2.65E-03	98.0%	1.21E-05	2.91E-04	1.06E-01	5.31E-05
75-69-4	Fluorotrichloromethane	137.40	0.3270	1.38E-02	98.0%	6.30E-05	1.51E-03	5.52E-01	2.76E-04
110-54-3	Hexane	86.18	2.3240	6.15E-02	99.0%	1.40E-04	3.37E-03	1.23E+00	6.15E-04
7647-01-0	Hydrochloric acid[4]	36.50	46.9300	5.26E-01	98.0%	2.40E-03	5.77E-02	2.10E+01	1.05E-02
7783-06-4	Hydrogen sulfide	34.08	23.5780	2.47E-01	99.0%	5.63E-04	1.35E-02	4.94E+00	2.47E-03
7439-97-6	Mercury (total)[5]	200.61	0.0003	1.80E-05	--	4.11E-06	9.86E-05	3.60E-02	1.80E-05
78-93-3	Methyl ethyl ketone	72.11	10.5770	2.34E-01	99.0%	5.35E-04	1.28E-02	4.68E+00	2.34E-03
108-10-1	Methyl isobutyl ketone	100.16	0.7500	2.31E-02	99.0%	5.27E-05	1.26E-03	4.61E-01	2.31E-04
127-18-4	Perchloroethylene (tetrachloroethylene)	165.83	1.1930	6.08E-02	98.0%	2.77E-04	6.66E-03	2.43E+00	1.22E-03
108-88-3	Toluene	92.13	25.4050	7.19E-01	99.0%	1.64E-03	3.94E-02	1.44E+01	7.19E-03
79-01-6	Trichloroethylene	131.38	0.6810	2.75E-02	98.0%	1.25E-04	3.01E-03	1.10E+00	5.50E-04
75-01-4	Vinyl chloride	62.50	1.0770	2.07E-02	98.0%	9.44E-05	2.27E-03	8.27E-01	4.13E-04
1330-20-7	Xylenes	106.16	16.5820	5.41E-01	99.0%	1.23E-03	2.96E-02	1.08E+01	5.41E-03
Totals: TACs						0.012	0.288	108.797	0.054

	Molecular Weight (g/Mol)	Rep. Concentration of Compound (ppmv)	Emission Factor (lb/hr/scfm)	Emission Factor (lb/MMBtu)[7]	Maximum Emissions from Flare (lbs/hr)	Maximum Emissions from Flare (lbs/day)	Maximum Emissions from Flare (tons/yr)
Nitrogen Oxides (NO_x)				0.06	0.82	19.69	3.59
Carbon Monoxide (CO)				0.20	2.74	65.64	11.98
Volatile Organic Compounds (VOCs)					0.52	12.57	2.29
Sulfur Dioxide (SO_2)	64.10	150			0.674	16.18	2.95
Particulate Matter (PM_{10})/$PM_{2.5}$[6]			0.001		0.225	5.40	0.99

Notes:

[1] List of hazardous air pollutants (HAPs) found in landfill gas, as determined from a list in AP-42 Tables 2.4-1 ("Uncontrolled Landfill Gas Concentrations") and 2.4-2.

[2] Average concentration of compounds found in LFG based on "Waste Industry Air Coalition Comparison of Recent Landfill Gas Analyses with Historic AP-42 Values."

[3] Destruction efficiency for HAPs, from AP-42, Table 2.4-3.

[4] Concentration of HCl is based on AP-42 Section 2.4.4.2. (11/98)

[5] Concentration of Mercury based on EPA AP-42 Section 2.4 Table 2.4-1 (11/98).

[6] PM2.5 assumed to be equal to PM10.

Variables:

MODEL INPUT VARIABLES:		
Max LFG Collection Rate to Flare @ 50% methane (flare capacity)	450	SCFM
Max Permitted Flare Rating	14	MMBtu/hr

Criteria pollutant emission factors used for flare:

Pollutant	Emission Factor[8]	Data Source
VOC	20 ppmv outlet as hexane at 3% oxygen	BACT/NSPS
CO	0.20 lb/MMBTU	Manufacturer's guarantee/BACT
SO_2	150 ppmv	BACT
NO_x	0.06 lb/MMBTU	Manufacturer's guarantee/BACT
PM_{10}	0.001 lb/hr/scfm methane	AP-42/BACT

ATTACHMENT 1

TABLE 2b
VOC EMISSIONS ESTIMATES FOR FLARE
EASTLAKE MUNICIPAL LANDFILL
CLEARLAKE, CALIFORNIA

Criteria Air Pollutants	Molecular Weight	Outlet Concentration of Compounds (a)	Annual Emissions from Flare (@3% oxygen)(b)
	g/mol	ppmv	tons/yr
Total Non-Methane Organics (NMOCs) as Hexane (c)	86.18	20	2.29
Volatile Organic Compounds (VOCs) (c)	86.18	20	2.29

Notes:

(a) Based on concentrations in exhaust gas per (c) and an estimated maximum exhaust gas flow of 5,885 scfm (dry).

(b) Outlet concentration limit based on 20 ppmv as hexane (@3% oxygen) per NSPS.

(c) For purposes of calculating flare emissions, VOCs are considered equal to NMOC.

Variables:

MODEL INPUT VARIABLES:		
Max LFG Exhaust Rate from Flare (a)	5,885	SCFM (dry)
Exhaust Oxygen per Manufacturer	15.0	%
Max LFG Exhaust Rate from flare (a)	1,951	SCFM (dry) @3% oxygen

APPENDIX A

LCAQMD Authority to Construct/Permit to Operate and

Solid Waste Facility Permit

PERMIT TO OPERATE

Lake County Air Quality Management District

885 Lakeport Blvd. Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # P/O 2003-11

By:_____

Douglas G. Gearhart, APCO

Type of Issuance: Renewal | Issuance Date: 10/31/2012 | Valid through: 10/31/2013 | Category: VII

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact:	Ms. Caroline Chavez	Facility:	Eastlake Municipal Landfill
Owner:	County of Lake Dept. of Solid Waste Mgmt.	Location:	16015 Davis Street
Mailing Address:	333 Second Street Lakeport, CA 95453		Clearlake, CA 95422

Name and Equipment Description: **Designated Non-Major Stationary Source - Eastlake Municipal Landfill**

One (1) Class III, Municipal Landfill and Class II Leachate Collection System and Impoundment, with One (1) CAT Model 623 E Diesel Powered Scraper, One (1) CAT Model 613 Diesel Powered Scraper, One (1) CAT D6C Diesel Powered Dozer, One (1) CAT Diesel Powered Track Loader, Two (2) CAT Model 826C Diesel Powered Landfill Compactors, One (1) DW Model 20 Diesel Powered Grid Roller, One (1) 1000 Gallon Capacity Above Ground Diesel Storage Tank with Secondary Containment, and One (1) Diesel Powered Water Truck.

Permit Conditions

Condition 1: Emissions

A. Total facility regulated air pollutants, including fugitive sources, shall be maintained below threshold levels subject to provisions of Lake County Air Quality Management District (LCAQMD) Regulation Chapter XII (or Environmental Protection Agency [EPA] Title V and III requirements), NSPS, NESHAP and as further described below. Any breakdown or upset condition shall be reported promptly, consistent with reporting requirements contained in Rule 510.

B. Facility emissions shall not exceed 95 tons per year (TPY) for any regulated air pollutant, nor 9.9 TPY for any single hazardous air pollutant, nor 24.5 TPY for any combination of hazardous air pollutants.

C. Emissions of non methane organic compounds (NMOC) shall be maintained below threshold levels (50 Mg/yr) of LCAQMD Regulation 441, NSPS, NESHAP, or County of Lake Department of Solid Waste Management (COLDOSWM) shall install and operate a gas collection and incineration device pursuant to those regulations.

D. The use of water, palliatives, oil, asphalt or other surfacing materials as appropriate shall be used on roads and yards within the facility to control particulate emissions. Regularly used roads shall be paved or chip sealed. Excavation, transport or maintenance activities involving serpentine rock or soils containing 0.25% or more asbestos shall be controlled to as near zero visible emissions as practical. COLDOSWM shall comply with the requirements of Section 467, LCAQMD Rules and Regulations, regarding surfacing materials and wearing surfaces.

E. Visible emissions shall not exceed the values listed below for more than three (3) minutes in any one (1) hour:

- Ringelmann 1 (20% opacity) for all excavation, loading, scraping, and compacting operations; and
- Ringelmann 1 (20% opacity) for diesel engine exhaust.

F. The Landfill, Class II surface impoundment, wet well(s), and pumping station shall all be properly managed and adequately treated to avoid causing an odor nuisance to adjacent residents. Hydrogen Sulfide (H2S) levels that exceed 8 parts per billion volume (ppbv) averaged for one hour at any residential property line adjacent to the project, shown to result from the operation of the source, shall be considered a nuisance and a violation of this condition. Additional mitigative measures shall be implemented by COLDOSWM to abate H2S odor nuisance pursuant to Section 510, and LCAQMD Rules and Regulations.

G. All accidental fires and breakdowns in process, monitoring, or emission control equipment shall be reported to the LCAQMD pursuant to Section 510, LCAQMD Rules and Regulations.

H. No burning of any kind is permitted at this facility.

Condition 2: Administrative and Work Practices

A. This Designated Non-Major Source permit has been issued for the Eastlake Municipal Solid Waste Landfill Facility, as an

(Conditions 2 through 6 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

established Title V and Landfill Gas Collection System exemption qualification contained and allowed under National Emission Standards for Hazardous Air Pollutants, and Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources for Municipal Solid Waste Landfills.
B. Upon reaching 90% of the annual emission limits contained in Condition 1A or 1B, COLDOSWM shall submit a permit application and seek a permit consistent with the provisions of LCAQMD Regulation Chapter XII or notify the LCAQMD and EPA in writing as to why such an application is not necessary.
C. COLDOSWM shall continue to participate in the AB2588 Air Toxics Information and Assessment program performing four-year updates, or more frequently upon request of the Air Pollution Control Officer (APCO).
D. This facility shall maintain a LCAQMD permit until closed in accordance with state law, or other recognized government authority, maintain landfill integrity, and prevent emissions due to improper closure or abandonment. Upon closure, COLDOSWM shall provide the LCAQMD a copy of the Certificate of Closure, prior to any relief from any LCAQMD permit requirement.
E. Upon closure, COLDOSWM shall ensure that the land where fill is placed along with a buffer zone will be designated for open space in perpetuity.
F. Diesel fuel utilized shall be California Low Sulfur Diesel containing less than 15ppmw sulfur.
G. All persons operating permitted equipment, monitoring or testing shall be adequately trained by the equipment manufacturer or a qualified person. Records of training shall be maintained by COLDOSWM.
H. The provisions of this permit are severable. If any provision of this permit is held invalid, the remainder of this permit shall not be affected thereby.

Condition 3: Records and Reporting
A. COLDOSWM shall tabulate all required emission records for each calendar month (amount of fill and the annual NMOC emission rate) in a format acceptable to the LCAQMD.
B. Annual emissions shall be determined within the first ten working days of each month. Annual emissions are the sum of all the emission units covered under this permit from the previous twelve-month period. Any exceed of the NMOC emission limitation for the rolling annual emissions limit contained in Condition 1 shall be reported to the LCAQMD in writing within ten (10) days.
C. By October 31st of each year, COLDOSWM shall provide the LCAQMD the following:

- Annual fill rate information (broken down by month);
- Annual NMOC emission calculation;
- Annual diesel fuel use; and
- A Statement of Compliance with the herein permit conditions.

D. All required records and logs shall be provided to LCAQMD, California Air Resources Board (ARB), and EPA staff upon request during inspection. Duplication of records shall be provided upon request. All records utilized to demonstrate compliance with this permit shall be maintained and remain available for not less than five (5) years.
E. All required emissions records shall be provided to the affected public upon request and in a manner intended to verify compliance with this permit and all applicable local, federal, and state air quality laws.
F. A performance plan consistent with Rule 655 may be submitted by COLDOSWM, and approved by the APCO incorporating the requirements of Conditions 1, 2, and 3.
G. COLDOSWM shall forward all leachate analysis results to the LCAQMD if requested in writing.

Condition 4: Modification
A. COLDOSWM shall apply for and receive an Authority to Construct permit prior to the addition of new equipment, or prior to any significant modification of a permit or process for the equipment described herein, any enlargement in the final capacity design, or any introduction of new processing such as wet digestion.

Condition 5: Monitoring
A. COLDOSWM shall conduct weekly, or more frequent, visual opacity surveys. a. The survey shall consist of a visual observation (daylight hours) of all operational stacks and emission points to identify those stacks or emission points which exhibit opacity greater than ten percent (10%). b. The survey shall be conducted from a location with a clear view of the facility and where the sun is not directly in the observer's eyes. c. The survey location(s) shall be at least 15 feet but not more than .25 miles from the subject equipment / operations. d. Each operational stack or emission point shall be observed for a minimum cumulative duration of 15 seconds during the survey. e. Any visible emissions other than uncombined water shall be recorded as a positive reading associated with the emission point or stack. f. If it is not possible to conduct the survey due to inclement weather conditions, COLDOSWM shall make three attempts during the day to conduct the survey. All attempts to conduct the survey shall be recorded. g. In addition to the opacity information, the observer shall record the estimated wind speed and direction, sky condition, sun location with respect to the facility and the survey location, and the time duration of the survey. Observer certification for plume evaluation is not required to complete the survey form. However, it is necessary that the observer is educated on the general procedures for determining the of visible emissions. As a minimum, the observer must be trained and knowledgeable regarding the effects on the visibility of emissions caused by background contrast, position of the sun and amount of ambient lighting, observer position relative to source and sun, and the presence of uncombined water. COLDOSWM shall log all opacity survey results in a written logbook as approved by the APCO, to satisfy the standard record keeping requirements for this condition.
B. Should the operation of this facility result in public health or odor complaints, the LCAQMD may require the source to fund an evaluation to include estimates of short term emissions, additional air monitoring and/or other studies necessary to identify the characteristics of the source and correct any problem (Section 430 and 670).
C. Pursuant to Section 441, LCAQMD Rules and Regulations, COLDOSWM shall estimate (calculate), or perform tests to measure the NMOC emission rate for this facility. If source tests are performed, the LCAQMD shall be provided a source test plan at least 30 days prior to the planned test(s), for review and approval.

Condition 6: Identification and Access
A. COLDOSWM shall provide the LCAQMD, ARB, and EPA prompt entry and safe access to the facility and equipment for the purpose of inspection, source testing, or air monitoring activities during open or normal business hours.
B. This permit and six (6) conditions shall be posted at the facility and be available for COLDOSWM's reference and LCAQMD staff upon request.

AUTHORITY TO CONSTRUCT

Permit # A/C 2011-03

Lake County Air Quality Management District
885 Lakeport Blvd. Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

By:_____
Douglas G. Gearhart, APCO

Type of Issuance: Renewal *Issuance Date: 10/31/2012* *Valid through: 10/31/2013* *Category: VII*

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact:	Ms. Caroline Chavez	*Facility:*	Eastlake Municipal Landfill
Owner:	County of Lake Dept. of Solid Waste Mgmt.	*Location:*	16015 Davis Street
Mailing Address:	333 Second Street Lakeport, CA 95453		Clearlake, CA 95422

Name and Equipment Description: **Landfill Gas Remediation Project**

One (1) Landfill Gas Migration Control System consisting of four (4) extraction wells; two (2) 200 cfm regenerative blowers (model CP-808FL5MWLR or equivalent); one (1) moisture separator; one (1) condensate sump/pumping system; one (1) 1,000 gallon polyethylene condensate storage tank; two (2) activated carbon adsorption units; associated piping, valves, and controls run on electric line power.

Permit Conditions

Condition 1: Emissions

A. All equipment and components shall be regularly maintained in good working order pursuant to the manufacturer's recommendations and operated in a manner to prevent and/or minimize air emissions. The extraction wells and lanfill gas migration control system shall be maintained in vapor tight and leak and odor free condition during periods of operation. The control system shall operate with appropriate amounts of activated carbon within its specified operational range to ensure emission requirements.

B. Air emissions shall be directed to and abated by the activated carbon adsorption vessels and abated to 99% or better abatement. Total facility emissions including incidental air emissions from tanks, processing leaks and other fugitives shall not exceed one (1) pound per day total volatile organic compounds (VOC's) and methane.

C. Visible emissions shall not exceed Ringelmann 0.25 (5% opacity) from the effluent exhaust stack for more than three (3) minutes in any one (1) hour.

Condition 2: Administrative

A. This permit has been issued and is valid for a Landfill Gas Migration Control System as specified in the permit application and supporting documentation.

B. The extraction system shall be operated under vacuum conditions and in conformance with the operating parameters specified in the application and incorporated by reference.

C. County of Lake Department of Solid Waste Management (COLDOSWM) shall comply with the requirements of the Air Toxics "Hot Spots" Information and Assessment Act as specified in Sections 44300 - 44394 of the California Health and Safety Code.

(Conditions 2 through 6 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

D. Within 180 days of initial operation, COLDOSWM shall apply for a Permit to Operate, and prove compliance with these conditions.

Condition 3: Notification, Records, and Reporting

A. The Lake County Air Quality Management District (LCAQMD) shall be promptly notified should equipment breakdown or upon failure to meet the required one (1) pound per day emission limit.

B. COLDOSWM shall forward all air emissions test data taken during the first 30 days of operation to the LCAQMD, and demonstrate the emission control equipment meets the one (1) pound per day emission limit for total VOC's and methane. Initial test results shall be provided within 45 days of sampling. Quarterly reports shall be submitted to the LCAQMD thereafter unless an alternate reporting schedule is approved by the Air Pollution Control Officer (APCO) in writing. Quarterly reports shall include operational information, inspection and monitoring results, and carbon change outs.

C. COLDOSWM shall maintain a written log indicating dates and times of operation, inspection and testing, and any maintenance or changes of operation. Said log shall be available at the site, entries made in ink, signed by the operator or his agent, and available to the LCAQMD immediately upon request.

D. COLDOSWM shall furnish an annual record of landfill gas migration control system use (hours), vapor (scf) processed, gas flow rates, liquid removed (gal), total VOC's and methane (lbs) treated, and annual emissions of total VOC's and methane (lbs) released to the air, in a format acceptable to the LCAQMD within 15 days of request, by October 31st of each year, and upon project completion.

Condition 4: Modification

A. COLDOSWM shall apply for and receive an Authority to Construct permit prior to the addition of new equipment, or significantly modifying the operational parameters.

Condition 5: Monitoring and Testing

A. Upon initial operation of the unit, the system and each well head shall be inspected and monitored for methane, oxygen (O2), and gas flow daily for the first week, and weekly thereafter for the first month. Within one (1) month of initial operation, samples shall be collected at the influent and effluent streams of the carbon units. Samples shall be sent to a certified laboratory for analysis of total VOC's and methane. Local readings shall be compared to laboratory data. Alternative monitoring may be required upon receipt of laboratory analysis.

B. The system components shall be regularly inspected and tested (at least monthly) to verify system performance and emission control. Annual influent vapors and effluent air stream samples shall be collected and sent to a certified laboratory for analysis of the parameters listed in Condition 5A, unless an alternate testing plan is approved in writing by the APCO. Local readings shall be compared to laboratory data.

C. The LCAQMD shall be notified at least 72 hours in advance of any compliance test and provided an opportunity to observe and collect duplicate samples.

D. All effluent air stream monitoring and sample collection shall be collected prior to activated carbon changeouts.

E. The herein permitted facility shall not cause a public nuisance nor make a measurable contribution to any Ambient Air Quality Standard exceed. Should this facility result in odor or health complaints, the LCAQMD may require under Sections 430 and 670, monitoring, testing and mitigation by COLDOSWM to abate said condition.

Condition 6: Identification and Access

A. This permit shall be posted at the equipment site and be available for COLDOSWM's reference and LCAQMD staff inspection. If locks or unmanned gates are used to secure the project area, the LCAQMD or its representative will be given free access of entry for the purposes of monitoring or inspecting.

ATTACHMENT 1

SOLID WASTE FACILITY PERMIT

1. Facility/Permit Number:
17-AA-0001

2. Name and Street Address of Facility:
EASTLAKE SANITARY LANDFILL
16015 Davis Avenue
Clearlake, California

3. Name and Mailing Address of Operator:
COUNTY OF LAKE
Public Services Department
333 North Second Street
Lakeport, CA 95453

4. Name and Mailing Address of Owner:
Same as Operator

5. Specifications:

a. Permitted Operations:

- [ ] Composting Facility (mixed wastes)
- [ ] Composting Facility (yard waste)
- [x] Landfill Disposal Site
- [ ] Material Recovery Facility
- [ ] Processing Facility
- [ ] Transfer Station
- [ ] Transformation Facility
- [x] Other: re-cycle/buy-back center storage & grinding wood waste/green waste

b. Permitted Hours of Operation:
7:30 a.m. to 3:00 p.m. seven days a week
Closed on legal holidays

c. Permitted Tons per Operating Day: .....200..... Total: Tons/Day Daily average calculated weekly.

Non-Hazardous - General	.....190.....	Tons/Day
Non-Hazardous - Sludge	.....	Tons/Day
Non-Hazardous - Separated or commingled recyclables	.....10.....	Tons/Day
Non-Hazardous - Other (See Section 14 of Permit)	.....	Tons/Day
Designated (See Section 14 of Permit)	.....	Tons/Day
Hazardous (See Section 14 of Permit)	.....	Tons/Day

d. Permitted Traffic Volume: three hundred (300)..... Total: Vehicles/Day

Incoming waste materials	.....290.....	Vehicles/Day
Outgoing waste materials (for disposal)	.....	Vehicles/Day
Outgoing materials from material recovery operations	.....10.....	Vehicles/Day

e. Key Design Parameters (Detailed parameters are shown on site plans bearing LEA and CIWMB validations):

	Total	Disposal	Transfer	MRF	Composting	Transformation
Permitted Area (in acres)	80 a	31 a	a	a	a	a
Design Capacity		6,050,000 cy	tpd	tpd	tpd	tpd
Max. Elevation (Ft. MSL)		MSL 1860 ft				
Max. Depth (Ft. BGS)		ft				
Estimated Closure Date		A.D. 2017				

Upon a significant change in design or operation from the described herein, this permit is subject to revocation or suspension. The attached permit findings and conditions are integral parts of this permit and supersede the conditions of any previous issued solid waste facility permits.

6. Approval:
Approving Officer Signature

Raymond Ruminski
Name/Title

FACILITY FILE CARBON COPY
ORIGINAL TO FILE # 17AA000
SUBMITTED BY MSA DATE
COPY TO Student File
COPY TO mc/ BP
COPY TO

7. Enforcement Agency Name and Address:
County of Lake
Department of Health Services
Environmental Health Division
922 Bevins Court
Lakeport, CA 95453

8. Received by CIWMB: JUN 1 1998

9. CIWMB Concurrence Date: JUL 31 1998

10. Permit Review Due Date:

11. Permit Issued Date: August 5, 1998

Rec'd JUL CIWMB

SOLID WASTE FACILITY PERMIT

Facility/Permit Number:
17-AA-0001

12. Legal Description of Facility (attach map with RFI):
SE 1/4 of section 23 and N 1/2 of section 26 T13N, R7W Mt. Diable baseline & meridian

13. Findings:

a. This permit is consistent with the County Solid Waste Management Plan or the County-wide Integrated Solid Waste Management Plan (CIWMP). Public Resources Code, Section 50000.

b. This permit is consistent with standards adopted by the California Integrated Waste Management Board (CIWMB). Public Resources Code, Section 44010.

c. The design and operation of the facility is in compliance with the State Minimum Standards for Solid Waste Handling and Disposal as determined by the LEA.

d. The following local fire protection district has determined that the facility is in conformance with applicable fire standards as required in Public Resources Code, Section 44151.

e. An initial evaluation was completed and a notice of exemption for this permit action was filed.

f. A County-wide Integrated Waste Management Plan has not been approved by the CIWMB.

g. The following authorized agent has made a determination that the facility is consistent with, and designated in, the applicable general plan: Public Resources Code, Section 50000.5(a). Lake County Community Development Department, Planning Division.

h. The following local governing body has made a written finding that surrounding land use is compatible with the facility operation, as required in Public Resources Code, Section 50000.5(b). Lake Conty Planning Commission.

14. Prohibitions:
The permittee is prohibited from accepting any liquid waste sludge, non-hazardous waste requiring special handling, designated waste, or hazardous waste unless such waste is specifically listed below, and unless the acceptance of such waste is authorized by all applicable permits.

The permittee is additionally prohibited from the following items:
open burning, scavenging, large dead animals without enforcement agency approval, bio-medical waste

15. The following documents also describe and/or restrict the operation of this facility (insert document date in space):

	Date		Date
[x] Report of Facility Information	May 1998		
[x] Waste Discharge Requirements	1996		
[x] Air Pollution Permits and Variances			
[x] Local & County Ordinances			
[x] Preliminary Closure/Post Closure Plan	1996		

SOLID WASTE FACILITY PERMIT	Facility/Permit Number: 17-AA-0001

16. Self Monitoring:

a. Results of all self-monitoring programs as described in the Report of Facility Information, will be reported as follows:

Program	Reporting Frequency	Agency Reported To
monitoring and reporting program No. 96-287 (from the Waste Discharge Requirements) leachate, ground water, surface water	quarterly, semi-annually, annually, every 5 years	California Regional Water Quality Control Board, Central Valley Region
weight and volume	quarterly	LEA
vehicles per day records	quarterly	LEA
volume in place/remaining capacity calculations and aerial mapping report	annually	LEA
waste diversion records (quantities and types of recycled material being diverted from landfill)	quarterly	Local solid Waste Task Force

SOLID WASTE FACILITY PERMIT	Facility/Permit Number: 17-AA-0001

17. LEA Conditions:

a. This solid waste facility permit is subject to review by the LEA and may be suspended, revoked or modified at any time for sufficient cause.

b. No significant change in design or operation of this facility shall be undertaken without prior approval by the LEA.

c. Additional information related to compliance with this permit and state minimum standard for disposal sites shall be furnished to the LEA upon request. Additional information concerning the design and operation of the facility shall be furnished to LEA upon request.

d. All recyclable materials diverted from the waste stream shall be handled and stored as described in the most recent approved Report of Disposal Site Information or Joint Technical Document.

e. Wood and brush processing operations shall be conducted as described in the most recent Report of Disposal Site Information or Joint Technical Document. The LEA may require more frequent removal or processing of wood waste material.

APPENDIX B

Drawing Excerpts from Construction Detail

1 - Location Map

2 - Existing Environmental Control Systems

3 - LFG Collection System Plan

4 - Extraction Well Schedule and Miscellaneous Details

5 - Sections and Details

6 - Condensate Sump and Discharge Details

8 - Schematic Flow Diagram

9 - LFG Blower/Flare System Plan

10 - LFG Blower/Flare Section and Detail

APPENDIX C

LFG Recovery Model

ATTACHMENT 1

EXHIBIT 1. LFG RECOVERY PROJECTION
Eastlake Landfill, Lake County CA

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	LFG Recovery Potential (scfm)	(mmcf/day)	(mmBtu/yr)	LFG System Coverage (%)	LFG Recovery from Planned System (scfm)	(mmcf/day)	(mmBtu/yr)
1972	15,100	15,100	0	0.00	0	0%	0	0.00	0
1973	16,500	31,600	8	0.01	2,114	0%	0	0.00	0
1974	18,000	49,600	16	0.02	4,327	0%	0	0.00	0
1975	19,700	69,300	25	0.04	6,648	0%	0	0.00	0
1976	21,500	90,800	34	0.05	9,101	0%	0	0.00	0
1977	23,500	114,300	44	0.06	11,693	0%	0	0.00	0
1978	25,700	140,000	54	0.08	14,446	0%	0	0.00	0
1979	28,100	168,100	65	0.09	17,381	0%	0	0.00	0
1980	30,700	198,800	77	0.11	20,517	0%	0	0.00	0
1981	33,600	232,400	90	0.13	23,873	0%	0	0.00	0
1982	35,000	267,400	103	0.15	27,481	0%	0	0.00	0
1983	36,400	303,800	117	0.17	31,119	0%	0	0.00	0
1984	37,900	341,700	131	0.19	34,786	0%	0	0.00	0
1985	39,400	381,100	145	0.21	38,495	0%	0	0.00	0
1986	41,000	422,100	159	0.23	42,244	0%	0	0.00	0
1987	42,700	464,800	173	0.25	46,044	0%	0	0.00	0
1988	44,400	509,200	188	0.27	49,908	0%	0	0.00	0
1989	46,200	555,400	202	0.29	53,833	0%	0	0.00	0
1990	48,100	603,500	217	0.31	57,829	0%	0	0.00	0
1991	47,100	650,600	233	0.34	61,908	0%	0	0.00	0
1992	44,900	695,500	247	0.36	65,660	0%	0	0.00	0
1993	29,000	724,500	259	0.37	68,931	0%	0	0.00	0
1994	29,600	754,100	263	0.38	69,826	0%	0	0.00	0
1995	49,400	803,500	266	0.38	70,764	0%	0	0.00	0
1996	50,900	854,400	280	0.40	74,431	0%	0	0.00	0
1997	47,300	901,700	294	0.42	78,140	0%	0	0.00	0
1998	50,200	951,900	305	0.44	81,174	0%	0	0.00	0
1999	51,700	1,003,600	318	0.46	84,475	0%	0	0.00	0
2000	46,700	1,050,300	330	0.48	87,835	0%	0	0.00	0
2001	47,200	1,097,500	340	0.49	90,340	0%	0	0.00	0
2002	48,300	1,145,800	349	0.50	92,800	0%	0	0.00	0
2003	45,700	1,191,500	358	0.52	95,301	0%	0	0.00	0
2004	47,300	1,238,800	366	0.53	97,324	0%	0	0.00	0
2005	48,600	1,287,400	374	0.54	99,477	0%	0	0.00	0
2006	54,000	1,341,400	382	0.55	101,714	0%	0	0.00	0
2007	51,800	1,393,200	393	0.57	104,604	0%	0	0.00	0
2008	47,200	1,440,400	403	0.58	107,053	0%	0	0.00	0
2009	41,400	1,481,800	409	0.59	108,746	0%	0	0.00	0
2010	40,900	1,522,700	412	0.59	109,549	0%	0	0.00	0
2011	40,600	1,563,300	415	0.60	110,246	0%	0	0.00	0
2012	64,000	1,627,300	417	0.60	110,868	0%	0	0.00	0
2013	64,000	1,691,300	431	0.62	114,738	0%	0	0.00	0
2014	64,000	1,755,300	445	0.64	118,430	75%	334	0.48	88,822
2015	64,000	1,819,300	459	0.66	121,952	75%	344	0.50	91,464
2016	56,300	1,875,600	471	0.68	125,313	75%	353	0.51	93,985
2017	42,500	1,918,100	479	0.69	127,442	75%	359	0.52	95,581
2018	42,500	1,960,600	480	0.69	127,540	75%	360	0.52	95,655
2019	42,500	2,003,100	480	0.69	127,635	75%	360	0.52	95,726
2020	42,500	2,045,600	480	0.69	127,725	75%	360	0.52	95,793
2021	42,500	2,088,100	481	0.69	127,810	75%	360	0.52	95,858
2022	42,500	2,130,600	481	0.69	127,892	75%	361	0.52	95,919
2023	42,500	2,173,100	481	0.69	127,970	75%	361	0.52	95,978
2024	42,500	2,215,600	481	0.69	128,045	75%	361	0.52	96,034
2025	42,500	2,258,100	482	0.69	128,116	75%	361	0.52	96,087
2026	42,500	2,300,600	482	0.69	128,184	75%	361	0.52	96,138
2027	42,500	2,343,100	482	0.69	128,249	75%	362	0.52	96,186
2028	42,500	2,385,600	482	0.69	128,310	75%	362	0.52	96,233
2029	42,500	2,428,100	483	0.70	128,369	75%	362	0.52	96,277
2030	42,500	2,470,600	483	0.70	128,425	75%	362	0.52	96,319

2012 LFG model Eastlake LF 2-13-13

5/8/2013

ATTACHMENT 1

EXHIBIT 1. LFG RECOVERY PROJECTION
Eastlake Landfill, Lake County CA

Year	Disposal Rate	Refuse In-Place	LFG Recovery Potential			LFG System Coverage	LFG Recovery from Planned System		
	(tons/yr)	(tons)	(scfm)	(mmcf/day)	(mmBtu/yr)	(%)	(scfm)	(mmcf/day)	(mmBtu/yr)
2031	8,900	2,479,500	483	0.70	128,479	75%	362	0.52	96,359
2032	0	2,479,500	466	0.67	123,826	80%	372	0.54	99,061
2033	0	2,479,500	444	0.64	118,141	85%	378	0.54	100,420
2034	0	2,479,500	424	0.61	112,717	85%	360	0.52	95,809
2035	0	2,479,500	404	0.58	107,542	85%	344	0.49	91,411
2036	0	2,479,500	386	0.56	102,604	85%	328	0.47	87,214
2037	0	2,479,500	368	0.53	97,893	85%	313	0.45	83,209
2038	0	2,479,500	351	0.51	93,399	85%	299	0.43	79,389
2039	0	2,479,500	335	0.48	89,111	85%	285	0.41	75,744
2040	0	2,479,500	320	0.46	85,019	85%	272	0.39	72,266

Methane Content of LFG Adjusted to: 50%
Selected Decay Rate Constant (k): 0.047
Selected Ultimate Methane Recovery Rate (Lo): 3,000 cu ft/ton

APPENDIX D

GCCS/Flare Specifications

April 29th, 2013

Re: *New PEI* Enclosed Landfill Gas Flare – Guaranteed Performance Specifications

The following is a synopsis of the guaranteed emissions levels and destruction efficiencies of the ***PEI*** enclosed landfill gas flare proposed for your **Eastlake Landfill** project. The emissions levels and destruction efficiencies stated herein are only guaranteed if testing is performed by an approved testing company with documented experience in emissions testing of low velocity landfill gas flare exhaust streams.

The flare is designed to combust from **80 to 450 SCFM** of landfill gas having a calorific density of between **300 Btu/ft^3** and **500 Btu/ft^3**, as long as the thermal loading rate is between **2.4 MMBtu/hr** and **13.5 MMBtu/hr**.

Operated within the above criteria, the ***PEI*** flare will emit no more than **0.05 lb/MMBtu NOx** (evaluated as NO_2). Such guarantee is based on CEMS testing performed by a approved testing company using chemiluminescence analytical techniques compliant with EPA method 7E, and when the following equation is used as the basis of the emission calculation;

lb/MMBtu NOx = (ppm NOx / $10^{\wedge 6}$) x (46 lb/lb-mole / 385.3 dscf/lb-mole) x Ff * x 20.9 / (20.9 - % Stack O_2)

Operated within the above criteria, the flare will emit no more than **0.20 lb/MMBtu CO**. Such guarantee is based on CEMS testing performed by an approved testing company using NDIR/GFC analytical techniques compliant with EPA method 10, and when the following equation is used as the basis of the emission calculation;

lb/MMBtu CO = (ppm CO / $10^{\wedge 6}$) x (28 lb/lb-mole / 385.3 dscf/lb-mole) x Ff * x 20.9 / (20.9 - % Stack O_2)

*** The Ff (fuel factor) shall be as determined by laboratory analysis or per EPA Method 19, Table 19-1**

Operated within the above criteria, the flare will provide NMOC destruction efficiency compliant with Subpart Cc, 60.33c, (c) (2), i.e. ". . .shall **reduce NMOC by 98 weight percent**, or;" (c) (3) of that same section, i.e. ". . . reduce the outlet NMOC concentration to **20 parts per million** as hexane by volume, dry basis at 3 percent oxygen, or less." Such guarantee is based on inlet flow rate measurement taken via pitot tube traverses performed in compliance with EPA method 2, and for **exhaust flow rates determined by a carbon balance equation evaluation**. Samples of the inlet and exhaust gases to provide methane and total gaseous non-methane organics constituencies shall be collected in summa canisters, and shall be laboratory evaluated using the TCA/FID analytical technique compliant with EPA method 25C. A GC/FID analyzer shall be employed during source testing for sampling exhaust gas during CEMS testing to provide an "on-line" indication and record of total volatile organic compounds (TVOC's). The calculation to determine the destruction efficiency shall be as follows;

(lb/hr NMOC's IN - lb/hr NMOC's OUT) / lb/hr NMOC's IN . . . where;

lb/hr NMOC's as hexane = (ppm as C_1 NMOC's / 6 / $10^{\wedge 6}$) x (86 lb/lb-mole / 385.3 dscf/lb-mole) x (dscf / hr)

or;

ppm NMOC's as hexane at 3% Oxygen = (ppm as C_1 NMOC's / 6) x (20.9 - 3) / (20.9 - % Stack O_2)

The system shall be capable of achieving a minimum of **99**% DRE of Total Volatile Organic Compounds (VOC's) (Sum of methane and non-methane organics). Please note that oxidizing combustion systems (such as landfill gas flares) neither generate nor remove sulphur. Any H_2S entering the flare is oxidized to form SOx compounds, but on a molecular basis, sulphur in is equal to sulphur out.

Note also that mineral based particulates, such as wind blown dust or silica, can be entrained into the ambient cooling and quenching air or purge air streams and passed into the combustor. As non-combustible matter, they will be passed into the exhaust stream and will be measured as particulate emissions, but are not generated by the combustion process. PEI makes no guarantees regarding these particulates. Barring individual identification of the particulate matter, it shall be assumed that if the combustor is meeting the above destruction efficiencies, it is evidence that any particulates measured are ambient particles and not generated by the combustion process.

1375 County Road 8690 West Plains, MO 65775
Phone (417) 256-2002 Fax (417) 256-2801
www.PerennialEnergy.com PEI@PerennialEnergy.com

SECTION 11187

LANDFILL GAS FLARING SYSTEM

PART 1. GENERAL

1.01 DESCRIPTION

A. Work Included:

1. The work described in this section consists of furnishing all labor, materials, equipment, and incidentals necessary to furnish and field test the Landfill Gas Flaring System at Eastlake Sanitary Landfill, Clearlake, CA as shown on the Contract Drawings and as specified herein, including all appurtenances to provide a complete system ready for operation.

2. The Landfill Gas Flaring System shall include the following four sub systems:

   a. Gas Handling System.

   b. Interconnecting Piping System.

   c. Vertical Ground Flare System.

   d. Control System.

3. All equipment and accessories shall have manufacturer's Shop Drawings approved by the County/Engineer prior to shipment and shall be tested in conformance with these Specifications prior to acceptance and final payment by the County.

4. The Contractor shall be responsible for furnishing all equipment and accessories as described in these Specifications and/or as noted on the Contract Drawings and as required for satisfactory operation of the system. The Contractor shall assume complete system responsibility, including warranty, for all equipment whether he is the manufacturer or not. The warranty does not extend to existing equipment, only the control interface of such.

5. The Contractor shall be responsible for all electrical wiring connections and operation and control of all equipment related to the Landfill Gas Flaring System.

6. Parts of equipment shall be amply proportioned for all stresses, which may occur during operation, and for any additional stresses, which may occur during fabrication, transportation, handling, and erection.

7. If necessary, modifications shall be made in the manufacturer's standard product to make it conform to the specific requirements of the Specifications and to requirements contained in regulations issued by public agencies. Such modifications shall be noted in Shop Drawing submittals.

8. Equipment shall include all production line improvements made to the delivery or Contract date. All equipment shall comply with applicable requirements of the standards of ASME, AGA, NFPA, and the Underwriters' Laboratories panels shall bear U.L. labels, as of the bid submittal date. Equipment shall not have been in service, except for shop tests, at any time prior to delivery. The equipment shall be furnished factory-assembled to the extent possible and ready for installation.

9. A brass or stainless steel nameplate shall be attached to each piece of equipment in a conspicuous place. The following information shall be plainly marked on the nameplate: name and address of the manufacturer, serial number, model number, and any other information necessary for complete identification.

1.02 SUBMITTALS

A. Submittals shall be made in accordance with Section 01300 - Submittals. In addition, the following specific information shall be provided:

1. Materials and Shop Drawings. Submittals shall include at least the following:

a. Certified Shop Drawings showing all-important details of construction, anchor plates for anchoring the skid to the concrete slab, dimensions, and weight. The flare manufacturer shall be responsible for the design of the anchor plates.

b. Descriptive literature, bulletins, and/or catalogs of the equipment.

c. A complete total bill of materials for all equipment.

d. A list of manufacturer's recommended spare parts.

e. The total weight of the equipment including the weight of the single largest item.

f. Complete performance data that will indicate full compliance with the Specifications; performance curves; calculations showing the equipment gas-flow and motor corrections required for operation at job-site elevation as specified under Design Criteria.

g. Complete control panel diagrams and elevations showing all components, wires, connections, and numbered terminals.

h. Complete electrical interconnect diagram showing all wires and terminals between the control panel and external devices.

i. All exceptions to the applicable requirements and Specifications provided in these Contract Documents.

B. Complete assembly, foundation and installation drawings, complete wiring diagrams, control panel layout and control schematics, together with detailed specifications, and data covering actual materials used, parts, devices, and other accessories shall be submitted.

C. An Operation and Maintenance (O&M) Manual shall be furnished in accordance with Section 01300 and the General Conditions for the LFG flaring system. The manual shall be prepared specifically for this installation and shall include all required catalog cuts, drawings, equipment list, descriptions, and information necessary to instruct operating and maintenance personnel who is unfamiliar with such equipment.

D. A factory representative, with a full knowledge of proper operation and maintenance, shall be provided for a minimum of two (2) 8-hour days to instruct representatives of the County and/or the Engineer on proper operation and maintenance of the LFG flaring system. If there are difficulties in operation of the equipment due to manufacturer's design or fabrication, additional service shall be provided at no additional cost to the County.

1.03 QUALIFICATIONS

A. The Landfill Gas Flaring System, including all ancillary equipment, shall be furnished by a manufacturer who is fully experienced, reputable, and qualified in the manufacture of the equipment to be furnished. The equipment shall be designed and fabricated in accordance with the best practices and methods. The manufacturer shall have experience in supplying equipment for the landfill gas handling systems, and shall have a minimum of five years experience in design and manufacture of this type of equipment and have a minimum five similar equipment installations operating successfully in the United States.

B. The Landfill Gas Flaring Systems shall be manufactured by Perennial Energy, Inc. of West Plains, Missouri, John Zink Company of Tulsa, Oklahoma, or approved equal.

1.04 DESIGN CRITERIA

A. Landfill Gas Blowers:

1. All equipment specified herein is intended to be standard equipment for use in a landfill gas handling system.

2. Blowers shall be designed for continuous operation in an outdoor environment and shall conform to the following requirement measured at Standard 14.7 psia and 68 degrees F condition:

Number required	2
Rated capacity each, scfm	450
Minimum capacity each, scfm	90
Site elevation, feet above MSL	1710
Gas composition:	
Methane	20 percent - 50 percent
Carbon Dioxide	25 percent - 50 percent
Traces gases, ppm	0 - 70
Actual landfill gas pressure:	
Inlet, inches of water (vacuum)	70
Outlet, inches of water (pressure)	20
Landfill gas inlet temperature:	

Maximum, degrees F	130
Minimum, degrees F	60
Shaft speed, rpm	3,600
Nominal motor efficiency, percent	91
Minimum motor power factor, percent	87
Motor insulation:	Class F
Motor service factor	1.15
Motor horsepower (Max)	25
Noise at 3 feet from unit	85 dbA
LFG moisture content	100% Saturated

3. When volumetric capacity is reduced to the specified minimum, the blower under the specified inlet conditions shall not surge or overload the motor.

4. The blower recommended will be based upon data previously established by tests in accordance with the ASME Power Test Code for Centrifugal Blowers.

B. Vertical Ground Flare Systems:

1. The landfill gas vertical ground flare systems shall be designed to operate continuously at the following service:

Number required	1
Landfill gas flow rate, scfm	90 to 450
Btu loading, mm Btu/hour	2.7 to 13.5
Inlet temperature, degrees F	100 to 130
LFG moisture content	100 % Saturated
Barometric pressure, psia	14.7
Landfill gas composition range:	
Methane	20 percent to 50 percent
Carbon Dioxide	25 percent to 50 percent
Trace Gases, ppm	0 to 70
Site elevation	1710 feet above MSL
Maximum Height of Stack, feet	35

2. The flare manufacturer shall guarantee the following performance requirements:

   a. The above composition percentages shall be considered approximate due to the complexity of the gas generation and collection process. The flare shall be complete with adjustment features, which will allow odor-free operation of the flare under significant changes in gas composition.

   b. The flare shall be capable of reducing odorous compounds such as hydrogen sulfide, mercaptan, and/or aromatics in the landfill gas to a nonodorous form by the combination of high temperature, excess combustion air, and retention time. Exhaust from the flare stack shall have no visible flame and no visible emissions.

   c. The thermocouple used to measure combustion temperature shall be located at

a distance that is greater than the distance equivalent to 0.6 seconds downstream of the burner at the maximum flow. Flare shall be designed to operate at a minimum combustion zone temperature no less than the 3-hour average temperature (measured by the thermocouple mentioned above) as determined during the most recent complying source test minus 50 degrees F.

d. The emissions from the flare shall comply with all Lake County Air Quality Management District (AQMD) emissions requirements as outlined in their Rules and Regulations. At a minimum, emissions from the flare shall not exceed the following values when the flare is operating within the designed Btu loading as specified in the Paragraph 1.04B above, without use of auxiliary fuel:

- Nitrogen Oxide (NOx) - 0.05 pound per million Btu.
- Carbon Monoxide (CO) - 0.15 pound per million Btu.
- PM10 – 7.35 pounds per million cubic feet of landfill gas.

e. The landfill gas flaring system shall be capable of achieving a minimum weighted average destruction efficiency of > 99 percent of the total organic compounds (TOCs), > 98 percent of nonmethane organic compounds (NMOCs) and >99 percent of methane per new AB 32 Methane Landfill Rule.

f. The landfill gas pressure loss through the flare at design flow (450 scfm) shall not exceed 10 inches w.c. as measured from the upstream side of the inlet gas valve to the outlet of the flare. The burner heads shall be designed to provide a sufficient pressure drop at minimum (90 scfm) flow and heat content conditions in order to maintain a stable flame and proper destruction.

1.05 APPLICABLE CODES AND STANDARDS

A. All equipment shall be manufactured in accordance with codes and guidelines as specifically detailed herein and in accordance with applicable portions of the following (latest edition):

1. Local Laws and Ordinances.
2. State and Federal Laws.
3. National Electrical Code.
4. National Electrical Manufacturers Association (NEMA).
5. Underwriters Laboratories (UL).
6. Uniform Building Code (UBC).
7. American National Standards Institute (ANSI).
8. American Society of Mechanical Engineers (ASME).
9. Institute of Electrical and Electronic Engineers (IEEE).
10. Instrument Society of America (ISA).
11. Industrial Risk Insurance (IRI).
12. Factory Mutual (FM).
13. National Fire Protection Agency (NFPA).

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. The equipment shall be delivered on site as fully assembled as transportation will allow. Factory-assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the County.

C. Finished surfaces of all exposed openings shall be protected by wooden blanks, strongly built, and securely bolted thereto.

D. Each box or package shall be properly marked to show its net weight in addition to its contents.

1.07 WARRANTY AND GUARANTEES

A. The equipment manufacturer shall warrant the units being supplied to the County against defects in workmanship and material for a period of one (1) year from the date of equipment acceptance by the County. In the event that the equipment fails to perform as specified, the equipment manufacturer shall promptly repair or replace the defective equipment without any additional cost to the County (including handling and shipment costs).

PART 2. PRODUCTS

2.01 GENERAL

A. All equipment shall be designed and proportioned to have liberal strength, stability, and stiffness and shall be especially adapted for the intended service. Ample room and facilities shall be provided for inspection, repairs, and adjustments.

B. These Specifications are intended to give a general description of what is required, but do not cover all requirements of the equipment as offered. They are, however, intended to cover the furnishing, delivery, and field testing of all materials, equipment, and apparatus as required. Any additional auxiliary equipment necessary for proper operation of the proposed Landfill Gas Flaring System not mentioned in these Specifications or shown on the Drawings shall be furnished and installed.

C. At all levels of performance of each gas system, the sound pressure shall not exceed 85 dbA over a frequency range of 37.8 and 9,600 cycles per second. Measurement shall be made a distance of 3 feet from the outer face of the equipment. The equipment manufacturer shall certify that the equipment furnished for this project does not exceed the specified sound pressure. This written certification shall be submitted with the Shop Drawings.

D. One (1) enclosed flare base plate foundation template, constructed of 1/4" carbon steel plate for assisting in setting and installing the anchor bolts in the field, shall be furnished by the

flare manufacturer. The template shall be shipped prior to the flare; so that it can be utilized at the time the flare foundation is formed and constructed.

2.02 GAS HANDLING SYSTEMS

A. Blower and Motor Assemblies:

1. Blower. The blower unit shall be the multistage centrifugal type. Impellers shall be mounted on one shaft supported on each end by bearings mounted in the outboard bearing housings. The blower shall be built from parts cast in patterns from which previous units have been built and tested. Blowers shall comply with the design criteria as specified in Paragraph 1.04A of Part 1 - General of this Section. The blower shall be driven directly by the motor through a variable frequency drive (VFD). The VFD furnished for the blowers shall be as manufactured by ABB Inc. of New Berlin, WI, or approved equal.

2. Blower Housings. The housings shall consist of cast iron sections held securely between cast iron inlet and outlets heads with steel tie rods.

   a. No contact shall be made between the shaft rotor and the housing, other than through the bearings. Stuffing boxes shall be used as seals to insure no leakage of gas to the atmosphere or air into the landfill gas.

   b. The inlet and outlet connections shall be drilled and tapped flange pattern per ANSI 1316.1, 125-pound, and shall be an integral part of the heads.

3. Impellers:

   a. The impellers shall be one piece cast aluminum alloy, keyed to the shaft and held by a locknut. Hubs of the impellers shall butt against each other directly or through one-piece metal spacers. There shall be ample clearance and tip speed shall not exceed 375 FPS.

   b. Impellers shall be precisely machine balanced. Vibration shall not exceed 2 mils in the vertical plane measured at the blower bearing housings.

4. Diffusers. Diffuser sections, which receive the gas from the impeller and guide the gas to the next impeller, shall be provided. The diffusing vanes shall be an integral part of the sections.

5. Shaft. Each shaft shall be made of high-grade carbon steel of sufficient diameter to operate below first critical speed.

6. Bearing Housings. Each blower shall be provided with two antifriction bearings. It shall be possible to replace bearings without disconnecting any piping or disassembling the compressor casing. Both inlet and outlet bearings shall be sized for a minimum expected life of 10 years continued operation as defined by ABMA B-10 standards.

7. Casing Drains. Each blower stage shall be provided with 3/8-inch diameter casing drains with manual shut-off valves. A ½-inch condensate drain line shall be provided at each blower for draining condensate from the blower to the moisture separator (see schematic flow diagram on the Contract Drawings)

8. Internal Lining. The blower internals shall be furnished with a factory applied Bisonite, Kynar, or phenolic coating minimum 6 mils thick to provide resistance to corrosion by landfill gas. The coating shall be applied to all parts of the blower, which come in contact with the landfill gas stream.

9. Motor. Each blower shall be direct-coupled to a horizontal 460 volt, 3-phase, 60-hertz motor. The directly coupled motors through the variable frequency drives (VFD) mounted adjacent to the flare panel shall drive the blowers. The motor rpm shall be 3,600. The minimum horsepower shall be as specified in Paragraph 1.4A above; however, the blower manufacturer shall be responsible for selecting the proper motor size to suit his equipment. The squirrel-cage induction motor shall be totally enclosed fan cooled (TEFC), and UL-approved. The motor shall have a cast-iron frame and copper windings. Motor shall be rated at 104 degrees Fahrenheit ambient with not more than 131 degrees Fahrenheit rise. Bearings shall be of the antifriction type with an ABMA L-10 life rating of not less than 25,000 hours.

10. Flexible Couplings and Drives. The blowers shall be connected to the drivers with a suitable flexible coupling. The installing contractor shall check and adjust the alignment of the couplings and drives in accordance with the instructions of the blowers' manufacturer to a tolerance of plus or minus 2 mils. Couplings shall be covered with base-mounted aluminum or non-sparking metallic guard.

11. Bases. Enamel painted rolled steel bed plates of suitable size for mounting blowers and drivers shall be furnished by the blower manufacturer. The blower and motor shall be carefully aligned and then bolted in place. Suitable vibration isolation pads shall be provided under the steel bedplates of the units. If the blower manufacturer intends to use a structural steel frame in lieu of the rolled steel plate for the blower base, it shall be coated with industrial enamel paint.

12. The blower-motor assemblies shall be located, installed, and plumbed on the gas handling skid, with a continuous galvanized ¼-inch thick galvanized steel checker plate, either bolted or welded to the top of the skid.

13. Auxiliary Equipment:

    The following auxiliary items shall be provided along with the blowers:

    a. A 4-1/2-inch-diameter bellows-type vacuum gauge shall be mounted at the inlet of each blower. The range of the vacuum gauge shall be 0 to 100 inches of water, and the gauge shall read "INCHES OF WATER." Graduations shall be at intervals of 1 inch of water.

    b. A 4-1/2-inch-diameter bellows-type pressure gauge shall be mounted at the

outlet of each blower. The range of the pressure gauge shall be 0 to 50 inches of water, and the gauge shall read "INCHES OF WATER." Graduations shall be at intervals of 1 inch of water.

c. Dial-type temperature gauges shall be provided at the inlet and outlet of each blower. The gauge shall range from 0 to 200 degrees F.

d. The manufacturer of the blowers shall provide flanged expansion joints concentric reducers, of sizes shown on the Contract Drawings, on the inlet and outlet of each blower. The flanged expansion joints shall be constructed of synthetic rubber with synthetic fiber reinforcement. The flanged expansion joints shall the pressure ratings of +20 psig and -20 inches of mercury. They shall be capable of withstanding the temperatures up to 250^0F. The split retaining rings shall be made of galvanized steel. The split rings shall conform to the requirements of 125-pound ANSI flanged fittings.

e. The manufacturer of the blowers shall provide one calibrated ammeter for each blower. The surge range shall be clearly indicated on the ammeter. The volume of gas in standard cubic feet per minute (scfm) shall be expressed as a function of ampere input (i.e., the ammeter shall have two scales: amps and scfm). The point of full load amps shall be clearly indicated on the ammeter.

14. Blower Controls:

a. Blower-motor starters and controls shall be as provided as shown on the Contract Drawings.

15. Experience:

a. Blowers shall be manufactured in the United States. Blower manufacturers shall have a minimum 5 years experience in the design and manufacture of this type of equipment and have a minimum of 25 operating installations in the United States.

b. Acceptable Manufacturers:

(1) Gardner-Denver Blower Division
100 Gardner Park
Peachtree city, GA 30269
(800) 543-7736

(2) Continental Blowers, L.L.C.
Liverpool, New York 13088
(315) 451-5410

(3) Houston Service Industries, Inc.
7901 Henson Road
Houston Road, TX 77061

(800) 725-2291

(4) National Turbine Corporation
374 Northern-Lights Drive
Syracuse, New York 13212
(315) 455-5591

2.03 INTERCONNECTING PIPING SYSTEMS

A. Valves:

1. Butterfly Valves:

a. All valve shafts shall be connected to operators by use of keys and keyways. The use of compression or friction connection will not be accepted.

b. The butterfly valves, for low-pressure/vacuum landfill gas services, shall have cast-iron wafer-style valve body with contoured 316 stainless steel disc, Type 316 stainless steel stem, Acetal stem bushing, and Viton replaceable resilient seat. Valves shall be bubble-tight at 150 psi differential pressure and shall be suitable for installation between ANSI 125-pound flanges.

c. All butterfly valves shall open left or counterclockwise when viewed from the stem. Manual valve operators shall be worm gear, with or without chains, as shown on the Contract Drawings. All operators shall have adjustable mechanical stop limiting devices to prevent overtravel of disc. Should an adjustment of the disc be required to maintain a bubble-tight seal, this adjustment shall be made externally without removing the operator housing cover. The operator shall be designed such that all adjustments can be made under pressure and without the possibility of dirt getting into the operator lubricant. Any adjustments through the lower shaft will not be acceptable. Operator components shall, at the extreme operator positions, withstand without damage a pull of 200 lbs for handwheel or an input torque of 300 ft-lb for operating nuts.

d. Interior of valve body and valve disc except for valve seat and stainless steel valve seat ring shall be coated with a fusion bonded, thermosetting epoxy coating in accordance with AWWA C550, latest revision. Coating shall be holiday-free with a minimum thickness of 12 mils. Surfaces shall be clean, dry, and free from rust and grease before coating.

e. All butterfly valves shall be manufactured by Demco/Copper Cameron Valves, DeZurik, Keystone Valves U.S.A., Kennedy Valve Manufacturing Company, or approved equal.

f. All exterior surfaces of butterfly valves shall be clean, dry and free from rust and grease before coating. The exterior ferrous parts of all valves shall be shop primed at the factory with one coat, minimum dry film thickness 1.5

mils, of a primer with rust-inhibitive pigments and synthetic resins. Following installation, above-ground valves shall be finish painted. The County shall select the color of the paint.

2. Solenoid Valves:

   a. Solenoid valves shall be 2-way type for normally closed operation designed for not less than a 150 psi water working pressure. The valves shall have forged brass bodies with NPT threaded ends, Buna N seals/disks, and NEMA 4 solenoid enclosures. The valves shall operate on 120 VAC power, shall have threaded conduit hubs, standby manual operators, and shall not require a minimum operating pressure differential for steady operation. The valves shall be manufactured by Automatic Switch Company or approved equal.

3. Check Valves:

   a. Check valves shall be of flapper type. The valves shall have cast aluminum lightweight body, 316 stainless steel internals, Viton or Teflon sealing member materials, and 316 stainless steel spring materials. The valves shall be flanged and shall be faced and drilled to 125-pound ANSI dimensions.

   b. Check valves shall be Model 5004-CAL as manufactured by Techno Corporation of Eire, Pennsylvania, or approved equal.

B. Piping:

1. Piping. All piping on the gas handling system skids shall be Schedule 40 6061-T6 or 6063-T6 aluminum. The same specification applies to tees, elbows, wyes, flanges, and other pipe fittings. All flanges shall conform to ANSI 125-pound specifications. All welding of aluminum piping and appurtenances shall conform to AWS D1.2 specifications.

2. The gaskets shall be full-face rubber, 1/16 inch to 1/8 inch in thickness, and shall meet the requirements of ANSI Specification A21.11.

3. Where shown on the Drawings or as required, pipe and fittings shall be drilled and taped to receive drainage or other piping or plugs. All holes shall be drilled accurately at right angles to the axis of any pipe or fitting.

4. All piping and fittings shall be supported in such a manner as to prevent any strain being transmitted between sections and connected equipment and appurtenances. Release of any joint shall result in no transverse piping movement and shall allow easy removal and replacement of any piping component. Not all required supports are shown on the Drawings.

5. In lieu of aluminum piping, the Contractor can furnish stainless steel piping. Stainless steel piping shall be minimum schedule 10, annealed, conforming to the requirements of ASTM A312, Grade TP 304L or TP 316, low carbon.

6. Flexible connectors shall be bellows type, Series 2500 as manufactured by Hyspan Precision Products, of Chula Vista, CA. or approved equal.

C. Landfill Gas Flowmeter:

1. The landfill gas flowmeter shall comprise of a single point FM approved mass flowmeter element/transmitter with display, suitable for installation on a 6-inch diameter stainless steel pipe, and a mass separate flowmeter computer/ transmitter with a 4-20 mA output. The mounting fittings, for the flowmeter and the transmitters, shall be of 3/4-inch S.S. The flowmeter shall be Model No. 454 FT flowmeter and a 155JR flow computer as manufactured by Kurz Instruments Inc., or approved equal.

2. The landfill gas flowmeter shall provide a 4-20 mA signal of flow of the landfill gas for connection to the remote indicator. The meters shall be factory calibrated for landfill gas (50 percent methane, 50 percent carbon dioxide) for a range of 450 to 90 scfm. The flowmeter shall be provided with a flow rate indicator (scfm), totalizer, and recorder to be located as shown on the Contract Drawings.

3. The recorders shall include a NEMA 4X enclosure, which the Contractor shall install on the inside flare control panel enclosure, as shown on the Contract Drawings.

4. The totalizer panels shall be installed in the flare control panels.

5. The strip chart recorder shall be manufactured by Yokogawa, or approved equal. LFG flows, flare-operating temperatures, time, and date shall be printed in figures every 15 minutes on the chart.

2.04 VERTICAL GROUND FLARE SYSTEM

A. Equipment

1. The landfill gas vertical ground flare shall have the following items as minimum:

a. Burners and burner chamber for landfill gas.

b. Stack.

c. Automatic landfill gas and propane gas safety shutoff valves.

d. Flame arrestor.

e. Control system, with a programmable logic controller, SLC-500 PLC, 24 inputs, (120V, 60 Hz), 16 outputs relay (120V, 60 Hz), manufactured by Allen Bradley or approved equal.

f. A complete propane gas pilot system, including two 5-gallon tanks, piping, valves, electric igniter and pressure regulator.

g. All controls, panel, and wiring, including exit gas temperature control.

h. Access manhole at the front of the unit for inspection and maintenance of burners.

i. Flame view ports.

j. Time clocks mounted inside the flare control panel shall be provided for automatic starting and stopping of the flare operations on preset time, for 7 days per week with a 1-hour minimum duration.

k. Protective screen to prevent accidental burns.

l. A set of sampling ports shall be spread horizontally and located at least 2 feet above the flame zone and at least 3 feet below the top of the flare shroud. Sampling ports shall be installed 90 degrees apart, and shall consist of 4-inch couplings with plugs.

m. Eye bolts shall be provided above each sampling port to properly support sampling probe and trains.

2. Flare Stack:

a. The circular flare stack shall be constructed of carbon steel, with a minimum thickness of 1/4 inch.

b. The flare stack shall be designed to minimize the danger of accidents to operating and maintenance personnel.

c. The landfill gas burners shall be made from 300 series stainless steel with minimum thickness of 16 gauge. The manifold shall be of a sectional header arrangement to accommodate the removal and repair of individual headers.

d. Refractory shall be 4 inches thick (minimum), lightweight, castable, insulating, and shop-installed in the ignition tube and stack. Refractory lining shall have 1/4-inch (minimum) 304 stainless steel anchors spaced two per square foot. Refractory shall be rated for the design operating temperature and precured a minimum of 48 hours. Refractory shall not require warm-up or cool-down procedures to avoid refractory damage. The flare may be subject to sudden startup after a prolonged idle period during which the refractory is exposed to weather conditions. In addition, sudden shutdown may occur after prolonged operational periods. It is required to have a refractory lining at the bottom of the flare to protect the structural concrete.

In lieu of refractory lining, ceramic fiber blanket will be acceptable as the flare stack insulation. Three layers of ceramic fiber insulation blanket shall be provided. Two 1-inch-thick layers of ceramic fiber blanket of 8 lbs/ft^3 density shall be installed, using overlap outer face construction methods, over one 2-inch-thick layer of ceramic fiber blanket of 4 lbs/ft^3 density. Insulation shall

be attached to stack wall and floor with Inconel 600 series, or approved equal, studs and washers. Prior to the installation of ceramic fiber blanket, internal surfaces of the stack shall be thoroughly cleaned and painted with rust-inhibitive, high-heat resistant paint.

A rain guard shall be provided at the top of the flare stack to prevent water seeping into the insulation.

e. The flare stack shall be provided with lifting eyes near the top of the flare to permit the lifting and upright suspension of the flare at these points. The flare shall arrive on the site with internal supports necessary to permit the lifting of the flare by the lifting eyes without damage to the refractory or other flare components.

f. The flare stack shall be assembled at the factory to the extent possible. Instructions for any unavoidable on-site assembly shall be provided to the County per submittal requirements.

g. The flare stack shall be installed on the concrete slab on pile foundation as specified by the structural engineer. All necessary support angles and anchor bolts to install the flare on the concrete slab shall be furnished by the flare manufacturer. The landfill gas supply pipe, and pilot light pipe, connections furnished with the flare shall extend a minimum of 1 foot beyond the outermost dimension of the flare.

h. The flare stack shall be provided with an access ladder to the height of the top of the thermocouple. The access ladder shall be provided with anti-climb guard and a head shield over the ladder at the top of the flare.

i. The control panel shall contain all control components not mounted on the flare.

j. In selecting and/or accepting equipment for installation at the project site, the County will assume no responsibility for injuries or claims resulting from failure of the equipment to comply with applicable national, state, and local safety codes or requirements, or the safety requirements of a recognized Agency in effect at the time of final review of the Shop Drawings, or failure due to faulty design concepts or defective workmanship and materials. Equipment manufacturers shall be held responsible for compliance with the requirements included in this paragraph.

k. Shell skin temperature shall not exceed 250 degrees F under maximum Btu loading conditions.

l. All hot surfaces with operating temperatures greater than 140 degrees F and which may inadvertently be touched, backed into, or otherwise contacted by operators or maintenance personnel shall be provided with a protective expanded steel or mesh screen to prevent accidental burns. The protective

screen shall be securely attached to the flare, and shall extend outward a minimum of 6 inches from all hot surfaces. The protective screen shall extend completely around the flare, from a maximum height (at the base) of 6 inches above grade to a minimum height (at the top) of 7 feet above grade. The screen shall have a minimum 75 percent open area, with holes not exceeding 3 inches in maximum dimension. The protective screens shall be comprised of a minimum of four sections, each of which shall be easily removable from the exterior, especially at those areas where regular maintenance or operational adjustments may be required.

m. Alternative methods for the prevention of accidental burns may also be proposed by the Contractor. Such proposals shall include a complete description of materials and construction methods, and shall address concerns regarding burn protection and accessibility. Hand rails shall not be accepted as an alternative method.

B. Controls:

1. All electrical components shall be UL approved. The controls shall be designed for 120-volt AC operation. All switching shall be accomplished in the "hot" circuit. The electronic flare control system shall be supplied with the following characteristics and components:

a. The control system shall accomplish a safe start component check during each start, which shall prevent the delivery of landfill gas into the flare unless a sufficient pilot light has been provided to ignite the landfill gas. The control system shall also prevent the discharge of uncombusted landfill gas.

b. Safety shutdown after automatic restart shall be accomplished within 4 seconds following a flame failure or the opening of any running interlock.

c. Automatic shutdown of the system shall be accomplished when the design Btu loading has been exceeded, to protect the internal insulating lining of the flare shell. The flare shall shut down automatically when the temperature drops below 1400^0 F

d. The local alarm panel shall indicate flare shutdown.

e. The pilot and main flames shall be monitored by a single ultraviolet-sensitive flame scanner, which shall not be actuated by hot refractory.

f. The flame detection scanner and amplifier shall be repetitive self-checking.

g. The scanner shall mount on and sight through a 1-1/2-inch standard pipe, reduced to 1-inch standard pipe. The scanner mount shall be positioned to permit the scanner to sense both the pilot flame and the primary flame at low-flow conditions. However, the manufacturer may opt to provide two scanners, in lieu of one, to individually sense the pilot flame and the primary

flame.

h. The scanner shall be suitable for operation up to 200 degrees F, as measured on the mounting hub.

i. The landfill gas inlet shall be equipped with a pneumatic, automatic, fast-closing (within 5 seconds), safety shutoff valve so that landfill gas shall flow to the combustion chamber through the fuel pipe only after the pilot is proven. A system of burner heads shall be located inside the combustion chamber to properly distribute landfill gas for efficient combustion.

j. The pilot gas fuel train shall include double block solenoid valves.

k. All electrically operated valves shall close upon loss of electrical power.

l. Operator interface. The control system shall be accomplished with a programmable logic controller, SLC-500 PLC, with adequate number of inputs, and outputs to operate the system specified, manufactured by Allen Bradley, KOYO –Automation Direct, or approved equal.

m. Time clocks mounted inside the flare control panel shall be provided for automatic starting and stopping of the flare operations on preset time, for 7 days per week with a 1-hour minimum duration.

2. The flare shall be provided with an adequate number of exit gas temperature control sensors (thermocouples) and ports. The number of ports for mounting the temperature sensor shall be determined by the manufacturer based on the flare capability and quality and quantity of gas expected. All of this information shall be submitted during the Contractor's first submittals of the Shop Drawings for the Flare. One of the sensors shall be located approximately 3 feet below the top of the flare stack. The thermocouple tube protruding into the flare shall be high-temperature stainless steel series Inknel made by Willon Industries, Telephone (818) 579-0268, or approved equal.

3. The control panel and switch board shall be suitable for slab mounting. All necessary brackets shall be furnished. The panel shall be hinged, dust-tight, and weatherized NEMA 12/3R. Weather proof rain/sun shield, extending a minimum of 3 feet over door side, shall be provided over all enclosures. Lights shall be provided under the overhead shield. The panel shall contain PLC, all components, devices, and instruments not mounted on the flare, including the following:

   a. Flare start-up selector switches and push buttons.

   b. Emergency shut-down push button.

   c. A "hand-off-auto" selector switch shall also be included in each motor control circuit.

d. Indicating lights for power on, purging on and complete, pilot gas on, landfill gas on, flame proved, blowers on and fail, LFG inlet valve fail, flare failure, flare high and low temperatures, propane low pressure, and high oxygen. These are to be provided on touch screen (HMI).

e. A push button and a lamp test circuit shall be provided to test the condition of each indicating lamp.

f. Pilot light ignition system.

g. Adjustable pilot fuel valve timer (0 to 15 minutes).

h. Combustion safeguard relay.

i. Elapsed timers and ampere meters for blower motors.

j. Continuous temperature indicator and controller.

k. Strip chart recorders for flare operating temperature, LFG flow to flare, the flare operating temperature, LFG flow, time and date shall be printed on the strip chart at every 15-minute interval. Yokagawa FX 106 digital strip recorder or equal.

l. Programmable controller and interfaces. The interface shall be at a minimum 6" color touch screen

m. Auto dialer.

n. Mass flow computer totalizer.

o. Interlocking relay contacts for controlling the blowers through VFDs.

p. Relay contacts for remote alarm auto dialer.

q. Control circuit fuses.

r. Name plates.

s. Terminal strips.

t. A 20 amp, 110 volt duplex utility outlet.

4. Interlocking relay contacts shall be provided to de-energize all blowers if the flare flame is lost.

5. A temperature controller with thermocouple shall operate an integral motor-driven air inlet damper(s) assembly to maintain the exhaust gas temperature as measured by the temperature sensors within 10°F of the temperature set point. The temperature set point shall be field-adjustable.

6. Control System Operation. Provide the required programmable logic control, relays, field devices, and field components to implement the following control operations and features:

   a) System Startup. System startup shall begin with a time delay cycle to evacuate any fugitive hydrocarbons from the flare enclosure. After purge is completed, the pilot shall be lit by use of propane gas, pilot gas solenoid valve, and spark plug ignition. Provide ignition transformer, pilot spark plug, and ignition timer. Upon proving the pilot flame by a self-checking flame scanner, the landfill gas (electric automatic) valve shall be opened and the landfill gas blower(s) shall be started allowing landfill gas to flow to the flare enclosure allowing the use of the landfill gas for system warm-up.

   After the starting of the blower and the landfill gas (pneumatic) valve is opened, the pilot gas solenoid valve shall then shut off to limit propane gas usage. If a flame is still sensed on the main burner, the system shall continue operation; if not, it shall shut down on flame failure.

   b) Temperature Control (Air). The unit temperature shall be maintained by automatically adjusting electric actuated air damper(s), opening the dampers to reduce the flue gas temperature by adding quench air. Provide an automatic temperature controller, two compatible damper operators, and temperature element to operate the analog control loop. Provide a temperature recorder on the control panel to continuously record the flare exit gas temperature.

   c) Automatic Start/Restart. In the automatic mode, the unit shall automatically start when power is applied. If the unit shuts down for any reason except high stack temperature, the auto mode shall allow the unit to attempt to purge and restart for a specified time period. A remote signal is sent if the unit fails to restart.

   d) Pressure Control. Provide a pressure regulator on the pilot gas line. Provide a pressure gauge on both the pilot gas line and enriched fuel line downstream of the automatic valves.

C. Flame Arrestor:

1. Flame arrestor shall be suitable for installation on line containing saturated LFG and shall be of the size shown on the Contract Drawings.

2. Flame arrestor shall have 125-pound ANSI flanged connections.

3. The housing construction shall be aluminum. The bank assembly shall be all aluminum and shall be so arranged for easy removal from the housing to facilitate inspection and cleaning. The net free area through the bank assembly shall not be less than four times that of the corresponding size pipe. All grids of the bank shall be arranged for individual removal. The flame arrestor shall be Groth Equipment

Corporation Model 7628, Varec Model 5010E, or approved equal.

D. Automatic Telephone Dialer:

1. General: The system shall receive input from the various monitored items in the form of a change in the status of a dry contact. Upon such change, the system shall automatically dial up to sixteen pre-selected phone numbers. When answered, the system shall send voice messages reporting the specific alarm condition. The system shall also be capable of reporting the status of all monitored items upon receipt of an inquiry phone call.

2. The system shall make provisions for the following input alarms:

   a. Inlet shut-off valve failure.
   b. Main flame failure.
   c. Blower No. 1 failure.
   d. Blower No. 2 failure.
   e. Flare high temperature failure.
   f. Flare low temperature failure.
   g. Spare.
   h. Spare.

3. The automatic telephone dialer shall be a self-contained, solid state device. The dialer shall continuously monitor the presence of AC power and the status of up to eight independent N.O. or N.C. contact inputs.

   Each contact input channel shall be keyboard programmable as follows: alarm on open circuit, alarm on closed circuit, or no alarm (status report only on inquiry). Alarm or status shall be reported utilizing a solid state used recorder high fidelity voice. No tape or mechanical voice reproduction devices shall be used.

   AC power failure or violation of alarm criteria for any input shall cause the unit to go into alarm status and begin dial-outs and optional local announcements. Upon initiating an alarm call-out, the system shall speak only those channels currently in alarm status.

   On phone inquiry or during on-site status check, a warning message shall be provided if no dial-out phone numbers are entered, or if the alarm switch is disabled, or if backup battery charge is low, or if AC power is off or has been off since last reset.

4. Phone Link: The dialer shall be FCC approved. It shall operate on a standard dial-up rotary pulse or Touch Tone^{R} telephone line and shall be capable of calling from one to sixteen phone numbers, each up to 60 digits in length and shall be compatible with the RACO Cellularm option for cellular phone connection/dialout functionality. Dedicated or leased phone line shall not be required.

5. Programming Capability: Pre-programmed speech shall provide entry guidance and confirmation of programmable features. Coded programming shall provide direct access to specific programmable items via appropriate function codes.

Both front panel and remote programming capability shall be provided for all functions. The user shall be permitted to selectively read channel status and to selectively read and alter any user entered speech messages or parameter programming from any Touch Tone^{R} phone.

The following parameters shall be alterable from their default values via keyboard entry at the dialer or remotely from any Touch Tone^{R} phone:

a. Messages - Alarm and normal messages for each channel shall be user programmable via solid state voice recording. Permanent resident factory recorded messages shall be included to support user programming and to provide default warning messages which will allow the unit to be fully functional even when no user messages have been recorded.

b. Alarm response delay - Each alarm channel response time shall be individually programmable 0.1 - 999.9 seconds. Default shall be 2.0 seconds. Power out response time shall be separately programmable.

c. Delay between alarm dial-outs - Shall be programmable 0.1-99.9 minutes. Default shall be 2.0 minutes.

d. Input alarm criteria - Each digital channel shall be independently keyboard configured for OPEN/CLOSED contact alarm or "NO ALARM." Default shall be open circuit alarm.

e. Built-in microphone - Shall be programmable ON/OFF.

f. Phone dialing mode - Shall be able to connect to local cellular network using RACO Cellularm technology.

g. Phone numbers - Sixteen phone numbers shall be programmable with each phone number up to 60 digits in length. Pauses and DTMF tones shall be provided for pager communication, etc.

h. Alarm Call Grouping - Shall be programmable to selectively call the appropriate phone number according to current alarm(s).

6. Power and Memory Backup: Normal power shall be 105-135 VAC, 15 Watts maximum. An integral gel cell rechargeable battery shall be furnished with built-in charger of the precision voltage controlled type. A "trickle charger" shall not be supplied. Battery backup times shall be 20 hours.

   Even if all power is removed, user-entered programming shall be kept intact for up to 10 years from date of shipment.

7. Construction: An enclosure shall be NEMA 4X. The autodialer shall be mounted in the flare control panel.

a) A cable connector shall be provided for voice output to a local amplifier.

b) Gas tube and solid state surge protection shall be integrally incorporated on the circuit board for all inputs including power, phone, and signal lines. Externally mounted protectors shall not be acceptable substitutes.

c) The dialer shall be suitable for a maximum environmental temperature of 130EF at the enclosure.

8. Automatic dialer - shall be Verbatim Model VSS-8C with Cellularm option, as manufactured by RACO Manufacturing and Engineering Company.

PART 3. EXECUTION

3.01 INSTALLATION

A. The LFG flaring system shall be installed in strict accordance with the manufacturer's instructions and recommendations in the location shown on the Contract Drawings.

B. Anchor bolts shall be installed accurately with the foundation template, furnished by the flare manufacturer, at the time the concrete is poured. Continuous inspection is required for anchor bolts installation and concrete pour.

C. The Contractor shall retain the services of the manufacturer or the manufacturer's designated factory-trained representatives for installation of the flaring system, including all controls or accessories.

D. Startup and debugging shall be considered completed when the manufacturer and Contractor have demonstrated that the flaring system is operating optimally and without mechanical/electrical and instrumentation problems. Debugging and startup of the equipment shall not be considered part of the erection or installation and, therefore, all startup and debugging efforts will be provided at no additional cost to the County nor will the time count against the manufacturer or his representative's required number of days. The County /Engineer shall be the sole judge as to whether the manufacturer and Contractor have completed startup and debugging.

E. The Contractor shall submit a certificate from the equipment manufacturer stating that the installation of the equipment is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation and care of the system.

3.02 INSPECTION AND TESTING

A. General:

1. A factory representative shall be provided for two (2) days and shall have complete knowledge of proper operation and maintenance to inspect the final installation and supervise the test run by the equipment.

2. Experienced factory-trained personnel, tools, and testing equipment shall be provided as required to perform the installation of the equipment furnished by the manufacturer, as well as test, calibrate, and start up the complete flaring operation and gas flow control as described on the flaring system operation requirement.

3. Experienced factory-trained PLC personnel and programming devices shall be provided as required to perform the programming or reprogramming to meet the actual flaring system operation and variable flow control during testing and start up as described on the flaring system operation requirement.

4. Field tests shall not be conducted until such time that the entire installation is complete and ready for testing.

B. Field Testing:

1. Upon completion of all the mechanical and electrical work, the Contractor shall conduct testing as specified herein to demonstrate that the equipment performs in accordance with all specifications.

2. The Contractor shall perform initial testing of the equipment, insuring to himself that the tests listed in the Demonstration Test paragraph below can be satisfactorily completed.

3. The Demonstration Test shall demonstrate that all items of these Specifications have been met by the equipment as installed and shall include, but not limited to, the following tests:

   a. That the LFG flaring system has been properly installed and all parts are in correct alignment.

   b. That the system satisfactorily operates continuously for 14 days.

   c. That there are no mechanical or electrical defects in any of the parts.

   d. That the controls perform satisfactorily as to automatic starting and stopping, and remote control of blowers and associated equipment.

   e. Alarm call outs

C. Performance Test:

Within sixty (60) days of successful completion of the demonstration test, the Contractor shall conduct a performance test on the LFG flaring system in accordance with approved test procedures (prepared by the independent laboratory selected by the Contractor). The test procedure shall include preparation and submission of testing protocol to AQMD for their review and approval. The tests shall be conducted by an independent testing laboratory with at least three years of experience in successfully conducting such tests. The tests shall include, but not limited to, testing of inlet gas to the flare and flare exhaust for the following:

1. Methane.
2. Total nonmethane organics.
3. Oxides of nitrogen (exhaust only).
4. Carbon monoxide (exhaust only).
5. Total particulates (exhaust only).
6. Hydrogen sulfide and total reduced sulfur.
7. Sulfur oxides (exhaust only).
8. Reactive organic compounds.
9. Toxic air contaminants including, but not limited to, benzene, chlorobenzene, dichlorobenzene, 1,2-cichloroethane, 1,1-dichloroethene, dichloromethane, tetrachloroethylene, tetrachloromethane, toluene, 1,1,1-trichloroethane, trichloroethylene, trichloromethane, vinyl chloride, and xylene isomers.
10. Carbon dioxide.
11. Oxygen.
12. Nitrogen.
13. Moisture content.
14. Exhaust temperature at the time of the test and exhaust temperature recorded by the sensor required by the permit.
15. Flow rate.
16. Energy content of landfill gas.

If the test results show that the flare has failed to comply with the specified emission criteria, it will be the Contractor's responsibility to make all modifications and/or adjustments to the flare necessary to meet the emission criteria. After all such modifications and/or adjustments, the performance test on the flare shall be reconducted to demonstrate compliance to the specified emission criteria. The costs of modifications and/or adjustments to the flare and performance tests shall be borne by the Contractor.

END OF SECTION

APPENDIX E

LCAQMD ATC Form

ATTACHMENT 2

FINAL REGULATION ORDER

Methane Emissions from Municipal Solid Waste Landfills

Subchapter 10. Climate Change
Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions
Subarticle 6. Methane Emissions from Municipal Solid Waste Landfills

Adopt new Article 4, Subarticle 6, sections 95460 to 95476, title 17, California Code of Regulations, to read as follows: (Note that the entire text of sections 95460 to 95476 set forth below is new language to be added to the California Code of Regulations.)

§ 95460. Purpose

The purpose of this subarticle is to reduce methane emissions from municipal solid waste (MSW) landfills pursuant to the California Global Warming Solutions Act of 2006 (Health & Safety Code, Sections 38500 et. seq.).

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95461. Applicability

This subarticle applies to all MSW landfills that received solid waste after January 1, 1977.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95462. Exemptions

(a) This subarticle does not apply to landfills that receive only hazardous waste, or are currently regulated under the Comprehensive Environmental Response, Compensation and Liability Act 42 U.S.C, Chapter 103 *(Promulgated 12/11/80; Amended 10/17/86).*

(b) This subarticle does not apply to landfills that receive only construction and demolition wastes, inert waste, or non-decomposable wastes.

(c) This subarticle does not apply to closed or inactive MSW landfills with less than 450,000 tons of waste-in-place.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95463. Determination for Installing a Gas Collection and Control System

(a) *Active MSW Landfills Less Than 450,000 Tons of Waste-in-Place:* Each owner or operator of an active MSW landfill having less than 450,000 tons of waste-in-place must submit a Waste-in-Place Report to the Executive Officer pursuant to section 95470(b)(4), within 90 days of the effective date of this subarticle.

(1) The Waste-in-Place report must be prepared for the period of January 1 through December 31 of each year. The report must be submitted to the Executive Officer by March 15 of the following year.

(2) The Waste-in-Place report must be submitted annually until either:

(A) The MSW landfill reaches a size greater than or equal to 450,000 tons of waste-in-place; or

(B) The owner or operator submits a Closure Notification pursuant to section 95470(b)(1).

(b) *MSW Landfills Greater Than or Equal to 450,000 Tons of Waste-in-Place:* Within 90 days of the effective date of this subarticle or upon reaching 450,000 tons of waste-in-place, each owner or operator of an MSW landfill having greater than or equal to 450,000 tons of waste-in-place must calculate the landfill gas heat input capacity pursuant to section 95471(b) and must submit a Landfill Gas Heat Input Capacity Report to the Executive Officer.

(1) If the calculated landfill gas heat input capacity is less than 3.0 million British thermal units per hour (MMBtu/hr) recovered, the owner or operator must:

(A) Recalculate the landfill gas heat input capacity annually using the procedures specified in section 95471(b).

(B) Submit an annual Landfill Gas Heat Input Capacity Report to the Executive Officer until either of the following conditions is met:

1. The calculated landfill gas heat input capacity is greater than or equal to 3.0 MMBtu/hr recovered, or

2. If the MSW landfill is active, the owner or operator submits a Closure Notification pursuant to section 95470(b)(1).

Submitting the Closure Notification fulfills the requirements of this subarticle. If the MSW landfill is closed or inactive, submittal of the Closure Notification is not required to fulfill the requirements of the subarticle.

(2) If the landfill gas heat input capacity is greater than or equal to 3.0 MMBtu/hr recovered the owner or operator must either:

(A) Comply with the requirements of sections 95464 through 95476, or

(B) Demonstrate to the satisfaction of the Executive Officer that after four consecutive quarterly monitoring periods there is no measured concentration of methane of 200 parts per million by volume (ppmv) or greater using the instantaneous surface monitoring procedures specified in sections 95471(c)(1) and 95471(c)(2). Based on the monitoring results, the owner or operator must do one of the following:

1. If there is any measured concentration of methane of 200 ppmv or greater from the surface of an active, inactive, or closed MSW landfill, comply with sections 95464 through 95476;

2. If there is no measured concentration of methane of 200 ppmv or greater from the surface of an active MSW landfill, comply with section 95463(b) and recalculate the landfill gas heat input capacity annually as required in section 95463(b) until such time the owner or operator submits a Closure Notification pursuant to section 95470(b)(1); or

3. If there is no measured concentration of methane of 200 ppmv or greater from the surface of a closed or inactive MSW landfill, the requirements of sections 95464 through 95470 no longer apply provided that the following information is submitted to and approved by the Executive Officer within 90 days:

   a. A Waste-in-Place Report pursuant to section 95470(b)(4); and

   b. All instantaneous surface monitoring records.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95464. Gas Collection and Control System Requirements

(a) *Design Plan and Installation.*

(1) *Design Plan*: If a gas collection and control system which meets the requirements of either sections 95464(b)(1), 95464(b)(2) or 95464(b)(3) has not been installed, the owner or operator of a MSW landfill must submit a Design Plan to the Executive Officer within one year after the effective date of this subarticle, or within one year of detecting any leak on the landfill surface exceeding a methane concentration of 200 ppmv pursuant to section 95463(b)(2)(B). The Executive Officer must review and either approve or disapprove the Design Plan within 120 days. The Executive Officer may request that additional information be submitted as part of the review of the Design Plan. At a minimum, the Design Plan must meet the following requirements:

(A) The Design Plan must be prepared and certified by a professional engineer.

(B) The Design Plan must provide for the control of the collected gas through the use of a gas collection and control system meeting the requirements of either sections 95464(b)(1), 95464(b(2) or 95464(b)(3).

(C) The Design Plan must include any proposed alternatives to the requirements, test methods, procedures, compliance measures, monitoring, and recordkeeping or reporting requirements pursuant to section 95468.

(D) A description of potential mitigation measures to be used to prevent the release of methane or other pollutants into the atmosphere during the installation or preparation of wells, piping, or other equipment; during repairs or the temporary shutdown of gas collection system components; or, when solid waste is to be excavated and moved.

(E) For active MSW landfills, the design plan must identify areas of the landfill that are closed or inactive.

(F) Design the gas collection and control system to handle the expected gas generation flow rate from the entire area of the MSW landfill and to collect gas at an extraction rate to comply with the surface methane emission limits in section 95465 and component leak standard in section 95464(b)(1)(B). The expected gas generation flow rate from the MSW landfill must be calculated pursuant to section 95471(e).

1. Any areas of the landfill that contain only asbestos-containing waste, inert waste, or non-decomposable solid waste may be excluded from collection provided that the owner or operator submits documentation to the Executive Officer containing the nature, date of deposition, location and amount of asbestos or non-decomposable solid waste deposited in the area. This documentation may be included as part of the Design Plan.

(2) Any owner or operator of an active MSW landfill must install and operate a gas collection and control system within 18 months after approval of the Design Plan.

(3) Any owner or operator of a closed or inactive MSW landfill must install and operate a gas collection and control system within 30 months after approval of the Design Plan.

(4) If an owner or operator is modifying an existing gas collection and control system to meet the requirements of this subarticle, the existing Design Plan must be amended to include any necessary updates or addenda, and must be certified by a professional engineer.

(5) An amended Design Plan must be submitted to the Executive Officer within 90 days of any event that requires a change to the Design Plan.

(6) The gas collection system must be operated, maintained, and expanded in accordance with the procedures and schedules in the approved Design Plan.

(b) *Gas Collection and Control System Requirements.*

(1) *General Requirements.* The owner or operator must satisfy the following requirements when operating a gas collection and control system:

(A) Route the collected gas to a gas control device or devices, and operate the gas collection and control system continuously except as provided in sections 95464(d) and 95464(e).

(B) Operate the gas collection and control system so that there is no landfill gas leak that exceeds 500 ppmv, measured as methane, at any component under positive pressure.

(C) The gas collection system must be designed and operated to draw all the gas toward the gas control device or devices.

(2) *Requirements for Flares.* An MSW landfill owner or operator who operates a flare must satisfy the following requirements:

(A) Route the collected gas to an enclosed flare that meets the following requirements:

1. Achieves a methane destruction efficiency of at least 99 percent by weight.

2. Is equipped with automatic dampers, an automatic shutdown device, a flame arrester, and continuous recording temperature sensors.

3. During restart or startup there must be a sufficient flow of propane or commercial natural gas to the burners to prevent unburned collected methane from being emitted to the atmosphere.

4. The gas control device must be operated within the parameter ranges established during the initial or most recent source test.

(B) Route the collected gas to an open flare that meets the requirements of 40 CFR § 60.18 (as last amended 73 Fed.Reg. 78209 (December 22, 2008), which is incorporated by reference herein. The operation of an open flare is not allowed except under the following conditions:

1. An open flare installed and operating prior to August 1, 2008, may operate until January 1, 2018.

2. Operation of an open flare on or after January 1, 2018, may be allowed if the owner or operator can demonstrate to the satisfaction of the Executive Officer that the landfill gas heat input capacity is less than 3.0 MMBtu/hr pursuant to section 95471(b) and is insufficient to support the continuous operation of an enclosed flare or other gas control device.

3. The owner or operator is seeking to temporarily operate an open flare during the repair or maintenance of the gas control system, or while awaiting the installation of an enclosed flare, or to address offsite gas migration issues.

a. Any owner seeking to temporarily operate an open flare must submit a written request to the Executive Officer pursuant to section 95468.

(3) *Requirements for Gas Control Devices other than Flares.* An MSW landfill owner or operator who operates a gas control device other than a flare must satisfy one of the following requirements:

(A) Route the collected gas to an energy recovery device, or series of devices that meets the following requirements:

1. Achieves a methane destruction efficiency of at least 99 percent by weight. Lean burn internal combustion engines must reduce the outlet methane concentration to less than 3,000 ppmv, dry basis, corrected to 15 percent oxygen.

2. If a boiler or a process heater is used as the gas control device, the landfill gas stream must be introduced into the flame zone. Where the landfill gas is not the primary fuel for the boiler or process heater, introduction of the landfill gas stream into the flame zone is not required.

3. The gas control device must be operated within the parameter ranges established during the initial or most recent source test.

(B) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions vented to the atmosphere from the gas treatment system are subject to the requirements of sections 95464(b)(2).

(4) *Source Test Requirements:* The owner or operator must conduct an annual source test for any gas control device(s) subject to the requirements of sections 95464(b)(2)(A) or 95464(b)(3)(A) using the test methods identified in 95471(f). An initial source test must be conducted within 180 days of initial start up of the gas collection and control system. Each succeeding complete annual source test must be conducted no later than 45 days after the anniversary date of the initial source test.

(A) If a gas control device remains in compliance after three consecutive source tests the owner or operator may conduct the source test every three years. If a subsequent source test shows the gas collection and control system is out of compliance the source testing frequency will return to annual.

(c) *Wellhead Gauge Pressure Requirement:* Each wellhead must be operated under a vacuum (negative pressure), except as provided in sections 95464(d) and 95464(e), or under any of the following conditions:

(1) Use of a geomembrane or synthetic cover. The owner or operator must develop acceptable pressure limits for the wellheads and include them in the Design Plan; or

(2) A decommissioned well.

(d) *Well Raising:* The requirements of sections 95464(b)(1)(A), 95464(b)(1)(B), and 95464(c), do not apply to individual wells involved in well raising provided the following conditions are met:

(1) New fill is being added or compacted in the immediate vicinity around the well.

(2) Once installed, a gas collection well extension is sealed or capped until the raised well is reconnected to a vacuum source.

(e) *Repairs and Temporary Shutdown of Gas Collection System Components:* The requirements of sections 95464(b)(1)(A), 95464(b)(1)(B), and 95464(c), do not apply to individual landfill gas collection system components that must be temporarily shut down in order to repair the components, due to catastrophic events such as earthquakes, to connect new landfill gas collection system components to the existing system, to extinguish landfill fires, or to perform construction activities pursuant to section 95466, provided the following requirements are met:

(1) Any new gas collection system components required to maintain compliance with this subarticle must be included in the most recent Design Plan pursuant to section 95464(a)(4).

(2) Methane emissions are minimized during shutdown pursuant to section 95464(a)(1)(D).

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95465. Surface Methane Emission Standards

(a) Except as provided in sections 95464(d), 95464(e), and 95466, beginning January 1, 2011, or upon commencing operation of a newly installed gas collection and control system or modification of an existing gas collection and control system pursuant to 95464(a)(1), whichever is later, no location on the MSW landfill surface may exceed either of the following methane concentration limits:

(1) 500 ppmv, other than non-repeatable, momentary readings, as determined by instantaneous surface emissions monitoring.

(2) An average methane concentration limit of 25 ppmv as determined by integrated surface emissions monitoring.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95466. Construction Activities

(a) The requirements of section 95465 do not apply to the working face of the landfill or to areas of the landfill surface where the landfill cover material has been removed and refuse has been exposed for the purpose of installing, expanding, replacing, or repairing components of the landfill gas, leachate, or gas condensate collection and removal system, or for law enforcement activities requiring excavation.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95467. Permanent Shutdown and Removal of the Gas Collection and Control System

(a) The gas collection and control system at a closed MSW landfill can be capped or removed provided the following requirements are met:

(1) The gas collection and control system was in operation for at least 15 years, unless the owner or operator can demonstrate to the satisfaction of the Executive Officer that due to declining methane rates the MSW landfill will be unable to operate the gas collection and control system for a 15-year period.

(2) Surface methane concentration measurements do not exceed the limits specified in section 95465.

(3) The owner or operator submits an Equipment Removal Report to the Executive Officer pursuant to section 95470(b)(2).

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95468. Alternative Compliance Options

(a) The owner or operator may request alternatives to the compliance measures, monitoring requirements, test methods and procedures of sections 95464, 95469, and 95471. Any alternatives requested by the owner or operator must be submitted in writing to the Executive Officer. Alternative compliance option requests may include, but are not limited to, the following:

(1) Semi-continuous operation of the gas collection and control system due to insufficient landfill gas flow rates.

(2) Additional time allowance for leak repairs for landfills having consistent issues related to the procurement and delivery of necessary parts to complete the repair, or adverse weather conditions that impede repair work.

(3) Alternative wind speed requirements for landfills consistently having winds in excess of the limits specified in this subarticle.

(4) Alternative walking patterns to address potential safety and other issues, such as: steep or slippery slopes, monitoring instrument obstructions, and physical obstructions.

(5) Exclusion of construction areas and other dangerous areas from landfill surface inspection.

(6) Exclusion of paved roads that do not have any cracks, pot holes, or other penetrations from landfill surface inspection.

(b) Criteria that the Executive Officer may use to evaluate alternative compliance option requests include, but are not limited to: compliance history; documentation containing the landfill gas flow rate and measured methane concentrations for individual gas collection wells or components; permits; component testing and surface monitoring results; gas collection and control system operation, maintenance, and inspection records; and historical meteorological data.

(c) The Executive Officer will review the requested alternatives and either approve or disapprove the alternatives within 120 days. The Executive Officer may request that additional information be submitted as part of the review of the requested alternatives.

(1) If a request for an alternative compliance option is denied, the Executive Officer will provide written reasons for the denial.

(2) The Executive Officer must deny the approval of any alternatives not providing equivalent levels of enforceability or methane emission control.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95469. Monitoring Requirements

(a) *Surface Emissions Monitoring Requirements:* Any owner or operator of a MSW landfill with a gas collection and control system must conduct instantaneous and integrated surface monitoring of the landfill surface quarterly using the procedures specified in section 95471(c).

(1) *Instantaneous Surface Monitoring:* Any reading exceeding the limit specified in section 95465(a)(1) must be recorded as an exceedance and the following actions must be taken:

(A) The owner or operator must record the date, location, and value of each exceedance, along with re-test dates and results. The location of each exceedance must be clearly marked and identified on a topographic map of the MSW landfill, drawn to scale with the location of both the grids and the gas collection system clearly identified.

(B) Corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, or well vacuum adjustments and the location must be remonitored within ten calendar days of a measured exceedance.

1. If the re-monitoring of the location shows a second exceedance, additional corrective action must be taken and the location must be re-monitored again no later than 10 calendar days after the second exceedance.

2. If the re-monitoring shows a third exceedance, the owner or owner or operator must install a new or replacement well as determined to achieve compliance no later than 120 calendar days after detecting the third exceedance, or it is a violation of this subarticle.

(C) Any closed or inactive MSW landfill, or any closed or inactive areas on an active MSW landfill that has no monitored exceedances of the limit specified in section 95465(a)(1) after four consecutive quarterly monitoring periods may monitor annually. Any exceedances of the limit specified in section 95465(a)(1) detected

during the annual monitoring that can not be remediated within 10 calendar days will result in a return to quarterly monitoring of the landfill.

(D) Any exceedances of the limit specified in section 95465(a)(1) detected during any compliance inspections will result in a return to quarterly monitoring of the landfill.

(2) *Integrated Surface Monitoring:* Any reading exceeding the limit specified in section 95465(a)(2) must be recorded as an exceedance and the following actions must be taken:

(A) The owner or operator must record the average surface concentration measured as methane for each grid along with re-test dates and results. The location of the grids and the gas collection system must be clearly marked and identified on a topographic map of the MSW landfill drawn to scale.

(B) Within 10 calendar days of a measured exceedance, corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, or well vacuum adjustments and the grid must be re-monitored.

1. If the re-monitoring of the grid shows a second exceedance, additional corrective action must be taken and the location must be re-monitored again no later than 10 calendar days after the second exceedance.

2. If the re-monitoring in section 95469(a)(2)(B)1. shows a third exceedance, the owner or operator must install a new or replacement well as determined to achieve compliance no later than 120 calendar days after detecting the third exceedance, or it is a violation of this subarticle.

(C) Any closed or inactive MSW landfill, or any closed or inactive areas on an active MSW landfill that has no monitored exceedances of the limit specified in section 95465(a)(2) after 4 consecutive quarterly monitoring periods may monitor annually. Any exceedances of the limits specified in section 95465(a)(2) detected during the annual monitoring that can not be remediated within 10 calendar days will result in a return to quarterly monitoring of the landfill.

(D) Any exceedances of the limits specified in section 95465(a)(2) detected during any compliance inspections will result in a return to quarterly monitoring of the landfill.

(3) An owner or operator of a closed or inactive MSW landfill, or any closed or inactive areas on an active MSW landfill that can demonstrate that in the three years before the effective date of this subarticle that there were no measured exceedances of the limits specified in section 95465 by annual or quarterly monitoring may monitor annually. Any exceedances of the limits specified in section 95465 detected during the annual monitoring that can not be remediated within 10 calendar days will result in a return to quarterly monitoring of the landfill.

(b) *Gas Control System Equipment Monitoring:* The owner or operator must monitor the gas control system using the following procedures:

(1) For enclosed flares the following equipment must be installed, calibrated, maintained, and operated according to the manufacturer's specifications:

(A) A temperature monitoring device equipped with a continuous recorder which has an accuracy of plus or minus (±) 1 percent of the temperature being measured expressed in degrees Celsius or Fahrenheit.

(B) At least one gas flow rate measuring device which must record the flow to the control device(s) at least every 15 minutes.

(2) For a gas control device other than an enclosed flare, demonstrate compliance by providing information describing the operation of the gas control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. Alternatives to this section must be submitted as specified in section 95468. The Executive Officer may specify additional monitoring procedures.

(3) Components containing landfill gas and under positive pressure must be monitored quarterly for leaks. Any component leak must be tagged and repaired within 10 calendar days, or it is a violation of this subarticle.

(A) Component leak testing at MSW landfills having landfill gas-to-energy facilities may be conducted prior to scheduled maintenance or planned outage periods.

(c) *Wellhead Monitoring:* The owner or operator must monitor each individual wellhead monthly to determine the gauge pressure. If there is any positive pressure reading other than as provided in sections 95464(d) and 95464(e), the owner or operator must take the following actions:

(1) Initiate corrective action within five calendar days of the positive pressure measurement.

(2) If the problem cannot be corrected within 15 days of the date the positive pressure was first measured, the owner or operator must initiate further action, including, but not limited to, any necessary expansion of the gas collection system, to mitigate any positive pressure readings.

(3) Corrective actions, including any expansion of the gas collection and control system, must be completed and any new wells must be operating within 120 days of the date the positive pressure was first measured, or it is a violation of this subarticle.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95470. Recordkeeping and Reporting Requirements.

(a) *Recordkeeping Requirements.*

(1) An owner or operator must maintain the following records, whether in paper, electronic, or other format, for at least five years:

(A) All gas collection system downtime exceeding five calendar days, including individual well shutdown and disconnection times, and the reason for the downtime.

(B) All gas control system downtime in excess of one hour, the reason for the downtime, and the length of time the gas control system was shutdown.

(C) Expected gas generation flow rate calculated pursuant to section 95471(e).

(D) Records of all instantaneous surface readings of 200 ppmv or greater; all exceedances of the limits in sections 95464(b)(1)(B) or 95465, including the location of the leak (or affected grid), leak concentration in ppmv, date and time of measurement, the action taken to repair the leak, date of repair, any required re-monitoring and the re-monitored concentration in ppmv, and wind speed during surface sampling; and the installation date and location of each well installed as part of a gas collection system expansion.

(E) Records of any positive wellhead gauge pressure measurements, the date of the measurements, the well identification number, and the corrective action taken.

(F) Annual solid waste acceptance rate and the current amount of waste-in-place.

(G) Records of the nature, location, amount, and date of deposition of non-degradable waste for any landfill areas excluded from the collection system.

(H) Results of any source tests conducted pursuant to section 95464(b)(4).

(I) Records describing the mitigation measures taken to prevent the release of methane or other emissions into the atmosphere:

1. When solid waste was brought to the surface during the installation or preparation of wells, piping, or other equipment;

2. During repairs or the temporary shutdown of gas collection system components; or,

3. When solid waste was excavated and moved.

(J) Records of any construction activities pursuant to section 95466. The records must contain the following information:

1. A description of the actions being taken, the areas of the MSW landfill that will be affected by these actions, the reason the actions are required, and any landfill gas collection system components that will be affected by these actions.

2. Construction start and finish dates, projected equipment installation dates, and projected shut down times for individual gas collection system components.

3. A description of the mitigation measures taken to minimize methane emissions and other potential air quality impacts.

(K) Records of the equipment operating parameters specified to be monitored under sections 95469(b)(1) and 95469(b)(2) as well as records for periods of operation during which the parameter boundaries established during the most recent source test are exceeded. The records must include the following information:

1. For enclosed flares, all 3-hour periods of operation during which the average temperature difference was more than

28 degrees Celsius (or 50 degrees Fahrenheit) below the average combustion temperature during the most recent source test at which compliance with sections 95464(b)(2) and 95464(b)(3)(A) was determined.

2. For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone pursuant to section 95464(b)(3)(A)2.

3. For any owner or operator who uses a boiler or process heater with a design heat input capacity of 44 megawatts (150 MMBtu/hr) or greater to comply with section 95464(b)(3), all periods of operation of the boiler or process heater (e.g., steam use, fuel use, or monitoring data collected pursuant to other federal, State, local, or tribal regulatory requirements).

(2) The owner or operator must maintain the following records, whether in paper, electronic, or other format, for the life of each gas control device, as measured during the initial source test or compliance determination:

(A) The control device vendor specifications.

(B) The expected gas generation flow rate as calculated pursuant to section 95471(e).

(C) The percent reduction of methane achieved by the control device determined pursuant to section 95471(f).

(D) For a boiler or process heater, the description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance test.

(E) For an open flare: the flare type (i.e., steam-assisted, air-assisted, or non-assisted); all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in 40 CFR § 60.18 (as last amended 73 Fed.Reg. 78209 (December 22, 2008), which is incorporated by reference herein; and records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame or the flare flame is absent.

(3) *Record Storage:* The owner or operator must maintain copies of the records and reports required by this subarticle and provide them to the

Executive Officer within five business days upon request. Records and reports must be kept at a location within the State of California.

(b) *Reporting Requirements.*

(1) *Closure Notification:* Any owner or operator of a MSW landfill which has ceased accepting waste must submit a Closure Notification to the Executive Officer within 30 days of waste acceptance cessation.

(A) The Closure Notification must include the last day solid waste was accepted, the anticipated closure date of the MSW landfill, and the estimated waste-in-place.

(B) The Executive Officer may request additional information as necessary to verify that permanent closure has taken place in accordance with the requirements of any applicable federal, State, local, or tribal statues, regulations, and ordinances in effect at the time of closure.

(2) *Equipment Removal Report:* A gas collection and control system Equipment Removal Report must be submitted to the Executive Officer 30 days prior to well capping, removal or cessation of operation of the gas collection, treatment, or control system equipment. The report must contain all of the following information:

(A) A copy of the Closure Notification submitted pursuant to section 95470(b)(1).

(B) A copy of the initial source test report or other documentation demonstrating that the gas collection and control system has been installed and operated for a minimum of 15 years, unless the owner or operator can demonstrate to the satisfaction of the Executive Officer that due to declining methane rates the landfill is unable to operate the gas collection and control system for a 15-year period.

(C) Surface emissions monitoring results needed to verify that landfill surface methane concentration measurements do not exceed the limits specified in section 95465.

(3) *Annual Report:* Any owner or operator subject to the requirements of this subarticle, except section 95463, must prepare an annual report for the period of January 1 through December 31 of each year. Each annual report must be submitted to the Executive Officer by March 15 of the following year. The annual report must contain the following information:

(A) MSW landfill name, owner and operator, address, and solid waste information system (SWIS) identification number.

(B) Total volume of landfill gas collected (reported in standard cubic feet).

(C) Average composition of the landfill gas collected over the reporting period (reported in percent methane and percent carbon dioxide by volume).

(D) Gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each control device.

(E) The date that the gas collection and control system was installed and in full operation.

(F) The percent methane destruction efficiency of each gas control device(s).

(G) Type and amount of supplemental fuels burned with the landfill gas in each device.

(H) Total volume of landfill gas shipped off-site, the composition of the landfill gas collected (reported in percent methane and percent carbon dioxide by volume), and the recipient of the gas.

(I) Most recent topographic map of the site showing the areas with final cover and a geomembrane and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface.

(J) The information required by sections 95470(a)(1)(A), 95470(a)(1)(B), 95470(a)(1)(C), 95470(a)(1)(D), 95470(a)(1)(E), and 95470(a)(1)(F), 95470(a)(1)(H), and 95470(a)(1)(K).

(4) *Waste-in-Place Report*: Any owner or operator subject to the requirements of sections 95463(a), or 95643(b)(2)(B)3. must report the following information to the Executive Officer:

(A) MSW landfill name, owner and operator, address, and solid waste information system (SWIS) identification number.

(B) The landfill's status (active, closed, or inactive) and the estimated waste-in-place, in tons.

(C) Most recent topographic map of the site showing the areas with final cover and a geomembrane and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface.

(5) *Landfill Gas Heat Input Capacity Report:* Any owner or operator subject to the requirements of section 95463(b) must calculate the landfill gas heat input capacity using the calculation procedures specified in section 95471(b) and report the results to the Executive Officer within 90 days of the effective date of this subarticle or upon reaching 450,000 tons of waste-in-place. The calculation, along with relevant parameters, must be provided as part of the report.

(6) Any report, or information submitted pursuant to this subarticle must contain certification by a responsible official of truth, accuracy, and completeness. This certification, and any other certification required under this subarticle, must state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95471. Test Methods and Procedures

(a) *Hydrocarbon Detector Specifications*: Any instrument used for the measurement of methane must be a gas detector or other equivalent instrument approved by the Executive Officer that meets the calibration, specifications, and performance criteria of EPA Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 CFR Part 60, Appendix A (as last amended 65 Fed.Reg. 61744 (October 17, 2000)), which is incorporated by reference herein, except for the following:

(1) "Methane" replaces all references to volatile organic compounds (VOC).

(2) The calibration gas shall be methane.

(b) *Determination of Landfill Gas Heat Input Capacity:* The landfill gas heat input capacity must be determined pursuant to sections 95471(b)(1), 95471(b)(2), or 95471(b)(3), as applicable:

(1) *MSW Landfills without Carbon Adsorption or Passive Venting Systems:* The heat input capacity must be calculated using the procedure as specified in Appendix I. The Executive Officer may request additional

information as may be necessary to verify the heat input capacity from the MSW landfill. Site-specific data may be substituted when available.

(2) *MSW Landfills with Carbon Adsorption Systems:* The landfill gas heat capacity must be determined by measuring the actual total landfill gas flow rate, in standard cubic feet per minute (scfm), using a flow meter or other flow measuring device such as a standard pitot tube and methane concentration (percent by volume) using a hydrocarbon detector meeting the requirements of 95471(a). The total landfill gas flow rate must be multiplied by the methane concentration and then multiplied by the gross heating value (GHV) of methane of 1,012 Btu/scf to determine the landfill gas heat input capacity.

(3) *MSW Landfills with Passive Venting Systems:* The landfill gas heat input capacity must be determined pursuant to both of the following and is the higher of those determined values:

(A) Section 95471(b)(1); and

(B) The owner or operator must measure actual landfill gas flow rates (in units of scfm) by using a flow measuring device such as a standard pitot tube and methane concentration (percent by volume) using a hydrocarbon detector meeting the requirements of 95471(a) from each venting pipe that is within the waste mass. Each gas flow rate must then be multiplied by its corresponding methane concentration to obtain the individual methane flow rate. The individual methane flow rates must be added together and then multiplied by the GHV of methane of 1,012 Btu/scf to determine the landfill gas heat input capacity.

(c) *Surface Emissions Monitoring Procedures:* The owner or operator must measure the landfill surface concentration of methane using a hydrocarbon detector meeting the requirements of section 95471(a). The landfill surface must be inspected using the following procedures:

(1) *Monitoring Area:* The entire landfill surface must be divided into individually identified 50,000 square foot grids. The grids must be used for both instantaneous and integrated surface emissions monitoring.

(A) Testing must be performed by holding the hydrocarbon detector's probe within 3 inches of the landfill surface while traversing the grid.

(B) The walking pattern must be no more than a 25-foot spacing interval and must traverse each monitoring grid.

1. If the owner or operator has no exceedances of the limits specified in section 95465 after any four consecutive quarterly monitoring periods, the walking pattern spacing may be increased to 100-foot intervals. The owner or operator must return to a 25-foot spacing interval upon any exceedances of the limits specified in section 95465 that cannot be remediated within 10 calendar days or upon any exceedances detected during a compliance inspection.

2. If an owner or operator of a MSW landfill can demonstrate that in the past three years before the effective date of this subarticle that there were no measured exceedances of the limit specified in section 95465(a)(1) by annual or quarterly monitoring, the owner or operator may increase the walking pattern spacing to 100-foot intervals. The owner or operator must return to a 25-foot spacing interval upon any exceedances of the limits specified in section 95465 that cannot be remediated within 10 calendar days or upon any exceedances detected during a compliance inspection.

(C) Surface testing must be terminated when the average wind speed exceeds five miles per hour or the instantaneous wind speed exceeds 10 miles per hour. The Executive Officer may approve alternatives to this wind speed surface testing termination for MSW landfills consistently having measured winds in excess of these specified limits. Average wind speed must be determined on a 15-minute average using an on-site anemometer with a continuous recorder for the entire duration of the monitoring event.

(D) Surface emissions testing must be conducted only when there has been no measurable precipitation in the preceding 72 hours.

(2) *Instantaneous Surface Emissions Monitoring Procedures.*

(A) The owner or operator must record any instantaneous surface readings of methane 200 ppmv or greater, other than non-repeatable, momentary readings.

(B) Surface areas of the MSW landfill that exceed a methane concentration limit of 500 ppmv must be marked and remediated pursuant to section 95469(a)(1).

(C) The wind speed must be recorded during the sampling period.

(D) The landfill surface areas with cover penetrations, distressed vegetation, cracks or seeps must also be inspected visually and with a hydrocarbon detector.

(3) *Integrated Surface Emissions Monitoring Procedures.*

(A) Integrated surface readings must be recorded and then averaged for each grid.

(B) Individual monitoring grids that exceed an average methane concentration of 25 ppmv must be identified and remediated pursuant to section 95469(a)(2).

(C) The wind speed must be recorded during the sampling period.

(d) *Gas Collection and Control System Leak Inspection Procedures.* Leaks must be measured using a hydrocarbon detector meeting the requirements of 95471(a).

(e) *Determination of Expected Gas Generation Flow Rate.* The expected gas generation flow rate must be determined as prescribed in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Chapter 3, which is incorporated by reference herein, using a recovery rate of 75 percent.

(f) *Control Device Destruction Efficiency Determination.* The following methods of analysis must be used to determine the efficiency of the control device in reducing methane:

(1) *Enclosed Combustors:* One of the following test methods, all of which are incorporated by reference herein (and all as promulgated in 40 CFR, Part 60, Appendix A, as last amended 65 Fed.Reg. 61744 (October 17, 2000) at the pages cited below must be used to determine the efficiency of the control device in reducing methane by at least 99 percent, or in reducing the outlet methane concentration for lean burn engines to less than 3,000 ppmv, dry basis, corrected to 15 percent oxygen:

U.S. EPA Reference Method 18, Measurement of Gaseous Organic Compound Emissions By Gas Chromatography (65 Fed.Reg. at 62007);

U.S. EPA Reference Method 25, Determination of Total Gaseous Nonmethane Organic Emissions as Carbon (65 Fed.Reg. at 62044);

U.S. EPA Reference Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer (65 Fed.Reg. at 62062); or

U.S. EPA Reference Method 25C, Determination of Nonmethane Organic Compounds in Landfill Gases (65 Fed.Reg. at 62066).

The following equation must be used to calculate destruction efficiency:

$$Destruction\ Efficiency = \left[1 - \left(\frac{Mass\ of\ Methane - Outlet}{Mass\ of\ Methane - Inlet}\right)\right] \times 100\%$$

(2) *Open Flares:* Open flares must meet the requirements of 40 CFR § 60.18 (as last amended 73 Fed.Reg. 78209 (December 22, 2008).

(g) *Determination of Gauge Pressure.* Gauge pressure must be determined using a hand-held manometer, magnahelic gauge, or other pressure measuring device approved by the Executive Officer. The device must be calibrated and operated in accordance with the manufacture's specifications.

(h) *Alternative Test Methods.* Alternative test methods may be used provided that they are approved in writing by the Executive Officer.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95472. Penalties

(a) Penalties may be assessed for any violation of this subarticle pursuant to Health and Safety Code section 38580. Each day during any portion of which a violation occurs is a separate offense.

(b) Any violation of this subarticle may be enjoined pursuant to Health and Safety Code section 41513.

(c) Each day or portion thereof that any report, plan, or document required by this subarticle remains unsubmitted, is submitted late, or contains incomplete or inaccurate information, shall constitute a single, separate violation of this subarticle.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95473. Implementation, Enforcement, and Related Fees

(a) The Executive Officer, at his or her discretion, may enter into an agreement with a District to implement and enforce this subarticle. Pursuant to this agreement, an owner or operator of a MSW landfill must pay any fees assessed by a District for the purpose of recovering the District's cost of implementing and enforcing the requirements of this subarticle. Implementation and enforcement of other law as described in Section 95474 cannot result in a standard, requirement, or prohibition less stringent than provided in this subarticle, as determined by the Executive Officer.

(b) The Executive Officer may request any owner or operator to demonstrate that a landfill does not meet the applicability criteria specified in this subarticle. Such demonstration must be submitted to the Executive Officer within 90 days of a written request received from the Executive Officer.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, 39601, and 40001(a), Health and Safety Code.

§ 95474. Applicability of Other Rules and Regulations

Compliance with this regulation does not exempt a person from complying with other federal, State, or local law, including but not limited to, California Health and Safety Code Section 41700; rules pertaining to visible emissions, nuisance, or fugitive dust, or from permitting requirements of a District, the Regional Water Quality Control Board, local enforcement agencies, the Integrated Waste Management Board, and other local, State, and federal agencies.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, 39601, and 40001(a), Health and Safety Code.

§ 95475. Definitions

(a) For purposes of this subarticle, the following definitions apply:

(1) "Active MSW Landfill" means a MSW landfill that is accepting solid waste for disposal.

(2) "Component Leak" means the concentration of methane measured one half of an inch or less from a component source that exceeds 500 parts per million by volume (ppmv), other than non-repeatable, momentary readings. Measurements from any vault must be taken within 3 inches above the surface of the vault exposed to the atmosphere.

(3) "Component" means any equipment that is part of the gas collection and control system and that contains landfill gas including, but not limited to, wells, pipes, flanges, fittings, valves, flame arrestors, knock-out drums, sampling ports, blowers, compressors, or connectors.

(4) "Construction and Demolition Wastes" means waste building materials, packaging and rubble resulting from construction, remodeling, repair and demolition operations on pavements, houses, commercial buildings and other structures.

(5) "Continuous Operation" means that the gas collection and control system is operated continuously, the existing gas collection wells are operating under vacuum while maintaining landfill gas flow, and the collected landfill gas is processed by a gas control system 24 hours per day.

(6) "Closed MSW Landfill" means that a MSW landfill is no longer accepting solid waste for disposal and has documentation that the closure was conducted in accordance with the applicable statutes, regulations, and local ordinances in effect at the time of closure.

(7) "District" means any air quality management district or air pollution control district in the State of California.

(8) "Destruction Efficiency" means a measure of the ability of a gas control device to combust, transform, or otherwise prevent emissions of methane from entering the atmosphere.

(9) "Enclosed Combustor" means an enclosed flare, steam generating boiler, internal combustion engine, or gas turbine.

(10) "Energy Recovery Device" means any combustion device that uses landfill gas to recover energy in the form of steam or electricity, including, but not limited to, gas turbines, internal combustion engines, boilers, and boiler-to-steam turbine systems.

(11) "Exceedance" means the concentration of methane measured within 3 inches above the landfill surface that exceeds 500 ppmv, other than non-repeatable, momentary readings, as determined by instantaneous surface emissions monitoring; or the average methane concentration measurements that exceed 25 ppmv, as determined by integrated surface emissions monitoring.

(12) "Executive Officer" means the Executive Officer of the Air Resources Board, or his or her delegate.

(13) "Facility Boundary" means the boundary surrounding the entire area on which MSW landfill activities occur and are permitted.

(14) "Gas Control Device" means any device used to dispose of or treat collected landfill gas, including, but not limited to, enclosed flares, internal combustion engines, boilers and boiler-to-steam turbine systems, fuel cells, and gas turbines.

(15) "Gas Collection System" means any system that employs various gas collection wells and connected piping, and mechanical blowers, fans, pumps, or compressors to create a pressure gradient and actively extract landfill gas.

(16) "Gas Control System" means any system that disposes of or treats collected landfill gas by one or more of the following means: combustion, gas treatment for subsequent sale, or sale for processing offsite, including for transportation fuel and injection into the natural gas pipeline.

(17) "Inactive MSW Landfill" means a MSW landfill that is no longer accepting solid waste for disposal, or can document that the landfill is no longer receiving solid waste.

(18) "Inert Waste" means any material meeting the definition of "Inert Waste" as defined in Title 27, California Code of Regulations, Division 2, Subdivision 1, Chapter 3, Subchapter 2, Article 2, Section 20230(a) (effective July 18, 1997).

(19) "Landfill Gas" means any untreated, raw gas derived through a natural process from the decomposition of organic waste deposited in a MSW landfill, from the evolution of volatile species in the waste, or from chemical reactions of substances in the waste.

(20) "Landfill Surface" means the area of the landfill under which decomposable solid waste has been placed, excluding the working face.

(21) "Municipal Solid Waste Landfill" or "MSW Landfill" means an entire disposal facility in a contiguous geographical space where solid waste is placed in or on land.

(22) "Non-decomposable Solid Waste" means materials that do not degrade biologically to form landfill gas. Examples include, but are not limited to, earth, rock, concrete asphalt paving fragments, uncontaminated concrete (including fiberglass or steel reinforcing rods embedded in the concrete), brick, glass, ceramics, clay products, inert slag, asbestos-containing waste, and demolition materials containing minor amounts (less than

10 percent by volume) of wood and metals. Materials that do not meet this definition are considered decomposable solid waste.

(23) "Non-repeatable, Momentary Readings" means indications of the presence of methane, which persist for less than five seconds and do not recur when the sampling probe of a portable gas detector is placed in the same location.

(24) "Operator" means any person or entity, including but not limited to any government entity, corporation, partnership, trustee, other legal entity, or individual that:

(A) Operates the MSW landfill;

(B) Is responsible for complying with any federal, state, or local requirements relating to methane emissions from real property used for MSW landfill purposes and subject to this subarticle;

(C) Operates any stationary equipment for the collection of landfill gas;

(D) Purchases landfill gas from an owner or operator of a MSW landfill and operates any stationary equipment for the treatment of landfill gas; or

(E) Purchases untreated landfill gas from an owner or operator of a MSW landfill and operates any stationary equipment for the combustion of landfill gas.

(25) "Owner" means any person or entity, including but not limited to any government entity, corporation, partnership, trustee, other legal entity, or individual that:

(A) Holds title to the real property on which the MSW landfill is located, including but not limited to title held by joint tenancy, tenancy in common, community property, life estate, estate for years, lease, sublease, or assignment, except title held solely as security for a debt such as mortgage;

(B) Is responsible for complying with any federal, state, or local requirements relating to methane emissions from real property used for MSW landfill purposes and subject to this subarticle.

(C) Owns any stationary equipment for the collection of landfill gas;

(D) Purchases the landfill gas from an owner or operator of a MSW landfill and owns any stationary equipment for the treatment of landfill gas; or

(E) Purchases untreated landfill gas from an owner or operator of a MSW landfill and owns any stationary equipment for the combustion of landfill gas.

(26) "Perimeter" means along the MSW landfill's permitted facility boundary.

(27) "Professional Engineer" means an engineer holding a valid certificate issued by the State of California Board of Registration for Professional Engineers and Land Surveyors or an engineer holding a valid certificate issued by a state offering reciprocity with California.

(28) "Solid Waste" means all decomposable and non-decomposable solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial waste, manure, vegetable or animal solid and semisolid wastes, sludge, and other discarded solid and semisolid wastes. Solid waste also includes any material meeting the definition of Solid Waste in 40 CFR § 60.751 (as last amended 64 Fed.Reg 9262, Feb 24, 1999) as incorporated by reference herein.

(29) "Subsurface Gas Migration" means underground landfill gases that are detected at any point on the perimeter pursuant to California Code of Regulations title 27, section 20921.

(30) "Waste-in-Place" means the total amount of solid waste placed in the MSW landfill estimated in tons. The refuse density is assumed to be 1,300 pounds per cubic yard and the decomposable fraction is assumed to be 70 percent by weight.

(31) "Well Raising" means a MSW landfill activity where an existing gas collection well is temporarily disconnected from a vacuum source, and the non-perforated pipe attached to the well is extended vertically to allow the addition of a new layer of solid waste or the final cover; or is extended horizontally to allow the horizontal extension of an existing layer of solid waste or cover material. The extended pipe (well extension) is then re-connected in order to continue collecting gas from that well.

(32) "Working Face" means the open area where solid waste is deposited daily and compacted with landfill equipment.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95476. Severability

Each part of this subarticle is deemed severable, and in the event that any part of this subarticle is held to be invalid, the remainder of this subarticle continues in full force and effect.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

APPENDIX I

1.0 Calculate Heat Input Capacity

Heat Input Capacity (MMBtu/hr) = Methane Gas Generation (scfm) x 60 minutes/1 hour x Collection Efficiency x GHV x 1 MMBtu/1,000,000 Btu

Where:

Collection Efficiency = the landfill gas collection efficiency in percent (%), which is 75 percent.

GHV (Gross Heating Value) = Gross heating value of methane, which is 1,012 in units of British thermal units per standard cubic feet, or Btu/scf; source: http://epa.gov/lmop/res/converter.htm).

2.0 Methane Gas Generation: CH_4 Generation is calculated using the following equation:

$$CH_4 \text{ Generation (Mg of } CH_4) = \{ANDOC_{year\text{-}start} \times [1-e^{-[k]}] - ANDOC_{deposited\text{-}last\ year} \times [1/k \times (e^{-[k \times (1-M/12)]} - e^{-[k]}) - (M/12) \times e^{-[k]}] + ANDOC_{deposited\text{-}same\ year} \times [1-((1/k) \times (1-e^{-[k \times (1-M/12)]} + (M/12))]\} \times FCH_4$$

Where:

CH_4 Generation = CH_4 generated in the inventory year in question (Mg of CH_4) using the Mathematically Exact First-Order Decay Model provided in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Chapter 3 (Source: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf).

FCH_4 = Fraction of decomposing carbon converted into CH_4 (Default = 0.5)

$ANDOC_{year\text{-}start}$ = ANDOC in place at the beginning of the inventory year in question

$ANDOC_{deposited\text{-}last\ year}$ = ANDOC deposited during the previous inventory year

$ANDOC_{deposited\text{-}same\ year}$ = ANDOC deposited during the inventory year in question

3.0 To Convert Methane Generated from Mg of CH_4 to SCFM

CH_4 Gas Generated (scfm) = CH_4 Generation (Mg/year) x 1 year/ 525,600 minutes x 1,000,000 g/Mg x 1 mole CH_4/16.04246 g CH_4 x 0.83662 SCF/mole landfill gas

4.0 Define ANDOC%

$ANDOC\% = \Sigma WIPFRAC_i \times TDOC_i \times DANF_i$
Where:

WIPFRACi = Fraction of the i^{th} component in the waste-in-place

TDOCi = Total Degradable Organic Carbon fraction of the ith waste component (Mg of that component/Mg of Total waste-in-place

DANFi = Decomposable Anaerobic Fraction of the i^{th} waste component, that fraction capable of decomposition in anaerobic conditions (Mg of decomposable carbon for that component/Mg TDOCi for that component)

5.0 Define ANDOC

ANDOC = WIP (Tons) x 0.9072 (Mg/Ton) x ANDOC%

Where:

ANDOC = Anaerobically Degradable Organic Carbon, carbon that is capable of decomposition in an anaerobic environment (Mg of carbon)

WIP = Waste-in-Place estimate of all the landfilled waste (wet weight) as reported to the CIWMB (tons)

6.0 Calculate $ANDOC_{year\text{-}end}$

$$ANDOC_{year\text{-}end} = ANDOC_{year\text{-}start} \times e^{-[k]} + ANDOC_{deposited\text{-}last\ year} \times [1/k \times (e^{-[k \times (1-M/12)]} - e^{-[k]}) - (M/12) \times e^{-[k]}] + ANDOC_{deposited\text{-}same\ year} \times [(1/k) \times (1-e^{-[k \times (1-M/12)]} + (M/12)]$$

Where:

$ANDOC_{year\text{-}end}$ = ANDOC remaining undecomposed at the end of the inventory year in question

$ANDOC_{year\text{-}start}$ = ANDOC in place at the beginning of the inventory year in question

$ANDOC_{deposited\text{-}last\ year}$ = ANDOC deposited during the previous inventory year

$ANDOC_{deposited\text{-}same\ year}$ = ANDOC deposited during the inventory year in question

M = Assumed delay before newly deposited waste begins to undergo anaerobic decomposition (Months, Default = 6)

k = Assumed rate constant for anaerobic decomposition; k = ln2/half-life (years); half-life is the number of years required for half of the original mass of carbon to degrade

The following values for the assumed rate constant for anaerobic decomposition (or "k") must be used:

Table 1. Average Rainfall and k Values

Average Rainfall (Inches/Year)	k Value
<20	0.020
20-40	0.038
>40	0.057

Source: U.S. EPA
http//www.ncgc.nrcs.usda.gov/products/datasets/climate/data/precipitation-state/.

The following waste characterization default values shown in Tables 1A, 1B, 2, and 3 in addition to the model equations must be used in estimating the methane generation potential for a MSW landfill:

ATTACHMENT 2

Table 1A	Waste Type (%) by Year				
Waste Type	**Up to 1964**	**1965-1974**	**1975-1984**	**1985-1992**	**1993-1995**
Newspaper	6.4%	6.4%	5.9%	4.8%	3.9%
Office Paper	10.7%	11.3%	12.0%	13.1%	15.0%
Corrugated Boxes	10.8%	13.5%	11.5%	10.5%	10.3%
Coated Paper	2.2%	2.0%	2.4%	2.1%	1.8%
Food	14.8%	11.3%	9.5%	12.1%	13.4%
Grass	12.1%	10.3%	10.1%	9.0%	6.6%
Leaves	6.1%	5.1%	5.0%	4.5%	3.3%
Branches	6.1%	5.1%	5.0%	4.5%	3.3%
Lumber	3.7%	3.3%	5.1%	7.0%	7.3%
Textiles	2.1%	1.8%	1.7%	3.3%	4.5%
Diapers	0.1%	0.3%	1.4%	1.6%	1.9%
Construction/Demolition	2.6%	2.5%	3.5%	3.9%	4.5%
Medical Waste	0.0%	0.0%	0.0%	0.0%	0.0%
Sludge/Manure	0.0%	0.0%	0.0%	0.0%	0.0%
Source: US EPA Municipal Solid Waste publication: http://www.epa.gov/msw/pubs/03data.pdf.					

ATTACHMENT 2

Table 1B	Waste Type (%) by Year	
Waste Type	**1996-2002[1]**	**2003-present[2]**
Newspaper	4.3%	2.2%
Office Paper	4.4%	2.0%
Corrugated Boxes	4.6%	5.7%
Coated Paper	16.9%	11.1%
Food	15.7%	14.6%
Grass	5.3%	2.8%
Leaves	2.6%	1.4%
Branches	2.4%	2.6%
Lumber	4.9%	9.6%
Textiles	2.1%	4.4%
Diapers	6.9%	4.4%
Construction/Demolition	6.7%	12.1%
Medical Waste	0.0%	0.0%
Sludge/Manure	0.1%	0.1%
Source: [1]CIWMB Statewide Waste Characterization Study (1999). [2]CIWMB Statewide Waste Characterization Study (2004).		

Table 2		
Waste Type	**TDOC**	**Source**
Newspaper	46.5%	EPA
Office Paper	39.8%	EPA
Corrugated Boxes	40.5%	EPA
Coated Paper	40.5%	EPA
Food	11.7%	EPA
Grass	19.2%	EPA
Leaves	47.8%	EPA
Branches	27.9%	EPA
Lumber	43.0%	IPCC
Textiles	24.0%	IPCC
Diapers	24.0%	IPCC
Construction/Demolition	4.0%	IPCC
Medical Waste	15.0%	IPCC
Sludge/Manure	5.0%	IPCC
Sources EPA *Solid Waste Management and Greenhouse Gasses: A Life-Cycle Assessment of Emissions and Sinks*, Exhibits 7-2, 7-3 (May 2002). IPCC *Guidelines for National Greenhouse Gas Inventories*, Chapter 2, Table 2.4, 2.5 and 2.6 (2006).		

ATTACHMENT 2

Table 3		
Waste Type	**DANF**	**Source**
Newspaper	16.1%	EPA
Office Paper	87.4%	EPA
Corrugated Boxes	38.3%	EPA
Coated Paper	21.0%	EPA
Food	82.8%	EPA
Grass	32.2%	EPA
Leaves	10.0%	EPA
Branches	17.6%	EPA
Lumber	23.3%	CEC
Textiles	50.0%	IPCC
Diapers	50.0%	IPCC
Construction/Demolition	50.0%	IPCC
Medical Waste	50.0%	IPCC
Sludge/Manure	50.0%	IPCC

Sources:
EPA *Solid Waste Management and Greenhouse Gasses: A Life-Cycle Assessment of Emissions and Sinks* Exhibits 7-2, 7-3 (May 2002).
CEC *Inventory of California Greenhouse Gas Emissions and Sinks: 1990-2004* (December 2006).
IPCC *Guidelines for National Greenhouse Gas Inventories*, Chapter 3, 3.13 (2006).

ATTACHMENT 3
APPLICABLE RULES

Provided below in table format are those LCAQMD rules most pertinent to the subject consideration from a pubic viewpoint with a statement on expected compliance. The designation " COLDOSWM " is used as the abbreviation for County of Lake Department of Solid Waste Management.

LCAQMD RULES (SECTIONS) CONSIDERED FOR THIS PERMIT:

Section #	Governs	Compliance Status
Section 400	Visible emissions	Conformance by COLDOSWM expected; addressed by permit condition.
Section 411	Particulate matter emissions other sources	Compliance by COLDOSWM expected.
Section 421	Addresses sulfur emissions via fuel specification	Compliance is expected.
Section 430	General - Nuisance	Conformance by COLDOSWM anticipated.
Section 431	Burning - Non Agricultural	Conformance by COLDOSWM expected.
Section 434	Burning - Public entity	Conformance by COLDOSWM expected.
Section 436.5	Burning - Wood waste	Conformance by COLDOSWM expected.
Section 439	Fuel Storage	Conformance by COLDOSWM expected.
Section 440	Defines new source performance standards (NSPS)	Conformance by COLDOSWM expected.
Section 467	Asbestos ATCM	Compliance expected by COLDOSWM.
Section 500	Maintenance-Reporting	Conformance by COLDOSWM expected.
Section 510	Malfunction-Define emissions allowed	Conformance by COLDOSWM is expected.

ATTACHMENT 3
APPLICABLE RULES

LCAQMD RULES (Continued)

Section #	Governs	Compliance Status
Section 520	Evasion	Cooperation by COLDOSWM is expected.
Section 530	Inspection/Emission Data-access	Cooperation by COLDOSWM is expected.
Section 533	Covers trade secrets	Compliance by the District and COLDOSWM expected.
Section 600	Permits-A/C	Compliance determined.
Section 601	Permits-A/C	Compliance determined.
Section 602	Defines parameters for granting/denying A/C's	Conformance is expected.
Section 606	Requires COLDOSWM to comply with all applicable local, state or national air pollution rules or regulations	Conformance by COLDOSWM is expected.
Section 607	Requires CARB review and concurrence within thirty (30) days	Conformance anticipated.
Section 610	Permits - P/O Covers issuance 611-617 pursuant to issuance.	Conformance by COLDOSWM expected.
Section 620	Posting of permits	Conformance by COLDOSWM is expected.
Section 650	Source Emission testing	Compliance by COLDOSWM is expected.
Section 661	Analysis fee	Compliance by COLDOSWM is expected.
Section 671	Covers request for Plans Specifications	Cooperation and conformance by COLDOSWM is expected.
Section 700	Covers emergency conditions	Cooperation and compliance expected.
Table V	Table of Standards	Conformance by COLDOSWM is expected.

TRANSMITTAL

TO:

DATE: June 13, 2011
NAME: Renaldo Crooks
COMPANY NAME: California Air Resources Board
ADDRESS: 1001 I Street
Sacramento, CA 95812

SCS ENGINEERS

Environmental Consultants
6601 Koll Center Parkway
Suite 140
Pleasanton, California 94566
Phone 925-426-0800
FAX 925 426-0707

FROM: Joseph Miller, P.E.
JOB/OVERHEAD NUMBER: 01209155.04 Task 1

COMMENTS:

Please find the attached Gas Collection and Control Plan for the Eastlake Sanitary Landfill, Clearlake, California (SWIS 17-AA-0001) in accordance with the AB32 Landfill Methane Rule. Please contact me at should you have any questions.

cc: Mr. Doug Gearhart, Lake County Air Quality Management District
Ms. Caroline Chavez, County of Lake, Department of Public Works

Environmental Consultants

3117 Fite Circle, Suite 108
Sacramento, CA 95827

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www.scsengineers.com

GAS COLLECTION AND CONTROL SYSTEM DESIGN PLAN

EASTLAKE SANITARY LANDFILL
CLEARLAKE, CALIFORNIA

Presented to:

County of Lake
Department of Public Services
333 Second Street
Lakeport, California 95453

Prepared by:

SCS Engineers
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Sacramento, California 95827
(916) 361-1297

June 2011
Project No. 01209155.04

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CERTIFICATION

I certify that this document fulfills the requirements for a landfill gas collection and control system design plan (GCCS Design Plan), as set forth in the California Air Resources Board regulation to reduce methane emissions from municipal solid waste landfills (Title 17 of the California Code of Regulation, Article 4, Subarticle 6). I further certify that this GCCS Design Plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of California.

Project: Gas Collection and Control System Design Plan
Eastlake Sanitary Landfill, Clearlake, California
County of Lake, Department of Public Services

6/10/11
Date

Joseph J. Miller
California Professional Engineer No. 42598

1.0 INTRODUCTION

1.1 PURPOSE OF DOCUMENT

This Gas Collection and Control System (GCCS) Design Plan (Plan) was prepared by SCS Engineers (SCS) on behalf of the County of Lake, Department of Public Services (County) for the Eastlake Sanitary Landfill (Eastlake, Site, or Landfill), located in Clearlake, California. This Plan has been prepared in accordance with the requirements of the California Air Resources Board (CARB) Methane Emissions from Municipal Solid Landfills regulation (Landfill Methane Emissions Rule [LMR]), contained in Title 17 of the California Code of Regulations (17 CCR), Subchapter 10, Article 4, Subarticle 6. As of this writing, the Eastlake Landfill is not subject to the requirements of the New Source Performance Standards (NSPS) for municipal solid waste (MSW) landfills. Therefore, the NSPS GCCS Plan requirements of the NSPS are not addressed in this document.

The purpose of this document is to provide a design plan for a GCCS that meets state requirements for MSW landfills. This Plan includes a description of the existing GCCS and a plan for future modifications to upgrade the system to achieve compliance with the CARB Rule. The Plan also proposes alternatives to full compliance with the CARB regulations as allowed by 17 CCR §95464(a)(1)(D), as deemed appropriate to ensure long-term and flexible compliance with the regulations.

Upon approval of this GCCS Design Plan by CARB or the Lake County Air Quality Management District (LCAQMD), the County will design, install, and operate the proposed system as outlined in Section 3, in accordance with the time requirements for active landfills of the CARB Rule as prescribed in 17 CCR §95464(a)(2) .

1.2 APPLICABILITY

The Site is regulated under the CARB LMR based on having greater than 450,000 tons of waste-in-place, and a landfill gas heat input capacity greater than 3.0 million British thermal units per hour (MMBTU/hr). The CARB regulation differs from federal NSPS and National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements and local air district rules in that it, in general, applies to smaller landfills and has more stringent requirements for methane collection and control, component leak testing, and surface emissions monitoring. Since the requirements of the CARB regulation are more stringent, they do not conflict with or impede compliance with existing federal and local air district requirements. Therefore, in accordance with the CARB rule, the County must comply with the requirement for submittal of a GCCS Design Plan, as set forth in 17 CCR §95464(a)(1) in order to document the proposed modifications to the existing GCCS that will be necessary to comply with the CARB Rule.

1.3 PLAN FORMAT

This Plan was developed using United States Environmental Protection Agency (U.S. EPA) guidance set forth in the enabling document entitled *Municipal Solid Waste Landfills, Volume 1:*

Summary of the Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills (USEPA, 1996). The plan format has been modified to specifically address the CARB's LMR.

In order to delineate the specific requirements of the CARB Rule, and therefore facilitate ease of review for compliance by the appropriate authority, this Plan is organized as follows:

- Section 1 - Introduction
- Section 2 - Existing Site Conditions
- Section 3 - Future Site Development
- Section 4 –CARB Rule Compliance Review and Evaluation
- Section 5 –CARB Rule Proposed Alternatives

The first three sections include a description of existing and future site conditions, and Sections 4 and 5 contain information pertaining specifically to the CARB Rule.

Supporting documents are appended to the Plan and include:

- Proposed GCCS design drawings
- Gas Flow Modeling
- Surface Emissions Monitoring Plan

Information presented in this GCCS Design Plan was compiled from review of County document files, including available construction and record drawings, SCS files, and documents obtained from regulatory agency websites, and discussions with County personnel.

1.4 AMENDMENTS TO THE PLAN

If necessary, this GCCS Design Plan will be amended to include any necessary updates or addenda for future modifications to the GCCS besides those presented herein in accordance with §95464(a)(4).

2.0 SITE DESCRIPTION

2.1 LANDFILL DESCRIPTION

The Eastlake Landfill is permitted as a Class III MSW disposal facility under Solid Waste Facility Permit (SWFP) No. 17-AA-0001 by the Lake County Department of Health Services, the local enforcement agency (LEA) for California Department of Resources, Recycling and Recovery (CalRecycle), formerly the California Integrated Waste Management Board. The facility is owned and operated by the County of Lake, Department of Public Services. The landfill is located at the following address (refer to **Figure 1**):

Eastlake Sanitary Landfill
16015 Davis Avenue
Clearlake, CA 95422

The facility is situated east of the City of Clearlake, in Section 26, Township 13 North, Range 7 West, of the Mount Diablo Base and Meridian (MDB&M). Land uses within a one mile radius of the Landfill are zoned residential, commercial, agricultural, and open space.

According to the Site's SWFP, the permitted disposal capacity is approximately 6 million cubic yards (CY). As of 2010, approximately 71% of the landfill capacity is filled, with approximately 1.7 million CY of airspace remaining.

The Landfill consists of one existing unlined waste management unit (Unit) covering 22.4 acres (Area I) and a lined Unit covering 12.3 acres (Area II). Filling began in Area I in 1972 and continued until 1999. A compacted and graded interim final cover has been placed over Area I. Landfilling operations began in Area II in 1999. Area II is currently active and consists of two modules: Module 1 and Module 2. Future operations (Phase III) will take place on top of the two previously established footprint areas. No further lateral expansion beyond the Area I/II footprint is planned. Filling will continue until the site reaches an elevation of 1,827 feet (ft) at its highest point, which is expected to be between 2025 and 2030. The site layout and fill sequencing are provided in **Figure 2**.

2.1.1 Waste Classification

The Landfill accepts nonhazardous solid waste, including mixed municipal solid waste (MSW), construction/demolition debris, and dewatered water treatment sludge. The maximum permitted throughput is 200 tons per day (tpd) averaged over a seven-day period.

2.1.2 Liner Construction

No engineered base liner is in place in Area I. Area II has an engineered base liner system consisting of required geosynthetic liner materials, including a geosynthetic clay liner. This base liner system is constructed in accordance with federal Resource Conservation and Recovery Act (RCRA) Subtitle D and California CCR Title 27 standards.

2.1.3 Leachate Management

Both Area I and Area II are equipped with a leachate collection and removal system (LCRS). The LCRS is constructed of a series of plastic pipes along the base of the Units and gravity-drains to a 600,000-gallon lined Class II surface impoundment located below the southern toe of the Area I.

2.2 EXISTING GCCS

As of the date of preparation of this GCCS Design Plan, the Site does not have a GCCS in place. The Landfill's SWFP and the current regulatory status with respect to the NSPS do not specifically require a GCCS. However, as previously mentioned, because the Site has greater than 450,000 tons of waste-in-place, and has a landfill gas heat input capacity greater than 3.0 million British thermal units per hour (MMBTU/hr), a GCCS is required under the LMR.

2.3 PROPOSED GAS MIGRATION SYSTEM

In response to the recent detections of elevated methane levels in soils in the northwest Site property boundary, the County will be installing a gas migration control system. The system will consist of three perimeter LFG extraction wells in native soils around the northwestern and northern perimeter of Area I. This action is in response to 27 CCR requirements for subsurface combustible gas migration control. LFG will be conveyed from the wells to an activated-carbon treatment unit by a 150 standard cubic feet per minute (scfm) blower. The perimeter extraction system will be operated on an interim basis for the purpose of controlling LFG migration while the County plans and budgets for a comprehensive in-fill GCCS. The interim wells will likely be taken off-line once the permanent GCCS is installed and is operational. Since the migration control system will not control methane, it is not regulated under the LMR. The locations of the interim perimeter extraction wells are provided in **Figure 3**. This interim system is expected to be operational by Fall, 2011.

2.4 PROPOSED GCCS INSTALLATION

The County proposes to install a comprehensive GCCS system in accordance with the LMR. The GCCS system will consist of vertical extraction wells, horizontal collectors, an enclosed LFG flare and associated blowers, and a system of headers and laterals to convey the extracted LFG. The GCCS component design is based upon the anticipated current and maximum LFG generation rates. The LFG controls installed will meet the regulatory requirements of the LMR, but will also be compatible with future fill operations and Site closure. A summary of the planned GCCS components are summarized in the following sections. The GCCS layout is presented in **Figure 3**. Preliminary design criteria are as outlined below.

2.4.1 Vertical Extraction Wells

Sixteen vertical LFG extraction wells will be installed generally on the top deck areas or near benches (**Figure 3**). These vertical well locations are planned for areas where filling operations

are at or within 25 to 30 feet of final fill elevations. The wells will be installed in 30-inch diameter borings that will extend to at least 80% of the depth of the underlying waste.

The well casings will be constructed of high density polyethylene (HDPE) of standard dimension ratio (SDR) 11, and will have a minimum diameter of 4-inches. The perforated sections will have ¾-inch diameter holes, and each well will be perforated along the lower 2/3 of the casing length.

The filter pack around the perforated sections of each well will be backfilled with coarse-washed rock. The annular space above the perforated zone will be sealed using bentonite or similar to prevent air intrusion.

Each well will be fitted with a control valve that will connect to the LFG lateral. The connections will be butt-fused to prevent air intrusion.

The horizontal spacing between vertical wells is a function of the well depth. Based on known refuse depths and these criteria, the LFG extraction wells will have an approximate spacing ranging up to 225 feet.

2.4.2 Horizontal Gas Collectors

The locations for horizontal gas collectors (HGCs) have been selected based on areas that will have at least 30 feet of refuse in place at each respective collector in the future. The HGCs will have an approximate spacing of 200 feet on center.

The HGCs will be placed in 4-foot deep trenches and backfilled with 1-inch maximum diameter gravel wrapped in geotextile material. Each HGC will have a minimum of 2 feet of soil cover to prohibit air intrusion from the finished soil.

The HGCs will be constructed of HDPE (SDR-17) pipe, 4-inches in diameter, and perforated with ¾-inch holes. The locations of the HCGs are provided in **Figure 3**.

2.4.3 GCCS Headers and Laterals

The GCCS headers and laterals will consist of HDPE (SDR-17) and will be located outside of the active and future work areas, and will take advantage of site grades to minimize the number of condensate traps, to the extent possible. Above-grade headers will be utilized on the fill areas to allow for future maintenance, and below-grade headers will be utilized for road crossings and near the blower/flare station. The locations of the headers and laterals are provided in **Figure 3**.

2.4.4 GCCS Condensate

Condensate will gravity-drain through the collection header to a network of 5 collection sumps. The condensate will be pumped to a central storage tank located near the blower/flare station via 3-inch diameter HDPE condensate return lines, or to the Class II Leachate Surface Impoundment. The locations of the condensate sumps and return lines are provided in **Figure 3**.

2.4.5 Blower/Flare Station

A blower/flare station will be installed near the existing Class II surface impoundment. The flare station will consist of an enclosed flare, skid-mounted extraction blowers, moisture separators and controls, condensate storage tank, air compressor, and associated piping and electrical service. The flare will have a rated capacity of 15.2 million British Thermal Units (MMBTU) and will be capable of operating with a minimum methane content of 20 percent by volume. Two 500-standard cubic feet per minute (scfm) blowers will be installed. The flare will operate on one blower, and the other will serve as a backup. The location of the blower/flare station is provided in **Figure 3**.

2.5 FUTURE SITE DEVELOPMENT

Once the Area II elevations reach those in Area I, Phase III operations will take place on top of the two previously-filled footprint areas. No further lateral expansion beyond Area I/II footprint is planned. Filling will continue until the Site reaches an elevation of 1,827 ft at its highest point. The fill side slopes will be graded to 3:1 (horizontal to vertical [H:V]). Post-closure end use is currently slated for passive open space.

3.0 GAS COLLECTION AND CONTROL SYSTEM EXPANSION/MODIFICATION DESIGN

Expansions and modifications to the GCCS will be made to minimize both subsurface lateral migration and surface emissions of LFG from the landfill. System performance depends upon the installation of a satisfactory GCCS system, proper management and installation, and maintenance of a suitable final refuse cover. If there is a temporary exceedance in surface emissions, it will be addressed by appropriate responses, evaluating both the GCCS and intermediate/final cover systems. Appropriate action will then be taken to correct the exceedance, as required by LMR.

3.1 GCCS DESIGN CONSIDERATIONS

The following sections present criteria used when selecting a design for expansions/modifications once the GCCS is in place.

3.1.1 Depths of Refuse

The Landfill operates as a canyon-fill disposal site. Ground surface elevations of Area I currently range between 1,700 and 1,750 feet above mean sea level (MSL); and for Area II, the elevations range between 1,660 and 1,710 feet MSL. The lowest elevation of waste placement is approximately 1,600 feet MSL. Vertical LFG extraction wells will be installed to at least 80% of the depth of the underlying waste. In units where a base liner exists, the vertical wells will be designed to terminate at least 15 feet above the underlying base liner.

3.1.2 Landfill Gas Generation Rates and Flow Characteristics

The LFG generation rates and flow characteristics will be considered in the design of upgrades/modifications to the GCCS. Expansions to the GCCS should be sized to accommodate the maximum expected LFG flow rate for the Site, and will be sized to accommodate a minimum 1.3 Factor of Safety (FOS).

The LFG generation rate was modeled using a model based on the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories. For the Site, the default decay rate constant (k-value) of 0.038/year was used. The decay rate constants are specified in the LMR based upon the annual precipitation received. The default value used for the Site corresponds to an average annual precipitation value of 27 inches. For 2011, the estimated LFG flow rate is 411 scfm, and the maximum LFG flow rate is approximately 532 scfm at year 2025, which is the year after planned closure. Assuming a 75% collection efficiency, a maximum capture rate of 399 scfm is anticipated for 2025. The LFG components should be sized to accommodate an LFG maximum flow rate. The estimated LFG generation rates are presented in **Table 1**.

3.1.3 Accessibility

Accessibility of the GCCS components will be achieved by installing commonly accessed components (such as wellheads, monitoring ports, etc.) on relatively flat surfaces of the landfill and/or as near the landfill's road network as possible.

3.1.4 Compatibility with Refuse Filling Operations

As refuse filling operations proceed and portions of the site reach final or near final grades, additional GCCS components will be installed and/or will be raised to accommodate filling. Vertical well casings will be extended as appropriate. Additional horizontal collectors will be installed in incremental 20-foot refuse lifts.

3.1.5 Integration with Closure End Use

Currently, the closure end use for the site is proposed to be secured open space. Any modifications to the closure end use will be reviewed by the County to evaluate their compatibility with the GCCS. Items of concern will be mitigated by either altering the proposed closure end-use or by adjusting or modifying the GCCS in accordance with LMR requirements.

3.1.6 GCCS Components

3.1.6.1 Materials

The GCCS components will to be constructed of PVC, HDPE, fiberglass, stainless steel, and other non-porous corrosion resistant materials.

3.1.6.2 Component Sizing

The GCCS components will be sized to accommodate a maximum LFG flow rate of 399 scfm based upon the LFG model. As filling continues, the LFG model will be updated, and the installed and future GCCS components will be sized appropriately.

3.1.6.3 Component Loading

The GCCS components will be designed to withstand the estimated installation, static, settlement, overburden, and traffic loads. GCCS components utilized shall be evaluated and verified to withstand the installation loads and static loads from the vacuums. Foundations used for GCCS components will be designed to handle the applied loads.

3.1.6.4 System Expansion

The County will conduct monitoring and document compliance of the GCCS performance in accordance with LMR requirements. If the GCCS at the Site does not meet the measures of performance set forth in the LMR, the GCCS will be adjusted or modified in accordance with LMR requirements.

The existing GCCS shall be expanded as necessary to comply with LMR requirements and as needed to accommodate fill accumulation. Expansion of the GCCS will be certified by a professional engineer and the measures of system performance will be verified as set forth in the LMR. Expandability of the GCCS is achieved by installing items such as, in-line valves, flange adapters with blind flanges or HDPE butt caps along the header and lateral piping. During interim conditions (e. g., prior to completion of filling and final closure), expansions will be made to the collection system that will ensure LFG will be collected at sufficient rates that may change over the interim time frame, and will be designed and installed properly to minimize off-site migration of gas.

3.1.6.5 Component Perforation

The vertical wells and HGCs will be selectively perforated to allow LFG entry without inducing head losses sufficient to impair performance across the intended extent of control.

3.1.6.6 Air Infiltration

The LFG collection elements will be designed to prevent excessive air infiltration through the use of solid pipe and solid backfill near the ground surface for vertical LFG extraction wells and for horizontal trenches. Hydrated bentonite plugs or geomembranes will be provided around the vertical well casing and HGCs where they penetrate the landfill cover. If the GCCS does not meet the operations standards, it will be adjusted or modified in accordance with the Plan.

3.1.6.7 Resistance to Decomposition Heat

Resistance of the GCCS to the heat generated as a result of refuse decomposition will be achieved through the use of materials tested and proven to withstand temperatures well above those typically found in landfills. The GCCS will be inspected during routine LFG system monitoring for heat damage. If heat damage of the GCCS components is observed and is believed to be detrimental to the operation of the GCCS, the cause of the elevated landfill temperature will be investigated, and the GCCS will be adjusted or modified to mitigate the effects of the elevated temperatures.

3.1.6.8 Corrosion Resistance

Corrosion resistance of the GCCS is achieved through the use of corrosion-resistant materials or materials that have a corrosion-resistant coating. Coated components will be inspected during routine GCCS monitoring for abrasion, chipping, or cracking of the coating. If damage to the coating material is observed, the coated components will be replaced or repaired.

3.1.7 GCCS Component Installation

3.1.7.1 Component Placement

Depths of refuse will be determined based on the difference between the elevations where vertical LFG extraction wells will be installed and the elevation of the landfill. *LFG extraction* wells will be designed and installed to extend to approximately 80% of the waste thickness. The

extraction wells will be designed to maintain a minimum separation distance of approximately 15 feet above the landfill base liner.

3.1.7.2 Leachate

The occurrence of leachate within the landfill will be addressed by the LCRS.

3.1.7.3 Wells and Trenches

Vertical wells and HGCs, constructed for the GCCS elements, will be of sufficient cross-section to allow for their proper construction and completion, including centering of the pipes and placement of gravel. The wells and HGCs will be constructed under the supervision of a construction quality assurance program implemented by WMC, and will be verified to be properly constructed.

3.1.7.4 Component Short Circuiting

The GCCS will be designed to prevent air infiltration through the cover, refuse contamination of the collection elements, and direct venting of LFG to the atmosphere. Air intrusion control will be verified through monitoring of operational standards for the GCCS and by maintaining the landfill cover. Contamination of the collection elements by refuse will be prevented by placing backfill in the extraction wells and HGCs, and providing a gravel filter pack between the refuse and the LFG collection elements. Direct venting of the LFG to the atmosphere will be avoided by operating the GCCS under vacuum.

3.1.7.5 Backfill Material

Gravel with a carbonate content of less than 15 percent and of sufficient size (typically 1-in to 3-in diameter) will be used to prevent penetration or blockages of the LFG collector pipe perforations.

3.1.7.6 Fill Settlement

Settlement will occur due to decomposition of the refuse. To accommodate refuse settlement, the GCCS components will be designed and installed with several features to account for this settlement including:

- LFG extraction wellheads will be connected to the LFG transmission piping via a flexible pipe or hose connection. This will allow the LFG piping to accommodate changes in the orientation of the LFG transmission piping or LFG extraction well.

- LFG transmission piping will be sloped at sufficient grades so that reasonable amounts of differential and total settlement may occur without causing pipe breakage, or disrupting the overall flow gradient of the LFG transmission piping.

3.1.8 GCCS Connection to LFG Transmission Piping

In general, the collection devices (vertical wells and horizontal collectors) will be connected to the collection header pipes via lateral piping. The lateral piping will be connected to the header either on or below the landfill surface, depending on the connection location. The connector assemblies (extraction wellheads) will be located above grade. These assemblies include a positive closing throttle valve, necessary seals and couplings, access couplings, and a minimum of two sampling ports. The collection devices will be constructed of PVC, HDPE, fiberglass, stainless steel, or other non-porous material of suitable thickness. The GCCS components are designed to withstand anticipated installation, static, settlement, overburden, and traffic loads.

3.1.9 GCCS Expandability

Expandability of the GCCS will be achieved by installing blind flanges or HDPE butt caps along the transmission piping, which will allow the LFG transmission piping to be easily expanded in the future. The GCCS has been designed with an additional FOS to make certain that the capacity is adequate for the estimated LFG extraction rate. In the event that actual LFG extraction rates do exceed the capacity of the system, additional GCCS components will be designed and installed.

3.1.10 Leachate and Condensate Management

Leachate management is accomplished through the use of a leachate collection and management system. The leachate management system is designed according to RCRA Subtitle D standards.

Condensate management will be accomplished by sloping the LFG transmission piping to low points in the GCCS piping for collection of the condensate. At low points in the perimeter header pipes, condensate drains into driplegs. The condensate will be pumped to a central storage tank located near the blower/flare station via 3-inch diameter HDPE condensate return lines, or to the Class II Leachate Surface Impoundment. Condensate and leachate will be managed in a manner that will reduce impacts on the GCCS and the ability to adequately extract LFG.

3.2 WELL DECOMMISSIONING/ABANDONMENT

A gas well may be decommissioned if it is experiencing declining gas flows. The LCAQMD and CARB will be notified prior to decommissioning, unless there is an imminent fire danger. In the case of a fire danger, the affected LFG well will be temporarily decommissioned while awaiting approval by the LCAQMD and CARB, provided that routine monitoring activities are maintained until final decommissioning approval has been granted. The following steps will be initiated for well decommissioning:

- Close and lock valving.

- Disconnection of well from collection system (removal of flex hose, capping of header or lateral piping). Once disconnected, monthly wellhead monitoring will not be performed on the well.

- Physical abandonment (cut off wellhead below ground, cap, and backfill). Physical abandonment may not be performed immediately following well disconnection. Timing of the physical abandonment of the well will depend on weather conditions or the potential for the well to recover sufficient gas flows.

A decommissioned well may be reconnected to the system at a later date if recovered gas flows are sufficient. At that time, monthly wellhead monitoring will be restarted. The LCAQMD and CARB will be notified if a well will be reconnected to the system.

3.3 MONITORING

The following monitoring activities will be conducted in accordance with the LMR: annual source testing, quarterly surface emissions monitoring (instantaneous and integrated monitoring), GCCS gas flow rate monitoring at least every 15 days, quarterly GCCS leak detection monitoring, and monthly wellhead pressure monitoring. The monitoring activities will be included in the annual report submitted to LCAQMD and CARB. A more detailed discussion of each monitoring activity is included in Section 4.

3.4 REPORTING

Unless violations of the LMR are observed during regular monitoring, the Site will submit annual reports to CARB and LCAQMD. The annual reports will include activities for the calendar year, and are due to the executive office by March 15 of the following year, starting 2012. The following items will be included in each annual report:

- MSW landfill name, owner and operator, address, and solid waste information system (SWIS) identification number.

- Total volume of landfill gas collected (reported in standard cubic feet).

- Average composition of the landfill gas collected over the reporting period (reported in percent methane and percent carbon dioxide by volume).

- Gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each control device.

- The date that the gas collection and control system was installed and in full operation.

- The percent methane destruction efficiency of each gas control device(s).

- Type and amount of supplemental fuels burned with the landfill gas in each device.
- Total volume of landfill gas shipped off-site, the composition of the landfill gas collected (reported in percent methane and percent carbon dioxide by volume), and the recipient of the gas.
- Most recent topographic map of the site showing the areas with final cover and a geomembrane, and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface.

The annual reporting requirements are further discussed in Section 4.

4.0 CARB LANDFILL METHANE RULE COMPLIANCE REVIEW AND EVALUATION

The purpose of this section is to describe and document information required to certify compliance of the GCCS with the applicable sections of 17 CCR, Article 4, Subarticle 6, §95460 to §95479 Landfill Methane Rule. An evaluation of the site specific conditions with respect to the CARB Rule compliance requirements is presented below. To facilitate review of this document, applicable sections of the LMR are presented below in italics.

4.1 §95463 – DETERMINATION FOR INSTALLING A GAS COLLECTION AND CONTROL SYSTEM

4.1.1 §95463(b) – MSW Landfills Greater Than or Equal to 450,000 Tons of Waste-in-Place

§95463(b) Within 90 days of the effective date of this subarticle or upon reaching 450,000 tons of waste-in-place, each owner or operator of an MSW landfill having greater than or equal to 450,000 tons of waste-in-place must calculate the landfill gas heat input capacity pursuant to §95471(b) and must submit a Landfill Gas Heat Input Capacity Report to the Executive Officer.

The Heat Input Capacity report was submitted on September 24, 2010 to the Executive Officer in compliance with this section.

4.1.2 §95463(b)(2) – Landfill Gas Heat Input Capacity Greater Than or Equal to 3.0 MMBTU/hr Recovered

§95463(b)(2) If the landfill gas heat input capacity is greater than or equal to 3.0 MMBTU/hr recovered the owner or operator must either:

(A) Comply with the requirements of §95464 through §95476;

(B) Demonstrate to the satisfaction of the Executive Officer that after four consecutive quarterly monitoring periods there is no measured concentration of methane of 200 parts per million by volume (ppmv) or greater using the instantaneous surface monitoring procedures specified in §95471(c)(1) and §95471(c)(2). Based on the monitoring results, the owner or operator must do one of the following:

1. If there is any measured concentration of methane of 200 ppmv or greater from the surface of an active, inactive, or closed MSW landfill, comply with §95464 through §95476;

2 If there is no measured concentration of methane of 200 ppmv or greater from the surface of an active MSW landfill, comply with §95463(b) and recalculate the landfill gas heat input capacity annually as required in §95463(b) until such time the owner or operator submits a Closure Notification pursuant to §95470(b)(1); or

3 If there is no measured concentration of methane of 200 ppmv or greater from the surface of a closed or inactive MSW landfill, the requirements of §95464 through §95470 no longer apply provided that the following information is submitted to and approved by the Executive Officer within 90 days:

a. A Waste-in-Place Report pursuant to §95470(b)(4);

b. All instantaneous surface monitoring records.

The Heat Input Capacity for the Site is greater than 3.0 MMBTU/hr; therefore, the Site will comply with §95464 through §95476 as described in this document.

4.2 §95464 – GAS COLLECTION AND CONTROL SYSTEM REQUIREMENTS

4.2.1 §95464(a)(1) – Design Plan

§95464(a)(1) *If a gas collection and control system which meets the requirements of either §95464(b)(1), §95464(b)(2) or §95464(b)(3) has not been installed, the owner or operator of a MSW landfill must submit a Design Plan to the Executive Officer within one year after the effective date of this subarticle, or within one year of detecting any leak on the landfill surface exceeding a methane concentration of 200 ppmv pursuant to §95463(b)(2)(B). The Executive Officer must review and either approve or disapprove the Design Plan within 120 days. The Executive Officer may request that additional information be submitted as part of the review of the Design Plan. At a minimum, the Design Plan must meet the following requirements:*

(A) The Design Plan must be prepared and certified by a professional engineer.

(B) The Design Plan must provide for the control of the collected gas through the use of a gas collection and control system meeting the requirements of either §95464(b)(1), §95464(b)(2) or §95464(b)(3).

(C) The Design Plan must include any proposed alternatives to the requirements, test methods, procedures, compliance measures, monitoring, and recordkeeping or reporting requirements pursuant to §95468.

(D) A description of potential mitigation measures to be used to prevent the release of methane or other pollutants into the atmosphere during the installation or preparation of wells, piping, or other equipment; during repairs or the temporary shutdown of gas collection system components; or, when solid waste is to be excavated and moved.

(E) For active MSW landfills, the design plan must identify areas of the landfill that are closed or inactive.

(F) Design the gas collection and control system to handle the expected gas generation flow rate from the entire area of the MSW landfill and to collect gas at an extraction rate to comply with the surface methane emission limits in §95465 and component leak standard in §95464(b)(1)(B). The expected gas generation flow rate from the MSW landfill must be calculated pursuant to §95471(e).

1. *Any areas of the landfill that contain only asbestos-containing waste, inert waste, or non-decomposable solid waste may be excluded from collection provided that the owner or operator submits documentation to the Executive Officer containing the nature, date of deposition, location and amount of asbestos or non-decomposable solid waste deposited in the area. This documentation may be included as part of the Design Plan.*

This document satisfies the requirement for a GCCS Design Plan and demonstrates conformance of the future GCCS with the required active gas collection system specifications. Information required for review and approval by the Executive Officer is presented in this document.

Proposed alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, record keeping, or reporting provisions of §95464 through §95476 are presented in Section 5.

4.2.2 §95464(a)(2) – GCCS Installation for an Active Landfill

§95464(a)(2) *Any owner or operator of an active MSW landfill must install and operate a gas collection and control system within 18 months after approval of the Design Plan.*

A GCCS will be installed in Areas I and II to comply with the CARB rule. The planned GCCS will be designed to handle the maximum expected flow rate from the landfill, as estimated from LFG modeling (see Section 3.1.2 and Table 1). LFG will be collected at a sufficient rate and from a sufficient number of extraction wells/HCGs to minimize surface emissions and off-site migration of subsurface gas by reducing gas pressures within the landfill. Rates of collection may be modified based upon results of surface emissions and perimeter probe monitoring.

4.2.3 §95464(a)(3) – GCCS Installation for a Closed Landfill

> *§95464(a)(3) Any owner or operator of a closed or inactive MSW landfill must install and operate a gas collection and control system within 30 months after approval of the Design Plan.*

The Site is active and therefore not subject to the GCCS installation requirements of this section at this time.

4.2.4 §95464(a)(4) – Modification of an Existing GCCS

> *§95464(a)(4) If an owner or operator is modifying an existing gas collection and control system to meet the requirements of this subarticle, the existing Design Plan must be amended to include any necessary updates or addenda, and must be certified by a professional engineer.*

Once the proposed system is in place, any modifications to the existing GCCS will be made through a Design Plan addendum, and will be certified by a professional engineer.

4.2.5 §95464(a)(5) – Amended Design Plan

> *§95464(a)(5) An amended Design Plan must be submitted to the Executive Officer within 90 days of any event that requires a change to the Design Plan.*

Amended GCCS Design Plans will be submitted to the Executive Officer within 90 days of changes at the Site that require the Design Plan to be revised.

4.2.6 §95464(a)(6) – Operation and Maintenance of GCCS

> *§95464(a)(6) The gas collection system must be operated, maintained, and expanded in accordance with the procedures and schedules in the approved Design Plan.*

GCCS system operation, maintenance, and expansion will be done in accordance with this GCCS Design Plan.

4.2.7 §95464(b)(1) – GCCS General Requirements

§95464(b)(1) The owner or operator must satisfy the following requirements when operating a gas collection and control system:

(A) Route the collected gas to a gas control device or devices, and operate the gas collection and control system continuously except as provided in §95464(d) and §95464(e).

(B) Operate the gas collection and control system so that there is no landfill gas leak that exceeds 500 ppmv, measured as methane, at any component under positive pressure.

(C) The gas collection system must be designed and operated to draw all the gas toward the gas control device or devices.

All collected gas is routed through the header piping system to the enclosed flare station. The GCCS will be designed to minimize both subsurface lateral migration and surface emission of LFG from the landfill. The County will monitor the surface of the landfill for surface emissions in accordance with this GCCS Design Plan and in full compliance with the rules. If the GCCS does not meet the measures of performance for the surface emissions as required by LMR, the GCCS will be adjusted or modified accordingly.

The SEM Plan for the Site is presented in **Appendix A.** Prior to each monitoring event, the County will conduct route planning during which the best route for that round of monitoring will be decided. This planning will result in revisions to the proposed plan on a continual basis. Excluded areas will consist of areas with steep slopes (greater than 3:1) and active filling areas of the landfill due to the health and safety risk of working around heavy equipment traffic. Prior to each monitoring event, the County will complete route planning where excluded areas will be delineated and any modifications to the route will be recorded. Any deviations from the proposed plan will be recorded and included in the annual report. SEM procedures will be in compliance with the LMR and LCAQMD regulations, and will be reported in the annual reports.

4.2.8 §95464(b)(2)(A) – Requirements for Flares

§95464(b)(2) An MSW landfill owner or operator who operates an [enclosed] flare must satisfy the following requirements;

(A) Route the collected gas to an enclosed flare that meets the following requirements:

1. Achieves a methane destruction efficiency of at least 99 percent by weight.

2. Is equipped with automatic dampers, an automatic shutdown device, a flame arrester, and continuous recording temperature sensors.

3. During restart or startup there must be a sufficient flow of propane or commercial natural gas to the burners to prevent unburned collected methane from being emitted to the atmosphere.

The gas control device must be operated within the parameter ranges established during the initial or most recent source test.

(B) Route the collected gas to an open flare that meets the requirements of 40 CFR 60.18 (as last amended 73 Fed. Reg. December22, 2008), which is incorporated by reference herein. The operation of an open flare is not allowed except under the following conditions:

1. An open flare installed and operating prior to August 1, 2008, may operate until January 1, 2018.

2. Operation of an open flare on or after January 1, 2018, may be allowed if the owner or operator can demonstrate to the satisfaction of the Executive Officer that the landfill gas heat input capacity is less than 3.0 MMBTU/hr pursuant to §95471(b) and is insufficient to support the continuous operation of an enclosed flare or other gas control device.

3. The owner or operator is seeking to temporarily operate an open flare during the repair or maintenance of the gas control system, or while awaiting the installation of an enclosed flare, or to address offsite gas migration issues

a. Any owner seeking to temporarily operate an open flare must submit a written request to the Executive Officer pursuant to §95468.

All LFG will be routed to an enclosed flare. The County or its contracted operator will operate the flare in compliance with §95464(b)(2)(A).

4.2.9 §95464(b)(3)(A) – Requirements for Gas Control Devices Other Than Flares

> *§95464(b)(3) An MSW landfill owner or operator who operates a gas control device other than a flare must satisfy one of the following requirements:*
>
> *(A) Route the collected gas to an energy recovery device, or series of devices that meets the following requirements:*
>
> 1. *Achieves a methane destruction efficiency of at least 99 percent by weight. Lean burn internal combustion engines must reduce the outlet methane concentration to less than 3,000 ppmv, dry basis, corrected to 15 percent oxygen.*
> 2. *If a boiler or a process heater is used as the gas control device, the landfill gas stream must be introduced into the flame zone. Where the landfill gas is not the primary fuel for the boiler or process heater, introduction of the landfill gas stream into the flame zone is not required.*
> 3. *The gas control device must be operated within the parameter ranges established during the initial or most recent source test.*

All LFG will be routed to an enclosed flare, and therefore, this section does not apply. Should the facility install a device other than a flare for LFG destruction, the device will be operated in accordance with this section. An amended GCCS Plan will also be submitted in accordance with §95464(a)(5) prior to installation of a new device.

4.2.10 §95464(b)(3)(B) – Requirements for Treatment Systems

> *§95464(b)(3) An MSW landfill owner or operator who operates a gas control device other than a flare must satisfy one of the following requirements:*
>
> *(B) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions vented to the atmosphere from the gas treatment system are subject to the requirements of §95464(b)(2).*

A treatment system will not be operated for purposes of compliance with the LMR, and therefore, the requirements of this section do not apply.

4.2.11 §95464(b)(4) – Source Test Requirements

> ***§95464(b)(4)*** *The owner or operator must conduct an annual source test for any gas control device(s) subject to the requirements of §95464(b)(2)(A) or §95464(b)(3)(A) using the test methods identified in §95471(f). An initial source test must be conducted within 180 days of initial start up of the gas collection and control system. Each succeeding complete annual source test must be conducted no later than 45 days after the anniversary date of the initial source test.*
>
> *(A) If a gas control device remains in compliance after three consecutive source tests the owner or operator may conduct the source test every three years. If a subsequent source test shows the gas collection and control system is out of compliance the source testing frequency will return to annual.*

An initial source test will be conducted on the enclosed flare within 180 days of initial startup, and annual source testing will occur within 45 days of the anniversary date of the initial test. If the enclosed flare remains in compliance after 3 consecutive years of testing, the source testing will be conducted every 3 years. However, should an exceedance be observed, annual source testing will resume. Results from the source testing will be included in the Site's annual reports.

4.2.12 §95464(c) – Wellhead Gauge Pressure Requirements

> ***§95464(c)*** *Each wellhead must be operated under a vacuum (negative pressure), except as provided in §95464(d) and §95464(e), or under any of the following conditions:*
>
> *(1) Use of a geomembrane or synthetic cover. The owner or operator must develop acceptable pressure limits for the wellheads and include them in the Design Plan; or*
>
> *(2) A decommissioned well.*

The GCCS will be designed and operated in accordance with the above stated rule.

4.2.13 §95464(d) – Well Raising

> ***§95464(d)*** *The requirements of §95464(b)(1)(A), §95464(b)(1)(B), and §95464(c), do not apply to individual wells involved in well raising provided the following conditions are met:*
>
> *(1) New fill is being added or compacted in the immediate vicinity around the well.*

(2) Once installed, a gas collection well extension is sealed or capped until the raised well is reconnected to a vacuum source.

Wells will not be subject to the GCCS routing requirements, leak monitoring requirements, or wellhead pressure requirements during well raising. This exemption will only apply when new fill is being added or compacted in the vicinity of the well.

4.2.14 §95464(e) – Repairs and Temporary Shutdown of Gas Collection System Components

§95464(e) The requirements of §95464(b)(1)(A), §95464(b)(1)(B), and §95464(c), do not apply to individual landfill gas collection system components that must be temporarily shut down in order to repair the components, due to catastrophic events such as earthquakes, to connect new landfill gas collection system components to the existing system, to extinguish landfill fires, or to perform construction activities pursuant to §95466, provided the following requirements are met:

(1) Any new gas collection system components required to maintain compliance with this subarticle must be included in the most recent Design Plan pursuant to §95464(a)(4).

(2) Methane emissions are minimized during shutdown pursuant to §95464(a)(1)(D).

Wells will not be subject to the GCCS routing requirements, leak monitoring requirements, or wellhead pressure requirements when components must be shut down due to catastrophic events, including landfill fires or connection of new GCCS components. This exemption will only apply when new GCCS components required to comply with the LMR are included in the GCCS Design Plan and methane emissions are minimized as described in Section 4.2.1.

4.3 §95465 – SURFACE METHANE EMISSION STANDARDS

§95465(a) *Except as provided in §95464(d), §95464(e), and §95466, beginning January 1, 2011, or upon commencing operation of a newly installed gas collection and control system or modification of an existing gas collection and control system pursuant to §95464(a)(1), whichever is later, no location on the MSW landfill surface may exceed either of the following methane concentration limits:*

(1) 500 ppmv, other than non-repeatable, momentary readings, as determined by instantaneous surface emissions monitoring.

(2) An average methane concentration limit of 25 ppmv as determined by integrated surface emissions monitoring.

The GCCS will be designed to minimize both subsurface lateral migration and surface emission of LFG from the landfill. In accordance with LMR, the County will monitor the surface of the landfill for surface emissions in accordance with this GCCS Design Plan and in full compliance with the LMR. If the GCCS does not meet the measures of performance for the surface emissions as required by LMR, the GCCS will be adjusted or modified accordingly.

The SEM Plan for the Landfill is presented in **Appendix A**, and a map showing the surface emissions grid under current conditions is attached to the plan. Prior to each monitoring event, the County will conduct route planning during which the best route for that round of monitoring will be decided. This planning will result in revisions to the proposed plan on a continual basis. Excluded areas will consist of areas with steep slopes (greater than 3:1) and active filling areas of the landfill due to the health and safety risk of working around heavy equipment traffic. Prior to each monitoring event, the County will complete route planning where excluded areas will be delineated and any modifications to the route will be recorded. Any deviations from the proposed plan will be recorded and included in the annual report. SEM procedures will be in compliance with the LMR and LCAQMD regulations and will be reported in the annual reports.

4.4 §95466 – CONSTRUCTION ACTIVITIES

4.4.1 §95466(a) – SEM Standards

§95466(a) The requirements of §95465 do not apply to the working face of the landfill or to areas of the landfill surface where the landfill cover material has been removed and refuse has been exposed for the purpose of installing, expanding, replacing, or repairing components of the landfill gas, leachate, or gas condensate collection and removal system, or for law enforcement activities requiring excavation.

SEM will not be conducted at the working face of the landfill or where refuse has been exposed for installing, expanding, replacing, or repairing components of landfill gas, leachate, or condensate systems or for law enforcement activities requiring excavation.

4.4.2 §95467 – Permanent Shutdown and Removal of the Gas Collection and Control System

§95467 (a) The gas collection and control system at a closed MSW landfill can be capped or removed provided the following requirements are met:

(1) The gas collection and control system was in operation for at least 15 years, unless the owner or operator can demonstrate

to the satisfaction of the Executive Officer that due to declining methane rates the MSW landfill will be unable to operate the gas collection and control system for a 15-year period.

(2) Surface methane concentration measurements do not exceed the limits specified in §95465.

(3) The owner or operator submits an Equipment Removal Report to the Executive Officer pursuant to §95470(b)(2).

The county will comply with the requirements of this section after site closure and through GCCS removal.

4.5 §95468 – ALTERNATIVE COMPLIANCE OPTIONS

4.5.1 §95468(a) – Owner/Operator Alternative Compliance Requests Requirements

§95468(a) *The owner or operator may request alternatives to the compliance measures, monitoring requirements, test methods and procedures of §95464, §95469, and §95471. Any alternatives requested by the owner or operator must be submitted in writing to the Executive Officer. Alternative compliance option requests may include, but are not limited to, the following:*

(1) Semi-continuous operation of the gas collection and control system due to insufficient landfill gas flow rates.

(2) Additional time allowance for leak repairs for landfills having consistent issues related to the procurement and delivery of necessary parts to complete the repair, or adverse weather conditions that impede repair work.

(3) Alternative wind speed requirements for landfills consistently having winds in excess of the limits specified in this subarticle.

(4) Alternative walking patterns to address potential safety and other issues, such as: steep or slippery slopes, monitoring instrument obstructions, and physical obstructions.

(5) Exclusion of construction areas and other dangerous areas from landfill surface inspection.

(6) Exclusion of paved roads that do not have any cracks, pot holes, or other penetrations from landfill surface inspection.

Alternative compliance requests are submitted to the Executive Officer as part of this GCCS Design Plan in Section 5.

4.5.2 §95468(b) and (c) – Evaluation/Approval of Alternative Compliance Options by Executive Officer Requirements

> ***§95468(b)*** *Criteria that the Executive Officer may use to evaluate alternative compliance option requests include, but are not limited to: compliance history; documentation containing the landfill gas flow rate and measured methane concentrations for individual gas collection wells or components; permits; component testing and surface monitoring results; gas collection and control system operation, maintenance, and inspection records; and historical meteorological data.*
>
> ***§95468(c)*** *The Executive Officer will review the requested alternatives and either approve or disapprove the alternatives within 120 days. The Executive Officer may request that additional information be submitted as part of the review of the requested alternatives.*
>
> *(1) If a request for an alternative compliance option is denied, the Executive Officer will provide written reasons for the denial.*
>
> *(2) The Executive Officer must deny the approval of any alternatives no providing equivalent levels of enforceability or methane emission control.*

The County acknowledges the potential alternatives. Proposed alternatives are included in Section 5 of this GCCS Design Plan.

4.6 §95469 – MONITORING REQUIREMENTS

4.6.1 §95469(a) – Surface Emission Monitoring Requirements

> ***§95469(a)*** *Any owner or operator of a MSW landfill with a gas collection and control system must conduct instantaneous and integrated surface monitoring of the landfill surface quarterly using the procedures specified in §95471(c).*

The SEM Plan for the Landfill, presented in **Appendix A**, shows the surface emissions grid under current conditions. Prior to each monitoring event, the County will conduct route planning during which the best route for that round of monitoring will be decided. This planning will result in revisions to the proposed plan on a continual basis. Excluded areas will consist of areas with steep slopes (greater than 3:1) and active filling areas of the landfill due to the health and safety risk of working around heavy equipment traffic. Prior to each monitoring event, the

County will complete route planning where excluded areas will be delineated and any modifications to the route will be recorded. Any deviations from the proposed plan will be recorded and included in the semiannual report. SEM procedures will be in compliance with the LMR and LCAQMD regulations and will be reported in the semiannual reports.

4.6.2 §95469(a)(1) – Instantaneous Surface Monitoring Requirements

§95469(a)(1): Any reading exceeding the limit specified in §95465(a)(1) must be recorded as an exceedance and the following actions must be taken:

(A) The owner or operator must record the date, location, and value of each exceedance, along with re-test dates and results. The location of each exceedance must be clearly marked and identified on a topographic map of the MSW landfill, drawn to scale with the location of both the grids and the gas collection system clearly identified.

(B) Corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, or well vacuum adjustments and the location must be remonitored within ten calendar days of a measured exceedance.

1. *If the re-monitoring of the location shows a second exceedance, additional corrective action must be taken and the location must be re-monitored again no later than 10 calendar days after the second exceedance.*

2. *If the re-monitoring shows a third exceedance, the owner or operator must install a new or replacement well as determined to achieve compliance no later than 120 calendar days after detecting the third exceedance, or it is a violation of this subarticle.*

(C) Any closed or inactive MSW landfill, or any closed or inactive areas on an active MSW landfill that has no monitored exceedances of the limit specified in §95465(a)(1) after four consecutive quarterly monitoring periods may monitor annually. Any exceedances of the limits specified in §95465(a)(1) detected during the annual monitoring that cannot be remediated within 10 calendar days will result in a return to quarterly monitoring of the landfill.

(D) Any exceedances of the limit specified in §95465(a)(1) detected during any compliance inspections will result in a return to quarterly monitoring of the landfill.

The SEM Plan for the Landfill is presented in **Appendix A.**

4.6.3 §95469(a)(2) – Integrated Surface Monitoring Requirements

§95469(a)(2) Any reading exceeding the limit specified in §95465(a)(2) must be recorded as an exceedance and the following actions must be taken:

(A) The owner or operator must record the average surface concentration measured as methane for each grid along with re-test dates and results. The location of the grids and the gas collection system must be clearly marked and identified on a topographic map of the MSW landfill drawn to scale.

(B) Within 10 calendar days of a measured exceedance, corrective action must be taken by the owner or operator such as, but not limited to, cover maintenance or repair, or well vacuum adjustments and the grid must be re-monitored.

1. *If the re-monitoring of the grid shows a second exceedance, additional corrective action must be taken and the location must be re-monitored again no later than 10 calendar days after the second exceedance.*

2. *If the re-monitoring in §95469(a)(2)(B)(1) shows a third exceedance, the owner or operator must install a new or replacement well as determined to achieve compliance no later than 120 calendar days after detecting the third exceedance, or it is a violation of this subarticle.*

(C) Any closed or inactive MSW landfill, or any closed or inactive areas on an active MSW landfill that has no monitored exceedances of the limit specified in §95465(a)(2) after 4 consecutive quarterly monitoring periods may monitor annually. Any exceedances of the limits specified in §95465(a)(2) detected during the annual monitoring that cannot be remediated within 10 calendar

days will result in a return to quarterly monitoring of the landfill.

(D) Any exceedances of the limits specified in §95465(a)(2) detected during any compliance inspections will result in a return to quarterly monitoring of the landfill..

The SEM Plan for the Landfill is presented in **Appendix A.**

4.6.4 §95469(a)(3) – Requirements for Annual Monitoring

§95469(a)(3) An owner or operator of a closed or inactive MSW landfill, or any closed or inactive areas on an active MSW landfill that can demonstrate that in the three years before the effective date of this subarticle that there were no measured exceedances of the limits specified in §95465 by annual or quarterly monitoring may monitor annually. Any exceedances of the limits specified in §95465 detected during the annual monitoring that cannot be remediated within 10 calendar days will result in a return to quarterly monitoring of the landfill.

The SEM Plan for the Site is presented in **Appendix A.** Reduced monitoring frequency will be used for areas meeting the criteria of this section.

4.6.5 §95469(b) – Gas Control System Equipment Monitoring Requirements

4.6.5.1 Enclosed Flares

§95469(b)(1) For enclosed flares the following equipment must be installed, calibrated, maintained, and operated according to the manufacturer's specifications:

(A) A temperature monitoring device equipped with a continuous recorder which has an accuracy of plus or minus (±) 1 percent of the temperature being measured expressed in degrees Celsius or Fahrenheit.

(B) At least one gas flow rate measuring device which must record the flow to the control device(s) at least every 15 minutes.

A data recorder will record measurements from thermocouples in the flare. Flow data from gas flow meters will be recorded on the data recorders at least every fifteen minutes.

4.6.5.2 Gas Control Device Other than Enclosed Flares

> *§95469(b)(2) For a gas control device other than an enclosed flare, demonstrate compliance by providing information describing the operation of the gas control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. Alternatives to this section must be submitted as specified in §95468. The Executive Officer may specify additional monitoring procedures.*

The County is not proposing devices other than an enclosed flare to control LFG. This GCCS Plan will be revised if a device other than an enclosed flare is installed in the future.

4.6.5.3 Components Containing LFG Under Positive Pressure

> *§95469(b)(3) Components containing landfill gas and under positive pressure must be monitored quarterly for leaks. Any component leak must be tagged and repaired within 10 calendar days.*
>
> *(A) Component leak testing at MSW landfills having landfill gas-to-energy facilities may be conducted prior to scheduled maintenance or during planned outage periods.*

Any portion of the GCCS operating under positive pressure will be monitored quarterly for leaks of methane resulting in 500 ppmv methane or greater. Any such leaks will be tagged and repaired within 10 calendar days.

4.6.6 §95469(c) – Wellhead Monitoring Requirements

> *§95469(c) The owner or operator must monitor each individual wellhead monthly to determine the gauge pressure. If there is any positive pressure reading other than as provided in §95464(d) and §95464(e), the owner or operator must take the following actions:*
>
> *(A) Initiate corrective action within five calendar days of the positive pressure measurement.*
>
> *(B) If the problem cannot be corrected within 15 days of the date the positive pressure was first measured, the owner or operator must initiate further action, including, but not limited to, any necessary expansion of the gas collection system, to mitigate any positive pressure readings.*
>
> *(C) Corrective actions, including any expansion of the gas collection and control system, must be completed and any*

new wells must be operating within 120 days of the date the positive pressure was first measured, or it is a violation of this subarticle.

The County will comply with the provisions of this subpart in accordance with the alternative procedures described in Section 5 of this GCCS Design Plan.

4.7 §95470 – RECORDKEEPING AND REPORTING REQUIREMENTS

4.7.1 §95470(a) – Recordkeeping Requirements

4.7.1.1 5-Year Record Keeping Requirements

§95470(a)(1) An owner or operator must maintain the following records, whether in paper, electronic, or other format, for at least five years:

(A) All gas collection system downtime exceeding five calendar days, including individual well shutdown and disconnection times, and the reason for the downtime.

(B) All gas control system downtime in excess of one hour, the reason for the downtime, and the length of time the gas control system was shutdown.

(C) Expected gas generation flow rate calculated pursuant to §95471(e).

(D) Records of all instantaneous surface readings of 200 ppmv or greater; all exceedances of the limits in §95464(b)(1)(B) or §95465, including the location of the leak (or affected grid), leak concentration in ppmv, date and time of measurement, the action taken to repair the leak, date of repair, any required re-monitoring and the re-monitored concentration in ppmv, and wind speed during surface sampling; and the installation date and location of each well installed as part of a gas collection system expansion.

(E) Records of any positive wellhead gauge pressure measurements, the date of the measurements, the well identification number, and the corrective action taken.

(F) Annual solid waste acceptance rate and the current amount of waste-in-place.

(G) Records of the nature, location, amount, and date of deposition of non-degradable waste for any landfill areas excluded from the collection system.

(H) Results of any source tests conducted pursuant to §95464(b)(4).

(I) Records describing the mitigation measures taken to prevent the release of methane or other emissions into the atmosphere:

1. *When solid waste was brought to the surface during the installation or preparation of wells, piping, or other equipment;*

2. *During repairs or the temporary shutdown of gas collection system components; or,*

3. *When solid waste was excavated and moved.*

(J) Records of any construction activities pursuant to §95466. The records must contain the following information:

1. *A description of the actions being taken, the areas of the MSW landfill that will be affected by these actions, the reason the actions are required, and any landfill gas collection system components that will be affected by these actions.*

2. *Construction start and finish dates, projected equipment installation dates, and projected shut down times for individual gas collection system components.*

3. *A description of the mitigation measures taken to minimize methane emissions and other potential air quality impacts.*

(K) Records of the equipment operating parameters specified to be monitored under §95469(b)(1) and §95469(b)(2) as well as records for periods of operation during which the parameter boundaries established during the most recent source test are exceeded. The records must include the following information:

1. *For enclosed flares, all 3-hour periods of operation during which the average temperature difference was more than 28 degrees Celsius (or 50 degrees Fahrenheit) below the average combustion temperature*

during the most recent source test at which compliance with §95464(b)(2) and §95464(b)(3)(A) was determined.

2. *For boilers or process heaters, whenever there is a change the location at which the vent stream is introduced into the flame zone pursuant to §95464(b)(3)(A)2.*

3. *For any owner or operator who uses a boiler or process heater with a design heat input capacity of 44 megawatts (150 MMBTU/hr) or greater to comply with§95464(b)(3), all periods of operation of the boiler or process heater (e.g., steam use, fuel use, or monitoring data collected pursuant to other federal, State, local, or tribal regulatory requirements).*

The County will comply with the record keeping requirements of this section. These records will be maintained at least five years and may be in paper or electronic format.

4.7.1.2 Gas Control Device Record Keeping Requirements

§95470(a)(2) The owner or operator must maintain the following records, whether in paper, electronic, or other format, for the life of each gas control device, as measured during the initial source test or compliance determination:

(A) The control device vendor specifications.

(B) The expected gas generation flow rate as calculated pursuant to §95471(e).

(C) The percent reduction of methane achieved by the control device determined pursuant to §95471(f).

(D) For a boiler or process heater, the description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance test.

(E) For an open flare: the flare type (i.e., steam-assisted, air-assisted, or non-assisted); all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in CFR 40 60.18 (as last amended 73 Fed.Reg.78209, December 22, 2008), which is

incorporated by reference herein; and records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame or the flare flame is absent.

The County will maintain the records required by this section, including device manufacturer specifications, gas generation flow rate calculations, and methane reduction achieved. If the Site adds a boiler, process heater, or open flare, the required data will be maintained for those devices as well.

4.7.1.3 Record Storage Requirements

§95470(a)(3) The owner or operator must maintain copies of the records and reports required by this subarticle and provide them to the Executive Officer within five business days upon request. Records and reports must be kept at a location within the State of California.

Records will be maintained and provided to the Executive Officer within five business days upon request.

4.7.2 §95470(b) – Reporting Requirements

4.7.2.1 Closure Notification Requirements

§95470(b)(1) Any owner or operator of a MSW landfill which has ceased accepting waste must submit a Closure Notification to the Executive Officer within 30 days of waste acceptance cessation.

(A) The Closure Notification must include the last day solid waste was accepted, the anticipated closure date of the MSW landfill, and the estimated waste-in-place.

(B) The Executive Officer may request additional information as necessary to verify that permanent closure has taken place in accordance with the requirements of any applicable federal, State, local, or tribal statues, regulations, and ordinances in effect at the time of closure.

The County will submit a Closure Notification to the Executive Officer within 30 days of waste acceptance cessation in compliance with this requirement.

4.7.2.2 Equipment Removal Report Requirements

§95470(b)(2) A gas collection and control system Equipment Removal Report must be submitted to the Executive Officer 30 days prior to well capping, removal or cessation of operation of the gas

collection, treatment, or control system equipment. The report must contain all of the following information:

(A) A copy of the Closure Notification submitted pursuant to §95470(b)(1).

(B) A copy of the initial source test report or other documentation demonstrating that the gas collection and control system has been installed and operated for a minimum of 15 years, unless the owner or operator can demonstrate to the satisfaction of the Executive Officer that due to declining methane rates the landfill is unable to operate the gas collection and control system for a 15-year period.

(C) Surface emissions monitoring results needed to verify that landfill surface methane concentration measurements do not exceed the limits specified in §95465.

The County will submit an Equipment Removal Report to the Executive Officer 30 days prior to well capping, removal, or ceasing to operate GCCS equipment, in compliance with this requirement.

4.7.2.3 Annual Report Requirements

§95470(b)(3) Any owner or operator subject to the requirements of this subarticle, except §95463, must prepare an annual report for the period of January 1 through December 31 of each year. Each subsequent annual report must be submitted to the Executive Officer by March 15 of the following year. The annual report must contain the following information:

(A) MSW landfill name, owner and operator, address, and solid waste information system (SWIS) identification number.

(B) Total volume of landfill gas collected (reported in standard cubic feet).

(C) Average composition of the landfill gas collected over the reporting period (reported in percent methane and percent carbon dioxide by volume).

(D) Gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each control device.

(E) The date that the gas collection and control system was installed and in full operation.

(F) The percent methane destruction efficiency of each gas control device(s).

(G) Type and amount of supplemental fuels burned with the landfill gas in each device.

(H) Total volume of landfill gas shipped off-site, the composition of the landfill gas collected (reported in percent methane and percent carbon dioxide by volume), and the recipient of the gas.

(I) Most recent topographic map of the site showing the areas with final cover and a geomembrane and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface.

(J) The information required by §95470(a)(1)(A), §95470(a)(1)(B), §95470(a)(1)(C), §95470(a)(1)(D), §95470(a)(1)(E), and §95470(a)(1)(F)., §95470(a)(1)(H), and §95470(a)(1)(K).

The County will prepare an annual report in accordance with the above section, and will submit to the Executive Officer by March 15 of the following year.

4.7.2.4 Waste-in-Place Report Requirements

§95470(b)(4) *Any owner or operator subject to the requirements of §95463(a), or §95643(b)(2)(B)3 must report the following information to the Executive Officer:*

(A) MSW landfill name, owner and operator, address, and solid waste information system (SWIS) identification number.

(B) The landfill's status (active, closed, or inactive) and the estimated waste-in-place, in tons.

(C) Most recent topographic map of the site showing the areas with final cover and a geomembrane and the areas with final cover without a geomembrane with corresponding percentages over the landfill surface.

The Landfill does not meet the requirements of §95463(a) or §95463(b)(2)(B)3 because the County estimates approximately 1.5 million tons of waste in place as of the date of this Plan and the Landfill is active. Therefore, the Landfill is not subject to this Section.

4.7.2.5 Landfill Gas Heat Input Capacity Report Requirements

> *§95470(b)(5) Any owner or operator subject to the requirements of §95463(b) must calculate the landfill gas heat input capacity using the calculation procedures specified in §95471(b) and report the results to the Executive Officer within 90 days of the effective date of this subarticle or upon reaching 450,000 tons of waste-in-place. The calculation, along with relevant parameters, must be provided as part of the report.*

The County submitted a Heat Input Capacity Report on September 24, 2010. This report is on file with the CARB.

4.7.2.6 Report Certification Requirements

> *§95470(b)(6) Any report, or information submitted pursuant to this subarticle must contain certification by a responsible official of truth, accuracy, and completeness. This certification, and any other certification required under this subarticle, must state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.*

Reports submitted will be certified by an official meeting the description above.

4.8 §95471 – TEST METHODS AND PROCEDURES

4.8.1 §95471(a) – Hydrocarbon Detector Specifications

> *§95471(a) Any instrument used for the measurement of methane must be a gas detector or other equivalent instrument approved by the Executive Officer that meets the calibration, specifications, and performance criteria of EPA Reference Method 21, Determination of Volatile Organic Compound Leaks, 40 CFR Part 60, Appendix A (as last amended 65 Fed.Reg. 61744 (October 17, 2000)), which is incorporated by reference herein, except for the following:*
>
> *(1) "Methane" replaces all references to volatile organic compounds (VOC).*
>
> *(2) The calibration gas shall be methane.*

Instruments used to measure methane during SEM or from the GCCS will be calibrated as required by EPA Method 21.

4.8.2 §95471(b) – Requirements for Determination of Landfill Gas Heat Input Capacity

4.8.2.1 MSW Landfills without Carbon Adsorption or Passive Venting Systems

> *§95471(b)(1) The heat input capacity must be calculated using the procedure as specified in Appendix H. The Executive Officer may request additional information as may be necessary to verify the heat input capacity from the MSW landfill. Site-specific data may be substituted when available.*

The September 10, 2010 Heat Input Capacity Report used site-specific data to calculate the heat input capacity as specified in Appendix H of the LMR.

4.8.2.2 MSW Landfills with Carbon Adsorption Systems

> *§95471(b)(2) The landfill gas heat capacity must be determined by measuring the actual total landfill gas flow rate, in standard cubic feet per minute (scfm), using a flow meter or other flow measuring device such as a standard pitot tube and methane concentration (percent by volume) using a hydrocarbon detector meeting the requirements of 95471(a). The total landfill gas flow rate must be multiplied by the methane concentration and then multiplied by the gross heating value (GHV) of methane of 1,012 BTU/scf to determine the landfill gas heat input capacity.*

The Site will not have a carbon adsorption system for purposes of complying with the LMR, and therefore, the requirements of this Section do not apply.

4.8.2.3 MSW Landfills with Passive Venting Systems

> *§95471(b)(3) The landfill gas heat input capacity must be determined pursuant to both of the following and is the higher of those determined values:*
>
> *(A) §95471(b)(1); and*
>
> *(B) The owner or operator must measure actual landfill gas flow rates (in units of scfm) by using a flow measuring device such as a standard pitot tube and methane concentration (percent by volume) using a hydrocarbon detector meeting the requirements of §95471(a) from each venting pipe that is within the waste mass. Each gas flow rate must then be multiplied by its corresponding methane concentration to*

obtain the individual methane flow rate. The individual methane flow rates must be added together and then multiplied by the GHV of methane of 1,012 BTU/scf to determine the landfill gas heat input capacity.

The Site will not have passive vents. If passive vents are added, the calculation method in this section will be used if required to submit a heat input capacity report.

4.8.3 §95471(c) – Surface Emissions Monitoring Procedures

§95471(c) The owner or operator must measure the landfill surface concentration of methane using a hydrocarbon detector meeting the requirements of §95471(a). The landfill surface must be inspected using the following procedures.

4.8.3.1 Monitoring Area

§95471(c)(1) The entire landfill surface must be divided into individually identified 50,000 square foot grids. The grids must be used for both instantaneous and integrated surface emissions monitoring.

(A) Testing must be performed by holding the hydrocarbon detector's probe within 3 inches of the landfill surface while traversing the grid.

(B) The walking pattern must be no more than a 25-foot spacing interval and must traverse each monitoring grid.

1. *If the owner or operator has no exceedances of the limits specified in §95465 after any four consecutive quarterly monitoring periods, the walking pattern spacing may be increased to 100-foot intervals. The owner or operator must return to a 25-foot spacing interval upon any exceedances of the limits specified in §95465 that cannot be remediated within 10 calendar days or upon any exceedances detected during a compliance inspection.*

2. *If an owner or operator of a MSW landfill can demonstrate that in the past three years before the effective date of this subarticle there were no measured exceedances of the limits specified in §95465(a)(1) by annual or quarterly monitoring, the owner or operator may increase the walking pattern spacing to 100-foot intervals. The owner or operator must return to a 25-*

foot spacing interval upon any exceedances of the limits specified in §95465 that cannot be remediated within 10 calendar days or upon any exceedances detected during a compliance inspection.

(C) Surface testing must be terminated when the average wind speed exceeds five miles per hour or the instantaneous wind speed exceeds 10 miles per hour. The Executive Officer may approve alternatives to this wind speed surface testing termination for MSW landfills consistently having measured winds in excess of these specified limits. Average wind speed must be determined on a 15-minute average using an on-site anemometer with a continuous recorder for the entire duration of the monitoring event.

(D) Surface emissions testing must be conducted only when there has been no measurable precipitation in the preceding 72 hours.

This section contains general requirements for SEM, including the areas to be monitored, weather conditions, gridding, and spacing. The SEM Plan is attached in **Appendix A**. Alternative requests are in Section 5 of this GCCS Plan and duplicated in the SEM Plan.

4.8.3.2 Instantaneous Surface Emissions Monitoring Procedures

§95471(c)(2) Instantaneous Surface Emissions Monitoring Procedures.

(A) The owner or operator must record any instantaneous surface readings of methane 200 ppmv or greater, other than non-repeatable, momentary readings.

(B) Surface areas of the MSW landfill that exceed a methane concentration limit of 500 ppmv must be marked and remediated pursuant to §95469(a)(1).

(C) The wind speed must be recorded during the sampling period.

(D) The landfill surface areas with cover penetrations, distressed vegetation, cracks or seeps must also be inspected visually and with a hydrocarbon detector.

This section contains specific requirements for instantaneous SEM, including monitoring thresholds and required actions. The SEM Plan is attached in **Appendix A**. Alternative requests are in Section 5 of this GCCS Plan and duplicated in the SEM Plan.

4.8.3.3 Integrated Surface Emissions Monitoring Procedures

§95471(c)(3) Integrated Surface Emissions Monitoring Procedures.

(A) Integrated surface readings must be recorded and then averaged for each grid.

(B) Individual monitoring grids that exceed an average methane concentration of 25 ppmv must be identified and remediated pursuant to §95469(a)(2).

(C) The wind speed must be recorded during the sampling period.

This section contains specific requirements for integrated SEM, including monitoring thresholds and required actions. The SEM Plan is attached in **Appendix A**. Alternative requests are in Section 5 of this GCCS Plan and duplicated in the SEM Plan.

4.8.4 §95471(d) – Gas Collection and Control System Leak Inspection Procedures

§95471(d) Leaks must be measured using a hydrocarbon detector meeting the requirements of §95471(a).

The GCCS will be checked for leaks using a hydrocarbon detector meeting the requirements of §95471(a).

4.8.5 §95471(e) – Determination of Expected Gas Generation Flow Rate Requirements

§95471(e) The expected gas generation flow rate must be determined as prescribed in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Chapter 3, which is incorporated by reference herein, using a recovery rate of 75 percent.

Expected gas generation has been calculated in accordance with the above section, and the estimated LFG generation rates are included in Table 1.

4.8.6 §95471(f) – Control Device Destruction Efficiency Determination Requirements

4.8.6.1 Enclosed Combustors

§95471(f)(1) One of the following test methods, all of which are incorporated by reference herein (and all as promulgated in 40 CFR, Part 60, Appendix A, as last amended 65 Fed.Reg. 61744

(October 17, 2000)), at the pages cited below must be used to determine the efficiency of the control device in reducing methane by at least 99 percent, or in reducing the outlet methane concentration for lean burn engines to less than 3,000 ppmv, dry basis, corrected to 15 percent oxygen:

U.S. EPA Reference Method 18, Measurement of Gaseous Organic Compound Emissions By Gas Chromatography (65 Fed.Reg. at 62007);

U.S. EPA Reference Method 25, Determination of Total Gaseous Nonmethane Organic Emissions as Carbon (65 Fed.Reg. at 62044);

U.S. EPA Reference Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer (65 Fed.Reg. at 62062); or

U.S. EPA Reference Method 25C, Determination of Nonmethane Organic Compounds in Landfill Gases (65 Fed.Reg at 62066).

The following equation must be used to calculate destruction efficiency [see Rule for equation].

One of the above methods for determining methane destruction will be used to determine the methane destruction efficiency of the enclosed flares.

4.8.6.2 Open Flares

§95471(f)(2) Open Flares: Open flares must meet the requirements of 40 CFR 60.18 (as last amended 73 Fed.Reg. 78209,December 22,2008).

The County is not planning to install an open flare. If the County adds an open flare at a later date, it will comply with the requirements of this section.

4.8.7 §95471(g) – Determination of Gauge Pressure Requirements

§95471(g) Gauge pressure must be determined using a hand-held manometer, magnahelic gauge, or other pressure measuring device approved by the Executive Officer. The device must be calibrated and operated in accordance with the manufacture's specifications.

A Landtec GEM 2000 or equal meter will be used to measure gauge pressure. The Landtec GEM 2000 or equal meter uses a pressure transducer to determine pressure and is considered a standard industry practice.

4.8.8 §95471(h) – Alternative Test Methods Requirements

> *§95471(h) Alternative test methods may be used provided that they are approved in writing by the Executive Officer.*

Alternative test methods are requested in Section 5.

5.0 CARB LANDFILL METHANE RULE PROPOSED ALTERNATIVES

The following requirements allow for alternatives to the operational standards, test methods, procedures, compliance requirements, monitoring, record keeping, and reporting provisions to be requested in the design plan.

> ***§95464(a)(1)(D)*** *The Design Plan must include any proposed alternatives to the requirements, test methods, procedures, compliance measures, monitoring, and recordkeeping or reporting requirements pursuant to §95468.*
>
> ***§95468(a)*** *The owner or operator may request alternatives to the compliance measures, monitoring requirements, test methods and procedures of §95464, §95469, and §95471. Any alternatives requested by the owner or operator must be submitted in writing to the Executive Officer. Alternative compliance option requests may include, but are not limited to, the following:*
>
> > *(1) Semi-continuous operation of the gas collection and control system due to insufficient landfill gas flow rates.*
> >
> > *(2) Additional time allowance for leak repairs for landfills having consistent issues related to the procurement and delivery of necessary parts to complete the repair.*
> >
> > *(3) Alternative wind speed requirements for landfills consistently having winds in excess of the limits specified in this subarticle.*

The following proposed alternatives to 17 CCR, Article 4, Subarticle 6 requirements, arranged by general topic, comply with the intent of the regulation.

5.1 §95464 GCCS REQUIREMENTS

5.1.1 Alternative to §95464(a)(1)(F) – GCCS Design Capacity

§95464(a)(1)(F) requires that the GCCS be designed to handle the expected gas generation flow rate from the entire area of the MSW landfill as calculated pursuant to §95471(e), a gas generation model. These models can predict LFG generation rates that differ greatly from the recovered LFG rates. The capacity of the control system may increase or decrease over time as the amount and quality of LFG produced by the landfill changes. Therefore, the control device(s), or system chosen for the existing, interim, and future timeframes may vary depending on the site-specific LFG characteristics including the quantities produced, which are collected by the gas collection system. The preliminary design for the proposed GCCS is based upon the gas

generation models. For future upgrades, the Site proposes to use a design capacity based on actual LFG recovery data and supported by SEM results.

5.1.2 Alternative to §95464(b)(2)(A)(4) – Enclosed Flare Operating Parameters – LFG Flow Rate

§95464(b)(2)(A)(4) requires that an enclosed flare operated as a control device be operated within the parameter ranges established during the initial or most recent source test. The amount and quality of LFG collected by the GCCS is variable and will increase or decrease naturally based on waste disposal and decomposition. The Site proposes that the LFG flow rate and composition be allowed to vary from the flow measured during source tests.

5.1.3 Alternative to §95464(b)(2)(A)(4) – Enclosed Flare Operating Parameters – Flare Temperature

§95464(b)(2)(A)(4) requires that an enclosed flare operated as a control device be operated within the parameter ranges established during the initial or most recent source test. Methane destruction increases with flare temperature. The Site proposes that temperature be used as the monitoring parameter and that the flare be allowed to operate at any temperature higher than the most recent source test. The County also proposes that the flare be allowed to operate at up to 28° Celsius (50° Fahrenheit) less than the temperature from the most recent source test, averaged over three hours, excluding startup, shutdown, and malfunction events. This is the flare temperature standard established in the NSPS regulation for enclosed flares.

5.1.4 Alternative to §95464(b)(3)(A)(3) – Gas Control Device Operating Parameters – LFG Flow Rate

§95464(b)(3)(A)(3) requires that the gas control device be operated within the operating parameters established during the initial or most recent source test. For devices other than flares, alternative parameters are allowed. The amount and quality of LFG collected by the GCCS is variable. The County proposes that the LFG flow rate and composition be allowed to vary from the flow measured during source tests.

5.1.5 Alternative to §95464(c) – Wellhead Negative Pressure Requirements

§95464(c) requires that wellheads must be operated under negative pressure except as noted in §95464(c). §95464(e) allows GCCS components to be temporarily shut down to extinguish fires. It is not clear that §95464(e) allows wellheads to be operated at neutral or positive pressure in the case of a fire. The County proposes that individual wellheads be exempted from the negative pressure requirement when required to prevent or extinguish a subsurface fire.

5.2 §95469 MONITORING REQUIREMENTS

5.2.1 Alternative to §95469(a) – Surface Emission Monitoring Requirements

§95469(a) requires that owners or operators of landfills with a GCCS must conduct instantaneous and integrated SEM quarterly using the procedures specified in §95471(c). The Site proposes to conduct SEM as described in the SEM Plan provided as **Appendix A.** Alternatively, the Site proposes that both instantaneous and integrated SEM may be conducted simultaneously as described in the Los Angeles County Sanitation District Example Protocol, provided as Appendix B.

5.2.2 Alternative to §95469(a)(1)(B)(2) –New Well Installation After Third Instantaneous SEM Exceedance

§95469(a)(1)(B)(2) requires that the landfill owner or operator install a new or replacement well within 120 calendar days of detecting the third exceedances of the instantaneous SEM required by §95469(a). Modifications such as replacing the existing blower with a blower with higher capacity may take longer than the 20 days that can elapse between the first SEM exceedances and the third exceedances and may be the proper solution to the problem. The County proposes to allow GCCS modification to correct the SEM exceedance other than adding another well.

5.2.3 Alternative to §95469(a)(2)(B)(2) – New Well Installation After Third Integrated SEM Exceedance

§95469(a)(1)(B)(2) requires that the landfill owner or operator install a new or replacement well within 120 calendar days of detecting the third exceedance of the integrated SEM required by §95469(a). Modifications such as replacing the existing blower with a blower with higher capacity may take longer than the 20 days that can elapse between the first SEM exceedances and the third exceedances and may be the proper solution to the problem. The County proposes to allow GCCS modification to correct the SEM exceedance other than adding another well.

5.2.4 Alternative to §95469(c) – Wellhead Pressure Requirements

§95469(c) requires corrective action if monthly wellhead pressure monitoring results in a positive pressure reading except as exempted in §95464(d) and §95464(e), well raising and temporary shutdown, respectively. The County proposes that no action be required for wellheads which are under positive pressure under alternative compliance conditions requested in this GCCS Design Plan.

5.2.5 Alternative to §95469(c)(2) and §95469(c)(3) – Wellhead Pressure Corrective Action Requirements

§95469(c)(2) requires corrective action, including, but not limited to, any necessary expansion of the GCCS, to correct any positive pressure readings if positive pressure readings cannot be corrected after 15 days after the initial positive pressure reading. §95469(c)(3) requires

corrective action, including any necessary expansion of the GCCS, to correct any positive pressure readings if positive pressure readings must be completed within 120 days of the initial positive pressure reading. Expanding the GCCS may not be an effective corrective action if the blower is the limiting factor. In such a case, expanding the GCCS may actually decrease the effectiveness of the GCCS. Other circumstances may exist where expanding the GCCS may not be the proper corrective action and the effectiveness of such corrective actions should be evaluated on an individual basis. The Site proposes that GCCS expansion is not required but may be included in the corrective action required by§95469(c)(2) and §95469(c)(3). Other more appropriate corrective actions shall be allowed if properly documented.

5.3 §95471 TEST METHODS AND PROCEDURES

5.3.1 Alternative to §95471(c)(1) – SEM Area

§95471(c)(1) requires landfill owners/operators conduct SEM activities over the entire landfill surface. §95471(a)(4) states that alternative walking patterns to address potential safety and other issues can be proposed by the landfill owner and operator and approved by the Executive Officer. §95471(a)(5) states that landfill owners and operators can propose to exclude dangerous areas from the surface inspection. §95471(a)(6) states that landfill owners and operators can propose to exclude paved roads from the landfill surface inspection. The County proposes to exclude the areas with heavy vegetation. Heavy vegetation typically exceeds waist height at the landfill. Such vegetation inhibits air flow and creates stagnant air with artificially high concentrations of methane. Such vegetation can also pose a hazard during SEM events by creating an additional trip hazard.

5.3.2 Alternative to §95471(c)(1)(A) – SEM Height

§95471(c)(1)(A) requires that during SEM, the detector's probe be within three inches from the landfill surface. The County proposes that measurements be taken when the probe tip is within three inches of vegetation in areas where the landfill surface is covered with low-lying vegetation such as grasses and shrubs. Low lying vegetation is considered part of the landfill surface. It reduces air flow and can create stagnant air with artificially high concentrations of methane, and therefore, should be excluded from SEM performed for compliance with §95471(c)(1)(A).

5.3.3 Alternative to §95471(c)(1)(D) –SEM Conditions – Precipitation

§95471(c)(1)(D) requires that surface testing be conducted only when there has been no measurable precipitation in the preceding 72 hours. The Site receives approximately 95 percent of its annual rainfall during the rainy season (October through April), and measurable precipitation within 72 hours of scheduled quarterly SEM conducted during October through April could occur. The Site proposes that SEM will be terminated if measurable precipitation occurs within 24 hours of a scheduled SEM event during the rainy season. Every attempt will be made to adhere to the precipitation requirement in §95471(c)(1)(D).

5.3.4 Alternative to §95471(c)(2)(B) –Instantaneous SEM Marking and Remediation

§95471(c)(2)(B) requires that surface areas of the landfill that exceed the instantaneous methane limit of 500 ppmv must be marked and remediated pursuant to §95469(a)(1). The County proposes that exceedances of the 500 ppmv limit be remediated pursuant to §95469(a)(1) or as allowed in approved alternatives proposed in this GCCS Design Plan.

5.3.5 Alternative to §95471(c)(3)(B) –Integrated SEM Marking and Remediation

§95471(c)(3)(B) requires that surface areas of the landfill that exceed the integrated methane limit of 25 ppmv must be marked and remediated pursuant to §95469(a)(2). The Site proposes that exceedances of the 25 ppmv limit be remediated pursuant to §95469(a)(2) or as allowed in approved alternatives proposed in this GCCS Design Plan.

Tables

ATTACHMENT 4

TABLE 1. ESTIMATED METHANE GENERATION RATES AND CAPTURE RATES
EASTLAKE SANITARY LANDFILL, CLEARLAKE, CA

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Methane Production (Mg/yr)	LFG Production (scfm)	LFG Production (m3/hour)	75% Collection Efficiency (scfm)
1972	15,100	0	0	0	0	0
1973	16,500	15,100	34	7	12	5
1974	18,000	31,600	70	14	24	11
1975	19,700	49,600	108	22	38	17
1976	21,500	69,300	148	30	52	23
1977	23,500	90,800	191	39	67	29
1978	25,700	114,300	237	49	83	37
1979	28,100	140,000	286	59	100	44
1980	30,700	168,100	339	70	118	52
1981	33,600	198,800	396	81	138	61
1982	35,000	232,400	457	94	159	70
1983	36,400	267,400	519	106	181	80
1984	37,900	303,800	581	119	203	90
1985	39,400	341,700	645	132	225	99
1986	41,000	381,100	710	146	248	109
1987	42,700	422,100	776	159	271	119
1988	44,400	464,800	843	173	294	130
1989	46,200	509,200	912	187	318	140
1990	48,100	555,400	982	202	343	151
1991	47,100	603,500	1,054	216	368	162
1992	48,900	650,600	1,121	230	391	173
1993	29,000	699,500	1,189	244	415	183
1994	29,600	728,500	1,210	249	422	186
1995	49,400	758,100	1,232	253	430	190
1996	50,900	807,500	1,297	266	453	200
1997	47,300	858,400	1,364	280	476	210
1998	50,200	905,700	1,420	292	495	219
1999	43,200	955,900	1,480	304	516	228
2000	46,700	999,100	1,522	313	531	234
2001	47,200	1,045,800	1,571	323	548	242
2002	48,300	1,093,000	1,619	332	565	249
2003	45,800	1,141,300	1,667	342	582	257
2004	47,300	1,187,100	1,708	351	596	263
2005	48,500	1,234,400	1,751	360	611	270
2006	54,000	1,282,900	1,795	369	626	277
2007	51,300	1,336,900	1,850	380	646	285
2008	47,200	1,388,200	1,897	390	662	292
2009	47,200	1,435,400	1,933	397	674	298
2010	48,100	1,482,600	1,967	404	686	303
2011	49,100	1,530,700	2,002	411	699	308
2012	50,100	1,579,800	2,038	419	711	314
2013	51,100	1,629,900	2,075	426	724	320
2014	52,100	1,681,000	2,113	434	737	325
2015	53,200	1,733,100	2,152	442	751	331
2016	54,200	1,786,300	2,191	450	765	338
2017	55,300	1,840,500	2,232	458	779	344
2018	56,400	1,895,800	2,273	467	793	350
2019	57,500	1,952,200	2,316	476	808	357
2020	58,700	2,009,700	2,359	484	823	363
2021	59,900	2,068,400	2,404	494	839	370
2022	61,100	2,128,300	2,449	503	854	377
2023	62,300	2,189,400	2,495	512	871	384
2024	63,500	2,251,700	2,543	522	887	392
2025	0	2,315,200	2,591	532	904	399

ASSUMED METHANE CONTENT OF LFG:	50%
METHANE CO2eq FACTOR:	21
OXIDATION FRACTION:	10%
SELECTED DECAY RATE CONSTANT (k):	0.038
SELECTED DEGRADABLE ORGANIC CARBON (DOC):	0.20

Figures

APPENDIX A

Surface Emissions Monitoring Plan

CARB RULE LANDFILL SURFACE EMISSIONS MONITORING PLAN

This surface emission monitoring (SEM) protocol has been developed for Eastlake Sanitary Landfill. This plan includes a description of the SEM sampling methods and procedures (including a topographic map with the SEM route), frequency of monitoring events, and record keeping procedures, that the County of Lake, Department of Public Services (County) will follow to demonstrate compliance with the surface methane emission standards as provided in Title 17 of the California Code of Regulations (17 CCR), Subchapter 10, Article 4, Subarticle 6, §95465.

SAMPLING METHODS AND PROCEDURES

A surface concentration of less than 500 parts per million by volume (ppmv) methane above background levels as determined by instantaneous SEM, and an average methane concentration of 25 ppmv as determined by integrated SEM, indicates proper operation of the gas collection and control system (GCCS). To determine if these levels are exceeded, the County will conduct instantaneous and integrated SEM in accordance with the following procedures and test method requirements of 17 CCR §95469(a)(1), §95469(a)(2), §95471(a) and §95471(c):

- Instantaneous and integrated SEM will be conducted by traversing the surface area of the landfill that contains buried waste with a portable monitor. The SEM walking pattern will traverse the landfill surface, divided into individual 50,000 square foot grids, along a pattern of parallel lines approximately 25 feet apart. SEM will also be conducted in any areas where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. Areas with slopes steep slopes (30 degrees and greater), other dangerous areas such as wet or icy surfaces, and construction areas will be excluded from SEM.

- If there are no exceedances of the methane concentration limits for instantaneous and integrated monitoring after four consecutive quarterly monitoring periods, the walking pattern spacing will be increased to 100-foot intervals. The County will return to a 25-foot spacing interval upon any exceedances of the methane concentration limits that cannot be remediated within 10 calendar days or upon any exceedances detected during a compliance inspection by the Air Resources Board.

- A portable monitor in general conformance with the calibration, specifications, and performance criteria of Title 40 of the Code of Federal Regulations, Part 60, Appendix A, Method 21 will be used to determine the methane concentrations. The instrument will be calibrated, according to the manufacturer's recommendations, for methane, diluted to a

nominal concentration of 200 ppmv in air. The detector probe will be positioned within 3 inches of the ground.

- Monitoring will be performed during typical meteorological conditions, and only when there has been no measurable precipitation in the preceding 72 hours. SEM will be terminated when the average wind speed exceeds five miles per hour or the instantaneous wind speed exceeds 10 miles per hour. Average wind speed will be determined on a 15-minute average using an on-site anemometer with a continuous recorder for the entire duration of the monitoring event and recorded during the sampling period.

- The background concentration will be determined by moving the probe inlet upwind and downwind outside the refuse permit boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

- Any instantaneous surface reading of methane of 200 ppmv or greater, will be recorded. Instantaneous surface readings that exceed a methane concentration limit of 500 ppmv, and integrated average surface methane concentrations that exceed 25 ppmv, will be marked in the field and the location of the exceedence will be identified on a topographic map of the landfill, drawn to scale with the location of both the grids and the GCCS identified. Corrective action such as cover maintenance or repair, or adjustment to the GCCS to increase the gas collection in the vicinity of each exceedence will be made and the location/grid will be re-monitored within 10 calendar days of the initial exceedence or, if inclement weather is observed, in accordance with the SEM variance. If the re-monitoring of the locations/grids shows a second exceedence, additional corrective actions will be taken and the location/grid will be re-monitored within 10 days of the second exceedence or, once again, in accordance with the SEM variance. A proposed corrective action plan and corresponding timeline will be submitted to the Administrator for approval for any location where the monitored methane concentration exceeds 500 ppmv above background three times within a quarterly period. The date, location, and value of each initial exceedence will be recorded, along with re-test dates and results.

FREQUENCY

Instantaneous and integrated SEM will be performed quarterly. If the methane concentration does not exceed 500 ppmv above the background methane concentration at any point as determined by instantaneous SEM, and an average concentration of 25 ppmv as determined by integrated SEM, for four consecutive quarterly monitoring periods in portions/areas of the landfill that are closed or inactive, monitoring will be performed annually in the areas/portions that are closed or inactive. The site will return to quarterly monitoring of the closed/inactive portions/area of the site if exceedances of the instantaneous and/or integrated methane

concentration limits are detected that cannot be remediated within 10 calendar days during the annual SEM event.

The site will also return to quarterly monitoring if any exceedances of the specified instantaneous and/or integrated surface methane concentration limits are detected during any compliance inspections.

RECORDKEEPING

Records will be kept for all exceedances of the methane concentrations limits for instantaneous and integrated SEM including the location of the affected location/grid, concentration in ppmv, date and time of measurement, the date and type of corrective action taken, any required re-monitoring and the re-monitored concentration in ppmv, wind speed during surface sampling, and the installation date and location of each well installed as part of a GCCS expansion. Records will also be kept of all instantaneous surface readings of 200 ppmv or greater. SEM records will be maintained with the site records for a period of five years in accordance with §95470(a)(3) and made available to the Executive Officer within five business days upon request.

APPENDIX B

Example Procedure for Conducting Integrated and Instantaneous Surface Monitoring

Example Procedure for Conducting Integrated and Instantaneous Surface Monitoring

The purpose of this document is to provide an example procedure for conducting integrated and instantaneous surface monitoring simultaneously. The regulation requires both integrated and instantaneous surface emissions monitoring to ensure that: 1) landfill surface methane standards are being met, 2) the gas collection system is being maintained and operated properly, and 3) to help identify specific areas where remediation of emissions may be required. Conducting instantaneous and integrated surface monitoring simultaneously would accomplish the requirements of the regulation while saving landfill owners and operators both time and resources.

This document presents an example procedure that was based on the Los Angeles County Sanitation District's (LACSD) monitoring procedures manual. LACSD has been conducting both integrated and instantaneous landfill surface monitoring as required under the South Coast Air Quality Management District's Rule 1150.1 for several years. The surface gas monitoring section of their manual provides detailed instructions on integrating the two sampling procedures and is used by their field staff to comply with Rule 1150.1; which contains surface monitoring requirements that are similar to the regulation.

The example procedure has been revised to address requirements that are specific to the regulation. The specifications in the example procedure are optional, unless described as required. Mention of trade names or commercial products in this document does not constitute endorsement or recommendation for use.

Overview of Surface Monitoring Procedures

Surface monitoring is conducted by continuously recording methane levels while traversing the landfill area in a systematic pattern § 95471(c). Samples are collected from within 3 inches of the landfill surface using a portable hydrocarbon detector [§ 95471(a) and § 95471(c)(1)(A)].

Integrated and instantaneous surface monitoring are conducted together during routine quarterly compliance monitoring. Usage of a hydrocarbon detector with data-logging capability (e.g., TVA 1000B or equivalent) enables integrated and instantaneous surface monitoring to be preformed simultaneously by recording methane readings at a short interval (e.g., every four to six seconds) along a path and averaging the results. In effect, the instrument provides the integrated surface methane measurement required by regulation. The continuous sampling and data logging of emission results over the short time interval allows instantaneous surface monitoring to be completed during the process.

Re-monitoring is required when emission levels exceed a threshold and is based on the type of monitoring for which the exceedance occurred (i.e., integrated monitoring is

performed for an integrated exceedance, and instantaneous monitoring is performed for a point source exceedance).

The major requirements for integrated and instantaneous surface monitoring are presented in Table 1 and summarized below:

1. The landfill disposal area is divided into 50,000 square feet (ft^2) grids as required in § 95471(c)(1). Current maps of the landfill should be maintained on-site. Due to the geometry of the disposal area, not all grids will measure 50,000 ft^2. All grids on the landfill surface must be sampled for methane at least quarterly, unless: 1) determined to be inaccessible and excluded from monitoring (see Table 4), or 2) the grids are in compliance with § 95469(a)(1)(C) or 95469(a)(2)(C) and can be monitored annually.

2. For integrated surface gas monitoring, methane level must be less than 25 ppmv for each grid [§ 95465(a)(2)].

3. For instantaneous surface gas monitoring, the methane level must be less than 500 ppmv at any point on the landfill surface [§ 95465(a)(1)]. All instantaneous surface monitoring measurements of 200 ppmv or greater must be recorded and reported [§ 95465(c)(2)(A) and § 95470(b)(3)(J)].

4. For any grid or area within a grid exceeding the integrated or instantaneous surface gas emission limit, remediation and re-monitoring of the grid or grid area must be conducted within the timelines specified in § 95469(a).

Table 1. Summary of Requirements for Integrated and Instantaneous Monitoring

Requirement	Limit/Specification
Monitor all accessible grids	Monitor once quarterly[1]
Integrated monitoring of all grids	< 25 ppmv average methane
Instantaneous monitoring of all grids	<500 ppm maximum methane[2]
Remediate and re-monitor any area that exceeds the emission limits	Timetables are specified in site-specific Compliance Plans[3]

1. Grids can be monitored annually if the conditions in § 95469(a)(1)(C) or 95469(a)(2)(C) are met.
2. Instantaneous surface methane readings of 200 ppmv or greater must be recorded pursuant to § 95471(c)(2)(A).
3. Timetables in Compliance Plans approved by the local air districts must also meet the requirements of the regulation.

Planning and Preparation

This section describes activities necessary to prepare for integrated and instantaneous surface gas monitoring. Table 2 provides a list of each activity, and further detail is included in the subsections that follow. Many of the activities described may require that results be recorded on data sheets. A sample data sheet is provided in Figure 2.

Table 2. List of Preparation Activities for Instantaneous and Integrated Monitoring

TASK	TIMING	COMMENTS
Obtain grid map	Daily	Print out or obtain grid map; use drawings from previous quarter if available.
Select grids and monitoring routes	Daily	A walking pattern with a 25-foot spacing interval in a 50,000-ft^2 grid[1]. A route of approximately 2,600 linear ft in a 50,000 ft^2 grid to be walked in 25 minutes is recommended.
Identify excluded areas	Quarterly	Sample all grids that can be monitored safely.
Inspect grid for accessibility	Prior to monitoring	Identify any items requiring attention before monitoring. As necessary, arrange to have brush or weeds removed from monitoring path.
Ensure area will be dry	3-5 days ahead of test	As necessary and to the extent possible, have irrigation shut off several days before testing.
Confirm weather conditions	Day of test	No rain in previous 72 hours (based on site rain gauge or local newspaper) [§ 95471(c)(1)(D)]; wind speed less than 5 mph for 15-min average or 10 mph instantaneous (based on hand held anemometer) [§ 95471(c)(1)(C)].
Prepare and calibrate equipment	Day of test	Prepare according to standard operating procedures.
Confirm safe conditions	Day of test	Confirm conditions are safe for monitoring. Use additional safety precautions as necessary so that all required areas are monitored.

1. Unless increased to a 100-foot spacing interval pursuant to § 95471(c)(1)(B)1. or § 95471(c)(1)(B)2.

Scheduling

Key factors to consider when scheduling surface gas grid monitoring are as follows:

1. Monitoring should always be started as early as possible in a quarter to assure that all monitoring is completed before the end of the quarter.

2. Grids to be monitored are selected daily and selection often depends on weather conditions, keeping in mind wind speed and rain requirements.

3. Re-monitoring and remediation activities should be incorporated into the quarterly schedule and typically take priority over routine monitoring.

Route Selection

This section describes methods for selecting sampling routes when excluding full or partial grids from monitoring. The entire landfill surface (except for exempt areas) must be monitored each quarter.

Ideal grid example. The monitoring path for an ideal grid (a 50,000 ft^2 rectangle) may resemble that shown in Figure 1. The walking pattern must be no more than a 25-foot spacing interval and must traverse each grid [§ 95471(c)(1)(A) and § 95471(c)(1)(B)]; unless the conditions in § 95471(c)(1)(B)1. or § 95471(c)(1)(B)2. are met and the spacing interval is increased to a 100-foot spacing interval. The sampling path resembles a "serpentine" pattern. A route of approximately 2,600 feet long in a 50,000 ft^2 grid to be walked in 25 minutes while using a 4-second sampling frequency is recommended. The walking pace should be approximately 100 feet per minute, except when limited by terrain or vegetation. This would yield about 375 data points per 50,000 ft^2 grid.

Irregular grid example. Different routes need to be used for grids with excluded areas or irregular shapes. Guidelines for selecting routes and sampling times for irregular grids are presented in Table 3. In these cases both the length of the traverse and the time taken to complete the traverse should be prorated to the percent of the total grid that can be sampled. For example, if only 70% (35,000 ft^2) of the area is sampled, the traverse length and sampling time are calculated as shown below:

Adjusted route length = 0.7 x 2,600 ft = 1,820 ft
Adjusted sample time = 0.7 x 25 minutes = 17.5 minutes

Note that since the proportion reduces both the distance and sample time, the speed at which the route is walked will remain the constant.

Grids with excluded areas. Grids with excluded areas will have less than 50,000 ft^2 of area available for traversing. In these cases both the length of the traverse and the time

taken to complete the traverse should be applied to the percent of the total grid that can be sampled.

Figure 1. Typical 50,000 Square Foot Grid and Walk Pattern

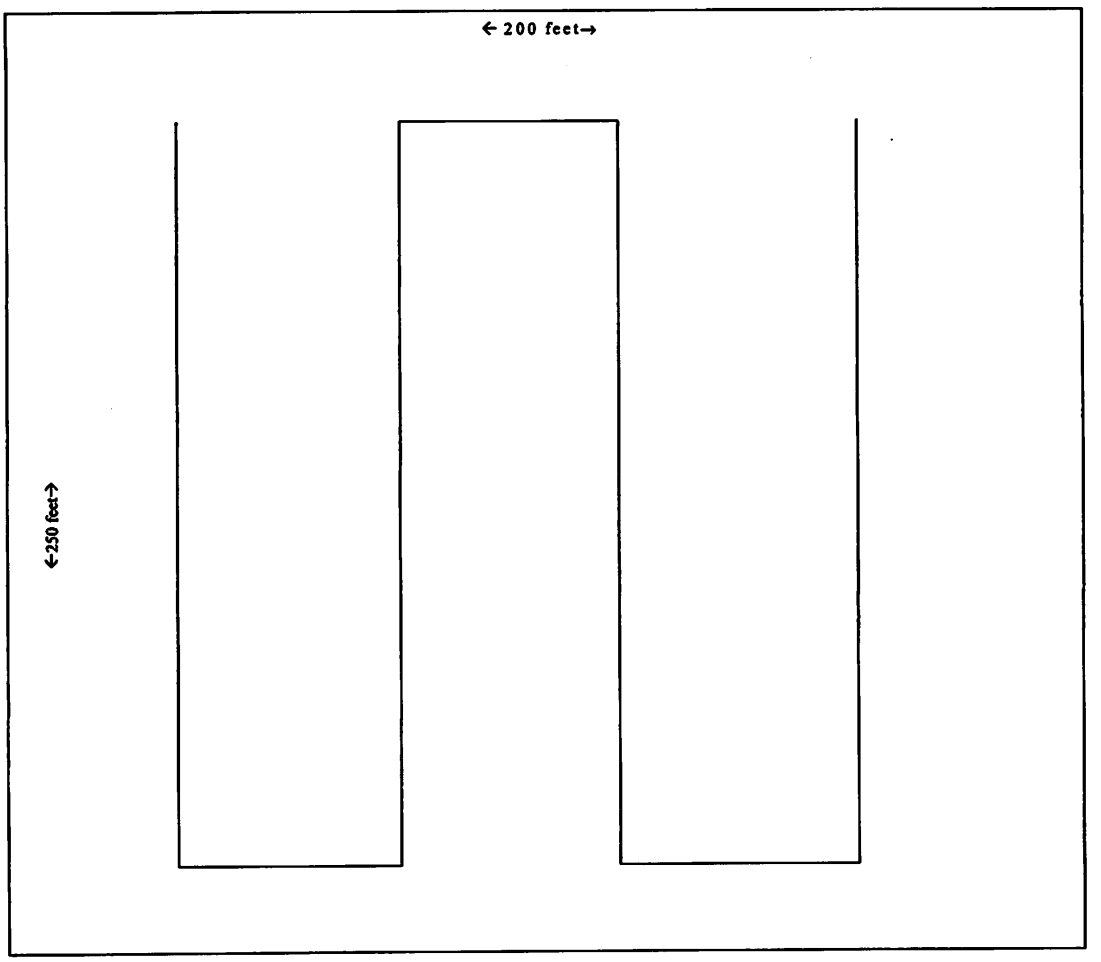

Table 3. Guidelines for Route Selection on Irregular Grids

ISSUE	ACTIONS
Grid has excluded area	1. Choose a representative route over remaining area. 2. Prorate length of route to fraction of grid sampled. 3. Prorate sampling time to fraction of grid sampled.
Grid has irregular shape and/or terrain	Adjust shape of route to provide complete, safe coverage.

Grids with irregular shapes or terrain. Some grids will have irregular shapes or terrain that will make walking a standard serpentine route impossible. In these cases, an alternate route should be developed that provides representative coverage of the grid.

Excluded areas. Table 4 presents reasons for excluding the following types of surfaces from monitoring as provide in § 95468 of the regulation:

- Steep or slippery slopes, construction areas or other dangerous areas.
- Paved areas (note that separations or cracks in paving must be monitored).
- Monitoring instrument obstruction and physical obstruction areas.
- The active working face.

Also, areas can be excluded if it can be demonstrated to the implementing agency that they are unsafe or inaccessible. If an area is inaccessible due to temporary conditions, such as construction or a wet surface, it should be checked again later in the quarter and monitored if it is accessible. Documentation of excluded areas meeting the criteria listed above should be noted on grid maps maintained on-site. Table 4 presents guidelines for determining if an area can or should be excluded from monitoring.

Although an area or a grid may not be routinely monitored, it is not exempt from compliance with the surface monitoring requirements of the regulation. Therefore, if there are signs of gas emission, such as distressed vegetation, cracks, odors, etc. the area must be monitored and repaired as necessary.

Grid Preparation

It is necessary to ensure ahead of time that the grid surface will be dry and accessible for monitoring. Steps taken to satisfy this requirement include:

- *Irrigation*. Make arrangements to shut off the irrigation a few days before monitoring if normal irrigation would render the grid unsafe to monitor. Monitoring should be planned around the irrigation schedule.
- *Vegetation*. Some types of vegetation are either unsafe to walk on or impractical to walk through. As necessary, and within the limits of the regulation or other restrictions, modifications to the landscape and vegetation should be considered to allow for safe monitoring of the grid. These modifications may include removal of vegetation or construction of a path to reach areas that are difficult to access. Vegetation removal generally excludes trees and bushes.

Table 4. Guidelines for Excluding Areas from Monitoring[1]

REASON FOR EXCLUSION	REFERENCE	COMMENTS
Steep or slippery slopes	§ 95468	
Paved areas	§ 95468	Must monitor cracks in pavement
Active working face	§ 95475(a)(20)	"Landfill surface" excludes the active working face
Thick or slippery vegetation	§ 95468	Cut vegetation or construct path as necessary, test when safe
Wet/muddy surface	§ 95468	Adjust irrigation; test when dry and safe. Monitoring takes precedence over irrigation
Uncorrectable unsafe conditions	§ 95468	Written submission and implementing agency approval required.

1. Areas excluded from monitoring must continue to comply with the regulation's methane emission limits. Repairs should be made if there are signs of emissions (distressed vegetation, cracks, odors, etc.).

Weather Conditions

The regulation includes several weather restrictions to ensure representative monitoring. These restrictions are:

1. Average wind speed less than 5 mph, based on 15-minute average [§ 95471(c)(1)(C)].

2. Instantaneous wind speed less than 10 mph [§ 95471(c)(1)(C)].

3. No measurable precipitation within the past 72 hours [§ 95471(c)(1)(D)].

Weather checks are performed as part of monitoring as follows:

1. At the beginning and end of each day, check and record wind speed and wind direction using the site weather station or other instrumentation. Relative humidity and barometric pressure can also be recorded.

2. Before and after monitoring each grid, measure and record wind speed using a hand held anemometer.

Equipment Preparation

A portable hydrocarbon detector meeting the specifications noted in the regulation should be used for sampling methane levels [§ 95471(a)]. The instrument used in this

example procedure document for conducting both integrated and instantaneous surface monitoring simultaneously is the TVA 1000B (other instruments meeting the requirements of § 95471(a) may also be used). The monitoring instrument should be maintained and serviced as specified in the operator's manual. Daily equipment preparation includes the following steps:

1. Turn on equipment and allow to warm up;
2. Fill hydrogen tank;
3. Calibrate; and
4. Input grid numbers into instrument.

Calibration. Details on equipment operation and calibration are included in the manufacturers equipment manual and in site-specific operating procedures. Critical calibration parameters that must be followed are listed in Table 5. If the analyzer does not meet calibration specifications, then it should be recalibrated or repaired, as necessary.

Table 5. Calibration Parameters for Surface Monitoring[1]

PARAMETER	SPECIFICATION	COMMENTS
Zero gas specification	Hydrocarbon free air, < 0.1 ppm	
Low span calibration gas concentration	5 ± 2 ppm	Optional
Mid span calibration gas concentration	25 ± 5 ppm	
High span calibration gas concentration	500 ± 25 ppm	
Instrument response on zero gas	0 ± 2 ppm	Take three readings
Instrument response on low gas	Gas value ± 0.5 ppm	Optional; take three readings
Instrument response on mid gas	Gas value ± 2 ppm	Take three readings
Instrument response on high gas	Gas value ± 15 ppm	Take three readings

1. Note-unless described as required, all specifications listed in this table are optional.

Setting up instrument grid number input files. At the start of the day, a data file is set up that contains the list of grids for integrated surface gas monitoring. This list is created on a personal computer and then uploaded to the instrument. For example, if grids 282, 283, and 284 are to be monitored, then these grid names are placed in a data file and transferred to the instrument. In addition, grid names are set up using the grid number

format as described above followed by a "P" (i.e.,"282P", "283P", and "284P", etc.) to denote instantaneous surface gas monitoring. When multiple instantaneous surface gas exceedances are discovered within the same grid, a number should follow the "P" to distinguish each separate monitoring event (i.e., "282P1", "282P2", "282P3", etc.).

Safety. It is important that all monitoring be done safely. Work safely, follow the rules of safe work practice, and promptly report all unsafe practices and conditions to your supervisors. Supervisors shall ensure that employees obey safe work rules. Because of the need to monitor as much of the landfill surface as possible, there will be occasions when special safety precautions will need to be taken to allow monitoring. These include, but are not limited to:

1. Assuring that slopes are dry before monitoring;

2. Cutting paths through areas where vegetation is slippery, dangerous to walk through, or conceals hazards such as pipes, wire, sprinklers, etc.;

3. Wearing snake chaps in snake-prone areas; and

4. Tying off for fall protection when necessary.

Integrated Monitoring

This section outlines the steps to be taken during integrated monitoring. Instantaneous monitoring, which is usually part of integrated monitoring, is discussed later. It should be noted that proactive action is necessary during integrated monitoring to evaluate possible exceedances of the instantaneous concentration limit. Table 6 presents a checklist for integrated monitoring, and Figure 2 shows an example data sheet.

Table 6. Checklist for Integrated Monitoring

ITEM	COMMENTS
Confirm surface is dry	If wet, reschedule monitoring.
Check wind speed with hand held anemometer	≤ 5 mph average and ≤ 10 mph instantaneous required. Record on data sheet.
Visually assess grid to plan traverse	If not done previously, draw inaccessible areas on grid map.
Confirm instrument settings and operation	Record instrument number on data sheet.
Start monitoring	Note start time to cover grid.
Ensure proper monitoring technique	Hold probe within 3" of the landfill surface

Table 6. Checklist for Integrated Monitoring (Cont.)

During monitoring, look for signs of point sources	If potential point sources are seen, (a) suspend integrated monitoring and conduct instantaneous monitoring, or (b) flag area and return within 24 hours to conduct instantaneous monitoring.
Listen for alarm	If alarm goes off, (a) suspend integrated monitoring and conduct instantaneous monitoring, or (b) flag are and return within 24 hours to conduct instantaneous monitoring.
Finish monitoring	Note stop time on data sheet.
Note relevant comments on data sheet	Include exceedances and any unusual conditions.

Figure 2. Example Integrated Monitoring Data Sheet

Date	Grid No.	Instrument No.	Start Time	Wind Speed, Start	Stop Time	Wind Speed, End	Comments

Confirm surface is dry. If the surface is wet from irrigation, arrange to monitor when the surface is dry enough to safely walk the slopes.

Check wind speed. Using the hand held anemometer, measure and record the local wind speed. Site regional wind speeds are to be measured at a weather station situated at the landfill. The 15-minute average wind speed must be below 5 mph and the instantaneous wind speed is not to exceed 10 mph. If the wind speed exceeds specifications, monitoring for that grid will need to be rescheduled. One approach to minimizing wind problems is to schedule monitoring according to the time of day based on local weather patterns. For example, perform grid monitoring on calm days or in the morning in areas of the landfill that tend to have higher afternoon wind speeds.

Assess grid to plan traverse. Review the grid visually to plan the traverse. Identify all corners, boundaries, and inaccessible areas. If there is uncertainty about the steepness of a slope, it should be measured with an inclinometer. Previous grid drawings may

show inaccessible areas. If a drawing does not exist, then one should be prepared. The percentage of the grid that is accessible should be estimated each quarter and noted on the drawing.

Confirm instrument settings and operation. Confirm that the proper grid number is entered, and that the instrument is operating properly.

Start monitoring. Note and record start time.

Ensure proper monitoring technique. Proper monitoring technique includes the following:

- *Probe height*. Should be held within 3 inches of the landfill surface [§ 95471(c)(1)(A)].
- *Horizontal coverage*. While walking, the probe should be slowly moved from side to side to cover a path about 4-6 feet wide (or about 2-3 feet on each side).
- *Walking pace*. A constant walking pace of approximately 100 feet per minute should be maintained, except when limited by terrain or vegetation. If the pace is interrupted for more than 10-15 seconds for any reason, data logging should be paused.

Look for signs of emissions. While conducting integrated monitoring, the technician should look for signs of gas emissions such as surface cracks, distressed vegetation, and odors. If any of these signs are observed, then instantaneous monitoring should focus on these areas. If the instrument alarm sounds during integrated monitoring, then instantaneous surface gas monitoring (as described in the following section) should be performed. Instantaneous surface gas monitoring is typically conducted during integrated monitoring but can be conducted afterwards (preferably within 24 hours).

Listen for alarm. The alarm set point on the TVA should be set to comply with the integrated surface methane limit. When the alarm sounds, discontinue integrated monitoring, indicate the location where integrated monitoring was halted, switch the grid name in the instrument from the integrated grid name to the instantaneous grid name (i.e., from "282" to "282P1") then begin instantaneous monitoring. Every effort should be made to identify the source of elevated emission. Once the instance of instantaneous monitoring is completed, return to the location where integrated monitoring was halted and resume integrated surface gas monitoring.

End of monitoring. At the end of monitoring, the following information should be noted on the data sheet:

- Post-monitoring wind speed; and
- Comments on any exceedances or other unusual conditions.

Instantaneous Surface Gas Monitoring

Instantaneous surface gas monitoring has become one of the most critical aspects of the monitoring and sampling program. Like integrated monitoring, instantaneous monitoring requires that the entire disposal area be divided into 50,000 ft^2 grids and that each grid be monitored using a 25-foot spacing interval; unless the conditions in § 95471(c)(1)(B)1. or § 95471(c)(1)(B)2. are met and the spacing interval is increased to a 100-foot spacing interval. Performing instantaneous and integrated monitoring separately may be extremely labor intensive and costly. To monitor more efficiently, it is recommended to perform instantaneous and integrated monitoring together. While conducting integrated monitoring, various triggers are used to initiate instantaneous monitoring.

Instantaneous monitoring requires the recording and remediation of any "point source" within the gird. A point source is any specific location within a grid where the methane concentration is 500 ppm or greater and is considered an exceedance. During instantaneous surface gas monitoring a grid may have multiple point sources. A checklist for instantaneous monitoring is presented in Table 7. Discussions of the checklist items immediately follow the table. Note that for this discussion, the term "point source monitoring" refers to activities that are separate from integrated monitoring and are focused on identifying, locating, and quantifying point sources.

Table 7. Checklist for Instantaneous Monitoring

ITEM	COMMENTS
Triggers for instantaneous monitoring	a. Instrument alarm sounds. b. Odor of landfill gas detected. c. Evidence of leakage seen, such as cracks or distressed vegetation. d. Retest of remediated area with prior exceedance.
Install marker if methane > 500 ppm	
Search for maximum concentration	Conduct search with probe within 3 inches of the landfill surface.
Document exceedance	

Triggers for detailed instantaneous monitoring. The triggers to initiate instantaneous monitoring are:

- The instrument alarm sounds during integrated monitoring, signaling a concentration greater than the alarm set point. The alarm set point is determined based on site-specific and area-specific conditions. When the instrument alarm sounds, there are two options for instantaneous monitoring:
  - Suspend integrated monitoring and conduct point source monitoring immediately, or
  - Mark the location with a flag, and return to the grid within 24 hours to conduct point source monitoring in the flagged area.
- The odor of landfill gas is detected. Searches for the source of an odor can be conducted before, during, or after an integrated traverse.
- Evidence of leakage is seen, such as cracks or distressed vegetation. Evaluation of cracks can be conducted before, during, or after an integrated traverse.
- An area needs to be re-monitored following remediation of a prior exceedance. If the area methane level exceeded the instantaneous limit and not the integrated limit, only instantaneous monitoring needs to be done for the retest.

Insert flag if concentration greater than 500 ppm is measured. If the methane concentration is greater than 500 ppm at any time during monitoring, the location should be flagged to indicate an exceedance. If the exceedance extends over a large area, flags should be placed so as to outline the extent of the exceedance and the maximum concentration within the outlined area should be recorded.

Search for maximum concentration. When any of the triggering events occur, the maximum concentration within the area should be determined. This concentration is determined by thoroughly monitoring the area in question paying particular attention to surface cracks, odors, and areas of distressed vegetation. During this search the probe should be maintained within 3 inches of the landfill surface.

If the area of maximum concentration is greater than 500 ppm, it should be marked and recorded on the data sheet as an exceedance.

Document exceedance. If there is an exceedance, several steps need to be taken to document the exceedance:

- Record the exceedance in the comments section on the data sheet;
- Show the area of the exceedance on a grid map; and

- Enter the exceedance in the database.

Data Reduction, Reporting, and Record Keeping

After monitoring, the data collected must be downloaded, evaluated, and stored. Table 8 lists the data reduction and evaluation activities. Note that specific procedures may vary from site to site. Any discrepancies or questions should be directed to the appropriate personnel.

Table 8. Overview of Data Reduction and Evaluation Steps

ITEM	COMMENTS
Download data from hydrocarbon detector to computer	Saved as text (*.txt) file.
Initial quality assurance (QA) review of data	a. Errors in grid naming b. High values (exceedances) c. Low extreme values (possible instrument drift) d. Correct sample time e. Distribution of values within grid
File distribution	a. Leave text file as original data. b. Transmit data to appropriate personnel at end of quarter. c. Archived data file.
Data and file handling	a. Import text file into database. b. Delete extraneous lines. c. Ensure no interruptions in data. d. Format and review data for high and low data
Data and file handling: data filtering	a. Identify grids with levels > 200 ppm for possible investigation (area noted during monitoring). b. If any grid has more than 25 points with < 1 ppm, invalidate data due to instrument drift and re-monitor grid.
Data and file handling: data reduction	a. Determine number of data points in each grid; a 25-minute traverse should result in 375 data points. b. Determine highest concentration in each grid. c. Determine lowest concentration in each grid. d. Determine average concentration in each grid. e. Determine how many instantaneous methane readings were over 200 ppmv for each grid.

Air Resources Board

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July 3, 2012

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JUL 05 2012
LAKE COUNTY AQMD

Ms. Caroline Chavez
County of Lake
Department of Public Services
333 Second Street
Lakeport, California 95453

RE: Gas Collection and Control Plan and Request for Alternative Compliance Options for the Eastlake Sanitary Landfill, SWIS # 17-AA-0001 Clear Lake, California

Dear Ms. Chavez:

Air Resources Board (ARB) staff has reviewed the County of Lake's (County) Gas Collection and Control Plan (Design Plan), the Supplemental Information submitted on June 13, 2011, and the Supplemental Information submitted October 25, 2011, for the Eastlake Sanitary Landfill (Site). The Design Plan was submitted pursuant to the "Regulation to Reduce Methane Emissions from Municipal Solid Waste Landfills," title 17, California Code of Regulations, subchapter 10, article 4, subarticle 6 (regulation). The Design Plan also included a section which discussed proposed alternative compliance options pursuant section 95468 of the regulation.

The following is our approval of the Design Plan and a summary of each alternative compliance request made by the County regarding the specific section of the regulation, together with a response as to whether the request was approved, or an explanation as to why the request was denied. We would like to make you aware that the Lake County Air Quality Management District (District) is planning to sign a Memorandum of Understanding (MOU) with ARB to implement and enforce the regulation. Although ARB staff has coordinated with District staff on this project, the District may have additional requirements. Please send any further correspondence regarding the Design Plan for the Eastlake Sanitary Landfill to the District with a copy to ARB.

Design Plan

- The County's Design Plan describes the Site's existing gas collection and control system (GCCS) and a plan for future modifications to upgrade the GCCS to achieve compliance with the regulation. The Design Plan has been reviewed for conformance with the specific provisions of section 95464(a)(1) of the regulation.

Based on that review, ARB staff have determined that the Design Plan includes those elements specifically required by section 95464(a)(1). The Design Plan was prepared and certified by a professional engineer. Relying upon that certification, the Design Plan appears to provide for those elements required to achieve the performance standards stipulated by section 95460 et seq. of the regulation. Accordingly, the Design Plan is approved as submitted subject to the following provisions:

- GCCS must be installed within 18 months from the date of this letter;
- GCCS must be installed, operated, maintained, and expanded in accordance with the design, procedures and schedules in the approved Design Plan;
- Any modifications to the GCCS shall meet the requirements of section 95460 et seq. of the regulation and the approved Design Plan must be amended to include any necessary updates or addenda, and must be certified by a professional engineer;
- An amended Design Plan must be submitted to the Executive Officer within 90 days of any event that requires a change to the Design Plan; and
- Comply with the reporting requirements stipulated by section 95470 of the regulation.

Alternative Compliance Option Requests

1. **5.1.1 Request:** ***Alternative to Sections 95464(a)(1)(F) – Gas Collection and Control System Design Capacity.*** Section 95464(a)(1)(F) requires that the GCCS be designed to handle the expected gas generation flow rate from the entire area of the MSW landfill as calculated pursuant to section 95471(e) a gas generation model. These models can predict landfill gas (LFG) generation rates that differ greatly from the recovered LFG rates. The preliminary design for the proposed GCCS is based upon the gas generation models. For future upgrades, the County proposes to use a design capacity based on actual LFG recovery data and supported by surface emission monitoring (SEM) results.

   Response: Approval is granted to the County to design future upgrades to the GCCS based on available site-specific LFG recovery data, as supported by SEM results. The design must ensure adequate capacity to maintain the collection and control efficiencies as required.

2. **5.1.2 Request:** ***Alternative to Section 95464(b)(2)(A)(4) – Enclosed Flare Operating Parameters – Landfill Gas Flow Rate.*** Section 95464(b)(2)(A)(4) requires that an enclosed flare be operated within the parameter ranges established during the initial or most recent source test. The amount and quality of LFG collected by the GCCS is variable and will increase or decrease naturally based on waste disposal and decomposition. The County proposes that the Site's

gas flow rate and composition be allowed to vary from the flow measured during source tests.

Response: No approval action is required. Inlet gas flow rate and composition are not parameters that the enclosed flare must be operated within. The enclosed flare must be designed to achieve a methane destruction efficiency of at least 99 percent by weight in accordance with section 95464(b)(2)(A)1.

3. **5.1.3 Request:** ***Alternative to Section 95464(b)(2)(A)(4) – Enclosed Flare Operating Parameters – Flare Temperature.*** As provided in sections 95464(b)(2)(A)(4) the County proposes that temperature be used as the monitoring parameter and that the flare be allowed to operate pursuant to the New Source Performance Standards' temperature criterion, which allows the operation of the flare at 28 degrees Celsius (50 degrees Fahrenheit) less than the temperature established during the most recent source test, averaged over three hours, excluding startup, shutdown, and malfunction (SSM) events.

   Response: Approval is granted to the County to use temperature as a monitoring parameter and to operate the enclosed flare pursuant to similar requirements specified in 40 Code of Federal Regulations, Part 60, Subpart WWW, 60.758(c)(1)(i). However, the County's enclosed flare must achieve a methane destruction efficiency of at least 99 percent by weight in accordance with section 95464(b)(2)(A)1.

4. **5.1.4 Request:** ***Alternative to Section 95464(b)(3)(A)(3) – Gas Control Device Operating Parameters – Landfill Gas Flow Rate.*** Section 95464(b)(3)(A)(3) requires that a gas control device be operated within the parameter ranges established during the initial or most recent source test. The amount and quality of LFG collected by the GCCS is variable. The County proposes that the Site's gas flow rate and composition be allowed to vary from the flow measured during source tests.

   Response: This request is not approved. The gas control device must be designed to achieve a methane destruction efficiency or outlet methane concentration in accordance with section 95464(b)(1)(A)1. ARB understands that the County may install a landfill gas-to-energy project at a future date. At that time, the county would need to submit an amended Design Plan as described in section 95464 (a)(5).

5. **5.1.5 Request:** ***Alternative to Section 95464(c) – Wellhead Negative Pressure Requirements.*** The County requests that individual wellheads be exempted from the negative pressure requirement when required to prevent or extinguish a subsurface fire, or when a well is decommissioned.

   Response: Pursuant to section 95468 of the regulation, approval is granted to the County to temporarily shut down or temporarily maintain a neutral or positive pressure measurement at any wellhead for the purpose of minimizing air intrusion to prevent or extinguish subsurface fires. During this period, methane emissions must be minimized pursuant to section 95464(a)(1)(D) and 95465, such that surface emissions will remain controlled. Individual shutdown of any well exceeding five days must be recorded pursuant to section 95470(1)(A). Corrective actions to mitigate any positive pressure reading must be completed within 120 days as required in section 95469(c). Individual wellheads are exempted from the negative pressure requirement when a well is decommissioned.

6. **5.2.1 Request:** ***Alternative to Section 95469(a) – Surface Emissions Monitoring Requirements.*** The County proposes to conduct separate integrated and instantaneous SEM, or simultaneous integrated and instantaneous SEM, as deemed necessary as provided in Appendix A and Appendix B, respectively.

   Response: No approval action required. It is the County's choice to either conduct the integrated and instantaneous SEM, simultaneously or individually, as long as the sampling meets the requirements. Please review the sample monitoring procedures which can be found in Appendix D of ARB's Implementation Guidance Document for the Regulation to Reduce Methane Emissions from Municipal Solid Waste Landfills July 2011(please see: http://www.arb.ca.gov/cc/landfills/docs/guidance0711.pdf).

7. **5.2.2 Request:** ***Alternative to Sections 95469(a)(1)(B)(2) – New Well Installation After Third Instantaneous Surface Emission Monitoring Exceedance.*** Section 95469(a)(1)(B)(2) requires that the landfill owner or operator install a new or replacement well within 120 calendar days of detecting the third exceedance of the instantaneous SEM monitoring required by section 95469(a). Modifications such as replacing the existing blower with a blower with higher capacity may take longer than the 20 days that can elapse between the first SEM exceedances and the third exceedances and may be the proper solution to the problem. The County requests to allow and utilize, where appropriate, GCCS modifications (e.g., replacing the existing blower with a blower with higher capacity) other than installation of additional wells to correct the SEM exceedance. Additional time may be needed to complete a modification to the GCCS.

Response: This request is not approved. As already allowed under section 95468(a), the County may explore other options as appropriate to comply with sections 95469(a)(1)(B)(2). However, as specified in section 95468(a), the County must first obtain approval from ARB in writing for any alternatives to the regulatory requirements, including extended time allowances for installation of GCCS equipment. Supporting documentation must be submitted as required.

8. **5.2.3 Request:** ***Alternative to Sections 95469(a)(2)(B)(2) – New Well Installation After Third Integrated Surface Emission Monitoring Exceedance.*** Section 95469(a)(2)(B)(2) requires that the landfill owner or operator install a new or replacement well within 120 calendar days of detecting the third exceedance of the integrated SEM monitoring required by section 95469(a). Modifications such as replacing the existing blower with a blower with higher capacity may take longer than the 20 days that can elapse between the first SEM exceedance and the third exceedance and may be the proper solution to the problem. The County requests to allow and utilize, where appropriate, GCCS modifications (e.g., replacing the existing blower with a blower with higher capacity) other than installation of additional wells to correct the SEM exceedance. Additional time may be needed to complete a modification to the GCCS.

   Response: This request is not approved. As already allowed under section 95468(a), the County may explore other options as appropriate to comply with sections 95469(a)(2)(B)(2). However, as specified in section 95468(a), the County must first obtain approval from ARB in writing for any alternatives to the regulatory requirements, including requests for extended time allowances for installation of GCCS equipment. Supporting documentation must be submitted as required.

9. **5.2.4 Request:** ***Alternative to Section 95469(c) – Wellhead Pressure Requirements.*** Section 95469(c) requires corrective action if monthly wellhead pressure monitoring results in a positive pressure reading except as exempted in sections 95464(d) and 95464(e), well raising and temporary shutdown, respectively. The County proposes that no action be required for wellheads which are under positive pressure under alternative compliance conditions requested in this letter.

   Response: See response to Item 5.

10. **5.2.5 Request:** ***Alternative to Section 95469(c)(2) and 95469(c)(3) – Wellhead Pressure Corrective Action Requirements.*** Section 95469(c)(2) requires correction action, including, but not limited to, any necessary expansion of the GCCS, to correct any positive pressure reading if positive pressure readings cannot be corrected after 15 days after the initial positive pressure reading.

Section 95469(c)(3) requires corrective action, including any necessary expansion of the GCCS, to correct any positive pressure readings if positive pressure readings must be completed within 120 days of the initial positive pressure reading. Expanding the GCCS may not be an effective corrective action if the blower is the limiting factor. The County proposes that the GCCS expansion is not required but may be included in the corrective action required by sections 95469(c)(2) and 95469(c)(3). Other, more appropriate, corrective actions, such as upgrading the blowers or header, should be allowed if properly documented.

Response: No approval action required. As already allowed under section 95468(a), the County may explore other options as appropriate to comply with sections 95469(c)(2) and 95469(c)(3).

11. ***5.3.1 Request: Alternative to Section 95471(c)(1) – SEM Monitoring Area.*** The Site is requesting to exclude from SEM areas that have heavy vegetation in addition to those which are dangerous, areas having monitoring and/or physical obstructions, slopes that are steep and/or slippery, active fill areas, road ways, improved surfaces such as parking areas, storage, and construction zones. These sites are delineated in the Supplemental Information dated October 25, 2011.

    Response: As provided in section 95468, areas that are dangerous, areas having monitoring and/or physical obstructions, slopes that are steep and/or slippery, active fill areas, road ways, improved surfaces such as parking areas, storage, and construction zones may be excluded from SEM. In addition, areas with heavy vegetation as identified in the Supplemental Information dated October 25, 2011, are granted approval to be excluded from SEM. However, if during an inspection by District or ARB staff it is determined that an area previously excluded from SEM is accessible and can be safely monitored; the exclusion may no longer apply to these areas.

    This approval does not relieve the County of the surface methane emissions standards specified in section 95465 for areas excluded from SEM. This includes, but is not limited to any area of the landfill surface that may indicate elevated concentrations of landfill gas, such as distressed vegetation, cracks, and seeps in the cover material.

12. ***5.3.2 Request: Alternative to Section 95471(c)(1)(A) – SEM Monitoring Height.*** The Site is proposing to take measurements when the probe tip is within three inches of vegetation in areas where the landfill surface is covered with low-lying vegetation such as grasses.

Response: In areas where the landfill surface is covered with low-lying vegetation such as grasses and surface monitoring cannot be conducted pursuant to section 95471(c)(1)(A), the County is granted approval to take measurements with the probe tip placed at the height of the vegetation.

13. ***5.3.3 Request: Alternative to Section 95471(c)(1)(D) – SEM Monitoring Conditions – Measurable Precipitation.*** Section 95471(c)(1)(D) requires that surface testing be conducted only when there has been no measureable precipitation in the preceding 72 hours. Due to the higher than average rainfall for the location, the Site proposes to terminate SEM if measurable precipitation occurs within 24 hours of a scheduled SEM event.

    Response: Based on the supporting precipitation data provided in Appendix D, the Site is granted approval to conduct SEM in accordance with the following precipitation evaporation rate limits (an onsite rain gauge is mandatory):

Precipitation Range (Inches)	Time Elements (Hours)
0.01 to 0.15	24
0.16 to 0.24	48
0.25 and greater	72

14. ***5.3.4 Request: Alternative to Section 95471(c)(2)(B) – Instantaneous SEM Monitoring Marking and Remediation.*** The Site proposes that exceedances of the 500 ppmv limit be remediated pursuant to section 95469(a)(1) or as allowed in this letter as an approved alternative.

    Response: This request is not approved. As already allowed under section 95468(a), the County may explore other options as appropriate to comply with sections 95469(a)(1). However, as specified in section 95468(a), the County must first obtain approval from ARB in writing for any alternatives to the regulatory requirements. Supporting documentation must be submitted as required.

15. ***5.3.5 Request: Alternative to Section 95471(c)(3)(B) – Integrated SEM Monitoring Marking and Remediation.*** The Site proposes that exceedances of the 25 ppmv limit be remediated pursuant to section 95469(a)(2) or as allowed in this letter as an approved alternative.

    Response: This request is not approved. As already allowed under section 95468(a), the County may explore other options as appropriate to comply with sections 95469(a)(2). However, as specified in section 95468(a), the County must

first obtain approval from ARB in writing for any alternatives to the regulatory requirements. Supporting documentation must be submitted as required.

Please note that approval of any alternative compliance option requests does not exempt the County from complying with other federal, State, or local laws, including but not limited to the requirements of a district rule or permit conditions. Additionally, any approvals may be subject to further review, request for additional information, and modification by ARB or the District.

If you have any questions, please contact Carolyn Craig at (916) 445-5516, or me at (916) 322-8285.

Sincerely,

Richard Boyd

Richard Boyd, Manager
Process Evaluation Section

cc: Renaldo Crooks
Air Pollution Specialist
Process Evaluation Section

Joseph J. Miller, P.E.
Vice President
SCS Engineers
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566

Doug Gearhart
Air Pollution Control Officer
Lake County AQMD
885 Lakeport Blvd.
Lakeport, California 95453-5405

ATTACHMENT 6
AUTHORITY TO CONSTRUCT PERMIT CONDITIONS

LAKE COUNTY AIR QUALITY MANAGEMENT DISTRICT
AUTHORITY TO CONSTRUCT

COUNTY OF LAKE DEPARTMENT OF SOLID WASTE MANAGEMENT
LANDFILL GAS COLLECTION AND CONTROL SYSTEM
EASTLAKE MUNICIPAL LANDFILL
A/C 2013-14

Equipment List: One (1) Landfill Gas Collection and Control System consisting of nineteen (19) or more extraction wells, ten (10) or more horizontal collection lines, a PEI enclosed Landfill Gas Flare (or equivalent) rated for 80 to 450 scfm gas, header and lateral piping, a blowers, and condensate collections sumps and automated control systems.

Location: Eastlake Municipal Landfill, 16015 Davis Avenue, Clearlake, CA 95422

Condition 1: Emissions

A. All equipment and components shall be regularly maintained in good working order pursuant to the manufacturer's recommendations and operated in a manner to prevent and/or minimize air emissions. The extraction wells, horizontal collectors, and landfill gas control systems shall be maintained in a vapor tight, leak free, and odor free condition during periods of operation. The control system shall operate within the manufacturer's specifications to ensure emission requirements.

B. Air emissions shall be directed to and abated by the landfill gas enclosed flare and destruction efficiency shall be 99% or better abatement for methane, 98% or better for NMOC and shall reduce NMOC concentrations to 20 parts per million by volume, or less, as hexane, dry basis at three (3) percent oxygen (O_2) or less, and shall reduce hydrogen sulfide (H_2S) to less than 0.03 parts per million. Total collection system emissions including air emissions from tanks, processing leaks and other fugitives shall not exceed one percent of influent methane concentration, nor one (1) pound per hour total non-methane volatile organic compounds (VOC's).

C. Visible emissions shall not exceed the values listed below for more than 3 minutes in any one (1) hour:

- Ringelmann 0.25 (5% opacity) from the flare stack;
- Ringelmann 1 (20% opacity) from all construction activities, equipment, and vehicle travel; and
- Ringelmann 1 (20% opacity) from diesel engine exhaust.

D. Automatic restart and/or shutdown controls shall be incorporated into the sysstem to prevent unabated landfill gas emissions. The system shall be set to shutdown upon the flare temperature dropping below 1,400 degrees F. Restarts and/or shutdowns shall be recorded in the system log

and the control system shall be set to notify the operator should restart fail or of a system shutdown.

Condition 2: Administrative
A. This permit has been issued and is valid for a Landfill Gas Control System as specified in the permit application and supporting documentation.

B. The extraction system shall be operated under vacuum conditions and in conformance with the operating parameters specified in the application, approved design plan, and approved alternative compliance options, which are incorporated by reference.

C. County of Lake Department of Solid Waste Management (COLDOSWM) shall comply with the requirements of the Air Toxics "Hot Spots" Information and Assessment Act as specified in Sections 44300 - 44394 of the California Health and Safety Code (H&SC).

D. Within 180 days of steady state operation, COLDOSWM shall apply for a Permit to Operate, and prove compliance with these conditions.

E. COLDOSWM shall maintain all operational and monitoring records for the previous five (5) years on-site or in the Public Services Office. Records must be available for review at the Landfill within four (4) hours of request. Easily readable copies of original documents meets this requirement.

Condition 3: Notification, Records, and Reporting
A. The Lake County Air Quality Management District (LCAQMD) shall be promptly notified should equipment breakdown or upon failure to meet the required emission limits.

B. COLDOSWM shall forward all air emissions test data taken during the first 180 days of operation to the LCAQMD, and demonstrate the emission control equipment meets emission limits for total VOC's and methane. Initial test results shall be provided within 45 days of sampling meeting both H&SC 95470(b)(3) and 40 CFR 60.756(g) and 40 CFR 60.8.

C. COLDOSWM shall submit an Annual report meeting the requirements of H&SC Section 95470(b)(3), to the LCAQMD upon request, and by March 15 of each year. Annual reports shall be submitted for the reporting period covering January 1 through December 31 and shall include the following: Landfill name, owner, operator, address, SWIS number; total volume of gas collected (CF), average composition of the lanfill gas collected during the reporting period (percent methane and percent carbon dioxide by volume); gas control device type, year of installation, rating, fuel type, and total amount of landfill gas combusted in each device; the date the gas collection and control system was installed and in full operation, the percent methane destruction efficiency of each gas control device, type and amount of supplemental fuels burned with the landfill gas in each device; the total volume of landfill gas shipped off-site, with composition and the recipient of the gas; the most recent topographic map of the site showing areas with final cover, geomembrane, and other areas with corresponding percentages over the landfill surface; all gas collection system downtime exceeding five calendar days (including

individual well shutdown, disconnection times, and the reason for the downtime); all gas control system downtime in excess of one hour, the reason for such, and the length of time the system was shutdown; expected gas generation flow rate per H&SC Section 95471(e); records of all instantaneous surface readings of 200ppmv or greater (methane), all exceedances of the 500 ppmv limit for methane from any gas collection system component under positive pressure, all exceedance of 500ppmv methane in surface monitoring, other than non-repeatable, momentary readings, as determined by the instantaneous surface emissions monitoring, exceedances of the average methane concentration limit of 25 ppmv methane as determined by integrated surface emissions monitoring, include the location of the leaks (or grid location), leak concentration in ppmv, date and time of measurement, the action taken to repair the leak, date of repair, any required re-monitoring and the re-monitoring concentration in ppmv, and wind speed during the surface sampling; the installation date and location of each well installed as part of a gas collection system expansion; records of any positive wellhead gauge pressure measurements, the date of the measurements, the well identification number, and corrective action taken; annual solid waste acceptance rate and the current waste in place; results of any source test, records for the enclosed flare temperature monitoring device and gas flow measuring device.

D. COLDOSWM shall submit a SemiAnnual report meeting the requirements of 40CFR 60.757(f), to the LCAQMD upon request, and by October 31 of each year. The initial report shall include the initial performance test report. All reports shall include reportable exceedance of system performance and surface monitoring, value and length of time for exceedance; description and duration of all periods when gas stream is diverted from the control device; description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the device was not operating; all periods when the collection system was not operating in excess of 5 days; the location of each exceedance of the 500ppm methane concentration during instantaneous surface monitoring and the concentration recorded at each location for which an exceedance was recorded in the previous monitoring event; and the date of installation and the location of each well or collection system expansion added, and the total hours of operation.

E. COLDOSWM shall maintain a written log indicating dates and times of operation, inspection and testing, and any maintenance or changes of operation. Said log shall be available at the site, entries made in ink, signed by the operator or his agent, and available to the LCAQMD immediately upon request.

Condition 4: Modification
A. COLDOSWM shall apply for and receive an Authority to Construct permit prior to the addition of new equipment, or significantly modifying the operational parameters.

Condition 5: Monitoring and Testing
A. Upon initial operation of the unit, the system and each well head shall be inspected and monitored for methane, O_2, and gas flow daily for the first week, and weekly thereafter for the first month. Within one hundred and eighty days (180) of initial operation or sixty (60) days of continuous steady state operation, samples shall be collected at the influent and effluent streams of the enclosed flare. Samples shall be sent to a certified laboratory for analysis of total VOC's

and methane. Local readings shall be compared to laboratory data. Alternative monitoring may be required upon receipt of laboratory analysis.

B. The system components shall be regularly inspected and tested (at least monthly) to verify system performance and emission control. Monthly monitoring shall include: measuring the gauge pressure in the gas collection header, monitoring nitrogen or oxygen concentrations, and monitoring temperature in the landfill gas at each wellhead.

C. Annual influent vapors to the flare station and flare effluent air stream samples shall be collected and sent to a certified laboratory for analysis of the parameters listed in Condition 5A, unless an alternate testing plan is approved in writing by the Air Pollution Control Officer. After three (3) years of source testing showing compliance with emissions limits, COLDOSWM may request to source test every three (3) years. Local readings shall be compared to laboratory data.

D. The LCAQMD shall be notified at least 72 hours in advance of any compliance test and provided an opportunity to observe and collect duplicate samples.

E. All effluent air stream monitoring and sample collection shall be collected prior to any system modifications or adjustments.

F. COLDOSWM shall have performed quarterly surface emissions monitoring for instantaneous and integrated monitoring requirements. Any instantaneous readings exceeding 500ppmv methane or any integrated readings exceeding 25ppmv methane shall be checked and verified, COLDOSWM shall notify the LCAQMD within one (1) business day and COLDOSWM shall initiate corrective action per H&SC Section 95469.

G. Any closed or inactive areas that have had no monitored exceedance for four (4) consecutive quarterly monitoring periods may request in writing to monitor annually.

H. The herein permitted facility shall not cause a public nuisance nor make a measurable contribution to any Ambient Air Quality Standard exceed. Should this facility result in odor or health complaints, the LCAQMD may require under Sections 430 and 670, monitoring, testing and mitigation by COLDOSWM to abate said condition.

Condition 6: Identification and Access

A. This permit shall be posted at the equipment site and be available for COLDOSWM's reference and LCAQMD staff inspection. If locks or unmanned gates are used to secure the project area, the LCAQMD or its representative will be given free access of entry for the purposes of monitoring or inspecting.

LAKE COUNTY AIR QUALITY MANAGEMENT DISTRICT

Douglas G. Gearhart
Air Pollution Control Officer

885 Lakeport Boulevard • Lakeport, CA 95453 • Tel 707-263-7000 • Fax 707-263-0421

Mr. Kim K. Clymire
County of Lake Dept. of Solid Waste Mgmt.
333 Second Street
Lakeport, CA 95453

October 26, 2009

RECEIVED
OCT 28 2009
PUBLIC SERVICES DEPT

1. Copy
2. Post on site
3. File
K

Subject: Permit Renewal

Dear Mr. Clymire:

Please find the enclosed renewal permit(s) for your Lake County facility. As always, please post a copy of the permit(s) (w/conditions) at the site. Feel free to contact Elizabeth Knight of my staff at (707) 263-7000, if you have any questions.

Sincerely,

Douglas G. Gearhart, APCO

By: Elizabeth Knight
Elizabeth Knight, Sr. AQS

EAK/DGG

Enclosure: Permit Card

DESIGNATED NON MAJOR STATIONARY SOURCE
PERMIT TO OPERATE

Lake County Air Quality Management District

885 Lakeport Blvd. Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # P/O 2003-11

By: Douglas Gearhart

Douglas G. Gearhart, APCO

Type of Issuance: Renewal *Issuance Date:* 10/31/2009 *Valid through:* 10/31/2010 *Category:* VII

Operations under this facility-wide permit shall be conducted in compliance with all component permit conditions, specifications, and data included with the applications under which those permits was issued. All associated equipment shall be properly maintained and kept in good condition and operated in a manner to minimize emissions at all times.

Contact:	Mr. Kim K. Clymire	*Facility:*	Eastlake Municipal Landfill
Owner:	County of Lake Dept. of Solid Waste Mgmt.	*Location:*	16015 Davis Street, Clearlake
Mailing Address:	333 Second Street Lakeport, CA 95453		

Name and Equipment Description: **Designated Non-Major Stationary Source - Eastlake Municipal Landfill**

One (1) Class III, Municipal Landfill and Class II Leachate Collection System and Impoundment, with One (1) CAT Model 623 E Diesel Powered Scraper, One (1) CAT Model 613 Diesel Powered Scraper, One (1) CAT D6C Diesel Powered Dozer, One (1) CAT Diesel Powered Track Loader, Two (2) CAT Model 826C Diesel Powered Landfill Compactors, One (1) DW Model 20 Diesel Powered Grid Roller, One (1) 1000 Gallon Capacity Above Ground Diesel Storage Tank with Secondary Containment, and One (1) Diesel Powered Water Truck.

Permit Conditions

Condition 1: Emissions

Total facility regulated air pollutants, including fugitive sources, shall be maintained below threshold levels subject to provisions of Lake County Air Quality Management District (LCAQMD) Regulation Chapter XII (or Environmental Protection Agency [EPA] Title V and III requirements), NSPS, NESHAP and as further described below. Any breakdown or upset condition shall be reported promptly, consistent with reporting requirements contained in Rule 510.

A. Facility emissions shall not exceed 95 tons per year (TPY) for any regulated air pollutant, nor 9.9 TPY for any single hazardous air pollutant, nor 24.5 TPY for any combination of hazardous air pollutants.

B. Emissions of non methane organic compounds (NMOC) shall be maintained below threshold levels (50 Mg/yr) of LCAQMD Regulation 441, NSPS, NESHAP, or County of Lake Department of Solid Waste Management (COLDOSWM) shall install and operate a gas collection and incineration device pursuant to those regulations.

C. The use of water, palliatives, oil, asphalt or other surfacing materials as appropriate shall be used on roads and yards within the facility to control particulate emissions. Regularly used roads shall be paved or chip sealed. Excavation, transport or maintenance activities involving serpentine rock or soils containing 0.25% or more asbestos shall be controlled to as near zero visible emissions as practical. COLDOSWM shall comply with the requirements of Section 467, LCAQMD Rules and Regulations, regarding surfacing materials and wearing surfaces.

D. Visible emissions shall not exceed the values listed below for more than three (3) minutes in any one (1) hour:

- Ringelmann 1 (20% opacity) for all excavation, loading, scraping, and compacting operations; and
- Ringelmann 1 (20% opacity) for diesel engine exhaust.

E. The Landfill, Class II surface impoundment, wet well(s), and pumping station shall all be properly managed and adequately treated to avoid causing an odor nuisance to adjacent residents. Hydrogen Sulfide (H2S) levels that exceed 8 parts per billion volume (ppbv) averaged for one hour at any residential property line adjacent to the project, shown to result from the operation of the source, shall be considered a nuisance and a violation of this condition. Additional mitigative measures shall be implemented by COLDOSWM to abate H2S odor nuisance pursuant to Section 510, and LCAQMD Rules and Regulations.

F. All accidental fires and breakdowns in process, monitoring, or emission control equipment shall be reported to the LCAQMD pursuant to Section 510, LCAQMD Rules and Regulations.

G. No burning of any kind is permitted at this facility.

Condition 2: Administrative and Work Practices

This Designated Non-Major Source permit has been issued for the Eastlake Municipal Solid Waste Landfill Facility, as an established Title

(Conditions 2 through 6 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

COUNTY OF LAKE
COMMUNITY DEVELOPMENT DEPARTMENT
Planning Division
Courthouse - 255 N. Forbes Street
Lakeport, California 95453
Telephone 707/263-2221 FAX 707/263-2225

ITEM #6
A.M. 11:00
September 28, 2006

STAFF REPORT

TO: Planning Commission

FROM: Mary Jane Fagalde, Community Development Director
Prepared by: Richard Coel, Assistant Director

SUBJECT: General Plan Conformity, GPC 06-10; CE 06-102
Supervisorial District 2

ATTACHMENTS:
1. Vicinity Map
2. Land Use Designation Map
3. Public Services Department Memorandum dated August 1, 2006

I. SUMMARY

The purpose of this agenda item is to confirm that the existing Eastlake Sanitary Landfill as well as a minor alteration to the operations permit is in conformity with the Lake County General Plan. The Lake County Environmental Health Division reviews the permit for the landfill, as mandated by the California Integrated Waste Management Board, every five years. A CEQA review and general plan conformance finding is needed for the "Report of Disposal Site Information".

II. PROPOSAL OUTLINE

APN:	010-008-03, 39 & 41 010-053-12 & 13
Location:	16015 Davis Street, Clearlake
Zoning:	"O', Open Space and "U", Unclassified
General Plan Designation:	Public Facilities
Existing Development:	County Landfill

III. GENERAL PLAN CONSISTENCY ANALYSIS

This general plan conformity report is necessary to comply with permit renewal requirements. A five- (5) year permit review mandated by the California Integrated Waste Management Board has resulted in an update to the Report of Disposal Site Information for the Eastlake Sanitary Landfill, which includes a proposal for minor alterations in the operation of the landfill to allow increased peak-day activities. The landfill has been in operation at this location since 1972. The current general plan does not contain specific policies related to this site. However, the Landfill is located on land designated Public Facilities by the 1981 General Plan. The General Plan describes the Eastlake Sanitary Landfill as the primary non-geothermal solid waste disposal facility in the county (and now the only facility) (page IV-86). Additionally, land uses in the vicinity of the landfill are limited by the Public Facilities designation. Continued operation of the existing facility and the minor alteration to allow increased peak-day activities as described in the Public Services Department memorandum dated August 1, 2006, which will not result in increases to the average daily tonnage or vehicle volume, can be found to be in conformance with the Lake County General Plan.

IV. RECOMMENDATION

Staff recommends the Planning Commission take the following actions:

A. Report that the Eastlake Sanitary Landfill remains in conformity with the Lake County General Plan for the following reasons:

1. This project is consistent with the Public Facilitates designation of the Lake County General Plan.

2. This project is consistent with Lake County General Plan objectives and policies related to public services.

3. The landfill remains compatible with surrounding low density and Service Commercial land uses.

B. Find that this proposal is categorically exempt from CEQA with the following findings:

1. This proposal is consistent with the Lake County General Plan.

2. This project will not have a significant effect on the environment.

3. The modifications included in the landfill operations document to allow

increased peak-day activities will not result in increased average daily vehicle trips or tonnage, and said modifications are exempt from CEQA pursuant to Class 1, for the continued operation and minor alteration of the existing site.

Sample Motions:

General Plan Conformity

I move that the Planning Commission report that the existing landfill operation located at 16015 Davis Street, Clearlake remains in Conformity with the Lake County General Plan.

Categorical Exemption

I move that the planning Commission find that the minor alterations specified in the Eastlake Sanitary Landfill's updated Report of Disposal Site Information are categorically exempt from CEQA as a Class 1 exemption.

Reviewed by: _____

FILED
COUNTY OF LAKE
PAM COCHRANE
COUNTY CLERK
By Janice K. Pankratz
DEPUTY CLERK

NOTICE OF EXEMPTION

TO: County Clerk
County of Lake
Lakeport, CA 95453

Office of Planning & Research
1400 Tenth Street, Room 222
P.O. Box 3044
Sacramento, CA 95812-3044

OCT 1 1 2006

FROM: Community Development Dept
Planning Division, County of Lake
255 North Forbes Street
Lakeport, CA 95453

PROJECT TITLE: Eastlake Sanitary Landfill, County of Lake
PROJECT LOCATION: 16015 Davis Street, Clearlake, CA
COUNTY: Lake APN's: 010-008-03, 37 & 41 & 010-053-12 & 13

DESCRIPTION OF PROJECT: Minor alteration to the operations permit for the Eastlake Sanitary Landfill.

NAME OF PUBLIC AGENCY APPROVING PROJECT:
Lake County Community Development Department

NAME OF PERSON OR AGENCY CARRYING OUT PROJECT:
County of Lake
255 N. Forbes Street
Lakeport, CA 95453

EXEMPT STATUS: Categorical Exemption Class one (1)

REASONS WHY PROJECT IS EXEMPT: Class 1 – Minor alterations of permit for existing public facilities for Eastlake Landfill, to allow increase in peak-day traffic and volume. No net increase in average weekly traffic or volume will result.

CONTACT PERSON: Richard Coel, Assistant Director
TELEPHONE NUMBER: 707-263-2221

Signature: Dana Bowen
Date: 10-11-06
Title: Office Assistant III

Signed by Lead Agency

ddb

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Posted OCT 1 1 2006 to Nov. 15, 2006

Appendix C

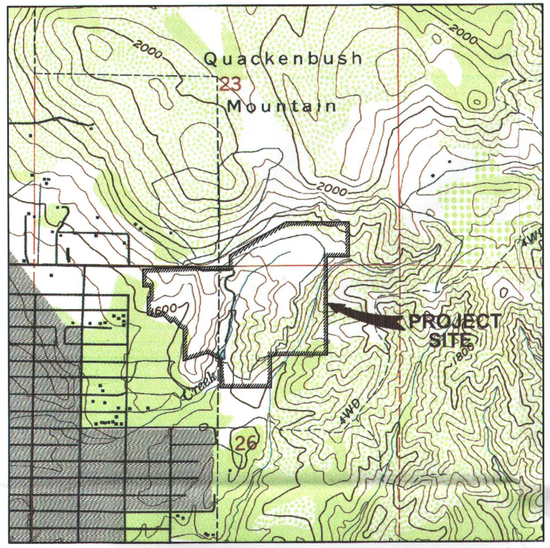
Drawings

PRELIMINARY CLOSURE

FOR

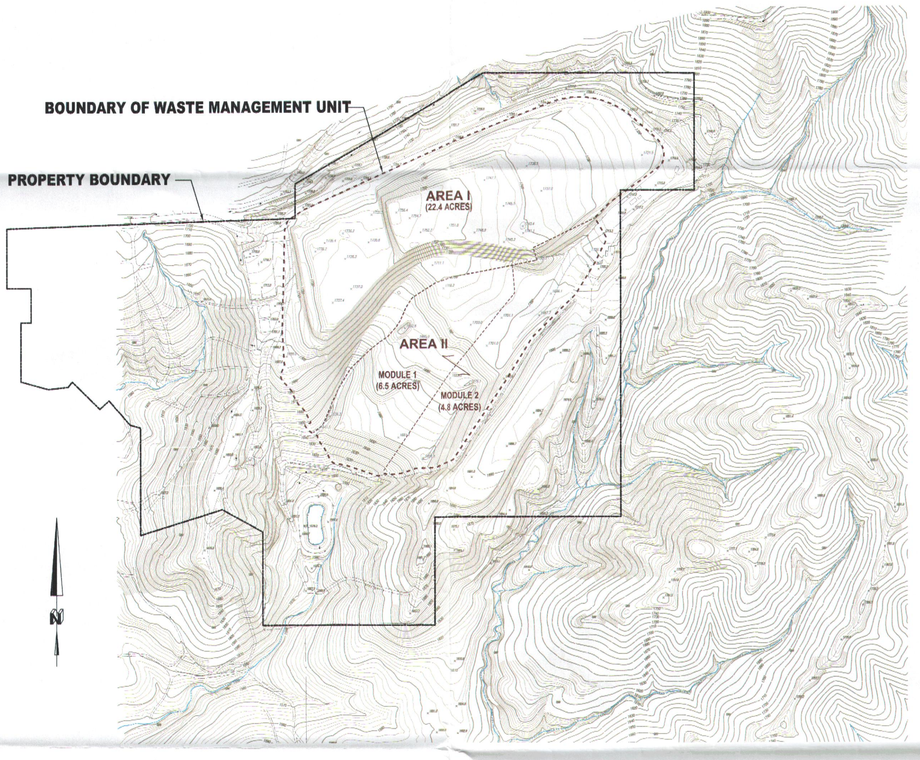
EASTLAKE SANITARY LANDFILL

COUNTY OF LAKE
STATE OF CALIFORNIA



REGIONAL TOPOGRAPHY

1" ~ 1000'



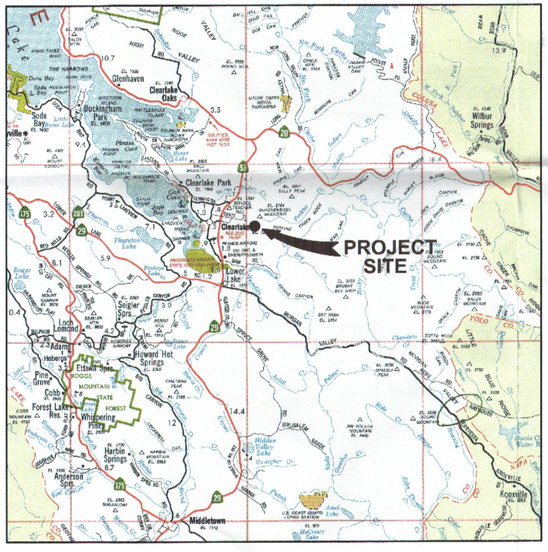
SITE MAP

300 0 300 600 900

SCALE : 1" = 300'

LEGEND

LCH	LOW HYDRAULIC CONDUCTIVITY
GCL	GEOSYNTHETIC CLAY LINER
HDPE	HIGH-DENSITY POLYETHYLENE
LCRS	LEACHATE COLLECTION AND REMOVAL SYSTEM
LFG	LANDFILL GAS
(E)	EXISTING
CMP	CORREGATED METAL PIPE
WWF	WELDED WIRE FABRIC
(TYP)	TYPICAL
MW-1	GROUNDWATER MONITORING WELL
EW-1	GROUNDWATER EXTRACTION WELL
SWMS-1	SURFACE WATER MONITORING POINT
LS-1	LCRS MONITORING POINT
LS-2	PAN LYSIMITER
GP-1	LFG MONITORING POINT
GP-7	PROPOSED LFG MONITORING POINT
G	SURVEY CONTROL MONUMENT MARKED WITH 1/2" REBAR



VICINITY MAP

NOT TO SCALE

GENERAL SITE INFORMATION

PROPERTY AREA: 80 ACRES
DISPOSAL AREA: 34.7 ACRES

DRAWING INDEX

REVISIONS	BY
1	
2	
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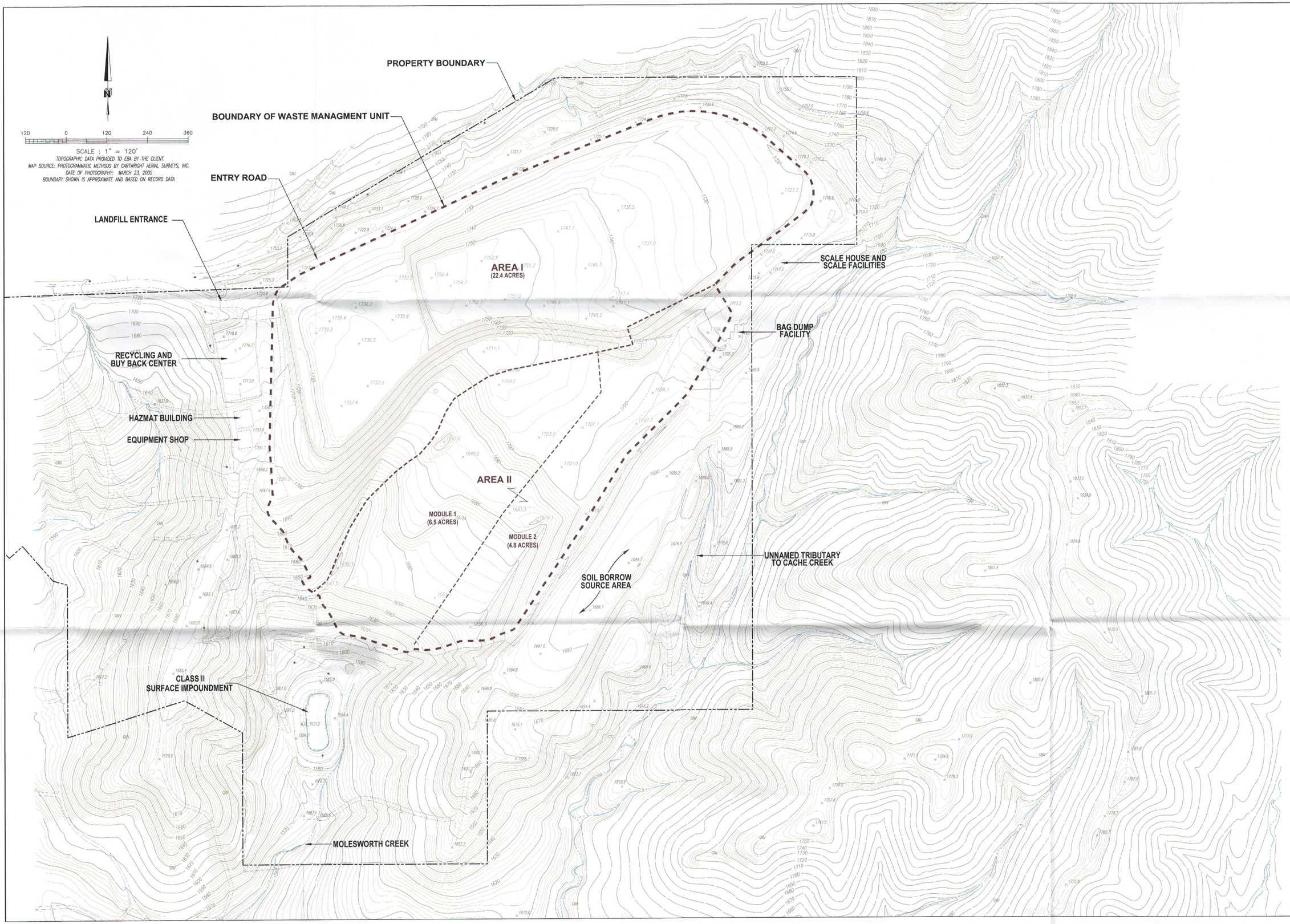
ENGINEERING
EBA
825 SONOMA AVENUE, SUITE C, SANTA ROSA, CALIFORNIA 95404
(707) 544-0784 FAX (707) 544-0866

EASTLAKE SANITARY LANDFILL

TITLE SHEET

LAKE COUNTY CALIFORNIA

DATE : JULY 2005
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
SHEET: **1**
1 OF 6 SHEETS



REVISIONS	BY
1	
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ENGINEERING
EBA
825 SONOMA AVENUE, SUITE C, SANTA ROSA, CALIFORNIA 95404
(707) 544-0784 FAX (707) 544-0866

EASTLAKE SANITARY LANDFILL

SITE PLAN

LAKE COUNTY CALIFORNIA

DATE : JULY 2005	
JOB : 05-1150	
SCALE : AS NOTED	
DRAWN BY: VAD	
SHEET:	2
	2 OF 6 SHEETS

Q:\1150\site plan.dwg, SITE PLAN, 07/29/2005 03:12:18 PM

±1000' RADIUS

APPROXIMATE PROPERTY LINE

N

200 0 200 400 600

SCALE : 1" = 200'

MAP SOURCE: LAKE COUNTY GIS
DATE OF PHOTOGRAPHY: COUNTYWIDE 1993 & CLEARLAKE 2001
BOUNDARY SHOWN IS APPROXIMATE AND BASED ON RECORD DATA

REVISIONS	BY
1	
2	
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(707) 544-0784 FAX (707) 544-0866

EASTLAKE SANITARY LANDFILL

LOCATIONS OF OFF-SITE STRUCTURES WITHIN 1,000 FEET

LAKE COUNTY CALIFORNIA

DATE : MAY 2005
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
SHEET: 3
3 OF 6 SHEETS

N

80 0 80 160 240

SCALE : 1" = 80'

TOPOGRAPHIC DATA PROVIDED TO EBA BY THE CLIENT.
MAP SOURCE: PHOTOGRAMMATIC METHODS BY CARTWRIGHT AERIAL SURVEYS, INC.
DATE OF PHOTOGRAPHY: MARCH 23, 2005
BOUNDARY SHOWN IS APPROXIMATE AND BASED ON RECORD DATA

CONCRETE LINED PERIMITER DITCH (TYP)

CMP DOWNDRAIN (TYP)

3H:1V

2%

8%

CMP CULVERT

CMP MANHOLE (TYP)

(E) CMP CULVERT

CMP INLET (TYP)

CMP CULVERT (TYP)

CMP DOWNDRAIN

ROCK RIP RAP OUTLET PROTECTION (TYP)

(E) CONCRETE LINED PERIMITER DITCH TO REMAIN

UNNAMED TRIBUTARY TO CACHE CREEK

CMP DOWNDRAIN (TYP)

2H:1V

MOLESWORTH CREEK

GNV

REVISIONS	BY
1	
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5	

EBA ENGINEERING
825 SONOMA AVENUE, SUITE C, SANTA ROSA, CALIFORNIA 95404
(707) 544-0784 FAX (707) 544-0686

EASTLAKE SANITARY LANDFILL

FINAL GRADING AND DRAINAGE PLAN

LAKE COUNTY CALIFORNIA

DATE	JULY 2005
JOB	05-1150
SCALE	AS NOTED
DRAWN BY	VAD
SHEET	4

4 OF 6 SHEETS

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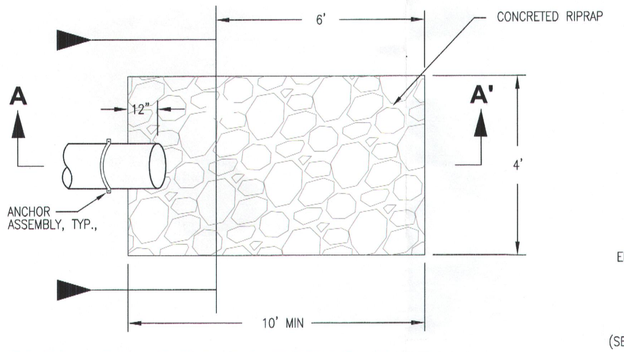
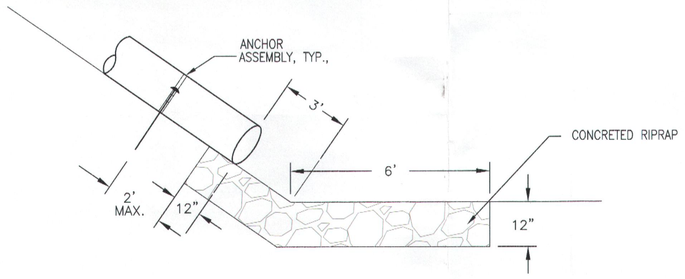


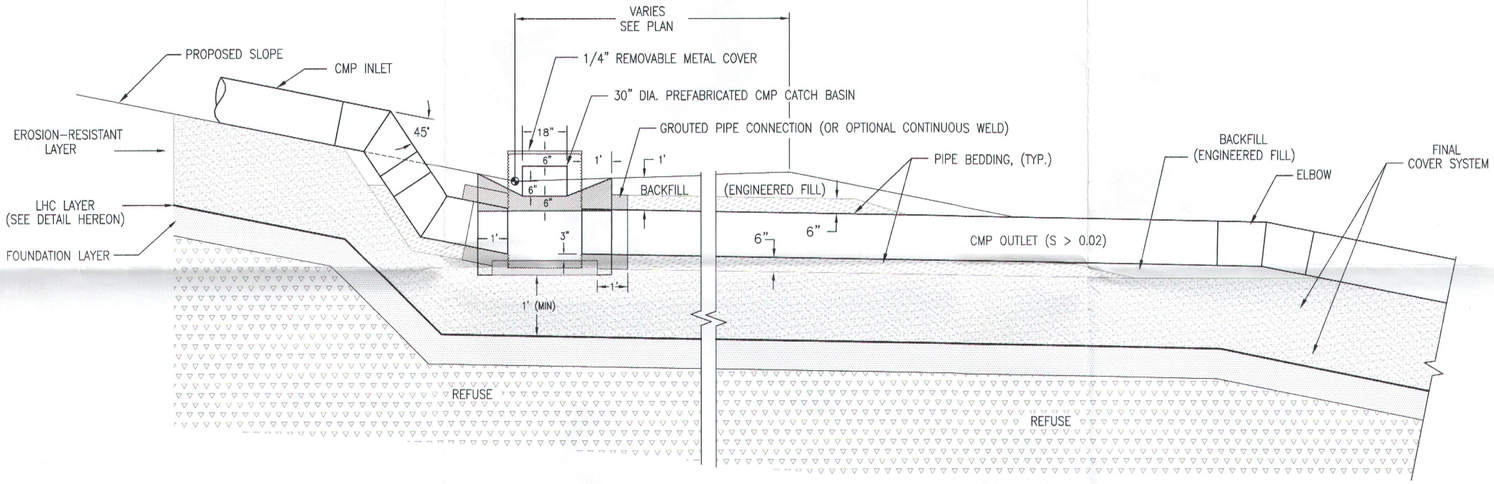
PLAN - CONCRETED RIPRAP OUTFALL

NOT TO SCALE



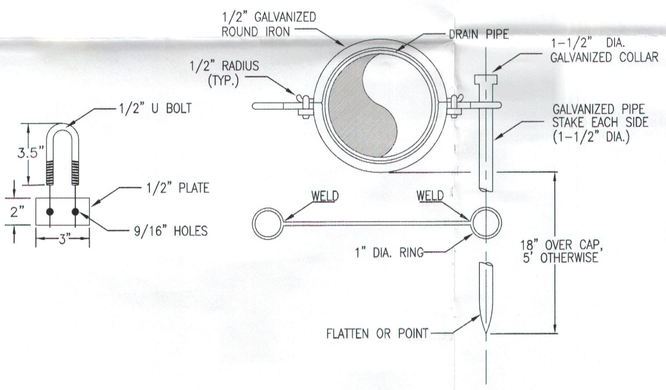
SECTION A-A' - CONCRETED RIPRAP OUTFALL

NOT TO SCALE



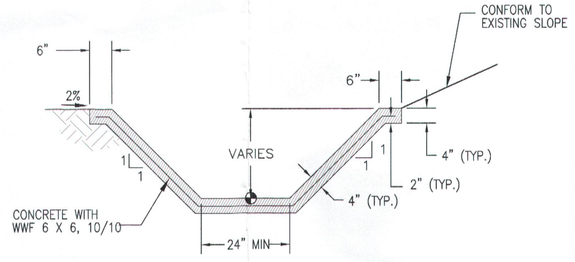
SECTION - BENCH AND DOWN DRAIN AT CMP CATCH BASIN

NOT TO SCALE



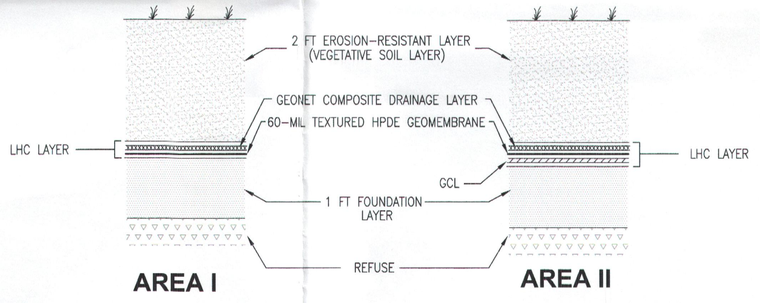
DOWN DRAIN ANCHOR ASSEMBLY

NOT TO SCALE



CONCRETE PERIMETER DITCH

NOT TO SCALE



FINAL COVER SYSTEM DESIGN

NOT TO SCALE

REVISIONS	BY
1	
2	
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ENGINEERING
EBA
825 SONOMA AVENUE, SUITE C, SANTA ROSA, CALIFORNIA 95404
(707) 544-0784 FAX (707) 544-0866
CALIFORNIA

EASTLAKE SANITARY LANDFILL

DETAILS

LAKE COUNTY

DATE : JULY 2005
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
SHEET:
5
5 of 6 SHEETS

TOPOGRAPHIC DATA PROVIDED TO EBA BY THE CLIENT.
MAP SOURCE: PHOTOGRAMMATIC METHODS BY CARTWRIGHT AERIAL SURVEYS, INC.
DATE OF PHOTOGRAPHY: MARCH 23, 2005
BOUNDARY SHOWN IS APPROXIMATE AND BASED ON RECORD DATA

PROPERTY BOUNDARY
BOUNDARY OF WASTE MANAGMENT UNIT
ENTRY ROAD
LANDFILL ENTRANCE
AREA I (22.4 ACRES)
AREA II
MODULE 1 (6.5 ACRES)
MODULE 2 (4.8 ACRES)
SCALE HOUSE AND SCALE FACILITIES
BAG DUMP FACILITY
RECYCLING AND BUY BACK CENTER
HAZMAT BUILDING
EQUIPMENT SHOP
CLASS II SURFACE IMPOUNDMENT
SOIL BORROW SOURCE AREA
UNNAMED TRIBUTARY TO CACHE CREEK
MOLESWORTH CREEK

GP-1 GP-2 GP-3 GP-4 GP-4A GP-5 GP-6 GP-7 GP-8
MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8 MW-9a MW-9b MW-10 MW-11 MW-12 MW-13 MW-14
EW-1 EW-2 EW-3
SWMS-1 SWMS-2 SWMS-3
LS-1 LS-2
A B C D E F G H I J K L M N O

LEGEND

- MW-1 GROUNDWATER MONITORING WELL
- EW-1 GROUNDWATER EXTRACTION WELL
- SWMS-1 SURFACE WATER MONITORING POINT
- LS-1 LCRS MONITORING POINT
- LS-2 PAN LYSIMITER
- GP-1 LFG MONITORING POINT
- GP-1 PROPOSED LFG MONITORING POINT
- G SURVEY CONTROL MONUMENT MARKED WITH 1/2" REBAR

REVISIONS	BY
1	
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3	
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EBA ENGINEERING
825 SONOMA AVENUE, SUITE C, SANTA ROSA, CALIFORNIA 95404
(707) 544-0784 FAX (707) 544-0866

EASTLAKE SANITARY LANDFILL

MONITORING AND CONTROL SYSTEMS

LAKE COUNTY CALIFORNIA

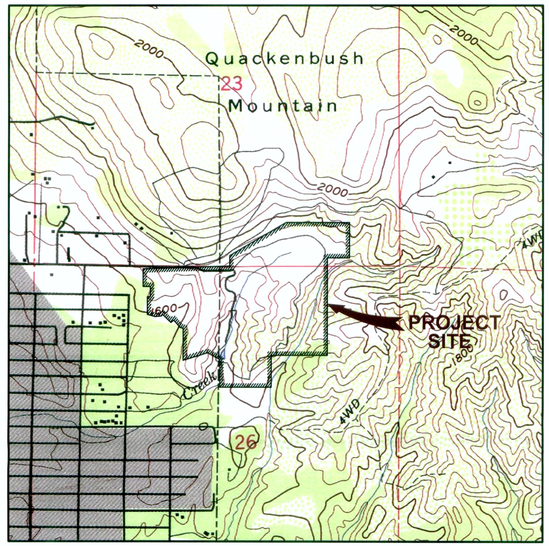
DATE : JULY 2005
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
SHEET: 6
6 of 6 SHEETS

REPORT OF DISPOSAL SITE INFORMATION

FOR

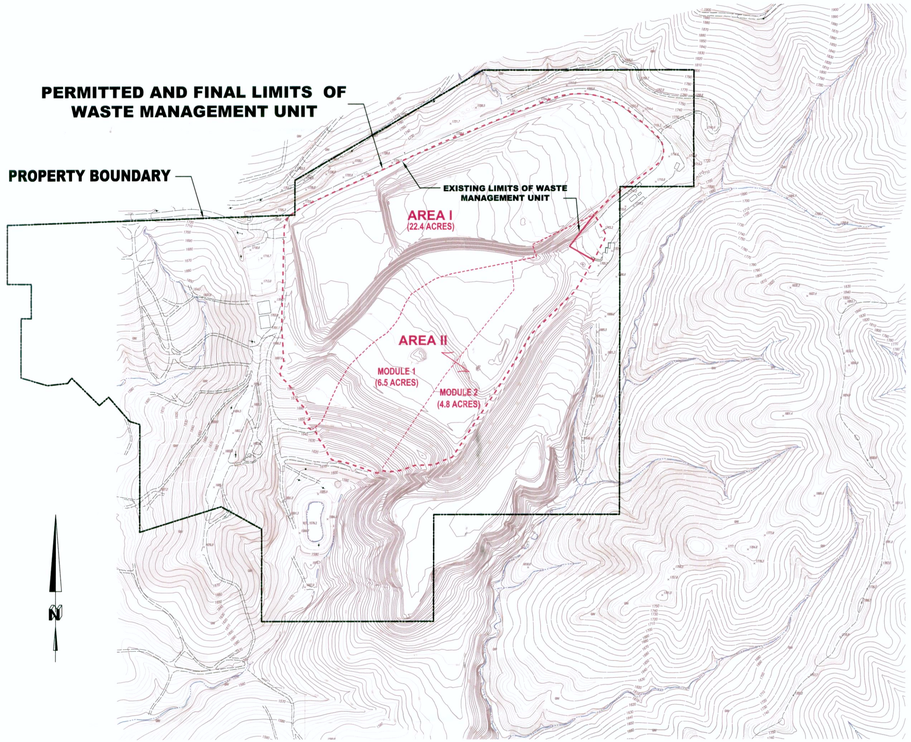
EASTLAKE SANITARY LANDFILL

COUNTY OF LAKE
STATE OF CALIFORNIA



REGIONAL TOPOGRAPHY

1" ~ 1000'



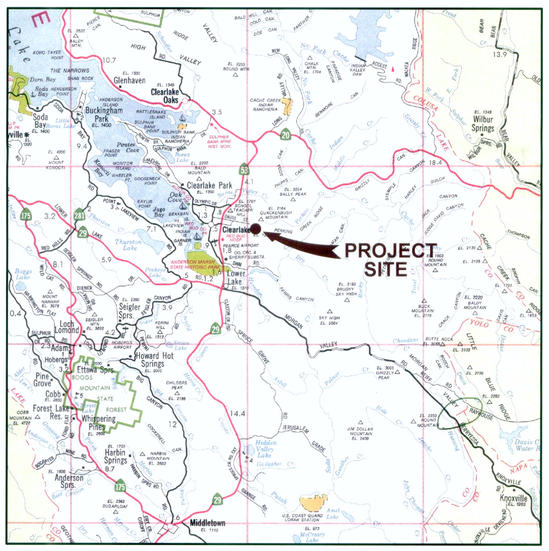
SITE MAP

600 300 0 300 600 900

SCALE : 1" = 300'

LEGEND

LCH	LOW HYDRAULIC CONDUCTIVITY
GCL	GEOSYNTHETIC CLAY LINER
HDPE	HIGH-DENSITY POLYETHYLENE
LCRS	LEACHATE COLLECTION AND REMOVAL SYSTEM
LFG	LANDFILL GAS
(E)	EXISTING
CMP	CORREGATED METAL PIPE
WWF	WELDED WIRE FABRIC
(TYP)	TYPICAL
MW-1	GROUNDWATER MONITORING WELL
EW-1	GROUNDWATER EXTRACTION WELL
SWMS-1	SURFACE WATER MONITORING POINT
LS-1	LCRS MONITORING POINT
LS-2	PAN LYSIMITER
GP-1	LFG MONITORING POINT
GP-7	PROPOSED LFG MONITORING POINT
	SURVEY CONTROL MONUMENT MARKED WITH 1/2" REBAR



VICINITY MAP

NOT TO SCALE

GENERAL SITE INFORMATION

PROPERTY AREA: 80 ACRES
DISPOSAL AREA: 34.7 ACRES

DRAWING INDEX

REVISIONS	BY
1 2006 06-29	DLH
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CALIFORNIA

EASTLAKE SANITARY LANDFILL

TITLE SHEET

LAKE COUNTY

DATE : SEPTEMBER 2008
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
SHEET:
1
1 OF 7 SHEETS

N

120 0 120 240 360

SCALE : 1" = 120'

TOPOGRAPHIC DATA PROVIDED TO EBA BY THE CLIENT.
MAP SOURCE: PHOTOGRAMMATIC METHODS BY CARTWRIGHT AERIAL SURVEYS, INC.
DATE OF PHOTOGRAPHY: JUNE 27, 2007
BOUNDARY SHOWN IS APPROXIMATE AND BASED ON RECORD DATA

PROPERTY BOUNDARY

PERMITTED AND FINAL LIMITS OF WASTE MANAGEMENT UNIT

ENTRY ROAD

LANDFILL ENTRANCE

EXISTING LIMITS OF WASTE MANAGEMENT UNIT

AREA I
(22.4 ACRES)

SCALE HOUSE AND SCALE FACILITIES

BAG DUMP FACILITY

RECYCLING AND BUY BACK CENTER

HAZMAT BUILDING

EQUIPMENT SHOP

AREA II

MODULE 1
(6.5 ACRES)

MODULE 2
(4.8 ACRES)

UNNAMED TRIBUTARY TO CACHE CREEK

CLASS II SURFACE IMPOUNDMENT

SOIL BORROW SOURCE AREA

MOLESWORTH CREEK

REVISIONS	BY
1	
2	
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CALIFORNIA

EASTLAKE SANITARY LANDFILL

SITE PLAN

LAKE COUNTY

DATE :SEPTEMBER 2008
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
SHEET: 2
2 OF 7 SHEETS

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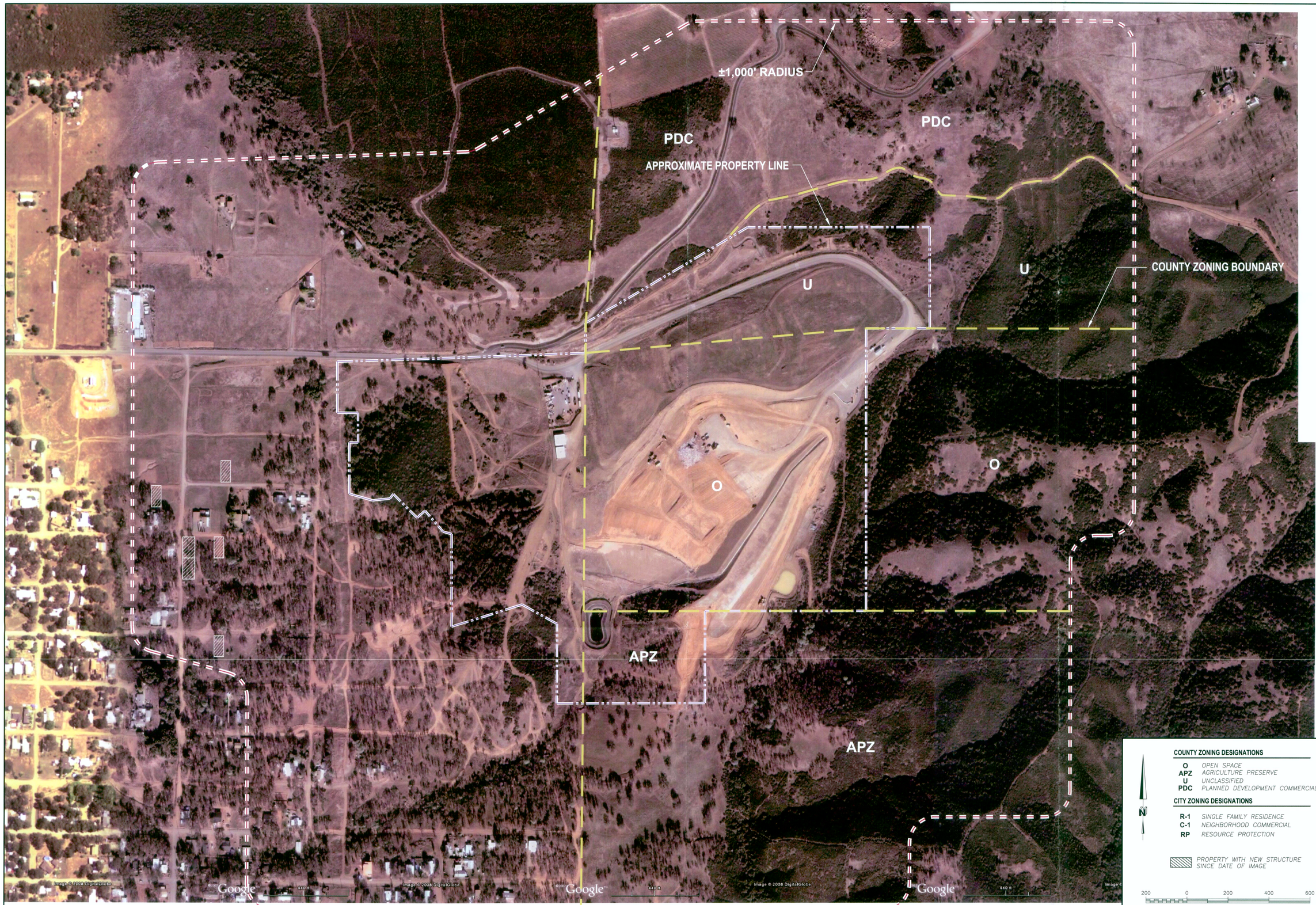

COUNTY ZONING DESIGNATIONS

O	*OPEN SPACE*
APZ	*AGRICULTURE PRESERVE*
U	*UNCLASSIFIED*
PDC	*PLANNED DEVELOPMENT COMMERCIAL*

CITY ZONING DESIGNATIONS

R-1	*SINGLE FAMILY RESIDENCE*
C-1	*NEIGHBORHOOD COMMERCIAL*
RP	*RESOURCE PROTECTION*

PROPERTY WITH NEW STRUCTURE SINCE DATE OF IMAGE

N

200 0 200 400 600

SCALE : 1" = 200'

REVISIONS	BY
1	
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CALIFORNIA

EASTLAKE SANITARY LANDFILL

OFF-SITE STRUCTURE AND LAND USE MAP

LAKE COUNTY

DATE :SEPTEMBER 2008

JOB : 05-1150

SCALE : AS NOTED

DRAWN BY: VAD

SHEET: **3**

3 OF 7 SHEETS

Q:\1150\Report of Disposal Site Information\SHEET 3.dwg, sheet 3, 9/11/2008 3:11:39 PM

N

120 0 120 240 360

SCALE : 1" = 120'

TOPOGRAPHIC DATA PROVIDED TO EBA BY THE CLIENT.
MAP SOURCE: PHOTOGRAMMATIC METHODS BY CARTWRIGHT AERIAL SURVEYS, INC.
DATE OF PHOTOGRAPHY: JUNE 27, 2007
BOUNDARY SHOWN IS APPROXIMATE AND BASED ON RECORD DATA

PROPERTY BOUNDARY

PERMITTED AND FINAL LIMITS OF WASTE MANAGEMENT UNIT

ENTRY ROAD

LANDFILL ENTRANCE

EXISTING LIMITS OF WASTE MANAGEMENT UNIT

AREA I
(22.4 ACRES)

SCALE HOUSE AND SCALE FACILITIES

BAG DUMP FACILITY

RECYCLING AND BUY BACK CENTER

HAZMAT BUILDING

EQUIPMENT SHOP

TEMPORARY CULVERT

PERMANANT SHOTCRETE DITCH

FUTURE CULVERT

AREA II

MODULE 1
(6.5 ACRES)

MODULE 2
(4.8 ACRES)

TEMPORARY CULVERT

TEMPORARY CULVERT
FUTURE CULVERT

PERMANANT CULVERT
FUTURE CULVERT
TEMPORARY CULVERT

UNNAMED TRIBUTARY TO CACHE CREEK

PERMANANT CULVERT

TEMPORARY CULVERT

CLASS II SURFACE IMPOUNDMENT

FUTURE SOIL BORROW SOURCE AREA

SOIL BORROW SOURCE AREA

FUTURE SEDIMENT POND WITHIN NEXT 5 YEARS

MOLESWORTH CREEK

REVISIONS	BY
1	
2	
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CALIFORNIA

EASTLAKE SANITARY LANDFILL

5- YEAR DRAINAGE PLAN

LAKE COUNTY

DATE : SEPTEMBER 2008
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
SHEET: 4
2 OF 7 SHEETS

Q:\1150\Report of Disposal Site Information\Sheet 4.dwg, drain plan, 9/12/2008 12:32:35 PM

N

160 0 160 320 480

SCALE : 1" = 160'

TOPOGRAPHIC DATA PROVIDED TO EBA BY THE CLIENT.
MAP SOURCE: PHOTOGRAMMATIC METHODS BY CARTWRIGHT AERIAL SURVEYS, INC.
DATE OF PHOTOGRAPHY: JUNE 27, 2007
BOUNDARY SHOWN IS APPROXIMATE AND BASED ON RECORD DATA

PROPERTY BOUNDARY

PERMITTED AND FINAL LIMITS OF WASTE MANAGEMENT UNIT

EXISTING LIMITS OF WASTE MANAGEMENT UNIT

ENTRY ROAD

LANDFILL ENTRANCE

AREA I
(22.4 ACRES)

AREA II

MODULE 1
(6.5 ACRES)

MODULE 2
(4.8 ACRES)

SCALE HOUSE AND SCALE FACILITIES

BAG DUMP FACILITY

RECYCLING AND BUY BACK CENTER

HAZMAT BUILDING

EQUIPMENT SHOP

CLASS II SURFACE IMPOUNDMENT

SOIL BORROW SOURCE AREA

UNNAMED TRIBUTARY TO CACHE CREEK

MOLESWORTH CREEK

MW-3 GP-2 LGMW-4 GP-1 MW-9b MW-9a SWMS-1 GP-4 GP-3 MW-16 LGMW-1 GP-4A MW-6 MW-5 MW-10 MW-15 LGMW-2 MW-7 LS-1 LS-2 MW-14 MW-13 LGMW-3 MW-8 GP-5 GP-7 GP-8 EW-3 EW-1 EW-2 MW-2 MW-1 GP-6 SWMS-3 SWMS-2 MW-11 MW-12

LEGEND

- MW-1 GROUNDWATER MONITORING WELL
- EW-1 GROUNDWATER EXTRACTION WELL
- SWMS-1 SURFACE WATER MONITORING POINT
- LS-1 LCRS MONITORING POINT
- LS-2 PAN LYSIMITER
- GP-1 / LGMW-1 LFG MONITORING POINT
- GP-7 PROPOSED LFG MONITORING POINT
- G SURVEY CONTROL MONUMENT MARKED WITH 1/2" REBAR

REVISIONS	BY
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CALIFORNIA

EASTLAKE SANITARY LANDFILL

MONITORING AND CONTROL SYSTEMS

LAKE COUNTY

DATE : SEPTEMBER 2008
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
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5 of 7 SHEETS

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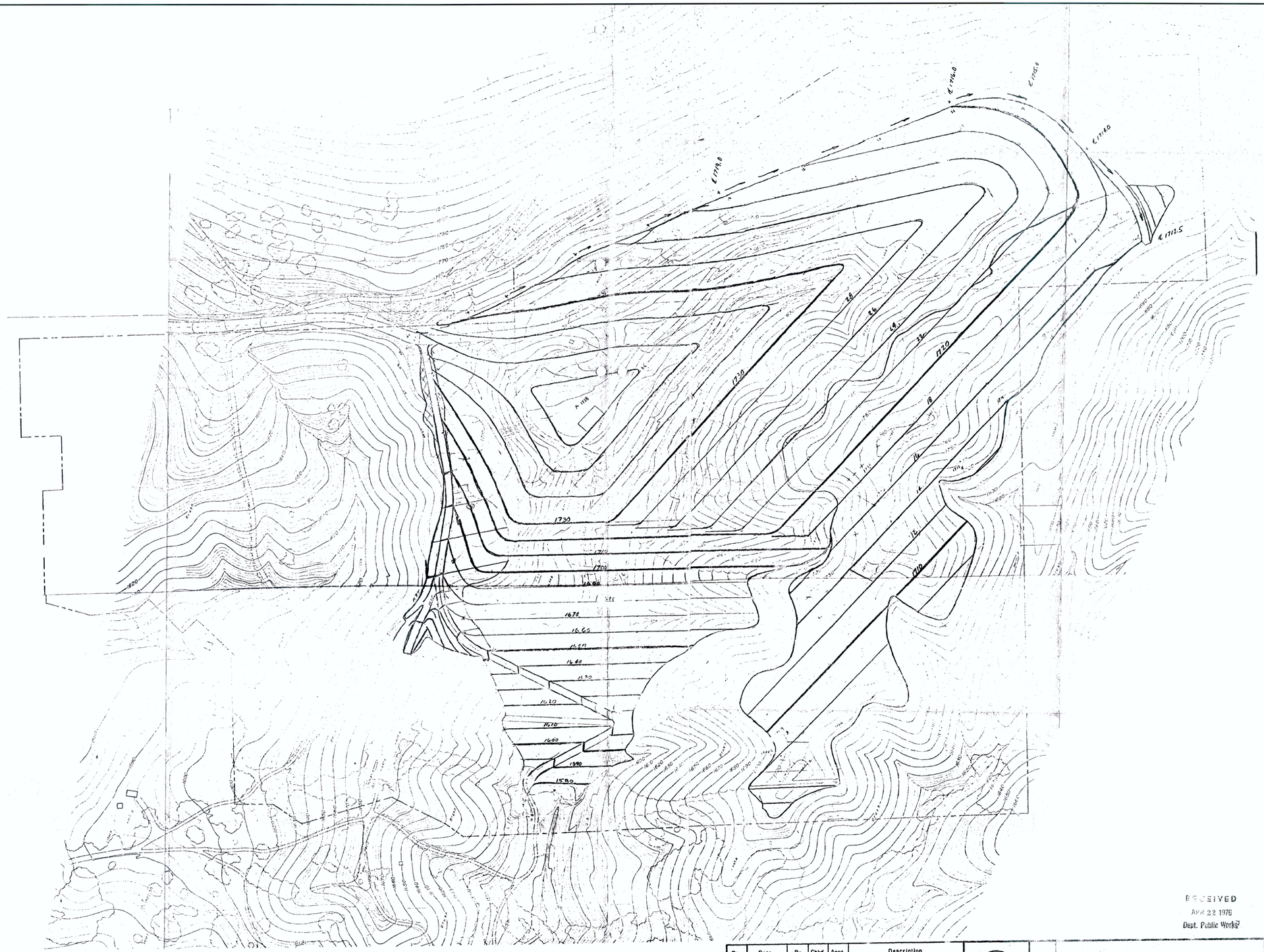

RECEIVED
APR 22 1976
Dept. Public Works

Rev.	Date	By	Chkd.	Appr.	Description
	4/76	RWE			Preliminary Layout Fill Contours

EMCON ASSOCIATES

EASTLAKE

Project No. 110-14 | Drawing No. 2

N

120 0 120 240 360
SCALE : 1" = 120'

REVISIONS	BY
1	
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EASTLAKE SANITARY LANDFILL

1976 LANDFILL TOPOGRAPHY

LAKE COUNTY CALIFORNIA

DATE : SEPTEMBER 2008
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
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6
6 OF 7 SHEETS

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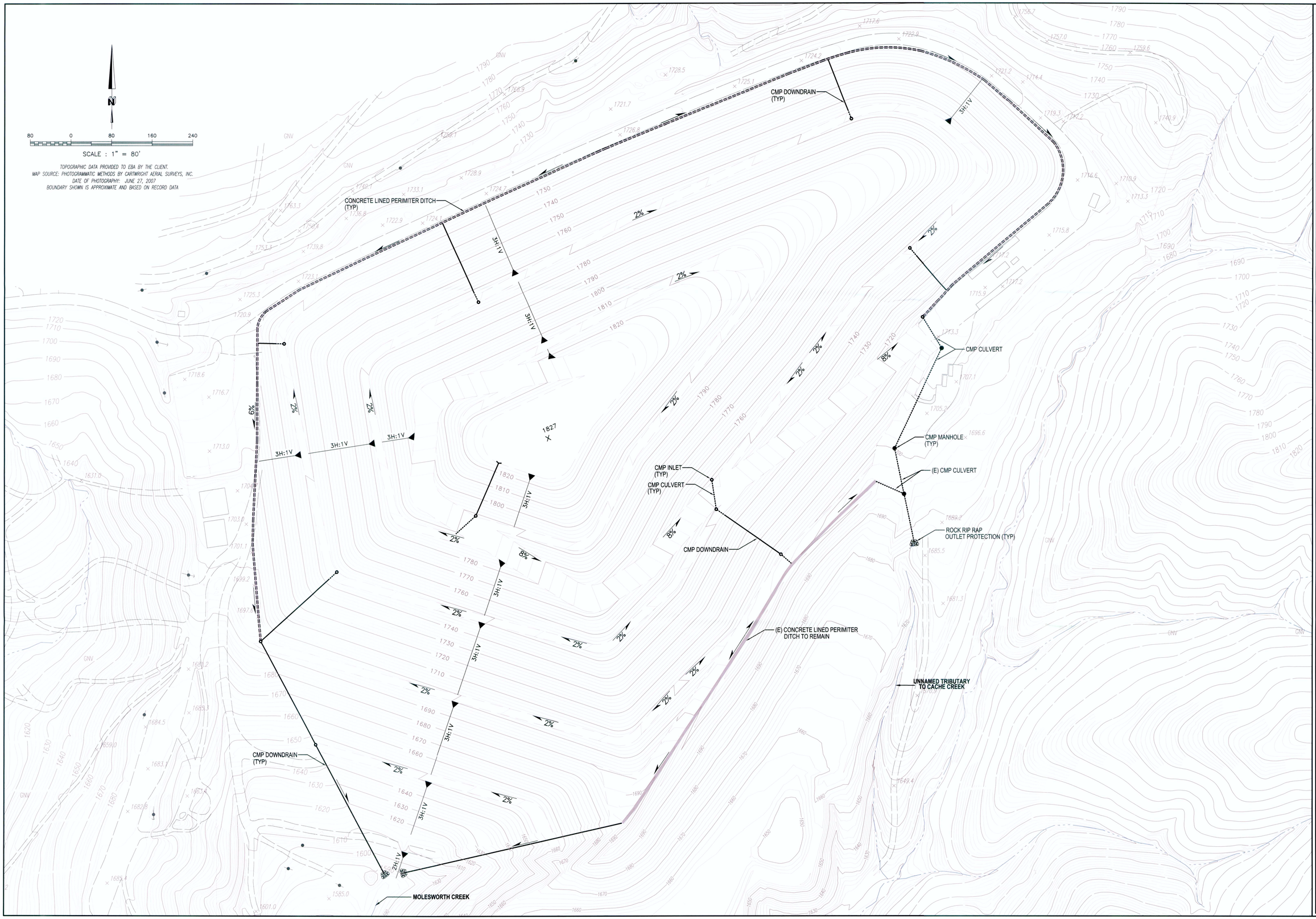

REVISIONS	BY
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CALIFORNIA

EASTLAKE SANITARY LANDFILL

FINAL GRADING AND DRAINAGE PLAN

LAKE COUNTY

DATE :SEPTEMBER 2008
JOB : 05-1150
SCALE : AS NOTED
DRAWN BY: VAD
SHEET: 7
7 OF 7 SHEETS

Q:\1150\Report of Disposal Site Information\Sheet 7.dwg, final grading, 9/12/2008 1:57:52 PM

Appendix D

Remaining Air Space and Site Life Projections, and 2018 Fill Sequencing Plan and Final Grading Plan

Environmental Consultants
and Contractors

7041 Koll Center Parkway
Suite 135
Pleasanton, CA 94566

925 426-0080
FAX 925 426-0707
www.scsengineers.com

SCS ENGINEERS

May 3, 2018
File No. 01214263.07 T2, T3

Mr. Lars Ewing
Public Services Director
Lake County Public Services Department
333 North Second Street
Lakeport, California 95453

Subject: **Fill Sequencing Plan Memo for the Eastlake Sanitary Landfill, Clearlake, California**

SCS Engineers (SCS) is pleased to provide the fill sequencing plan (Plan) for the Eastlake Sanitary Landfill, Clearlake, California (Landfill or Site). The Plan was completed as part of the work outlined in our March 27, 2018 proposal and subsequent approval by the County, dated March 28, 2018. Specifically, work under the proposal included providing a Plan to allow current filling operations and relocation of existing fire debris to continue at the Site and provide sufficient information to allow for grading control of refuse placement for site operations. This memo also includes updated site life estimates to address recent County concerns. This effort included performing work under all Tasks (Tasks 1 through 3) of the aforementioned proposal. Further details of the deliverables and work summary are included below.

DELIVERABLES

Deliverables for this work include the following:

- The revised Fill Grading and Drainage Plan (as 11x17 and ANSI D PDF compilations). This includes a GPS Drawing which will be forwarded to the GPS equipment vendor upon County approval of the Plan. Drawings also include grading sections of the Plan for use by the landfill operator prior to having electronic info sent to the GPS vendor.

- Revised air space consumption and site life estimates (based upon the proposed Plan).

- Survey coordinate information (as a PDF) to be used by the GPS equipment vendor for grading control. SCS will forward this information along with associated electronic files upon County approval of this Plan.

WORK SUMMARY

SCS' work under this assignment included the following activities:

- Revise the approved permitted grading plan, performed by EBA Engineering (July 2005), to enable use with the Site's GPS system and better delineate drainage benches so that refuse placement operations and grading control may be adequately performed for the Site moving forward.

- Perform a site visit to determine current fill areas, areas where buried fire refuse will be relocated; and, to incorporate landfill operator input to the draft fill grading plan. Note that the subject proposal to provide phases of construction was not practical because the landfill operator indicated that fill operations will occur in multiple areas in concert. Given that, SCS is providing the entire fill sequencing plan for the Site under this deliverable to satisfy this task.

- Provide a Plan aimed to increase airspace compared to the previously approved permitted fill plan (EBA, 2005) to maximize anticipated site life estimates presented under SCS' April 4, 2018, deliverable to the County.

- Prepare volumes for the Plan to revise air space/site life estimates. Note that site life is based on a 1/1/19 starting date and incoming wildfire refuse has subsided since that point so the initial April 4, 2018 deliverable was somewhat conservative.

- Provide a revised air space and site life estimate for the proposed fill sequencing plan. A summary of our findings is included below for ease of reference.

REMAINING AIRSPACE ESTIMATES

- Gross Volume Between 2018 Topography and Revised Final Grades: 902,800 cu yd
- Final Closure Cover Volume (4 foot thickness): 243,600 cu yd
- Remaining usable disposal capacity (Net): 659,200 cu yd

REVISED SITE LIFE ESTIMATES

Based on the above, a revised site life estimate has been performed. To recap our April 4, 2018 deliverable, the site life estimate was based on County provided incoming refuse data (scale house data) from April 3, 2015 through February 24, 2018 for the applicable date range and prorated for the remainder of 2018. Remaining site life **starting January 1, 2019**, is estimated for future disposal rates ranging from 40,000 to 50,000 tons per year (tpy).

Our current findings, based upon County approval of the proposed revised fill plan, are as follows:

- Estimated Airspace (to be consumed), 2/1/18 to 12/31/18: 163,800 cu yd
  (Using disposal records between 5/11/16 to 5/11/17 prorated)
- Remaining useable airspace, **1/1/19**: 495,400 cu yd
- Remaining Site Life Estimate Range (Starting 2/1/18): 5.9 to 7.4 Years

The remaining site life estimates are based on an airspace utilization, or effective refuse density of 1,200 pounds per cubic yard (lb/cu yd). This airspace utilization factor is consistent with County practice prior to wildfire debris deliveries to the Eastlake Landfill, and is a typical industry value for newly placed municipal solid waste.

Given the above, remaining site life under this proposed Plan has increased by nearly 10 months and now anticipated to be exhausted between January 2024 and May 2025 for 50,000 and 40,000 tpy disposal rates, respectively. Note that previous 2018 site life estimates concluded that remaining site life would end in March 2023 and July 2024 for these disposal rates. Further, site life estimates typically do not include refuse settlement and placement density which would increase site life so these estimates may still be somewhat conservative.

A worksheet with details on the estimated remaining air space capacity and site life estimates is attached along with support data. Useable airspace includes volume occupied by both waste materials and daily cover.

CLOSING

We trust this deliverable meets County expectations while addressing the current site life concern for your Site. Per our previous correspondence, SCS will also monitor refuse disposal information moving forward as part of our landfill expansion efforts.

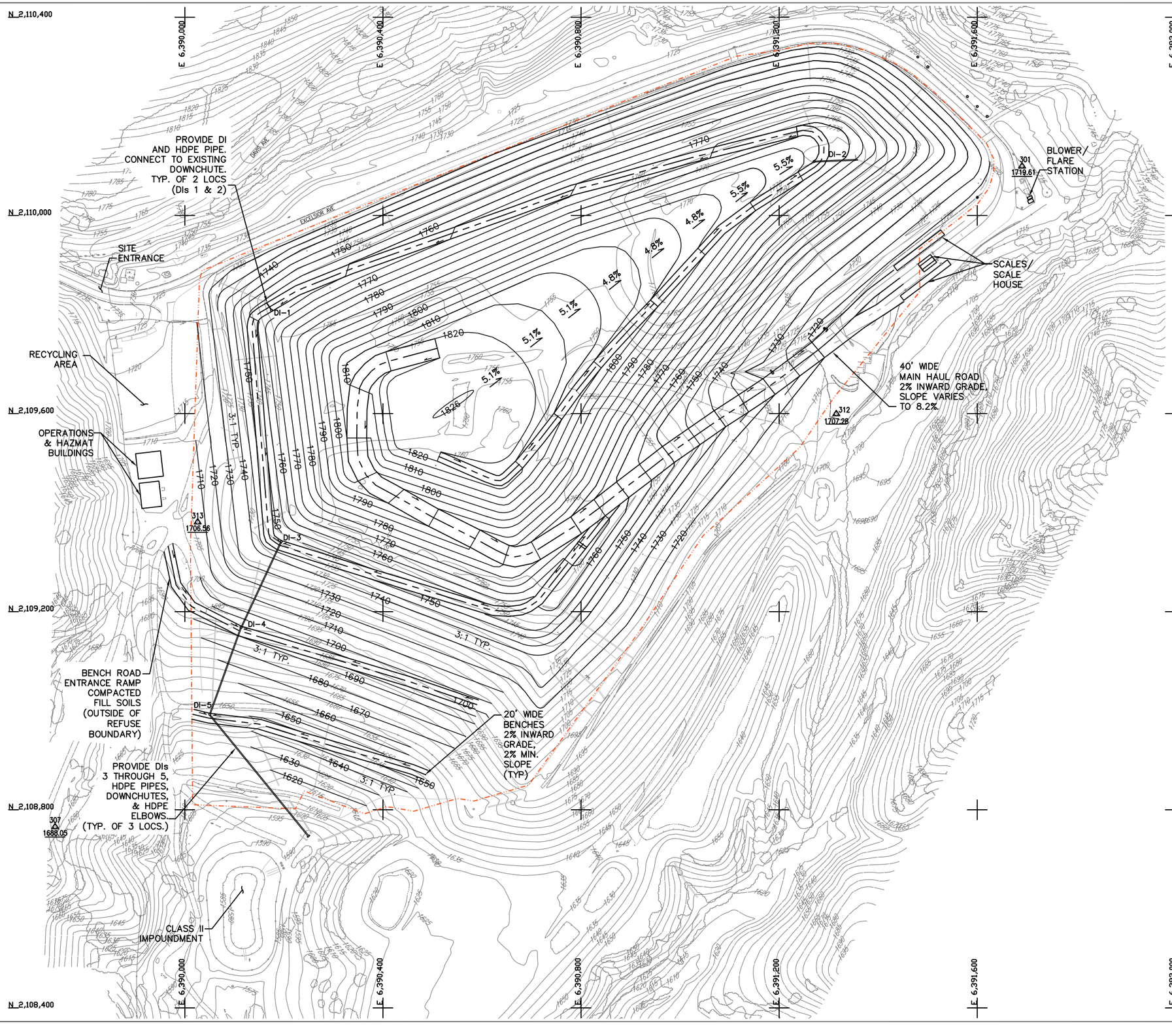
We appreciate the opportunity to provide continued environmental consulting services for your Site. Should you require any clarification or want to discuss any the above findings, please call either of the undersigned at your convenience.

Sincerely,

Mark J. Erickson, E.I.T.
Senior Project Professional II
SCS ENGINEERS
(707) 546-9461

Ambrose A. McCready, P.E.
Vice President
SCS ENGINEERS
(916) 361-1297

DRAWINGS



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DRAWING IS HALF-SIZE AT 11x17

LEGEND

- EXISTING MAJOR CONTOURS
- REVISED PERMITTED FILL GRADES (MODIFIED FOR NEW TOPO)
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- DRAINAGE FLOW DIRECTION
- 301 1719.61 SURVEY CONTROLS
- 312 1707.28
- 313 1706.56

GENERAL NOTES

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COORDINATE SYSTEM/DATUM INFO

COORDINATE SYSTEM:
CALIFORNIA STATE PLANE, ZONE 2.

HORIZONTAL DATUM: NAD 83

VERTICAL DATUM: NAVD 88

TOPOGRAPHICAL NOTES

1. AERIAL FLIGHT DATE 1-31-18 PERFORMED BY GEOMAPS; TOPOGRAPHIC & SURVEY DATA PROVIDED BY SHN LAND SURVEYING.

2. TOPOGRAPHY SHOWN IS A PORTION OF THE ENTIRE FLIGHT AREA AND IS BEING PRESENTED TO FOCUS ON THE PERMITTED FILL AREA. ENTIRE TOPOGRAPHY WILL BE SENT UNDER DIFFERENT COVER.

NO.	REVISION	DATE
1	CLIENT DELIVERABLE	5/2/18

SHEET TITLE: FINAL GRADING & DRAINAGE PLAN

PROJECT TITLE: EASTLAKE LANDFILL AERIAL/AIR SPACE LAKE COUNTY, CALIFORNIA

EASTLAKE SANITARY LANDFILL
COUNTY OF LAKE
CLEARLAKE, CALIFORNIA

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
CONSULTING ENGINEERS & CONTRACTORS
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SACRAMENTO, CA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

PROJ. NO. 01214263.07 T3 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: AAM | APP. BY: AAM | ACAD FILE: EXH-1 FGP 050218

DATE: 4-24-18

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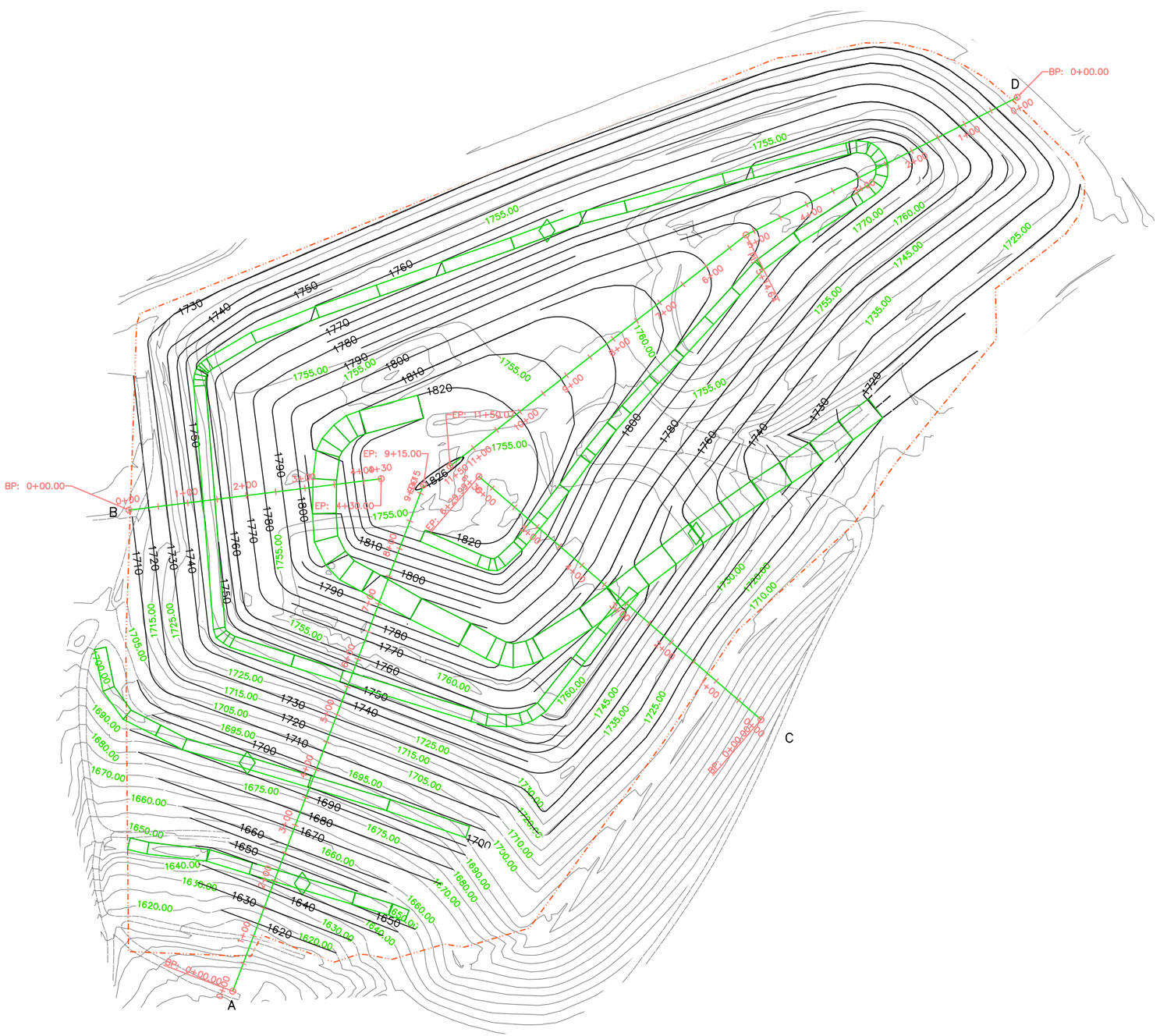

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LEGEND

- 1780 — REVISED PERMITTED FINAL CONTOURS
- 1715.00 — EXISTING TOPOGRAPHY MAJOR CONTOURS
- APPROXIMATE PERMITTED REFUSE LIMIT

DRAWING NOTES:

1. DRAWING REPRESENTS WHERE REFUSE FILL MAY BE PLACED BETWEEN THE 2018 AERIAL TOPOGRAPHY (DATED 1/31/18) TO THE REVISED PERMITTED FILL GRADES (SCS, MAY 2018).

2. EXISTING CONTOURS SHOWN ARE FROM THE 2018 AERIAL TOPOGRAPHY.

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DRAWING IS HALF-SIZE AT 11x17

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
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Totals			1374168.87 Sq. Ft.	7313.54 Cu. Yd.	910094.35 Cu. Yd.	902780.80 Cu. Yd.<Fill>

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FINAL GRADING REVISIONS
LAKE COUNTY, CALIFORNIA

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COUNTY OF LAKE
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PH. (916) 361-1297 FAX. (916) 361-1299

PROJ. NO: 01214263.07 T2 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: AAM | APP. BY: AAM | CAD FILE: FGP C3D_050118

DATE: 4-26-18

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DRAWING: 2

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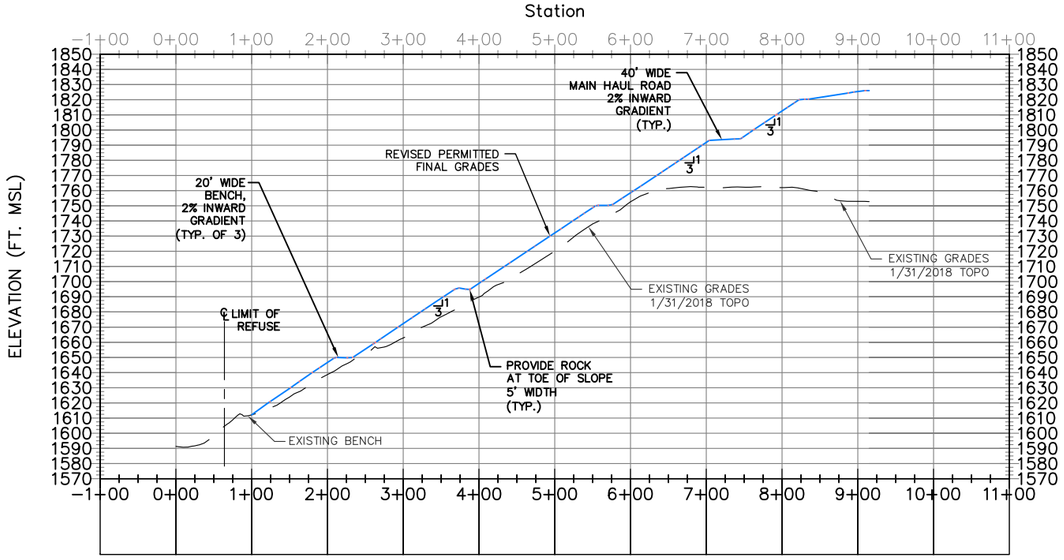

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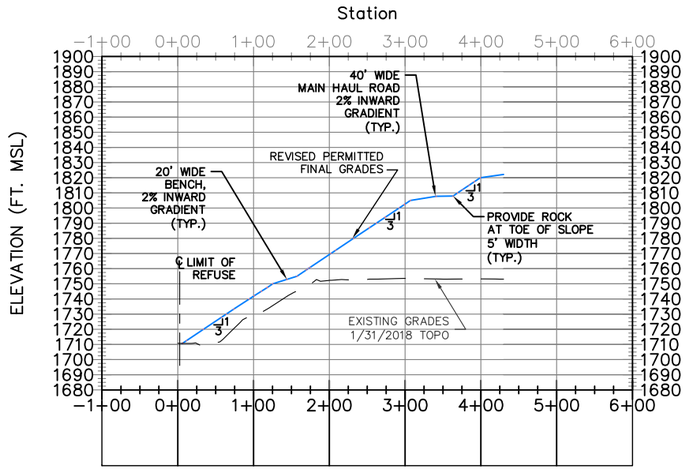

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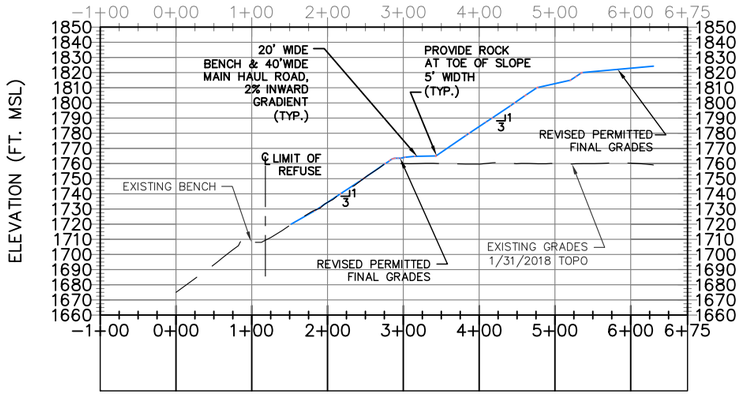

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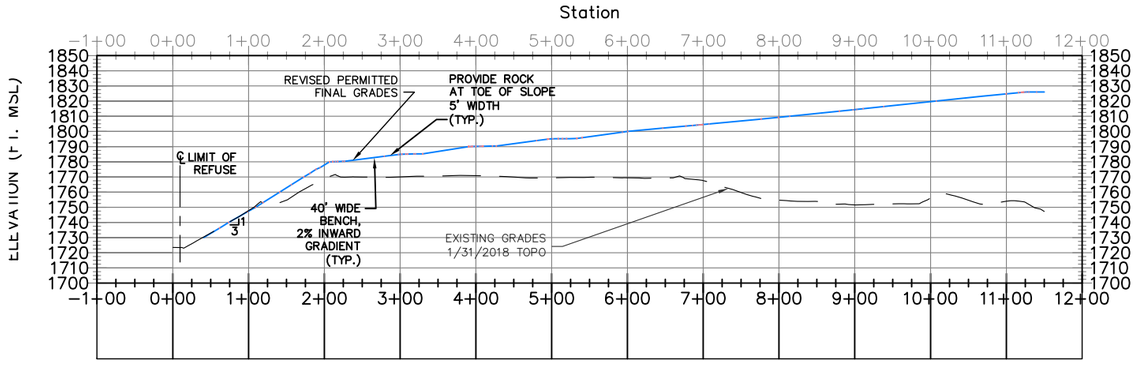
Alignment – D PROFILE



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V: 1"=50'

DRAWING IS HALF-SIZE AT 11x17

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PROJ. NO. 01214263.07 T3 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: AAM | APP. BY: AAM
AGAD FILE: FGP C3D 050118

DATE: 4-26-18

SCALE: AS SHOWN

DRAWING: 3

N 2,110,400 | N 2,110,000 | N 2,109,600 | N 2,109,200 | N 2,108,800 | N 2,108,400

E 6,390,000 | E 6,390,400 | E 6,390,800 | E 6,391,200 | E 6,391,600 | E 6,392,000

PROVIDE DI AND HDPE PIPE. CONNECT TO EXISTING DOWNCHUTE. TYP. OF 2 LOCS (DIs 1 & 2)

SITE ENTRANCE

RECYCLING AREA

OPERATIONS & HAZMAT BUILDINGS

313 1706.56

BENCH ROAD ENTRANCE RAMP COMPACTED FILL SOILS (OUTSIDE OF REFUSE BOUNDARY)

PROVIDE DIs 3 THROUGH 5, HDPE PIPES, DOWNCHUTES, & HDPE ELBOWS. (TYP. OF 3 LOCS.)

307 1688.05

CLASS II IMPOUNDMENT

DI-1 | DI-2 | DI-3 | DI-4 | DI-5

5.5% | 4.8% | 5.1% | 3:1 TYP.

20' WIDE BENCHES 2% INWARD GRADE, 2% MIN. SLOPE (TYP)

40' WIDE MAIN HAUL ROAD 2% INWARD GRADE, SLOPE VARIES TO 8.2%

301 1719.61 BLOWER/ FLARE STATION

SCALES/ SCALE HOUSE

312 1707.28

50 0 50 100 150
SCALE 1"=100'

DRAWING IS HALF-SIZE AT 11x17

LEGEND

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DATE: 4-24-18

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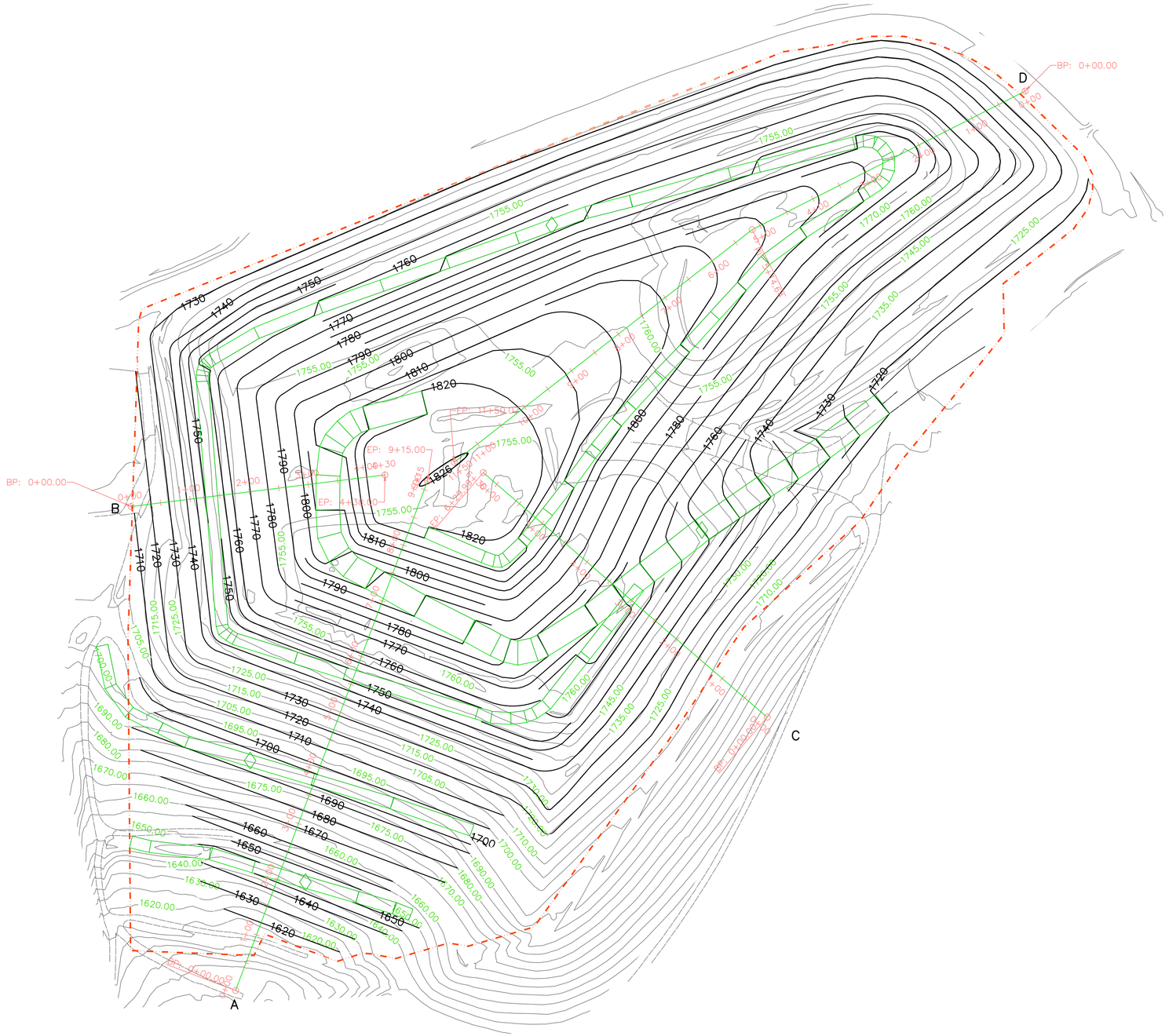

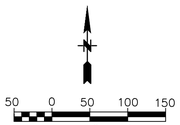

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Totals			1374168.87 Sq. Ft.	7313.54 Cu. Yd.	910094.35 Cu. Yd.	902780.80 Cu. Yd.<Fill>

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SACRAMENTO, CA 95827
PH. (916) 361-1297 FAX. (916) 361-1299

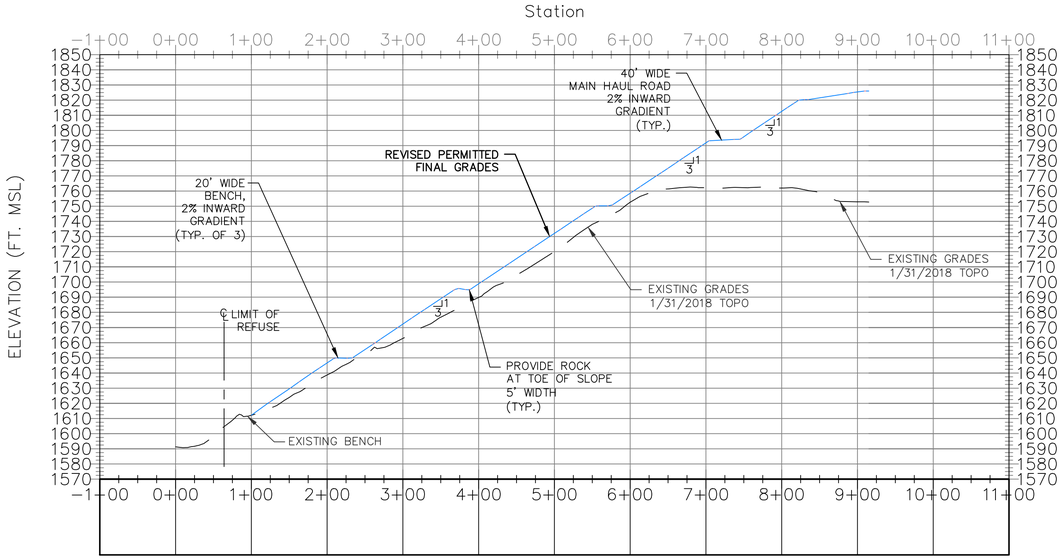
PROJ. NO: 01214263.07 T2 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: AAM | ACAD FILE: FGP C-30_050118 | APP. BY: AAM

DATE: 4-26-18

SCALE: AS SHOWN

DRAWING: 2

Alignment – A PROFILE



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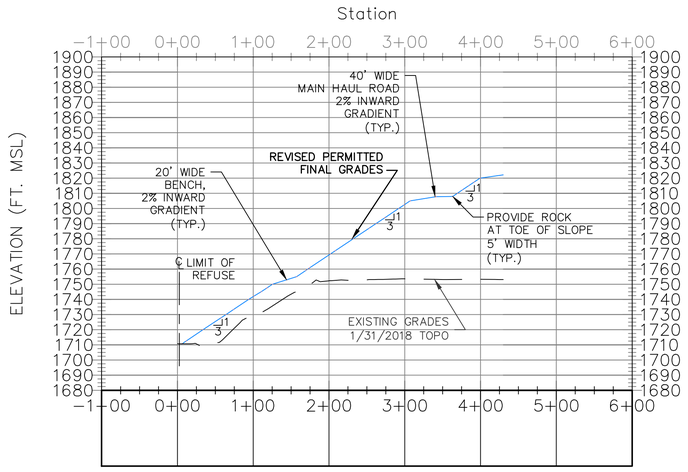
Alignment – B PROFILE



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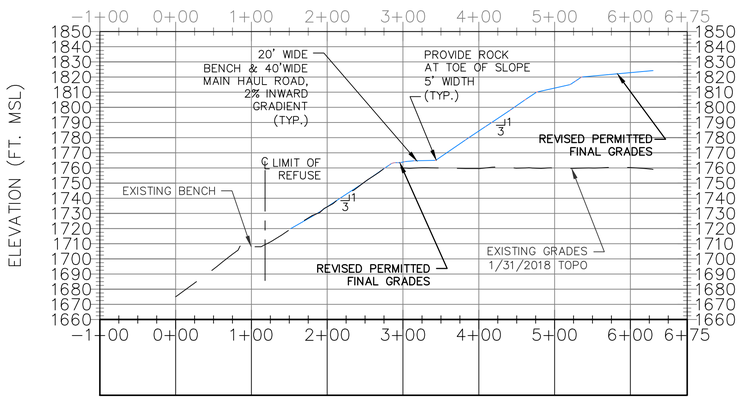

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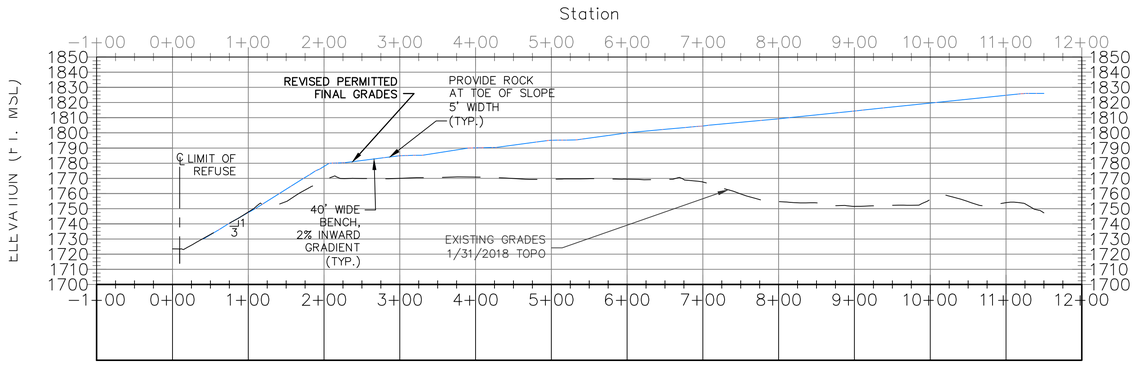

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V: 1"=50'

DRAWING IS HALF-SIZE AT 11x17

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PROJ. NO. 01214263.07 T3 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: AAM | FGP_C3D 050118 | APP. BY: AAM

DATE: 4-26-18

SCALE: AS SHOWN

DRAWING: 3

REVISED

AIR SPACE/SITE LIFE ESTIMATE WORKSHEET

Project: Eastlake LF Remaining Disposal Capacity
Project #: 01214263.07 T3
Date: 5/1/2018
Performed By: M. Erickson
Check By: A. McCready
Subject: Remaining Air Space And Site Life Estimates

REMAINING AIR SPACE

Item	Description	Volume (CY) NET	Notes	Acres
1	Permitted Fill Volume	902,780	Revised Permitted Fill Grades (from 2018 Topo to final fill grade of 1826' MSL)	
2	Final Cover System		Estimated at 4' Final Cover over Entire Permitted Closure area	
		233,435	3:1 Slope Area, using a 1.05 Slope Factor and a 4 foot Cover Thickness	34.45
		10,141	Top Deck Area, using a 4 foot cover thickness.	1.6
	Final Cover Volume	243,576		36.02
3	Net Fill Volume	659,204	Item 1 minus Item 2.	

SITE LIFE ESTIMATES

Item	Description	Volume (CY) NET	Notes
1	Net Fill Volume	659,204	Estimated remaining airspace less final cover volume
2	Air Space Estimate (Remainder of 2018)	163,800	Prorated from the period of 5/11/16 to 5/11/17 (Date of Aerial) using weekly data (actual 107,400 tons) between those dates (98,280 tons prorated) ; and, converted to Cubic Yards using an effective density of 1,200 Pounds/CY.
3	Remaining Fill Volume	495,404	Starting 1/1/19
4	Site Life Estimate (in Years)	7.4	Estimated at 40,000 tons per year or 66,667 CY/Year (projected estimate) Assumes no import from Mendocino County upon agreement sunset.
5	Site Life Estimate (in Years)	6.6	Estimated at 45,000 tons per year or 75,000 CY/Year (moderately conservative estimate) Assumes limited import from Mendocino County upon agreement sunset.
6	Site Life Estimate (in Years)	5.9	Estimated at 50,000 tons per year or 83,333 CY/Year using County disposal data for 2016 & 2017. (conservative estimate)

GPS SUPPORT INFORMATION

Point #	Northing	Easting	Elev.	Descriptor
101	2109450.52	6390127.39	1729.73	CP 60DS
102	2110165.36	6391821.00	1737.99	CP 60DS
103	2108945.09	6384358.52	1458.66	BENCHMARK
301	2110099.63	6391690.52	1719.61	CP 23 CONSER CNTRL PT 203 (2016)
302	2110913.42	6391008.98	1885.46	CONSER CNTRL PT 2012 (2014)
303	2110829.98	6391060.15	1870.77	CONSER CNTRL PT 200 (2016)
304	2110861.82	6390944.03	1871.31	AT 8001
305	2110916.92	6390687.16	1927.80	AT 8002
306	2109961.87	6389651.25	1738.14	AT 8005 PAINT IN AC
307	2108765.68	6389738.15	1688.05	AT 8007
311	2108005.57	6390216.28	1602.63	AT 8008
312	2109599.48	6391315.45	1707.28	AT 4 PAINTED
313	2109380.86	6390026.01	1706.56	AT 8006
314	2109984.12	6388823.36	1651.43	CONSER CNTRL PT 2020 (2014)

Appendix E

Slope Stability Analysis

FINAL REPORT

SLOPE STABILITY EVALUATION

FOR

THE EASTLAKE SANITARY LANDFILL
LAKE COUNTY, CALIFORNIA

Prepared for:

Lake County Public Services Department
333 Second Street
Lakeport, California 95453

Prepared by:

Golder Associates Inc.
1009 Enterprise Way, Suite 350
Roseville, California 95678
(916) 786-2424

Susan Yang
Staff Engineer

Kenneth G. Haskell, P.E.
Senior Consultant/Principal

September 2004

043-7396

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

1. INTRODUCTION

1.1 Purpose and Scope

Golder Associates Inc. (Golder) was retained by Lake County to complete a slope stability evaluation for the Eastlake Sanitary Landfill located in Lake County, California. Our work was completed in accordance with our proposal dated May 10, 2004.

We understand that the Regional Water Quality Control Board (RWQCB) requested that Lake County revise and update the 1996 Preliminary Closure and Postclosure Maintenance Plan (PCPMP) for the landfill. Based on several discussions with RWQCB staff, their primary concern with the PCPMP is completion of slope stability analyses for the proposed cover system and overall refuse fill. The purpose of this slope stability study is to address the RWQCB's slope stability concerns. Stability of the cover system, also referred to as cover veneer stability, addresses the potential failure within or along the base of the cover system. Stability of the overall refuse fill addresses the potential of failure to occur along the base liner system and/or within the refuse mass.

1.2 Project and Site Description

The Eastlake Landfill is a 34.7-acre, Class III landfill facility located at the eastern end of Davis Street in Clearlake, California as shown in Figure 1. The landfill is owned and operated by Lake County and is comprised of a 22.4-acre unlined area referred to as Area I, and a 12.3-acre, composite-lined area referred to as Area II. Figure 2 shows the location of Areas I and Area II.

In 1996, SHN prepared a PCPMP for the landfill (July 1996). The PCPMP proposed 3H:1V (horizontal to vertical) final cover slopes for Areas I and II. The cover grading plan included 15-foot wide benches located every 50 feet vertically. The PCPMP included a maximum final cover elevation of 1,860 feet mean sea level (msl). This PCPMP was submitted to the regulatory agencies, but it was never formerly reviewed by the RWQCB.

Because the site does not have a readily available source of low-permeability soil, SHN prepared an Engineered Alternative Design (EAD) substituting a 60-mil geomembrane in place of the prescriptive low-permeability soil liner for Area I. In addition, a geosynthetic clay liner (GCL) was substituted for the prescriptive low-permeability soil liner for Area II. However, supporting slope stability analyses were not included in the PCPMP to verify the proposed final cover slopes and proposed maximum cover elevation.

In 1998, Golder was retained to prepare the design of the Area II composite-lined expansion. As part of this project, Golder completed a seismic characterization for the site and performed slope stability analyses for the refuse fill located above the composite liner system. The analyses considered 3H:1V overall final slopes proposed in the PCPMP. These analyses did not consider cover veneer stability.

The first phase of Area II was constructed in 1999. The second phase of Area II was constructed in 2003. Only a small area (approximately 1.0 acres) remains to be constructed for the Area II landfill, which is located in the existing bag dump area. If this remaining area is developed, we anticipate that it would be completed near the end of the life of the landfill.

In 2000, Golder prepared the design of a new scalehouse and scale facilities, which were constructed during the summer of 2000. The scalehouse and scale facilities are located within the footprint of the permitted Area II landfill. However, for the purpose of estimating remaining airspace capacity, Golder assumed the Area II footprint will be modified so that the landfill is terminated at the scale facilities.

Golder has been retained by the County each year to calculate annual airspace consumption and remaining airspace from 1999 through 2004. For the purpose of estimating remaining airspace, Golder modified the 1996 PCPMP cover grades as follows:

- The eastern limits of the cover were modified to exclude the scalehouse, exclude the bag dump area and associated access road, and to match the actual Area II liner grades that were constructed in 1999 and 2003.

- The 1996 PCPMP incorporated a 15-foot wide access road that approached grades as steep as 20 percent. Golder incorporated a 45-foot wide access road at an 8 percent grade that would allow two-way traffic including earthmoving equipment.

Although the cover system maintained the 3H:1V concept, the above modifications reduced the maximum achievable fill elevation from 1,860 to 1,827 feet msl. Figure 4 shows Golder's version of the final cover plan that has been used to estimate remaining airspace.

Golder calculated a remaining airspace 2,619,839 cubic yards as of March 29, 2004. Assuming that future airspace consumption equals the 2003-2004 airspace consumption rate of 139,000 cubic yards, the landfill was calculated to have a remaining life of approximately 19 years.

Starting in 2005, the County plans to use an automated tarp system in place of soil for daily cover. For this type of refuse cover system, we expect the refuse to soil cover ratio will improve and substantially reduce the annual airspace consumption, which will in turn extend the life of the landfill.

2. SITE CONDITIONS

2.1 Climate and Hydrology

The climate for the Lake County area is characterized by warm summers and mild winters. Rainfall is seasonal with the majority of the precipitation occurring between the months of November and May. The average annual precipitation for the area is 27 inches and the average annual evaporation is 60-inches. The 100-year, 24-hour storm event for the site vicinity is 5.9 inches.

2.2 Geologic and Hydrogeologic Conditions

The Eastlake Landfill is located at the upper end of a canyon that is the headwaters of Molesworth Creek. The canyon axis is oriented in a north-south direction.

The geologic sequence at the site consists of Tertiary-age Cache Formation, which unconformably overlies bedrock of the Franciscan Formation. The Cache Formation generally consists of a thick sequence of poorly to well sorted gravels, sand silt and clay. Locally occurring lenses of silty sand to clayey silts are located throughout the Cache Formation. Grain size distribution tests completed by Golder measured the silt and clay fraction at 25 percent or less. At the site, the Franciscan Formation is primarily comprised of a fractured, weathered fine to medium-grained sandstone with some occurrences of siltstone.

Within Area II, the contact between the Franciscan Formation and Cache Formation occurred approximately 20 to 30 feet vertically from the bottom of the landfill. Perched groundwater occurred along this contact, resulting in the need to install a sub-drain system along the eastern slope of the first phase of liner construction.

2.3 Seismic Hazards

Golder (1998) reported the results of a comprehensive review of seismic hazards at the Eastlake Landfill for the purpose of designing the Area II liner system. This report provides the following:

- A description of the geologic and active tectonic setting of the Clearlake region of northern California;
- A summary of the historical earthquake locations and felt effects up to early 1998;
- Identification and characterization of 23 active faults and other seismogenic sources within 62 miles (100 km) of the landfill site; and
- Evaluation the potential for surface fault rupture within the landfill site.

Golder (1998) concluded that there was no evidence for Holocene active faults or potential ground rupture within the landfill site.

For Area II liner design, a design earthquake event was selected that had a 10 percent probability of exceedence in a 250-year period. This probability is equivalent to a return period of about 2,500 years. The peak bedrock acceleration for this design earthquake was estimated to the 0.58g.

The 1998 seismic study selected a design earthquake event that exceeded the Maximum Probable Earthquake (MPE) required by Title 27 of the California Code of Regulations. The MPE is defined as the maximum earthquake expected to occur in a 100-year period. The conservative approach selected in 1998, was in part, due to uncertainty in selecting an MPE for Clearlake area based on the information available at that time. For this slope stability evaluation, we re-examined our 1998 seismic study and evaluated seismic information available for the Clearlake area since 1998 including the historical seismicity, active faulting and seismic hazard models for this part of California.

The USGS/NEIC preliminary determination of epicenters (PDE) catalog (1973-present) contains records of 329 earthquakes between 1 January 1998 and June 30, 2004 within 62 miles (100 km) of the Eastlake Landfill. Of these earthquakes, only 22 have moment magnitudes (M_w) $\geq$ 4.0. The largest earthquake occurred on September 3, 2000 about 40 miles (65 km) southwest of the landfill site. The earthquake was M_w 5.2, and at a shallow depth of about 6 miles (10 km). These records indicate that the pattern of seismicity described by Golder (1998) continues to the present day.

In our recent review, Golder did not find any geologic mapping and seismicity analysis that indicate new active faults in the vicinity of Clearlake. However, Cao et al. (2003) have revised their characterization of a number of active faults in northern California for the development of the 2002 California probabilistic seismic hazard assessment (PSHA). Several of these faults are within 62 miles (100 km) of the Eastlake Landfill (Golder, 1998). For example, they have combined the Round Valley, Lake Mountain and Bartlett Springs fault into a single seismic source described as the Bartlett Springs fault system.

The source characterization revisions of Cao et al. (2003) involve the adjustment of inputs for PSHA models. The minor adjustments have little impact on the estimated earthquake hazard at the Eastlake Landfill site because the faults are more than 25 miles (40 km) from the landfill site.

From our review, we recommend that the PGA with a 50% probability of exceedence in 75 years be used as the MPE ground motion for seismic design at Eastlake Landfill. To estimate the MPE PGA at Eastlake Landfill, we used the probabilistic seismic hazard model for the conterminous United States developed by Frankel et al. (2002). This model incorporates catalogs of historical earthquakes, the location and activity of major faults, and statistical relations that describe the attenuation of earthquake shaking away from the earthquake source. California earthquake sources (faults and background earthquakes) were determined jointly for the model with the California Geological Survey (Cao et al., 2003). $PGA_{(rock)}$ values determined from the model are mean estimates at weak rock sites. $PGA_{(rock)}$ refers to the PGA that occurs at the top of a bedrock unit.

The Frankel et al. (2002) model estimates that a mean $PGA_{(rock)}$ of 0.17g has a 50% probability of exceedence in 75 years for the Eastlake Landfill. This probability is equivalent to a return period of about 100 years. The 0.17g PGA value is an appropriate MPE ground motion only if a PGA greater than 0.17g has not occurred at the site during historic earthquakes. To check whether any historic earthquakes have produced earthquakes ground motions greater than the 0.17g, we estimated the PGA(rock) ground motions expected at Guadalupe from the 1906 M_w 7.9 San Francisco earthquake. For our estimate we assume that the moment release occurred on the San Andreas fault rupture closest to Eastlake Landfill about 48 miles (77 km) west of the Eastlake landfill. We chose this earthquake because it is the largest historic earthquake close to the landfill site.

Based on the Sadigh et al. (1997) attenuation relation, we calculate that a median $PGA_{(rock)}$ is 0.08g occurred at the landfill site during the 1906 San Francisco earthquake. The median plus one standard deviation (84^{th}-percentile) PGA is calculated to be 0.11g from the Sadigh (1997) attenuation relationship. Both of these values are lower than the probabilistically-determined MPE PGA of 0.17g, which indicates that the site has not experienced a PGA greater than 0.17g in the past 100 years. Accordingly, a design PGA of 0.17g with the MPE is appropriate for the Eastlake Landfill.

3. SLOPE STABILITY CALCULATIONS

3.1 Cover System Slope Stability

Cover system slope stability was evaluated by considering the potential of a failure occurring between the cover components. Our assumptions and calculations procedures are summarized in the following sections.

In performing the cover system analyses, we recognize that closure of the landfill may not occur for 20 years or more. We expect that the materials available for construction and the standards of practice may change during this time. However, closure design needs to be based on currently available materials and design practices.

In selecting design strengths for the cover system, we relied on the extensive geosynthetic interface database that has been developed by Golder to select reasonably attainable design interface strengths. Golder's database consists of over 400 interface shear tests between a variety of geosynthetic materials and soils. Because there are a wide variety of differing geosynthetic materials and manufacturers, we consider this approach more prudent than conducting site specific tests between a specific set of manufacturer's products that may or may not be available in 20 years. Additional discussion on the design interface shear strengths is provided in Section 3.1.2.

3.1.1 Cover System Components

The 1996 PCPMP presents an EAD cover system for Areas I and II. For Area I, the cover system consists of the following components from top to bottom (Figure 5):

- 1 foot of vegetative soil cover;
- A geocomposite drainage layer;
- A 60-mil, textured (both sides) high density polyethylene (HDPE) geomembrane; and
- Two feet of foundation soil.

The cover system for Area II consists of the following components from top to bottom (Figure 5):

- 1 foot of vegetative soil cover;
- A geocomposite drainage layer;
- A 60-mil, textured (both sides), high density polyethylene (HDPE) geomembrane;
- A reinforced geosynthetic clay liner (GCL); and
- Two-foot foundation soil.

In the above EAD cover systems, a geocomposite drainage layer is required to prevent excessive water build-up over the geomembrane layer, which can lead to a slope veneer failure. As more

landfills are closed with similar geosynthetic components, a number of slope veneer failures have occurred. The slope failures have been attributed to the following:

1. Clogging of the geocomposite drainage layer with soil, resulting in inadequate drainage capacity;
2. Inadequate design drainage capacity;
3. Inadequate shear strength; and
4. Clogging of the geocomposite drainage layer with roots, resulting in inadequate drainage capacity.

The first three issues can be handled through appropriate design of the cover system and inclusion of redundancy in the drainage system design. Specific design recommendations are discussed further in Section 4.2. Similarly, the latter issue can be mitigated by increasing the vegetative cover thickness and specifying shallow-rooted grasses for the vegetative cover. In addition, some landfills are including a herbicidal coating on the upper side of the geocomposite drainage layer to inhibit root penetration. Taking these issues into consideration, we also considered the following alternative design cover system for Area II (components from top to bottom):

- 2-foot thick vegetative soil cover;
- A geocomposite drainage layer;
- A 60-mil, textured (both sides), high density polyethylene (HDPE) geomembrane;
- A reinforced GCL; and
- One-foot thick foundation soil.

This alternative cover design can be applied to Area I except that the GCL would be eliminated from the cover components. Figure 6 illustrates the alternative cover design for Area I and Area II.

The above alternative cover system effectively eliminates one foot of the foundation layer thickness and adds one foot to the vegetative cover layer thickness. For cover systems that use geosynthetic components for the hydraulic barrier layer(s), a one foot thick foundation layer is adequate to supporting the cover system. Golder has successfully demonstrated adequate performance and permitted one-foot foundation layers for the Hay Road Landfill near Dixon, California and the Ostrom Road Landfill near Marysville, California, which are both Class II landfill facilities with geomembrane and geomembrane/GCL cover systems.

3.1.2 Design Interface Shear Strengths

As discussed above, design interface shear strengths were selected based on the direct shear interface shear strength data compiled by Golder since 1997. In selecting representative test results, the following issues were considered:

- Normal stresses. The vegetative cover system thicknesses considered for the Eastlake Landfill range is one to two feet thick. Therefore, normal stresses will be between

approximately 125 psf and 250 psf. We only considered test results that were limited to stress ranges of 50 to 500 psf.

- Test conditions. To provide consistency in the test results, we only considered test results that were completed at shear rate of 0.04 inches per minute, and where applicable, the interface was wetted.

- Peak/Residual Strengths. A key parameter in slope stability analyses is the selection of shear strengths based on peak or residual shear strengths. Residual shear strengths refer to the strengths at large strains, and in some cases, are significantly lower than peak strengths that occur at low strains. However, at low normal loads (< 500 psf), the differences between peak and residual strengths tends to be smaller than at higher normal loads for most geosynthetic/soil interfaces.

- Soil Types. We assumed that vegetative soil cover and foundation soil layer were comprised of Cache Formation soils that will be screened to remove over-sized particles. Since these soils tend to exhibit low plasticity, we expect this material to exhibit properties more closely similar to a granular material or low-plasticity silt.

Based on our database, we assumed the following design interface shear strengths:

- Vegetative Soil/Geocomposite (GC) Interface. We assumed a design shear strength characterized by a friction angle of 26 degrees with no cohesion.

- GC/Geomembrane (GM) Interface. We assumed a design shear strength characterized by a friction angle of 26 degrees with no cohesion.

- GM/GCL Interface. We assumed a design shear strength characterized by a friction angle of 29 degrees with no cohesion.

- GM or GCL/Foundation Soil Interface. We assumed a design shear strength characterized by a friction angle of 30 degrees with no cohesion.

Based on the above characterization, we expect that the cover can be designed such that the lowest strength interface has an internal friction angle of 26 degrees with no cohesion. Appendix A includes summary test results to support this assumption.

3.1.3 Slope Stability Calculations

Slope stability analyses were completed using the program XSTABL (v. 5.101a), which is a two-dimensional, limit equilibrium method of slices. Analyses completed using a design internal friction angle of 26 degrees, a 2-foot thick vegetative soil layer, and a 3H:1V slope are summarized below.

COVER VENEER STABILITY

Analyses	Computed Value
Static FS	1.53
Ky	0.15g
Displacement (inches)	2-inches

As indicated above, the static factor of safety is 1.53, which meets the minimum requirements of Title 27 of the California Code of Regulations.

Ky is the yield acceleration, which is defined as the acceleration necessary to result in a factor of safety of 1.0. Using simplified procedure of Bray et. al. (1998), a permanent seismic deformation of approximately 2-inches was computed for the design earthquake event. Displacements of 12-inches or less are generally considered acceptable for liner and cover systems and are not expected to adversely impact the landfill containment and control systems. Appendix A includes our slope stability calculations.

Although our slope stability calculations were completed for a 2-foot thick vegetative cover layer, these results are also applicable to a vegetative layer thickness of one-foot because the critical design strength only includes friction and does not include any cohesion. Therefore, the factors of safety should be similar for differing thickness of vegetative soil cover.

3.2 Refuse Slope Stability

3.2.1 Liner System Components

The liner system components along the majority of the base of the Area II landfill consist of the following:

- 2- foot operations soil layer;
- A geotextile filter layer;
- A 1-foot thick LCRS gravel layer;
- A geotextile cushion layer;
- A 60-mil, textured (both sides), high density polyethylene (HDPE) geomembrane;
- A reinforced geosynthetic clay liner (GCL); and
- Subgrade.

On the western and northern slopes of the Area II landfill, a geotextile cushion layer was placed over the subgrade and underlies the GCL. In addition, the southern one-third of the western slope did not include a GCL since this portion of the liner was located over existing refuse and did not constitute a lateral expansion. Figure 3 shows the location of the various liner systems. Figure 7 illustrates the various liner sections.

3.2.2 Design Shear Strengths

There is no single accepted design approach in selecting design shear strengths for base liner systems in landfills. Current design practices include the following:

- Use of peak shear strengths;
- Use of factored strengths, which typically is between peak and residual strengths;
- Use of residual shear strengths on slopes and peak strengths along the base; and
- Use of residual strengths for all liner interfaces.

For Area II landfill, the critical interface occurs between the GM/GCL interface or internal GCL shear strength along the base. In 1998 Golder used a factored shear strength approach that resulted in a design interface shear strength of 14 degrees and no cohesion for the GM/GCL interface or internal GCL strength. This factored strength was based on the average of the peak strength and the residual strength for unreinforced, hydrated GCL.

For this study, we re-examined our approach and elected to use residual strengths for all interfaces. We also examined an alternative slope section that was skewed from the axis of the canyon and intersected the western side-slope liner system. Therefore a portion of this liner contains a GM/GCL interface and GCL/GT interface. The design shear strengths that were assumed include the following:

- GM/GCL: We assumed a non-linear envelope based on the residual strengths between GSE 60-mil textured HDPE geomembrane and Bentonite DN reinforced GCL, which were the materials used to construct the Area II landfill in 1999 and 2003. This existing data includes shear strengths for normal load of up to 10,000 psf. Assuming an average density of 70 pounds per cubic foot (pcf), the maximum computed normal stress is 11,200 psf. Since we did not measure shear strength data of GSE textured GM/Bentonite DN above a normal load of 10,000 psf, we conservatively assumed no additional strength gain for normal loads above 10,000 psf. The design shear strength is shown in Appendix B.

- GCL/GT. We found only one test for GT/GCL interface at low normal loads with a resulting friction angle of 19 degrees. For the purposes of this study, we assumed a residual friction angle of 12 degrees with no cohesion. In our opinion, this is a very conservative estimate of this interface shear strength. Smooth GM/GT interfaces usually have residual strengths of 8 to 12 degrees. We expect that GT/GCL interface to exhibit considerably higher shear strengths.

For the refuse, we characterized the shear strength by an internal angle of friction of 32 degrees and a cohesion of 200 psf. These parameters are consistent with those previously used by Golder for landfill slope stability studies. These parameters are also consistent with the minimum shear strength range indicated by Singh and Murphy (1990).

3.2.3 Slope Stability Calculations

Slope stability analyses were completed using the program XSTADL (v. 5.101a). Two critical sections were considered. Section D-D' is a section parallel to the axis of the canyon. Section A-A' was slightly skewed to the canyon and extends from the toe berm toward the west-northwest slope of the Area II landfill liner. Appendix B shows the location of these cross-sections.

The results of the static and seismic slope stability analyses are summarized below for a 3H:1V final refuse slope.

OVERALL REFUSE FILL STABILITY

Interface	Static FS	Ky	Displacement (inches)
Section A-A'	1.55	0.115	1
Section B-B'	1.75	0.15	<1

As indicated above, the critical static factor of safety is 1.55, which meets the minimum requirements of Title 27 of the California Code of Regulations.

Using the simplified procedure of Bray et. al. (1998), a permanent seismic deformation of less than one inch was computed for the design earthquake event. Displacements of this magnitude are acceptable for liner systems and are not expected to adversely impact the landfill's containment or control systems. Appendix B includes our slope stability calculations.

4. CONCLUSIONS AND RECOMMENDATIONS

The results of our analyses indicate that adequate factors of safety can be achieved for the cover veneer stability and overall refuse slope stability for the proposed 3H:1V final cover slopes. Maximum deformations under seismic loads are also within acceptable limits. Therefore, the 3H:1V final cover slopes meet the minimum requirement of the Title 27 of the California Code of Regulations. This conclusion is only valid for the assumed cover section profiles and the modified cover grades shown in Figure 4, which vary from the 1996 PCPMP cover grades as discussed in Section 2. Additional slope stability analyses should be completed if future closure grades vary from that shown in Figure 4 of this report or if different cover components are selected.

Our recommendations include the following:

- Future revisions to the PCPMP should identify minimum design shear strengths for the cover system components, and incorporate provisions for confirming these design strengths during construction.

- The PCPMP should address minimum design hydraulic capacities and consider designing redundancy in the hydraulic capacity. This redundancy might include significantly over-sized geocomposite drainage layers (i.e. thicker geocomposites) and/or incorporating additional gravel/pipe interceptor drains within the cover system.

- The PCPMP should address potential clogging of the geocomposite drainage layer and identified measures that will be implemented to prevent clogging. These measures may include, but are not necessarily limited to identifying the need to complete "clogging" tests (i.e. gradient ratio test), the potential for increasing the vegetative layer thickness to 2 feet as discussed in Section 3.1.1, and developing a means for inspecting and maintaining or cleaning out key portions of the subsurface drainage system.

We recognize that the PCPMP is not a final design document for the closure. However, it is necessary and appropriate to address the above issues for the purpose of developing cost estimates for the closure and postclosure maintenance of the landfill.

5. USE OF THIS REPORT

This report was prepared for the exclusive use of Lake County and their consultants in the preparation of a Preliminary Closure and Postclosure Maintenance Plan (PCPMP) in accordance with Title 27 of the California Code of Regulations. This report presents our findings of the stability of the landfill slopes based on assumptions contained in this report. Our findings are contingent upon the appropriate implementation of specific recommendations contained in this report. Additional engineering analyses and design details need to be developed as part of the PCPMP to properly implement our recommendations. In particular, these additional analyses and details include the proper design of the cover geocomposite drainage system to ensure adequate long-term performance.

The engineering analyses for this project were completed in accordance with locally accepted engineering practice. Golder shall be notified of any use of this report by any party other than Lake County or any use for differing applications. Based on the intended use of the report, Golder may recommend additional investigations, testing and/or engineering analyses. Golder is not responsible for any improper use of this report or failure to notify or comply with any recommended additional work.

6. REFERENCES

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Appendix F

LFG Collection and Control System

SCS ENGINEERS

CONSTRUCTION COMPLETION REPORT:

Landfill Gas Collection and Control System Installation
Eastlake Sanitary Landfill
Lake County, California

Presented to:

County of Lake
Public Services Department
333 Second Street
Lakeport, CA 95453

Presented by:

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March 4, 2014
File No. 01209155.06 / Task 5

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Appendices

Acronyms

AQMD	Lake County Air Quality Management District
BFS	Blower Flare Station
bgs	below ground surface
CARB	California Air Resources Board
CMP	corrugated metal pipe
County	County of Lake
CQA	Construction Quality Assurance
CS	Condensate Sump
GCCS	gas collection and control system
HC	horizontal collector
HDPE	high density polyethylene
Landfill	Eastlake Landfill
LCPSD	Lake County Public Services Department – Integrated Waste Management
LCRS	leachate collection recovery system
LFG	landfill gas
msl	mean sea level
msw	municipal solid waste
PEI	Perennial Energy, Inc.
PG&E	Pacific Gas and Electric
PLC	programmable logic controller
rebar	reinforcing bar
RWQCB	Regional Water Quality Control Board (Central Valley Region)
SCS	SCS Engineers
SCS-FS	SCS Field Services Construction

1 INTRODUCTION AND BACKGROUND

PURPOSE OF REPORT

This report documents the results of construction quality assurance (CQA) observation and testing activities conducted during landfill gas (LFG) collection and control system (GCCS) construction at the Eastlake Landfill located at 16015 Davis Avenue (Landfill or Site) in Clearlake, California. This report contains a certification statement that GCCS construction was completed in accordance with the approved project plans and specifications and other controlling documents as put forth below.

CQA observation and testing activities were performed according to project design plans and specifications prepared by SCS Engineers (SCS). These documents were reviewed and approved by the Lake County Air Quality Management District (AQMD).

BACKGROUND

Site Location and Description

The site is located in Clearlake, California at 16015 Davis Avenue and is owned, operated, and managed by the County of Lake (County). The site is designated as a Class III landfill facility. The Eastlake Landfill serves as the primary municipal solid waste (MSW) disposal site for residents and businesses located in the County and surrounding areas. The permitted landfill boundary encompasses approximately 80 acres. The current permitted landfill footprint is 35 acres.

GCCS Project Description

The Site is subject to the California Air Resources Board (CARB) Landfill Methane Rule (California Code of Regulations Title 17, Subchapter 10, Article 4, Subarticle 4). The Rule is part of statewide regulations to reduce greenhouse gas emissions from industrial sources, including landfills. The Rule specifically requires that measures be undertaken to limit landfill methane emissions; methane is a primary greenhouse gas. A preliminary plan for compliance with the Rule was prepared by SCS on behalf of the County and approved by the CARB in July, 2012.

SCS subsequently prepared design plans and specifications for the GCCS, which were issued for construction bids in May, 2013 (County Bid No. 13-11). The design for the GCCS consisted of a network of vertical gas extraction wells and horizontal gas collection trenches installed in the refuse mass, collection piping, liquid condensate traps, extraction blowers, an enclosed ground flare for thermal destruction of collected LFG, and gas flow metering devices and controls.

Under an inter-agency agreement, enforcement of the Rule including GCCS installation and operation, is now the responsibility of the Lake County AQMD. An Authority to Construct permit for the GCCS was issued by the AQMD on August 12, 2013. GCCS construction

commenced in September 2013 and was substantially completed in January, 2014. Initial start-up and continuous operation of the GCCS commenced on January 23, 2014.

PROJECT PARTICIPANTS

SCS Engineers provided engineering design, permitting, engineering services during construction, and CQA observation services. SCS Field Services Construction (SCS-FS) was selected as the contractor to perform the GCCS installation work outlined in the construction documents, under separate contract with the County. The County was responsible for construction management. SCS and SCS-FS worked with the County throughout the project to complete the required GCCS installation while allowing for uninterrupted operation of the Eastlake Landfill site.

SCOPE OF WORK

SCS's CQA scope of work for this assignment included:

- Provide field observation services to confirm that the GCCS was installed as per the following County and AQMD-approved plans and specifications (construction documents):
    - "Landfill Gas Collection and Control System, Eastlake Sanitary Landfill, 16015 Davis Avenue, Clearlake, California (18 Sheets), dated May 20, 2013.
    - "Technical Specifications, Landfill Gas Collection and Control System, Eastlake Sanitary Landfill, Lake County, California, Bid No. 13-11", dated May 2013
- Maintain daily field logs and photographic documentation; and,
- Prepare this project completion report summarizing construction observations.

Red-line mark-ups of the construction drawings are provided as **Appendix A**. A photographic log showing key construction activities is provided as **Appendix B**. Landfill gas well installation logs are provided as **Appendix C**. A checklist for LFG flare start-up procedures is provided as **Appendix D**.

CONSTRUCTION OBSERVATION

SCS-FS personnel were on-Site to complete the GCCS construction activities, as outlined in the project bid documents, from September 2013 through January 2014. SCS CQA representatives were on Site as required during essential construction activities from September 2013 through January 2014.

Items observed by SCS for CQA purposes included, but were not limited to, installation of the following (refer to Photographic Log provided in **Appendix B**):

- LFG extraction wells;
- LFG Horizontal Collector (HC) trenches;
- Above- and below-grade LFG header and lateral connection lines;
- Components associated with LFG header and connection lines such as isolation valves, butterfly valves, blind flanges, and other various components;
- LFG condensate sumps (CS);
- Blower Flare Station (BFS) concrete pads; and,
- BFS mechanical and electrical systems.

DESIGN CHANGES

GCCS construction often varies in the field from the design documents produced. This is typically due to changes in landfill topography, site specific conditions, and in consideration of current site waste disposal operations.

The following general design changes occurred during the construction activities:

- The depth of vertical extraction well GW-10 was adjusted to account for subsurface conditions (wet drill cuttings encountered at 50 feet below grade).
- Main header alignments were slightly modified in the field to maintain required slopes;
- Main header alignments were modified which increased the amount of below-grade header (decreasing the amount of above grade header) to maintain required slopes;
- Select HC trenches were excavated to a greater depth than shown on the design plans due to the thickness of intermediate landfill soil cover in certain areas;
- Locations of select LFG extraction wells were modified based on field conditions;
- One (1) additional LFG extraction well, designated GW-21 was installed in lieu of horizontal collection trench HC-2. This change was made to optimize LFG collection in the northwest area of the Site, as additional fill had been placed in this area after the design plans were issued for bid. Connections between these locations and the main LFG header were also modified as required;
- Over-excavation and replacement/compaction of soils below the LFG flare, blower skid and air compressor was not required. Based on compaction tests performed following foundation preparation and a reviewed by SCS, the excavations extended into competent native soils.

- The discharge piping alignment was revised between the extraction blower assembly skid and flare station.

The design changes described above were approved by SCS prior to completion by the Contractor. Furthermore, these changes were determined by SCS to have no adverse effect on the design or future performance of the LFG collection and control system.

The final LFG collection and control system installed during this scope of work is shown on the mark-up drawings provided in **Appendix A**. The final LFG wellfield configuration consisted of twenty one (21) vertical extraction wells, designated GW-1 through GW-21, and nine (9) horizontal collectors, designated HC-1, and HC-3 through HC-10.

2 CONSTRUCTION QUALITY ASSURANCE

LFG EXTRACTION SYSTEM COMPONENTS

The GCCS Eastlake Landfill required a network of LFG extraction wells, ancillary components, and lateral and header conveyance piping to be able to remove LFG created within the refuse mass. Condensate traps were also installed to collect condensate generated by vacuum extraction of LFG gas from the Site. These components were then connected to the BFS to complete the GCCS for the Site. Details on each component of the LFG collection system are discussed below.

LFG Well Drilling and Well Installation

During the period of September 9 through September 17, 2013 Sacramento Drilling, subcontractor to SCS-FS, drilled 21 LFG Wells (GW-1 through GW-21) at the Site. After drilling, well casing construction, backfilling, and surface installations were completed by SCS-FS. Field modifications were made for the locations of select wells, which were approved by SCS, as described above (**Appendix A**). LFG extraction wells were installed per project design drawings and specifications. Well boring and completion logs are provided as **Appendix C.**

LFG Horizontal Collector Trench Installation

Nine (9) LFG HCs were installed during the period of September 18 through October 4, 2013. SCS-FS excavated an HC trench at each location and installed a LFG HC per the project design and specifications. Horizontal collector trenches were excavated to a greater depth than anticipated in several locations due to a thicker than expected soil cover. The locations of select HCs were also modified, as approved by SCS, in an effort to increase GCCS performance and decrease general construction costs. The locations of HCs installed during this scope of work are shown in **Appendix A**. LFG HCs were installed per the intent of project design drawings and specifications.

LFG Lateral and Header Installation

SCS-FS began high density polyethylene (HDPE) lateral and header installation procedures on October 7, 2013. HDPE piping was fused for required components of the LFG system and

included pipe dimensions of 2-inch to 8-inch diameter piping. SDR ratings ranged from SDR-9 for compressed air lines to SDR-17 for LFG laterals and headers. Clearing, grubbing, and grading activities were performed by SCS-FS prior to the installation of above grade header and laterals per project design drawings and specifications. HDPE lateral and header installation was completed in January, 2014. The locations of LFG HDPE laterals and header alignments are shown on the mark-up drawings provided in **Appendix A**.

Pressure Testing

HDPE lateral and header lines were pressure-tested according to project specifications. This consisted of pressurizing various legs of the header and lateral piping to test pressure of 10 pounds per square inch gauge (psig) over a period of one hour. On the test dates, no pressure losses were observed in the piping system. HDPE compressed air lines were also tested according to project specifications. Pressure testing was conducted as the installation of HDPE piping and isolation valves occurred. An SCS CQA representative was on-Site to observe that the pressure testing of various GCCS components met the project criteria. Representative photos of HDPE piping pressure testing is provided in the photographic log presented in **Appendix B**.

LFG Header Road Crossings

LFG header road crossings were constructed in nine (9) locations. Two of these locations were completed across the main asphalt paved access road, with the remaining locations occurring across perimeter soil access roads. At each location, soil was removed to the necessary depth and an HDPE header line was installed inside of a Schedule 80 corrugated metal pipe (CMP). Associated condensate lines and air return lines were also installed at select header road crossing locations per project design and specifications.

Condensate Sumps

Four condensate sumps, designated CS-1 through CS-4, were installed in their originally designed locations per project requirements. The components of each CS were approved under an SCS-FS submittal and complete turn-key CS units were provided by Real Environmental Products. SCS's CQA Monitor provided oversight and inspection of this work item. The components supplied and work provided for condensate sump installation was found to meet project specifications.

BFS SYSTEM

BFS Construction

Following installation of concrete forms and reinforcing bar (rebar), concrete was placed in the flare station pad and air compressor pad on November 6, 2013, with concrete being placed in the blower pad on November 7, 2013. An independent subcontractor, Reese and Associates, was present on both days to collect concrete samples for laboratory analysis of strength parameters. Based on review of test results, the concrete being placed met project design specifications and was approved by SCS.

BFS system components (air compressor, blower assembly skid, and flare station) were installed after the concrete was allowed to set for one month and concrete strength testing reports from Reese and Associates were approved by SCS. BFS system components were fully installed prior to energizing the system by connection to a Pacific Gas and Electric (PG&E) power line. The BFS electrical system was energized on January 8, 2014.

BFS Start-up

Perennial Energy, Inc. (PEI, flare manufacturer) and SCS personnel were on-Site for the BFS system start-up that occurred January 21 through January 23, 2014. PEI and SCS personnel observed that the pilot flame and flare start-up, flare operation, blower rotation, programmable logic controller (PLC) controls, and flare shut-down all functioned properly. A start-up check list is provided as **Appendix D**. SCS-FS proceeded to bring the GCCS online and performed minor system modifications, such as well head flow rate adjustment. Continuous flare operation began on January 23, 2014. GCCS system modifications were completed on January 24, 2014.

3 CERTIFICATION STATEMENT

This Report was prepared under the direction of the undersigned and contains a summary of the construction quality assurance activities performed at the Eastlake Landfill located at 16015 Davis Avenue, Clearlake, California (Site).

The undersigned, Mr. Joseph J. Miller, hereby certifies that he is a Registered Engineer in the State of California and is knowledgeable in the field of GCCS system design. Construction inspections were carried out by Messrs. Art Violenta, Alex Tuveson and Mark Erickson of SCS Engineers, under Mr. Miller's direction.

Based on the construction observations documented herein, the undersigned hereby certifies that the landfill gas collection and control system installed at the Eastlake Sanitary Landfill was installed in general accordance and intent of the approved drawings and specifications prepared by SCS Engineers, dated May 2013.

REGISTERED PROFESSIONAL ENGINEER
JOSEPH J. MILLER
C 042598
Exp. 3/31/14
CIVIL
STATE OF CALIFORNIA

Joseph J. Miller, P.E.
Vice President/Project Director
SCS Engineers

APPENDIX A

RED-LINE AND SURVEY DRAWINGS

RED LINE DRAWINGS

LANDFILL GAS COLLECTION AND CONTROL SYSTEM
EASTLAKE SANITARY LANDFILL
16015 DAVIS AVENUE, CLEARLAKE, CALIFORNIA

FOR

COUNTY OF LAKE PUBLIC SERVICES DEPARTMENT
333 NORTH SECOND STREET, LAKEPORT, CALIFORNIA 95453

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

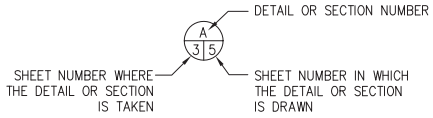
INDEX OF SHEETS

REFERENCE SHEETS

REFERENCE SHEETS NOT INCLUDED IN RED-LINE DRAWING MARK-UP SET

VICINITY MAP
N.T.S.

DETAIL AND SECTION LABELING CONVENTION



LOCATION MAP
N.T.S.

REV | DATE | DESCRIPTION | CK. BY

SHEET TITLE: TITLE SHEET–LOCATION MAP

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT CONSULTING ENGINEERS, INC.
8951 CAL CENTER PARKWAY, SUITE 140
SACRAMENTO, CA 95826
PH: (925) 426-0080 FAX: (925) 426-0707

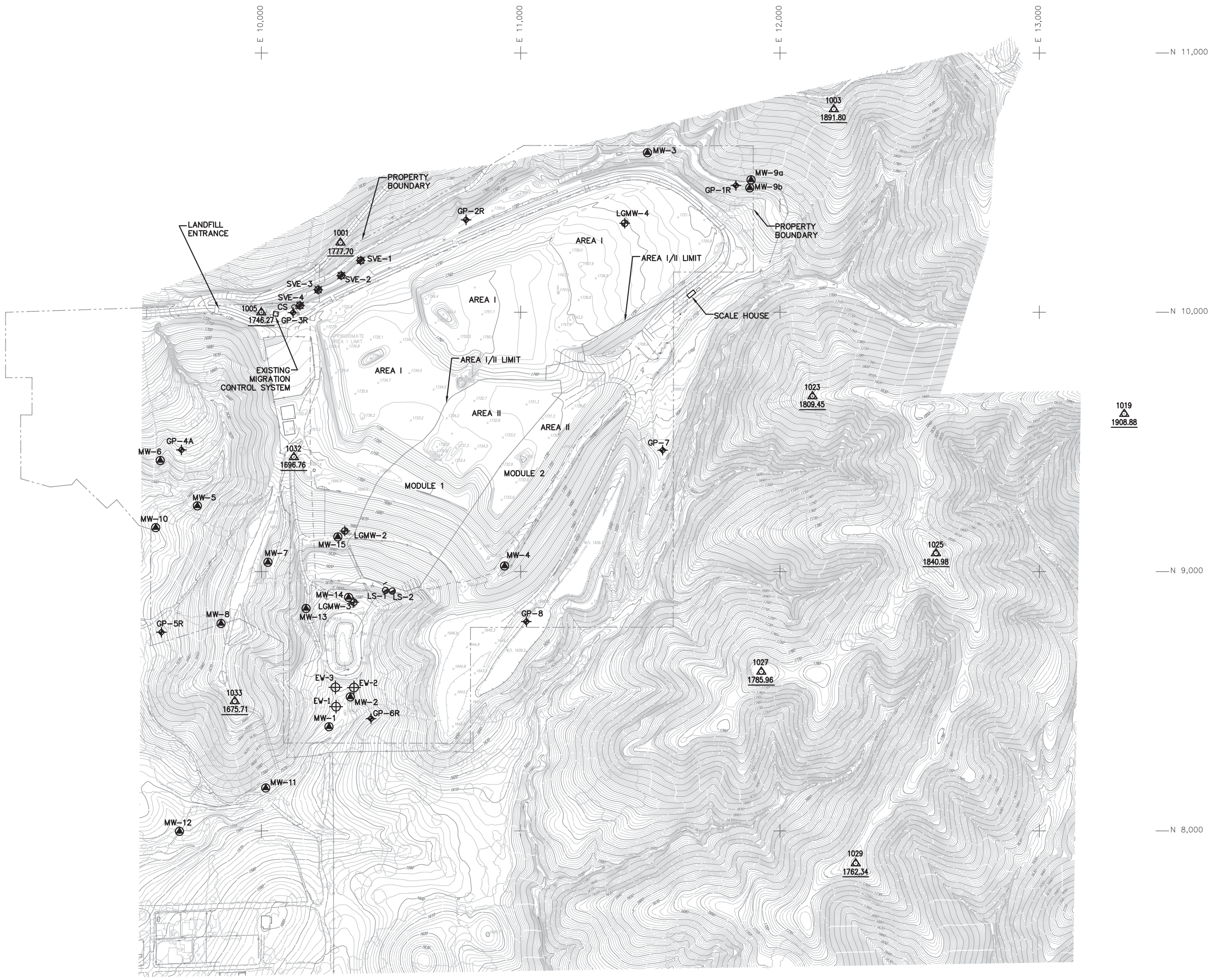
PROJ. NO. 01209155.06 T1 | DWN. BY: MJE | CKD. BY: SRK | DSN. BY: MJE | CADD FILE: SHT-1_JFC.052013 | APP. BY: JJM

CADD FILE: SHT-1_ELLF_JFC

DATE: 05-20-13

SCALE: AS SHOWN

DRAWING: 1 OF 18



LEGEND:

	APPROXIMATE PERMITTED LANDFILL LIMIT
	AREA II, MODULE I AND 2 LIMIT
	PROPERTY BOUNDARY
1740	MAJOR CONTOURS
	MINOR CONTOURS
MW-5	GROUNDWATER MONITORING WELL
LS-1	LEACHATE SUMP
LGMW-3	LFG MONITORING WELL
EW-2	GROUNDWATER EXTRACTION WELL
GP-1R	LFG PROBE
SVE-1	MIGRATION CONTROL WELL
CS	CONDENSATE SUMP
1032 1696.76	SURVEY CONTROL

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

NOTES:

1. AERIAL TOPOGRAPHY PERFORMED IN JANUARY 2013 BY CARTWRIGHT AERIAL SURVEYS INC. 5979 FREEPORT BLVD., SACRAMENTO, CA 95822.
2. LOCATIONS OF ANY ENVIRONMENTAL CONTROL FEATURE SHOWN ARE APPROXIMATE AND SHOULD BE USED FOR INFORMATION PURPOSES ONLY.

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: EXISTING ENVIRONMENTAL CONTROL SYSTEMS

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT CONSULTING ENGINEERS, INC.
6601 KOLL CENTER PARKWAY, SUITE 140
PLEASANTON, CA 94566
PH. (925) 426-0080 FAX. (925) 426-0707

PROJ. NO. 01209155.06 T1 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: JJM | ACAD FILE: SHT-2_E.040813R1 | APP. BY: JJM

CADD FILE: SHT-2_.EECS_IFC

DATE: 05-20-13

SCALE: AS SHOWN

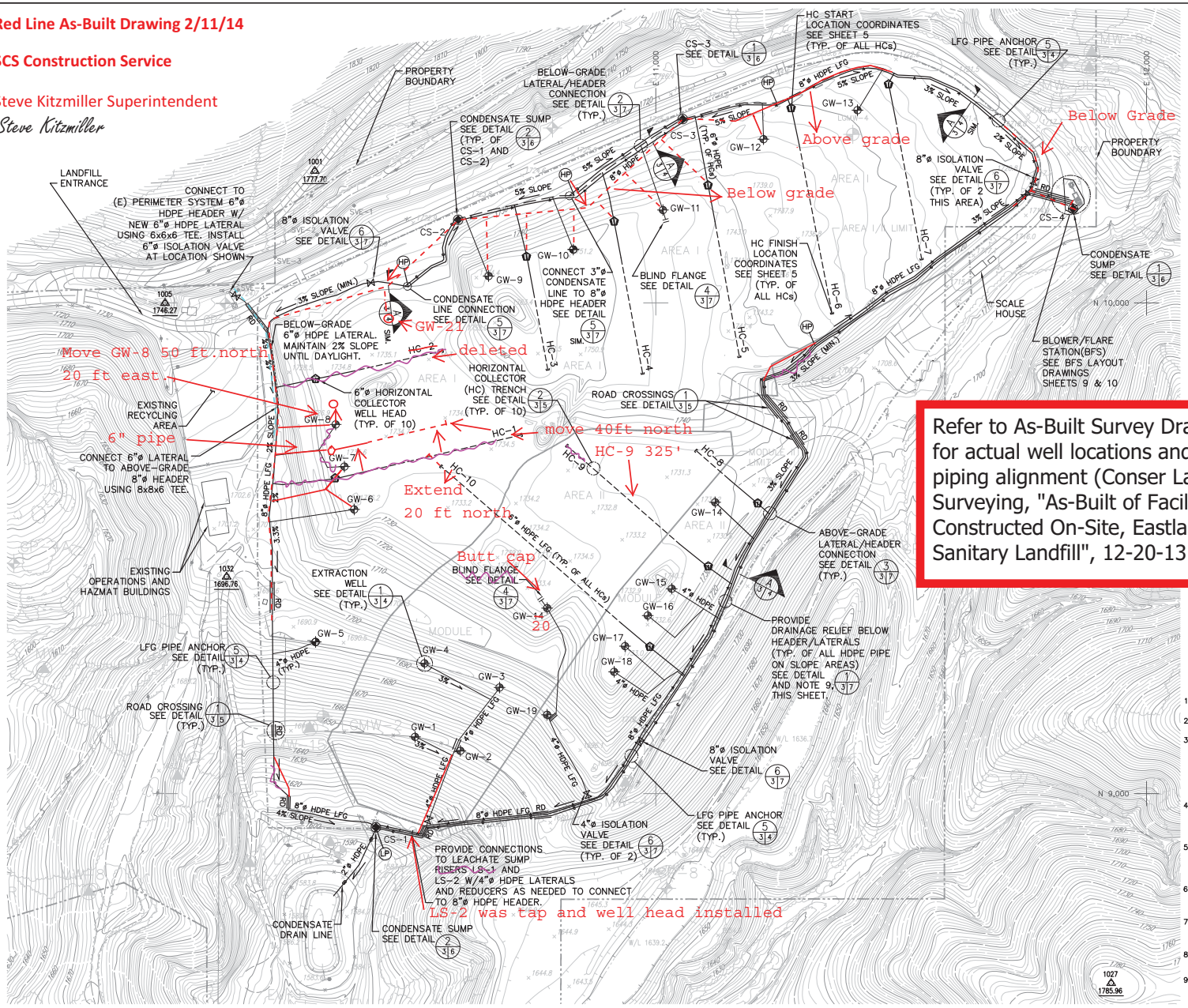
DRAWING: 2 OF 18

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller



Refer to As-Built Survey Drawing for actual well locations and piping alignment (Conser Land Surveying, "As-Built of Facilities Constructed On-Site, Eastlake Sanitary Landfill", 12-20-13

SCALE 1"=100'

LEGEND:

- APPROXIMATE PERMITTED LANDFILL LIMIT
- AREA II, MODULE 1 AND 2 LIMIT
- PROPERTY BOUNDARY
- MAJOR CONTOURS
- MINOR CONTOURS
- ABOVE GRADE 8"ø HDPE SDR 17 LFG HEADER
- BELOW GRADE 8"ø HDPE SDR 17 LFG HEADER
- ABOVE GRADE 4"ø HDPE SDR-17 LFG LATERAL
- BELOW GRADE 6"ø HDPE SDR-11 HORIZONTAL COLLECTOR
- ROAD CROSSING
- CONDENSATE FLOW DIRECTION
- LFG EXTRACTION WELL
- CONDENSATE SUMP
- HEADER/LATERAL ISOLATION VALVE
- HORIZONTAL COLLECTOR WELL HEAD
- EXISTING GROUNDWATER MONITORING WELL
- EXISTING LEACHATE SUMP
- EXISTING LFG MONITORING WELL
- EXISTING GROUNDWATER EXTRACTION WELL
- EXISTING LFG PROBE
- SURVEY CONTROL
- 2" DIA. HDPE SDR 9 AIR LINE
- 2" DIA. HDPE SDR 11 CONDENSATE LINE
- 2" DIA. HDPE SDR 11 CONDENSATE DRAIN LINE
- LFG HEADER LOW POINT
- LFG HEADER HIGH POINT

NOTES:

1. AERIAL TOPOGRAPHY PERFORMED IN JANUARY 2013 BY CARTWRIGHT AERIAL SURVEYS INC. 5979 FREEPORT BLVD., SACRAMENTO, CA 95822.
2. LOCATIONS OF ANY ENVIRONMENTAL CONTROL FEATURE SHOWN ARE APPROXIMATE AND ARE FOR INFORMATION PURPOSES ONLY.
3. THE CONTRACTOR SHALL MAINTAIN MINIMUM PIPE SLOPES AS FOLLOWS:
   i. 3% ALONG ABOVE-GRADE LFG HEADER AND LATERALS UNLESS SHOWN OTHERWISE.
   ii. 5% ALONG BELOW-GRADE LFG HEADER AND LATERALS UNLESS SHOWN OTHERWISE.
4. LOCATION OF LFG EXTRACTION WELLS AND HORIZONTAL COLLECTORS SHALL BE STAKED IN THE FIELD BY THE CONTRACTOR AND BE APPROVED BY THE COUNTY AND/OR ENGINEER PRIOR TO START OF ANY DRILLING OR TRENCHING WORK.
5. THE LFG HEADER ALIGNMENT SHALL BE STAKED BY THE CONTRACTOR PRIOR TO HEADER PLACEMENT AND APPROVED BY THE COUNTY AND/OR ENGINEER. ADJUSTMENTS TO THE ALIGNMENT MAY BE REQUIRED TO SUIT THE FIELD CONDITIONS AND WILL REQUIRE ENGINEER APPROVAL.
6. ALL BUTTERFLY VALVES SHALL BE WAFER STYLE. 6-INCH AND SMALLER BUTTERFLY VALVES SHALL BE PVC AND 8-INCH AND LARGER SHALL BE METAL. SEE SPECIFICATIONS.
7. CONDENSATE SUMPS SHALL BE LOCATED AT THE LOWEST POINT ALONG THE HEADERS. LOCATIONS SHOWN ON THE DRAWINGS MAY NEED TO BE ADJUSTED IN FIELD TO SUIT THE SITE CONDITIONS.
8. CONTRACTOR SHALL LABEL CONDENSATE AND AIR LINES AT 500 FT. INTERVALS.
9. THE CONTRACTOR SHALL PROVIDE DRAINAGE OUTLETS AT 100'-0" ON CENTERS, OR AS DETERMINED IN THE FIELD, ALONG THE HEADER. SEE DETAIL ON SHEET 7.

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: LFG COLLECTION SYSTEM PLAN

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT CONSULTING ENGINEERS, INC.
6420 KAISER CENTER PARKWAY, SUITE 140
OAKLAND, CA 94621
PH. (925) 426-0080 FAX. (925) 426-0707

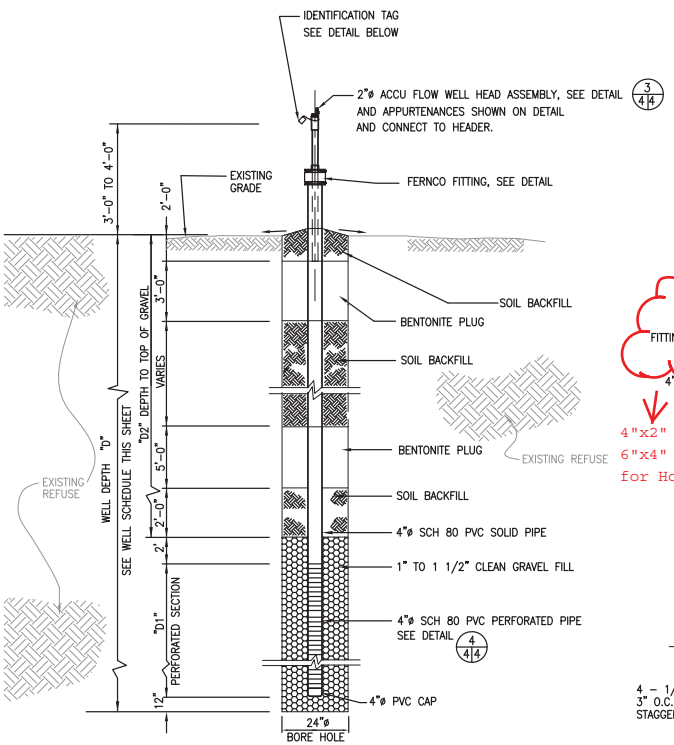
PROJ. NO. 01209155.06 T1 | DWN. BY: M.E | CHK. BY: SRK | ACAD FILE: SHT-3_IFC.050213 | APP. BY: JUM

CADD FILE: SHT-3_ELLF_IFC

DATE: 05-20-13

SCALE: AS SHOWN

DRAWING: 3 OF 18



DETAIL – EXTRACTION WELL 1 3|4
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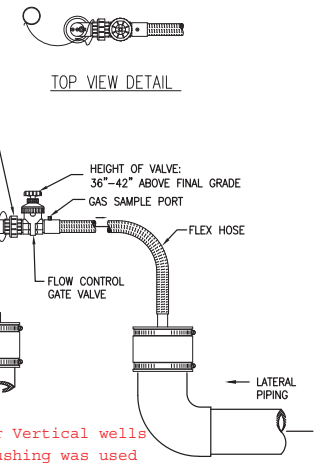

DETAIL – 2"ø ACCU-FLO VERTICAL WELLHEAD 3 4|4
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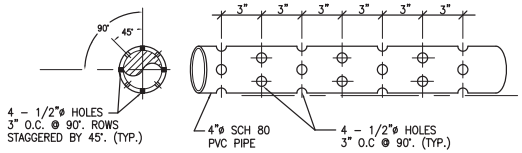


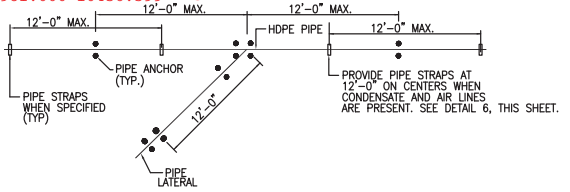
DETAIL – PERFORATED PIPE 4 4|4
N.T.S.

LFG EXTRACTION WELL SCHEDULE

WELL ID	LOCATION COORDINATES		EXISTING GRADE	BASE LINER GRADE	REFUSE DEPTH	WELL DEPTH	SLOTTED LENGTH	DEPTH TO TOP OF GRAVEL
	NORTHING	EASTING	ELEV. (FT. MSL)	ELEV. (FT. MSL)	FT.	"D" FT.	"D1" FT.	"D2" FT.
GW-1	9115.72	10509.28	1656	1596	60	35	14	18
GW-2	9087.38	10601.67	1659	1592	67	40	19	18
GW-3	9216.38	10681.55	1694	1600	94	70	35	32
GW-4	9265.60	10528.57	1692	1610	82	60	30	27
GW-5	9309.20	10306.61	1690	1630	60	45	22	20
GW-6	9579.12	10385.29	1735	1650	85	70	35	32
GW-7	9666.50	10365.37	1735	1670	65	50	25	22
GW-8	9752.30	10347.50	1734	1650	84	70	35	32
GW-9	10054.66	10659.17	1753	1654	99	80	40	37
GW-10	10108.78	10831.83	1751	1647	104	85	45	37
GW-11	10189.25	11014.51	1747	1652	95	80	40	37
GW-12	10333.67	11219.42	1734	1675	59	45	22	20
GW-13	10392.79	11410.94	1729	1680	49	35	14	18
GW-14	9593.66	11120.96	1731	1668	63	40	19	18
GW-15	9417.57	11032.45	1733	1678	55	30	9	18
GW-16	9362.94	10983.56	1733	1674	59	30	9	18
GW-17	9300.54	10937.25	1733	1668	65	40	19	18
GW-18	9248.23	10915.05	1733	1668	65	40	19	18
GW-19	9160.74	10778.48	1696	1641	55	30	9	18

NOTES:
1. BASE LINER GRADE ELEVATIONS FURNISHED BY COUNTY.
2. EXISTING GRADE ELEVATIONS TAKEN FROM JANUARY 2013 TOPOGRAPHY PERFORMED BY CARTWRIGHT AERIAL SURVEYS INC., AND FURNISHED BY COUNTY.

GW-20 9378.488 10777.882 1734 85 45 43
GW-21 9981.000 10456.599 1754 55 27 25



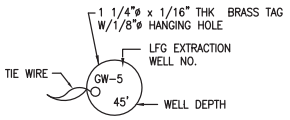
DETAIL – HDPE PIPE ANCHOR SPACING (TYP.) 5 3|4
N.T.S.

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller



DETAIL – IDENTIFICATION TAG 2 4|4
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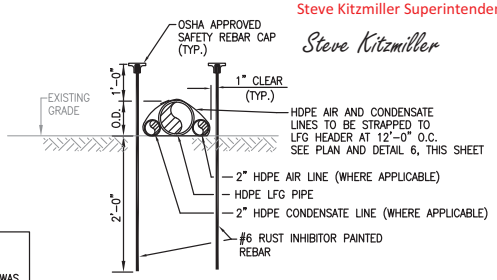
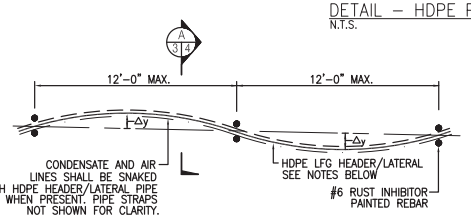
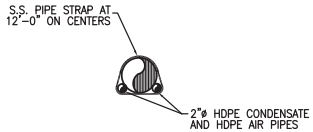


SECTION – PIPE ANCHOR AT FINISHED GRADE A 3|4



PLAN

NOTES:
1. Δy VARIES BETWEEN 0" TO 18" DEPENDING ON THE OUTSIDE TEMPERATURE (0" @ 60°F AND 18" @ 110°F)
2. DUE TO THERMAL EXPANSION AND CONTRACTION OF HDPE PIPE, LFG PIPE SHALL BE INSTALLED IN A SNAKED POSITION. CONTRACTOR SHALL MAKE ALLOWANCE FOR EXTRA LENGTH OF PIPE.



DETAIL – PIPE STRAP 6 4|4
N.T.S.

LFG EXTRACTIION WELL NOTES:

WELL DEPTHS, SHOWN IN THE ABOVE WELL SCHEDULE, HAVE BEEN COMPUTED BASED ON YEAR 2013 TOPOGRAPHY. THE BASE LINER SYSTEM FOR THE SITE WAS PROVIDED TO SCS BY THE COUNTY AND IN PDF FORMAT, WITH EXCEPTION TO AREA 2 MODULE 2 BASE GRADES.

LFG EXTRACTION WELL DESIGN MAY BE MODIFIED BASED ON THE ACTUAL FIELD CONDITIONS ENCOUNTERED DURING DRILLING AND THE ENGINEER WILL IMMEDIATELY REVISE THE WELL DESIGN AND FURNISH INFORMATION TO THE CONTRACTOR.

REV | DATE | DESCRIPTION | CK. BY:

SHEET TITLE: EXTRACTION WELL SCHEDULE AND MISCELLANEOUS DETAILS

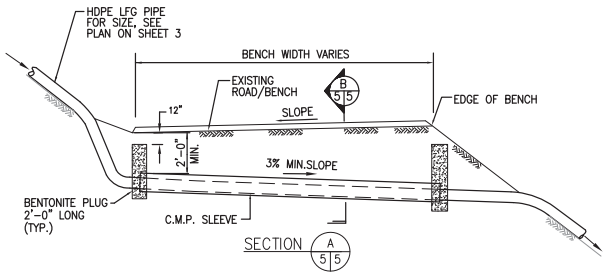
PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

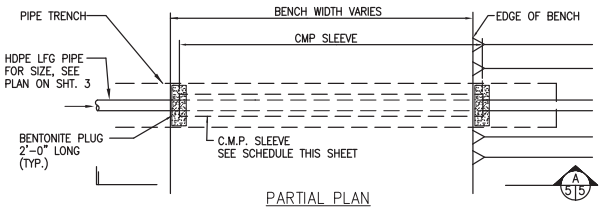
CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT CONSULTING ENGINEERS, INC.
6601 KOLL CENTER PARKWAY, SUITE 140
PLEASANTON, CA 94566
PH. (925) 426-0080 FAX. (925) 426-0707

PROJ. NO. 01209155.06 T1 | DWN. BY: MJE | ACAD FILE: SHT-4_E...040813
DSN. BY: MJE | CHK. BY: SRK | APP. BY: SRK

CADD FILE: SHT-4..ELLF..IFC.050213
DATE: 05-20-13
SCALE: AS SHOWN
DRAWING: 4 OF 18





DETAIL – ROAD/BENCH CROSSING 1 3|5
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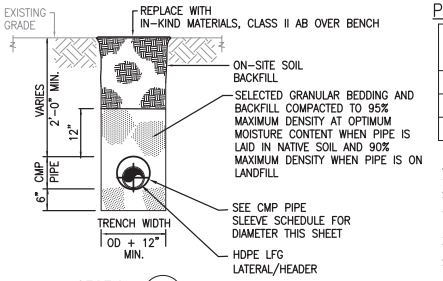


SECTION B 5|5

PIPE–SLEEVE SCHEDULE

PIPE SIZE (INCHES)	CMP SLEEVE SIZE (INCHES)
4	8
6	10
8	12

SLEEVE SCHEDULE NOTES:

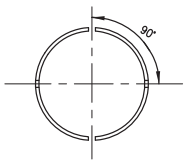
1. SCHEDULE ABOVE IS FOR A SINGLE LFG PIPE ROUTED THROUGH A CMP CULVERT.
2. FOR AIR AND CONDENSATE LINES WITH AN 8"Ø PIPE, THE CMP Ø SHALL BE 15"Ø MIN.

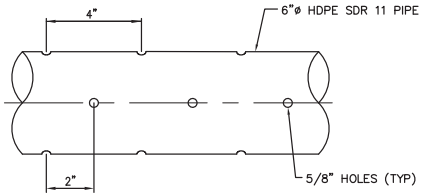
HORIZONTAL COLLECTOR SCHEDULE

HORIZONTAL COLLECTOR (HC) ID	START LOCATION COORDINATES NORTHING	START LOCATION COORDINATES EASTING	FINISH LOCATION COORDINATES NORTHING	FINISH LOCATION COORDINATES EASTING
HC–1	9641.74	10346.61	9731.15	10726.40
~~HC–2~~	~~9844.95~~	~~10306.78~~	~~9902.43~~	~~10565.46~~
HC–3	10095.51	10736.93	9864.44	10779.75
HC–4	10165.93	10914.99	9856.34	10973.12
HC–5	10239.84	11106.67	9890.59	11170.28

HORIZONTAL COLLECTOR (HC) ID	START LOCATION COORDINATES NORTHING	START LOCATION COORDINATES EASTING	FINISH LOCATION COORDINATES NORTHING	FINISH LOCATION COORDINATES EASTING
HC–6	10395.96	11276.60	9979.03	11358.99
HC–7	10447.85	11474.16	10089.18	11541.82
HC–8	9591.14	11207.54	9698.49	11082.74
HC–9	9461.84	11106.38	9708.90	10819.03
HC–10	9298.44	10987.59	9666.77	10562.45

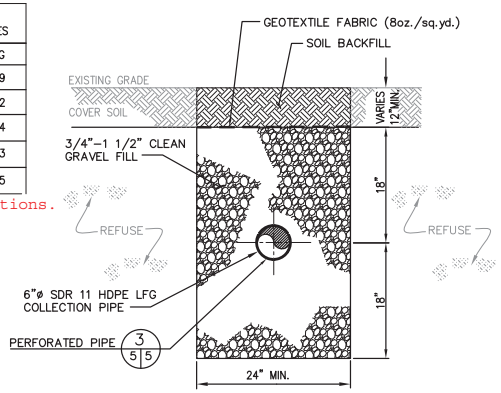
refer to attached As-Built Survey Drawing for HC layout and start/finish locations.





PERFORATION DESCRIPTION:
2 ROWS OF 5/8" HOLES, 180 DEGREES APART, 4" C-C, STAGGERED 2" (4 TOTAL ROWS)

DETAIL–PERFORATED PIPE 3 3|5
N.T.S.



SECTION C 5|5
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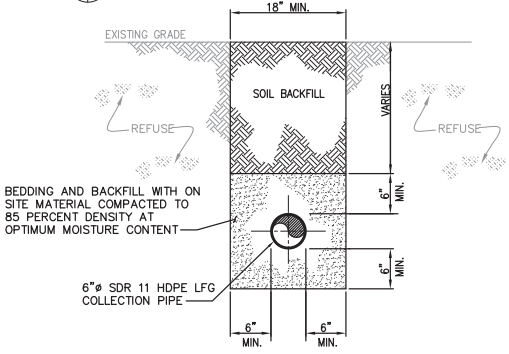
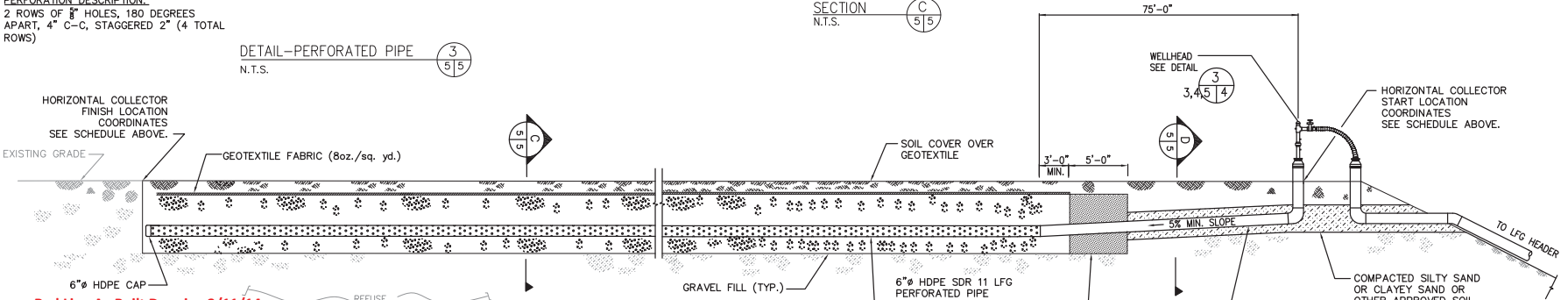


SECTION D 5|5
N.T.S.



DETAIL–HORIZONTAL COLLECTOR 2 3|5
N.T.S.

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

REV | DATE | DESCRIPTION | CK. BY

SHEET TITLE: SECTIONS AND DETAILS

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT CONSULTING ENGINEERS, INC.
8951 CAL CENTER PARKWAY, SUITE 140
SACRAMENTO, CALIFORNIA 95826
PH: (925) 426-0080 FAX: (925) 426-0707

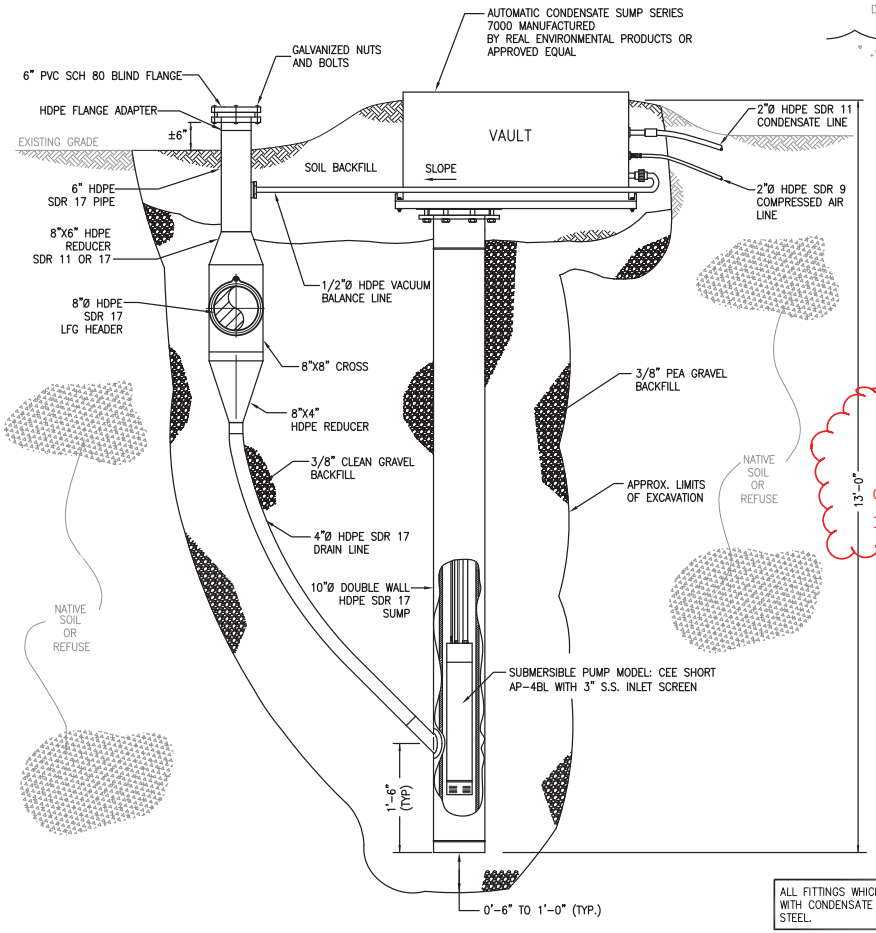
PROJ. NO. 01209155.06 T1 | DWN. BY: MJE | CHK. BY: SRK | APP. BY: JJM | CADD FILE: SHT-5_JFC.052013

CADD FILE: SHT-1_ELLF_IFC

DATE: 05-20-13

SCALE: AS SHOWN

DRAWING: 5 OF 18

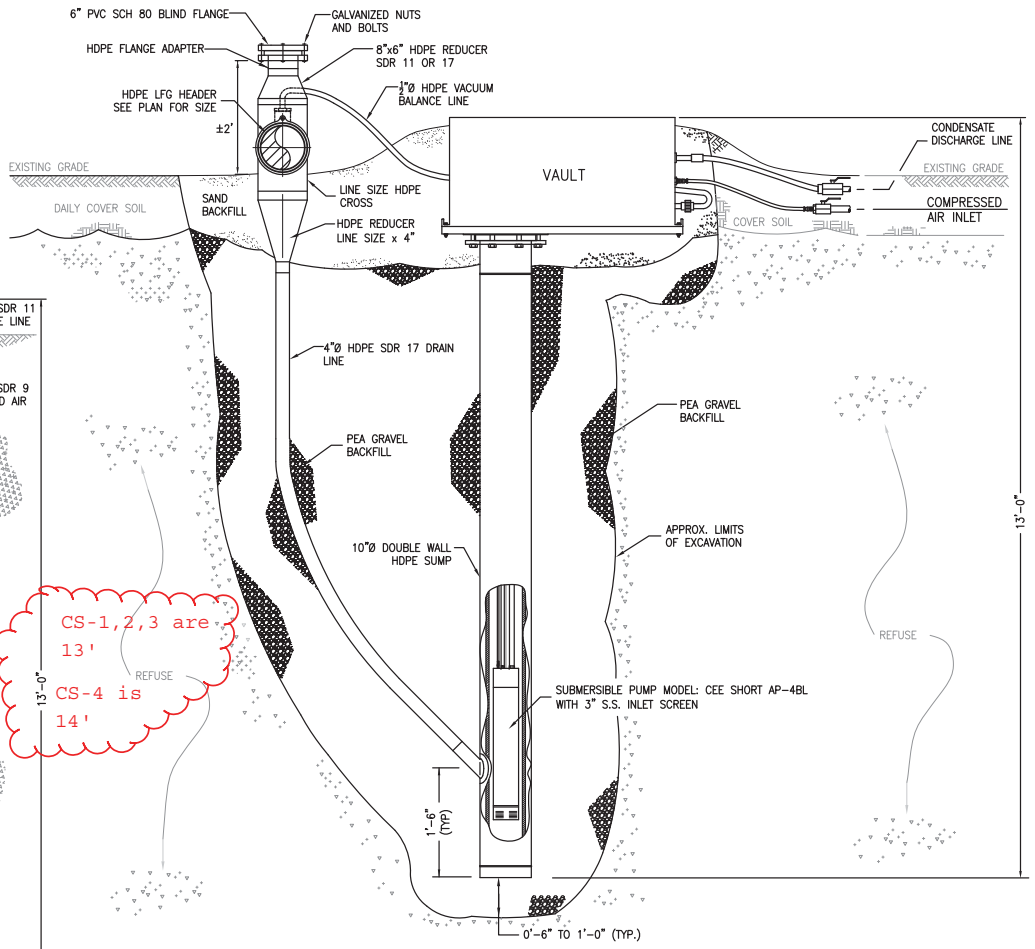


NOTE: CS-3 IS LOCATED IN REFUSE.
CS-4 IS LOCATED IN NATIVE SOIL.

DETAIL – AUTOMATIC PNEUMATIC CONDENSATE SUMP – (CS-3 AND CS-4) CS-2 (1/3|6)
N.T.S.

ALL FITTINGS WHICH COME IN CONTACT WITH CONDENSATE SHALL BE STAINLESS STEEL.

NOTE:
A MINIMUM OF 6 INCHES AND A MAXIMUM OF 18 INCHES OF OVER EXCAVATION WILL BE ALLOWED FOR PNEUMATIC AUTOMATIC CONDENSATE SUMP..



CS-1,2,3 are 13'
CS-4 is 14'

DETAIL – AUTOMATIC PNEUMATIC CONDENSATE SUMP – (CS-1 AND CS-2) (2/3|6)
N.T.S.

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: CONDENSATE SUMP AND DISCHARGE DETAILS

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE
DEPARTMENT OF PUBLIC SERVICES
LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT CONSULTING ENGINEERS, INC.
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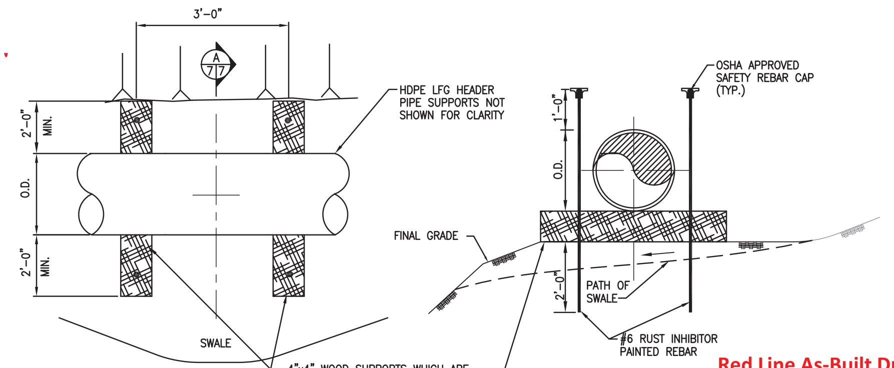
CADD FILE: SHT-1_ELLF_IFC

DATE: 05-20-13

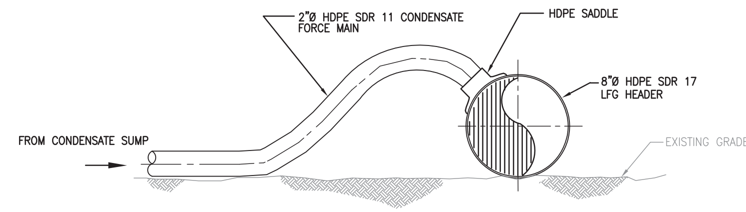
SCALE: AS SHOWN

DRAWING: 6 OF 18



NOTE: SURFACE DRAINAGE OUTLET UNDER THE LFG PIPING WILL BE ROUTED THROUGH WOOD BOARD SUPPORTS. THE LOCATION OF THESE ROUTES WILL BE DETERMINED BY THE DESIGN ENGINEER IN THE FIELD TO SUIT SITE CONDITIONS.

DETAIL – DRAINAGE SWALE UNDER LFG PIPE (1 / 3|7)
N.T.S.



NOTE: CONDENSATE CONNECTION SHOWN IS FOR ABOVE-GRADE APPLICATIONS. SHOULD CONNECTION BE BELOW-GRADE (AS SHOWN ON PLANS), 2' MIN. COVER SHALL BE PLACED ABOVE TOP OF CONDENSATE PIPE.

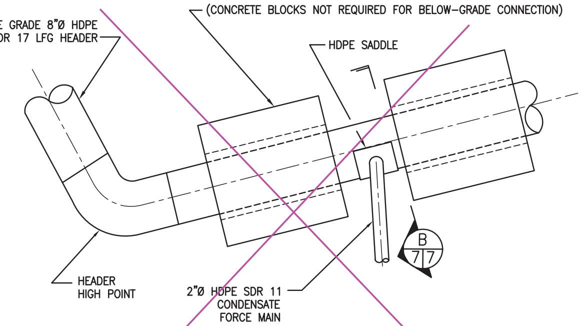
SECTION B (7|7)
N.T.S.

Red Line As-Built Drawing 2/11/14

SCS Construction Service

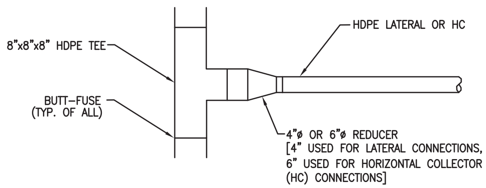
Steve Kitzmiller Superintendent

Steve Kitzmiller



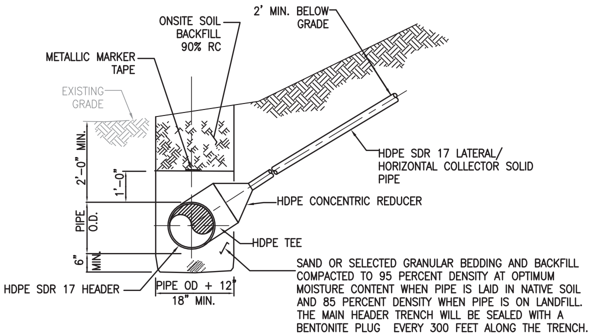
DETAIL – INSTALLTION OF CONDENSATE LINE ON HDPE HEADER (5 / 3|7)
N.T.S.

Not Used

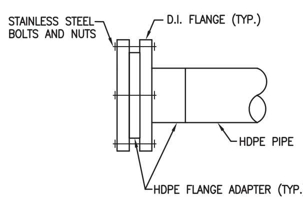


DETAIL – HDPE FITTING CONNECTION ABOVE-GRADE (3 / 3|7)
N.T.S.

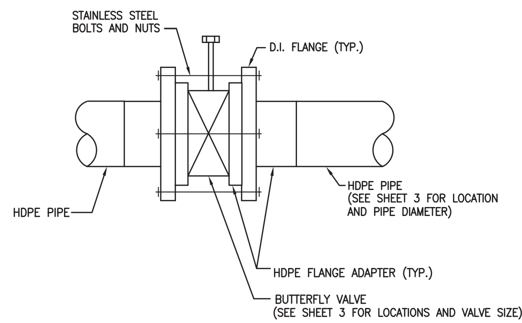
Metallic Tape and 2" PVC pipe fill with Bentenite was used for under ground. Site Manager Kris Byrd requested we leave 2" pipe in place used for as built.



DETAIL – TYPICAL CONNECTION OF HDPE LATERAL BELOW-GRADE (2 / 3|7)
N.T.S.



DETAIL – INSTALLATION OF BLIND FLANGE ON HDPE PIPE (4 / 3|7)
N.T.S.



DETAIL – INSTALLATION OF ISOLATION VALVE ON HDPE PIPE (6 / 3|7)
N.T.S.

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: MISC. DETAILS

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
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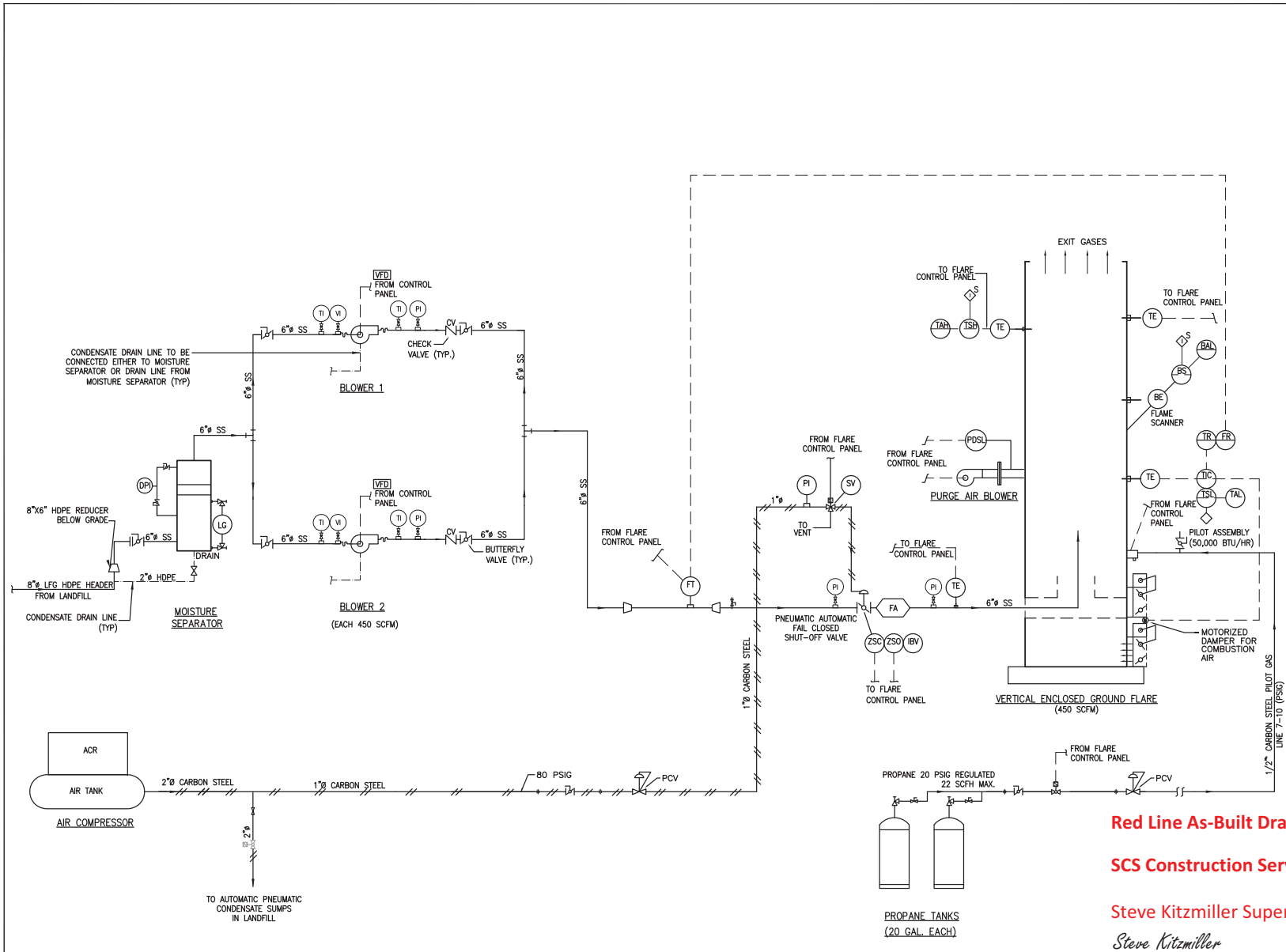
PROJ. NO. 01209155.06 T1 | DSN. BY: MJE | DWN. BY: MJE | CHK. BY: SRK | APP. BY: JJM | ACAD FILE: SHT-7_E..._052013

CADD FILE: SHT-1_ELLF_IFC

DATE: 02-20-13

SCALE: AS SHOWN

DRAWING: 7 OF 18



LANDFILL GAS FLARING SYSTEM – SCHEMATIC FLOW DIAGRAM
N.T.S.

LEGEND:

GENERAL INSTRUMENT SYMBOL BALLOONS

LOCALLY MOUNTED	MOUNTED ON FLARE CONTROL PANEL	MOUNTED BEHIND FLARE CONTROL PANEL

ABBREVIATIONS

BAL	BURNER ALARM
BE	BURNER ELEMENT
BS	BURNER SWITCH
CV	CHECK VALVE
DPI	DIFFERENTIAL PRESSURE INDICATOR
FR	FLOW RECORDER
FT	FLOW TRANSMITTER
FCV	FLOW CONTROL VALVE
LAH	LEVEL ALARM HIGH
LG	LEVEL GAUGE
PCV	PRESSURE CONTROL VALVE
PI	PRESSURE INDICATOR
PDSL	PRESSURE DIFFERENTIAL SWITCH LOW
TAH	TEMPERATURE ALARM HIGH
TAL	TEMPERATURE ALARM LOW
TE	TEMPERATURE ELEMENT
TI	TEMPERATURE INDICATOR
TIC	TEMPERATURE INDICATING CONTROLLER
TR	TEMPERATURE RECORDER
TSH	TEMPERATURE SWITCH HIGH
TSL	TEMPERATURE SWITCH LOW
ZSO	LIMIT SWITCH TO PROVE VALVE IN OPEN POSITION
ZSC	LIMIT SWITCH TO PROVE VALVE IN CLOSED POSITION
IBV	INLET BLOCK VALVE
VI	VACUUM INDICATOR
SV	SOLENOID VALVE

ABBREVIATIONS (OTHER THAN INSTRUMENTS)

FA	FLAME ARRESTOR
LFG	LANDFILL GAS
SS	STAINLESS STEEL
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DI	DUCTILE IRON

SYMBOLS

- TRANSMISSION LINE (PNEUMATIC)
- ELECTRICAL SIGNAL
- FLOW LINE
- LOCAL INTERLOCK

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: SCHEMATIC FLOW DIAGRAM

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE
DEPARTMENT OF PUBLIC SERVICES
LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
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PROJ. NO. 01209155.06 T1
DSN. BY: MJE
DWN. BY: MJE
CHK. BY: SRK
APP. BY: SRK
ACAD FILE: SHT-1_ELLF_052013

CADD FILE: SHT-1_ELLF_IFC

DATE: 05-20-13

SCALE: AS SHOWN

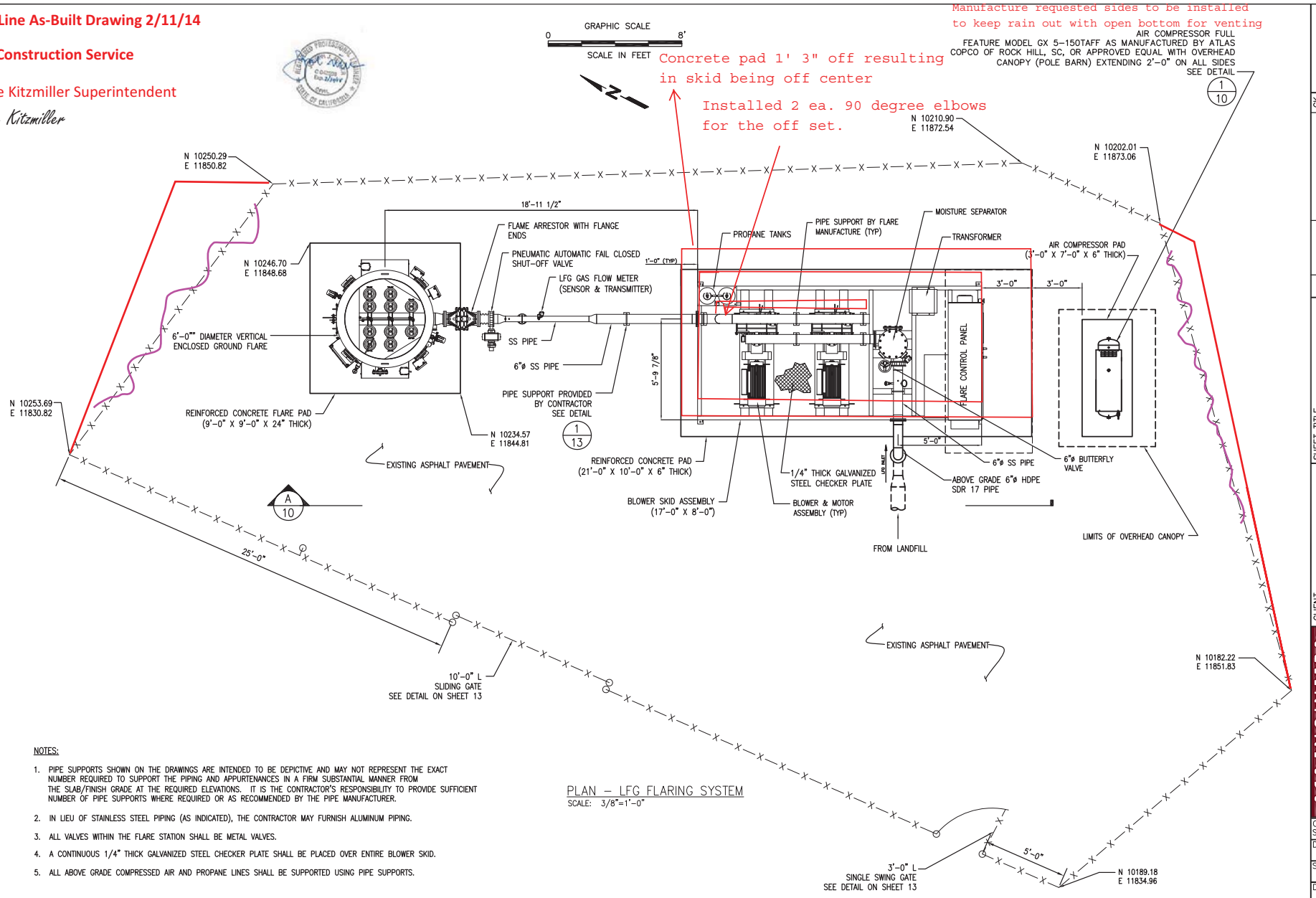
DRAWING: 8 OF 18

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller



PLAN – LFG FLARING SYSTEM
SCALE: 3/8"=1'-0"

NOTES:

1. PIPE SUPPORTS SHOWN ON THE DRAWINGS ARE INTENDED TO BE DEPICTIVE AND MAY NOT REPRESENT THE EXACT NUMBER REQUIRED TO SUPPORT THE PIPING AND APPURTENANCES IN A FIRM SUBSTANTIAL MANNER FROM THE SLAB/FINISH GRADE AT THE REQUIRED ELEVATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SUFFICIENT NUMBER OF PIPE SUPPORTS WHERE REQUIRED OR AS RECOMMENDED BY THE PIPE MANUFACTURER.
2. IN LIEU OF STAINLESS STEEL PIPING (AS INDICATED), THE CONTRACTOR MAY FURNISH ALUMINUM PIPING.
3. ALL VALVES WITHIN THE FLARE STATION SHALL BE METAL VALVES.
4. A CONTINUOUS 1/4" THICK GALVANIZED STEEL CHECKER PLATE SHALL BE PLACED OVER ENTIRE BLOWER SKID.
5. ALL ABOVE GRADE COMPRESSED AIR AND PROPANE LINES SHALL BE SUPPORTED USING PIPE SUPPORTS.

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: LFG BLOWER/FLARE SYSTEM PLAN

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE
DEPARTMENT OF PUBLIC SERVICES
LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
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PROJ. NO. 01209155.06 T1 | DWN. BY: MJE | ACAD FILE: SHT-9.....051513
DSN. BY: MJE | CHK. BY: SRK | APP. BY: SRK

CADD FILE: SHT-9 ELLF_IFC

DATE: 05-20-13

SCALE: AS SHOWN

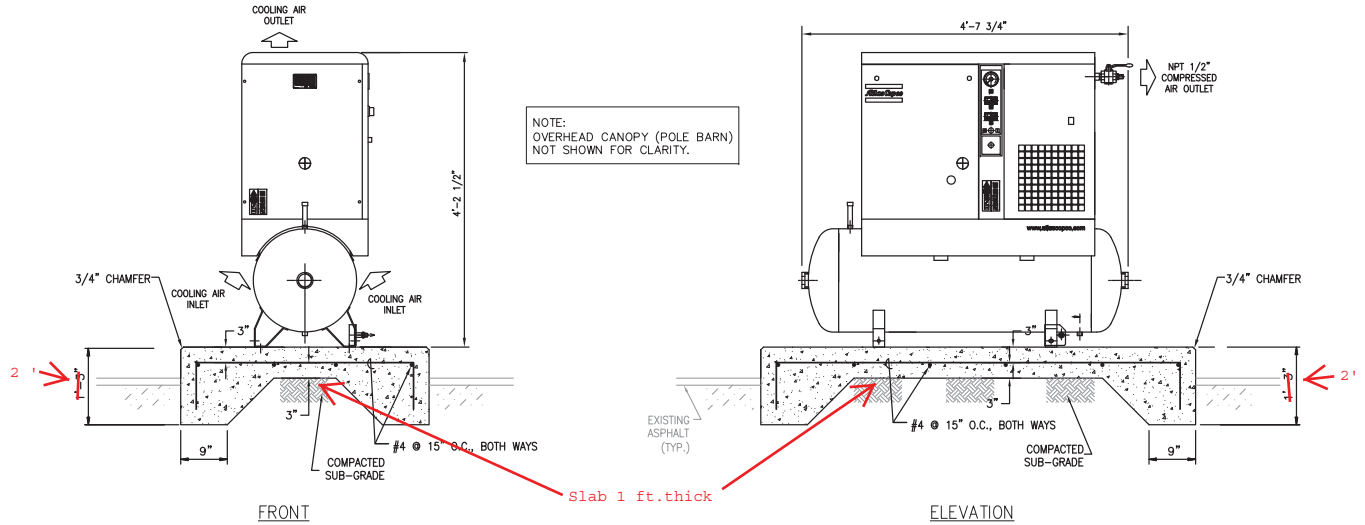
DRAWING: 9 OF 18

Red Line As-Built Drawing 2/11/14

SCS Construction Service

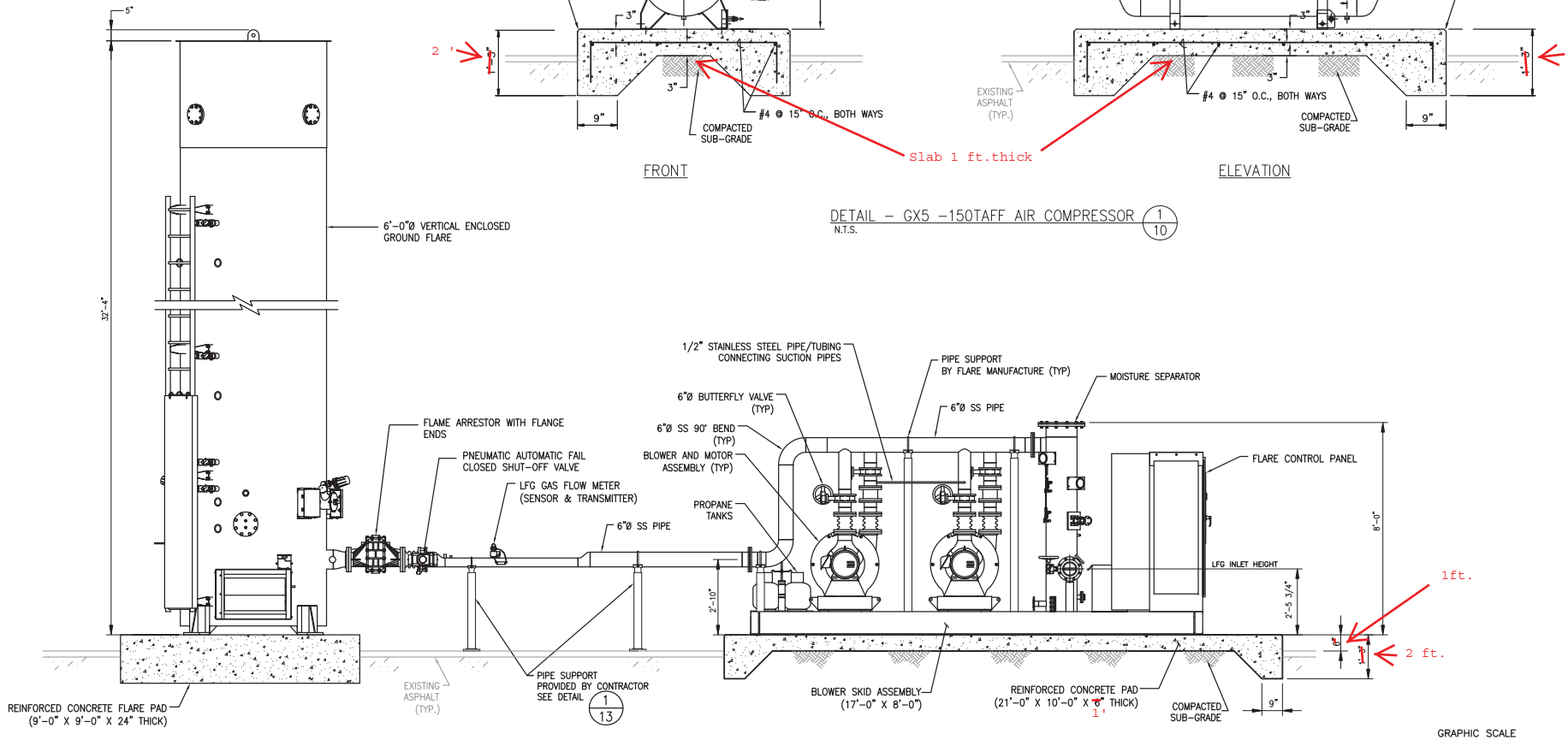
Steve Kitzmiller Superintendent

Steve Kitzmiller



NOTE:
OVERHEAD CANOPY (POLE BARN)
NOT SHOWN FOR CLARITY.

DETAIL – GX5 -150TAFF AIR COMPRESSOR (1/10)
N.T.S.



SECTION – LFG FLARING SYSTEM (A/10)
SCALE: 1/2"=1'-0"

GRAPHIC SCALE
0 2 4 6
SCALE IN FEET

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: LFG BLOWER/FLARE SECTION AND DETAIL

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE
DEPARTMENT OF PUBLIC SERVICES
LAKEPORT, CA 95453

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PROJ. NO. 01209155.06 T1 | DWN. BY: MJE | CHK. BY: SRK | APP. BY: SRK | CADD FILE: SHT-1_ELLF_IFC | DSK. BY: MJE

CADD FILE: SHT-1_ELLF_IFC

DATE: 05-20-13

SCALE: AS SHOWN

DRAWING: 10 OF 18

CONCRETE NOTES

1. PROPERTIES OF CONCRETE SHALL BE AS FOLLOWS:

USE	MAXIMUM AGGREGATE SIZE	MINIMUM 28 DAY COMP. STRENGTH (PSI)	MAXIMUM WATER/CEMENT RATIO	MINIMUM CEMENT SACK PER CY	MAX. SLUMP
FOUNDATIONS	1"	3,000	0.55	5.5	4"

2. CONCRETE SPECIFIED IN THESE DRAWINGS SHALL BE CONSIDERED AS STRUCTURAL CONCRETE.

3. THE DIMENSIONS SHOWN FOR LOCATION OF REINFORCING STEEL ARE TO FACE OF BAR AND DENOTE CLEAR COVERAGE. UNLESS SPECIFICALLY NOTED, CONCRETE COVERAGE SHALL BE AS FOLLOWS:

LOCATION	COVERAGE
CONCRETE DEPOSITED DIRECTLY AGAINST THE GROUND (EXCEPT SLABS)	3"
CONCRETE EXPOSED TO THE GROUND BUT PLACED IN FORMS	2"
SLABS ON GRADE (CLEARENCE TO TOP SURFACE)	SEE PLANS & DETAILS

4. REINFORCEMENT SHALL CONFORM TO ASTM A615 GRADE 60.

5. CONTINUOUS REINFORCEMENT SHALL BE SPLICED BY LAPPING THE REINFORCEMENT WITH THE MINIMUM LENGTH SHOWN IN DETAIL 2/S-1.

6. ALL ANCHOR BOLTS SHALL CONFORM TO ASTM A36, UNLESS NOTED OTHERWISE.

7. REFER TO BOTH CIVIL AND MECHANICAL DRAWINGS FOR LOCATION AND SPACING OF ALL PLUMBING FIXTURES.

8. ALL REINFORCING STEEL, ANCHOR BOLTS, DOWELS AND OTHER INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO POURING CONCRETE.

9. ANCHOR BOLTS OR SILL BOLTS SHALL BE HEX HEAD BOLTS UNLESS OTHERWISE NOTED. DO NOT USE UPSET (ROLLED) THREADS.

10. ALL WELDING OF REINFORCEMENT SHALL BE LOW HYDROGEN ELECTRODES UNLESS OTHERWISE NOTED. WELDING OF REINFORCING SHALL BE ALLOWED ONLY WHERE DETAILED ON DRAWINGS. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY SPECIFICATIONS AWS D1.4. WELDING SHALL NOT BE DONE WITHIN TWO BAR DIAMETERS OF ANY BENT PORTION OF A BAR THAT HAS BEEN BENT COLD. WELDING OF CROSSING BARS SHALL NOT BE PERMITTED FOR ASSEMBLY OF REINFORCEMENT UNLESS AUTHORIZED BY THE STRUCTURAL ENGINEER OF RECORD. ASTM A706 REINFORCING SHALL BE USED FOR ALL REINFORCING THAT IS BEING WELDED.

11. PIPES LARGER THAN 1-1/2" DIAMETER SHALL NOT BE EMBEDDED IN STRUCTURAL CONCRETE EXCEPT WHERE SPECIFICALLY APPROVED BY STRUCTURAL ENGINEER. PIPES SHALL NOT DISPLACE OR INTERUPT REINFORCING BARS.

FOUNDATION NOTES

1. ALL FOOTINGS SHALL EXTEND TO FIRM BEARING IN UNDISTURBED SOIL OR ENGINEERED FILL.

2. ALL REINFORCING STEEL, ANCHOR BOLTS, AND OTHER EMBEDDED ITEMS SHALL BE SECURELY POSITIONED IN THE FORMS PRIOR TO POURING OF CONCRETE.

3. SEE CONCRETE NOTES FOR LAP REQUIREMENTS.

4. EXCAVATION: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION PROCEDURES AND FOR PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS, AND UTILITIES.

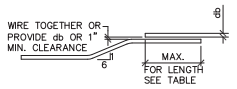
5. BACKFILL: DO NOT BACKFILL UNTILL 7 DAYS MINIMUM AFTER COMPLETION OF THE SLABS.

6. THE SOIL BENEATH, AND EXTENDING 5'-0" BEYOND, THE PAD SHALL BE COMPACTED TO 95%.

7. FOUNDATION DESIGNS ARE BASED UPON THE FOLLOWING PARAMETERS:

A. MAXIMUM ALLOWABLE SOIL BEARING PRESSURE:
   DEAD LOAD PLUS LIVE LOAD = 1.0 KSF
   DEAD LOAD PLUS LIVE LOAD PLUS WIND OR (SEISMIC) = 1.33 KSF
B. PASSIVE RESISTANCE = 150.0 PCF
C. COEFFICIENT OF FRICTION = 0.25

LAP LENGTH									
BAR SIZE	#3	#4	#5	#6	#7	#8	#9	#10	#11
BOTTOM BAR	20"	26"	33"	39"	46"	55"	70"	89"	109"
TOP BAR	26"	34"	43"	51"	60"	72"	91"	115"	141"



NOTES:
1. SPLICES ARE SHOWN IN INCHES AND SHALL CONFORM TO CLASS "B" SPLICES AS PER ACI 318 (LATEST EDITION).
2. SPLICE LENGTHS ASSUME THE MODIFICATION FACTORS OF ACI 318 SECTIONS 12.2 ARE 1.0. FOR OTHER CONDITIONS PROVIDE SPLICE LENGTHS IN ACCORDANCE WITH ACI 318.
3. USE THE SPLICE LENGTH GIVEN FOR TOP BARS WHEN MORE THAN 12" OF CONC. IS CAST BELOW HORIZONTAL BARS IN THE MEMBER. USE THE SPLICE LENGTH GIVEN FOR BOTTOM BARS FOR ALL OTHER CONDITIONS.

CONCRETE REINF. BAR SPLICE LENGTH

GENERAL STRUCTURAL NOTES

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH 2010 CALIFORNIA BUILDING CODE (C.B.C.).
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES OR INCONSISTENCIES.
3. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS OR SPECIFICATIONS.
4. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDUM.
5. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING AND SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT.
6. TEMPORARY BRACING OR SHORING SHALL NOT BE REMOVED UNTIL MATERIALS REACH THEIR DESIGN STRENGTH.
7. OPENINGS, POCKETS, ETC. SHALL NOT BE PLACED IN SLABS UNLESS SPECIFICALLY DETAILED ON THE STRUCTURAL DRAWINGS. NOTIFY THE ENGINEER WHEN DRAWINGS BY OTHERS SHOW OPENINGS POCKETS ETC., NOT SHOWN ON THE STRUCTURAL DRAWINGS, BUT WHICH ARE LOCATED IN STRUCTURAL MEMBERS.
8. CONTRACTOR SHALL READ AND FOLLOW ALL REFERENCED ICC REPORTS FOR INSTALLATION OF ITEMS SHOWN. ALTERNATIVE METHODS OF CONSTRUCTION MAY BE SUBMITTED FOR APPROVAL TO THE ENGINEER WITH APPLICABLE ICC REPORTS.
9. IT IS THE INTENT OF THESE PLANS TO PROVIDE DETAILS OF CONSTRUCTION NECESSARY TO GUIDE THE GENERAL CONTRACTOR WITH STRUCTURAL ASPECTS OF THE PROJECT ONLY.
10. DO NOT SCALE STRUCTURAL DRAWINGS. IF DIMENSIONS OR DETAILS ARE NOT CLEAR, OR IF DISCREPANCIES EXIST ON THE DRAWINGS CONTACT THE ENGINEER.
11. SEE MECHANICAL, ELECTRICAL AND/OR ARCHITECTURAL DRAWINGS FOR LOCATION AND SIZES OF PIPES, CONDUITS, FLOOR DRAINS, VENTS, DUCTS, DRAIN LEADERS AND OTHER SIMILAR OPENINGS NOT INDICATED ON THESE STRUCTURAL DRAWINGS.
12. SEE MECHANICAL, ELECTRICAL AND/OR ARCHITECTURAL DRAWINGS FOR EMBEDMENT OF BOLTS, ANCHORS AND OTHER MISCELLANEOUS EMBEDDED ITEMS NOT SHOWN ON THESE STRUCTURAL DRAWINGS.

BASIS OF DESIGN

1. THE FOLLOWING APPLIED LOADS, PER THE 2010 CBC, WERE USED IN THE DESIGN OF THE PROPOSED BUILDING:

WIND: BASIC WIND SPEED = 85 MPH
EXPOSURE C
I = 1.0

SEISMIC: I = 1.0
SEISMIC DESIGN CATEGORY = D
SITE CLASS = D
Ss = 1.518 S1 = 0.689
Fa = 1.000 Fv = 1.500
Sds = 1.012 Sd1 = 0.689
R = 3.0
DESIGN BASE SHEAR = 2.437k

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA — CIVIL

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: STRUCTURAL NOTES

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT

COUNTY OF LAKE
DEPARTMENT OF PUBLIC SERVICES
LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
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CADD FILE: SHT-1_ELLF_IFC

DATE: 05-20-13

SCALE: AS SHOWN

DRAWING: 11 OF 18

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

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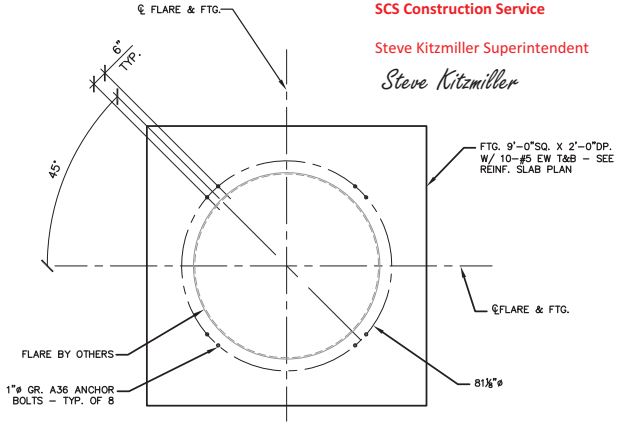
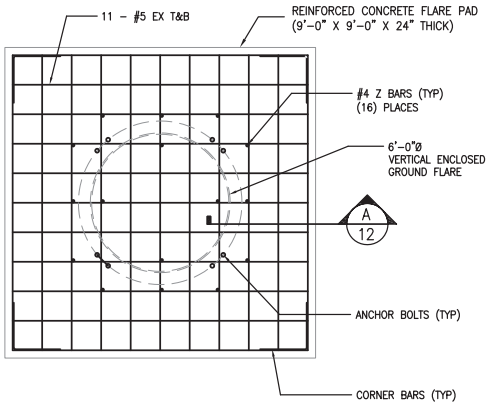
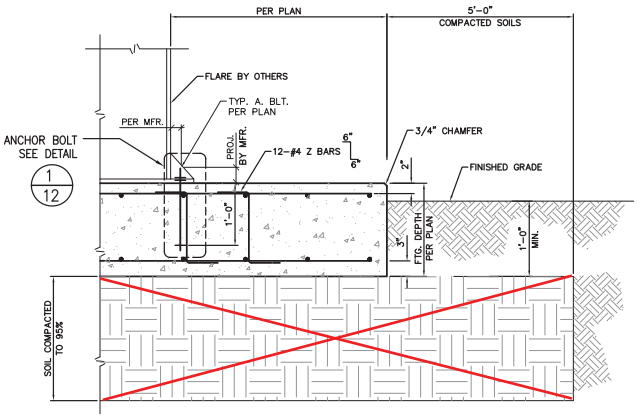


PLAN – FOUNDATION
N.T.S.



PLAN – SLAB REINFORCEMENT
N.T.S.

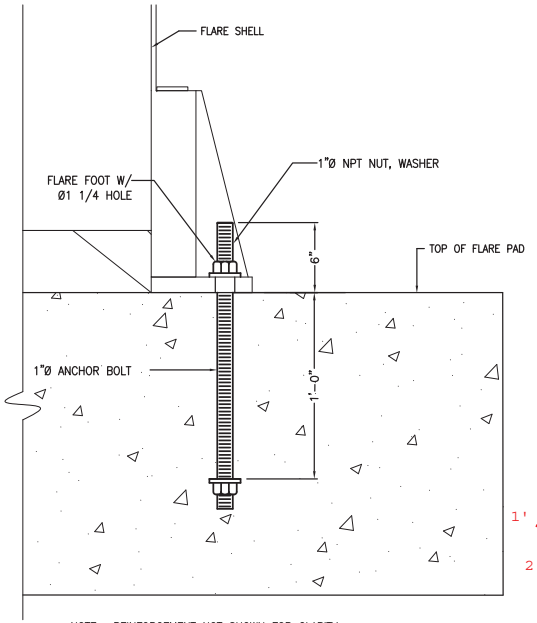


SECTION A 12
N.T.S.

Over excavating was not performed, compaction testing was performed at 3' out and 3' down from top outside edge, each side of concrete.Test passed 95% compaction

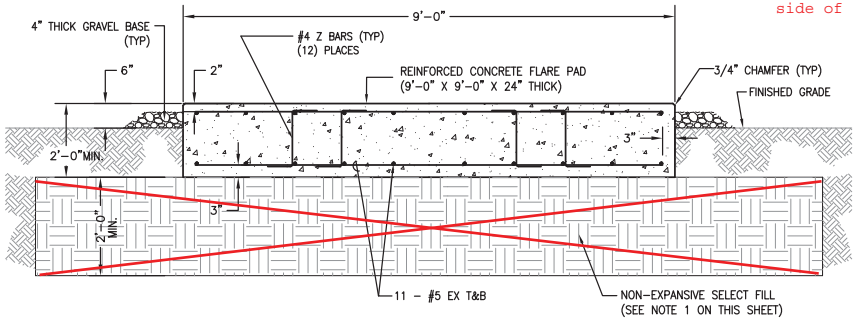
NOTE:

1. THE EXISTING POTENTIALLY EXPANSIVE SOIL AT THE NEW FLARE PAD LOCATION SHALL BE MITIGATED BY EXCAVATION AND REPLACEMENT WITH A MINIMUM OF 2 FEET OF NON-EXPANSIVE SELECT FILL BELOW THE BOTTOM OF THE FLARE PAD. THE NON-EXPANSIVE SELECT FILL SHALL EXTEND 5 FEET BEYOND THE PAD FOOTPRINT ON ALL SIDES AND SHALL CONSIST OF AGGREGATE BASE ROCK CONFORMING TO THE REQUIREMENTS OF CALTRANS CLASS 2 AGGREGATE BASE OR AN EQUIVALENT NON-EXPANSIVE MATERIAL, AS APPROVED BY THE GEOTECHNICAL ENGINEER. PRIOR TO PLACEMENT OF NON-EXPANSIVE SELECT FILL, THE FOUNDATION SUBGRADE, EXPOSED BY EXCAVATION, SHALL BE COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 90% AT A MOISTURE CONTENT OF OPTIMUM TO A MAXIMUM OF 3% ABOVE OPTIMUM IN ACCORDANCE WITH ASTM D-1557 (LATEST REVISION). SELECT NON-EXPANSIVE AGGREGATE BASE ROCK SHALL COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 95% PURSUANT TO ASTM D-1557 (LATEST REVISION) THE FILL SHALL BE SPREAD EVENLY AND COMPACTED IN UNIFORM LIFTS NOT EXCEEDING 8 INCHES IN UNCOMPACTED THICKNESS.

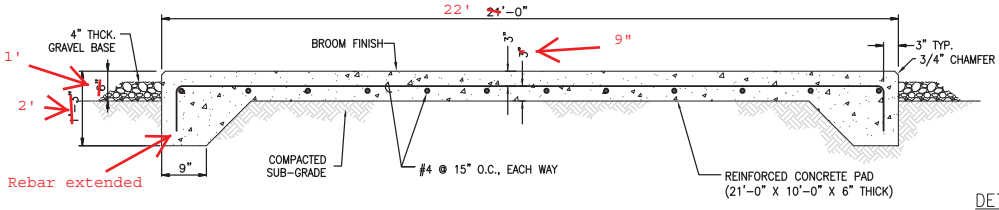


NOTE: REINFORCEMENT NOT SHOWN FOR CLARITY.

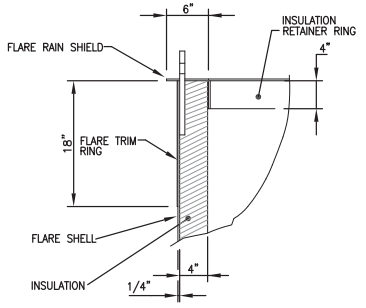
DETAIL – ANCHOR BOLT 1 12
N.T.S.



DETAIL – FLARE PAD
N.T.S.



DETAIL – BLOWER SKID PAD
N.T.S.



DETAIL – TYPICAL FLARE STACK TOP SECTION
N.T.S.

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: STRUCTURAL DETAILS

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT CONSULTING ENGINEERS, INC.
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PROJ. NO. 01209155.06 T1 | DWN. BY: MJE | CHK. BY: SRK | CADD FILE: SHT-1_E.LLF_JFC | APP. BY: SRK | DATE: 05-20-13 | SCALE: AS SHOWN | DRAWING: 12 OF 18

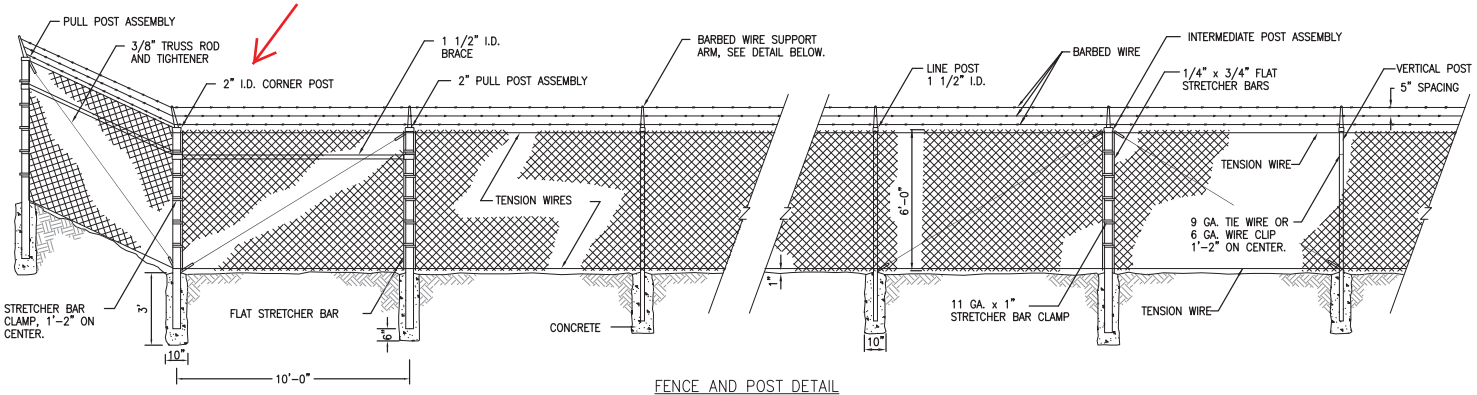
Red Line As-Built Drawing 2/11/14

SCS Construction Service

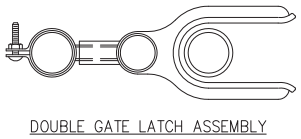
Steve Kitzmiller Superintendent

Steve Kitzmiller

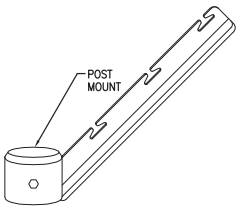
Per submittal 3" ID corner post



FENCE AND POST DETAIL



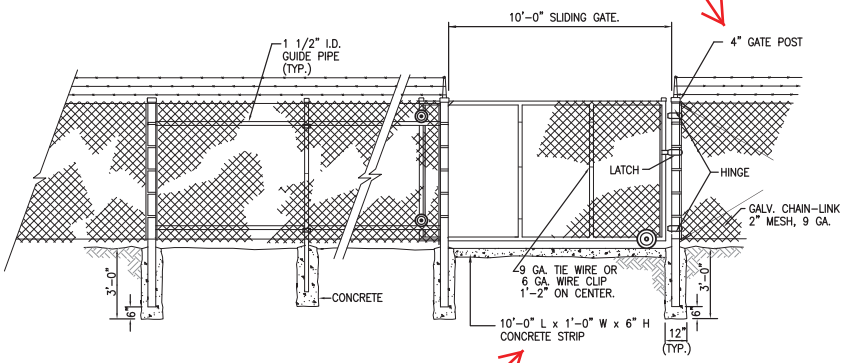
DOUBLE GATE LATCH ASSEMBLY



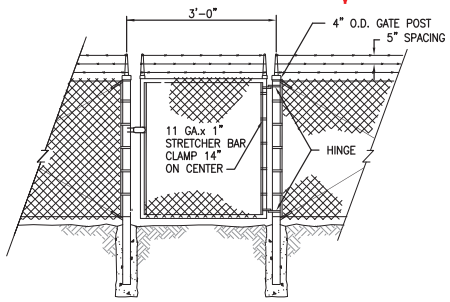
BARBED WIRE SUPPORT ARM

Per Submittal 3 1/2" ID post on 10" gate

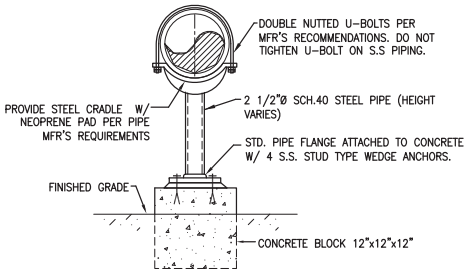
Per submittal 3" ID post on single gate and corners.



SLIDING GATE DETAIL



SINGLE SWING GATE



DETAIL – PIPE SUPPORT (TYP.) (PROVIDED BY CONTRACTOR) 1 9|13

N.T.S.

No concrete strip was installed because asphalt was used under gate.

DETAIL – TYPICAL 6' CHAIN LINK FENCE W/~~REDWOOD SLATS~~

N.T.S.

Green Mesh Fabric was used Lieu off Slats per county.

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: CHAIN LINK FENCE AND GATE DETAILS

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

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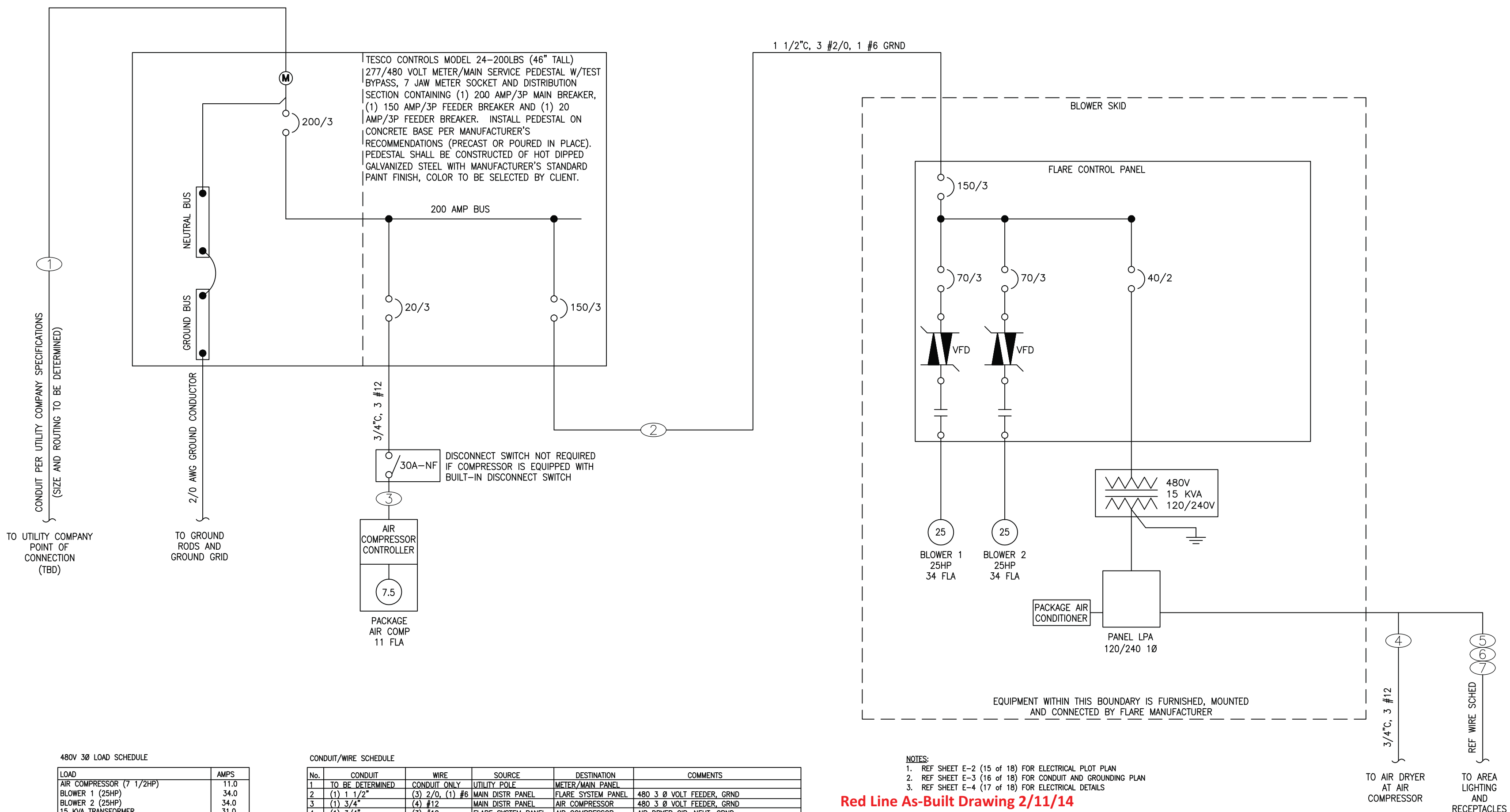
PROJ. NO. 01209155.06 T1
DSN. BY: M.JE DWN. BY: M.JE CHK. BY: SRK APP. BY: J.JM
ACAD FILE: SHT-13.IFC.052013

CADD FILE: SHT-1_ELLF_IFC

DATE: 05-20-13

SCALE: AS SHOWN

DRAWING: 13 OF 18



480V 3Ø LOAD SCHEDULE

LOAD	AMPS
AIR COMPRESSOR (7 1/2HP)	11.0
BLOWER 1 (25HP)	34.0
BLOWER 2 (25HP)	34.0
15 KVA TRANSFORMER	31.0
AIR CONDITIONER	20.0
TOTAL CONNECTED	130.0
25% LARGEST MOTOR	8.5
TOTAL AMPS	138.5

CONDUIT/WIRE SCHEDULE

No.	CONDUIT	WIRE	SOURCE	DESTINATION	COMMENTS
1	TO BE DETERMINED	CONDUIT ONLY	UTILITY POLE	METER/MAIN PANEL	
2	(1) 1 1/2"	(3) 2/0, (1) #6	MAIN DISTR PANEL	FLARE SYSTEM PANEL	480 3 Ø VOLT FEEDER, GRND
3	(1) 3/4"	(4) #12	MAIN DISTR PANEL	AIR COMPRESSOR	480 3 Ø VOLT FEEDER, GRND
4	(1) 3/4"	(3) #12	FLARE SYSTEM PANEL	AIR COMPRESSOR	AIR DRYER CIR, NEUT, GRND
5	(1) 3/4"	(4) #12	FLARE SYSTEM PANEL	AREA LIGHT POLE 1	LITE & RECEPT CIR'S, NEUT, GRND
6	(1) 3/4"	(5) #12	AREA LIGHT POLE 1	AREA LIGHT SWITCH	LITE & RECEPT CIR'S, SW LEG, NEUT, GRND
7	(1) 3/4"	(4) #12	AREA LIGHT SWITCH	AREA LIGHT POLE 2	RECEPT CIR, SW LEG, NEUT, GRND
8					
9					
10					

NOTES:
1. REF SHEET E-2 (15 of 18) FOR ELECTRICAL PLOT PLAN
2. REF SHEET E-3 (16 of 18) FOR CONDUIT AND GROUNDING PLAN
3. REF SHEET E-4 (17 of 18) FOR ELECTRICAL DETAILS

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

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REGISTERED PROFESSIONAL ENGINEER EUGENE R. VANDERVORD E8046 EXP. 9-30-14 ELECTRICAL STATE OF CALIFORNIA

REV | DATE | DESCRIPTION | CK. BY

SHEET TITLE: SINGLE LINE DIAGRAM AND LOAD SCHEDULE

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
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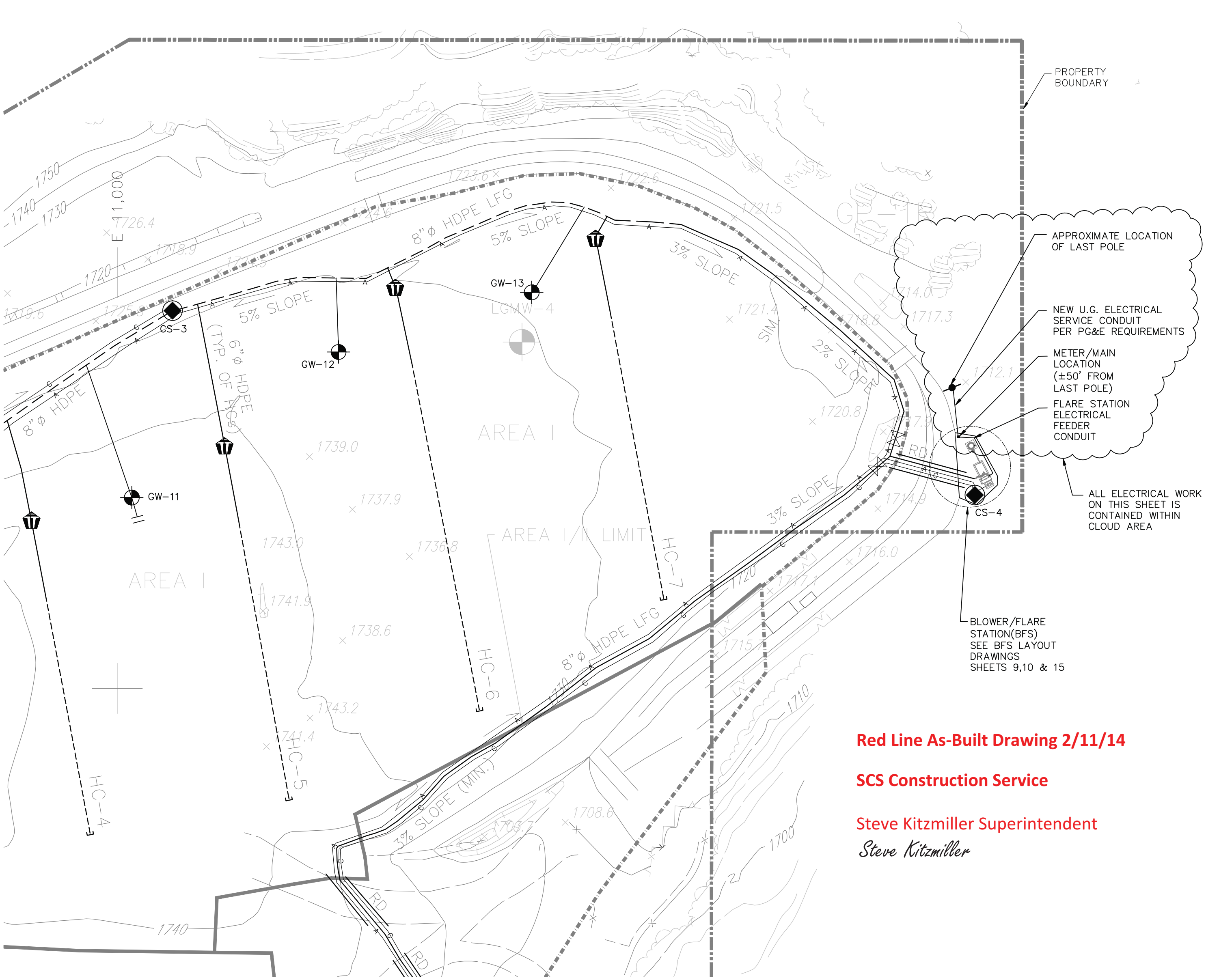
PROJ. NO. 01209155.06 T1 | DSN. BY: DUTCHER | DWN. BY: JIM RUBINO | CHK. BY: SRK | ACAD FILE: SHT-1_E_032713 | APP. BY: SRK

CADD FILE: SHT-14_ELLF_051013
DATE: 05-20-13
SCALE: AS SHOWN
DRAWING: E-1 (14 of 18)



Red Line As-Built Drawing 2/11/14

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Steve Kitzmiller Superintendent

Steve Kitzmiller

SCALE 1"=50'

LEGEND:

- APPROXIMATE PERMITTED LANDFILL LIMIT
- AREA II, MODULE 1 AND 2 LIMIT
- PROPERTY BOUNDARY
- MAJOR CONTOURS
- MINOR CONTOURS
- ABOVE GRADE 8"⌀ HDPE SDR 17 LFG HEADER
- BELOW GRADE 8"⌀ HDPE SDR 17 LFG HEADER
- ABOVE GRADE 4"⌀ HDPE SDR-17 LFG LATERAL
- HC-5 BELOW GRADE 6"⌀ HDPE SDR-11 HORIZONTAL COLLECTOR
- RD ROAD CROSSING
- CONDENSATE FLOW DIRECTION
- GW-3 LFG EXTRACTION WELL
- CS-2 CONDENSATE SUMP
- HEADER/LATERAL ISOLATION VALVE
- HORIZONTAL COLLECTOR WELL HEAD
- MW-5 EXISTING GROUNDWATER MONITORING WELL
- LS-1 EXISTING LEACHATE SUMP
- LGMW-3 EXISTING LFG MONITORING WELL
- EW-2 EXISTING GROUNDWATER EXTRACTION WELL
- GP-1R EXISTING LFG PROBE

NOTES:

1. THE CONTRACTOR SHALL INSTALL THE ELECTRICAL UNDERGROUND SERVICE CONDUIT(S) IN COMPLIANCE WITH ALL THE APPLICABLE REQUIREMENTS AND SPECIFICATIONS OF THE UTILITY COMPANY (PG&E)
2. LOCATION OF THE ELECTRICAL METER/MAIN PEDESTAL SHALL BE AS SHOWN ON SHEET E-3 (16 OF 18). PEDESTAL SHALL BE ORIENTED SO THAT THE FRONT IS FACING TOWARD THE FLARE STATION (SOUTH), THE BACK FACING THE NORTH FENCE. THE ALIGNMENT SHALL BE PARALLEL TO THE WEST FENCE. A MINIMUM OF 48" CLEARANCE SHALL BE MAINTAINED FROM THE NORTH FENCE TO THE CLOSEST POINT OF THE REAR OF THE PEDESTAL AND THE LEFT SIDE A MINIMUM OF 48" FROM THE WEST FENCE.
3. THE METER/MAIN PEDESTAL SHALL BE MANUFACTURED BY TESCO CONTROLS, MODEL 24-200 AND SHALL INCLUDE A 7-JAW METER SOCKET AND TEST BYPASS MEETING PG&E SPECIFICATIONS. REF SINGLE LINE DIAGRAM ON SHEET E-1 (14 OF 18) FOR CUSTOM DISTRIBUTION SECTION AND CONSTRUCTION NOTES AND DETAIL 4 ON SHEET E-4 (17 OF 18) FOR BASE DETAIL.
4. THE LINE (UTILITY) AND LOAD CONDUITS SHALL BE LOCATED TO FIT IN THE LINE/LOAD ENTRY AREAS DESIGNATED ON THE MANUFACTURER'S INSTALLATION DRAWINGS.
5. THE LOAD CONDUITS (FLARE STATION FEEDER AND AIR COMPRESSOR FEEDER) SHALL BE RIGID GALVANIZED STEEL AND SHALL BE FITTED WITH TYPE ES SEALOFF FITTINGS AND GROUND BUSHINGS WHERE THEY ENTER THE PEDESTAL.
6. REFERENCE SHEET E-3 (16 OF 18) FOR THE GROUNDING INSTALLATION.

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REGISTERED PROFESSIONAL ENGINEER EUGENE R. VANDERFORD E8046 EXP. 9-30-14 ELECTRICAL STATE OF CALIFORNIA

REV	DATE	DESCRIPTION	BY	CK

SHEET TITLE: ELECTRICAL PLOT PLAN

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT CONSULTING ENGINEERS, INC.
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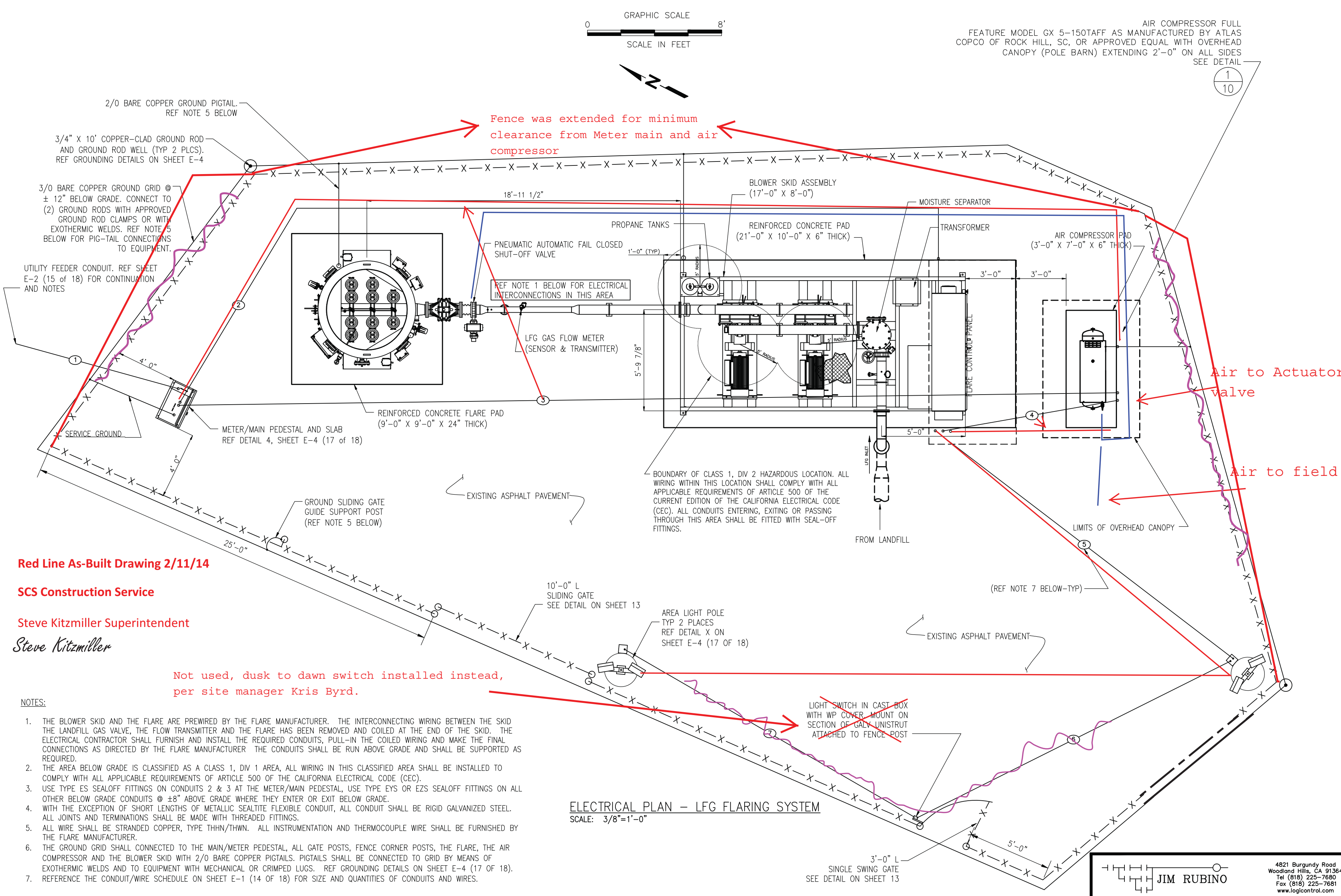
PROJ. NO. 01209155.06 T1 | DWN. BY: JR/MJE | CHK. BY: SRK | DSN. BY: JIM RUBINO | APP. BY: SRK | ACAD FILE: SHT-15_E_032713

CADD FILE: SHT-15_ELLF_IFC

DATE: 05-20-13

SCALE: AS SHOWN

DRAWING: E-2 (15 OF 18)



Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

NOTES:

1. THE BLOWER SKID AND THE FLARE ARE PREWIRED BY THE FLARE MANUFACTURER. THE INTERCONNECTING WIRING BETWEEN THE SKID THE LANDFILL GAS VALVE, THE FLOW TRANSMITTER AND THE FLARE HAS BEEN REMOVED AND COILED AT THE END OF THE SKID. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL THE REQUIRED CONDUITS, PULL-IN THE COILED WIRING AND MAKE THE FINAL CONNECTIONS AS DIRECTED BY THE FLARE MANUFACTURER. THE CONDUITS SHALL BE RUN ABOVE GRADE AND SHALL BE SUPPORTED AS REQUIRED.
2. THE AREA BELOW GRADE IS CLASSIFIED AS A CLASS 1, DIV 1 AREA, ALL WIRING IN THIS CLASSIFIED AREA SHALL BE INSTALLED TO COMPLY WITH ALL APPLICABLE REQUIREMENTS OF ARTICLE 500 OF THE CALIFORNIA ELECTRICAL CODE (CEC).
3. USE TYPE ES SEALOFF FITTINGS ON CONDUITS 2 & 3 AT THE METER/MAIN PEDESTAL, USE TYPE EYS OR EZS SEALOFF FITTINGS ON ALL OTHER BELOW GRADE CONDUITS @ ±8" ABOVE GRADE WHERE THEY ENTER OR EXIT BELOW GRADE.
4. WITH THE EXCEPTION OF SHORT LENGTHS OF METALLIC SEALTITE FLEXIBLE CONDUIT, ALL CONDUIT SHALL BE RIGID GALVANIZED STEEL. ALL JOINTS AND TERMINATIONS SHALL BE MADE WITH THREADED FITTINGS.
5. ALL WIRE SHALL BE STRANDED COPPER, TYPE THHN/THWN. ALL INSTRUMENTATION AND THERMOCOUPLE WIRE SHALL BE FURNISHED BY THE FLARE MANUFACTURER.
6. THE GROUND GRID SHALL CONNECTED TO THE MAIN/METER PEDESTAL, ALL GATE POSTS, FENCE CORNER POSTS, THE FLARE, THE AIR COMPRESSOR AND THE BLOWER SKID WITH 2/0 BARE COPPER PIGTAILS. PIGTAILS SHALL BE CONNECTED TO GRID BY MEANS OF EXOTHERMIC WELDS AND TO EQUIPMENT WITH MECHANICAL OR CRIMPED LUGS. REF GROUNDING DETAILS ON SHEET E-4 (17 OF 18).
7. REFERENCE THE CONDUIT/WIRE SCHEDULE ON SHEET E-1 (14 OF 18) FOR SIZE AND QUANTITIES OF CONDUITS AND WIRES.

ELECTRICAL PLAN – LFG FLARING SYSTEM
SCALE: 3/8"=1'-0"

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REGISTERED PROFESSIONAL ENGINEER EUGENE R. VANDERBURGH E8046 EXP. 9-30-14 ELECTRICAL STATE OF CALIFORNIA

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: ELECTRICAL PLAN LFG FLARING SYSTEM

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

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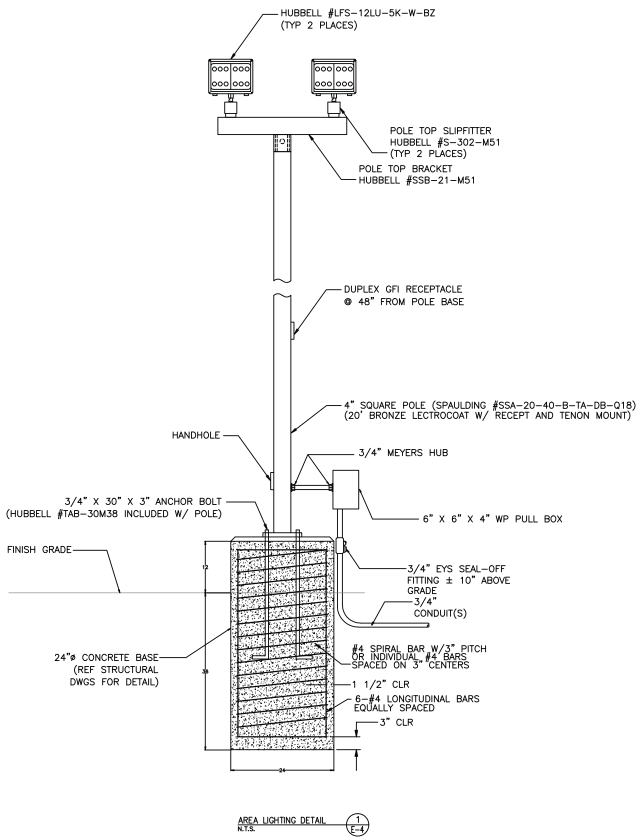
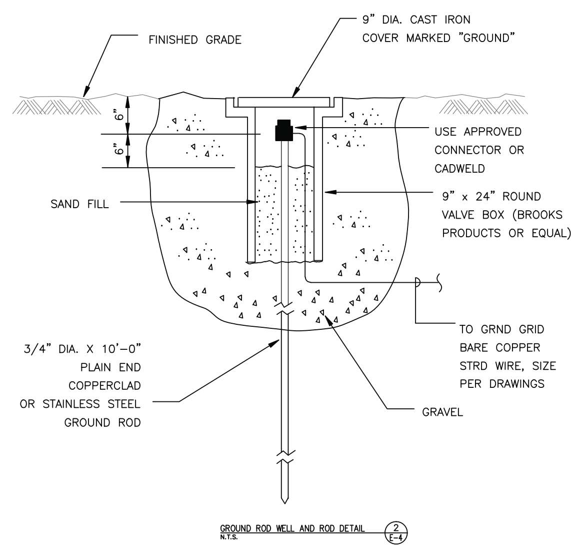
PROJ. NO. 01209155.06 T1
ACAD FILE: SHT-16_E_050913
DWN. BY: JR/MJE
APP. BY: SRK
CHK. BY: SRK
DSN. BY: JIM RUBINO

CADD FILE: SHT-16_ELLF_IFC
DATE: 05-20-13
SCALE: AS SHOWN
DRAWING: E-3 (16 OF 18)



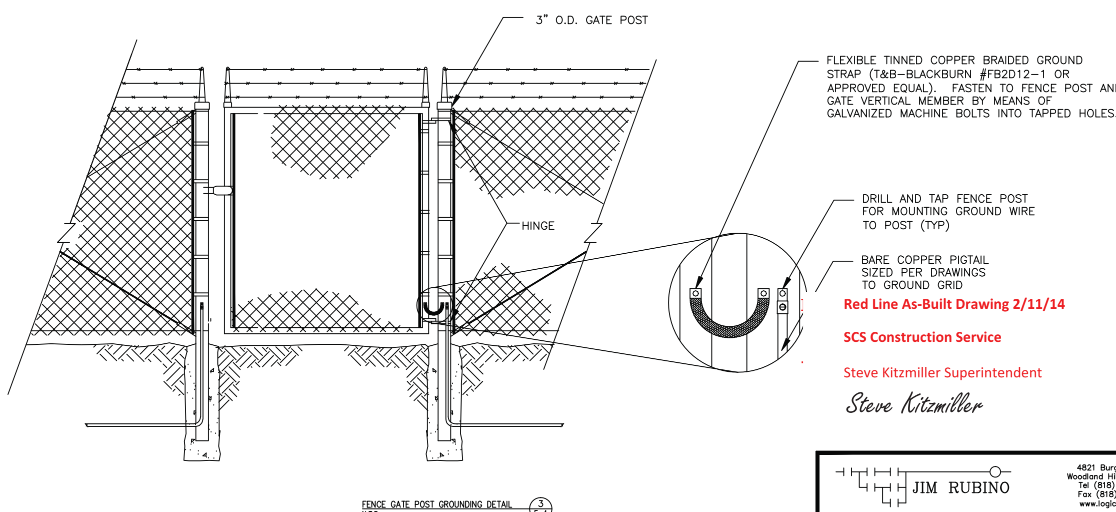
AREA LIGHTING DETAIL (1/E-4)
N.T.S.



GROUND ROD WELL AND ROD DETAIL (2/E-4)
N.T.S.

NOTES:

1. REFERENCE SHEET E-3 FOR LOCATION OF GROUND GRID, GROUND RODS AND GROUND ROD WELLS, METER/MAIN PANEL AND ALL OTHER EQUIPMENT. CONTRACTOR SHALL EXTEND A 2/0 GROUNDING PIGTAIL FROM THE GROUND GRID TO THE METER/MAIN PANEL AND MAKE ALL GROUNDING AND BONDING CONNECTIONS AS REQUIRED BY THE LATEST VERSION OF THE CALIFORNIA ELECTRICAL CODE.
2. REFERENCE SHEET E-1 FOR CONDUIT AND WIRE SIZES.
3. ALL UNISTRUT, UNISTRUT FITTINGS AND SPRING NUTS SHALL BE GALVANIZED. ALL ASSEMBLY BOLTS, WASHERS AND LOCK WASHERS SHALL BE 3/8" OR 1/2" STAINLESS STEEL.
4. FENCE GATE POST GROUNDING IS SHOWN FOR A SINGLE GATE ENTRY, DOUBLE GATE ENTRIES AND OTHER FENCE POSTS WILL USE SIMILAR GROUNDING METHODS AND MATERIALS.
5. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL (RGS). THE AREA BELOW GRADE IS CLASSIFIED AS HAZARDOUS, CLASS I DIV 1. ALL WIRING IN THIS CLASSIFIED AREA SHALL BE IN COMPLIANCE WITH THE REQUIREMENTS OF THE LATEST VERSION OF THE THE CALIFORNIA ELECTRICAL CODE. SEALOFF FITTINGS SHALL BE INSTALLED ON ALL UNDERGROUND CONDUITS EXTENDING ABOVE GRADE AT ±8" ABOVE GRADE. ALL CONDUIT JOINTS AND TERMINATIONS SHALL BE MADE WITH THREADED FITTINGS.
6. SPECIFICATIONS FOR AND INSTALLATION OF THE NEW METER/MAIN PEDESTAL AND SERVICE CONDUIT SHALL COMPLY WITH ALL REQUIREMENTS OF THE UTILITY COMPANY (PG&E) AND THE MANUFACTURER'S INSTRUCTIONS AND DRAWINGS.
7. THE FLARE BLOWER SKID IS PRE-ASSEMBLED AND PRE-WIRED BY THE FLARE MANUFACTURER. FLARE MANUFACTURER WILL COIL SUFFICIENT WIRE AND CABLE TO EXTEND FROM THE SKID TO THE LANDFILL GAS VALVE AND THE FLARE. THE CONTRACTOR SHALL FURNISH AND INSTALL THE REQUIRED CONDUITS, PULL-IN AND MAKE THE FINAL TERMINATIONS OF THE COILED CABLES AND WIRES AS DIRECTED BY THE FLARE MANUFACTURER.



FENCE GATE POST GROUNDING DETAIL (3/E-4)
N.T.S.

Red Line As-Built Drawing 2/11/14

SCS Construction Service

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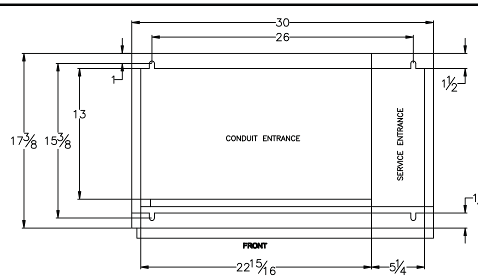

METER/MAIN PEDESTAL BASE PLAN (4/E-4)
N.T.S.

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ELECTRICAL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: ELECTRICAL DETAILS

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE DEPARTMENT OF PUBLIC SERVICES LAKEPORT, CA 95453

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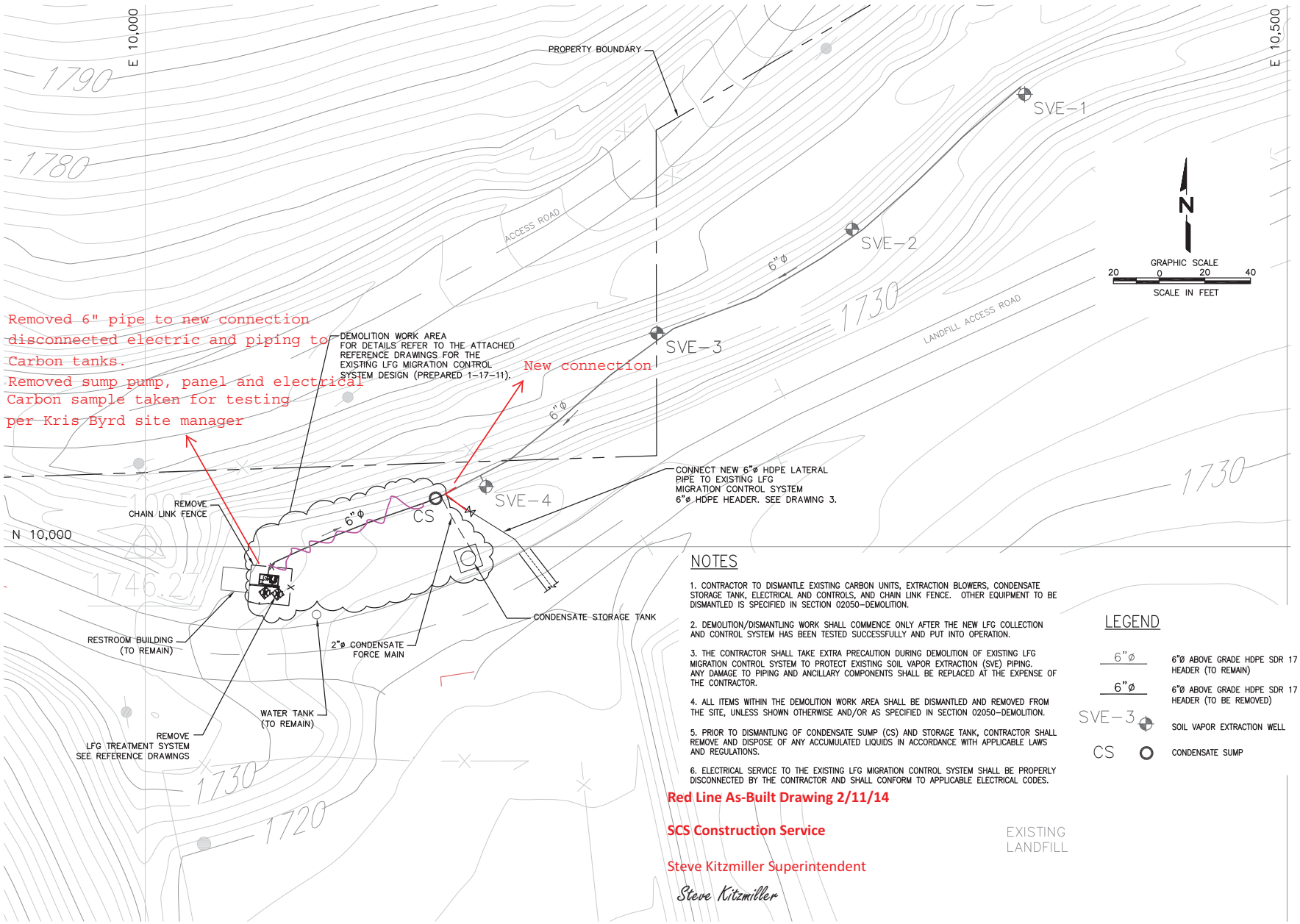
PROJ. NO. 01209155.06 T1
DSN. BY: JIM RUBINO
DWN. BY: JR
CHK. BY: SRK
ACAD FILE: SHT-17_E_032713
APP. BY: SRK

CADD FILE: SHT-17_ELLF_IFC
DATE: 05-20-13
SCALE: AS SHOWN
DRAWING: E-4
(17 OF 18)



NOTES

1. CONTRACTOR TO DISMANTLE EXISTING CARBON UNITS, EXTRACTION BLOWERS, CONDENSATE STORAGE TANK, ELECTRICAL AND CONTROLS, AND CHAIN LINK FENCE. OTHER EQUIPMENT TO BE DISMANTLED IS SPECIFIED IN SECTION 02050-DEMOLITION.

2. DEMOLITION/DISMANTLING WORK SHALL COMMENCE ONLY AFTER THE NEW LFG COLLECTION AND CONTROL SYSTEM HAS BEEN TESTED SUCCESSFULLY AND PUT INTO OPERATION.

3. THE CONTRACTOR SHALL TAKE EXTRA PRECAUTION DURING DEMOLITION OF EXISTING LFG MIGRATION CONTROL SYSTEM TO PROTECT EXISTING SOIL VAPOR EXTRACTION (SVE) PIPING. ANY DAMAGE TO PIPING AND ANCILLARY COMPONENTS SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR.

4. ALL ITEMS WITHIN THE DEMOLITION WORK AREA SHALL BE DISMANTLED AND REMOVED FROM THE SITE, UNLESS SHOWN OTHERWISE AND/OR AS SPECIFIED IN SECTION 02050-DEMOLITION.

5. PRIOR TO DISMANTLING OF CONDENSATE SUMP (CS) AND STORAGE TANK, CONTRACTOR SHALL REMOVE AND DISPOSE OF ANY ACCUMULATED LIQUIDS IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS.

6. ELECTRICAL SERVICE TO THE EXISTING LFG MIGRATION CONTROL SYSTEM SHALL BE PROPERLY DISCONNECTED BY THE CONTRACTOR AND SHALL CONFORM TO APPLICABLE ELECTRICAL CODES.

LEGEND

6"ø	6"Ø ABOVE GRADE HDPE SDR 17 LFG HEADER (TO REMAIN)
6"ø	6"Ø ABOVE GRADE HDPE SDR 17 LFG HEADER (TO BE REMOVED)
SVE-3	SOIL VAPOR EXTRACTION WELL
CS	CONDENSATE SUMP

Red Line As-Built Drawing 2/11/14

SCS Construction Service

Steve Kitzmiller Superintendent

Steve Kitzmiller

REV	DATE	DESCRIPTION	CK. BY

SHEET TITLE: DEMOLITION PLAN
LFG MIGRATION CONTROL SYSTEM

PROJECT TITLE: LANDFILL GAS COLLECTION AND CONTROL SYSTEM
EASTLAKE SANITARY LANDFILL

CLIENT: COUNTY OF LAKE
DEPARTMENT OF PUBLIC SERVICES
LAKEPORT, CA 95453

SCS ENGINEERS
STEARNS, CONRAD, AND SCHMIDT
CONSULTING ENGINEERS, INC.
8661 YGNACIO CENTER PARKWAY, SUITE 140
PLEASANTON, CA 94566
PH. (925) 426-0080 FAX. (925) 426-0707

PROJ. NO. 01209155.06 T1 | DWN. BY: MJE | CADD FILE: D-1_050413
DSN. BY: MJE | CHK. BY: SRK | APP. BY: JJM

CADD FILE: SHT-D-1_050813
DATE: 05-20-13
SCALE: AS SHOWN
DRAWING: D-1 (18 OF 18)

AS-BUILT SURVEY

AS BUILT TABLE					AS BUILT TABLE (CONT.)		
CODE #	POINT #	DESCRIPTION	ELEVATION	CODE #	POINT #	DESCRIPTION	ELEVATION
1	1500	TOP FLANGE	1747.47	111	1610	TOP 4" PIPE/END CAP	1734.04
2	1501	GROUND AT GAS-WELL 11	1746.36	112	1611	TOP 4" PIPE AT GAS-WELL 20	1734.06
3	1502	TOP 4" TEE	1746.85	113	1612	GROUND AT 8" PIPE (COVERED)	1663.0
4	1503	TOP 4" PIPE	1739.90	114	1613	TOP 8" PIPE	1655.45
5	1504	TOP 8"/4" TEE	1733.45	115	1614	TOP 8" PIPE	1638.96
6	1505	TOP 8" PIPE	1732.00	116	1615	TOP 8" PIPE	1628.21
7	1506	TOP 8"/6" TEE	1728.93	117	1616	TOP 8" PIPE	1613.11
8	1507	TOP 6" PIPE	1736.03	118	1617	TOP 8" 45°	1610.49
9	1508	TOP 6" 90°	1742.73	119	1618	TOP 8"/4" TEE	1610.45
10	1509	TOP 6" 90°	1742.59	120	1619	TOP 4" PIPE @ BUTTERFLY V.	1610.63
11	1510	TOP 8" PIPE	1727.18	121	1620	TOP 4" TEE	1612.38
12	1511	TOP CENTER FLANGE	1730.33	122	1621	TOP 4" 90°	1612.46
13	1512	TOP CONDENSATE SUMP 3	1729.85	123	1622	TOP 18"/4" TEE	1613.19
14	1513	TOP 8" PIPE	1727.07	124	1623	TOP 18" PIPE	1612.61
15	1514	TOP 8" PIPE	1729.13	125	1624	TOP 18" FLANGE	1614.23
16	1515	TOP 8" 45°	1733.42	126	1625	TOP 4" PIPE	1629.53
17	1516	TOP 8"/4" TEE	1731.52	127	1626	TOP 4" TEE	1648.07
18	1517	TOP 4" 90°	1735.13	128	1627	TOP 4" PIPE	1653.48
19	1518	TOP 4" 90° GAS-WELL 12	1735.23	129	1628	TOP 4" 90°	1654.92
20	1519	TOP 4" PIPE	1733.43	130	1629	TOP 4" 90° AT GAS-WELL 1	1655.90
21	1520	TOP 8"/6" TEE	1729.97	131	1630	GROUND AT 4" PIPE (COVERED)	1654.28
22	1521	TOP 6" 90°	1731.97	132	1631	TOP 4 90°	1657.92
23	1522	TOP 6" 90°	1733.95	133	1632	GROUND AT GAS-WELL 2	1658.51
24	1523	TOP 8" PIPE	1728.19	134	1633	TOP 4" PIPE	1666.45
25	1524	TOP 8" PIPE	1728.19	135	1634	TOP 4" TEE	1682.96
26	1525	TOP 8"/4" TEE	1725.06	136	1635	TOP 4" 90°	1695.11
27	1526	TOP 4" PIPE	1727.32	137	1636	TOP 4" 90° AT GAS-WELL 3	1694.33
28	1527	TOP 4" 90°	1729.14	138	1637	TOP 4" PIPE	1687.19
29	1528	TOP 4" 90° GAS-WELL 13	1728.78	139	1638	TOP 4" 90°	1693.34
30	1529	TOP 8"/6" TEE	1723.99	140	1639	TOP 4" 90° AT GAS-WELL 4	1691.94
31	1530	TOP 6" 90°	1725.72	141	1640	GROUND AT 8" PIPE (COVERED)	1608.11
32	1531	TOP 6" 90°	1725.40	142	1641	TOP CENTER FLANGE	1609.88
33	1532	TOP 8" PIPE	1722.40	143	1642	TOP CONDENSATE SUMP 1	1608.55
34	1533	GROUND AT 8" PIPE (COVERED)	1720.8	144	1643	TOP 8"/6" TEE	1608.78
35	1534	GROUND AT BUTTERFLY VALVE	1718.42	145	1644	TOP 2" PIPE	1602.48
36	1535	TOP 8" TEE	1717.97	146	1645	TOP 2" PIPE	1590.06
37	1536	GROUND AT BUTTERFLY VALVE	1718.31	147	1646	TOP 2" PIPE @ FENCE	1585.36
38	1537	TOP 8" PIPE	1717.02	148	1647	TOP 8" PIPE	1607.34
39	1538	TOP CENTER FLANGE	1717.55	149	1648	TOP 8" PIPE	1609.93
40	1539	TOP CONDENSATE SUMP 4	1716.70	150	1649	TOP 8" PIPE	1611.89
41	1540	TOP 8" 90°	1714.46	151	1650	GROUND AT 8" 90° (COVERED)	1612.84
42	1541	TOP 4" 90°	1714.96	152	1651	TOP 8" PIPE	1619.77
43	1542	TOP 8" PIPE	1719.50	153	1652	GROUND @ 8" PIPE (COVERED)	1636.39
44	1543	TOP 8" PIPE	1721.56	154	1653	TOP 8" PIPE	1652.57
45	1544	TOP 8" PIPE	1723.67	155	1654	TOP 8" PIPE	1668.36
46	1545	TOP 8" PIPE	1725.85	156	1655	TOP 8"/4" TEE	1679.52
47	1546	TOP 8" PIPE	1727.93	157	1656	TOP 4" PIPE	1684.95
48	1547	TOP 8" PIPE	1731.39	158	1657	TOP 4" 90°	1691.45
49	1548	TOP 8" PIPE	1740.52	159	1658	TOP 4" 90° AT GAS-WELL 5	1690.20
50	1549	TOP 8" PIPE	1741.15	160	1659	GROUND @ 8" PIPE (COVERED)	1688.51
51	1550	TOP 8" 90°	1731.31	161	1660	TOP 8" PIPE	1690.37
52	1551	GROUND AT 8" PIPE (COVERED)	1729.96	162	1661	GROUND AT 8" PIPE (COVERED)	1692.99
53	1552	TOP 2" 90°	1730.76	163	1662	TOP 8" PIPE	1696.20
54	1553	TOP 2" 90°	1730.48	164	1663	TOP 8" PIPE	1697.84
55	1554	GROUND AT 2" PIPE (COVERED)	1729.9	165	1664	TOP 8" PIPE	1699.49
56	1555	TOP 2" PIPE	1729.49	166	1665	TOP 8" PIPE	1700.60
57	1556	TOP 8" PIPE	1721.72	167	1666	TOP 8" PIPE	1702.41
58	1557	TOP 8" 90°	1722.01	168	1667	TOP 8" PIPE	1702.61
59	1558	TOP 2" 90°	1721.43	169	1668	TOP 8" PIPE	1701.47
60	1559	TOP 8" PIPE	1719.80	170	1669	TOP 8"/4" TEE	1705.24
61	1560	TOP 8"/6" TEE	1717.88	171	1670	TOP 4" PIPE	1727.66
62	1561	TOP 6" PIPE	1724.84	172	1671	TOP 4" PIPE	1728.67
63	1562	TOP 6" 90°	1728.40	173	1672	TOP 4" TEE	1730.05
64	1563	TOP 6" 90°	1728.78	174	1673	TOP 4" PIPE	1734.24
65	1564	TOP 8"/4" TEE	1716.14	175	1674	TOP 4" 90°	1736.00
66	1565	TOP 4" PIPE	1729.76	176	1675	TOP 4" 90° AT GAS-WELL 6	1735.65
67	1566	TOP 4" 90°	1731.69	177	1676	TOP 4" 90°	1736.21
68	1567	TOP 4" 90° GAS-WELL 14	1730.93	178	1677	TOP 4" 90° GAS-WELL 7	1736.00
69	1568	TOP 8" PIPE	1714.84	179	1678	TOP 8" PIPE	1705.13
70	1569	TOP 8"/6" TEE	1713.22	180	1679	TOP 6" 90°	1735.56
71	1570	TOP 6" PIPE	1722.48	181	1680	TOP 6" 90°	1735.35
72	1571	TOP 6" 90°	1731.29	182	1681	TOP 6" PIPE	1727.29
73	1572	TOP 6" 90°	1731.14	183	1682	TOP 6" PIPE	1720.13
74	1573	TOP 4" 90°	1731.94	184	1683	GROUND AT 6" PIPE (COVERED)	1709.94
75	1574	TOP 4" 90° GAS-WELL 15	1732.01	185	1684	TOP 8"/6" TEE	1708.43
76	1575	TOP 4" PIPE	1729.06	186	1685	TOP 8"/6" TEE	1707.44
77	1576	TOP 4" TEE	1721.49	187	1686	TOP 6" 90°	1707.44
78	1577	TOP 8"/4" TEE	1710.87	188	1687	TOP 8"/6"	1712.85
79	1578	TOP 8" PIPE	1708.52	189	1688	APPROX. TOP 8"/4" TEE	1713.82
80	1579	TOP 4" 90°	1725.00	190	1689	TOP 4" PIPE	1717.77
81	1580	TOP 4" PIPE	1723.83	191	1690	GROUND AT 4" PIPE (COVERED)	1722.73
82	1581	TOP 4" 90°	1733.36	192	1691	TOP 4" PIPE	1728.68
83	1582	TOP 4" 90° GAS-WELL 16	1733.23	193	1692	GROUND AT 4" PIPE (COVERED)	1733.20
84	1583	TOP 6" 90°	1733.36	194	1693	TOP 4" PIPE	1734.79
85	1584	TOP 6" 90°	1732.41	195	1694	TOP 4" 90°	1734.91
86	1585	TOP 4" 90° GAS-WELL 17	1734.27	196	1695	TOP 4" 90° GAS-WELL 8	1734.35
87	1586	TOP 4" 90°	1734.47	197	1696	TOP 8"/6" TEE	1715.54
88	1587	TOP 4" 90° GAS-WELL 18	1734.16	198	1697	TOP 8"/6" TEE	1717.75
89	1588	TOP 4" 90°	1734.99	199	1698	TOP 6" PIPE	1719.47
90	1589	TOP 4" 90°	1725.98	200	1699	TOP 8" PIPE	1720.97
91	1590	TOP 4" TEE	1722.47	201	1700	TOP 6" PIPE	1717.81
92	1591	TOP 4" PIPE	1713.18	202	1701	TOP 6" PIPE	1724.57
93	1592	TOP 8"/6" TEE	1706.04	203	1702	TOP 6" PIPE	1725.13
94	1593	TOP 8"/4" TEE	1704.27	204	1703	TOP 6" PIPE @ BUTTERFLY V.	1732.28
95	1594	TOP 8" PIPE	1699.35	205	1704	TOP 8" PIPE	1719.68
96	1595	TOP 8" PIPE @ BUTTERFLY V.	1694.74	206	1705	TOP 8" PIPE	1723.58
97	1596	TOP 8" PIPE	1691.23	207	1706	TOP 8" PIPE	1725.92
98	1597	TOP 8" PIPE	1687.07	208	1707	TOP 8" PIPE	1728.32
99	1598	TOP 8"/4" TEE	1683.98	209	1708	TOP 8" PIPE	1730.82
100	1599	TOP 4" PIPE @ BUTTERFLY V.	1684.44	210	1709	BUTTERFLY VALVE	1733.69
101	1600	TOP 4" PIPE	1689.86	211	1710	TOP 8"/4" TEE	1733.54
102	1601	TOP 4" PIPE	1691.88	212	1711	TOP 4" PIPE	1747.92
103	1602	GROUND AT 4" PIPE (COVERED)	1693.54	213	1712	TOP 4" 90°	1751.40
104	1603	TOP 4" 90° NO ELEVATION		214	1713	TOP 4" 90° GAS-WELL 21	1751.54
105	1604	TOP 4" 90° GAS-WELL 19	1696.52	215	1714	TOP 8" PIPE	1733.72
106	1605	TOP 4" PIPE	1701.98	216	1715	TOP 8" PIPE	1731.89
107	1606	TOP 4" PIPE	1717.32	217	1716	TOP 8" PIPE	1729.55
108	1607	GROUND AT 4" PIPE (COVERED)	1732.47	218	1717	TOP 8" PIPE	1727.31
109	1608	TOP 4" PIPE	1734.01	219	1718	TOP CENTER FLANGE	1729.32
110	1609	TOP 4" TEE	1734.23	220	1719	TOP CONDENSATE SUMP 2	1727.64

SCS ENG. EASTLAKE SANITARY LANDFILL 12-20-2013

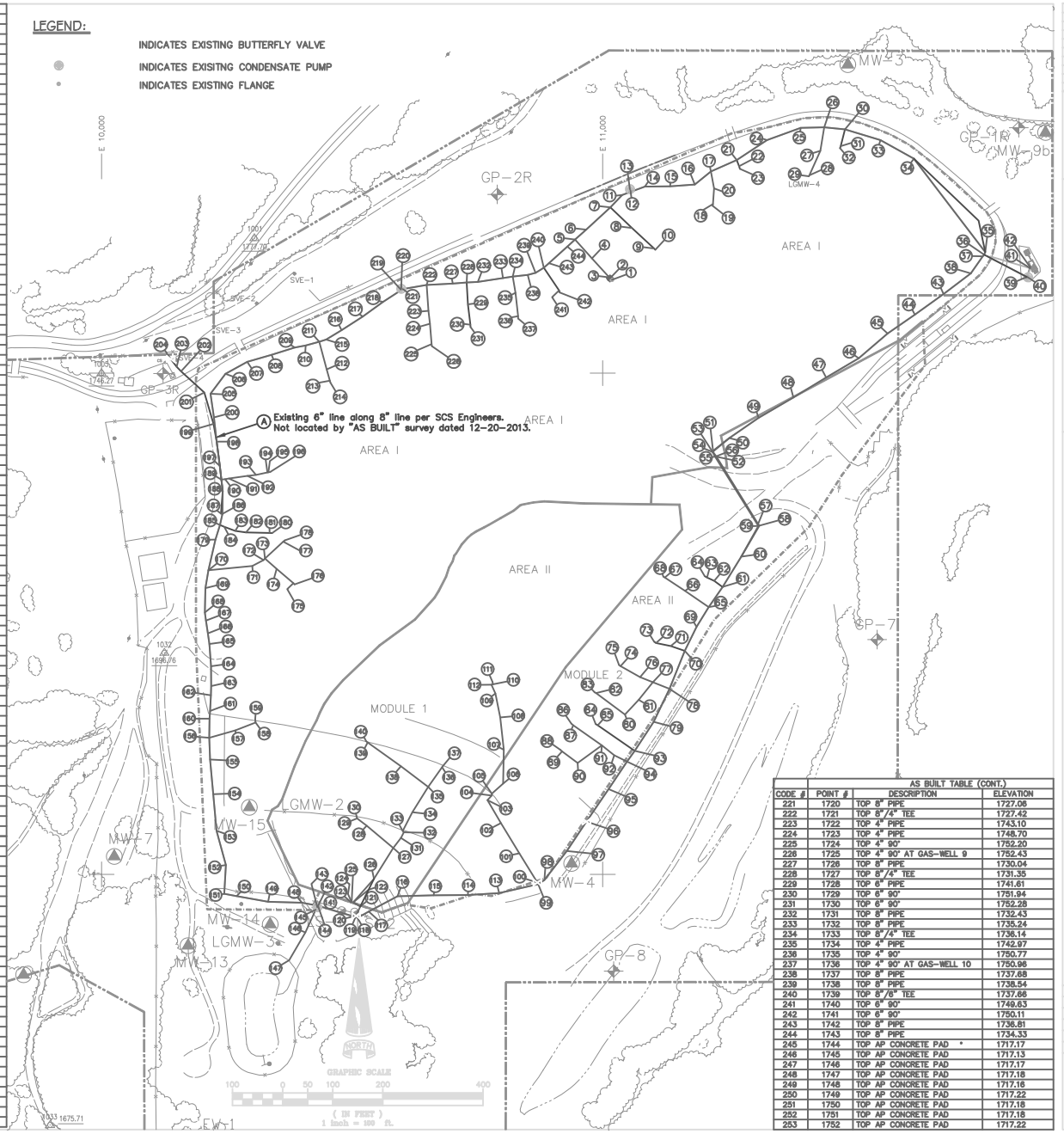
LEGEND:

INDICATES EXISTING BUTTERFLY VALVE

INDICATES EXISITNG CONDENSATE PUMP

INDICATES EXISTING FLANGE

Existing 6" line along 8" line per SCS Engineers. Not located by "AS BUILT" survey dated 12-20-2013.



AS BUILT TABLE (CONT.)			
CODE #	POINT #	DESCRIPTION	ELEVATION
221	1720	TOP 8" PIPE	1727.08
222	1721	TOP 8"/4" TEE	1727.42
223	1722	TOP 4" PIPE	1743.10
224	1723	TOP 4" PIPE	1748.70
225	1724	TOP 4" 90°	1752.20
226	1725	TOP 4" 90° AT GAS-WELL 9	1752.43
227	1726	TOP 8" PIPE	1730.04
228	1727	TOP 8"/4" TEE	1731.35
229	1728	TOP 6" PIPE	1741.61
230	1729	TOP 6" 90°	1751.94
231	1730	TOP 6" 90°	1752.28
232	1731	TOP 8" PIPE	1732.43
233	1732	TOP 8" PIPE	1735.24
234	1733	TOP 8"/4" TEE	1736.14
235	1734	TOP 4" PIPE	1742.97
236	1735	TOP 4" 90°	1750.77
237	1736	TOP 4" 90° AT GAS-WELL 10	1750.96
238	1737	TOP 8" PIPE	1737.68
239	1738	TOP 8" PIPE	1738.54
240	1739	TOP 8"/6" TEE	1737.68
241	1740	TOP 6" 90°	1749.63
242	1741	TOP 6" 90°	1750.11
243	1742	TOP 8" PIPE	1736.81
244	1743	TOP 8" PIPE	1734.33
245	1744	TOP AP CONCRETE PAD *	1717.17
246	1745	TOP AP CONCRETE PAD	1717.13
247	1746	TOP AP CONCRETE PAD	1717.17
248	1747	TOP AP CONCRETE PAD	1717.18
249	1748	TOP AP CONCRETE PAD	1717.16
250	1749	TOP AP CONCRETE PAD	1717.22
251	1750	TOP AP CONCRETE PAD	1717.18
252	1751	TOP AP CONCRETE PAD	1717.18
253	1752	TOP AP CONCRETE PAD	1717.22

REVISIONS		
NO.	DESCRIPTION/NAME	BY
A	6" ALONG SIDE 5" 2-7-14	SJB

Cusser Land Surveying
150 THIRD STREET
LAKEPORT, CALIFORNIA 95453
PHONE (707) 263-5512
FAX (707) 263-0455

"AS_BUILT" OF FACILITIES CONSTRUCTED ON SITE
EASTLAKE SANITARY LANDFILL

COUNTY OF LAKE — LAKE COUNTY — CALIFORNIA

JOB NO.:	2013-83
ACAD FILE:	EASTLAKASBUILT
DESIGNED:	SJB
DRAWN:	SJB
CHECKED:	MSC
DATE:	12-20-13

1

1 OF 1 SHEETS

APPENDIX B

PHOTO LOG

PHOTO LOG

Photo 1. Landfill Gas Extraction Well Installation.

Photo 2. Landfill Gas Horizontal Collector Installation.

Photo 3. Landfill Gas Horizontal Collector Bentonite Plug Installation.

Photo 4. Clearing and Grubbing of Above Grade Header Location.

Photo 5. Below Grade Header Placement and Backfill.

Photo 6. Above Grade Header Placement and Staking.

Photo 7. Flare Station Pad Concrete Installation.

Photo 8. Pressure Testing of Landfill Gas Air Lines and Landfill Gas Header.

Photo 9. Condensate Trap Installation and Backfill.

Photo 10. Blower Flare Station.

Photo 11. Landfill Gas Well Head.

APPENDIX C

WELL INSTALLATION LOGS

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-01

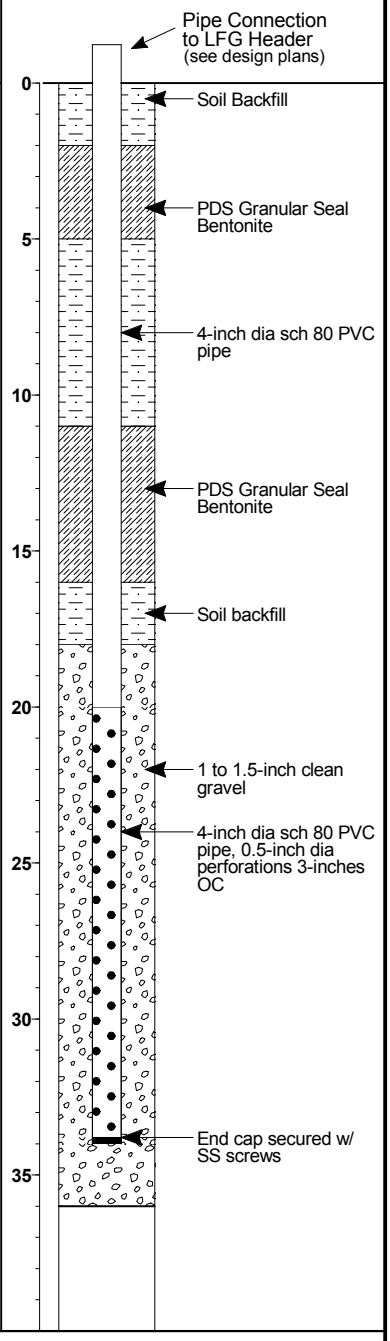
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1656	0		Dry cover soil, sandy silt, brown , some cobbles	
1651	5			
1646	10			
1641	15		Refuse - MSW	
1636	20			
1631	25			
1626	30			
1621	35			
1616	40			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Tuveson**
Sampling Method: **Visual**

Date Started: **9/16/13**
Date Ended: **9/16/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1656.0 Ft**
Total Depth: **36.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-02

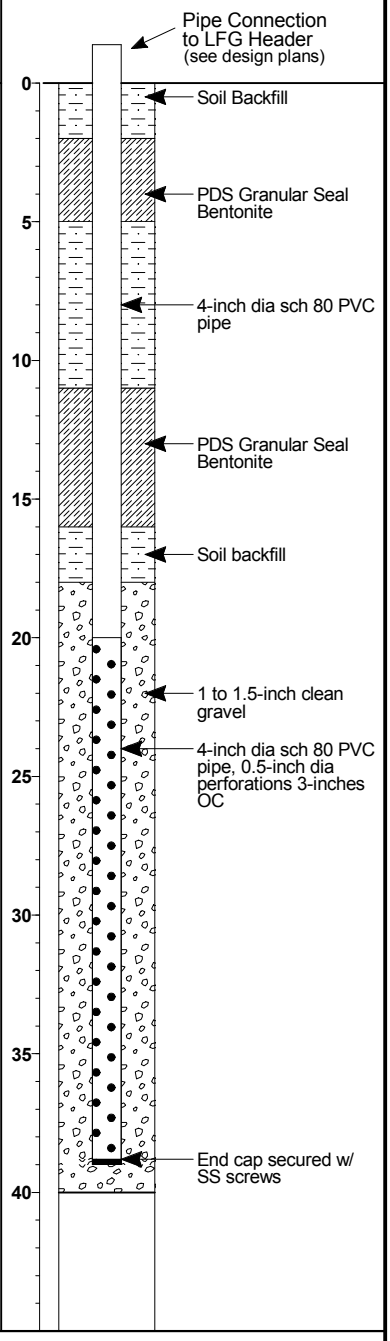
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1658	0		Dry cover soil, light brown	
			Refuse includes plastic, cloth, metal, wood, and paper	
1653	5			
1648	10		Refuse, damp, includes black plastic, cloth , soil, metal, wood, paper, and wire	
1643	15			
1638	20		Refuse, wet, includes black plastic, cloth, metal, wood, paper, wire, and cable	
1633	25			
1628	30			
1623	35			
1618	40			
1613	45			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/13/13**
Date Ended: **9/13/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1658.3 Ft**
Total Depth: **40.0 Ft**

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-03

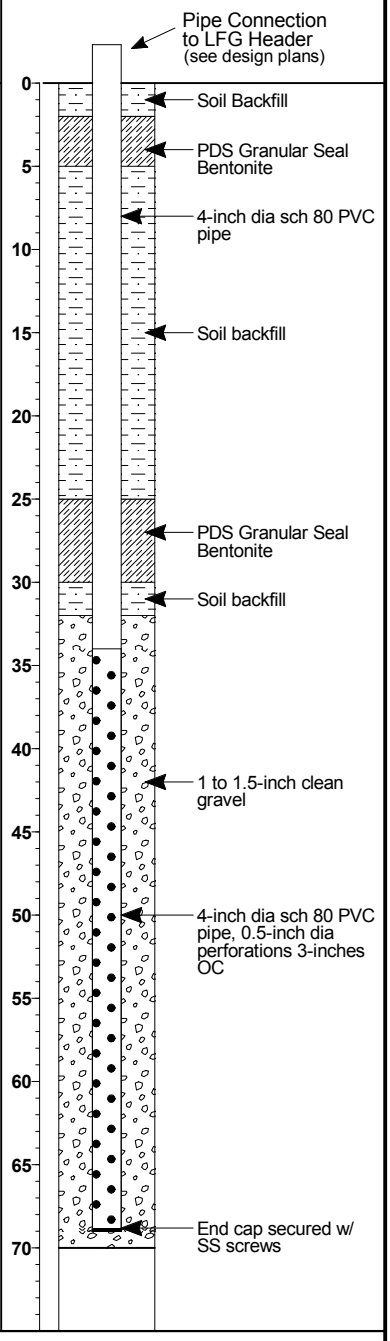
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1694	0		Dry cover soil, light brown	
1689	5		Refuse including paper, plastic, wood, and tires	
1684	10			
1679	15			
1674	20			
1669	25			
1664	30			
1659	35			
1654	40			
1649	45			
1644	50			
1639	55			
1634	60			
1629	65			
1624	70			
1619	75			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/13/13**
Date Ended: **9/13/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1694.0 Ft**
Total Depth: **70.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-04

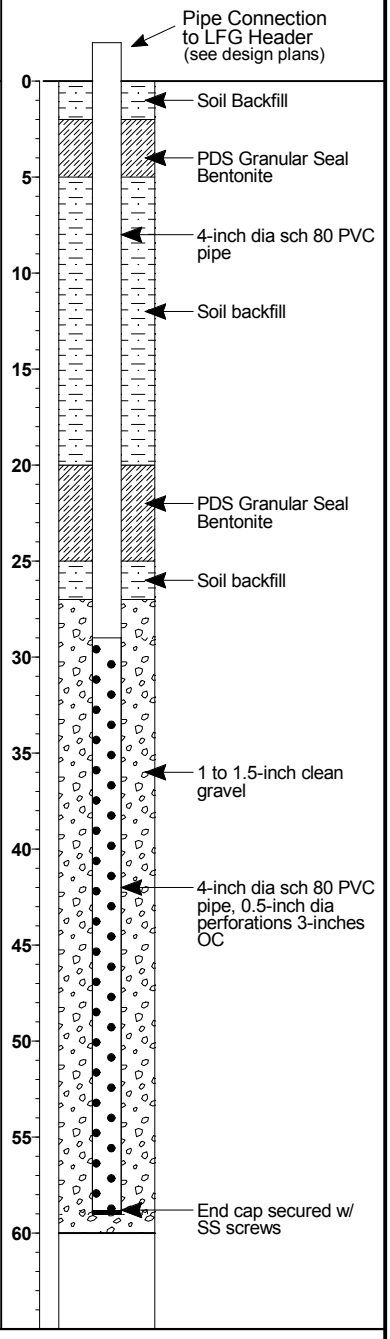
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1692	0		Dry cover soil, light brown	
1687	5			
1682	10			
1677	15		Refuse including paper, plastic, wood, and tires	
1672	20			
1667	25			
1662	30			
1657	35			
1652	40			
1647	45			
1642	50			
1637	55			
1632	60			
1627	65			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/13/13**
Date Ended: **9/13/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1691.8 Ft**
Total Depth: **60.0 Ft**

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-05

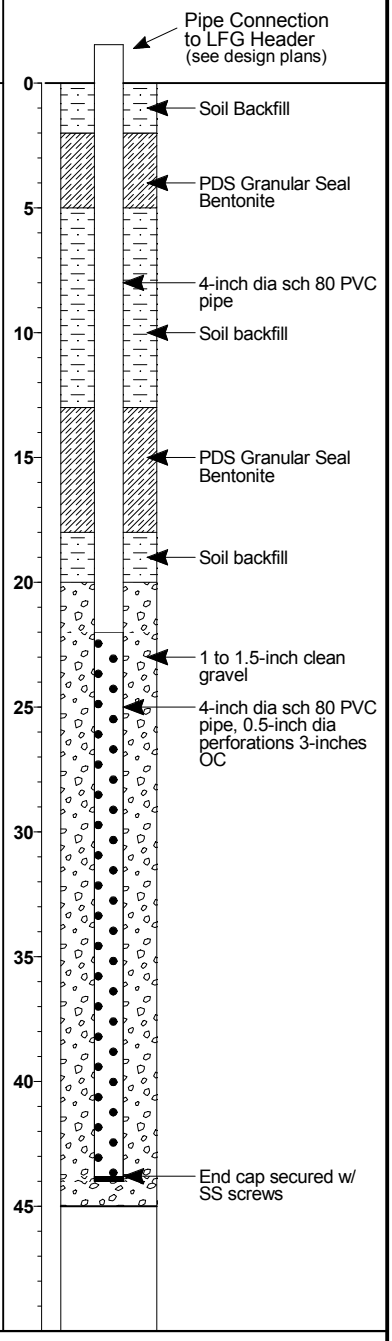
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1690	0		Dry cover soil, light brown	
1685	5			
1680	10			
1675	15		Refuse including paper, plastic, wood, and tires	
1670	20			
1665	25			
1660	30			
1655	35			
1650	40			
1645	45			
1640	50			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/12/13**
Date Ended: **9/12/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1689.9 Ft**
Total Depth: **45.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

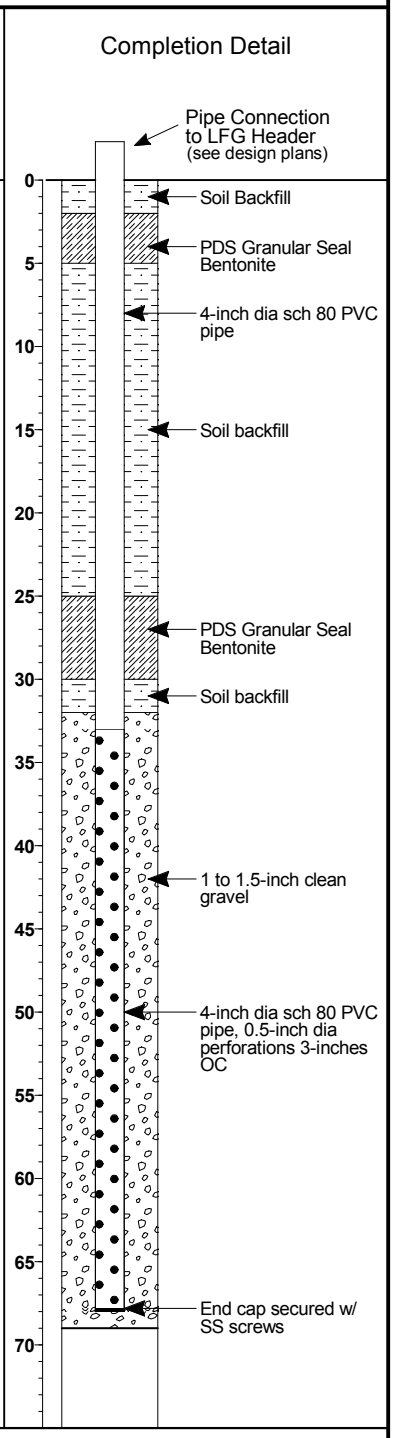
BORING NUMBER: GW-06

ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1735	0		Dry cover soil, sandy silt, brown , some cobbles	
1730	5			
1725	10			
1720	15		Refuse - MSW	
1715	20			
1710	25			
1705	30			
1700	35			
1695	40			
1690	45			
1685	50			
1680	55			
1675	60			
1670	65			
1665	70			
1660	75			



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Tuveson**
Sampling Method: **Visual**

Date Started: **9/16/13**
Date Ended: **9/16/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1735.0 Ft**
Total Depth: **69.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-07

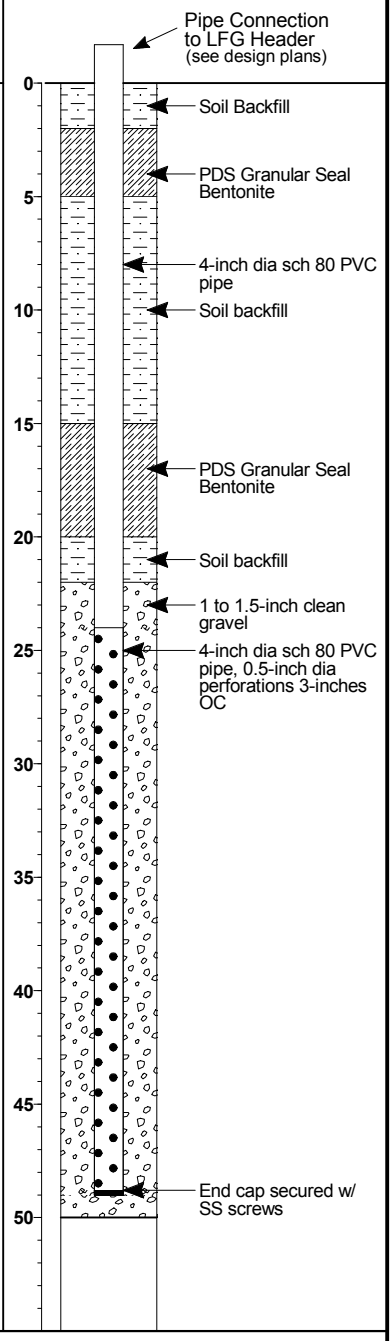
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1735	0		Dry cover soil, sandy silt, brown , some cobbles	
1730	5			
1725	10			
1720	15		Refuse - MSW	
1715	20			
1710	25			
1705	30			
1700	35			
1695	40			
1690	45			
1685	50			
1680	55			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Tuveson**
Sampling Method: **Visual**

Date Started: **9/16/13**
Date Ended: **9/16/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1735.0 Ft**
Total Depth: **50.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-08

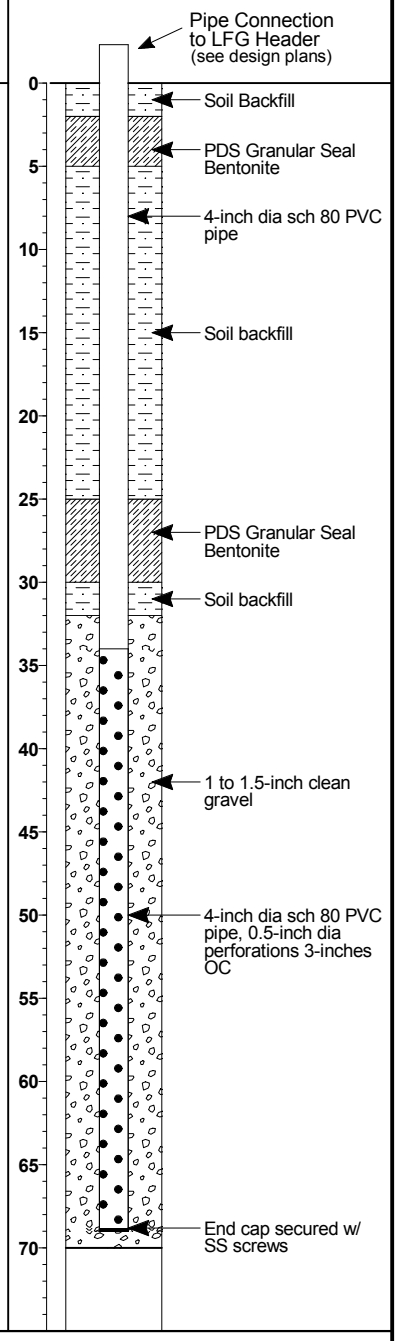
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1734	0		Dry cover soil, sandy silt, brown , some cobbles	
1729	5			
1724	10			
1719	15		Refuse - MSW	
1714	20			
1709	25			
1704	30			
1699	35			
1694	40			
1689	45			
1684	50			
1679	55			
1674	60			
1669	65			
1664	70			
1659	75			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Tuveson**
Sampling Method: **Visual**

Date Started: **9/17/13**
Date Ended: **9/17/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1734.0 Ft**
Total Depth: **70.0 Ft**

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-09

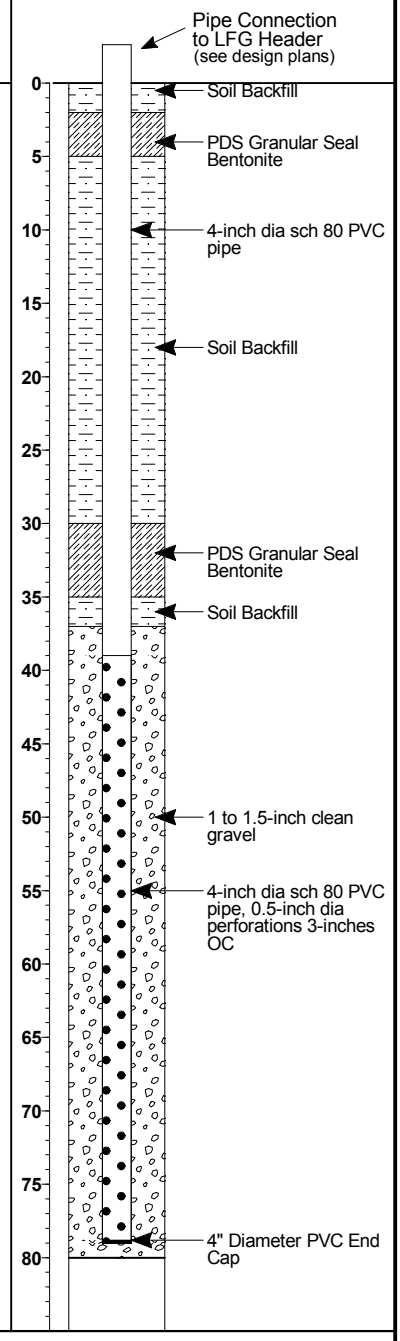
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1753	0		Dry Soil Cover, light brown	
1748	5		Dry refuse (paper, plastic, cloth, wood, metal, wires, soil)	
1743	10			
1738	15		Damp/Black (paper, plastic, cloth, wood, metal)	
1733	20			
1728	25			
1723	30			
1718	35			
1713	40			
1708	45			
1703	50			
1698	55		Wet/Black (paper, plastic, cloth, wood, metal)	
1693	60			
1688	65			
1683	70			
1678	75			
1673	80			
1668	85			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/12/13**
Date Ended: **9/12/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1752.5 Ft**
Total Depth: **80.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-10

ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

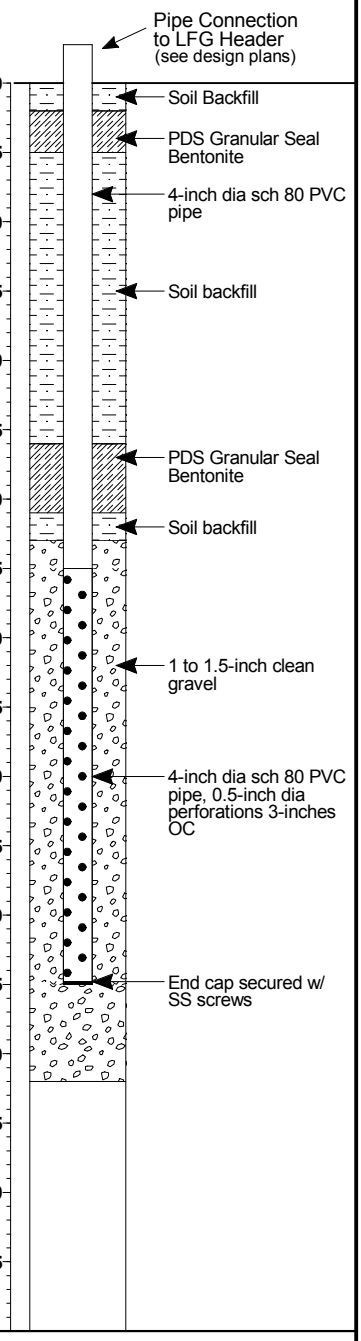
JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft msl)	Depth (ft)	Sample Location	Sample Number	Blow Counts	OVM (ppm)	USCS Soil Class.	Graphic Log	Description
1751	0							Dry cover soil, light brown
1746	5							
1741	10							
1736	15							Refuse including paper, plastic, wood, and tires
1731	20							
1726	25							
1721	30							
1716	35							
1711	40							
1706	45							
1701	50							Wet refuse observed at 50 feet deep. Adjust target depth to complete perforations from 35 to 65 feet deep.
1696	55							
1691	60							
1686	65							
1681	70							
1676	75							
1671	80							
1666	85							
1661	90							

Sample Information

Completion Detail



Drilling Company:	**Sacramento Drilling**	Date Started:	**9/12/13**
Drilling Method:	**Bucket Auger**	Date Ended:	**9/12/13**
Logged By:	**A. Violenta**	Boring Diameter:	**24-inch**
Sampling Method:	**Visual**	Well Diameter:	**4"**

Surface Elevation: **1750.9 Ft**
Total Depth: **72.0 Ft**

STANDARD_LOG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 3/3/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-11

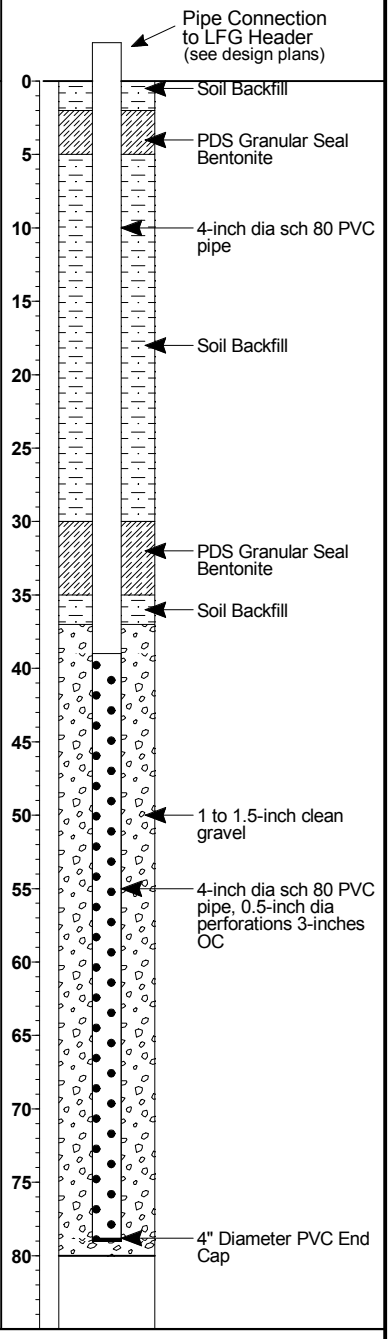
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1746	0		Dry cover soil, light brown	
1741	5		Refuse including paper, plastic, wood, and tires	
1736	10			
1731	15			
1726	20			
1721	25			
1716	30			
1711	35			
1706	40			
1701	45			
1696	50			
1691	55			
1686	60			
1681	65			
1676	70			
1671	75			
1666	80			
1661	85			

Completion Detail



Drilling Company:	**Sacramento Drilling**	Date Started:	**9/10/13**
Drilling Method:	**Bucket Auger**	Date Ended:	**9/10/13**
Logged By:	**A. Violenta**	Boring Diameter:	**24-inch**
Sampling Method:	**Visual**	Well Diameter:	**4"**

Surface Elevation: **1746.5 Ft**
Total Depth: **80.0 Ft**

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-12

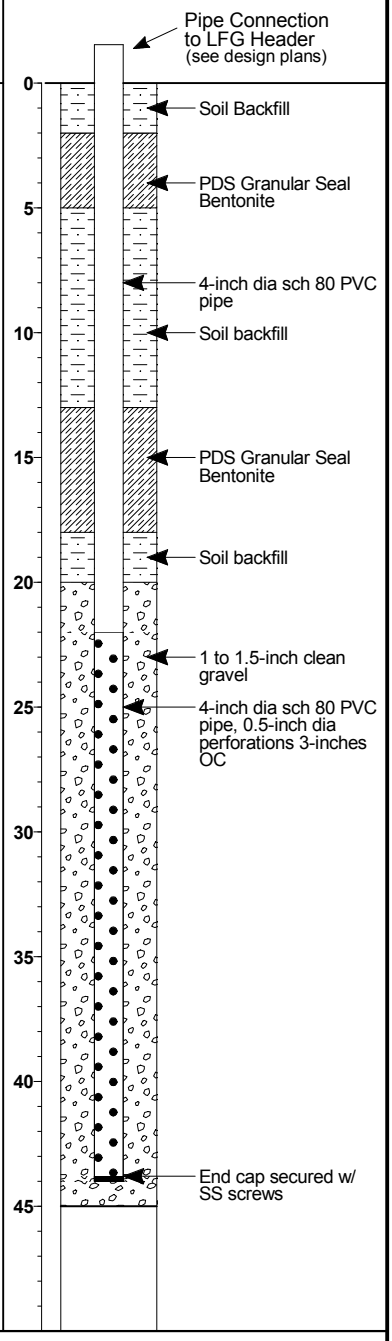
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1735	0		Dry cover soil, light brown	
1730	5			
1725	10			
1720	15		Refuse including paper, plastic, wood, and tires	
1715	20			
1710	25			
1705	30			
1700	35			
1695	40			
1690	45			
1685	50			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/10/13**
Date Ended: **9/10/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1734.9 Ft**
Total Depth: **45.0 Ft**

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-13

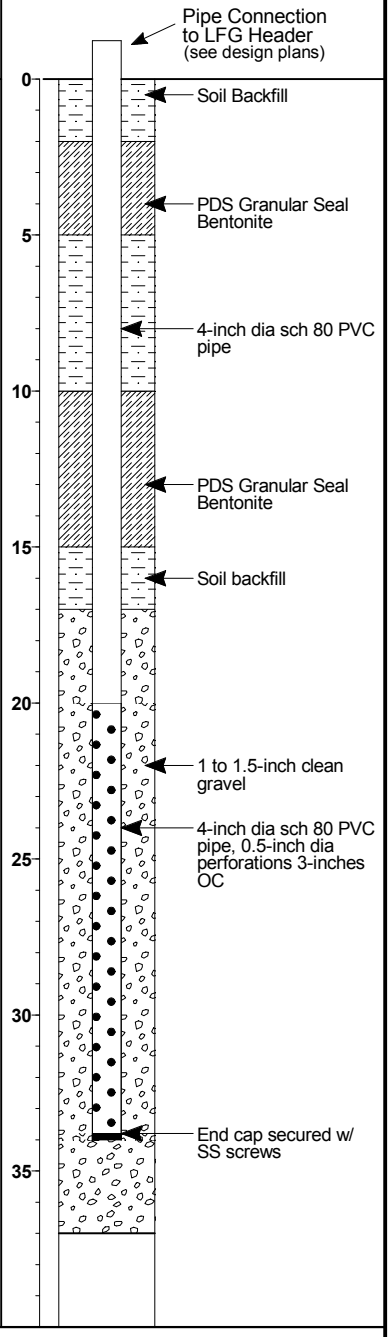
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1729	0		Dry cover soil, light brown	
1724	5			
1719	10			
1714	15		Refuse including paper, plastic, wood, and tires	
1709	20			
1704	25			
1699	30			
1694	35			
1689	40			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/9/13**
Date Ended: **9/9/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1728.8 Ft**
Total Depth: **37.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-14

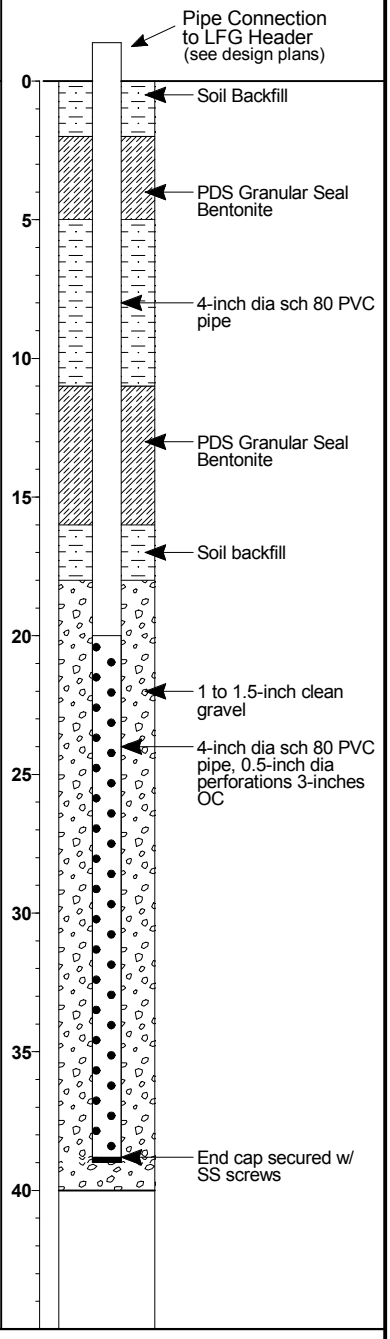
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1730	0		Dry cover soil, light brown	
1725	5			
1720	10		Refuse including paper, plastic, wood, and tires	
1715	15			
1710	20			
1705	25			
1700	30			
1695	35			
1690	40			
1685	45			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/10/13**
Date Ended: **9/10/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1730.5 Ft**
Total Depth: **40.0 Ft**

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-15

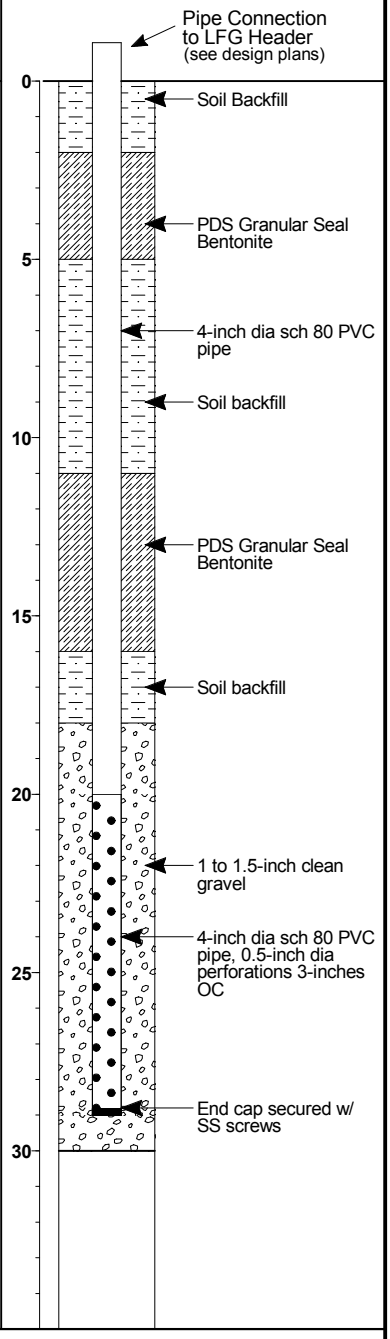
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1658	0		Dry cover soil, light brown	
1653	5			
1648	10		Refuse including paper, plastic, wood, and tires	
1643	15			
1638	20			
1633	25			
1628	30			
1623	35			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/10/13**
Date Ended: **9/10/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1658.3 Ft**
Total Depth: **30.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-16

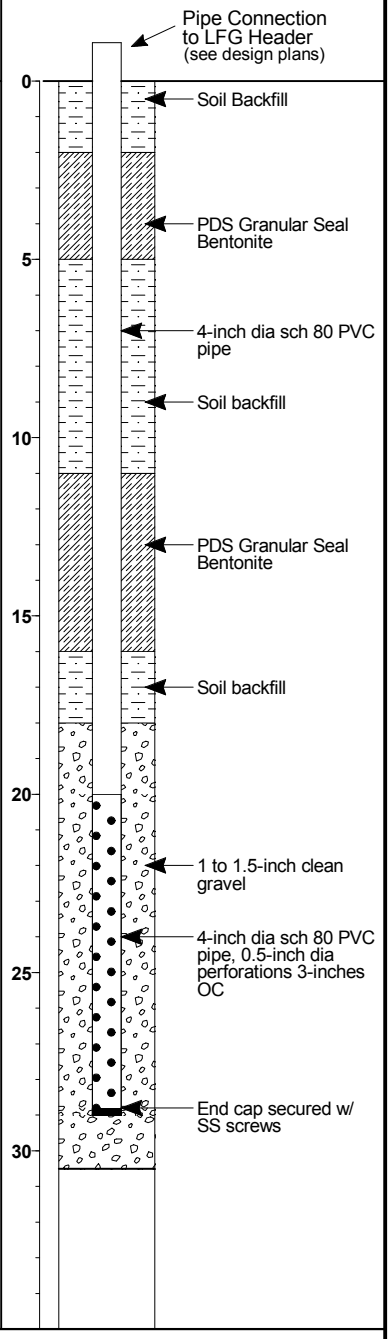
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1733	0		Dry cover soil, light brown	
1728	5			
1723	10		Refuse including paper, plastic, wood, and tires	
1718	15			
1713	20			
1708	25			
1703	30			
1698	35			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/11/13**
Date Ended: **9/11/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1733.1 Ft**
Total Depth: **30.5 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-17

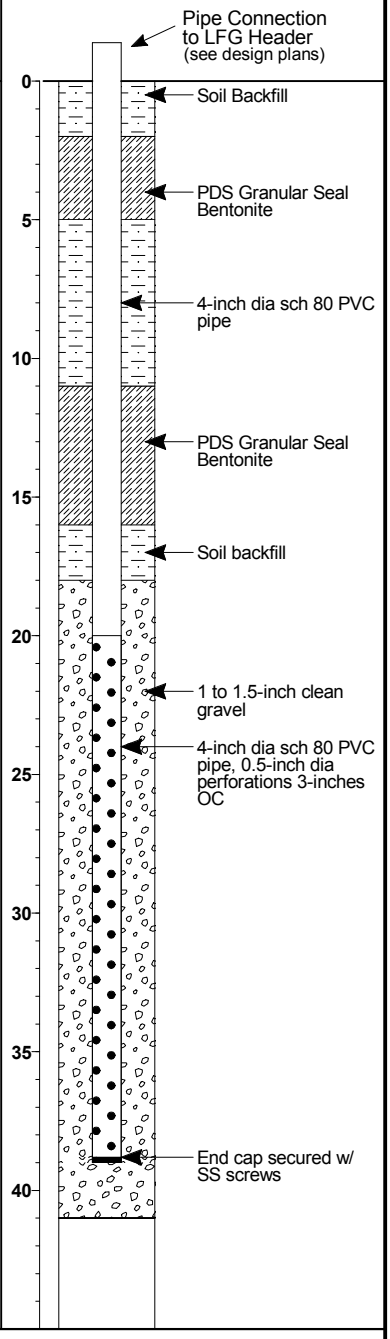
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1734	0		Dry cover soil, light brown	
1729	5		Refuse including paper, plastic, wood, and tires	
1724	10			
1719	15			
1714	20			
1709	25			
1704	30			
1699	35			
1694	40			
1689	45			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/10/13**
Date Ended: **9/10/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1734.3 Ft**
Total Depth: **41.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

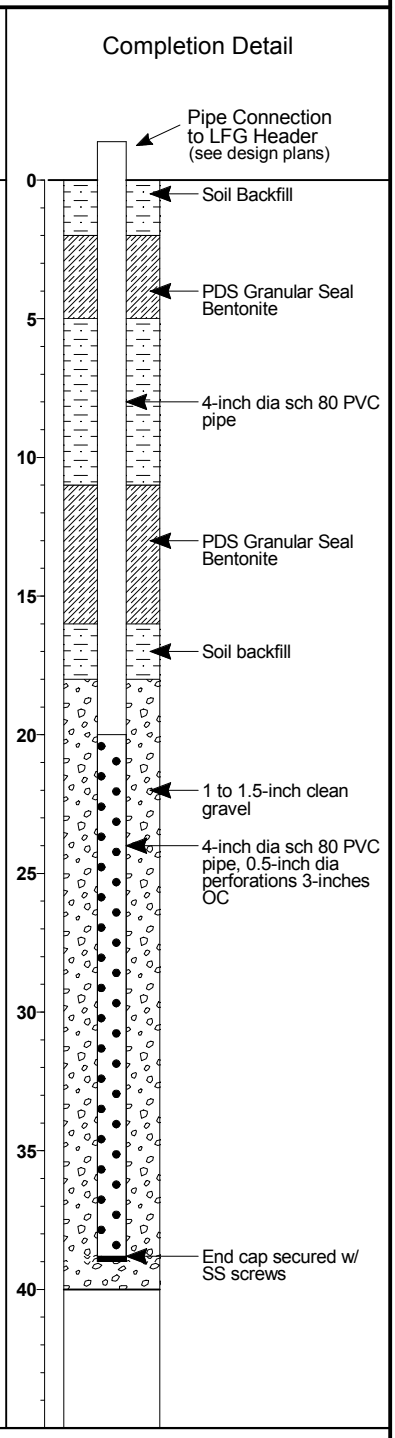
BORING NUMBER: GW-18

ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1733	0		Dry cover soil, light brown	
1728	5		Refuse including paper, plastic, wood, and tires	
1723	10			
1718	15			
1713	20			
1708	25			
1703	30			
1698	35			
1693	40			
1688	45			



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/11/13**
Date Ended: **9/11/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1732.8 Ft**
Total Depth: **40.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-19

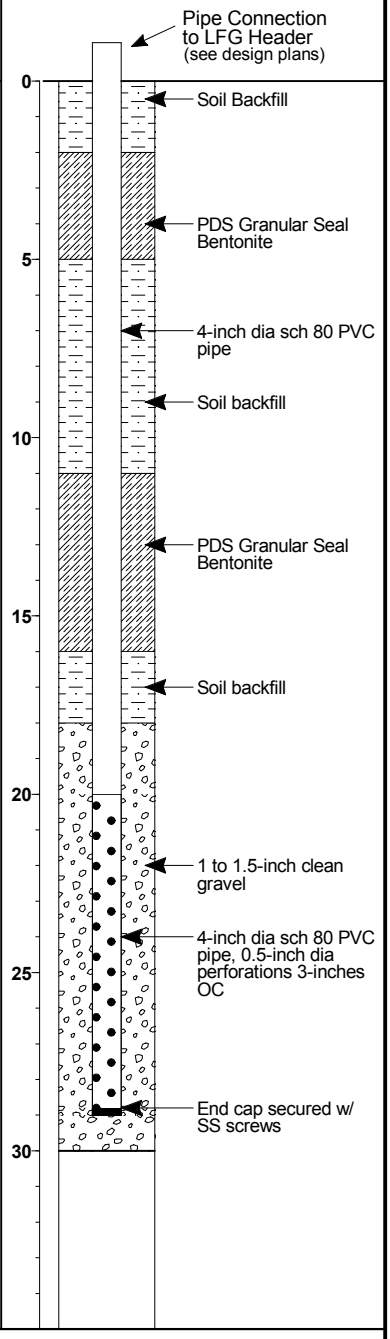
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1696	0		Dry cover soil, light brown	
1691	5			
1686	10		Refuse including paper, plastic, wood, and tires	
1681	15			
1676	20			
1671	25			
1666	30			
1661	35			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/13/13**
Date Ended: **9/13/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1696.0 Ft**
Total Depth: **30.0 Ft**

STD_LOG_LFG EASTLAKE LF SAC GINT LIBRARY.GPJ STD_LOG.GDT 2/7/14

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-20

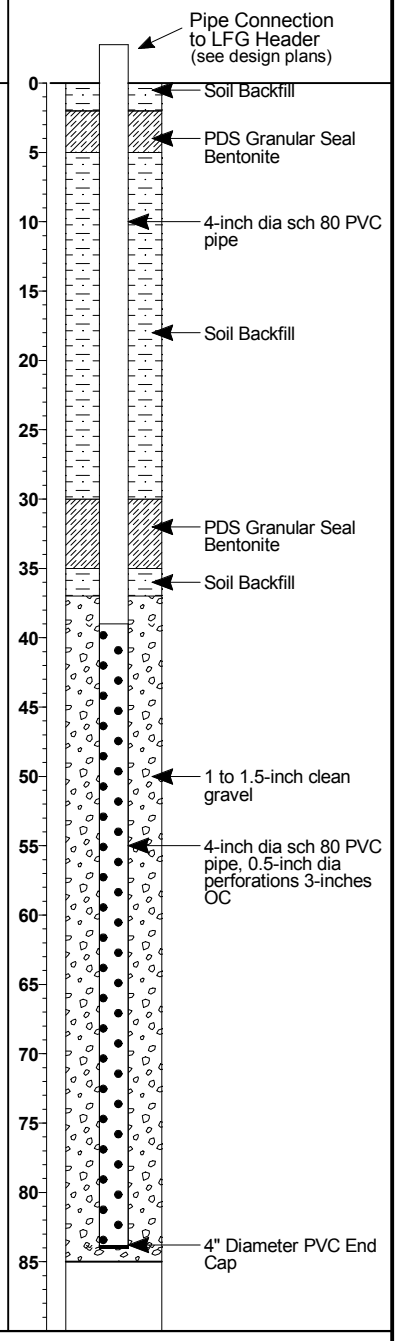
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft)	Depth (ft bgs)	Graphical Log	Description	Comments
1734	0		Dry cover soil, light brown	
1729	5		Refuse including paper, plastic, wood, and tires	
1724	10			
1719	15			
1714	20			
1709	25			
1704	30			
1699	35			
1694	40			
1689	45			
1684	50			
1679	55			
1674	60			
1669	65			
1664	70			
1659	75			
1654	80			
1649	85			
1644	90			

Completion Detail



Drilling Company: **Sacramento Drilling**
Drilling Method: **Bucket Auger**
Logged By: **A. Violenta**
Sampling Method: **Visual**

Date Started: **9/11/13**
Date Ended: **9/11/13**
Boring Diameter: **24-inch**
Well Diameter: **4"**

Surface Elevation: **1734.3 Ft**
Total Depth: **85.0 Ft**

SCS ENGINEERS

BORING LOG

3117 Fite Circle, Suite 108
Sacramento, California 95827-1808

BORING NUMBER: GW-21

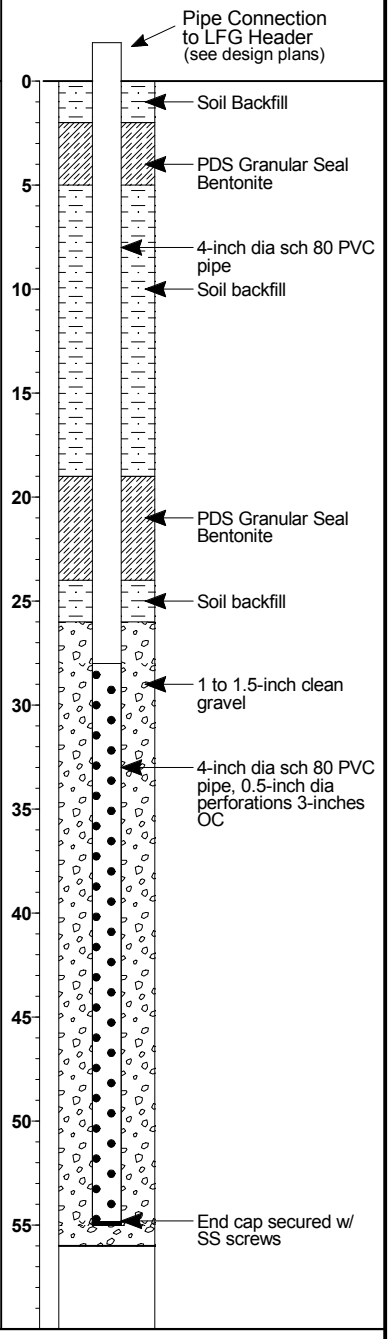
ESL GCCS INSTALLATION
Eastlake Sanitary Landfill
Clearlake, CA

JOB NUMBER: 01209155.07

REMARKS:

Elevation (ft) / Depth (ft bgs)	Graphical Log	Description	Comments
0		Dry cover soil, sandy silt, brown , some cobbles	
5			
10			
15		Refuse - MSW	
20			
25			
30			
35			
40			
45			
50			
55			
60			

Completion Detail



Drilling Company:	**Sacramento Drilling**	Date Started:	**9/17/13**		
Drilling Method:	**Bucket Auger**	Date Ended:	**9/17/13**	Total Depth:	**56.0 Ft**
Logged By:	**A. Tuveson**	Boring Diameter:	**24-inch**		
Sampling Method:	**Visual**	Well Diameter:	**4"**		

APPENDIX D

LANDFILL GAS FLARE START-UP CHECKLIST

PEI PERENNIAL ENERGY

INSTALLATION INSPECTION AND START-UP PROCEDURES
GAS COMPRESSION SYSTEMS

System Inspection:

JC 1-21-13 System Skid (Check each line item - - initial and date)

✓ Is system skid placed, leveled, anchored & grounded per PEI standards and applicable project specifications?

✓ Is primary electrical service installed and teminated at system electrical entrance point?

✓ Is primary gas piping installed at skid inlet per PEI standards and applicable project specifications?

✓ Is the condensate management system or drain installed per PEI standards and applicable project specifications?

✓ Is pilot and/or supplemental fuel source installed and connected per PEI standards and applicable project specifications?

✓ Is work area free of debris and trip hazards?

Electrical Inspection:

JC 1-21-13 MCC & Control Panel(s) (Check each line item - - initial and date)

✓ Are panel door swing arcs clear of any interference?

✓ Are all terminals tightened to PEI standards?

✓ Is system grounding and bonding installed correctly?

✓ Is primary electrical service ON, and are phase voltages within PEI standard ranges?

✓ Are 3 phase legs connected for proper motor rotations for all 3 phase devices? ("Bump" all 3 phase devices to verify proper rotation)

✓ Is 240/120 VAC within proper voltage range, and is AC surge protection functional?

✓ Is 24VDC within proper voltage range, and is DC surge protection functional?

✓ Is communication equipment (phone, modem, autodialer, etc.) connected correctly? Is there dial tone on panel phone? Is communication equipment surge protection functional?

✓ Are all required MCC & load center circuit breakers closed?

Operational Start-up:

1-23-14 JL Functional Checks (Check each line item - - initial and date)

✓ Does system start in full automatic control mode?

✓ Does system start occur in proper sequence?

✓ Does shutdown occur in the proper sequence when system switch is turned OFF?

✓ Do each of the subsystems operate in the "TEST" or "ON" modes?

✓ Do each of the subsystems stop in the manual "OFF" mode?

✓ Do all of the EMERGENCY STOP switches (if any) initiate immediate system shutdown?

✓ Do each of the "ALARMS" operate per PEI standards and applicable project specifications? (Complete the "ALARM & SHUTDOWN" Data Sheet)

✓ Do each of the "SHUTDOWNS" operate per PEI standards and applicable project specifications? (Complete the "ALARM & SHUTDOWN" Data Sheet)

✓ Do the system pressures comply with PEI design criteria and applicable project specifications within the limits of the ability of the landfill to produce sufficient quantity and quality of gas?

✓ Do the system flowrates comply with the PEI design goals and applicable project specifications within the limits of the ability of the landfill to produce sufficient quantity and quality of gas?

✓ Is all metering and monitoring instrumentation functional and calibrated? (Verify that all setpoints are recorded properly in the O & M Manual)

Specification Compliance:

1-23-14 JL Compliance with specified performance requirements

✓ Does the system meet all of the PEI standard and specification performance requirements within the limits of the ability of the landfill to produce sufficient quantity and quality of gas?

Appendix G

California Environmental Reporting System Summary

Eastlake Sanitary Landfill (CERSID: 10137121)

Facility Information **Accepted Feb 28, 2018**

Submitted on 12/4/2017 9:08:47 AM by *Robert ReGester* of Eastlake Sanitary Landfill (Clearlake, CA)
Submittal was ***Accepted*** on 2/28/2018 8:12:14 AM by Craig Wetherbee

- Business Activities
- Business Owner/Operator Identification

Hazardous Materials Inventory **Accepted Feb 28, 2018**

Submitted on 12/4/2017 9:08:47 AM by *Robert ReGester* of Eastlake Sanitary Landfill (Clearlake, CA)
Submittal was ***Accepted*** on 2/28/2018 8:12:45 AM by Craig Wetherbee

- Hazardous Material Inventory (3)
- Site Map (Official Use Only)
  - *Eastlake Landfill Site Map 2017* (Adobe PDF, 172KB)
  - *Annotated Site Map (Official Use Only)* (Adobe PDF, 252KB)

Emergency Response and Training Plans **Accepted Feb 28, 2018**

Submitted on 12/4/2017 9:08:47 AM by *Robert ReGester* of Eastlake Sanitary Landfill (Clearlake, CA)
Submittal was ***Accepted*** on 2/28/2018 8:12:53 AM by Craig Wetherbee

- Emergency Response/Contingency Plan
  - *Emergency Response/Contingency Plan* (Adobe PDF, 375KB)
  - *Environmental Cleanup Companies* (Adobe PDF, 51KB)
  - *Storage Inspection Form* (MS Excel, 12KB)
- Employee Training Plan
  - Provided In Submital Element: Emergency Response and Training Plans

Site Identification

Eastlake Sanitary Landfill
16015 Davis Street
Clearlake, CA 95422
County
Lake

CERS ID
10137121
EPA ID Number
CAL000212407

Submittal Status

Submitted on 12/4/2017 by *Robert ReGester* of Eastlake Sanitary Landfill (Clearlake, CA)
Submittal was ***Accepted***; Processed on 2/28/2018 by *Craig Wetherbee* for Lake County Environmental Health

Hazardous Materials

Does your facility have on site (for any purpose) at any one time, hazardous materials at or above 55 gallons for liquids, 500 pounds for solids, or 200 cubic feet for compressed gases (include liquids in ASTs and USTs); or is regulated under more restrictive inventory local reporting requirements (shown below if present); or the applicable Federal threshold quantity for an extremely hazardous substance specified in 40 CFR Part 355, Appendix A or B; or handle radiological materials in quantities for which an emergency plan is required pursuant to 10 CFR Parts 30, 40 or 70?	**Yes**

Underground Storage Tank(s) (UST)

Does your facility own or operate underground storage tanks?	**No**

Hazardous Waste

Is your facility a Hazardous Waste Generator?	**Yes**
Does your facility treat hazardous waste on-site?	**No**
Is your facility's treatment subject to financial assurance requirements (for Permit by Rule and Conditional Authorization)?	**No**
Does your facility consolidate hazardous waste generated at a remote site?	**No**
Does your facility need to report the closure/removal of a tank that was classified as hazardous waste and cleaned on-site?	**No**
Does your facility generate in any single calendar month 1,000 kilograms (kg) (2,200 pounds) or more of federal RCRA hazardous waste, or generate in any single calendar month, or accumulate at any time, 1 kg (2.2 pounds) of RCRA acute hazardous waste; or generate or accumulate at any time more than 100 kg (220 pounds) of spill cleanup materials contaminated with RCRA acute hazardous waste.	**No**
Is your facility a Household Hazardous Waste (HHW) Collection site?	**No**

Excluded and/or Exempted Materials

Does your facility recycle more than 100 kg/month of excluded or exempted recyclable materials (per HSC 25143.2)?	**No**
Does your facility own or operate ASTs above these thresholds? Store greater than 1,320 gallons of petroleum products (new or used) in aboveground tanks or containers.	**No**
Does your facility have Regulated Substances stored onsite in quantities greater than the threshold quantities established by the California Accidental Release prevention Program (CalARP)?	**No**

Additional Information

Facility/Site

Eastlake Sanitary Landfill
16015 Davis Street
Clearlake, CA 95422

CERS ID
10137121

Submittal Status

Submitted on 12/4/2017 by *Robert ReGester* of Eastlake Sanitary Landfill (Clearlake, CA)
Submittal was ***Accepted***; Processed on 2/28/2018 by *Craig Wetherbee* for Lake County Environmental Health

Identification

Co. of Lake, Public Services

Operator Phone	Business Phone	Business Fax
(707) 994-5888	(707) 994-5888	(707) 994-5888

Beginning Date	Ending Date	
Dun & Bradstreet	**SIC Code**	**Primary NAICS**

Facility/Site Mailing Address

333 Second Street
Lakeport, CA 95453

Primary Emergency Contact

Kris Byrd
Title
Landfill Supervisor

Business Phone	24-Hour Phone	Pager Number
(707) 994-5888	(707) 900-1725	

Owner

Co. of Lake, Public Services Dept
(707) 262-1760
333 Second St
Lakeport, CA 95453

Secondary Emergency Contact

Lars Ewing
Title
Director

Business Phone	24-Hour Phone	Pager Number
(707) 262-1618	(707) 533-3561	

Billing Contact

Lars Ewing
(707) 262-1618 lars.ewing@lakecountyca.gov
333 Second St
Lakeport, CA 95453

Environmental Contact

Ray Ruminski, Env. Health Director
(707) 263-1164 ray.ruminski@lakecountyca.gov
922 Bevins Court
Lakeport, CA 95453

Name of Signer	Signer Title	Document Preparer
Lars Ewing	Director	Susan Bennett

Additional Information

Locally-collected Fields

Some or all of the following fields may be required by your local regulator(s).

Property Owner

County of Lake
Phone
() 262-1618
Mailing Address
255 North Forbes
Lakeport, CA 95431

Assessor Parcel Number (APN)

Number of Employees
0
Facility ID
17-000-71241

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **Eastlake Sanitary Landfill**
Facility Name **Eastlake Sanitary Landfill**
16015 Davis Street, Clearlake 95422

Chemical Location
(MB) Maintenance Building - South side of building

CERS ID **10137121**
Facility ID **17-000-71241**
Status **Submitted** on 12/4/2017 9:08 AM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Quantities: Largest Cont.	Quantities: Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Hydraulic Oil	**Gallons**	**110**	**55**	110		- Fire	Refined oils	95 %		
	CAS No	State: Liquid	Storage Container: Steel Drum		Pressue: Ambient	Waste Code	- Chronic health	additives	5 %		
Flammable Liquid, Class I-A	Map: 2 Grid: 1	Type: Mixture	Days on Site: 365		Temperature: Ambient						
DOT: 3 - Flammable and Combustible Liquids	**MOTOR OIL**	**Gallons**	**55**	**55**	55		- Fire	VARIOUS LUBRICATING BASE OILS	85 %		6474X-XX-X
	CAS No	State: Liquid	Storage Container: Steel Drum		Pressue: Ambient	Waste Code		ADDITIVE PACKAGE, INCLUDING	15 %		MIXTURE
Combustible Liquid, Class III-B	Map: 2 Grid: 1	Type: Mixture	Days on Site: 365		Temperature: Ambient	221		ZINC ALKYLDITHIOPHOSPHATE	2 %		68649-42-3

Hazardous Materials And Wastes Inventory Matrix Report

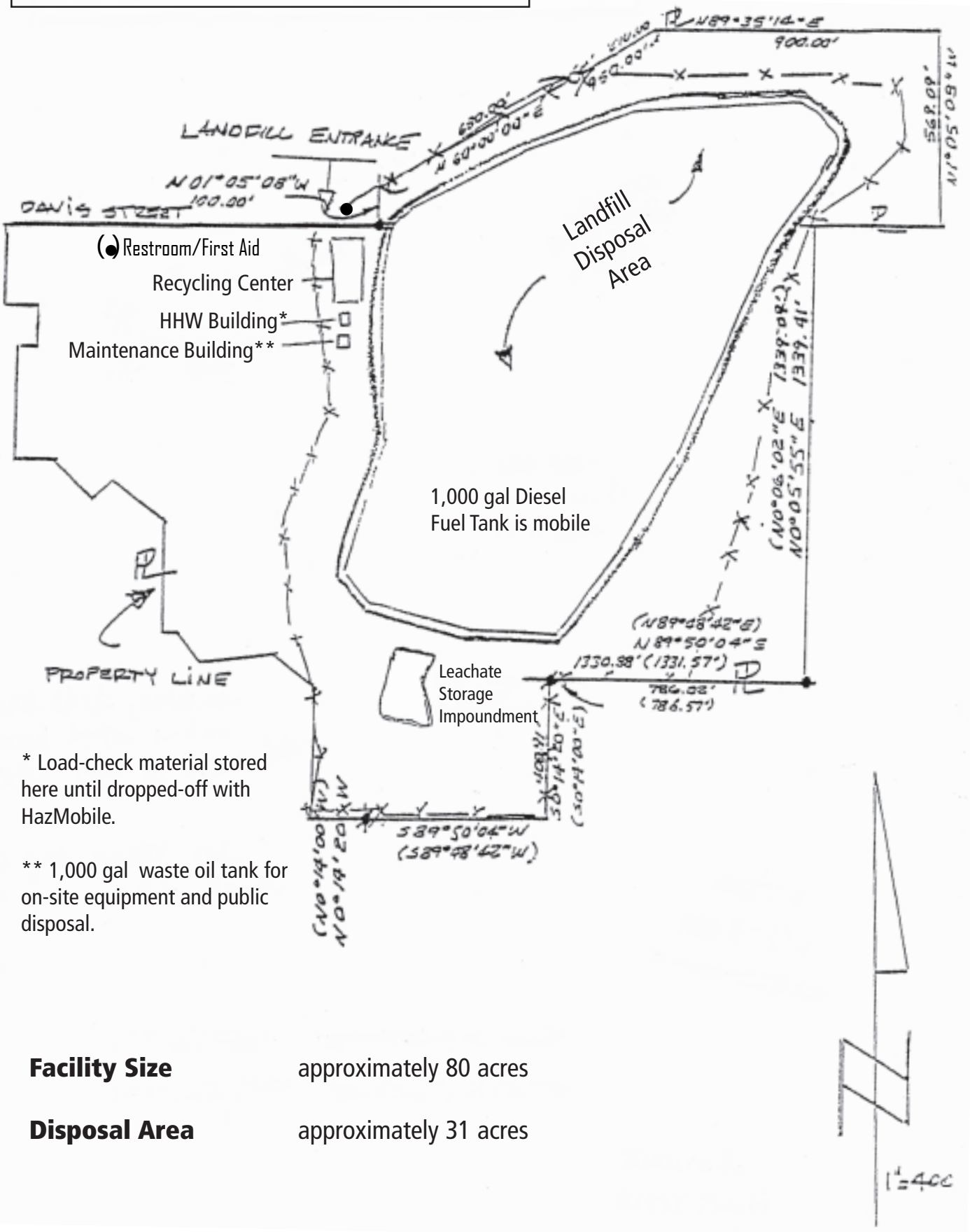
CERS Business/Org. **Eastlake Sanitary Landfill**
Facility Name **Eastlake Sanitary Landfill**
16015 Davis Street, Clearlake 95422

Chemical Location
Mobile Tank

CERS ID **10137121**
Facility ID **17-000-71241**
Status **Submitted** on 12/4/2017 9:08 AM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Largest Cont.	Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
DOT: 3 - Flammable and Combustible Liquids Combustible Liquid, Class II	**DIESEL FUEL** CAS No 68334-30-5 Map: 1 Grid: 1	**Gallons** State Liquid Type Pure	**1000** Storage Container Tank Wagon Days on Site: 365	**1000**	1000 Pressue Ambient Temperature Ambient	Waste Code	- Fire - Chronic health				

Eastlake Landfill
County of Lake Public Services Department



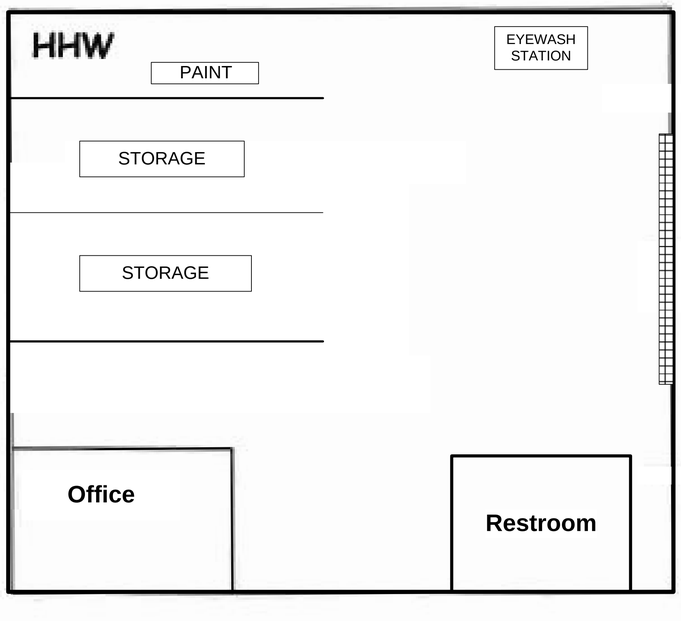
* Load-check material stored here until dropped-off with HazMobile.

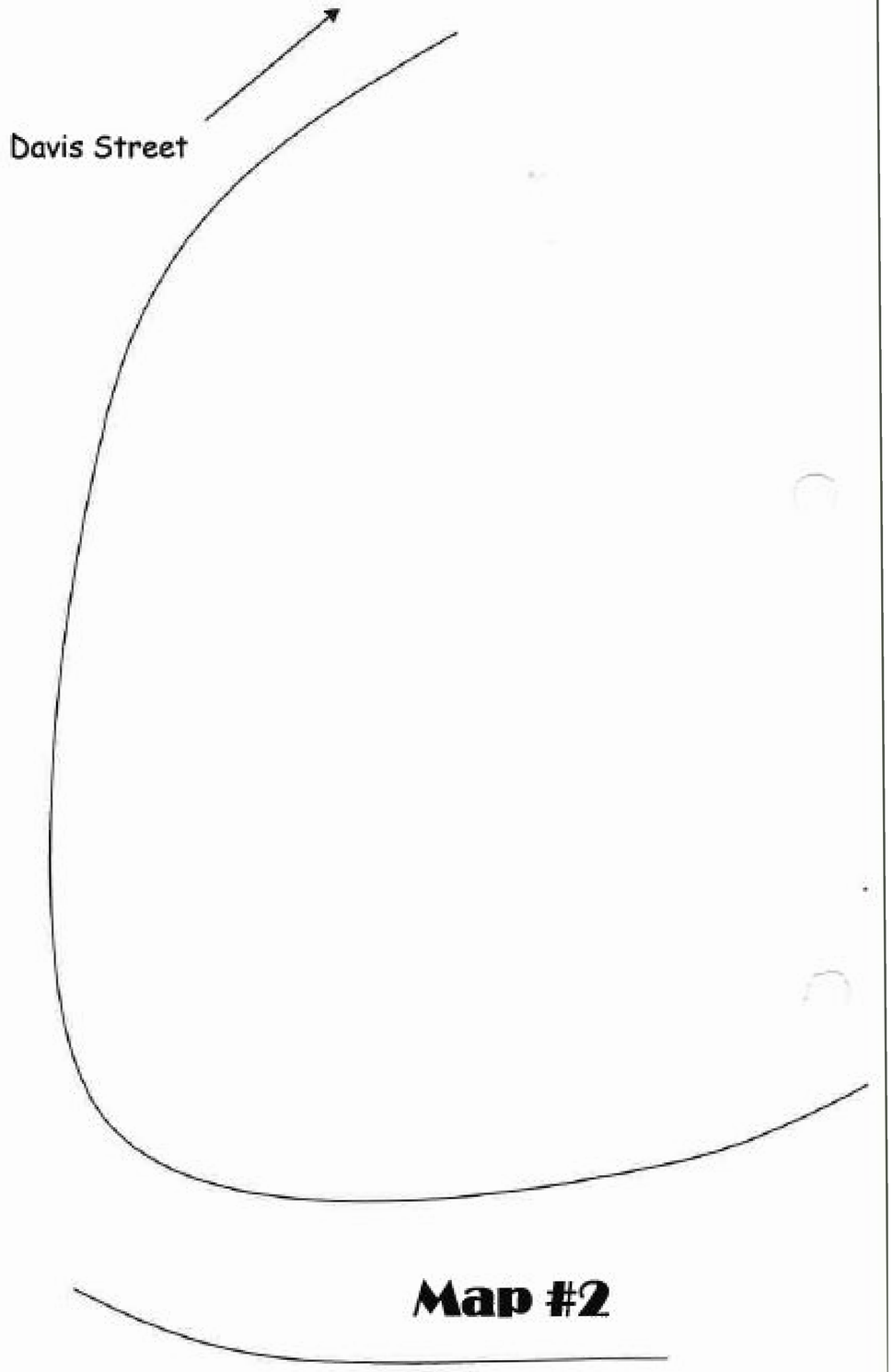
** 1,000 gal waste oil tank for on-site equipment and public disposal.

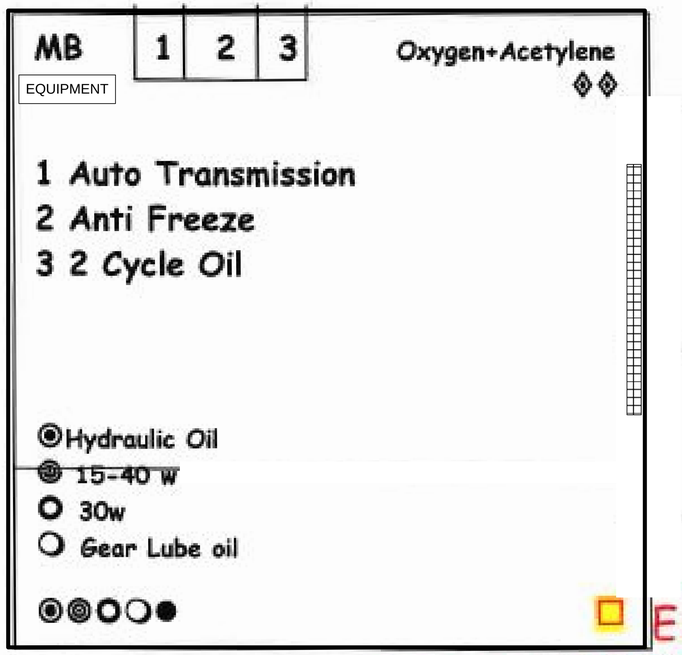
Facility Size	approximately 80 acres
Disposal Area	approximately 31 acres


Emergency
Exit/Evacuation Route
Assembly Area
DAVIS ST.
Restroom/First Aid
Household Haz Waste Bldg (HHW)
MB Maintenance Bldg (MB)
N

Map 1







ESO
Emergency Shut Off

Map 2

N

Map #2

CALIFORNIA ENVIRONMENTAL REPORTING SYSTEM (CERS)

CONSOLIDATED EMERGENCY RESPONSE / CONTINGENCY PLAN

Prior to completing this Plan, please refer to the INSTRUCTIONS FOR COMPLETING A CONSOLIDATED CONTINGENCY PLAN

A. FACILITY IDENTIFICATION AND OPERATIONS OVERVIEW

FACILITY ID # A1.	CERS ID # A2.	DATE OF PLAN PREPARATION/REVISION (MM/DD/YYYY) A3.
17-000-7124 1	10137121	11/28/2017

BUSINESS NAME *(Same as Facility Name or DBA - Doing Business As)* A4.
Eastlake Sanitary Landfill

BUSINESS SITE ADDRESS A5.
16015 Davis Avenue

BUSINESS SITE CITY A6.		ZIP CODE A7.
Clearlake	CA	95422

TYPE OF BUSINESS (e.g., Painting Contractor) A8.	INCIDENTAL OPERATIONS (e.g., Fleet Maintenance) A9.
Landfill	

THIS PLAN COVERS CHEMICAL SPILLS, FIRES, AND EARTHQUAKES INVOLVING (Check all that apply): A10.

☒ 1. HAZARDOUS MATERIALS; ☒ 2. HAZARDOUS WASTES

B. INTERNAL RESPONSE

INTERNAL FACILITY EMERGENCY RESPONSE WILL OCCUR BY (Check all that apply): B1.

☒ 1. CALLING PUBLIC EMERGENCY RESPONDERS (e.g., 9-1-1)
☒ 2. CALLING HAZARDOUS WASTE CONTRACTOR
☐ 3. ACTIVATING IN-HOUSE EMERGENCY RESPONSE TEAM

C. EMERGENCY COMMUNICATIONS, PHONE NUMBERS AND NOTIFICATIONS

In the event of an emergency involving hazardous materials and/or hazardous waste, all facilities must IMMEDIATELY:
1. Notify facility personnel and evacuate if necessary in accordance with the Emergency Action Plan (Title 8 California Code of Regulations §3220);
2. Notify local emergency responders by calling 9-1-1;
3. Notify the local Unified Program Agency (UPA) at the phone number below; and
4. Notify the State Warning Center at (800) 852-7550.

Facilities that generate, treat, store or dispose of hazardous waste have additional responsibilities to notify and coordinate with other response agencies. Whenever there is an imminent or actual emergency situation such as an explosion, fire, or release, the Emergency Coordinator must follow the appropriate requirements for the category of facility and type of release involved:
1. Title 22 California Code of Regulations §66265.56. Emergency Procedures for generators of 1,000 kilograms or more of hazardous waste in any calendar month.
2. Title 22 California Code of Regulations §66265.196. Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems.
3. Title 40 Code of Federal Regulations §302.6. Notification requirements for a release of a hazardous substance equal to or greater than the reportable quantity.
4. Title 22 California Code of Regulations §66262.34(d)(2) and Title 40 Code of Federal Regulations §262.34(d)(5)(ii) for generators of less than 1000 kilograms of hazardous waste in any calendar month.

Following notification and before facility operations are resumed in areas of the facility affected by the incident, the Emergency Coordinator shall notify the local UPA and the local fire department's hazardous materials program, if necessary, that the facility is in compliance with requirements to:
1. Provide for proper storage and disposal of recovered waste, contaminated soil or surface water, or any other material that results from an explosion, fire, or release at the facility; and
2. Ensure that no material that is incompatible with the released material is transferred, stored, or disposed of in areas of the facility affected by the incident until cleanup procedures are completed.

EMERGENCY RESPONSE PHONE NUMBERS:		
	AMBULANCE, FIRE, POLICE AND CHP	9-1-1
	CALIFORNIA STATE WARNING CENTER (CSWC)/CAL OES.	(800) 852-7550
	NATIONAL RESPONSE CENTER (NRC)	(800) 424-8802
	POISON CONTROL CENTER	(800) 222-1222
	LOCAL UNIFIED PROGRAM AGENCY (UPA)	C1.
	OTHER (Specify): C2. Lake County Environmental Health	(707) 263-1164 C3.
NEAREST MEDICAL FACILITY / HOSPITAL NAME: C4. St. Helena Hospital, Clearlake		(707) 994-6486 C5.

AGENCY NOTIFICATION PHONE NUMBERS:		
	CALIFORNIA DEPT. OF TOXIC SUBSTANCES CONTROL (DTSC)	(916) 255-3545
	REGIONAL WATER QUALITY CONTROL BOARD (RWQCB).	(916) 464-3291 C6.
	U.S. ENVIRONMENTAL PROTECTION AGENCY (US EPA)	(800) 300-2193
	CALIFORNIA DEPT. OF FISH AND WILDLIFE (CDFW)	(916) 358-2900
	U.S. COAST GUARD (USCG)	(202) 267-2180
	CAL OSHA	(916) 263-2800
	CAL FIRE OFFICE OF THE STATE FIRE MARSHAL (OSFM)	(916) 323-7390
	OTHER (Specify): C7.	C8.
	OTHER (Specify): C9.	C10.

INTERNAL FACILITY EMERGENCY COMMUNICATIONS OR ALARM NOTIFICATION WILL OCCUR BY (Check all that apply): C11.

- ☑ 1. VERBAL WARNINGS;
- ☐ 2. PUBLIC ADDRESS OR INTERCOM SYSTEM;
- ☑ 3. TELEPHONE;
- ☐ 4. PAGERS;
- ☐ 5. ALARM SYSTEM;
- ☑ 6. PORTABLE RADIO

NOTIFICATIONS TO NEIGHBORING FACILITIES THAT MAY BE AFFECTED BY AN OFF-SITE RELEASE WILL OCCUR BY (Check all that apply): C12.

- ☑ 1. VERBAL WARNINGS;
- ☐ 2. PUBLIC ADDRESS OR INTERCOM SYSTEM;
- ☑ 3. TELEPHONE;
- ☐ 4. PAGERS;
- ☐ 5. ALARM SYSTEM;
- ☑ 6. PORTABLE RADIO

EMERGENCY COORDINATOR CONTACT INFORMATION: Kris Byrd, Landfill Supervisor C13.

PRIMARY EMERGENCY COORDINATOR NAME: Kris Byrd PHONE NO.: (707) 994-5888 PHONE NO.: (707) 900-1725

ALTERNATE EMERGENCY COORDINATOR NAME: Lars Ewing PHONE NO.: (707) 262-1618 PHONE NO.: (707) 533-3561

☐ Check if additional Emergency Coordinator contact and address information is available onsite or by calling PHONE NO.:

Note: If more than one alternate emergency coordinator is designated, attach a list in order of responsibility.

D. EMERGENCY CONTAINMENT AND CLEANUP PROCEDURES

Check the applicable boxes to indicate your facility's procedures for containing spills and preventing and mitigating releases, fires and/or explosions.

D1.

- ☑ 1. MONITOR FOR LEAKS, RUPTURES, PRESSURE BUILD-UP, ETC.;
- ☑ 2. PROVIDE STRUCTURAL PHYSICAL BARRIERS (e.g., Portable spill containment walls, built-in berms);
- ☑ 3. PROVIDE ABSORBENT PHYSICAL BARRIERS (e.g., Pads, spill pigs, spill pillows);
- ☑ 4. COVER OR BLOCK FLOOR AND/OR STORM DRAINS;
- ☑ 5. LINED TRENCH DRAINS AND/OR SUMPS;
- ☐ 6. AUTOMATIC FIRE SUPPRESSION SYSTEM;
- ☑ 7. ELIMINATE SOURCES OF IGNITION FOR FLAMMABLE HAZARDS;
- ☑ 8. STOP PROCESSES AND/OR OPERATIONS;
- ☑ 9. AUTOMATIC / ELECTRONIC EQUIPMENT SHUT-OFF SYSTEM;
- ☑ 10. SHUT OFF WATER, GAS, ELECTRICAL UTILITIES;
- ☑ 11. CALL 9-1-1 FOR PUBLIC EMERGENCY RESPONDER ASSISTANCE AND/OR MEDICAL AID;
- ☑ 12. NOTIFY AND EVACUATE PERSONS IN ALL THREATENED AND/OR IMPACTED AREAS;
- ☑ 13. ACCOUNT FOR EVACUATED PERSONS IMMEDIATELY AFTER EVACUATION;
- ☐ 14. PROVIDE PROTECTIVE EQUIPMENT FOR ON-SITE EMERGENCY RESPONSE TEAM;
- ☑ 15. REMOVE CONTAINERS AND/OR ISOLATE AREAS;
- ☑ 16. HIRE LICENSED HAZARDOUS WASTE CONTRACTOR;
- ☑ 17. USE ABSORBENT MATERIAL FOR SPILL CONTAINMENT;
- ☑ 18. VACUUM SUCTION USING APPROPRIATE VACUUM (e.g., Intrinsically safe) FOR SPILL CONTROL AND/OR CLEANUP;
- ☑ 19. DECONTAMINATE PERSONNEL AND EQUIPMENT WITHIN DESIGNATED AREA AND DISPOSE OF WASTEWATER AS HAZARDOUS WASTE;
- ☑ 20. PROVIDE SAFE TEMPORARY STORAGE OF HAZARDOUS WASTE GENERATED DURING EMERGENCY ACTIONS;
- ☐ 21. OTHER (Specify): D2.

E. FACILITY EVACUATION

THE FOLLOWING ALARM SIGNAL(S) WILL BE USED TO BEGIN EVACUATION OF THE FACILITY (Check all that apply): E1.

E2.

- ☐ 1. BELLS;
- ☐ 2. HORNS/SIRENS;
- ☑ 3. VERBAL (i.e., Shouting);
- ☐ 4. OTHER (Specify):

THE FOLLOWING LOCATION(S) WILL BE USED FOR AN EMERGENCY ASSEMBLY AREA(S) (e.g., Parking lot, street corner): E3.

Front Gate

Note: The Emergency Coordinator must account for all onsite employees and visitors after evacuation.

EVACUATION ROUTE S AND ALTERNATE EVACUATION ROUTES ARE DESCRIBED AS FOLLOWS: E4.

- ☑ 1. WRITTEN PROCEDURES DESCRIBING ROUTES, EXITS, AND ASSEMBLY AREAS;
- ☑ 2. EVACUATION MAP(S) DEPICTING ROUTES, EXITS, AND ASSEMBLY AREAS;
- ☐ 3. OTHER (Specify): E5.

Note: Evacuation procedures and/or maps should be posted in visible facility locations and must be included in the Contingency Plan.

F. ARRANGEMENTS FOR EMERGENCY SERVICES

ADVANCE ARRANGEMENTS FOR LOCAL EMERGENCY SERVICES (Check one of the following): F1.

- ☑ 1. HAVE BEEN DETERMINED NOT NECESSARY;
- ☐ 2. THE FOLLOWING ARRANGEMENTS HAVE BEEN MADE (Specify): F2.

Note: Advance arrangements with local fire and police departments, hospitals, state and local emergency response teams, and/or emergency services contractors should be made for your facility, if necessary. Large Quantity Generators must describe arrangements in the Contingency Plan.

G. EMERGENCY EQUIPMENT

Check the applicable boxes to list emergency response equipment available at the facility, identify the location(s) where the equipment is kept, and indicate the equipment's capability, if applicable.

TYPE	EQUIPMENT AVAILABLE G1.	LOCATION G2.	CAPABILITY G3.
EXAMPLE	☒ *CHEMICAL PROTECTIVE GLOVES*	*SPILL RESPONSE KIT*	*SINGLE USE, OIL RESISTANT ONLY*
Safety and First Aid	1. ☐ CHEMICAL PROTECTIVE SUITS, APRONS, AND/OR VESTS		
	2. ☐ CHEMICAL PROTECTIVE GLOVES		
	3. ☐ CHEMICAL PROTECTIVE BOOTS		
	4. ▣ SAFETY GLASSES, GOGGLES, AND FACE SHIELDS	all workers	OSHA appr. safety glasses
	5. ▣ HARD HATS	one per worker	V-Guard, class F & G
	6. ☐ AIR-PURIFYING RESPIRATORS		
	7. ☐ SELF-CONTAINED BREATHING APPARATUS (SCBA)		
	8. ▣ FIRST AID KITS	weigh station (WS), HHW	Northern Safety Kits
	9. ▣ PLUMBED EYEWASH FOUNTAIN AND/OR SHOWER	Entry R.R., WS, HHW	eyewash / shower
	10. ▣ PORTABLE EYEWASH KITS AND/OR STATION	WS	Northern Safety eyewash bottles
	11. ☐ OTHER		
Fire Fighting	12. ▣ PORTABLE FIRE EXTINGUISHERS	HHW, all Equipment, Flare Station	ABC
	13. ▣ FIXED FIRE SUPPRESSION SYSTEMS AND/ OR SPRINKLERS	HHW	
	14. ▣ FIRE ALARM BOXES	HHW	
	15. ☐ OTHER		
Spill Control and Clean-Up	16. ▣ ALL-IN-ONE SPILL KIT	HHW, Equipment service truck	
	17. ▣ ABSORBENT MATERIAL	HHW, MB, Fuel Trailer, Svc Truck	waddles / pads
	18. ▣ CONTAINER FOR USED ABSORBENT	HHW, MB	
	19. ▣ BERM AND/OR DIKING EQUIPMENT	HHW	
	20. ▣ BROOM	HHW	
	21. ▣ SHOVEL	HHW	
	22. ▣ VACUUM	HHW	
	23. ☐ EXHAUST HOOD		
	24. ▣ SUMP AND/OR HOLDING TANK	HHW, MB	
	25. ☐ CHEMICAL NEUTRALIZERS		
	26. ☐ GAS CYLINDER LEAK REPAIR KIT		
	27. ☐ SPILL OVERPACK DRUMS		
	28. ▣ OTHER	Fuel Trailer	Secondary Containment
Communi-cations and Alarm Systems	29. ▣ TELEPHONES (e.g., Cellular)	WS, HHW, Supervisor, workers	
	30. ☐ INTERCOM AND/OR PA SYSTEM		
	31. ▣ PORTABLE RADIOS	on site / workers	Kenwood K-2300 - (5)
	32. ☐ AUTOMATIC ALARM CHEMICAL MONITORING EQUIPMENT		
Other	33. ☐ OTHER		
	34. ☐ OTHER		

H. EARTHQUAKE VULNERABILITY

Identify areas of the facility that are vulnerable to hazardous materials releases due to seismic motion. These areas require immediate isolation and inspection.

VULNERABLE AREAS (Check all that apply): H1.

- [x] 1. HAZARDOUS MATERIALS AND/OR WASTE STORAGE AREAS
- [ ] 2. PROCESS LINES AND PIPING
- [ ] 3. LABORATORY
- [ ] 4. WASTE TREATMENT AREA

LOCATIONS (e.g., Shop, outdoor shed, lab): H2.

Household Hazardous Waste Bldg. (HHW)

Identify mechanical systems vulnerable to releases / spills due to earthquake-related motion. These systems require immediate isolation and inspection.

VULNERABLE SYSTEMS AND/OR EQUIPMENT (Check all that apply): H3.

- [x] 1. SHELVES, CABINETS AND/OR RACKS
- [x] 2. TANKS AND SHUT-OFF VALVES
- [x] 3. PORTABLE GAS CYLINDERS
- [x] 4. EMERGENCY SHUT-OFF AND/OR UTILITY VALVES
- [x] 5. SPRINKLER SYSTEMS
- [ ] 6. STATIONARY PRESSURIZED CONTAINERS (e.g., Propane tank)

LOCATIONS: H4.

HHW
Tipping Area
Maintenance Building (MB)
MB
HHW

I. EMPLOYEE TRAINING

Employee training is required for all employees and/or contractors handling hazardous materials and/or hazardous wastes during normal and/or emergency operations. Most facilities will need to submit a separate Training Plan. However, your CUPA may accept this section as the Training Plan for some small facilities.
Employee training plans may include the following content:

- Applicable laws and regulations;
- Emergency response plans and procedures;
- Safety Data Sheets;
- Hazard communication related to health and safety;
- Methods for safe handling of hazardous substances;
- Hazards of materials and processes (e.g., fire, explosion, asphyxiation);
- Hazard mitigation, prevention and abatement procedures;
- Coordination of emergency response actions;
- Notification procedures for local emergency responders, CUPA, Cal OES, and onsite personnel;
- Communication and alarm systems;
- Personal protective equipment;
- Use and maintenance of emergency response equipment and supplies (e.g. Fire extinguishers, respirators, spill control materials);
- Decontamination procedures;
- Evacuation procedures and evacuation staging locations;
- Identification of facility areas, equipment, and systems vulnerable to earthquakes and other natural disasters.
- OTHER (Specify):

Check the applicable boxes below to indicate how the employee training program is administered.

- [x] 1. FORMAL CLASSROOM
- [x] 2. VIDEOS
- [x] 3. SAFETY MEETINGS
- [ ] 4. STUDY GUIDES / MANUALS I1.
- [ ] 5. OTHER (Specify): I2.
- [ ] 6. NOT APPLICABLE SINCE FACILITY HAS NO EMPLOYEES
- [ ] 7. CHECK IF A SEPARATE EMPLOYEE TRAINING PLAN IS USED AND UPLOADED TO CERS AS A PDF DOCUMENT I3.
- [ ] 8. CHECK IF EMPLOYEE TRAINING IS COVERED BY THE ABOVE REFERENCED CONTENT AND OTHER DOCUMENTS ONSITE I4.

EMPLOYEE TRAINING FREQUENCY AND RECORDKEEPING TRAINING MUST BE:

- Provided initially for new employees as soon as possible following the date of hire. New employees should not work in an unsupervised position that involves hazardous materials handling and/or hazardous waste management without proper training;
- Provided within six months from the date of hire for new employees at a large quantity generator;
- Ongoing and provided at least annually;
- Amended prior to a change in process or work assignment;
- Given upon modification to the Emergency Response/Contingency Plan.

Large Quantity Generator Training: Large quantity generators (1,000 kg or more) must retain written plan and documentation of employee training which includes:

- A written description of the type and amount of both initial and ongoing training that will be given to persons filling each job position having responsibility for hazardous waste management and/or emergency response.
- The name, job title and job description for each position at the facility related to hazardous waste management.
- Current employee training records must be retained until closure of the facility and former employee training records must be retained for at least three years after termination of employment.

Small Quantity Generator Training: Small quantity generators (less than 1,000 kg) must include basic hazardous waste management and emergency response procedures but a written employee training plan and training records are not required. In order to show that the facility has met the small quantity generator employee training requirement, an employee training plan and training records may be made available.

Hazardous Materials Business Plan Training: Businesses must provide initial and annual employee training that includes the content referenced above. The training may be based on the job position and training records must be made available for a period of at least three years.

J. LIST OF ATTACHMENTS

Check one of the following: J1.

- [ ] 1. NO ATTACHMENTS ARE REQUIRED; or
- [x] 2. THE FOLLOWING DOCUMENTS ARE ATTACHED: J2.

Environmental Cleanup Company courtesy listing and Eastlake Landfill Storage Inspection Form

Environmental Cleanup Companies that have offered services in Lake County.

This list provided as a courtesy of Lake County Environmental Health and does not represent our endorsement of any one company.

Fremouw Environmental Services, Inc 9110 Winters Road Winters, CA 95694-9665 map *Yolo, CA Metro Area* Phone: **(530) 795-4337** Website: Hazwasteremoval.com	**Paul Davis Restoration** Located in Middletown & Petaluma **1-866-220-9900** Clean Ups of: Crime Scene, Meth Labs, toxic, sewer backflow, etc.
Safety Kleen **1-888-375-5336 (24-hr spill hotline)** **707 584-0415 (local)** **Petroleum products + chemicals**	**Evergreen Oil** **1-800-972-5284 8-5pm** **Petroleum products + chemicals** up next day to clean up
Ashbury Environmental Services CleanUp Dispatch: **1-800-733-9043** **Petroleum products + chemicals** **No biohazards** (formerly Chico Drain Oil bought by Ashbury)	**Sacramento Waste Oil** **1-916-849-0144** Petroleum products clean-up & disposal next day
NRC Environmental Services 24 hr Emergency Spill Response 800-337-7455	**Local Certified SOIL Clean Up** **But NOT certified Haulers:** R B Peters (707) 263-3678 Epidendio Const. (707) 994-5100 Granite Const. (707) 467-4100

List Revised 12/03/2013

Appendix H

Soil Loss Calculations

APPENDIX F

SOIL LOSS ANALYSIS
EASTLAKE SANITARY LANDFILL
PRELIMINARY CLOSURE & POSTCLOSURE MAINTENANCE PLAN

I. INTRODUCTION

The final cover for Eastlake Sanitary Landfill will be designed to minimize soil erosion. Based on soil and climatologic conditions of the site, a seed mix and planting technique will be implemented in order to establish a vegetative cover, which is adapted to site conditions and requires minimal maintenance. In addition to establishing vegetative cover, slopes must be designed to limit soil erosion losses to acceptable rates.

II. PREDICTING SOIL LOSS

This analysis employs the Universal Soil Loss Equation (USLE) to verify the adequacy of the final cover design and stabilization criteria of the selected vegetation. The soil loss analysis was performed in order to determine soil loss from the landfill cap during the 2-year, 6-hour precipitation event in order to compare results with U.S. EPA guidelines established at a maximum of 2.0 tons per acre for this particular precipitation event (U.S. EPA, 1982). In order to minimize potential future maintenance requirements, this quantity was set as the maximum allowable rate of erosion for the final cover.

The USLE predicts soil loss due to water induced sheet and rill erosion from the final cover in accordance with Title 27 of the California Code of Regulations (27CCR), §21150, and incorporates the following factors:

- Rainfall-erosivity factor;
- Land use factor;
- Soil erodibility factor; and
- Factor accounting for the length and steepness of the final cover slopes.

The USLE provides average soil loss as the product of five factors and was designed to calculate average soil loss due to rainfall runoff episodes on agricultural lands. The USLE estimates sheet and rill erosion from initial mobilization, and does not account for soil losses due to gullying. The USLE does not consider the effects of soil re-deposition. The Universal Soil Loss Equation is defined as follows:

$$A = RKLSCP$$

Where:

A = The computed soil loss per unit area - Expressed in the units selected for K and the period selected for R. For this analysis, K and R were selected such that A is computed in tons per acre per year.

R = The rainfall and runoff factor - R is the number of rainfall erosion index units.

K = The soil erodibility factor - K is the soil loss rate per erosion index unit for a specified soil as measured on a unit plot, which is defined as a 72.6-foot length of uniform 9 percent slope in clean tilled continuous fallow.

LS = The length-slope factor - LS is the ratio of soil loss per unit area from a given site to that from a unit plot having a 9 percent slope and 72.6-foot length.

C = The cover and management factor - C is the ratio of soil loss from an area with specified cover and management to that from an identical area in tilled continuous fallow.

P = The support practice factor - P is the ratio of soil loss with a farming support practice like contouring, strip cropping, or terracing to that with straight-row farming up and down the slope. Often, C and P will be combined into one factor (CP).

The values and sources for the specific terms of the USLE are presented below:

Determination of A - The product of the five factors representative of a unit areas of the site was computed and evaluated for the first year after closure and for subsequent years during the postclosure period.

Determination of R - The R value is based on the relationship presented in the *R-Zone* equation. Based on Figure 5.3 (Goldman et al., 1986), the landfill is within R-Zone IA.

Based on Figure 5.5 (Goldman et al., 1986), the R-Zone IA equation is:

$$R = 10.2\ D^{2.2}$$

Where: D = The precipitation depth for the 2-year return period, 6-hour duration precipitation event.

The 2-year, 6-hour precipitation depth for the site is 1.6 inches (Western Regional Climate Center).

Accordingly:

$$R = 10.2\ D^{2.2}$$
$$R = 10.2\ (1.6)^{2.2}$$
$$R = 28.69$$

Determination of K - The value of K was estimated based on particle size distribution of the silty, sandy soils which are predominant over the landfill site and throughout the proposed borrow areas. Assuming that the vegetative soil layer will be derived from these on-site soils, a K value of 0.3 was estimated for a silty sand using Figure 5.6 (Goldman et al., 1986).

Determination of C - The value for C for the postclosure period was estimated to be 0.02, which assumes a grassy cover will be established which covers 95% of the entire area (Gray and Leiser, 1982).

Determination of P - Since no erosion control practices are anticipated, a P value of 1.0 (SCS, 1985) was chosen, and represents a conservative USLE parameter value.

Determination of LS - The value of the length-slope factor (Goldman et al., 1986) was calculated from the equation:

$$LS = (L/72.6)^m [(430x^2 + 30x + 0.43)/6.613]$$

where L is slope length in feet, x is the sine of the slope angle, and m is 0.3, 0.4, or 0.5 for slopes less than 4 percent, slopes at 4 percent, and slopes greater than 4 percent, respectively.

III. RESULTS

Calculations and results of the soil loss analysis are presented in the attached calculation sheet. Soil loss from the closure of the landfill is estimated to be 1.50 tons per acre for the postclosure maintenance period for the 2-year, 6-hour storm. This is estimated to be less than U.S. EPA guidelines of 2.0 tons per acre using the parameters described in this analysis. Actual soil loss may be less as this does not account for soil deposition on concave slopes and within channels.

REFERENCES

Goldman, S.J., Jackson, K., and Bursytynsky, T.A., 1986, Erosion and Sediment Control Handbook, McGraw-Hill Book Co., New York.

Gray, D.H., and Leiser, A.T., 1982, Biotechnical Slope Protection and Erosion Control, Van Nostrand Reinhold Co., New York.

Department of Water Resources (DWR), Division of Planning. Rainfall Depth-Duration-Frequency for California, 1986; Revised November 1982; Long Duration-Frequency microfiche updated April 1983; Short Duration-Frequency microfiche updated August 1986.

United States Department of Agriculture, Soil Conservation Service, 1982, Plant Materials for Use on Surface-Mined Lands in Arid and Semiarid Regions.

United States Department of Agriculture, Soil Conservation Service (SCS), 1985, Guides for Erosion and Sediment Control in California. Revised February 1985.

United States Environmental Protection Agency (U.S. EPA), 1982, Draft Guidance Document: Landfill Design, Liner System, and Final Cover, July 1982.

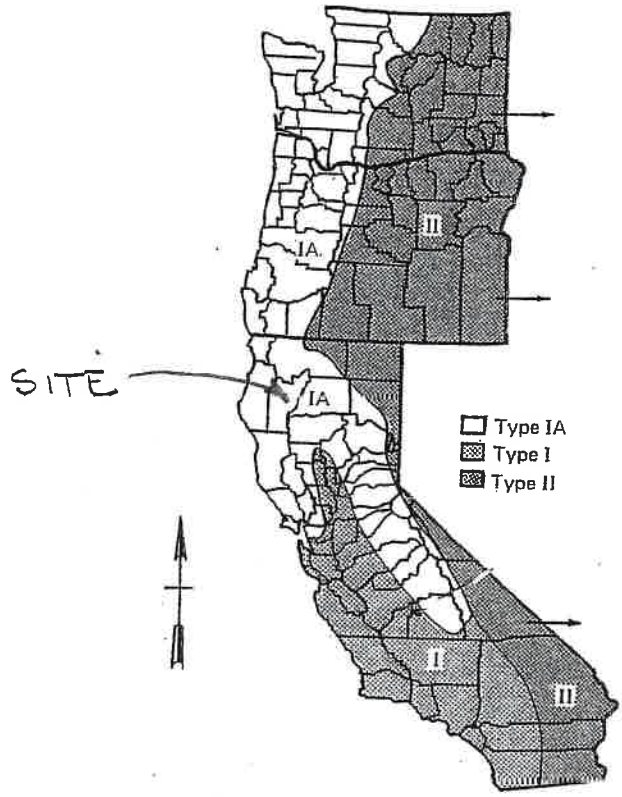


Fig. 5.3 Distribution of storm types in the western United States. (4) Type II storms occur in Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming also.

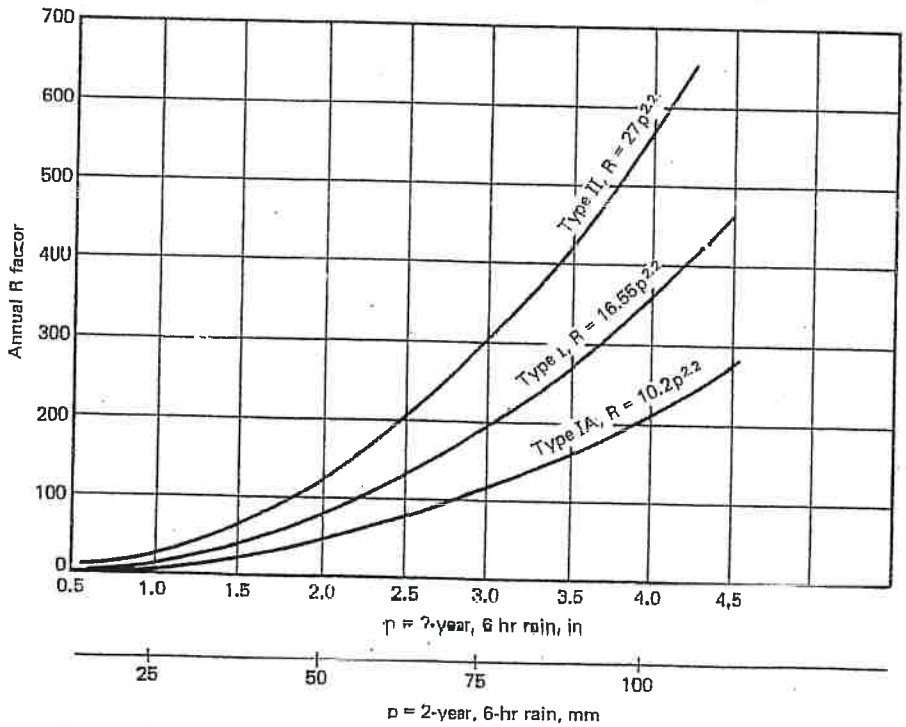


Fig. 5.5 Relations between average annual erosion index and 2 year, 6-hr rainfall in California. (14)

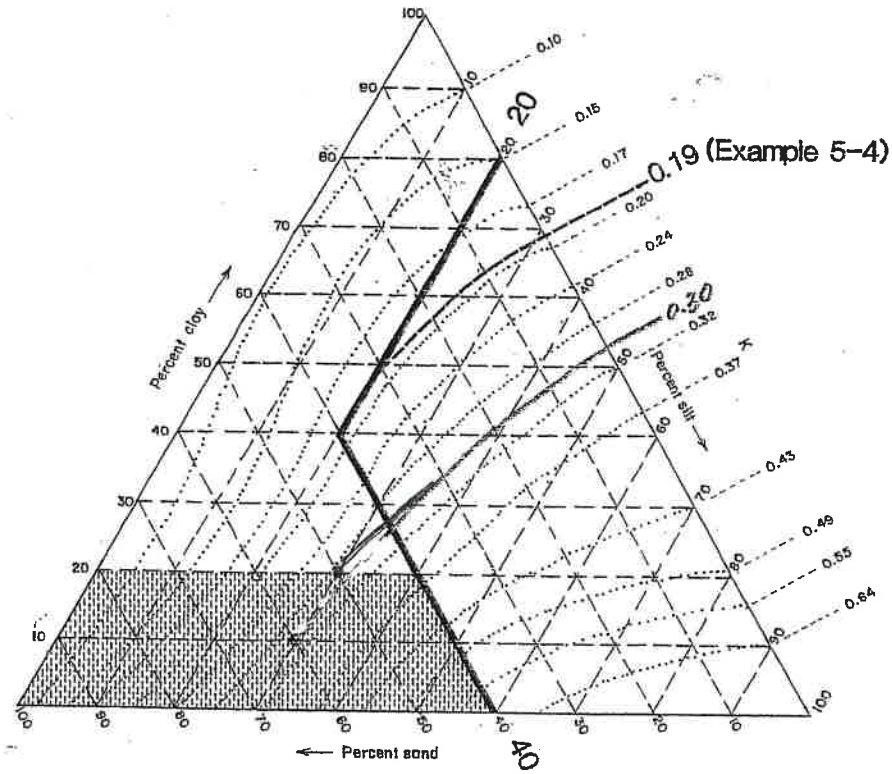


Fig. 5.6 Triangular nomograph for estimating K value. (6) See Table 5.3 for adjustments to K value under certain conditions.

TABLE F-1
SOIL LOSS ANALYSIS
FINAL CLOSURE EASTLAKE LANDFILL

Watershed	Area (acres)	Slope	Length (feet)	(1) m for LS	LS Factor	K Factor	Annual Soil Loss (Tons)
3:1 Area	29.50	0.33	125	0.5	10.33	0.30	52.45
3% Areas	5.50	0.02	30	0.3	0.14	0.30	0.13

Totals: 35.00 Acres 52.6 Tons

1.50 Tons/Acre

(1) for S<=3%, m=0.3; S=4%, m=0.4; S>=4%, m=0.5

CP factor = **0.020**

Assumes track walked up and down and established vegetation (Goldman et. Al,. 1986)

2-year, 6-hour precipitation = **1.60** in.

R (type IA) Factor = **28.69** ($R=10.2D^{2.2}$, Goldman et al., 1986)

Appendix I

Preliminary Closure and Postclosure Maintenance Cost Estimates

Environmental Consultants
and Contractors

7041 Koll Center Parkway
Suite 135
Pleasanton, CA 94566

925 426-0080
www.scsengineers.com

SCS ENGINEERS

April 27, 2017
File No. 01215154.02

MEMORANDUM

TO: Lars Ewing, Lake County Public Services Department

FROM: Alex Tuveson, EIT, SCS Engineers
Joseph Miller, PE, SCS Engineers

SUBJECT: Updated Closure and Post-Closure Maintenance Cost Estimates
Revised April 2017
Eastlake Sanitary Landfill (Solid Waste Facility No. 17-AA-0001)
Lake County, California

On behalf of the Lake County Public Services Department (County), SCS Engineers (SCS) has prepared Revised Updated Closure and Post-Closure Maintenance Cost Estimates (Revised Cost Estimates) for the Eastlake Sanitary Landfill, located in Clearlake, California. The Revised Cost Estimates are required by the Lake County Department of Health Services, the local enforcement agency (LEA) for landfill permitting and regulatory compliance, and the California Department of Resources Recycling and Recovery (CalRecycle). These Revised Cost Estimates address select comments provided by CalRecycle in a memorandum to the County dated January 23, 2017.

SCS previously submitted Updated Closure and Post-Closure Maintenance Cost Estimates in August 2015. CalRecycle subsequently sent a letter, dated September 15, 2016, requesting clarification and/or additional information related to some aspects of the August 2015 submittal. On behalf of the County, SCS submitted Revised Cost Estimates dated December 2016. CalRecycle subsequently requested additional information and corrections to the Revised December 2016 Cost Estimates. Responses to the January 23, 2017 CalRecycle technical items affecting closure and post-closure cost estimates are addressed herein. The County has independently addressed other previous comments in separate transmittals to CalRecycle and the LEA.

CLOSURE AND POST-CLOSURE COST ESTIMATES

Revised, updated closure and post-closure maintenance expenses for landfill closure were estimated by SCS in accordance with 27 CCR Title 27 §20950(f), §21790(b)(1), §21815, §21820(a), §21840, and §22207. The updated cost estimates are based on the following:

- EBA Engineering, "Preliminary Closure and Postclosure Maintenance Plan, Eastlake Sanitary Landfill, Lake County California", dated August 2005;

- Preliminary final closure design drawings prepared by EBA Engineering: "Preliminary Closure for Eastlake Sanitary Landfill, County of Lake, State of California" (6 Sheets), dated July 2005;

- Information on historic and current expenditures for landfill site maintenance, environmental controls and monitoring provided by the County;

- Independent vendor quotes for liner material installation including material costs and labor;

- Landfill industry unit costs and our experience with closure capital improvements and post-closure monitoring and maintenance. Where applicable, closure construction quantity take-offs were estimated from digitized versions of the preliminary closure design plans using AutoDesk Civil 3D software; and

- Responses to CalRecycle technical comments provided in correspondence to the County dated September 15, 2016 and January 23, 2017 (see below).

Closure cost estimates were prepared for the final closure of the 34.7-acre permitted area in accordance with the above-cited regulations. These regulations require an estimate, in current dollars of the cost of hiring a third party to close the landfill in accordance with the submitted and approved preliminary closure plan. To our knowledge, and except as noted below, the design and other closure provisions outlined in the above-referenced Preliminary Closure and Post-Closure Maintenance Plan, dated August 2005, remain valid.

Post-closure maintenance cost estimates were prepared in accordance with the applicable requirements above and applicable agency comments. The estimates reflect costs in current dollars for hiring a third party to inspect, monitor, and maintain the closed landfill and environmental control features.

Estimated capital expenses for landfill closure are summarized in **Table 1**. Estimated annual and 30-year total post-closure costs for third-party inspections, monitoring and maintenance are summarized in **Table 2**. Worksheets with detailed line-item closure and post-closure expenses are provided in **Attachment 1**. Our cost estimates account for operation, maintenance and monitoring for the landfill gas (LFG) collection and control system put into service in January 2014. Key underlying assumptions and other information used in preparing the cost estimates are also provided in **Attachment 1**.

The cost estimates reflect use of California prevailing wage labor rates as applicable (updated for 2016-17), and SCS's best engineering judgment based on our understanding of Site conditions. Labor costs reflecting prevailing wage were provided by the California Department of Industrial Labor Relations for laborers and equipment operators. Please note that California prevailing wage labor rates presented in the December 2016 Revised Cost Estimates are valid through June 25, 2017. As such, the hourly rates for laborers and equipment operators have not been modified from the December 2016 Revised Cost Estimates. Heavy equipment rates were taken from California Department of Transportation Labor Surcharge and Equipment Rental Rates. Heavy equipment

rates reflect the recently updated Caltrans Labor Surcharge and Equipment Rental Rates, effective April 1, 2017. These labor and equipment rates are shown in **Attachment 2**.

RESPONSES TO AGENCY COMMENTS

Technical comments received by CalRecycle in their January 23, 2017 memorandum that were addressed in the revised cost estimates by SCS are as follows:

Comment #1: The Plans indicate that one-foot intermediate cover is intended to serve as part of the required two-foot foundation layer, as a result, only an additional 12 inches of soil will need to be placed as a foundation layer

Please note that intermediate cover is not considered part of the final cover layer (Title 27, California Code of Regulations [27 CCR], section 60164). The closure cost estimate needs to include the cost for two-foot foundation layer. At the time for final (or partial) closure, the acceptability of a one-foot foundation layer will be re-evaluated.

Response to Comment #1. SCS has revised the costs to include the addition of one-foot of foundation layer soil cover (total thickness two feet). **Note that the existing Preliminary Closure and Post-Closure Maintenance Plan (EBA Engineering 2005), previously approved by CalRecycle, provides for a one-foot thick foundation soil layer in the final cover.** At the time of final (or partial) closure, or prior to that, the County may wish to petition for the acceptability of a one-foot foundation layer as previously recommended in the Preliminary Closure and Post-Closure Maintenance Plan prepared by EBA Engineering in 2005.

Comment #2: Surcharges, overhead and profit margins for labor, equipment, and material cost should be recalculated using the following methodology:

Labor	Prevailing Wage	Labor Surchage	Actual Wage	Overhead/Profit Margin	Total Labor Cost
Laborer	$44.33	0.12	$49.65	0.33	$66.03

Equipment	Unit Cost	Overhead/Profit Margin	Total Equipment Cost
Scraper	$292.71	0.15	$336.62

Material	Unit Cost	Overhead/Profit Margin	Total Material Cost
40-mil LLDPE Geomembrane	$0.55	0.15	$0.63

Response to Comment #2: SCS has revised the costs to include the labor surcharges and overhead/profit margins recommended by CalRecycle as shown above.

PROFESSIONAL CERTIFICATION

The undersigned, Joseph J. Miller, a Civil Engineer, Registration Number 042598, registered in the State of California pursuant to Section 6762 of the Business and Professions Code, hereby certifies that I have prepared initial cost estimates pursuant to Government Code Section 66796.22(b) pertaining to closure and post-closure maintenance for the Eastlake Sanitary Landfill located at 16015 Davis Avenue, Clearlake, in the County of Lake, California.

I certify (or declare) under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

27 April 2017
Pleasanton, CA

Date and Place

Signature

(Seal)

C.E. No. 042598

SCS Engineers
7041 Koll Center Parkway, Suite 135
Pleasanton, California 94566
Business Address

(925) 426-0080
Telephone Number

TABLE 1.
PRELIMINARY CLOSURE COSTS
EASTLAKE SANITARY LANDFILL

Item	Estimated Cost ($2017)
Pre-Field Activities	184,000
Final Cover	3,772,300
CQA – Soil and Liner Placement	235,500
Revegetation	90,500
Landfill Gas Monitoring and Control System	232,450
Leachate Control	N/A
Final Drainage	521,100
Engineering/Documentation	239,000
Sub-Total	**$5,274,900**
20% Contingency	$1,055,000
Total	**$6,329,900**

TABLE 2.
POST-CLOSURE MONITORING AND MAINTENANCE COSTS
EASTLAKE SANITARY LANDFILL

Item	Estimated Annual Cost ($2017)
Final Cover Maintenance	21,200
Drainage System Maintenance	15,600
Leachate Collection/Disposal	13,700
Landfill Gas Control and Monitoring	89,400
Inspections and Surveys	2,800
Water Quality Monitoring	78,200
Security	5,000
Annual Total	**$225,900**
30-Year Total	**$6,777,000**

ATTACHMENT 1

REVISED CLOSURE AND POST-CLOSURE COST ESTIMATE WORKSHEETS

EASTLAKE SANITARY LANDFILL

Preliminary Closure Cost Estimates - Eastlake Sanitary Landfill
27-Apr-17

SCS ENGINEERS

Item	Description	Unit	Unit Cost	Quantity		Cost	
1	**Pre-Field Activities**					**$**	**184,000**
1a	Mobilization and Demobilization	LS	170,000.00	1	$ 170,000		
1b	Surveying	LS	14,000.00	1	$ 14,000		
2	**Final Cover**					**$**	**3,772,300**
2a	Rough Grading, Scarifing, and Recompaction	AC	3,810	36.2	$ 138,000		
2b	Foundation Layer (1 ft)	AC	6,540	36.2	$ 236,800		
2c	GCL	SF	0.80	588,600	$ 470,900		
2d	60-mil HDPE	SF	0.75	1,578,200	$ 1,183,700		
2e	Geo-composite drain layer	SF	0.70	1,578,200	$ 1,104,740		
2f	Erosion Layer (2.0 ft)	CY	4.48	116,900	$ 523,700		
2g	Gravel all-weather bench roads	SF	1.46	78,500	$ 114,500		
3	**CQA - Soil and Liner Placement**					**$**	**235,500**
3a	Geotechnical Inspection and Testing	LS	45,500.00	1	$ 45,500		
3b	Conformance tests - GCL	LS	2,200.00	1	$ 2,200		
3c	Conformance tests - HDPE	LS	7,200.00	1	$ 7,200		
3d	Conformance tests - geocomposite	LS	9,600.00	1	$ 9,600		
3e	Field CQA Inspector	Day	1,560.00	100	$ 156,000		
3f	CQA Report	EA	15,000.00	1	$ 15,000		
4	**Revegetation - hydroseeding**	AC	2,500.00	36.2	$ 90,500	**$**	**90,500**
5	**Landfill Gas Monitoring and Control System**					**$**	**232,450**
5a	Replacement Gas Extraction Wells	LF	96.30	1050	$ 101,100		
5b	Install header pipe	LF	22.30	4,500	$ 100,350		
5c	Engineering and permitting	LS	31,000.00	1	$ 31,000		

Item	Description	Unit	Unit Cost	Quantity		Cost	
6	**Leachate Control**					**$**	**-**
6a	Replacement Leachate Extraction Wells	N/A	0.00	0	$ -		
6b	Piping	N/A	0.00	0	$ -		
7	**Final Drainage**					**$**	**521,100**
7a	Drop Inlet Structures	EA	4,500.00	14	$ 63,000		
7b	CMP Downchutes	LF	45.00	1,900	$ 85,500		
7c	Bench V-ditch w/ erosion mat Typ I & II	LF	25.00	8,400	$ 210,000		
7d	Lined Trapezoidal Ditch	LF	35.00	2,800	$ 98,000		
7e	CMP Culvert	LF	85.00	520	$ 44,200		
7f	Grouted Rock Inlets/Outfalls	EA	1,700.00	12	$ 20,400		
8	**Engineering/Documentation**					**$**	**239,000**
8a	Final Closure Plan and CQA Documents	LS	75,000.00	1	$ 75,000		
8b	Design Plans and Specifications	LS	150,000.00	1	$ 150,000		
8c	Final Survey - Aerial Topo	LS	14,000.00	1	$ 14,000		
	SUBTOTAL					**$**	**5,274,900**
	20% CONTINGENCY					**$**	**1,055,000**
	TOTAL					**$**	**6,329,900**

Preliminary Post-Closure Cost Estimates - Eastlake Sanitary Landfill
27-Apr-17

SCS ENGINEERS

Item		Unit	Unit Cost	Quantity		Cost		
1	**Final Cover Maintenance**						**$**	**21,200**
1a	Inspect Final Cover	YR	1,250	2	$	2,500		
1b	Final Cover Maintenance (Erosion Layer)	AC-YR	160	36.2	$	5,800		
1c	Liner Repairs	YR	12,900	1	$	12,900		
2	**Drainage System Maintenance**						**$**	**15,600**
2a	Inspect Drainage System	YR	1,250	2	$	2,500		
2b	Drainage System Repairs	YR	8,900	1	$	8,900		
2c	Sedimentation Basin Cleanouts	YR	4,200	1	$	4,200		
3	**Leachate Collection/Disposal**						**$**	**13,700**
3a	Leachate Disposal	$-GAL	0.009	1,460,000	$	13,200		
3b	Leachate System Maintenance	YR	15,000	1/30	$	500		
4	**Landfill Gas Control and Monitoring**						**$**	**89,400**
4a	LFG System Operation and Maintenance	MO	4,600	12	$	55,200		
4b	LFG Probe Monitoring/Sampling	QTR	incl above	4	$	-		
4c	Air Quality Monitoring/Reporting (incl source test)	YR	20,500	1	$	20,500		
4d	Blower/flare replacement (1x)	YR	352,000	1/30	$	11,700		
4e	Monitoring Well Repairs/Replacements	YR	60,000	1/30	$	2,000		
5	**Inspections and Surveys**						**$**	**2,800**
5a	Inspection and repairs	YR	incl. above	2	$	-		
5b	Aerial Topo and Survey (5 year interval)	YR	14,000	1/5	$	2,800		

6	**Water Quality Monitoring**						**$**	**78,200**
6a	Water Quality Monitoring/Reporting	YR	49,000	1	$	49,000		
6b	Agency Permit Fees - WDRs	YR	22,000	1	$	22,000		
6c	Monitoring Well Repairs/Replacements	YR	215,000	1/30	$	7,200		
7	**Security**	YR	5,000.00	1	$	5,000	**$**	**5,000**
	SUBTOTAL ANNUAL COST						**$**	**225,900**
	TOTAL 30-YEAR COST						**$**	**6,777,000**

General Site Information

Facility Name:	Eastlake Sanitary Landfill
Solid Waste Facility Permit:	17-AA-0001
Facility Owner/Operator:	Lake County Public Services Department
Site Address:	16015 Davis Avenue, Clearlake, CA

Closure Costs

Item **Comment/Assumptions**

General

Closure area - 34.7 acres (plan); 36.2 acres (slope). This includes both Area 1 (unlined waste management unit, or WMU) and Area 2, a lined unit.

An alternative final cover system was previously proposed in the Preliminary Closure and Post-Closure Maintenance Plan (EBA Engineering, 2005) to meet the prescriptive standards in 27 CCR Section 21090(a). **A one-foot thick foundation soil layer was approved by oversight agencies. The cover configuration shown below consists of the two-foot foundation layer requested by CalRecycle in their letter dated January 23, 2017. At the time for final (or partial) closure, the acceptability of a a one-foot foundation layer will be re-evaluated by the County.** The cover configuration shown below is presented to meet the requirements for the hydraulic conductivity layer to mimic that in the underlying base liners for Areas 1 and 2, respectively.

Cover Feature	**Landfill Area 1**	**Landfill Area 2**
WMU area footprint (plan):	22.4 acres	12.3 acres
Cover area (slope):	23.4 acres 1,019,600 sq ft	12.8 acres 558,600 sq ft
Foundation Layer:	2-ft thick compacted soil (CalRecycle 1-23-17) 1-ft thick compacted soil (approved Plan 2005)	2-ft thick compacted soil (CalRecycle 1-23-17) 1-ft thick compacted soil (approved Plan 2005)
Low-hydraulic conductivity layer:	60-mil HDPE geomembrane Geonet drainage layer	GCL 60-mil HDPE geomembrane Geonet drainage layer
Erosion resistant Layer:	2-ft thick compacted soil	2-ft thick compacted soil

Labor costs reflect prevailing wage; data provided by the California Department of Industrial Relations for laborers and operators for Group 3, Area 2 (www.dir.ca.gov/dlsr/pwd/index.htm). Machinery and Equipment rates are from California Department of Transportation (CalTrans), Division of Construction "Labor Surcharge and Equipment Rental Rates, effective April 1, 2017 through March 31, 2018.

Existing landfill security provisions include a locking swing gate at the site entrance, perimeter fencing, and fencing around the leachate pond (surface impoundment). Additional security measures will not be required at the time of closure. This is consistent with the currently-approved Preliminary Closure and Post-Closure Maintenance Plan (EBA Engineering, 2005).

The existing perimeter landfill gas (LFG) migration monitoring system is in compliance with 27 CCR 21090 requirements and installation of additional or replacement monitoring wells will not be required at the time of closure.

A water quality monitoring program is in effect with site Waste Discharge Requirements (WDRs) and Monitoring and Reporting Program R5-2006-0108, as administered by the Central Valley Regional Water Quality Control Board (RWQCB). There are 16 groundwater monitoring wells used in the site monitoring program. It is assumed that new or replacement wells will be installed as part of current landfill operations, in response to RWQCB requirements, and that no new installations will be required at the time of closure. This is consistent with the currently-approved Preliminary Closure and Post-Closure Maintenance Plan (EBA, 2005).

Existing structures will be left in place at closure, including the hazmat and maintenance buildings, LFG flare, and scalehouse. Structure removal will not be required. This is consistent with the currently-approved Preliminary Closure and Post-Closure Maintenance Plan (EBA, 2005).

SCS experience with similar projects refers to recently completed projects (within last 5 years) where SCS acted as engineer, performed CQA monitoring, and/or was the project contractor or sub-contractor.

1a **Mobilization and Demobilization**. Unit cost based on 3.5% of capital cost for closure improvements. Includes performance and maintenance bonds, equipment and material deliveries, admin, purchasing, schedules, coordination, office trailer, health and safety, and sanitary facilities and water services.

1b **Surveying**. Initial aerial surveying includes pre-flight ground control surveying and staking, aerial survey, photogrammetry and generation of AutoCAD topographic survey figure(s). Aerial survey cost of $14,000 based on actual subcontractor fee for November 2014 surveying project at Eastlake Landfill.

2a **Rough Grading and Recompaction.** Final grading with prevailing wage labor, dozer, scraper, water truck and compactor type equipment. Clearing, grubbing, stripping, and finish grading completed at $0.09/square foot ($3,810/acre).

	No.	Hourly Rate	Hours/day	Labor Surcharge	Overhead Profit Margin		$/day
Prevaling wage laborer	4	$50.24	8	1.12	1.33	$	2,394.80
Prevailing wage operator	8	$72.09	8	1.12	1.33	$	6,872.66
Caterpillar 623B Scraper	2	$142.23	8	1	1.15	$	2,617.03
John Deer 650G Dozer	2	$42.28	8	1	1.15	$	777.95
2,000 gallon Water Truck	2	$25.30	8	1	1.15	$	465.52
Bomag K300 Compactor	2	$64.49	8	1	1.15	$	1,186.62
Subtotal, labor and equipment:						$	14,314.58
Fuel 40 gal/unit-day x		8	$ 2.85	gal =		$	912.00
Total:						$	15,226.58
Closure area, acres:				36.2			
Crew productivity, ac / day:				4			
Number of work days:				9			
Total Cost, Rough Grading (rounded 00):						$	137,800
Unit cost for rough grading (rounded 0):				$ 3,810.00	$/ac		

2b **Foundation Layer.** Placement of an additional 12 inches of final soil cover to be installed. Soil to be obtained from on-Site borrow pit area. Foundation Layer soil placement and grading with prevailing wage labor, dozer, scraper, water truck and compactor type equipment. Soil removal from borrow pit, soil placement, compaction, and finish grading completed at $0.15/square foot ($6,540/acre).

	No.	Hourly Rate	Hours/day	Labor Surcharge	Overhead Profit Margin		$/day
Prevaling wage laborer	6	$50.24	8	1.12	1.33	$	3,592.20
Prevailing wage operator	9	$72.09	8	1.12	1.33	$	7,731.74
Caterpillar 623B Scraper	4	$142.23	8	1	1.15	$	5,234.06
John Deer 650G Dozer	1	$42.48	8	1	1.15	$	390.82
2,000 gallon Water Truck	2	$25.30	8	1	1.15	$	465.52
Bomag K300 Compactor	2	$64.49	8	1	1.15	$	1,186.62
Subtotal, labor and equipment:						$	18,600.96
Fuel 40 gal/unit-day x		9	$ 2.85	gal =		$	1,026.00
Total:						$	19,626.96
Closure area, acres:				36.2			
Crew productivity, ac / day:				3			
Number of work days:				12			
Total Cost, Foundation Layer (rounded 00):						$	236,800
Unit cost for foundation layer (rounded 0):				$ 6,540.00	$/ac		

2c **GCL Layer**. Install GCL layer in Landfill Area 2 only. Includes prevailing wage labor, materials and equipment for liner placement and anchor trench. Area estimated via AutoCAD take-off from final grading plan. Unit cost for GCL purchase, delivery, tax and installation based on estimate provided by Sierra Geosynthetic Services, Inc. (SGS) of Sparks, Nevada on December 22, 2016. Cost includes Overhead/Profit Margin of 15% requested by CalRecycle. Unit cost provided of $0.78 per square foot rounded to $0.80 to be conservative.

2d **60-mil HDPE Membrane**. Install synthetic membrane (HDPE) in Landfill Area 1 and 2. Includes prevailing wage labor, materials and equipment for liner placement and anchor trench. Area estimated via AutoCAD take-off from final grading plan. Unit cost for HDPE purchase, delivery, tax and installation based estimate provided by SGS on December 22, 2016. Cost includes Overhead/Profit Margin of 15% requested by CalRecycle. Unit cost provided of $0.72 per square foot rounded to $0.75 to be conservative.

2e **Geocomposite Drain Layer**. Install geocomposite drain net in Landfill Area 1 and 2. Includes prevailing wage labor, materials and equipment for placement. Area estimated via AutoCAD take-off from final grading plan. Unit cost for drain net purchase, delivery and installation based on estimate provided by SGS on December 22, 2016. Cost includes Overhead/Profit Margin of 15% requested by CalRecycle. Unit cost provided of $0.68 per square foot rounded to $0.70 to be conservative.

2f **Erosion-resistant (Vegetative) Layer**. Install in Landfill Area 1 and 2. Assume prevailing wage labor, dozer, scraper, water truck and compactor type equipment. Area estimated via AutoCAD take-off from final grading plan. Final cover profile includes 2.0 foot thick soil layer. Unit cost is for placement, grading and compaction of previously-stockpiled soils. Productivity for erosion resistant soil placement projected at 3,400 cu yd/day, for 34 day construction project (85% compaction).

	No.	Hourly Rate	Hours/day	Labor Surcharge	Overhead Profit Margin		$/day
Prevaling wage laborer	4	$50.24	8	1.12	1.33	$	2,394.80
Prevailing wage operator	8	$72.09	8	1.12	1.33	$	6,872.66
Caterpillar 623B Scraper	2	$142.23	8	1	1.15	$	2,617.03
John Deer 650G Dozer	2	$42.48	8	1	1.15	$	781.63
2,000 gallon Water Truck	2	$25.30	8	1	1.15	$	465.52
Bomag K300 Compactor	2	$64.49	8	1	1.15	$	1,186.62
Subtotal, labor and equipment:						$	14,318.26
Fuel 40 gal/unit-day x		8	$ 2.85 gal =			$	912.00
Total:						$	15,230.26
Erosion layer volume, cu yd:				116,900			
Crew productivity, cu yd / day:				3,400			
Number of work days:				34.4			
Total Cost, Erosion Resistant Layer (rounded 00):						$	523,700
Unit cost for erosion resistant soil layer placement:				$ 4.48 $/cu yd			

2g

Gravel All-Weather Bench Roads. Install aggregate road surface using prevailing wage labor, compactor, motor grader, and water truck. Bench length determined via take-off from final grading plan. Estimated for placement as all-weather road base at 15-feet wide and 0.5-feet thick, including reinforcement geotextile. Gravel purchase, delivery and placement cost based on SCS experience with recent similar projects at Eastlake Landfill.

Labor/Equipment	No.	Hourly Rate	Hours/day	Labor Surcharge	Overhead Profit Margin		$/day
Prevaling wage laborer	2	$50.24	8	1.12	1.33	$	1,197.40
Prevailing wage operator	3	$72.09	8	1.12	1.33	$	2,577.25
Caterpillar 14H Grader	1	$111.44	8	1	1.15	$	1,025.25
John Deer 650G Dozer	0	$42.48	8	1	1.15	$	-
2,000 gallon Water Truck	1	$25.30	8	1	1.15	$	232.76
Bomag K300 Compactor	1	$64.49	8	1	1.15	$	593.31
Subtotal, labor and equipment:						$	5,625.96
Fuel	40 gal/unit-day x	3	$ 2.85 /gal =			$	342.00
Total:						$	5,967.96 /day
Gravel road area, sq ft:				78,500			
Crew productivity, sq ft / day:				40,000			
Number of work days:				2			
Subtotal extended cost, labor and equipment (rounded, 00):						$	11,700.00

Other Costs	Unit	Quantity	Unit Cost	Overhead Profit Margin		
Reinforcement geotextile	Sq Ft	78,500	$ 0.40	1.15	$	36,110
Class II AB gravel	Cu Yd	1,450	$ 40.00	1.15	$	66,700
Subtotal, materials:					$	102,810
Total cost, bench road palcement (rounded, 00):					$	114,500
Unit cost for bench road placement:			$ 1.46	$/sq ft		

3 **Construction Quality Assurance (CQA)**. Unit cost includes CQA inspections, as well as field and laboratory testing for soils and geosynthetics (prevailing wage). Unit cost based on SCS experience performing CQA with similar projects with similar testing requirements. Assume 5-month (100-day) schedule for landfill cover construction.

3a **Geotechnical Inspection and Testing (soil)**. Assume perform classificaiton, moisture, compaction, particle size and plasticity tests for foundation and vegetation layer soil cover components, at frequencies as specified below. Unit cost for lab work based on geotechnical lab rate sheets from SCS Engineers experience with similar projects, for uniform foundation/veg soils from on-site borrow source.

Foundation layer volume: 58,450 sq ft (1-ft layer in place at time of closure)

Foundation layer area: 1,578,200 sq ft

Erosion (vegetation) layer volume: 116,900 cu yd

Test Method	Test Frequency (1x per unit)	Unit	Quantity	Unit Cost	Extended Cost
Soil Borrow Characterization					
Moisture ASTM D2216	50,000	Cu yd	4	$ 20.00	$ 80.00
Particle Size ASTM D422	50,000	Cu yd	4	$ 105.00	$ 420.00
Atteberg Limits ASTM D4318	50,000	Cu yd	4	$ 230.00	$ 920.00
Classification D2487	50,000	Cu yd	4	$ 25.00	$ 100.00
Moisture Density D1557	50,000	Cu yd	4	$ 255.00	$ 1,020.00
Foundation Layer					
Moisture ASTM D2216	1	Day	25	$ 255.00	$ 6,375.00
Nuclear Density ASTM 6938	2	Day	47	$ 115.00	$ 5,405.00
Erosion Layer					
Moisture ASTM D2216	5,000	Cu yd	36	$ 255.00	$ 9,180.00
Nuclear Density ASTM 6938	1,000	Cu yd	176	$ 125.00	$ 22,000.00
Total Soil Testing (rounded, 00):					$ 45,500.00

Unit cost for soil testing: $ 0.26 $/cu yd

3b **Conformance Tests (GCL)**. Conformance test frequency and unit costs based on SCS Engineers experience with similar projects, at frequencies as described below. Unit costs for lab work based on geosynthetics test lab rate sheet for landfill liner installation project.

Foundation/ GCL Layer area: 588,600 sq ft

Test Method	Test Frequency (1x per unit)	Unit	Quantity	Unit Cost	Extended Cost
Swell Index ASTM D5890	100,000	Sq ft	6	$ 75.00	$ 450.00
Mass/Area ASTM D5261	50,000	Sq ft	12	$ 30.00	$ 360.00
Peel ASTM D6496	100,000	Sq ft	6	$ 50.00	$ 300.00
Index Flux - Permeability ASTM D5887	100,000	Sq ft	6	$ 180.00	$ 1,080.00
Total GCL Conformance Testing (rounded, 00):					$ 2,200.00

Unit cost for GCL testing: $ 0.004 $/sq ft

3c **Conformance Tests - HDPE**. Conformance test frequency and unit costs based on SCS Engineers experience with similar projects, at frequencies as described below. Unit costs for lab work based on geosynthetics test lab rate sheet for landfill liner installation project.

Foundation/ HDPE Layer area: 1,578,200 sq ft

Test Method	Test Frequency (1x per unit)	Unit	Quantity	Unit Cost	Extended Cost
Density ASTM D792	100,000	Sq ft	16	$ 30.00	$ 480.00
Carbon Black ASTM D1603	100,000	Sq ft	16	$ 35.00	$ 560.00
Thickness ASTM D1593	100,000	Sq ft	16	$ 30.00	$ 480.00
Tensile Strength ASTM D638	100,000	Sq ft	16	$ 45.00	$ 720.00
Destructive Test Peel/Shear	500	Lin Ft Seam	150	$ 25.00	$ 3,750.00
Shipping	1	Day	50	$ 25.00	$ 1,250.00
Total HDPE Conformance Testing (rounded, 00):					$ 7,200.00
Unit cost for HDPE testing:				$ 0.005	$/sq ft

3d **Conformance Tests - Geocomposite**. Conformance test frequency and unit costs based on SCS Engineers experience with similar projects, at frequencies as described below. Unit costs for lab work based on geosynthetics test lab rate sheet for landfill liner installation project.

Foundation/ Geonet Layer area: 1,578,200 sq ft

Test Method	Test Frequency (1x per unit)	Unit	Quantity	Unit Cost	Extended Cost
Tensile Properties ASTM D638	50,000	Sq ft	32	$ 45.00	$ 1,440.00
Puncture Resistance ASTM D3738	50,000	Sq ft	32	$ 40.00	$ 1,280.00
Thickness ASTM D1777	50,000	Sq ft	32	$ 10.00	$ 320.00
Permeability ASTM D5887	50,000	Sq ft	32	$ 180.00	$ 5,760.00
Weight ASTM D3776	50,000	Sq ft	32	$ 25.00	$ 800.00
Total Geocomposite Conformance Testing (rounded, 00):					$ 9,600.00
Unit cost for HDPE testing:				$ 0.006	$/sq ft

3e **Field CQA Inspector**. Assume 35-acre closure project requires 5-month (100 day) schedule, per the Preliminary Closure and Post Clousre Maintenance Plan (EBA, 2005). Daily cost for CQA inspector and incidentals estimated as follows:

	Unit	Quantity	Unit Cost	$/day
Field Technician	Hr	10	$ 125.00	$ 1,250.00
CQA Officer	Hr	0.5	$ 225.00	$ 112.50
Per Diem	Day	1	$ 125.00	$ 125.00
Vehicle	Day	1	$ 75.00	$ 75.00
Total Daily Cost (rouned, 0):				$ 1,560.00

3f **CQA Report**. Assume 1 capital project, with 1 close-out report at $15,000 each.

4 **Revegetation - Hydroseed**. Work to include hydromulch, seed, using prevailing wage labor and equipment. Unit cost based on recent contractor bids for hydroseed construction services at California landfills.

5a **LFG Extraction Wells**. The existing LFG system was constructed in 2014 and consists of 21 vertical extraction wells, and 9 horizontal collectors, for a 35-acre landfill footprint area. Assume 14 new vertical extraction wells will be installed in the "top deck" areas at closure (replacing horzontal collectors) to provide coverage of 1 well/acre. Average well depth assumed at 75 feet. Unit costs based on contractor bid for 2014 LFG system installation project at Eastlake Landfill, and reflect prevailing wage labor rates. Costs include drilling, materials, and labor.

		Unit	Quantity	Unit Cost	Extended Cost
Contractor mobilization/surveys		EA	1	$ 7,500.00	$ 7,500
LFG extraction wells @ 75 feet deep	14	LF	1050	$ 75.00	$ 78,750
Drilling refusal @ 10%		LF	105	$ 75.00	$ 7,875
Accu-flow LFG wellheads		EA	14	$ 500.00	$ 7,000
Total LFG Well Replacements (rounded, 00):					$ 101,100
Unit cost for LFG Well Replacements:				$ 96.30 $/lin ft	

5b **Gas Header / Related Improvements**. Assume above-grade LFG header and lateral piping, 4- to 6-inch diameter, to be installed in 15-acre "top deck" area at closure. Existing main header system (8-inch diameter) and condensate handling system were designed/sized to accomodate LFG system at full-build out and improvements to these components will not be required. Unit costs based on contractor bid for 2014 LFG system installation project at Eastlake Landfill, and reflect prevailing wage labor rates. Per acre quantities for LFG piping based on SCS Engineers experience with LFG design.

	Quantity Per Acre	Unit	Quantity	Unit Cost	Extended Cost
Contractor mobilization/surveys	incl. above	0	0	$ -	$ -
Above grade LFG piping, 4- to 6-inch dia	300	LF	4,500	$ 14.00	$ 63,000
Road crossings	1/10	EA	2	$ 18,000.00	$ 36,000
Header/lateral control valves	1/10	EA	2	$ 750.00	$ 1,500
Total LFG Piping (rounded, 00):					$ 100,500
Unit cost for LFG Piping:				$ 22.30 $/lin ft	

5c **Engineering and Permitting**. Cost based on SCS experience with similar projects for LFG control systems. Typical costs for engineering and permitting are estimated at 15% of project subtotal cost.

6a,b	**Leachate Control**. Not applicable. Existing Area 1 and Area 2 WMUs were constructed with a leachate collection and removal system (LCRS) at the respective unit base grades. Leachate from LCRS piping gravity-drains to an existing 600,000 gallon Class II surface impoundment (pond). Accumulated liquids are in turn discharged to the sanitary sewer system that drains to the Southeast Regional Wastewater Treatment Plant. There are no existing leachate extraction wells or force-main piping system(s). The LCRS piping and Class II surface impoundment are maintained as part of ongoing site operations, and no new capital improvements to these facilities are proposed as part of landfill closure. This is consistent with conditions described in the Preliminary Closure and Post-Closure Maintenance Plan (EBA, 2005).
7a	**Drainage - Drop Inlet Structures/Manholes**. Number of inlet structures determined from final grading and drainage plan drawing (Lake County RDSI, Drawing 7, September 2008). Unit cost based on industry data and contractor bid for similar and recently completed landfill improvement projects. Cost includes operation of equipment and labor for installation.
7b	**Drainage - Downdrains/Downchutes**. Lengths determined via take off from final grading and drainage plan (Lake County RDSI, 2008). Downdrain details from EBA 2005, Drawing 5. Installation cost includes prevailing wage labor, materials and equipment. Preliminary design provides for CMP or HDPE downdrains with discharge to v-ditches. Cost based on vendor quotes for materials and labor for installation on similar projects.
7c	**Drainage - Bench V-Ditches**. Construction of bench v-ditches including prevailing wage labor, equipment, and materials. Assume earthen v-ditch with erosion control mat on all landfill bench roads. V-ditch length determined via AutoCAD take off from final grading plan. Unit cost based on average cost for Type I and Type II v-ditch construction based on industry data and contractor bid for similar and recently completed landfill improvement projects.
7d	**Drainage - Concrete-Lined Trapezoidal Ditch**. Lengths determined via take-off from final grading and drainage plan (Lake County RDSI, 2008). Concrete perimeter ditch details from EBA 2005. New concrete-lined trapezoidal ditch to be installed around west, northern and northeastern fill perimeter. Unit cost based on average cost for Type I and Type II v-ditch construction based on industry data and contractor bid for similar and recently completed landfill improvement projects.
7e	**Drainage - CMP Culvert**. Lengths determined via take off from final grading and drainage plan (Lake County RDSI, 2008). Installation cost includes prevailing wage labor, materials and equipment. Preliminary design provides for CMP or HDPE downdrains with discharge to v-ditches. Cost based on vendor quotes for materials and labor for installation on similar projects.
7f	**Drainage - Grouted Rock Inlets/Outfall**. Number determined from final grading and drainage plan drawing (Lake County RDSI, Drawing 7, September 2008). Details on outfalls from EBA 2005, Sheet 5. Unit cost based on industry data and contractor bid for similar and recently completed landfill improvement projects. Cost includes operation of equipment and labor for installation.
8a	**Documentation**. Prepare final closure plan and CQA documents. Assume 1 capital project.
8b	**Design Plans and Specifications** (construction documents). Engineering fees based on SCS experience with similar projects. Typical fees based on percentage of project cost of 2% - 4% based on size of project.
8c	**Aerial Survey**. Includes pre-flight ground control surveying, aerial survey, photogrammetry and generation of final survey figure(s). Aerial survey cost of $14,000 based on actual subcontractor fee for November 2014 surveying project at Eastlake Landfill.

Post-Closure Maintenance Costs

Item **Comment/Assumptions**

1 **Final Cover Maintenance**. The post-closure land use for the Eastlake Landfill is Open Space. The Landfill to be seeded with native grasses and no irrigation system is planned.

1a **Final Cover Inspections**. The final cover will be inspected on a semi-annual basis with reports issued to Lake County and summarized in Semi-Annual Self Monitoring Report to RWQCB. Cost for inspection and reporting estimated at $1,250/event. Work performed concurrent with Item 2.a below. Cost includes one person to complete one day of inspection activities. Excludes liner repairs.

1b **Cover Maintenance - Erosion Layer**. Final grading area is 36.2 acres (slope area). Assume expenses for minor repairs (regrading and replacement of vegetative soil cover), fertilizing and hydroseed. Annual cost estiimated as follows based on SCS experience for similar size projects. Assume one project every 2 years.

Labor/Equipment	Hourly Rate	Hours/yr	Labor Surcharge	Overhead Profit Margin		Extended Cost
Prevaling wage laborer	$50.24	16	1.12	1.33	$	1,197.40
Prevailing wage operator	$72.09	16	1.12	1.33	$	1,718.16
Prevailing wage foreman	$93.13	8	1.12	1.33	$	1,109.81
Dozer (Cat D6H LGP or equal)	$75.61	16	1	1.15	$	1,391.22
2,000 gallon Water Truck	$25.30	16	1	1.15	$	465.52

Materials	Quantity	Unit	Unit Cost		Extended Cost
Hydroseed and erosion control (5% of site area)	2	Acre	$ 2,500.00	$	5,000.00
Fuel (40 gal/unit-day)	160	Gal	$ 2.85	$	456.00
Total cover maintenance(rounded 00):				$	11,300

Unit cost for cover maintenance:	$ 160.00	/ac-year

1c **Liner Repairs**. Assume 6 capital projects over 30 year maintenance period (once per 5 years). Liner repairs assumed to be approximately 0.5 acre each. Repair cost for foundation soil, 60-mil HDPE, GCL, geocomposite drain layer and vegetative layer placement as listed under "Item 2" in Closure Cost Estimate. Costs below for each capital project.

Labor/Equipment	Hourly Rate	Hours/event	Labor Surcharge	Overhead Profit Margin		Extended Cost
Prevaling wage laborer	$50.24	80	1.12	1.33	$	5,987.00
Prevailing wage operator	$72.09	60	1.12	1.33	$	6,443.12
Prevailing wage foreman	$93.13	40	1.12	1.33	$	5,549.06
Compactor (Bomag K300 or equal)	$64.49	24	1	1.15	$	1,779.92
Dozer (Cat D6H LGP or equal)	$75.61	24	1	1.15	$	2,086.84
2,000 gallon Water Truck	$25.30	40	1	1.15	$	1,163.80

Materials	Quantity	Unit	Unit Cost		Extended Cost
GCL (Area 2 only)	10,890	Sq ft	$ 0.80	$	8,712.00
60-mil HDPE	21,780	Sq ft	$ 0.75	$	16,335.00
Geo-composite drain net	21,780	Sq ft	$ 0.70	$	15,246.00
Fuel (40 gal/unit-day)	440	Gal	$ 2.85	$	1,254.00
Total liner repair (rounded 00):				$	64,600 /event

Unit cost for liner repair (rounded 00):	$ 12,900.00	/year

2a **Drainage System Inspection**. The drainage system will be inspected on a semi-annual basis with any reports issued to Lake County. Cost for inspection and reporting estimated at $1,250/event. Work performed concurrent with item 1a above. Cost includes one person and necessary equipment to complete one day of inspection activities.

2b **Drainage System Maintenance & Repairs.** Assume maintenance to include removal of silt and debris from drainage structures, maintaining connections and anchors of down drains, and re-vegetation of grass-lined ditches. Use loader, dump truck and operator(s), with ditch spoils re-used on-site. Annual cost is estimated as follows.

Labor/Equipment	Hourly Rate	Hours/Year	Labor Surcharge	Overhead Profit Margin		Extended Cost
Prevaling wage laborer	$50.24	24	1.12	1.33	$	1,796.10
Prevailing wage operator	$72.09	24	1.12	1.33	$	2,577.25
Prevailing wage foreman	$93.13	8	1.12	1.33	$	1,109.81
Loader (John Deere 644B or equal):	$68.06	24	1	1.15	$	1,878.46
Haul truck 20,000 GVW	$25.30	24	1	1.15	$	698.28

Materials	Quantity	Unit	Unit Cost		Extended Cost
Miscellaneous materials	1	LS	$ 500.00	$	500.00
Fuel (20 gal/unit-day)	120	Gal	$ 2.85	$	342.00

Total drainage system maintenance (rounded 00):	$	8,900	/year

2c **Sedimentation Basin Maintenance/Clean-Outs**. There are two existing basins, which will remain utilized during the post-closure period. Both basins will be cleaned out every two years. Use loader, dump truck and operator(s), with basin spoils re-used on-site. Per event cost is estimated as follows.

Labor/Equipment	Hourly Rate	Hours/event	Labor Surcharge	Overhead Profit Margin		Extended Cost
Prevaling wage laborer	$50.24	24	1.12	1.33	$	1,796.10
Prevailing wage operator	$72.09	24	1.12	1.33	$	2,577.25
Prevailing wage foreman	$93.13	8	1.12	1.33	$	1,109.81
Loader (John Deere 644B or equal):	$68.06	24	1	1.15	$	1,878.46
Haul truck 20,000 GVW	$25.30	24	1	1.15	$	698.28

Materials	Quantity	Unit	Unit Cost		Extended Cost
Fuel (20 gal/unit-day)	120	Gal	$ 2.85	$	342.00

Total basin maintenance (rounded 00):	$	8,400	/event

Unit cost for basin maintenance (rounded 00):	$	4,200	/year

3a **Leachate Disposal**. Unit cost based on historic leachate flows at the Eastlake Landfill which range between 1.05 MM gal/yr and 1.46 MM gal/yr (EBA, 2005; SHN Consulting 2013 and 2014). Highest flow used to be conservative. Discharge to sanitary sewer system to the Southeast Regional Wastewater Treatement Plant. Disposal cost is currently $10,000/year which is equivalent to $0.009/gal (Lake County, 2015).

3b **Leachate System Maintenance**. The surface impoundment discharges to sanitary sewer via a submersible pump with 2 HP electric motor. Assume the pump and motor will be scheduled for replacement once during the post-closure period. Pump installation estimate is $15,000/unit; based on manufacturer data (includes pump, electrical, controls and installation). Annual cost pro-rated over 30 years.

4a **Landfill Gas System Operation and Maintenance**. Unit costs for routine LFG collection system monitoring and maintenance include field labor (1x/mo), electric power for blower/flare, and miscellaneous supplies and expenses. Expenses for LFG system operation, monitoring, maintenance (O&M) and reporting based on existing professionaol services contract executed by Lake County.

	Quantity	Unit	Unit Cost	Extended Cost
Routine O&M - wellfield and flare station contractor	12	Mo	$ 2,500.00	$ 30,000.00
Miscellaneous repairs / materials	1	LS	$ 2,500.00	$ 2,500.00
Electric power 25 HP motor (18.6 kW)	163,374	$/kw-hr	$ 0.14	$ 22,872

Total LFG system O&M and reporting (rounded 00):	$ 55,400	/year

Unit cost for LFG system O&M and reporting:	$ 4,600	/mo

4b **LFG Probe Monitoring and Sampling**. Included with above for Item 4a. Includes quarterly monitoring of perimeter probes with field instruments; reports issued to County and Local Enforcement Agency (LEA).

4c **Air Quality Monitoring and Reporting**. Annual cost includes quarterly/annual surface emissions monitoring, annual flare source testing, and preparation of semi-annual reports. The work is in accordance with federal Title V permit, California Landfill Methane Rule (LMR) and Authority to Construct Permit No. A/C 2013-14, issued by the Lake County Air Quality Management District. Assume surface emissions monitoring results during 1st year of postclosure will be below specified thresholds and tests will be performed on an annual basis per LMR allowances. Unit costs based on existing professional services agreements for air quality and flare source test services at the Eastlake Landfill.

	Quantity	Unit	Unit Cost	Extended Cost
Landfill surface emissions monitoring	1	YR	$ 4,000.00	$ 4,000
Flare source test	1	LS	$ 7,000.00	$ 7,000
Title V Semi-Annual reports	2	YR	$ 3,500.00	$ 7,000
Annual AB 32 Report	1	YR	$ 2,500.00	$ 2,500

Total LFG system O&M and reporting (rounded 00):	$ 20,500	/year

4d **Blower/Flare Replacement**. Assume replace LFG flare unit and blower(s) once during post-closure period. Unit costs based on contractor bid for 2014 LFG system installation project at Eastlake Landfill, and reflect prevailing wage labor rates. Project cost estimated as follows:

	Quantity	Unit	Unit Cost	Extended Cost
Contractor mobilization	1	EA	$ 8,000.00	$ 8,000
Enclosed ground flare & blower skid, 300 scfm	1	EA	$ 200,000.00	$ 200,000
Installation, including civil, foundation, piping, etc.:	1	LS	$ 50,000.00	$ 50,000
Electrical and controls	1	LS	$ 30,000.00	$ 30,000
Replacement air compressor, 15 HP	1	EA	$ 12,000.00	$ 12,000
Engineering & permitting at 15%	1	LS	$ 45,000.00	$ 45,000
Flare source test:	1	LS	$ 7,000.00	$ 7,000
Total LFG blower/flare replacement (rounded 00):				$ 352,000

Annual cost for blower/flare replacement:	$ 11,700	/yr

4e **LFG Monitorng Well Repair/Replacement**. The existing LFG monitoring network consists of 8 perimeter monitoring wells, completed to depths 10 to 45 feet below ground surface. The system is in compliance with 27 CCR 21090 requirements. Assume all 8 wells will require replacement during 30-year post-closure period. Well replacement cost of $7,500 each for 45-foot deep installation, including permitting, drilling and probe completion. Total cost = $60,000 over 30 years = $2,000/yr.

5a **Final Grading - Inspection and Repairs**. Included with items 1a and 1b above.

5b **Aerial Topo and Survey**. Assume $14,000/event, required every 5 years. Aerial survey cost based on subcontractor fee for November 2014 surveying project at Eastlake Landfill.

6a **Water Quality Monitoring/Reporting**. Assume monitoring for detection and corrective action parameters specified in WDRs and MRP No. R5-2006-0108, as administered by the RWQCB. Work includes groundwater, leachate and surface water monitoring and reporting. Annual costs as listed below are based on existing professional services agreemements and County budgets for water quality monitoring and reporting at Eastlake Landfill.

	Quantity	Unit	Unit Cost	Extended Cost
Sampling and laboratory costs (Budget Item 23.8031)	1	LS	$ 25,000.00	$ 25,000
Semi-annual monitoring reports (Budget Item 23.8032)	2	EA	$ 4,500.00	$ 9,000
Other water monitoring (Budget Item 23.8033)	1	LS	$ 15,000.00	$ 15,000
Total water quality monitoring and reporting (rounded 00):				$ 49,000 /year

6b **Agency Permit Fees**. Amount based on current RWQCB permit fee for administration of WDRs at Eastlake Landfill (County Budget Item 23.8034).

6c **Monitoring Well Repairs/Replacement.** The existing monitoring network consists of 16 groundwater wells. Assume all 16 wells will require replacement during the 30-year post-closure period. Costs include permitting, drilling, materials, and field oversight by geologist.

	Quantity	Unit	Unit Cost	Extended Cost
Permitting	1	LS	$ 3,000.00	$ 3,000
Well installation - drilling and materials (16 @ 100 ft bgs)	1600	LF	$ 110.00	$ 176,000
Field oversight - geologist	220	HR	$ 165.00	$ 36,300
Total groundwater well replacement (rounded 000):				$ 215,000

Annual cost for groundwater well replacement:	$ 7,200	/yr

7 **Security**. Assume $5,000/yr to repair perimeter fencing, gates, signs and other security items.

ATTACHMENT 2

PREVAILING WAGE AND EQUIPMENT RATES

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #LABORER AND RELATED CLASSIFICATIONS

DETERMINATION: NC-23-102-1-2016-1
ISSUE DATE: August 22, 2016
EXPIRATION DATE OF DETERMINATION: JUNE 25, 2017** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director – Research Unit for specific rates at (415) 703-4774.

LOCALITY: ALL LOCALITIES WITHIN ALAMEDA, ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, CONTRA COSTA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MARIN, MENDOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO, AND YUBA COUNTIES.

		Employer Payments					Straight-Time		Overtime Hourly Rate		
Classification[a] (Journeyperson)	Basic Hourly Rate[g]	Health and Welfare	Pension	Vacation and Holiday	Training	Other Payments	Hours[f]	Total Hourly Rate	Daily 1 1/2X	Saturday[b] 1 1/2X	Sunday/ Holiday 2X
AREA 1[c]											
Construction Specialist	29.99	7.84	11.06	2.63	0.45	0.22	8	52.19	67.185	67.185	82.18
Group 1; Group 1(B)[e]	29.29	7.84	11.06	2.63	0.45	0.22	8	51.49	66.135	66.135	80.78
Group 1 (A)	29.51	7.84	11.06	2.63	0.45	0.22	8	51.71	66.465	66.465	81.22
Group 1 (C)	29.34	7.84	11.06	2.63	0.45	0.22	8	51.54	66.21	66.21	80.88
Group 1 (E)	29.84	7.84	11.06	2.63	0.45	0.22	8	52.04	66.96	66.96	81.88
Group 1 (F-1)	29.87	7.84	11.06	2.63	0.45	0.22	8	52.07	67.005	67.005	81.94
Group 1 (F-2)	28.89	7.84	11.06	2.63	0.45	0.22	8	51.09	65.535	65.535	79.98
Group 1 (G)	29.49	7.84	11.06	2.63	0.45	0.22	8	51.69	66.435	66.435	81.18
Group 2	29.14	7.84	11.06	2.63	0.45	0.22	8	51.34	65.91	65.91	80.48
Group 3; Group 3(A)	29.04	7.84	11.06	2.63	0.45	0.22	8	51.24	65.76	65.76	80.28
Group 4; Group 6(B)	22.73	7.84	11.06	2.63	0.45	0.22	8	44.93	56.295[d]	56.295[d]	67.66[d]
Group 6	30.25	7.84	11.06	2.63	0.45	0.22	8	52.45	67.575	67.575	82.70
Group 6 (A)	29.75	7.84	11.06	2.63	0.45	0.22	8	51.95	66.825	66.825	81.70
Group 6 (C)	29.16	7.84	11.06	2.63	0.45	0.22	8	51.36	65.94	65.94	80.52
Group 7 – Stage 1 (1st 6 months)	20.33	7.84	11.06	2.63	0.45	0.22	8	42.53	52.695	52.695	62.86
Stage 2 (2nd 6 months)	23.23	7.84	11.06	2.63	0.45	0.22	8	45.43	57.045	57.045	68.66
Stage 3 (3rd 6 months)	26.14	7.84	11.06	2.63	0.45	0.22	8	48.34	61.41	61.41	74.48
AREA 2[c]											
Construction Specialist	28.99	7.84	11.06	2.63	0.45	0.22	8	51.19	65.685	65.685	80.18
Group 1; Group 1(B)[e]	28.29	7.84	11.06	2.63	0.45	0.22	8	50.49	64.635	64.635	78.78
Group 1 (A)	28.51	7.84	11.06	2.63	0.45	0.22	8	50.71	64.965	64.965	79.22
Group 1 (C)	28.34	7.84	11.06	2.63	0.45	0.22	8	50.54	64.71	64.71	78.88
Group 1 (E)	28.84	7.84	11.06	2.63	0.45	0.22	8	51.04	65.46	65.46	79.88
Group 1 (F-1)	28.87	7.84	11.06	2.63	0.45	0.22	8	51.07	65.505	65.505	79.94
Group 1 (F-2)	27.89	7.84	11.06	2.63	0.45	0.22	8	50.09	64.035	64.035	77.98
Group 2	28.14	7.84	11.06	2.63	0.45	0.22	8	50.34	64.41	64.41	78.48
Group 3; Group 3(A)	28.04	7.84	11.06	2.63	0.45	0.22	8	50.24	64.26	64.26	78.28
Group 4; Group 6(B)	21.73	7.84	11.06	2.63	0.45	0.22	8	43.93	54.795[d]	54.795[d]	65.66[d]
Group 6	29.25	7.84	11.06	2.63	0.45	0.22	8	51.45	66.075	66.075	80.70
Group 6 (A)	28.75	7.84	11.06	2.63	0.45	0.22	8	50.95	65.325	65.325	79.70
Group 6 (C)	28.16	7.84	11.06	2.63	0.45	0.22	8	50.36	64.440	64.440	78.52
Group 7 – Stage 1 (1st 6 months)	19.63	7.84	11.06	2.63	0.45	0.22	8	41.83	51.645	51.645	61.46
Stage 2 (2nd 6 months)	22.43	7.84	11.06	2.63	0.45	0.22	8	44.63	55.845	55.845	67.06
Stage 3 (3rd 6 months)	25.24	7.84	11.06	2.63	0.45	0.22	8	47.44	60.06	60.06	72.68

PLEASE GO TO PAGE 50 FOR CLASSIFICATIONS WITHIN EACH GROUP

# INDICATES AN APPRENTICEABLE CRAFT. THE CURRENT APPRENTICE WAGE RATES ARE AVAILABLE ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/PWAPPWAGE/PWAPPWAGESTART.ASP. TO OBTAIN ANY APPRENTICE WAGE RATES AS OF JULY 1, 2008 AND PRIOR TO SEPTEMBER 27, 2012, PLEASE CONTACT THE DIVISION OF APPRENTICESHIP STANDARDS OR REFER TO THE DIVISION OF APPRENTICESHIP STANDARDS' WEBSITE AT HTTP://WWW.DIR.CA.GOV/DAS/DAS.HTML.

a GROUP 1(D) - MAINTENANCE OR REPAIR TRACKMEN AND ROAD BEDS AND ALL EMPLOYEES PERFORMING WORK COVERED BY THIS CLASSIFICATION SHALL RECEIVE $0.25 PER PER HOUR ABOVE THEIR REGULAR RATE FOR ALL WORK PERFORMED ON UNDERGROUND STRUCTURES NOT SPECIFICALLY COVERED HEREIN. THIS SHALL NOT APPLY TO WORK BELOW GROUND LEVEL IN OPEN CUT. THIS SHALL APPLY TO CUT AND COVER WORK OF SUBWAY CONSTRUCTION AFTER TEMPORARY COVER HAS BEEN PLACED.
GROUP 1(H) - ALL LABORERS WORKING OFF OR WITH OR FROM BOS'N CHAIRS, SWINGING SCAFFOLDS, BELTS RECEIVE $0.25 PER HOUR ABOVE THEIR APPLICABLE WAGE RATE. THIS SHALL NOT APPLY TO LABORERS ENTITLED TO RECEIVE THE WAGE RATE SET FORTH IN GROUP 1(A).

b SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORK WEEK DUE TO INCLEMENT WEATHER, MAJOR MECHANICAL BREAKDOWN OR LACK OF MATERIALS BEYOND THE CONTROL OF THE EMPLOYER.

c **AREA 1** - ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO, AND SANTA CLARA COUNTIES.
AREA 2 - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES.

d SERVICE LANDSCAPE LABORER ON NEW CONSTRUCTION MAY WORK ANY FIVE (5) DAYS WITHIN A WEEK.

e GROUP 1(B) RECEIVES AN ADDITIONAL AMOUNT EACH DAY. SEE PAGE 50 FOR DETAILS.

f WHEN THREE SHIFTS ARE EMPLOYED FOR FIVE (5) OR MORE CONSECUTIVE DAYS, SEVEN AND ONE-HALF (7 ½) CONSECUTIVE HOURS (EXCLUSIVE OF MEAL PERIOD), SHALL CONSTITUTE A DAY OF WORK, FOR WHICH EIGHT (8) TIMES THE STRAIGHT TIME HOURLY RATE SHALL BE PAID AT THE NON-SHIFT WAGE RATE FOR THE SECOND SHIFT. THE THIRD SHIFT SHALL BE SEVEN (7) HOURS OF WORK FOR EIGHT (8) HOURS PAY AT THE NON-SHIFT WAGE RATE.

g ZONE PAY AT THREE DOLLARS ($3.00) PER HOUR, FACTORED AT THE APPLICABLE OVERTIME MULTIPLE, WILL BE ADDED TO THE BASE RATE FOR WORK PERFORMED OUTSIDE THE FREE ZONE DESCRIBED BY THE BOUNDARIES ALONG TOWNSHIP AND RANGE LINES. PLEASE SEE TRAVEL AND SUBSISTENCE PROVISION FOR MAP DESCRIPTION AND EXCEPTIONS.

RECOGNIZED HOLIDAYS: HOLIDAYS UPON WHICH THE GENERAL PREVAILING HOURLY WAGE RATE FOR HOLIDAY WORK SHALL BE PAID, SHALL BE ALL HOLIDAYS IN THE COLLECTIVE BARGAINING AGREEMENT, APPLICABLE TO THE PARTICULAR CRAFT, CLASSIFICATION, OR TYPE OF WORKER EMPLOYED ON THE PROJECT, WHICH IS ON FILE WITH THE DIRECTOR OF INDUSTRIAL RELATIONS. IF THE PREVAILING RATE IS NOT BASED ON A COLLECTIVELY BARGAINED RATE, THE HOLIDAYS UPON WHICH THE PREVAILING RATE SHALL BE PAID SHALL BE AS PROVIDED IN SECTION 6700 OF THE GOVERNMENT CODE. YOU MAY OBTAIN THE HOLIDAY PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/PWD. HOLIDAY PROVISIONS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: IN ACCORDANCE WITH LABOR CODE SECTIONS 1773.1 AND 1773.9, CONTRACTORS SHALL MAKE TRAVEL AND/OR SUBSISTENCE PAYMENTS TO EACH WORKER TO EXECUTE THE WORK. YOU MAY OBTAIN THE TRAVEL AND/OR SUBSISTENCE PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/PWD. TRAVEL AND/OR SUBSISTENCE REQUIREMENTS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-4774.

DETERMINATION: NC-23-102-1-2016-1 and NC-23-102-1-2016-1A

CONSTRUCTION SPECIALIST
ASPHALT IRONERS AND RAKERS
CHAINSAW
CONCRETE DIAMOND CHAINSAW
LASER BEAM IN CONNECTION WITH LABORER'S WORK
MASONRY AND PLASTER TENDER
CAST IN PLACE MANHOLE FORM SETTERS
PRESSURE PIPELAYERS
DAVIS TRENCHER – 300 OR SIMILAR TYPE (AND ALL SMALL TRENCHERS)
STATE LICENSED BLASTERS AS DESIGNATED
DIAMOND DRILLERS
DIAMOND CORE DRILLER
MULTIPLE UNIT DRILLS
HIGH SCALERS (INCLUDING DRILLING OF SAME)
HYDRAULIC DRILLS
CERTIFIED WELDER

GROUP 1 (FOR CONTRA COSTA COUNTY ONLY, USE GROUP 1 (G) FOR SOME OF THE FOLLOWING CLASSIFICATIONS)
ASPHALT SPREADER BOXES (ALL TYPES)
BARKO, WACKER AND SIMILAR TYPE TAMPERS
BUGGYMOBILE
CAULKERS, BANDERS, PIPEWRAPPERS, CONDUIT LAYERS, PLASTIC PIPE LAYERS
CERTIFIED ASBESTOS AND MOLD REMOVAL WORKER
CERTIFIED HAZARDOUS WASTE WORKER (INCLUDING LEAD ABATEMENT)
COMPACTORS OF ALL TYPES
CONCRETE AND MAGNESITE MIXER AND ½ YARD
CONCRETE PAN WORK
CONCRETE SANDERS, CONCRETE SAW
CRIBBERS AND/OR SHORING
CUT GRANITE CURB SETTER
DRI PAK-IT MACHINE
FALLER, LOGLOADER AND BUCKER
FORM RAISERS, SLIP FORMS
GREEN CUTTERS
HEADERBOARD MEN, HUBSETTERS, ALIGNERS BY ANY METHOD
HIGH PRESSURE BLOW PIPE (1-1/2" OR OVER, 100 LBS. PRESSURE/OVER)
HYDRO SEEDER AND SIMILAR TYPE
JACKHAMMER OPERATORS
JACKING OF PIPE OVER 12 INCHES
JACKSON AND SIMILAR TYPE COMPACTORS
KETTLEMEN, POTMEN, AND MEN APPLYING ASPHALT, LAY-KOLD, CREOSOTE, LIME, CAUSTIC AND SIMILAR TYPE MATERIALS (APPLYING MEANS APPLYING DIPPING, OR HANDLING OF SUCH MATERIALS)
LAGGING, SHEETING, WHALING, BRACING, TRENCH-JACKING, LAGGING HAMMER
MAGNESITE, EPOXY RESIN, FIBER GLASS AND MASTIC WORKERS (WET/DRY)
NO JOINT PIPE AND STRIPPING OF SAME, INCLUDING REPAIR OF VOIDS
PAVEMENT BREAKERS AND SPADERS, INCLUDING TOOL GRINDER
PERMA CURBS
PRECAST-MANHOLE SETTERS
PIPELAYERS (INCLUDING GRADE CHECKING IN CONNECTION WITH PIPELAYING)
PRESSURE PIPE TESTER
POST HOLE DIGGERS-AIR, GAS, AND ELECTRIC POWER BROOM SWEEPERS
POWER TAMPERS OF ALL TYPES, EXCEPT AS SHOWN IN GROUP 2
RAM SET GUN AND STUD GUN
RIPRAP-STONEPAVER AND ROCK-SLINGER, INCLUDING PLACING OF SACKED CONCRETE AND/OR SAND (WET OR DRY) AND GABIONS AND SIMILAR TYPE
ROTARY SCARIFIER OR MULTIPLE HEAD CONCRETE CHIPPING SCARIFIER
ROTO AND DITCH WITCH
ROTOTILLER
SAND BLASTERS, POTMEN, GUNMEN, AND NOZZLEMEN
SIGNALING AND RIGGING
SKILLED WRECKER (REMOVING AND SALVAGING OF SASH, WINDOWS, DOORS, PLUMBING AND ELECTRIC FIXTURES)
TANK CLEANERS
TREE CLIMBERS
TRENCHLESS TECHNOLOGY LABORER- PIPE INSTALLATION, BURSTING, RELINING, OR SIMILAR
TRENCHLESS LABORER'S WORK, CAMERA CONTROLLER
TURBO BLASTER
VIBRA-SCREED-BULL FLOAT IN CONNECTION WITH LABORER'S WORK
VIBRATORS

GROUP 1 (A)
ALL WORK OF LOADING, PLACING AND BLASTING OF ALL POWDER & EXPLOSIVES OF WHATEVER TYPE, REGARDLESS OF METHOD USED FOR LOADING AND PLACING
JOY DRILL MODEL TWM-2A
GARDENER-DENVER MODEL DH 143 AND SIMILAR TYPE DRILLS
TRACK DRILLERS
JACK LEG DRILLERS
WAGON DRILLERS
MECHANICAL DRILLERS-ALL TYPES REGARDLESS OF TYPE OR METHOD OF POWER
MECHANICAL PIPE LAYER-ALL TYPES REGARDLESS OF TYPE OR METHOD OF POWER
BLASTERS AND POWDERMAN
TREE TOPPER
BIT GRINDER

GROUP 1 (B) -- SEE GROUP 1 RATES
SEWER CLEANERS (ANY WORKMEN WHO HANDLE OR COME IN CONTACT WITH RAW SEWAGE IN SMALL DIAMETER SEWERS) SHALL RECEIVE $4.00 PER DAY ABOVE GROUP 1 WAGE RATES. THOSE WHO WORK INSIDE RECENTLY ACTIVE, LARGE DIAMETER SEWERS, AND ALL RECENTLY ACTIVE SEWER MANHOLES SHALL RECEIVE $5.00 PER DAY ABOVE GROUP 1 WAGE RATES.

GROUP 1 (C)
BURNING AND WELDING IN CONNECTION WITH LABORER'S WORK
SYNTHETIC THERMOPLASTICS AND SIMILAR TYPE WELDING

GROUP 1 (D)
SEE FOOTNOTE A ON PAGE 49

GROUP 1 (E)
WORK ON AND/OR IN BELL HOLE FOOTINGS AND SHAFTS THEREOF, AND WORK ON AND IN DEEP FOOTINGS (DEEP FOOTINGS IS A HOLE 15 FEET OR MORE IN DEPTH)
SHAFT IS AN EXCAVATION OVER FIFTEEN (15) FEET DEEP OF ANY TYPE

GROUP 1 (F-1)
ALIGNER OF WIRE WINDING MACHINE IN CONNECTION WITH GUNITING OR SHOT CRETE

GROUP 1 (F-2)
ALIGNER HELPER OF WIRE WINDING MACHINE IN CONNECTION WITH GUNITING OR SHOT CRETE

GROUP 1 (G) APPLIES ONLY TO WORK IN CONTRA COSTA COUNTY
PIPELAYERS (INCLUDING GRADE CHECKING IN CONNECTION WITH PIPELAYING), CAULKERS, BANDERS, PIPEWRAPPERS, CONDUIT LAYERS, PLASTIC PIPE LAYER, PRESSURE PIPE TESTER, NO JOINT PIPE AND STRIPPING OF SAME, INCLUDING REPAIR OF VOIDS, PRECAST MANHOLE SETTERS, CAST IN PLACE MANHOLE FORM SETTERS IN CONTRA COSTA COUNTY ONLY

GROUP 1(H)
SEE FOOTNOTE A ON PAGE 49

GROUP 2
ASPHALT SHOVELERS
CEMENT DUMPERS AND HANDLING DRY CEMENT OR GYPSUM
CHOKE-SETTER AND RIGGER (CLEARING WORK)
CONCRETE BUCKET DUMPER AND CHUTEMAN
CONCRETE CHIPPING AND GRINDING
CONCRETE LABORERS (WET OR DRY)
DRILLERS HELPER, CHUCK TENDER, NIPPER (ONE CHUCKTENDER ON SINGLE MACHINE OPERATION WITH MINIMUM OF ONE CHUCKTENDER FOR EACH TWO MACHINES ON MULTIPLE MACHINE OPERATION. JACKHAMMERS IN NO WAY INVOLVED IN THIS ITEM.)
GUINEA CHASER (STAKEMAN), GROUT CREW
HIGH PRESSURE NOZZLEMAN, ADDUCTORS
HYDRAULIC MONITOR (OVER 100 LBS. PRESSURE)
LOADING AND UNLOADING, CARRYING AND HANDLING OF ALL RODS AND MATERIALS FOR USE IN REINFORCING CONCRETE CONSTRUCTION
PITTSBURGH CHIPPER, AND SIMILAR TYPE BRUSH SHREDDERS
SEMI-SKILLED WRECKER (SALVAGING OF OTHER BUILDING MATERIALS) – SEE ALSO SKILLED WRECKER (GROUP 1)
SLOPER
SINGLEFOOT, HAND HELD, PNEUMATIC TAMPER
ALL PNEUMATIC, AIR, GAS AND ELECTRIC TOOLS NOT LISTED IN GROUPS 1 THROUGH 1 (F)
JACKING OF PIPE-UNDER 12 INCHES

GROUP 3
CONSTRUCTION LABORERS INCLUDING BRIDGE LABORERS, GENERAL LABORERS AND CLEANUP LABORERS
DEMOLITION WORKER
DUMPMAN, LOAD SPOTTER
FLAGPERSON/PEDESTRIAN MONITOR
FIRE WATCHER
FENCE ERECTORS, INCLUDING TEMPORARY FENCING
GUARDRAIL ERECTORS
GARDENER, HORTICULTURAL AND LANDSCAPE LABORERS (SEE GROUP 4, FOR LANDSCAPE MAINTENANCE ON NEW CONSTRUCTION DURING PLANT ESTABLISHMENT PERIOD)
JETTING
LIMBERS, BRUSH LOADERS, AND PILERS
PAVEMENT MARKERS (BUTTON SETTERS)
PAVERS/INTERLOCKING PAVERS (ALL TYPES) AND INTERLOCKING PAVER MACHINES MAINTENANCE, REPAIR TRACKMEN AND ROAD BEDS
STREETCAR AND RAILROAD CONSTRUCTION TRACK LABORERS
TEMPORARY AIR AND WATER LINES, VICTAULIC OR SIMILAR
TOOL ROOM ATTENDANT (JOBSITE ONLY)
WHEELBARROW, INCLUDING POWER DRIVEN

GROUP 3 (A) -- SEE GROUP 3 RATES
COMPOSITE CREW PERSON (OPERATION OF VEHICLES, WHEN IN CONJUNCTION WITH LABORER'S DUTIES)

GROUP 4
ALL FINAL CLEANUP OF DEBRIS, GROUNDS AND BUILDINGS NEAR THE COMPLETION OF THE PROJECT INCLUDING BUT NOT LIMITED TO STREET CLEANERS (NOT APPLICABLE TO ENGINEERING OR HEAVY HIGHWAY PROJECTS)
CLEANING AND WASHING WINDOWS (NEW CONSTRUCTION ONLY), SERVICE LANDSCAPE LABORERS (SUCH AS GARDENER, HORTICULTURE, MOWING, TRIMMING, REPLANTING, WATERING DURING PLANT ESTABLISHMENT PERIOD) ON NEW CONSTRUCTION
BRICK CLEANERS (JOB SITE ONLY)
MATERIAL CLEANERS (JOB SITE ONLY)

NOTE: AN ADDITIONAL DETERMINATION FOR LANDSCAPE MAINTENANCE WORK AFTER THE PLANT ESTABLISHMENT PERIOD OR WARRANTY PERIOD IS PUBLISHED ON PAGE 57 OF THESE GENERAL DETERMINATIONS.

GROUP 6
STRUCTURAL NOZZLEMAN

GROUP 6 (A)
NOZZLEMAN (INCLUDING GUNMAN, POTMAN)
RODMAN
GROUNDMAN

GROUP 6 (B) -- SEE GROUP 4 RATES
GUNITE TRAINEE (ONE GUNITE LABORER SHALL BE ALLOWED FOR EACH THREE (3) JOURNEYMAN (GROUP 6, 6A, 6C, OR GENERAL LABORER) ON A CREW. IN THE ABSENCE OF THE JOURNEYMAN, THE GUNITE TRAINEE RECEIVES THE JOURNEYMAN SCALE.).
NOTE: THIS RATIO APPLIES ONLY TO WORK ON THE SAME JOB SITE.

GROUP 6 (C)
REBOUNDMAN

GROUP 7
LANDSCAPE LABORER TRAINEE (RATIO FOR TRAINEES IS ONE IN THREE. AT LEAST ONE SECOND PERIOD TRAINEE AND AT LEAST ONE THIRD PERIOD TRAINEE MUST BE EMPLOYED BEFORE EMPLOYING ANOTHER FIRST PERIOD TRAINEE).
NOTE: THIS RATIO APPLIES ONLY TO WORK ON THE SAME JOB SITE.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #LABORER AND RELATED CLASSIFICATIONS (Special Single and Second Shift)

DETERMINATION: NC-23-102-1-2016-1A
ISSUE DATE: August 22, 2016
EXPIRATION DATE OF DETERMINATION: JUNE 25, 2017** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director-Research Unit for specific rates at (415) 703-4774.
LOCALITY: ALL LOCALITIES WITHIN ALAMEDA, ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, CONTRA COSTA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MARIN, MENDOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO, AND YUBA COUNTIES.

		Employer Payments					Straight-Time		Overtime Hourly Rate		
Classification[a] (Journeyperson)	Basic Hourly Rate[f]	Health and Welfare	Pension	Vacation and Holiday	Training	Other Payments	Hours	Total Hourly Rate	Daily 1 1/2X	Saturday[b] 1 1/2X	Sunday/ Holiday 2X
AREA 1[c]											
Construction Specialist	32.99	7.84	11.06	2.63	0.45	0.22	8	55.19	71.685	71.685	88.18
Group 1; Group 1(B)[e]	32.29	7.84	11.06	2.63	0.45	0.22	8	54.49	70.635	70.635	86.78
Group 1 (A)	32.51	7.84	11.06	2.63	0.45	0.22	8	54.71	70.965	70.965	87.22
Group 1 (C)	32.34	7.84	11.06	2.63	0.45	0.22	8	54.54	70.71	70.71	86.88
Group 1 (E)	32.84	7.84	11.06	2.63	0.45	0.22	8	55.04	71.46	71.46	87.88
Group 1 (F-1)	32.87	7.84	11.06	2.63	0.45	0.22	8	55.07	71.505	71.505	87.94
Group 1 (F-2)	31.89	7.84	11.06	2.63	0.45	0.22	8	54.09	70.035	70.035	85.98
Group 1 (G)	32.49	7.84	11.06	2.63	0.45	0.22	8	54.69	70.935	70.935	87.18
Group 2	32.14	7.84	11.06	2.63	0.45	0.22	8	54.34	70.41	70.41	86.48
Group 3; Group 3(A)	32.04	7.84	11.06	2.63	0.45	0.22	8	54.24	70.26	70.26	86.28
Group 4; Group 6(B)	25.73	7.84	11.06	2.63	0.45	0.22	8	47.93	60.795[d]	60.795[d]	73.66[d]
Group 6	33.25	7.84	11.06	2.63	0.45	0.22	8	55.45	72.075	72.075	88.70
Group 6 (A)	32.75	7.84	11.06	2.63	0.45	0.22	8	54.95	71.325	71.325	87.70
Group 6 (C)	32.16	7.84	11.06	2.63	0.45	0.22	8	54.36	70.44	70.44	86.52
Group 7 – Stage 1 (1st 6 months)	23.33	7.84	11.06	2.63	0.45	0.22	8	45.53	57.195	57.195	68.86
Stage 2 (2nd 6 months)	26.23	7.84	11.06	2.63	0.45	0.22	8	48.43	61.545	61.545	74.66
Stage 3 (3rd 6 months)	29.14	7.84	11.06	2.63	0.45	0.22	8	51.34	65.91	65.91	80.48
AREA 2[c]											
Construction Specialist	31.84	7.84	11.06	2.63	0.45	0.22	8	54.04	69.96	69.96	85.88
Group 1; Group 1(B)[e]	31.14	7.84	11.06	2.63	0.45	0.22	8	53.34	68.91	68.91	84.48
Group 1 (A)	31.36	7.84	11.06	2.63	0.45	0.22	8	53.56	69.24	69.24	84.92
Group 1 (C)	31.19	7.84	11.06	2.63	0.45	0.22	8	53.39	68.985	68.985	84.58
Group 1 (E)	31.69	7.84	11.06	2.63	0.45	0.22	8	53.89	69.735	69.735	85.58
Group 1 (F-1)	31.72	7.84	11.06	2.63	0.45	0.22	8	53.92	69.78	69.78	85.64
Group 1 (F-2)	30.74	7.84	11.06	2.63	0.45	0.22	8	52.94	68.31	68.31	83.68
Group 2	30.99	7.84	11.06	2.63	0.45	0.22	8	53.19	68.685	68.685	84.18
Group 3; Group 3(A)	30.89	7.84	11.06	2.63	0.45	0.22	8	53.09	68.535	68.535	83.98
Group 4; Group 6(B)	24.58	7.84	11.06	2.63	0.45	0.22	8	46.78	59.07[d]	59.07[d]	71.36[d]
Group 6	32.10	7.84	11.06	2.63	0.45	0.22	8	54.30	70.35	70.35	86.40
Group 6 (A)	31.60	7.84	11.06	2.63	0.45	0.22	8	53.80	69.60	69.60	85.40
Group 6 (C)	31.01	7.84	11.06	2.63	0.45	0.22	8	53.21	68.715	68.715	84.22
Group 7 – Stage 1 (1st 6 months)	22.48	7.84	11.06	2.63	0.45	0.22	8	44.68	55.92	55.92	67.16
Stage 2 (2nd 6 months)	25.28	7.84	11.06	2.63	0.45	0.22	8	47.48	60.12	60.12	72.76
Stage 3 (3rd 6 months)	28.09	7.84	11.06	2.63	0.45	0.22	8	50.29	64.335	64.335	78.38

PLEASE GO TO PAGE 50 FOR CLASSIFICATIONS WITHIN EACH GROUP

# INDICATES AN APPRENTICEABLE CRAFT. THE CURRENT APPRENTICE WAGE RATES ARE AVAILABLE ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/PWAPPWAGE/PWAPPWAGESTART.ASP. TO OBTAIN ANY APPRENTICE WAGE RATES AS OF JULY 1, 2008 AND PRIOR TO SEPTEMBER 27, 2012, PLEASE CONTACT THE DIVISION OF APPRENTICESHIP STANDARDS OR REFER TO THE DIVISION OF APPRENTICESHIP STANDARDS' WEBSITE AT HTTP://WWW.DIR.CA.GOV/DAS/DAS.HTML.

a GROUP 1(D) - MAINTENANCE OR REPAIR TRACKMEN AND ROAD BEDS AND ALL EMPLOYEES PERFORMING WORK COVERED BY THIS CLASSIFICATION SHALL RECEIVE $0.25 PER PER HOUR ABOVE THEIR REGULAR RATE FOR ALL WORK PERFORMED ON UNDERGROUND STRUCTURES NOT SPECIFICALLY COVERED HEREIN. THIS SHALL NOT APPLY TO WORK BELOW GROUND LEVEL IN OPEN CUT. THIS SHALL APPLY TO CUT AND COVER WORK OF SUBWAY CONSTRUCTION AFTER TEMPORARY COVER HAS BEEN PLACED.
GROUP 1(H) - ALL LABORERS WORKING OFF OR WITH OR FROM BOS'N CHAIRS, SWINGING SCAFFOLDS, BELTS RECEIVE $0.25 PER HOUR ABOVE THEIR APPLICABLE WAGE RATE. THIS SHALL NOT APPLY TO LABORERS ENTITLED TO RECEIVE THE WAGE RATE SET FORTH IN GROUP 1(A).

b SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORK WEEK DUE TO INCLEMENT WEATHER, MAJOR MECHANICAL BREAKDOWN OR LACK OF MATERIALS BEYOND THE CONTROL OF THE EMPLOYER.

c **AREA 1** - ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO, AND SANTA CLARA COUNTIES.
AREA 2 - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES.

d SERVICE LANDSCAPE LABORER ON NEW CONSTRUCTION MAY WORK ANY FIVE (5) DAYS WITHIN A WEEK.

e GROUP 1(B) RECEIVES AN ADDITIONAL AMOUNT EACH DAY. SEE PAGE 50 FOR DETAILS.

f ZONE PAY AT THREE DOLLARS ($3.00) PER HOUR, FACTORED AT THE APPLICABLE OVERTIME MULTIPLE, WILL BE ADDED TO THE BASE RATE FOR WORK PERFORMED OUTSIDE THE FREE ZONE DESCRIBED BY THE BOUNDARIES ALONG TOWNSHIP AND RANGE LINES. PLEASE SEE TRAVEL AND SUBSISTENCE PROVISIONS FOR MAP DESCRIPTION AND EXCEPTIONS.

RECOGNIZED HOLIDAYS: HOLIDAYS UPON WHICH THE GENERAL PREVAILING HOURLY WAGE RATE FOR HOLIDAY WORK SHALL BE PAID, SHALL BE ALL HOLIDAYS IN THE COLLECTIVE BARGAINING AGREEMENT, APPLICABLE TO THE PARTICULAR CRAFT, CLASSIFICATION, OR TYPE OF WORKER EMPLOYED ON THE PROJECT, WHICH IS ON FILE WITH THE DIRECTOR OF INDUSTRIAL RELATIONS. IF THE PREVAILING RATE IS NOT BASED ON A COLLECTIVELY BARGAINED RATE, THE HOLIDAYS UPON WHICH THE PREVAILING RATE SHALL BE PAID SHALL BE AS PROVIDED IN SECTION 6700 OF THE GOVERNMENT CODE. YOU MAY OBTAIN THE HOLIDAY PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/PWD. HOLIDAY PROVISIONS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: IN ACCORDANCE WITH LABOR CODE SECTIONS 1773.1 AND 1773.9, CONTRACTORS SHALL MAKE TRAVEL AND/OR SUBSISTENCE PAYMENTS TO EACH WORKER TO EXECUTE THE WORK. YOU MAY OBTAIN THE TRAVEL AND/OR SUBSISTENCE PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET AT HTTP://WWW.DIR.CA.GOV/OPRL/PWD. TRAVEL AND/OR SUBSISTENCE REQUIREMENTS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED BY CONTACTING THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # OPERATING ENGINEER (HEAVY AND HIGHWAY WORK)

DETERMINATION: NC-23-63-1-2016-2
ISSUE DATE: August 22, 2016
EXPIRATION DATE OF DETERMINATION: June 25, 2017** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

			Employer Payments					Straight-Time			Overtime Hourly Rate			
Classification (Journeyperson)	Basic Hourly Rate		Health and Welfare	Pension	Vacation and Holiday[e]	Training	Other Payments	Hours[f]	Total Hourly Rate		Daily/ Saturday[d] 1 1/2X		Sunday and Holiday 2X	
Classification Group[a]	Area 1[b]	Area 2[c]							Area 1[b]	Area 2[c]	Area 1[b]	Area 2[c]	Area 1[b]	Area 2[c]
Group 1	$42.67	$44.67	$13.63	$10.78	$4.51	$0.77	$0.74	8	$73.10	$75.10	$94.44	$97.44	$115.77	$119.77
Group 2	$41.14	$43.14	$13.63	$10.78	$4.51	$0.77	$0.74	8	$71.57	$73.57	$92.14	$95.14	$112.71	$116.71
Group 3	$39.66	$41.66	$13.63	$10.78	$4.51	$0.77	$0.74	8	$70.09	$72.09	$89.92	$92.92	$109.75	$113.75
Group 4	$38.28	$40.28	$13.63	$10.78	$4.51	$0.77	$0.74	8	$68.71	$70.71	$87.85	$90.85	$106.99	$110.99
Group 5	$37.01	$39.01	$13.63	$10.78	$4.51	$0.77	$0.74	8	$67.44	$69.44	$85.95	$88.95	$104.45	$108.45
Group 6	$35.69	$37.69	$13.63	$10.78	$4.51	$0.77	$0.74	8	$66.12	$68.12	$83.97	$86.97	$101.81	$105.81
Group 7	$34.55	$36.55	$13.63	$10.78	$4.51	$0.77	$0.74	8	$64.98	$66.98	$82.26	$85.26	$99.53	$103.53
Group 8	$33.41	$35.41	$13.63	$10.78	$4.51	$0.77	$0.74	8	$63.84	$65.84	$80.55	$83.55	$97.25	$101.25
Group 8-A	$31.20	$33.20	$13.63	$10.78	$4.51	$0.77	$0.74	8	$61.63	$63.63	$77.23	$80.23	$92.83	$96.83
ALL CRANES AND ATTACHMENTS:														
Group 1	$44.30	$46.30	$13.63	$10.78	$4.51	$0.77	$0.74	8	$74.73	$76.73	$96.88	$99.88	$119.03	$123.03
Group 1-A	$43.55	$45.55	$13.63	$10.78	$4.51	$0.77	$0.74	8	$73.98	$75.98	$95.76	$98.76	$117.53	$121.53
Truck Crane Assistant to Engineer	$36.58	$38.58	$13.63	$10.78	$4.51	$0.77	$0.74	8	$67.01	$69.01	$85.30	$88.30	$103.59	$107.59
Assistant to Engineer	$34.29	$36.29	$13.63	$10.78	$4.51	$0.77	$0.74	8	$64.72	$66.72	$81.87	$84.87	$99.01	$103.01
Group 2-A	$41.79	$43.79	$13.63	$10.78	$4.51	$0.77	$0.74	8	$72.22	$74.22	$93.12	$96.12	$114.01	$118.01
Truck Crane Assistant to Engineer	$36.32	$38.32	$13.63	$10.78	$4.51	$0.77	$0.74	8	$66.75	$68.75	$84.91	$87.91	$103.07	$107.07
Assistant to Engineer	$34.08	$36.08	$13.63	$10.78	$4.51	$0.77	$0.74	8	$64.51	$66.51	$81.55	$84.55	$98.59	$102.59
Group 3-A	$40.05	$42.05	$13.63	$10.78	$4.51	$0.77	$0.74	8	$70.48	$72.48	$90.51	$93.51	$110.53	$114.53
Truck Crane Assistant to Engineer	$36.08	$38.08	$13.63	$10.78	$4.51	$0.77	$0.74	8	$66.51	$68.51	$84.55	$87.55	$102.59	$106.59
Hydraulic	$35.69	$37.69	$13.63	$10.78	$4.51	$0.77	$0.74	8	$66.12	$68.12	$83.97	$86.97	$101.81	$105.81
Assistant to Engineer	$33.80	$35.80	$13.63	$10.78	$4.51	$0.77	$0.74	8	$64.23	$66.23	$81.13	$84.13	$98.03	$102.03
Group 4-A	$37.01	$39.01	$13.63	$10.78	$4.51	$0.77	$0.74	8	$67.44	$69.44	$85.95	$88.95	$104.45	$108.45

# Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp. To obtain any apprentice wage rates as of July 1, 2008 and prior to September 27, 2012, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at http://www.dir.ca.gov/das/das.html.

[a] For classifications within each group, see pages 39B-40.

[b] **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties.

[c] **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties. (Portions of counties falling in each area detailed on page 41).

[d] Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.

[e] Includes an amount for supplemental dues.

[f] When three shifts are employed for five (5) or more consecutive days, seven and one-half (7 1/2) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.

NOTE: For Special Single and Second Shift rates, please see page 39A.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at http://www.dir.ca.gov/OPRL/PWD. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at http://www.dir.ca.gov/OPRL/PWD. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

DETERMINATION: NC-23-63-1-2016-2

CLASSIFICATIONS

GROUP 1
Drill Equipment, over 200,000 lbs
Operator of Helicopter (when used in erection work)
Hydraulic Excavator 7 cu yds and over
Power Shovels, over 7 cu yds

GROUP 2
Highline Cableway
Hydraulic Excavator 3 1/2 cu yds up to 7 cu yds
Licensed Construction Work Boat Operator, On Site
Microtunneling Machine
Power Blade Operator (finish)
Power Shovels, (over 1 cu yd and up to and including 7 cu yds m.r.c.)

GROUP 3
Asphalt Milling Machine
Cable Backhoe
Combination Backhoe and Loader over ¾ cu yds
Continuous Flight Tie Back Machine
Crane Mounted Continuous Flight Tie Back Machine, tonnage to apply
Crane Mounted Drill Attachments, Tonnage to apply
Dozer, Slope Board
Drill Equipment, over 100,000 lbs up to and including 200,000 lbs
Gradall
Hydraulic Excavator up to 3 1/2 cu yds
Loader 4 cu yds and over
Long Reach Excavator
Multiple Engine Scrapers (when used as push pull)
Power Shovels, up to and including 1 cu yd
Pre-Stress Wire Wrapping machine
Side Boom Cat, 572 or larger
Track Loader 4 cu yds and over
Wheel Excavator (up to and including 750 cu yds per hour)

GROUP 4
Asphalt Plant Engineer/Boxman
Chicago Boom
Combination Backhoe and Loader up to and including ¾ cu yds
Concrete Batch Plants (wet or dry)
Dozer and/or Push Cat
Drill Equipment, over 50,000 lbs up to and including 100,000 lbs
Pull-Type Elevating Loader
Gradesetter, Grade Checker (GPS, mechanical or otherwise)
Grooving and Grinding Machine
Heading Shield Operator
Heavy Duty Drilling Equipment, Hughes, LDH, Watson 3000 or similar
Heavy Duty Repairman and/or Welder
Lime Spreader
Loader under 4 cu yds
Lubrication and Service Engineer (mobile and grease rack)
Mechanical Finishers or Spreader Machine (asphalt, Barber-Greene and similar)
Miller Formless M-9000 Slope Paver or similar
Portable Crushing and Screening plants
Power Blade Support
Roller Operator, Asphalt
Rubber-Tired Scraper, Self-Loading (paddle-wheels, etc)
Rubber-Tired Earthmoving Equipment (Scrapers)
Slip Form Paver (concrete)
Small Tractor with Drag
Soil Stabilizer (P&H or equal)
Spider Plow and Spider Puller
Timber Skidder
Track Loader up to 4 yards
Tractor Drawn Scraper
Tractor, Compressor Drill Combination
Tubex Pile Rig
Unlicensed Construction Work Boat Operator, On Site
Welder
Woods-Mixer (and other similar Pugmill equipment)

GROUP 5
Cast-In Place Pipe Laying Machine
Combination Slusher and Motor Operator
Concrete Conveyor or Concrete Pump, Truck or Equipment Mounted
Concrete Conveyor, Building Site
Concrete Pump or Pumpcrete Guns
Drilling Equipment, Watson 2000, Texoma 700 or similar
Drilling and Boring Machinery, Horizontal (not to apply to waterlines, wagon drills or jackhammers)
Concrete Mixers/all
Man and/or Material Hoist
Mechanical Finishers (concrete) (Clary, Johnson, Bidwell Bridge Deck or similar types)
Mechanical Burm, Curb and/or Curb and Gutter Machine, Concrete or Asphalt
Mine or Shaft Hoist
Portable Crushers
Power Jumbo Operator (setting slip-forms, etc., in tunnels)
Screedman (automatic or manual)
Self Propelled Compactor with Dozer
Tractor with boom, D6 or smaller
Trenching Machine, maximum digging capacity over 5 ft. depth
Vermeer T-600B Rock Cutter or similar

GROUP 6
Armor-Coater (or similar)
Ballast Jack Tamper
Boom-Type Backfilling Machine
Asst. Plant Engineer
Bridge and/or Gantry Crane
Chemical Grouting Machine, truck mounted
Chip Spreading Machine Operator
Concrete Barrier Moving Machine
Concrete Saws (self-propelled unit on streets, highways, airports, and canals)
Deck Engineer
Drill Doctor
Drill Equipment, over 25,000 lbs up to and including 50,000 lbs
Drilling Equipment Texoma 600, Hughes 200 series or similar up to and including 30 ft. m.r.c.
Helicopter Radioman
Hydro-Hammer or similar
Line Master
Skidsteer Loader, Bobcat larger than 743 series or similar (with attachments)
Locomotive
Rotating Extendable Forklift, Lull Hi-Lift or similar
Assistant to Engineer, Truck Mounted Equipment
Pavement Breaker, Truck Mounted, with compressor combination
Paving Fabric Installation and/or Laying Machine
Pipe Bending Machine (pipelines only)
Pipe Wrapping Machine (Tractor propelled and supported)
Screedman, (except asphaltic concrete paving)
Self-Loading Chipper
Self Propelled Pipeline Wrapping Machine
Tractor

GROUP 7
Ballast Regulator
Cary Lift or similar
Combination Slurry Mixer and/or Cleaner
Coolant/Slurry Tanker Operator (hooked to Grooving/Grinding Machine)
Drilling Equipment, 20 ft and under m.r.c.
Drill Equipment, over 1,000 lbs up to and including 25,000 lbs
Fireman Hot Plant
Grouting Machine Operator
Highline Cableway Signalman
Stationary Belt Loader (Kolman or similar)
Lift Slab Machine (Vagtborg and similar types)
Maginnes Internal Full Slab Vibrator
Material Hoist (1 Drum)
Mechanical Trench Shield
Partsman (heavy duty repair shop parts room)
Pavement Breaker with or without Compressor Combination
Pipe Cleaning Machine (tractor propelled and supported)
Post Driver
Roller (except Asphalt), Chip Seal
Self Propelled Automatically Applied Concrete Curing Machine (on streets, highways, airports and canals)
Self Propelled Compactor (without dozer)
Signalman
Slip-Form Pumps (lifting device for concrete forms)
Super Sucker Vacuum Truck
Tie Spacer
Trenching Machine (maximum digging capacity up) to and including 5 ft depth
Truck-Mounted Rotating Telescopic Boom Type Lifting Device, Manitex or similar (Boom Truck) - Under 15 tons
Truck Type Loader

GROUP 8
Bit Sharpener
Boiler Tender
Box Operator
Brakeman
Combination Mixer and Compressor (shotcrete/gunite)
Compressor Operator
Deckhand
Fireman
Generators
Gunite/Shotcrete Equipment Operator
Heavy Duty Repairman Helper
Hydraulic Monitor
Ken Seal Machine (or similar)
Mast Type Forklift
Mixermobile
Assistant to Engineer
Pump Operator
Refrigerator Plant
Reservoir-Debris Tug (Self-Propelled Floating)
Ross Carrier (Construction site)
Rotomist Operator
Self Propelled Tape Machine
Shuttlecar
Self Propelled Power Sweeper Operator (Includes Vacuum Sweeper)
Slusher Operator
Surface Heater
Switchman
Tar Pot Fireman
Tugger Hoist, Single Drum
Vacuum Cooling Plant
Welding Machine (powered other than by electricity)

DETERMINATION: NC-23-63-1-2016-2

GROUP 8-A
Articulated Dump Truck Operator
Elevator Operator
Mini Excavator under 25 H.P. (Backhoe-Trencher)
Skidsteer Loader, Bobcat 743 series or
Smaller and similar (without attachments)

ALL CRANES AND ATTACHMENTS:

GROUP 1
Cranes over 350 tons
Derrick over 350 tons
Self Profelled Boom Type Lifting Device over 350 tons

GROUP 1-A
Clamshells and Draglines over 7 cu yds
Cranes over 100 tons
Derrick, over 100 tons
Derrick Barge Pedestal mounted over 100 tons
Self Propelled Boom Type Lifting Device Over 100 tons

GROUP 2-A
Clamshells and Draglines over 1 cu yds up to and
including 7 cu yds
Cranes over 45 tons up to and including 100 tons
Derrick Barge 100 tons and under
Mobile Self-Erecting Tower Crane (Potain) over 3 stories
Self Propelled Boom Type Lifting Device over 45 tons
Tower Cranes

GROUP 3-A
Clamshells and Draglines up to and including 1 cu yd
Cranes 45 tons and under
Mobile Self-Erecting Tower Crane (Potain), 3 stories
and under
Self Propelled Boom Type Lifting Device 45 tons
and under

GROUP 4-A
Boom Truck or dual-purpose A-Frame Truck,
Non-Rotating over 15 tons.
Truck Mounted Rotating Telescopic Boom
Type Lifting Device, Manitex or similar
(Boom Truck -over 15 tons)
Truck-Mounted Rotating Telescopic Boom Type
Lifting Device, Munitex or Similar (Boom Truck),
under 15 tons

DESCRIPTION FOR AREAS 1 AND 2:

Area 1 is all of Northern California within the following Township, State and/or county Boundaries:

Commencing in the Pacific Ocean on the extension of the Southerly line of Township 19S, of the Mount Diablo Base and Meridian,
Thence Easterly along the Southerly line of Township 19S, to the Northwest corner of Township 20S, Range 6E,
Thence Southerly to the Southwest corner of Township 20S, Range 6E,
Thence Easterly to the Northwest corner of Township 21S, Range 7E Thence
Southerly to the Southwest corner of Township 21S, Range 7E
Thence Easterly to the Northwest corner of Township 22S, Range 9E,
Thence Southerly to the Southwest corner of Township 22S, Range 9E,
Thence Easterly to the Northwest corner of Township 23S, Range 10E,
Thence Southerly to the Southwest corner of Township 24S, Range 10E,
Thence Easterly to the Southwest corner of Township 24S, Range 31E,
Thence Northerly to the Northeast corner of Township 20S, Range 31E
Thence Westerly to the Southeast corner of Township 19S, Range 29E,
Thence Northerly to the Northeast corner of Township 17S, Range 29E,
Thence Westerly to the Southeast corner of Township 16S, Range 28E,
Thence Northerly to the Northeast corner of Township 13S, Range 28E,
Thence Westerly to the Southeast corner Township 12S, Range 27E,
Thence Northerly to the Northeast corner of Township 12S, Range 27E,
Thence Westerly to the Southeast corner of Township 11S, Range 26E,
Thence Northerly to the Northeast corner of Township 11S, Range 26E,
Thence Westerly to the Southeast corner of Township 10S, Range 25E,
Thence Northerly to the Northeast corner of Township 9S, Range 25E,
Thence Westerly to the Southeast corner of Township 8S, Range 24E,
Thence Northerly to the Northeast corner of Township 8S, Range 24E,
Thence Westerly to the Southeast corner of Township 7S, Range 23E,
Thence Northerly to the Northeast corner of Township 6S, Range 23E,
Thence Westerly to the Southeast corner of Township 5S, Range 20E,
Thence Northerly to the Northeast corner of Township 5S, Range 20E,
Thence Westerly to the Southeast corner of Township 4S, Range 19E,
Thence Northerly to the Northeast corner of Township 1S, Range 19E,
Thence Westerly to the Southeast corner of Township 1N, Range 18E,
Thence Northerly to the Northeast corner of Township 3N, Range 18E,
Thence Westerly to the Southeast corner of Township 4N, Range 17E,
Thence Northerly to the Northeast corner of Township 4N, Range 17E,
Thence Westerly to the Southeast corner of Township 5N, Range 15E,
Thence Northerly to the Northeast corner of Township 5N, Range 15E,
Thence Westerly to the Southeast corner of Township 6N, Range 14E,
Thence Northerly to the Northeast corner of Township 10N, Range 14E,
Thence Easterly along the Southern line of Township 11N, to the California / Nevada State Border,
Thence Northerly along the California / Nevada State Border to the Northerly line of Township 17N,
Thence Westerly to the Southeast corner of Township 18N, Range 10E,
Thence Northerly to the Northeast corner of Township 20N, Range 10E,
Thence Westerly to the Southeast corner of Township 21N, Range 9E,
Thence Northerly to the Northeast corner of Township 21N, Range 9E,
Thence Westerly to the Southeast corner of Township 22N, Range 8E,
Thence Northerly to the Northeast corner of Township 22N, Range 8E,
Thence Westerly to the Northwest corner of Township 22N, Range 8E,
Thence Northerly to the Southwest corner of Township 27N, Range 8E,
Thence Easterly to the Southeast corner of Township 27N, Range 8E,
Thence Northerly to the Northeast corner of Township 28N, Range 8E,
Thence Westerly to the Southeast corner of Township 29N, Range 6E,
Thence Northerly to the Northeast corner of Township 32N, Range 6E,
Thence Westerly to the Northwest corner of Township 32 N, Range 6E,
Thence Northerly to the Northeast corner of Township 35N, Range 5E,
Thence Westerly to the Southeast corner of Township 36N, Range 3E,
Thence Northerly to the Northeast corner of township 36N, Range 3E,
Thence Westerly to the Southeast corner of Township 37N, Range 1W,
Thence Northerly to the Northeast corner of Township 38N, Range 1W,
Thence Westerly to the Southeast corner of Township 39N, Range 2W,
Thence Northerly to the Northeast corner of Township 40N, Range 2W,
Thence Westerly to the Southeast corner of Township 41N, Range 4W,
Thence Northerly to the Northeast corner of Township 42N, Range 4W,
Thence Westerly to the Southeast corner of Township 43N, Range 5W,
Thence Northerly to the California / Oregon State Border,
Thence Westerly along the California / Oregon State Border to the Westerly Boundary of Township Range 8W,
Thence Southerly to the Southwest corner of Township 43N, Range 8W,
Thence Easterly to the Southeast corner of Township 43N, Range 8W,
Thence Southerly to the Southwest corner of Township 42N, Range 7W,
Thence Easterly to the Southeast corner of Township 42N, Range 7W,
Thence Southerly to the Southwest corner of Township 41N, Range 6W,
Thence Easterly to the Northwest corner of Township 40N, Range 5W,
Thence Southerly to the Southwest corner of Township 38N, Range 5W,
Thence Westerly to the Northwest corner of Township 37N, Range 6W,
Thence Southerly to the Southwest corner of Township 35N, Range 6W,
Thence Westerly to the Northwest corner of Township 34N, Range 10W,
Thence Southerly to the Southwest corner of Township 31N, Range 10W,
Thence Easterly to the Northwest corner of Township 30N, Range 9W,
Thence Southerly to the Southwest corner of Township 30N, Range 9W,
Thence Easterly to the Northwest corner of Township 29N, Range 8W,
Thence Southerly to the Southwest corner of Township 23N, Range 8W,
Thence Easterly to the Northwest corner of Township 22N, Range 6W,
Thence Southerly to the Southwest corner of Township 16N, Range 6W,
Thence Westerly to the Southeast corner of Township 16N, Range 9W,
Thence Northerly to the Northeast corner of Township 16N, Range 9W,
Thence Westerly to the Southeast. corner of Township 17N, Range 12W,
Thence Northerly to the Northeast corner of Township 18N, Range 12W,
Thence Westerly to the Northwest corner of Township 18N, Range 15W,
Thence Southerly to the Southwest corner of Township 14N, Range 15W,
Thence Easterly to the Northwest corner of Township 13N, Range 14W,
Thence Southerly to the Southwest corner of Township 13N, Range 14W,
Thence Easterly to the Northwest corner of Township 12N, Range 13W,
Thence Southerly to the Southwest corner of Township 12N, Range 13W,
Thence Easterly to the Northwest corner of Township 11N, Range 12W,
Thence Southerly into the Pacific Ocean
and Commencing in the Pacific Ocean on the extension of the Humboldt Base Line,
Thence Easterly to the Northwest corner of Township 1S, Range 2E,
Thence Southerly to the Southwest corner of Township 2S, Range 2E,
Thence Easterly to the Northwest corner of Township 3S, Range 3E,
Thence Southerly to the Southwest corner of Township 5S, Range 3E,
Thence Easterly to the Southeast corner of Township 5S, Range 4E,
Thence Northerly to the Northeast corner of Township 4S, Range 4E,
Thence Westerly to the Southeast corner of Township 3S, Range 3E,
Thence Northerly to the Northeast corner of Township 5N, Range 3E,
Thence Easterly to the Southeast corner of Township 6N, Range 5E,
Thence Northerly to the Northeast corner of Township 7N, Range 5E,
Thence Westerly to the Southeast corner of Township 8N, Range 3E,
Thence Northerly to the Northeast corner of Township 9N, Range 3E,
Thence Westerly to the Southeast corner of Township 10N, Range 1E,
Thence Northerly to the Northeast corner of Township 13N, Range 1E,
Thence Westerly into the Pacific Ocean,
excluding that portion of Northern California contained within the following lines:
Commencing at the Southwest corner of Township 12N, Range 11E, of the Mount Diablo Base and Meridian,
Thence Easterly to the Southeast corner of Township 12N, Range 16E,
Thence Northerly to the Northeast corner of Township 12N, Range 16E,
Thence Westerly to the Southeast corner of Township 13N, Range 15E,
Thence Northerly to the Northeast corner of Township 13N, Range 15E,
Thence Westerly to the Southeast corner of Township 14N, Range 14E,
Thence Northerly to the Northeast corner of Township 16N, Range 14E,
Thence Westerly to the Northwest corner of Township 16N, Range 12E,
Thence Southerly to the Southwest corner of Township 16N, Range 12E,
Thence Westerly to the Northwest corner of Township 15N, Range 11E,
Thence Southerly to the point of beginning at the Southwest corner of Township 12N, Range 11E,

Area 2 shall be all areas not part of Area 1 described above.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: # OPERATING ENGINEER (HEAVY AND HIGHWAY WORK)
(SPECIAL SINGLE AND SECOND SHIFT)

DETERMINATION: NC-23-63-1-2016-2
ISSUE DATE: August 22, 2016
EXPIRATION DATE OF DETERMINATION: June 25, 2017** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

LOCALITY: All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba counties.

			Employer Payments						Straight-Time		Overtime Hourly Rate			
Classification (Journeyperson)	Basic Hourly Rate		Health and Welfare	Pension	Vacation and Holiday[e]	Training	Other Payments	Hours	Total Hourly Rate		Daily/ Saturday[d] 1 1/2X		Sunday and Holiday 2X	
Classification Group[a]	Area 1[b]	Area 2[c]							Area 1[b]	Area 2[c]	Area 1[b]	Area 2[c]	Area 1[b]	Area 2[c]
Group 1	$47.00	$49.00	$13.63	$10.78	$4.51	$0.77	$0.74	8	$77.43	$79.43	$100.93	$103.93	$124.43	$128.43
Group 2	$45.27	$47.27	$13.63	$10.78	$4.51	$0.77	$0.74	8	$75.70	$77.70	$98.34	$101.34	$120.97	$124.97
Group 3	$43.61	$45.61	$13.63	$10.78	$4.51	$0.77	$0.74	8	$74.04	$76.04	$95.85	$98.85	$117.65	$121.65
Group 4	$42.05	$44.05	$13.63	$10.78	$4.51	$0.77	$0.74	8	$72.48	$74.48	$93.51	$96.51	$114.53	$118.53
Group 5	$40.63	$42.63	$13.63	$10.78	$4.51	$0.77	$0.74	8	$71.06	$73.06	$91.38	$94.38	$111.69	$115.69
Group 6	$39.13	$41.13	$13.63	$10.78	$4.51	$0.77	$0.74	8	$69.56	$71.56	$89.13	$92.13	$108.69	$112.69
Group 7	$37.85	$39.85	$13.63	$10.78	$4.51	$0.77	$0.74	8	$68.28	$70.28	$87.21	$90.21	$106.13	$110.13
Group 8	$36.58	$38.58	$13.63	$10.78	$4.51	$0.77	$0.74	8	$67.01	$69.01	$85.30	$88.30	$103.59	$107.59
Group 8-A	$34.07	$36.07	$13.63	$10.78	$4.51	$0.77	$0.74	8	$64.50	$66.50	$81.54	$84.54	$98.57	$102.57
ALL CRANES AND ATTACHMENTS:														
Group 1	$48.73	$50.73	$13.63	$10.78	$4.51	$0.77	$0.74	8	$79.16	$81.16	$103.53	$106.53	$127.89	$131.89
Group 1-A	$47.98	$49.98	$13.63	$10.78	$4.51	$0.77	$0.74	8	$78.41	$80.41	$102.40	$105.40	$126.39	$130.39
Truck Crane Assistant to Engineer	$40.15	$42.15	$13.63	$10.78	$4.51	$0.77	$0.74	8	$70.58	$72.58	$90.66	$93.66	$110.73	$114.73
Assistant to Engineer	$37.56	$39.56	$13.63	$10.78	$4.51	$0.77	$0.74	8	$67.99	$69.99	$86.77	$89.77	$105.55	$109.55
Group 2-A	$45.99	$47.99	$13.63	$10.78	$4.51	$0.77	$0.74	8	$76.42	$78.42	$99.42	$102.42	$122.41	$126.41
Truck Crane Assistant to Engineer	$39.86	$41.86	$13.63	$10.78	$4.51	$0.77	$0.74	8	$70.29	$72.29	$90.22	$93.22	$110.15	$114.15
Assistant to Engineer	$37.33	$39.33	$13.63	$10.78	$4.51	$0.77	$0.74	8	$67.76	$69.76	$86.43	$89.43	$105.09	$109.09
Group 3-A	$44.03	$46.03	$13.63	$10.78	$4.51	$0.77	$0.74	8	$74.46	$76.46	$96.48	$99.48	$118.49	$122.49
Truck Crane Assistant to Engineer	$39.59	$41.59	$13.63	$10.78	$4.51	$0.77	$0.74	8	$70.02	$72.02	$89.82	$92.82	$109.61	$113.61
Hydraulic	$39.13	$41.13	$13.63	$10.78	$4.51	$0.77	$0.74	8	$69.56	$71.56	$89.13	$92.13	$108.69	$112.69
Assistant to Engineer	$37.02	$39.02	$13.63	$10.78	$4.51	$0.77	$0.74	8	$67.45	$69.45	$85.96	$88.96	$104.47	$108.47
Group 4-A	$40.63	$42.63	$13.63	$10.78	$4.51	$0.77	$0.74	8	$71.06	$73.06	$91.38	$94.38	$111.69	$115.69

# Indicates an apprenticeable craft. The current apprentice wage rates are available on the Internet at http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp. To obtain any apprentice wage rates as of July 1, 2008 and prior to September 27, 2012, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at http://www.dir.ca.gov/das/das.html.

[a] For classifications within each group, see pages 39B-40.

[b] **AREA 1** - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties.

[c] **AREA 2** - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity counties. (Portions of counties falling in each area detailed on page 41).

[d] Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.

[e] Includes an amount for supplemental dues.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at http://www.dir.ca.gov/OPRL/PWD. Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at http://www.dir.ca.gov/OPRL/PWD. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

State of California
California State Transportation Agency

Department of Transportation
Division of Construction

Labor Surcharge and Equipment Rental Rates

(Cost of Equipment Ownership)

Effective April 1, 2017 through March 31, 2018

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FOR DOUBLE-SIDED PRINTING

Table of Contents

USER'S GUIDE
FOR LABOR SURCHARGE AND EQUIPMENT RENTAL RATES
April 1, 2017 - March 31, 2018

Equipment Rental Rates are available on the Internet at:

http://www.dot.ca.gov/hq/construc/equipmnt.html

Miscellaneous Equipment Rental Rates are available on the Internet at:

http://www.dot.ca.gov/hq/construc/misceqrr/index.htm

The miscellaneous listing is updated daily.

Changes

Books are no longer available in hard copy and should be downloaded from the internet and printed.
Changes to the equipment rates in the April 1, 2017 book are the result of: 1) fuel costs decreased; 2) interest rates decreased; 3) Producers' Price Index increased; 4) no change in sales tax; and 5) no change in freight (F.O.B.) rates.

Labor Surcharge

The labor surcharge compensates the contractor for statutory payroll items stipulated by various governmental agencies. The six items included are worker's compensation, social security, Medicare, Federal unemployment insurance, State unemployment insurance, and State training taxes. The general rate is an average of the job classifications common to Caltrans projects. The labor surcharges in the April 1, 2017 book are the result of decreases in worker's compensation rates. The rates were derived from using the pure premium rate approved by the Insurance Commissioner effective January 1, 2017 and increasing it by the historical statewide average expense. In the calculation of the labor surcharge for overtime work, the worker's compensation is not included on the premium portion of overtime, as provided by worker's compensation regulations.

The surcharge percentage to be applied to the actual wages paid as provided in Section 9-1.04B [9-1.03A(1b)] of the *Standard Specifications* will **be 11 percent for regular time (RT)** and **11 percent for overtime (OT)**.

Exceptions to the general rate are listed below. These classifications were chosen because of high worker's compensation insurance costs. Forward questions, regarding worker's compensation rating and proper labor surcharge usage, to the rental rate personnel in the Division of Construction.

EXCEPTIONS

Type of Work Performed	Labor Surcharge Percent	
	RT	**OT**
Concrete Construction - Bridge	**11**	**11**
Drilling	**14**	**13**
Fence & Guardrail Construction	**13**	**12**
Erection of structural metal for metal bridges, excluding sign bridge	**14**	**13**
Landscape Gardener	**12**	**11**
Mobil Crane & Hoist Service	**15**	**14**
Painting Steel Structures or Bridges	**15**	**14**
Pile Driving, not including drilled, cast-in-place concrete piles	**16**	**15**
Sign Erection or Repair	**17**	**15**
Wrecking & Demolition	**13**	**12**

An appropriate labor surcharge will be established by the Division of Construction for work that is determined by the resident engineer to be covered by Longshoreman and Harbor Worker's Act.

Background

By the authority described in Section 9-1.04 [9-1.03A] of the *Standard Specifications*, compensation for work paid by force account is determined to be the total of the direct equipment costs (rental rate) plus a 15 percent markup for all overhead not included as direct costs. The direct costs include fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance, depreciation, storage, cost of facilities capital, overhaul and all incidentals. The labor costs required to provide the above listed items are also included. The operator cost is not included in the equipment rate.

The calculated rate represents the cost of owning and operating the equipment, which is likely to be lower than the rate charged by a rental yard. The rental yard rate may include additional overhead and profit as well as a premium for short-term rentals. In certain situations, factors are applied to the calculated rates to provide ownership-only rates for delay situations or operating-only rates for overtime situations. The rates are calculated using factors for the direct cost items described above. The factors represent an average and are applied to all makes and models of equipment within the class. **All rates are hourly, unless stated otherwise.**

Overtime and Multiple Shifts

Certain equipment costs are fixed on an annual basis, no matter how many hours are worked. Once an estimate of the costs and hours of use is made, a rate can be determined. When more than the estimated number of hours are worked (Overtime or Multiple Shift), a duplication of payment occurs on the fixed cost portion of the equipment rate.
In order to avoid this duplication, Caltrans uses a reduced rate for the Overtime or Multiple Shift situations. The definition of Overtime or Multiple Shift periods is:

Overtime hours occur after the equipment has worked at force account, eight hours per day (or after the daily equivalent of forty hours per week for special work schedules - 4/10 or 9/80). Multiple shift hours will be paid at the same rate as overtime hours.

The hours shown on the Daily Extra Work Bill will determine when the Overtime and Multiple Shift is to be used. **When the hours worked on force account are eight or less, straight time rates will be used**. When the hours worked on force account are more than eight, Overtime and Multiple Shifts rates will be used. Saturday, Sunday or holiday work will be paid at the overtime rate except in those cases where these days are considered working days in the special provisions.

Be advised the computed overtime rates are no longer rounded and now equal the product of the straight time rate and overtime factor. The Overtime and Multiple Shift Factors are recalculated annually to reflect changes in the operating costs.

Delays

As described in Section 8-1.07C [8-1.09] of the *Standard Specifications*, the Delay Factor may be applied to the equipment rental rate. The Delay Factor may be the basis for compensation for idle equipment time on an excusable delay. The factor has been calculated to include the ownership costs without including operating costs. The Delay Factor recovers all the contractor's non-operating costs in an eight hour day. If payment is made for equipment on an excusable delay, it is limited to eight hours per day or forty hours per week maximum.

The NONOP class for non-operated items and the TRAFC class for traffic safety devices have been separated from traditional "rolling stock" equipment when calculating the Delay Factor. These classes are comprised of items whose depreciable lives are related to the number of uses per year, rather than the number of hours per year. Accordingly, the reasonable compensation for the contractor's actual loss has been estimated to equal the cost of facilities capital. **It should be recognized that these items must be out of service before the Delay Factor is applied. For example, if work behind K-rail is delayed, the K-rail should be paid straight time until it is no longer controlling traffic.**

Any use of this factor must have the prior approval of the resident engineer. The Delay Factor is recalculated annually to reflect changes in the operating costs.

Use of Daily Extra Work Bill

Identification codes and rates are intended to be used with the Department's Internet change order billing system. The class is abbreviated using a 5 digit alpha-code, the make (manufacturer), a 4 digit alpha-code, and the code a 7 digit alpha-numeric code. All three codes must be used to define the equipment when using the automated pay system. Since the majority of items are described by per hour rates, each line has an entry for hours with an allowable maximum of 24. Special items with other than hourly rates should be appropriately checked and then entered in the Regular Hours column. For example, 50 Traffic Cones used 3 days (converts to 1.5, 100-cone-days) requires 1.5 be entered in the Regular Hours column. Note that any entry in the Delay Factor column will automatically apply the Delay Factor to every equipment entry on the current report.

Whenever an identification code cannot be found or the rate for a particular date of work performed is not available, updated information should be requested from the resident engineer. It is the resident engineer's responsibility to establish rates for equipment not found in the *Labor Surcharge and Equipment Rental Rates* publication. Support for this determination is available from both District and Headquarters Construction Offices. **Rates are regularly superseded during contract periods, so avoid the use of old publications or expired rates**.

The equipment is presented with a standard configuration capable of performing work commonly encountered on Caltrans projects. Special attachments or accessories are described under the classification heading in the *Labor Surcharge and Equipment Rental Rates* publication. Attachments other than those described by these remarks will be paid only upon direction of the resident engineer.

EQUIPMENT RENTAL RATE

NOTE--THE FOLLOWING RATES ARE IN EFFECT FROM APRIL 1, 2017 THROUGH MARCH 31, 2018

ATTACHMENTS

TRACTOR ATTACHMENTS -including power control units and accessories necessary to provide a functional attachment. Dozer blades are included in the standard configuration for both crawler and heavy, rubber tire tractors. Rippers are listed from R1 to R8 and Winches for logging or towing are listed from S1 to S5. Equipment model groups are as follows:
1. Case 300 Thru 800 Series, Cat D-2 thru D-4, Deere 400 & 450, Dresser TD-7, TD-8 and TD-9, Fiat-Allis FD-5 Thru FD-7, Komatsu D21E Thru D37P, Liebherr PR711 & PR721.
2. Case 1150, Cat D-5, Deere 750, Dresser TD-12, Fiat-Allis FD9 & 10, Komatsu D58P, Liebherr PR731.
3. Case 1450 and 1550, Cat D-6, Deere 850, Dresser TD-15, Komatsu D63PE Thru D68P, Liebherr PR741.
4. Cat D-7 & 814, Dresser TD-20, Fiat-Allis 14 & FD14, Komatsu D83P, Terex 82-30
5. Cat D-8 & 824, Dresser TD-25, Fiat-Allis FD20 Komatsu D135A, Terex 82-40 Michigan 280, Raygo CHD 17 & CD-500.
6. Cat D-9 & 834, Fiat-Allis FD30, Raygo CHD 24 & CD 800.
7. Cat D-10, Dresser TD-40, Fiat-Allis FD40, Komatsu 375, Michigan 380, Raygo CDH 30.
8. Cat D-11, Fiat-Allis FD50, Komatsu 475

Model	Code	Rate
Clam action bucket 1 CY & Less	**C1**	$4.09
Clam action Over 1 CY to 2 CY	**C2**	$7.20
Clam action Over 2 CY to 3.5 CY	**C3**	$10.42
Clam action Over 3.5 CY to 5 CY	**C4**	$14.86
Clam action bucket Over 5 CY	**C5**	$20.54
Ripper on No. 1 models	**R1**	$2.46
Ripper on No. 2 models	**R2**	$3.22
Ripper on No. 3 models	**R3**	$5.37
Ripper on No. 4 models	**R4**	$6.08
Ripper on No. 5 models	**R5**	$9.98
Ripper on No. 6 models	**R6**	$15.78
Ripper on No. 7 models	**R7**	$18.30
Ripper on No. 8 models	**R8**	$30.47
Winch on No. 1 models	**S1**	$2.92
Winch on No. 2 models	**S2**	$4.35
Winch on No. 3 models	**S3**	$5.77
Winch on No. 4 models	**S4**	$7.40
Winch on No. 5 models	**S5**	$12.96
Lift gate	**TG**	$0.84
Pump, water truck only	**TP**	$5.78
Winch, truck	**TW**	$0.31
Gas welding hose per 15.2 m (50 lf)	**WH**	$0.02
Elec welding lead per 30.5 m (100 lf)	**WL**	$0.18

AIR COMPRESSOR [AIRCP]

DELAY FACTOR = 0.17 **OVERTIME FACTOR = 0.85**

All types of self contained units, regardless of power (gas, diesel and lpg) or type of compression (reciprocating, screw and vane). The listed rates include 15.2 meters (50 lineal feet) of hose, all hose whips, fittings, couplings and any compressor attachments. Listed in accordance with mfr's rated capacity in liters per second (cubic feet per minute) at 7 bar (100 psi).

PORTABLE **[PORT]**

OVER	TO	Code	Rate
0	19 (40)	**000-004**	$3.75
19 (40)	76 (160)	**004-016**	$13.98
76 (160)	118 (250)	**016-025**	$15.48
118 (250)	212 (450)	**025-045**	$27.71
212 (450)	354 (750)	**045-075**	$45.06
354 (750)	566 (1200)	**075-120**	$67.23
566 (1200)	708 (1500)	**120-150**	$86.90

AIR DRILLS, CRAWLER [AIRDL]

DELAY FACTOR = 0.48 **OVERTIME FACTOR = 0.56**

All types, pneumatically propelled, including attachments. Expendable carbon drill steel, bits and shanks shall be paid by separate invoice. Rated in accordance with the cylinder bore diameter in millimeters(inches).

CRAWLER DRILLS **[CLR]**

OVER	TO	Code	Rate
0	100 (4)	**0-4**	$25.28
100 (4)	& Over	**5**	$25.87

AIR TOOLS [AIRTO]

DELAY FACTOR = 0.61 **OVERTIME FACTOR = 0.42**

All types including paving breakers, clay spades and diggers, sinker rock drills, trench diggers, sheeting/spike drivers, backfill tampers and hand held grinding tools. Expendable drill steel, bits and breakers points, grinding wheels and shanks shall be paid by separate invoice. Rated by tool weight in kilograms (pounds), determined in accordance with the mfr's specifications.

AIR TOOLS **[ATOL]**

OVER	TO	Code	Rate
0	4.5 (10)	**0-10**	$0.42
4.5 (10)	9.1 (20)	**10-20**	$0.46
9.1 (20)	13.6 (30)	**20-30**	$0.83
13.6 (30)	18.1 (40)	**30-40**	$0.97
18.1 (40)	27.2 (60)	**40-60**	$1.05
27.2 (60)	& Over	**60**	$1.48

ASPHALT DIKE & SHOULDER PAVERS [ASDSP]

DELAY FACTOR = 0.13 **OVERTIME FACTOR = 0.90**

Includes all attachments, accessories and automatic grade and line control.

A.C. DIKE COMPANY [ACDC]

Model	Code	Rate
No. 1	**4050**	$62.40
No. 2	**4052**	$53.62
Nos. 43, 44	**4054**	$74.37

ASPHALT PAVING COMPANY [APCO]

Model	Code	Rate
E-1	**4000**	$88.85
E-2, E3	**4002**	$158.45

BLAW-KNOX [B-K]

Model	Code	Rate
RW-35 / 38	**4075**	$63.07
RW-85	**4077**	$31.13
RW-95	**4079**	$49.98
RW-100	**4081**	$91.61
RW-195D	**4083**	$125.22

DELTA [DLTA]

Model	Code	Rate
DC-1	**4095**	$127.15

ASPHALT PAVERS [ASPAV]

DELAY FACTOR = 0.19 **OVERTIME FACTOR = 0.85**

Includes all attachments, accessories and automatic grade and line control.

BARBER-GREENE [B-G]

Model	Code	Rate
BG 220	**0805**	$81.09
BG 225	**0810**	$88.57
BG 240	**0815**	$95.15
BG 245	**0820**	$104.95
BG 260	**0825**	$120.66
BG 260B	**0826**	$159.30
BG 265	**0830**	$138.08
RT 435, 4wd	**0905**	$102.15
RT 445, 4wd	**0925**	$100.53
RT 455, 4wd	**0945**	$98.59
RT 455, 4wd, 10-20' screed	**0955**	$102.35
RT 465, 4wd	**0965**	$128.50
SA 125	**1419E**	$77.16
SB 131	**1420**	$95.68
SB 140	**1425**	$117.15
SA 141	**1430**	$80.06
SA 145	**1432**	$102.65
SA 150	**1435**	$128.74
SB 170	**1440**	$128.76

BLAW-KNOX [B-K]

Model	Code	Rate
PF-22	**1490**	$36.07
PF-35	**1550**	$63.74
PF-115	**1750**	$105.57
PF-120H	**2010**	$94.71
PF-171	**2090**	$146.23
PF-180	**2100**	$60.10
PF-180H	**2204**	$153.14
PF-200	**2250**	$150.57
PF-200, 18' screed	**2252**	$153.47
PF-220	**2300**	$151.92
PF-400A	**2350**	$134.28
PF-500	**2404**	$165.12
PF-500, 18' screed	**2406**	$168.23
PF-510, 18' screed	**2407**	$175.85
PF-3172, 18' screed	**2408**	$146.42
PF-3200	**2410**	$194.60
PF-5510	**2415**	$203.91

CATERPILLAR [CAT]

Model	Code	Rate
AP-200	**2420**	$38.38
AP-800	**2430**	$102.92
AP-1050	**2431**	$162.14
AP-1000	**2435**	$159.01
AP-1000 4wd	**2436**	$165.04
AP-1055B	**2438**	$206.32
AP-1055D	**2438D**	$257.24
AP-1200	**2440**	$129.79

CEDAR RAPIDS [CEDR]

Model	Code	Rate
BSF-2H	**2550**	$83.21
BSF-3R	**2600**	$89.74
CR-351	**2668A**	$135.07
CR-351 4wd	**2668B**	$139.87
CR-361R (RUBBER TRACK)	**2668R**	$169.20
CR-431	**2669**	$113.18
CR-551	**2670**	$182.39
CR-461	**2672**	$180.25
CR-561	**2674**	$192.40

LAYTON [LYTN]

Model	Code	Rate
F-525	**2680**	$20.07
D-550	**2682**	$22.57
H-500B	**2684**	$7.18

ASPHALT WINDROW PICKUP MACHINE [ASPWP]

DELAY FACTOR = 0.09 **OVERTIME FACTOR = 0.93**

Includes all attachments and accessories.

ATHEY **[ATHY]**

Model	Code	Rate
7-11	**5000**	$77.08

BARBER-GREENE **[B-G]**

Model	Code	Rate
BG-610H	**5100**	$56.53

CATERPILLAR **[CAT]**

Model	Code	Rate
WE-601B	**5200**	$61.31

CLARK'S WELDING COMPANY **[CLAR]**

Model	Code	Rate
500	**5300**	$46.64
601	**5304**	$41.14
Lincoln 660	**5305**	$84.46

C.M.I. **[CMI]**

Model	Code	Rate
851	**5405**	$77.37

AUGERS, CRAWLER MOUNTED [AUGCL]

DELAY FACTOR = 0.31 **OVERTIME FACTOR = 0.72**

Includes carrier, attachments and accessories with up to 6.1 meters(20 feet) of auger flights. Consumable bits or tips to be paid by separate invoice.

BAYSHORE **[BYSH]**

Model	Code	Rate
8400 TD limited access	**1500**	$105.93

TEXOMA **[TXMA]**

Model	Code	Rate
TAURUS	**2010**	$220.19
700CL	**2100**	$126.27

WATSON **[WATS]**

Model	Code	Rate
2000CM	**2500**	$95.55
2500CM	**2505**	$148.47
3000CM	**2510**	$168.42
3100CM	**2515**	$175.49

AUGERS, HORIZONTAL [AUGHZ]

DELAY FACTOR = 0.30 **OVERTIME FACTOR = 0.73**

Includes all attachments and accessories with up to 9.1 meters(30 feet) of auger flight, track and/or pipe pusher. Consumable bits or tips shall be paid by separate invoice. Power unit is included.

AKKERMAN **[AKMN]**

Model	Code	Rate
360	**5000**	$105.45
420 series 1250	**5002**	$108.34

AMERICAN AUGER **[AMAU]**

Model	Code	Rate
36-350	**5014**	$25.74

BORZALL **[BORZ]**

Model	Code	Rate
2300-10	**5040**	$8.36
4265-10	**5042**	$11.56

DITCH WITCH **[D-W]**

Model	Code	Rate
2510	**5040**	$41.84

AUGERS, TRUCK MOUNTED [AUGTK]

DELAY FACTOR = 0.24 **OVERTIME FACTOR = 0.78**

Includes truck/carrier, all attachments and accessories with up to 6.1 meters(20 feet) of auger flight. Consumable bits or tips shall be paid by separate invoice.

ATLANTIC **[ATLN]**

Model	Code	Rate
LDH-80	**5000**	$167.69
LDH-100	**5005**	$138.84
LLDH-80	**5010**	$175.26
LLDH-120	**5015**	$188.26

CALWELD **[CALW]**

Model	Code	Rate
150-A	**5050**	$75.60
200	**5052**	$97.75
4500LH	**5054**	$165.37

HUGHES **[HUGH]**

Model	Code	Rate
EZ 112	**5070**	$57.08
EZ 120	**5071**	$64.39
LDH-100	**5072**	$107.78
LDH-80	**5074**	$106.25
LLDH-120	**5076**	$157.00
LLDH-80	**5078**	$144.40

P.D.E. **[PDE]**

Model	Code	Rate
M -100	**5084**	$34.63
M-400 with hammer	**5085**	$30.34

TEXOMA **[TXMA]**

Model	Code	Rate
Economatic 115	**5087**	$76.42
Super Economatic	**5089**	$75.74
80	**5090**	$123.29
270	**5093**	$78.61
330	**5095**	$81.79
330 with hammer	**5095B**	$94.72
500 with hammer	**5096B**	$96.56
600	**5097**	$103.09
700	**5099**	$165.50

WATSON **[WATS]**

Model	Code	Rate
1000	**6010**	$61.69
2000	**6012**	$130.66
3000	**6014**	$166.84

BITUMINOUS DISTRIBUTORS [BITDT]

DELAY FACTOR = 0.16 **OVERTIME FACTOR = 0.86**

Includes all equipment for handling bituminous materials under pressure. Includes pumps, spray bars and other attachments and accessories.

TRAILER MOUNTED **[TLMD]**

Does not include towing unit. Capacity rated in liters (U.S. gallons).

OVER	TO	Code	Rate
0	1136 (300)	**0-300**	$6.03

TRUCK MOUNTED **[TRMD]**

Including truck. Capacity rated in liters (U.S. gallons).

OVER	TO	Code	Rate
0	3028 (800)	**00-08**	$52.89
3028 (800)	5299 (1400)	**08-14**	$68.03
5299 (1400)	6831 (1800)	**14-18**	$70.42
6831 (1800)	11355 (3000)	**18-30**	$72.22
11355 (3000)	15140 (4000)	**30-40**	$76.02

BROOMS & SWEEPING EQUIPMENT [BRMSW]

DELAY FACTOR = 0.17 **OVERTIME FACTOR = 0.84**

Includes all attachments and accessories with brooms of any type. Includes broom wear.

BROOMS - MOUNTED & TOWED **[MTTD]**

Includes traction, PTO or engine driven.

Model	Code	Rate
ALL	**ALL**	$24.75

BROOMS - SELF PROPELLED **[SFPR]**

Model	Code	Rate
ALL	**ALL**	$36.49

SWEEPERS - SELF PROPELLED, **[SWSP]**

PICK UP

Rated in accordance with hopper size in cubic meters (cubic yards).

OVER	TO	Code	Rate
0	2.3 (3.0)	**0-3**	$84.73
2.3 (3.0)	4.6 (6.0)	**3-6**	$113.60
4.6 (6.0)	6.9 (9.0)	**6-9**	$131.08

BRUSH CHIPPING & SHREDDING MACHINES [BRUCP]

DELAY FACTOR = 0.09 **OVERTIME FACTOR = 0.92**

Includes all attachments, accessories and power unit. Rated in accordance with the cutter head width in millimeters(inches)

BRUSH CHIP & SHRED **[BCSM]**

OVER	TO	Code	Rate
0	230 (9)	**00-09**	$24.59
230 (9)	300 (12)	**09-12**	$37.85
300 (12)	405 (16)	**12-16**	$37.53

COMPACTORS, HAND GUIDED [COMHG]

DELAY FACTOR = 0.22 **OVERTIME FACTOR = 0.80**

Includes pan, vibrating plate, rammer and jumping jack type compactors(gas or diesel). Includes all attachments and accessories. Listed in accordance with the weight in kilograms(pounds)

COMPACTORS **[COMP]**

OVER	TO	Code	Rate
0	113 (250)	**0-250**	$3.28
113 (250)	& Higher	**250**	$8.26

CONCRETE MIXERS [CONMX]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.88**

STATIONARY OR PORTABLE **[SORP]**

Rated by Mfr's capacity in cubic meters (sacks or cubic feet).

OVER	TO	Code	Rate
0	0.10 (3.5)	**0-3.5**	$1.72
0.10 (3.5)	0.17 (6.0)	**03.5-6**	$2.55
0.17 (6.0)	0.31 (11)	**06-11**	$3.29
0.31 (11)	0.45 (16)	**11-16**	$4.69

TRANSIT MIX **[TRMX]**

PTO type, including carrier. Rated by Mfr's capacity in cubic meters (cubic yards).

OVER	TO	Code	Rate
6.4 (9)	7.6 (10)	**09-10**	$124.34
7.6 (10)	9.2 (12)	**10-12**	$122.43

CONCRETE PUMPS [CONPM]

DELAY FACTOR = 0.19 **OVERTIME FACTOR = 0.83**

Includes truck/carrier or self powered trailer mounted units. Including attachments, accessories and hoses.

ELBA **[ELBA]**

Model	Code	Rate
K-8020	**1000**	$77.87

MAYCO **[MACO]**

Model	Code	Rate
C-30HD	**1020**	$14.21
LST-30/60S	**1024**	$24.49

SCHWING **[SHWG]**

Model	Code	Rate
BPA-1000	**1050**	$30.58
WP-1000X	**1052**	$40.25
WP-1250X	**1054**	$51.87
900-1200 w/28 m boom	**1055**	$83.59
900-1200 w/32 m boom	**1057**	$90.29
BPL 1200 w/36 m boom	**1058**	$100.12

THOMSEN **[THOM]**

Model	Code	Rate
A-3.75 w/ mixer	**1070**	$19.05
A-7	**1072**	$16.35
11 pump w/28 m boom	**1078**	$95.77
12 pump w/32 m boom	**1082**	$103.06
14 pump w/36 m boom	**1084**	$150.83

CONCRETE SLIPFORM PAVERS [CONSF]

DELAY FACTOR = 0.21 **OVERTIME FACTOR = 0.83**

Includes all attachments and accessories. Detached, independently powered finished bridges or spray/tyne machines are not included.

C.M.I. **[CMI]**

Model	Code	Rate
SF-250	**2002**	$142.71
SF-350 series 2	**2004**	$235.87
SF-550	**2006**	$309.30

GOMACO **[GOMA]**

Model	Code	Rate
GP-2000	**2020**	$144.04
GP-2500	**2022**	$159.75
GP-3500	**2024**	$230.63

CONCRETE VIBRATORS [CONVB]

DELAY FACTOR = 0.37 **OVERTIME FACTOR = 0.65**

Includes all attachments and accessories. Includes vibrator motor but independent power, whether air or electric, shall be paid as a separate item.

CONCRETE VIBRATORS **[CVIB]**

Model	Code	Rate
Each Vibrating Head	**EVHD**	$0.90

CURB EXTRUSION MACHINES [CRBEX]

DELAY FACTOR = 0.24 **OVERTIME FACTOR = 0.80**

Self propelled for asphalt or concrete curb and gutter section. Includes attachments, accessories and molds. Rated by Mfr's maximum width recommendations in millimeters (inches).

CURB EXTRUSION MACHINE **[CEM]**

OVER	TO	Code	Rate
0	460 (18)	**0-18**	$29.26
460 (18)	& Over	**18 PLUS**	$84.34

CONCRETE BARRIER SLIPFORM PAVERS [CRBSF]

DELAY FACTOR = 0.22 **OVERTIME FACTOR = 0.83**

Includes all attachments, accessories and barrier or curb molds.

C.M.I. **[CMI]**

Model	Code	Rate
SF-175	**3000**	$106.58

CURBMASTER **[CURB]**

Model	Code	Rate
CMT-800	**3020**	$67.46

GOMACO **[GOMA]**

Model	Code	Rate
GT-6000-(78&90)	**3040**	$74.68
COMMANDER II	**3045**	$86.41
COMMANDER III	**3050**	$118.32

MILLER FORMLESS **[MILL]**

Model	Code	Rate
M-7500	**3063**	$87.36
M-8100	**3065**	$123.54
M-8800	**3067**	$159.03

ELECTRIC GENERATORS & LIGHT PLANTS [ELGEN]

DELAY FACTOR = 0.15 **OVERTIME FACTOR = 0.86**

Rates are for gas or diesel power and alternating or direct current.

GENERATOR [GEN]

Rated in accordance with Mfr's output in kilowatts.

OVER	TO	Code	Rate
0	1	**000-001**	$0.65
1	3	**001-003**	$1.48
3	7.5	**003-008**	$3.08
7.5	15	**008-015**	$6.92
15	25	**015-025**	$10.81
25	50	**025-050**	$11.10
50	100	**050-100**	$19.54
100	200	**100-200**	$38.79
200	300	**200-300**	$65.03
300	400	**300-400**	$89.20
400	500	**400-500**	$112.09

LIGHTS [LITE]

Includes trailer, pole and generator.

Model	Code	Rate
2 Light Set	**2 LIGHT**	$3.40
4 Light Set	**4 LIGHT**	$7.20

ELECTRIC POWERED HAND TOOLS [ELTOL]

DELAY FACTOR = 0.61 **OVERTIME FACTOR = 0.42**

Includes electric powered, hand held tools not listed elsewhere in this book. Expendable bits, blades, discs, wheels, etc. shall be paid by separate invoice. Rated in accordance with Mfr's suggested retail price.

TOOLS [TOOL]

OVER	TO	Code	Rate
450	600	**045-060**	$0.30
600	800	**060-080**	$0.40
800	1000	**080-100**	$0.50

FORK LIFT TRUCKS [FKLFT]

DELAY FACTOR = 0.25 **OVERTIME FACTOR = 0.77**

Includes attachments and accessories. Listed in accordance with the Mfr's maximum rated capacity in kilograms(pounds).

FORK LIFT TRUCKS [FLT]

OVER	TO	Code	Rate
454 (1000)	1814 (4000)	**010-040**	$24.61
1814 (4000)	2722 (6000)	**040-060**	$32.73
2722 (6000)	3629 (8000)	**060-080**	$37.00
3629 (8000)	5443 (12000)	**080-120**	$50.74
5443 (12000)	7258 (16000)	**120-160**	$54.04
7258 (16000)	9072 (20000)	**160-200**	$63.52
9072 (20000)	11340 (25000)	**200-250**	$63.46
11340 (25000)	13608 (30000)	**250-300**	$69.67
13608 (30000)	18144 (40000)	**300-400**	$89.91
18144 (40000)	22680 (50000)	**400-500**	$109.54
22680 (50000)	34020 (75000)	**500-750**	$150.47

GRADERS [GRADR]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.88**

Includes ripper and scarifier attachments and all accessories. Electronic blade control and specialty cutting tools shall be paid separately.

BLADE-MOR [BMOR]

Model	Code	Rate
727	**2173**	$20.72
747	**2178**	$30.18

CATERPILLAR [CAT]

Model	Code	Rate
120G 87V serial	**2685**	$58.99
130G 74V serial	**2695**	$65.65
12E 99E serial	**2710**	$39.17
12F 73G serial	**2768**	$59.27
12F 13K serial	**2826**	$46.65
12F 89H serial	**2884**	$47.14
12G 61M serial	**2890**	$67.41
12H	**2895**	$73.46
14E 72G serial	**3174**	$61.50
14G	**3180**	$100.56
14H	**3185**	$111.44
140 14U serial	**3250**	$62.53
140G 72V serial	**3260**	$72.57
140H	**3265**	$78.54
143H	**3267**	$88.03
16 49G serial	**3290**	$80.59
16 49G800 serial	**3348**	$117.86
16 G93U serial	**3360**	$140.19
16H	**3380**	$150.02
160H	**3385**	$92.04
163H	**3390**	$97.66

JOHN DEERE [DEER]

Model	Code	Rate
JD-570A	**3890**	$38.64
JD-570B	**3892**	$45.65
JD-670	**3900**	$48.88
JD-670A	**3905**	$54.89
JD-670CH	**3907**	$73.36
JD-770	**3910**	$55.57
JD-770A, 770A-H	**3915**	$66.17
JD-770B	**3916**	$73.43
JD-772CH	**3930**	$89.24

GALION **[GALN]**

Model	Code	Rate
A-400E	**4940**	$53.52
T-400A	**4980**	$50.88
T-500C	**5150**	$59.00
T-500L	**5204**	$57.58
T-500M	**5210**	$60.66

KOMATSU **[KOMA]**

Model	Code	Rate
GD 505A-2	**8980**	$55.98
GD 515A-1	**8986**	$59.00
GD 605A-2	**9000**	$61.65
GD 615A-1	**9005**	$68.86
GD 625A-1C	**9007**	$91.26
GD 655A-2	**9010**	$68.16

HAMMERS, DEMOLITION & PILE [HAMMR]

DELAY FACTOR = 0.25 **OVERTIME FACTOR = 0.78**

Includes attachments, accessories and power unit. Does not include carrier.

ABI **[ABI]**

Model	Code	Rate
HVR-60	**0100**	$32.11

AMERICAN PILE DRIVING EQUIPMENT **[APE]**

Model	Code	Rate
150	**0010**	$138.58
180	**0050**	$186.65
200/500	**0060**	$210.92
300 VIBRO	**0075**	$231.46
400B VIBRO	**0085**	$372.32

ALLIED STEEL & TRACTOR **[AS&T]**

Model	Code	Rate
800	**0300**	$54.16
HYRAM 720	**0310**	$5.88
HYRAM 725	**0320**	$11.05
HYRAM 730	**0330**	$13.47
HYRAM 740	**0340**	$19.20
HYRAM 750	**0350**	$21.33
HYRAM 77	**0360**	$8.89
HYRAM 770	**0370**	$21.68
HYRAM 780	**0380**	$35.23
HYRAM 790	**0390**	$46.23
HYRAM 88	**0400**	$15.19

DELMAG **[DELM]**

Model	Code	Rate
D-12	**0500**	$22.93
D-16	**0510**	$32.30
D-22	**0520**	$51.35
D-30	**0530**	$37.81
D-30-32	**0540**	$57.45
D-36-32	**0560**	$74.92
D46-32	**0570**	$87.77
D62-22	**0580**	$144.24
D100-13	**0590**	$226.33

FOSTER **[FOST]**

Model	Code	Rate
1700	**0600**	$113.53
4030	**0630**	$159.75
FNV-1800	**0660**	$98.77
FNV-4150	**0693**	$205.14

HYDRAULIC POWER SYS **[HPSI]**

Model	Code	Rate
150	**0420**	$81.52
260	**0430**	$128.88
300	**0440**	$154.90

I.C.E. **[ICE]**

Model	Code	Rate
44-50	**0450**	$195.42
216	**0460**	$70.72
416L	**0470**	$116.86
812	**0480**	$181.26

KENT **[KENT]**

Model	Code	Rate
KHB10G	**0700**	$18.15
KHB 15G	**0710**	$26.12
KHB 30G	**0750**	$29.61
KHB 40G	**0760**	$46.92

NPK **[NPK]**

Model	Code	Rate
4XE	**0795**	$14.50
6XA	**0800**	$12.88
H-10XB	**0810**	$31.55
H-12X	**0815**	$33.74
H-16X	**0820**	$31.14
H-20X	**0840**	$35.28
H4X,HXA	**0860**	$10.80
H7X	**0880**	$13.98

OKADA **[OKAD]**

Model	Code	Rate
UB-5	**0900**	$7.63
UB-8	**0950**	$14.83

RAMMER **[RAMR]**

Model	Code	Rate
S-84	**1000**	$31.23
S-86	**1050**	$33.64

STANLEY **[STAN]**

Model	Code	Rate
MB250	**1100**	$5.80
MB2900	**1120**	$23.34
MB4900	**1140**	$41.49
MB550	**1160**	$9.18
MB800	**1180**	$13.68

TELEDYNE **[TELD]**

Model	Code	Rate
950X	**1190**	$31.20
TB1025	**1195**	$34.16
TB1425X	**1200**	$33.93
TB2225X	**1220**	$63.42
TB425	**1240**	$13.45
TB825X	**1260**	$23.30

TRAMAC **[TRMC]**

Model	Code	Rate
BRH1100	**1300**	$35.84
BRH125	**1310**	$10.98
BRH250	**1320**	$12.59
BRH400	**1330**	$11.87
BRH620	**1340**	$23.50
BRH750	**1350**	$21.70
BRV950	**1360**	$22.89

TUNKER **[TUNK]**

Model	Code	Rate
40.01	**1400**	$154.98
40.05	**1450**	$154.98
60.05	**1460**	$129.73

VULCAN **[VULC]**

Model	Code	Rate
1	**1500**	$25.92
010	**1520**	$37.03
100C	**1540**	$38.62
2300	**1560**	$123.78
80C	**1580**	$29.74

HYDRAULIC CRANES & EXCAVATORS, CRAWLER MOUNTED [HCECL]

DELAY FACTOR = 0.21 **OVERTIME FACTOR = 0.82**

Includes all attachments and accessories required for lifting or digging. Pavement breaker or compactor attachments are not included.

BANTAM **[BANT]**

Model	Code	Rate
C 266	**0680**	$71.99
C 366	**0690**	$83.66
C 744	**1075**	$55.44

CASE **[CASE]**

Model	Code	Rate
9030B	**0100B**	$72.77
9040	**0110**	$84.32
9060B	**0120B**	$169.32
40E E-Boom	**1600**	$66.09
40E Y-Boom	**1601**	$66.48
50E	**1602**	$83.52
125B	**1602H**	$68.94
170C	**1602N**	$95.08
220B	**1602R**	$123.14
880B Y-Boom	**1609**	$46.98
980B	**1615**	$72.97
1080	**1615E**	$63.41
1080B	**1615J**	$64.99
1280	**1616**	$87.30
1280B	**1616E**	$81.50

CATERPILLAR **[CAT]**

Model	Code	Rate
304 CR	**0200**	$26.50
305C CR	**0250**	$35.17
312	**0300**	$43.88
312C	**0300C**	$48.26
312CL	**0300CL**	$49.17
314CL CR	**0302CLR**	$55.37
315L	**0305**	$53.30
320	**0310**	$70.33
320BL	**0312**	$74.56
320C	**0312C**	$72.49
320CL	**0312CL**	$81.08
320L	**0315**	$71.74
321C LCR	**0320R**	$101.14
322L	**0325**	$88.25
325	**0330**	$92.88
325BL	**0335**	$102.67
325L	**0340**	$97.44
328D LCR	**0343DR**	$122.88
330BL	**0345**	$128.44

330CL	**0345CL**	$140.37
330D L	**0345DL**	$170.07
330L	**0350**	$122.36
345BL	**0355**	$173.05
350L	**0360**	$174.25
375L	**0365**	$280.05
205	**1617**	$30.33
211	**1617E**	$43.99
213	**1617H**	$48.50
215	**1618**	$50.12
215B LC	**1619E**	$55.95
215C	**1619F**	$61.67
215D	**1619G**	$68.60
225	**1620**	$71.02
225LC	**1621**	$71.53
225D LC	**1622**	$89.99
227	**1623**	$74.50
229	**1625**	$96.53
231D	**1630**	$110.60
231DLC	**1635**	$112.13
235	**1640**	$114.81
235B	**1642**	$127.83
235 Front Shovel	**1645**	$124.33
235B Front Shovel	**1647**	$138.61
235C	**1648**	$145.19
235DLC	**1649**	$150.89
245	**1650**	$193.60
245B	**1650B**	$213.32
245 Front Shovel	**1652**	$205.06
245B Front Shovel	**1652B**	$228.34
E 180	**1653**	$59.41
EL 180	**1654**	$60.52
EL 200B	**1654E**	$65.17
E 240	**1655**	$76.63
EL 240	**1656**	$78.06
E 300	**1657**	$96.05
E 300B	**1657B**	$106.61
EL 300	**1658**	$97.91
EL 300B	**1658B**	$108.61

JOHN DEERE **[DEER]**

Model	Code	Rate
225D LC	**1575D**	$91.41
330C LC	**1600C**	$131.88
450LC	**1645**	$167.19
490	**1660**	$36.31
490E	**1660E**	$46.77
690A	**1685**	$48.91
690B	**1695**	$62.03
690C	**1697**	$56.91
690D	**1697D**	$59.94
690E LC	**1697ELC**	$69.97
790	**1698**	$71.84
790D	**1698D**	$77.17
790E LC	**1698ELC**	$85.84
792	**1699**	$85.22
890	**1700**	$114.72
890A	**1705**	$105.98
892D LC	**1708**	$98.53
990	**1720**	$125.69
992D LC	**1722**	$144.03
30	**1725**	$17.06
50	**1730**	$27.14
70	**1735**	$25.22
200LC	**1745**	$78.03

DROTT **[DROT]**

Model	Code	Rate
35D E boom	**1835**	$50.33
35D Y boom	**1845**	$50.74
40D E boom	**1930**	$62.53
40D Y boom	**1965**	$67.53
50D	**2005**	$81.15

FIAT-ALLIS **[F-A]**

Model	Code	Rate
FE 18	**9000**	$46.10
FE 20 HD	**9010**	$58.45
FE 20 LC	**9020**	$54.71
FE 28	**9030**	$76.67
FE 40 L	**9040**	$132.71

GRADALL **[GRAD]**

Model	Code	Rate
G 660	**0150**	$62.51
G 660B	**0160**	$78.55
G 660C	**0170**	$79.27
G 880B	**0210**	$85.20
G 880C	**0215**	$82.18
G 1000	**0230**	$132.37
XL4200	**0260**	$79.60
XL5200	**0280**	$95.64

HITACHI **[HIT]**

Model	Code	Rate
UH 07LC	**2630**	$60.12
UH 062	**2660**	$62.72
UH 172	**2695**	$116.97
UH 122	**2750**	$77.88
EX 150	**2797**	$55.64
EX 200 LC	**2800**	$67.88
EX 270 LC	**2806**	$101.08
EX 300LC-2	**2807**	$117.64

EX 300LC-3	**2807A**	$121.04
EX 330LC-5	**2807B**	$134.82
EX 370-5	**2807F**	$140.39
EX 400 LC	**2808**	$155.84
EX 450LC-5	**2808K**	$185.08
EX 550LC	**2809**	$229.64
EX 700	**2810**	$276.22
EX 750-5	**2815**	$288.47
EX 1100	**2880**	$356.28

HYUNDAI **[HYUN]**

Model	Code	Rate
200LC	**2950**	$67.05
210LC-3	**2952C**	$69.91
280LC	**2960**	$98.97
290LC	**2970**	$103.45
450LC	**3010**	$156.63

INTERNATIONAL **[INTL]**

Model	Code	Rate
630	**4250**	$46.91
640 HD	**4260**	$62.57
650 HD	**4280**	$72.02

KATO **[KATO]**

Model	Code	Rate
HD450 VII	**3050**	$45.20
HD700 VII LC	**3060**	$65.61
HD1250 VII LC	**3080**	$109.68

KOBELCO **[KOBL]**

Model	Code	Rate
SK200LC MARK III	**4687**	$70.24
K 903B	**4688**	$32.00
K 904D	**4693**	$35.00
K 904E	**4694**	$36.92
K 904 Mark II	**4694A**	$36.96
K 905	**4695**	$39.61
K 905A LC	**4697**	$42.91
K 907C	**4700**	$57.68
K 907D	**4702**	$62.10
K 907 LC	**4704**	$62.82
K 909A	**4710**	$80.26
K 909 LC	**4711**	$82.74
K 912A	**4712**	$94.99
K 914	**4715**	$114.50
K 916	**4717**	$127.89
SK270LC MARK IV	**4720**	$100.92
SK400LC MARK IV	**4725**	$168.88

KOEHRING **[KOEH]**

Model	Code	Rate
366 post 1980	**4752**	$98.18
466E	**4990**	$113.12
566	**5160**	$124.53
666, 666E	**5225**	$157.41
866, 866E	**5235**	$186.35
6611	**6000**	$37.05
6614	**6005**	$45.55
6612	**6010**	$44.34
6620	**6015**	$63.24
6625	**6020**	$77.15
6633	**6029**	$108.74
6644	**6040**	$145.27

KOMATSU **[KOMA]**

Model	Code	Rate
PC 120-5	**9485**	$48.16
PC 150-1	**9490**	$42.57
PC 150-3	**9495**	$52.82
PC 200 LC-2	**9500**	$53.27
PC 200-5	**9504**	$69.86
PC 200 LC-3	**9505**	$64.86
PC 200 LC-5	**9506**	$71.22
PC 220 LC-2	**9510**	$68.68
PC 220 LC-3	**9515**	$80.32
PC 220 LC-5	**9516**	$86.90
PC 220 LC-6	**9516F**	$93.65
PC 220 LC-7	**9516G**	$98.12
PC 280 LC-3	**9517**	$90.72
PC 300 LC-1, LC-2	**9520**	$88.36
PC 300 LC-3	**9525**	$106.59
PC 300 LC-5	**9526**	$122.13
PC 300 LC-6	**9526A**	$133.96
PC 360 LC-3	**9527**	$122.51
PC 400 LC-1	**9530**	$120.70
PC 400 LC-3	**9535**	$142.03
PC 400 LC-5	**9536**	$160.47
PC 400 LC-6	**9537**	$176.19
PC 600 LC-6	**9539**	$251.13
PC 650-1	**9540**	$222.05
PC 650-1 Front Shovel	**9550**	$236.43
PC 650-3	**9552**	$237.86
PC 750-6	**9555**	$288.07
PC 1000-1	**9560**	$367.00
PC 1000 LC-1	**9565**	$379.23
PC 1100 LC-6	**9575LC**	$440.30

LINK-BELT **[L-B]**

Model	Code	Rate
LS 1600	**5390**	$27.82
LS 2650	**5395**	$38.74
LS 2700C II	**5398**	$53.53
2700 QUANTUM	**5399**	$56.24
LS 2800	**5400**	$45.44
LS 2800A	**5402**	$53.57
LS 2800A PL	**5404**	$45.98
LS 2800 PL	**5405**	$43.21
LS 2800B	**5410**	$58.01
LS 3400	**5475**	$77.34
LS 3400C II	**5477**	$82.82
LS 4300	**5660**	$97.77
LS 4300C II	**5662**	$107.54
LS 4800	**5750**	$113.11
LS 4800 PL	**5755**	$99.96
LS 5400	**5805**	$129.99
LS 5800	**5810**	$136.10
LS 5800A	**5812**	$143.91
LS 5800C II	**5814**	$151.01
LS 6400	**5820**	$201.81
LS 7400	**5830**	$196.50
LS 7400A	**5840**	$245.01

MASSEY FERGUSON **[M-F]**

Model	Code	Rate
MF 450D	**6245**	$37.49
MF 450S	**6250**	$39.81

MITSUBISHI **[MITS]**

Model	Code	Rate
MS 090	**6290**	$27.18
MS 180-3	**6295**	$51.73
MS 180 LC-8	**6296**	$58.36
MS 230 LC-3	**6300**	$67.39
MS 240 LC-8	**6305**	$72.84
MS 280-2	**6310**	$82.41
MS 380-2	**6320**	$116.11
MS 450-8	**6330**	$132.63

NORTHWEST **[NW]**

Model	Code	Rate
35 DH	**6335**	$101.75
45 DH	**6340**	$112.80
55 DH	**6345**	$120.54
55 DH Series II	**6360**	$200.71

P&H **[P&H]**

Model	Code	Rate
H 750	**6628**	$49.28
H 1250	**6630**	$81.68
H 1750	**6635**	$103.72
H 2500	**6645**	$132.34
HS 2500	**6650**	$137.03

TAKEUCHI **[TAKU]**

Model	Code	Rate
TB 15	**7686**	$11.46
TB 025	**7686A**	$19.04
TB 045	**7686E**	$31.52
TB 070	**7686H**	$31.55
TB 10S	**7688**	$9.04
TB 35S	**7690**	$17.65
TB 68S	**7692**	$26.29
TB 800	**7695**	$12.61

HYDRAULIC CRANES & EXCAVATORS, SELF PROPELLED. [HCESP]

DELAY FACTOR = 0.16 **OVERTIME FACTOR = 0.86**

Includes all attachments and accessories required for lifting or digging. Pavement breaker or compactor attachments are not included.

BUCYRUS-ERIE **[B-E]**

Model	Code	Rate
300C/SP	**1670**	$58.43
320C	**1672**	$58.61
360C	**1678**	$58.94

BADGER **[BAGR]**

Model	Code	Rate
4425/30	**1565**	$79.81
4435	**1570**	$88.25
4435B	**1573**	$89.51
4435C	**1573C**	$100.49
4445	**1574**	$126.28
4450	**1575**	$94.90
4450B	**1577**	$101.37
4455	**1579**	$127.00

CASE **[CASE]**

Model	Code	Rate
40E E-Boom, Cruz Air	**1685**	$50.95
40E Y-Boom, Cruz Air	**1687**	$51.16
40F E-Boom, Cruz Air	**1687H**	$53.17
40F Y-Boom, Cruz Air	**1687K**	$53.99
45 E-Boom, Cruz Air	**1688**	$65.71
45 Y-Boom, Cruz Air	**1689**	$70.42
45B E-Boom, Cruz Air	**1689H**	$69.74
45B Y-Boom, Cruz Air	**1689K**	$70.47

880R E-Boom	**1690**	$45.32
880R Y-Boom	**1695**	$45.44
1085 E-Boom, Cruz Air	**1696E**	$53.04
1085 Y-Boom, Cruz Air	**1696Y**	$53.34
1085B Y-Boom, Cruz Air	**1696Z**	$59.51
1285 E-Boom, Cruz Air	**1697E**	$66.08
1285 Y-Boom, Cruz Air	**1697Y**	$66.22
3330 Low Profile	**1698E**	$27.28
3330B	**1698H**	$27.52

CATERPILLAR **[CAT]**

Model	Code	Rate
206	**1699**	$37.46
212	**1699E**	$47.71
214	**1699H**	$51.52
224	**1699J**	$63.54

GRADALL **[GRAD]**

Model	Code	Rate
G 3WD, 4x4	**0110**	$76.32

GROVE **[GROV]**

Model	Code	Rate
24	**3820**	$28.77
36	**3830**	$46.52
68	**3850**	$55.01
1012	**3870**	$67.24
2535	**3880**	$87.86
RT-48	**4030**	$49.25
RT-49	**4115**	$49.53
RT-58	**4285**	$50.75
RT-418	**4354**	$66.13
RT-420	**4356**	$66.13
RT-422	**4358**	$66.13
RT-500D	**4359**	$91.28
RT-525	**4360**	$59.72
RT-525B	**4362**	$62.58
RT-525C	**4363**	$78.98
RT-527.5	**4365**	$60.56
RT-528B	**4370**	$62.58
RT-528C	**4372**	$79.47
RT-60	**4520**	$59.18
RT-60S	**4540**	$61.09
RT-515	**4606**	$59.57
RT-518	**4607**	$61.48
RT-520	**4608**	$62.99
RT-522	**4609**	$62.24
RT-522C	**4609G**	$77.64
RT-625	**4630**	$68.30
RT-630	**4635**	$68.30
RT-630B	**4637**	$74.24
RT-635	**4640**	$76.74
RT-65 S	**4700**	$80.67
RT-740	**4710**	$91.67
RT-745	**4715**	$119.52
RT-75 S	**4720**	$86.61
RT-755	**4725**	$99.72
RT-760	**4727**	$147.58
RT-865	**4730**	$123.55
RT-865B	**4732**	$171.65
RT-875	**4735**	$152.62
RT-980	**4750**	$148.30
RT-990	**4760**	$173.33
RT-9100	**4790**	$226.95

KOMATSU **[KOMA]**

Model	Code	Rate
PW 210-1	**9580**	$86.97

LINK-BELT **[L-B]**

Model	Code	Rate
HSP 15	**5500**	$56.71
HSP 18	**5505**	$56.71
HSP 20	**5510**	$62.66
HSP 22	**5530**	$64.06
HSP 25	**5535**	$68.86
HSP 8015	**5538**	$67.79
HSP 8018	**5538E**	$67.79
HSP 8018XL	**5538G**	$81.94
HSP 8018C	**5538H**	$62.93
HSP 8025	**5538P**	$70.85
HSP 8025 S	**5538PF**	$72.38
HSP 8030	**5538Q**	$81.50
HSP 8035	**5538R**	$119.95
HSP 8040	**5538S**	$120.09
HSP 8050	**5538T**	$122.22
HSP 8055	**5538V**	$108.41
HSP 8060	**5539**	$135.76

LORAIN **[LORN]**

Model	Code	Rate
LRT 15H	**5730**	$57.79
LRT 15U	**5735**	$59.05
LRT 18U	**5740**	$59.51
LRT 35U	**5745**	$87.37
LRT 40U	**5750**	$88.14
LRT 150	**5755**	$57.40
LRT 150D	**5756**	$73.18
LRT 180	**5760**	$57.36
LRT 180D	**5760D**	$73.18
LRT 200	**5765**	$57.19
LRT 200D	**5765D**	$73.35

LRT 220	**5767**	$59.62
LRT 230	**5768**	$64.91
LRT 230D	**5768D**	$73.37
LRT 250	**5769**	$64.93
LRT 250D	**5769D**	$73.37
LRT 275	**5770**	$64.93
LRT 275D	**5770D**	$73.37
LRT 330	**5772**	$82.12
LRT 400	**5773**	$94.89
LRT 450	**5774**	$98.03
LRT 500	**5775**	$101.05
LRT 550	**5790**	$106.29

P&H **[P&H]**

Model	Code	Rate
OMEGA 14	**5790**	$54.63
OMEGA 15	**5792**	$54.63
OMEGA 18	**5794**	$55.06
OMEGA 25	**5795**	$74.43
OMEGA 20	**5796**	$55.73
OMEGA 23	**5796E**	$58.47
OMEGA 30	**5796J**	$76.84
OMEGA 35	**5796P**	$77.80
OMEGA 40	**5797**	$105.35
OMEGA 45	**5797E**	$107.07
OMEGA 50	**5797J**	$108.45
OMEGA 60	**5798**	$109.67
OMEGA 65	**5799**	$132.45
OMEGA 114	**5799C**	$63.13
OMEGA 114D	**5799G**	$61.18
OMEGA 118	**5799Q**	$64.63
OMEGA 118D	**5799S**	$61.33
OMEGA 120	**5799U**	$66.27
OMEGA 120D	**5799W**	$62.03
OMEGA 122	**5799X**	$67.25
OMEGA 122D	**5799Y**	$62.61
OMEGA 125	**5799Z**	$67.62
OMEGA 128	**5799ZA**	$66.11
R 150	**5890**	$45.87
R 150-1	**5910**	$45.38
R 180	**5975**	$46.20
R 200	**6060**	$46.52
OMEGA S-15	**6062**	$76.97
OMEGA S-18	**6063**	$76.97
OMEGA S-20	**6064**	$79.52
S-35	**6064E**	$107.30

PETTIBONE **[PET]**

Model	Code	Rate
16 MK P Series	**6500**	$50.68
20 MK P Series	**6580**	$51.31
25	**6740**	$47.10
25 MK P Series	**6750**	$52.09
29 MK P Series	**6880**	$53.12
30	**6900**	$47.10
30 MK P Series	**6903**	$54.11
30 SC, 30 SC P Series	**6910**	$73.37
60 SC	**6990**	$79.87
60 SC P Series	**6995**	$85.86
70	**7100**	$85.06
70 SC	**7165**	$84.77
70 SC P Series	**7170**	$90.77
80 MK P Series	**7250**	$84.87
80 SC P Series	**7260**	$86.26

R.O. PRODUCTS **[ROP]**

Model	Code	Rate
MC 5A	**8005**	$28.89
MC 50B	**8175**	$46.30
MC 50C	**8260**	$47.63

HYDRAULIC CRANES & EXCAVATORS, TRUCK MTD. W/ CARRIER [HCETD]

DELAY FACTOR = 0.15 **OVERTIME FACTOR = 0.87**

Includes truck/carrier. Includes all attachment and accessories required for lifting or digging. Pavement breaker or compactor attachments are not included.

BUCYRUS-ERIE **[B-E]**

Model	Code	Rate
25 XC	**1360**	$74.09
30 XC	**1370**	$74.73
40 C	**1475**	$65.79
60 XC	**1590**	$121.27
65 C	**1592**	$104.38
90 XC	**1600**	$132.63

BADGER **[BAGR]**

Model	Code	Rate
300 Hydro-Scopic	**0550**	$51.31
460 Hydro-Scopic	**0555**	$63.21
666 Hydro-Scopic	**0560**	$91.01
888 Hydro-Scopic	**0600**	$96.63

BANTAM **[BANT]**

Model	Code	Rate
T 744 Teleskoop	**1285**	$59.69
T 888	**1310**	$84.44
T 888B	**1315**	$97.70

DEVAULT **[DVUT]**

Model	Code	Rate
TK 15-10	**1900**	$36.44

GRADALL **[GRAD]**

Model	Code	Rate
G 3W	**0120**	$60.93
G 660	**0170**	$59.64
G 660B	**0180**	$76.72
G 660C	**0190**	$75.22
G 800	**0210**	$50.35
G 880B	**0220**	$84.97
G 880C	**0230**	$82.98
G 1000	**0240**	$93.37

GROVE **[GROV]**

Model	Code	Rate
TD 520	**2221**	$89.17
TD 522	**2223**	$89.17
TD 525	**2224**	$90.07
TMS 250	**2850**	$84.70
TMS 250A	**2860**	$85.19
TMS 250B	**2870**	$85.19
TMS 250C	**2875**	$119.42
TMS 300	**2922**	$101.45
TMS 300B	**2923**	$118.55
TMS 760	**3180**	$181.91
TMS 865	**3378**	$135.96
TM 875	**3380**	$158.94
TMS 875	**3385**	$159.81
TM 890	**3387**	$179.72
TM 1075	**3390**	$145.11

HIAB **[HIAB]**

Model	Code	Rate
100 AW	**3850**	$31.89
1165	**3852**	$28.78
170 thru 174	**3854**	$27.31
175 thru 177	**3855**	$27.45
550, 5501	**3857**	$30.28
650	**3859**	$31.18

KOEHRING **[KOEH]**

Model	Code	Rate
4460 Teleskoop	**4400**	$59.36
4465 Teleskoop	**4405**	$60.57
4470 Teleskoop	**4410**	$70.68
4475 Teleskoop	**4415**	$71.87

LINK-BELT **[L-B]**

Model	Code	Rate
HTC 14	**4505**	$82.29
HTC 25	**4507**	$82.29
HTC 35	**4509**	$92.05
HTC 50	**4510**	$120.64
HTC 50W	**4520**	$115.77
HTC 814	**4530**	$110.08
HTC 814XL	**4531**	$115.04
HTC 822 S	**4532**	$101.39
HTC 825	**4535**	$93.69
HTC 825 S	**4536**	$102.44
HTC 830	**4537**	$112.00
HTC 835	**4539**	$118.08
HTC 835XL	**4539C**	$133.76
HTC 840	**4539E**	$137.20
HTC 850	**4539G**	$142.28
HTC 855	**4539H**	$122.48
HTC 860	**4539J**	$144.99
HTC 1040	**4540**	$134.35
HTC 1050	**4545**	$137.14
HTC 1055	**4550**	$126.14
HTC 1060	**4555**	$141.75
HTC 11100	**4600**	$246.97

LORAIN **[LORN]**

Model	Code	Rate
MCH 140	**4942**	$96.02
MCH 150	**4946**	$88.80
MCH 180	**4947**	$88.80
MCH 300	**4953**	$104.91
MCH 350	**4955**	$85.78
MCH 400	**4957**	$115.16
MCH 500	**4960**	$94.88

MANITEX **[MANX]**

Model	Code	Rate
1161	**4980**	$35.05
1770	**4985**	$63.11
2284	**4990**	$65.84
2592	**4995**	$67.76

NATIONAL **[NATL]**

Model	Code	Rate
Ser 4/400, 11.3 m (37') boom	**4983**	$31.57
Ser 4/400, 14.0 m (46') boom	**4984**	$31.77
Ser 4/400, 16.8 m (55') boom	**4985**	$31.94
Ser 5/500A/B, 14.3 m (47') boom	**4986**	$36.89
Ser 5/500A/B, 17.1 m (56') boom	**4987**	$37.50
Ser 6/600, 14.3 m (47') boom	**4989**	$36.43
Ser 6/600, 17.1 m (56') boom	**4990**	$36.79

856	**4995**	$37.29
856B	**4996**	$36.46
875	**4997**	$38.02
875B	**4998**	$39.44
Series 85	**4999**	$33.26

P&H **[P&H]**

Model	Code	Rate
ALPHA 100 ton	**5000**	$233.36
CN T-280	**5005**	$120.34
T-150	**5290**	$86.05
T-180	**5380**	$86.49
T-200	**5470**	$87.01
T-250	**5560**	$101.96
CN T-250	**5561**	$122.68
OMEGA T-250	**5570**	$98.17
OMEGA T-300	**5580**	$101.41
OMEGA T-350	**5585**	$102.62
T-300A	**5665**	$96.84
OMEGA T-400	**5666M**	$121.80
OMEGA T-450	**5669**	$123.50
T-600 XL	**5670**	$139.29
OMEGA T-500	**5680**	$123.49
OMEGA T-650	**5745**	$164.22
T-750	**5780**	$119.12

PITMAN **[PIT]**

Model	Code	Rate
Hydralift HL 40 thru 95	**6670**	$27.70
Hydralift HL 100 thru 170	**6675**	$31.08
HL 857	**6685**	$36.02
HL 1200, 1545-T2 or 1580	**6695**	$38.36
POLECAT	**6697**	$42.45
PELICAN	**6699**	$45.29

R.O. PRODUCTS **[ROP]**

Model	Code	Rate
TC-40	**6860**	$28.65
TC-50	**6862**	$30.21
TC-70	**6864**	$31.57
TC-80	**6866**	$31.64
TC-85	**6868**	$31.16
TC-110	**6870**	$35.32
TC-120	**6872**	$35.92
TC-125	**6874**	$35.57
TC-145	**6876**	$38.50
TC-150	**6878**	$36.89

HYDRAULIC CRANES & EXCAVATORS, TRUCK MTD. LESS CARRIER. [HCETG]

DELAY FACTOR = 0.12 **OVERTIME FACTOR = 0.90**

Includes all lifting and digging attachments and accessories. Truck/carrier to be paid separately. Pavement breaker or compactor attachments are not included.

BUCYRUS-ERIE **[B-E]**

Model	Code	Rate
H-3 series two	**1000**	$35.20
H-5 series two	**1300**	$42.22

GALION **[GALN]**

Model	Code	Rate
125 P	**1970**	$41.63
150 P	**1980**	$50.51

GROVE **[GROV]**

Model	Code	Rate
TM 100C	**2020**	$58.42
TM 200C	**2040**	$50.15

HYDRAULIC PERSONNEL LIFTS & AERIAL WORK PLATFORMS [HYLFT]

DELAY FACTOR = 0.24 **OVERTIME FACTOR = 0.78**

Includes self propelled and power take off(PTO) units whether gas, diesel or electric. Rates for any truck or carrier mounted units shall pay for the truck separately. Reach is rated by Mfr's maximum extension in meters(feet).

BOOM TYPE **[BOOM]**

OVER	TO	Code	Rate
0	7.6 (25)	**00-24**	$13.08
7.6 (25)	15.2 (50)	**25-49**	$31.99
15.2 (50)	22.9 (75)	**50-74**	$46.31

SCISSOR TYPE **[SCIS]**

OVER	TO	Code	Rate
0	6.1 (20)	**00-20**	$14.38
6.4 (21)	9.1 (30)	**21-30**	$17.61
9.4 (31)	15.2 (50)	**31-50**	$26.27

LOADERS, CRAWLER [LDRCL]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.88**

Includes all attachments and accessories excluding clam-action buckets and backhoe(see attachment class).

CASE [CASE]

Model	Code	Rate
350B	**2370**	$28.63
450B	**2610**	$26.85
455B	**2620**	$28.61
455C	**2620A**	$31.49
1155D	**3555**	$54.75
1155E	**3556**	$59.01
1450	**3560**	$59.44
1450B	**3565**	$66.28
1455B	**3568**	$67.17

CATERPILLAR [CAT]

Model	Code	Rate
931B	**3735**	$29.72
931C	**3735C**	$31.76
931 LGP	**3740**	$27.94
931B LGP	**3745**	$30.81
935B	**3845**	$35.60
935C	**3845C**	$37.96
939C	**3900**	$49.98
943	**4130**	$47.46
943 LGP	**4135**	$44.33
951C 86J 1992 serial	**4200**	$39.97
951C 86J 2598 serial	**4210**	$45.32
951C LGP 86J 2598 ser	**4215**	$46.15
953	**4220**	$63.82
953 LGP	**4230**	$58.91
955L 85J 6247 serial	**4675**	$57.03
955L 85J 13X10129 ser	**4680**	$62.86
955L LGP 85J 13X10129	**4685**	$63.20
963	**4690**	$88.27
963 LGP	**4693**	$78.83
973	**4695**	$132.05
973 LGP	**4698**	$111.10
977K	**5014**	$64.46
977K 11K serial	**5092**	$68.69
977L 11K 3919 serial	**5170**	$80.85
977L 11K 5083 serial	**5180**	$89.99
977L 14X serial	**5185**	$94.42
977L LGP	**5190**	$94.09
983	**5248**	$127.01
983B	**5265**	$138.70

JOHN DEERE [DEER]

Model	Code	Rate
JD 350C	**5420**	$30.16
JD 450C (4 speed PS)	**5805**	$30.66
JD 455D	**5807**	$32.41
JD 455E	**5809**	$32.65
JD 455G	**5809A**	$38.21
JD 555	**5810**	$34.77
JD 555A	**5812**	$38.55
JD 555B	**5814**	$37.78
JD 555G	**5814A**	$49.02
JD 655	**5815**	$55.41
JD 655B	**5817**	$64.49
JD 755	**5820**	$51.49
JD 755A	**5822**	$64.88
JD 755B	**5824**	$74.27
JD 855	**5830**	$97.87

DRESSER [DRES]

Model	Code	Rate
100E (PS)	**9000**	$32.00
100G	**9005**	$37.51
125E (PS)	**9010**	$39.68
125G	**9015**	$45.83
175C (PS)	**9020**	$78.01
200	**9025**	$92.95
250C (PS)	**9030**	$92.57
250E (PS)	**9035**	$107.03

KOMATSU [KOMA]

Model	Code	Rate
D 53S-16	**7878**	$52.39
D 53S-17	**7878A**	$65.01
D 55S-2	**7900**	$52.51
D 55S-3	**7978**	$52.51
D 57S-1	**8000**	$74.45
D 65S-6	**8017**	$69.46
D 66S-1	**8020**	$102.72
D 75S-2	**8056**	$75.23
D 75S-3	**8060**	$95.58
D 75S-5	**8061**	$136.69
D 155S-1	**8080**	$190.78

LOADERS, RUBBER TIRE [LDRRT]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.87**

Includes all attachments and accessories. Clam-action buckets, 4WD and backhoes are excluded unless otherwise noted.

ALLIS-CHALMERS [A-C]

Model	Code	Rate
710C	**0747**	$28.85
714B	**0750**	$27.96
714C w/ backhoe	**0752**	$30.43
715B w/ backhoe	**0765**	$29.85
715C w/ backhoe	**0767**	$30.69

CASE [CASE]

Model	Code	Rate
W-11	**1365**	$27.58
W-11B	**1368**	$33.41
W-18	**1444**	$45.60
W-18 9213140 serial	**1450**	$49.05
W-18B	**1460**	$53.05
W-20	**1472**	$49.17
W-20B	**1480**	$49.93
W-20C	**1482**	$53.83
W-30	**1565**	$73.54
480B	**1636**	$22.50
480B w/ backhoe	**1640**	$23.78
480C	**1650**	$29.21
480C w/ backhoe	**1660**	$30.74
480D	**1662**	$32.92
480D w/ backhoe	**1664**	$34.82
480E w/ backhoe	**1666**	$28.61
480E LL	**1667**	$27.42
480F w/ backhoe	**1668**	$29.89
480F LL	**1669**	$28.16
480LL	**1677**	$32.96
570L XT 4WD	**1690**	$32.58
580B w/ backhoe	**1705**	$29.81
580C	**1710**	$23.92
580C w/ backhoe	**1715**	$25.78
580D	**1717**	$25.24
580D w/ backhoe	**1720**	$27.69
580 Super D	**1725**	$27.55
580 Super D w/ backhoe	**1727**	$30.05
580 Super E	**1731**	$28.20
580 Super E w/ backhoe	**1735**	$30.89
580K w/ backhoe	**1739**	$31.17
580K 4WD w/ backhoe	**1740**	$32.24
580 Super K w/ backhoe	**1742**	$34.41
580L w/ backhoe	**1743**	$34.66
580 Super L 4WD w/ backhoe	**1744**	$40.39
590 Turbo w/ backhoe	**1745**	$42.01
590 Super L 4WD w/ backhoe	**1746**	$44.38
621	**1750**	$56.70
721	**1752**	$68.97
821	**1754**	$84.49
680E w/ backhoe	**1840**	$39.53
680G w/ backhoe	**1850**	$38.23
680H w/ backhoe	**1852**	$41.06
680K w/ backhoe	**1854**	$44.55
680L w/ backhoe	**1856**	$45.26
680L 4WD w/ backhoe	**1857**	$46.05
780 w/ backhoe	**1864**	$50.16
780B w/ backhoe	**1866**	$54.25
780C w/ backhoe	**1867**	$55.30
780D w/ backhoe	**1868**	$56.05
780D 4WD w/ backhoe	**1869**	$57.41

CATERPILLAR [CAT]

Model	Code	Rate
416 w/ backhoe	**1860**	$31.24
416 Series II w/ backhoe	**1860A**	$31.47
416B 4WD w/ extend-a-hoe	**1861A**	$38.98
416C 4WD w/ backhoe	**1861C**	$40.57
416D w/ backhoe	**1861D**	$35.81
416D 4WD w/ backhoe	**1861D4**	$36.89
420D w/ backhoe	**1861M**	$40.07
420D 4WD w/ backhoe	**1861M4**	$41.15
426 w/ backhoe	**1862**	$35.32
426 Series II w/ backhoe	**1862A**	$35.55
426C w/ backhoe	**1862C**	$44.46
426C 4WD w/ backhoe	**1862C4**	$45.86
428 w/ backhoe	**1864**	$35.30
428 Series II w/ backhoe	**1864A**	$35.52
430D	**1865D**	$49.07
430E	**1865E**	$51.97
436 w/ backhoe	**1866**	$38.41
436 Series II w/ backhoe	**1866A**	$38.60
446 w/ backhoe	**1868**	$50.16
446B w/ backhoe	**1868B**	$55.72
446D	**1868D**	$58.30
450E	**1869E**	$70.09
910	**1870**	$33.42
910E	**1870E**	$39.48
916	**1885**	$44.72
920	**1894**	$40.71
926	**2065**	$51.94
926E	**2067**	$56.52
928G	**2070G**	$68.33
930 41K serial	**2088**	$49.69
930G	**2088G**	$80.96
936	**2100**	$63.24

936E	**2110**	$69.06
936F	**2120**	$71.78
938F	**2130**	$73.57
938G	**2130G**	$83.01
950 90A serial	**2228**	$51.73
950 31K & 81J serial	**2270**	$64.04
950B	**2272**	$79.22
950E	**2300**	$84.71
950F	**2301**	$89.07
950F Series II	**2303**	$92.75
950G	**2310**	$99.90
950H	**2310H**	$116.93
962G	**2320G**	$109.01
966C	**2340**	$95.41
966D	**2350**	$104.24
966E	**2360**	$115.53
966F	**2361**	$118.14
966G	**2362**	$133.81
966H	**2362H**	$156.84
970F	**2370**	$139.53
972G	**2372G**	$148.96
980B	**2376**	$117.36
980C	**2378**	$147.66
980F	**2381**	$152.50
980G	**2382**	$168.39
980H	**2382H**	$185.19
988 87A6868 serial	**2398**	$142.86
988B 50W serial	**2436**	$212.86
992B 25K serial	**2460**	$257.29
992C	**2470**	$409.03
IT 12	**2472**	$34.18
IT 12B	**2472B**	$39.88
IT 14F	**2473**	$46.40
IT 18	**2474**	$43.48
IT 18B	**2475**	$49.28
IT 28	**2476**	$52.42
IT 28B	**2477**	$57.24
IT 28F	**2477G**	$66.53
IT 28G	**2478**	$69.72
IT 38G	**2480**	$80.21
IT 62G	**2482**	$110.28

CLARK **[CLRK]**

Model	Code	Rate
35C	**2484**	$41.25
45C	**2486**	$48.24
55C	**2488**	$58.12
75C	**2491**	$76.26
125B	**2492**	$97.12
275B	**2496**	$169.05
275C	**2497**	$187.59

JOHN DEERE **[DEER]**

Model	Code	Rate
JD-210C	**2485**	$25.79
JD-210C w/ backhoe	**2490**	$26.10
JD-210LE	**2495**	$34.17
JD-310A w/ backhoe	**2504**	$27.34
JD-310B w/ backhoe	**2506**	$28.03
JD-310C w/ backhoe	**2507**	$30.77
JD-310D w/ backhoe	**2507D**	$34.94
JD-310E w/ backhoe	**2507E**	$35.82
JD-310SE w/ backhoe	**2507F**	$40.07
310G	**2507G**	$36.75
JD-315SE w/ backhoe	**2507H**	$40.70
JD-410 w/ backhoe	**2508**	$30.02
JD-410B w/ backhoe	**2508B**	$30.71
JD-410C w/ backhoe	**2508C**	$35.86
JD-410D w/ backhoe	**2508D**	$43.08
JD-410E w/ backhoe	**2508E**	$45.16
410G	**2508G**	$46.14
410J 4WD	**2508J**	$53.92
410K	**2508K**	$57.08
JD-444	**2510**	$39.68
JD-444C	**2515**	$41.68
JD-444D	**2520**	$42.72
JD-444E	**2521**	$46.64
JD-500C w/ backhoe	**2592**	$39.02
JD-510 w/ backhoe	**2620**	$35.61
JD-510B w/ backhoe	**2625**	$34.99
JD-510C w/ backhoe	**2630**	$41.04
JD-510D w/ backhoe	**2630D**	$49.10
JD-544B	**2660B**	$49.22
JD-544C	**2660C**	$50.83
JD-544D	**2660D**	$49.74
JD-544E	**2660E**	$55.12
JD-544G	**2660G**	$61.39
544J	**2660J**	$81.03
544K	**2660K**	$90.32
JD-610B w/ backhoe	**2690**	$40.02
JD-610C w/ backhoe	**2691**	$45.25
JD-624E	**2700**	$66.26
JD-624G	**2700G**	$75.73
JD-624H	**2700H**	$82.81
JD-644B	**2710**	$68.06
JD-644C	**2715**	$70.98
JD-644D	**2717**	$72.86
JD-644E	**2719**	$79.51
JD-644G	**2719B**	$91.47
JD-644H	**2719H**	$98.20
644J	**2719J**	$110.35
JD-710B w/ backhoe	**2720**	$50.94

JD-710C w/ backhoe	**2721**	$56.74
JD-710D w/ backhoe	**2722**	$62.71
JD-710D 4WD w/ backhoe	**2722D**	$64.65
710G	**2722G**	$66.90
JD-744H	**2723**	$134.10
744J	**2723J**	$159.95
JD-844	**2725**	$126.66

DRESSER **[DRES]**

Model	Code	Rate
510B	**2310**	$38.88
510C	**2310C**	$52.28
515B	**3517**	$50.40
515C	**3517C**	$62.00
520B	**3519**	$58.40
520C	**3519C**	$73.98
530	**3520**	$82.12
530C	**3520C**	$90.84
540	**3530**	$114.86
550	**3540**	$114.54

FIAT-ALLIS **[F-A]**

Model	Code	Rate
545B	**3042**	$47.35
745C	**3046**	$92.75
FR 10	**3049H**	$50.29
FR 10B	**3049I**	$55.11
FR 20	**3050**	$106.15
FR 30	**3051**	$139.29
FR 20B	**3051B**	$118.94
FR 35	**3052**	$186.48

FORD **[FORD]**

Model	Code	Rate
545C	**3054**	$27.86
650 w/ backhoe	**3056**	$30.52
655A w/ backhoe	**3056F**	$34.81
655C w/ backhoe	**3056G**	$38.56
750 w/ backhoe	**3057**	$40.29
755 w/ backhoe	**3061**	$43.43
755B w/ backhoe	**3063**	$49.53
755A w/ backhoe	**3065**	$48.14
A-62	**3114**	$42.38
A-64	**3116**	$51.41
A-66	**3118**	$67.30

FURUKAWA **[FURU]**

Model	Code	Rate
FL 320A	**3120M**	$94.47
FL 330	**3120S**	$103.13

HOUGH **[HOUG]**

Model	Code	Rate
H65C	**3578**	$64.94
H-90E	**3884**	$113.84
H-100C	**3954**	$133.05

INTERNATIONAL **[INTL]**

Model	Code	Rate
260A	**2260**	$29.47
260A w/ backhoe	**2270**	$31.13
270A w/ backhoe	**2280**	$34.31
280A w/ backhoe	**2285**	$42.55

J C B **[JCB]**

Model	Code	Rate
214S w/ backhoe	**4430**	$41.85
215S w/ backhoe	**4435**	$46.10
217S w/ backhoe	**4440**	$49.41
3C 1550 2WD w/ hoe	**4448**	$29.77
3D 1700 4WD w/ hoe	**4450**	$40.01
1400B w/ backhoe	**4455**	$33.74
1550B w/ backhoe	**4457**	$38.65
1600B w/ backhoe	**4458**	$44.58
1700B w/ backhoe	**4459**	$45.64

KAWASAKI **[KAWA]**

Model	Code	Rate
60Z IV	**4300**	$58.22
65Z IV	**4310**	$65.10
KSS 80Z II	**4330**	$82.67
80Z III	**4335**	$97.34
80Z IV	**4340**	$99.41
85Z IV	**4345**	$124.40
90Z III	**4350**	$137.40
90Z IV	**4355**	$141.49
95Z IV-2	**4360**	$182.77

KOMATSU **[KOMA]**

Model	Code	Rate
W 120-3	**4520**	$96.01
W 180-1	**4525**	$136.37
WA 200-1	**4536**	$54.68
WA 250-1	**4537**	$75.21
WA 300-1	**4538**	$71.19
WA 320-1	**4539**	$88.25
WA 350-1	**4540**	$84.57
WA 380-1	**4541**	$105.30
WA 380-3	**4541C**	$105.93
WA 400-1	**4542**	$100.62
WA 420-3	**4543C**	$121.96
WA 450-1	**4544**	$125.73

WA 450-2	**4544B**	$141.87
WA 450-3	**4544C**	$144.79
WA 470-1	**4545**	$138.16
WA 500-1	**4546**	$169.02
WA 600-1	**4550**	$248.67
WB 140-2 4WD	**4700**	$44.31
WB 150-2 4WD	**4710**	$51.17

MASSEY FERGUSON **[M-F]**

Model	Code	Rate
MF 44C	**5143**	$50.73
MF 50H Series S	**5150**	$29.99
MF 50H Series S, 4WD	**5152**	$30.68
MF 50HX Series S	**5154**	$32.28
MF 50HX Series S, 4WD	**5156**	$33.15
MF 55C	**5170**	$65.22
MF 60 w/ backhoe	**5171**	$32.07
MF 60H Series S w/ hoe	**5172**	$34.54
MF 66C	**5174**	$83.66
MF 80 w/ backhoe	**5182**	$45.53
MF 88	**5184**	$132.81
640	**6000**	$30.27
650	**6010**	$32.42

NEW HOLLAND **[NHND]**

Model	Code	Rate
545D	**0100**	$29.13
575E w/ backhoe	**0110**	$41.35
655D w/ backhoe	**0120**	$37.32
655E w/ backhoe	**0130**	$44.74
675D 4WD w/ backhoe	**0140**	$43.15
675E 4WD w/ backhoe	**0150**	$51.23

TEREX **[TERX]**

Model	Code	Rate
70C	**7938**	$120.07
72-61	**8036**	$147.09
72-71B	**8055**	$192.97
72-81	**8080**	$230.41

VOLVO-MICHIGAN-EUCLID **[VME]**

Model	Code	Rate
175B	**6186**	$119.06
175C	**6186C**	$139.64
275B	**6330**	$152.18
275C	**6330C**	$187.59
L-70C	**9570C**	$63.22
L-90	**9575**	$75.89
L-120	**9595**	$98.35
L-120C	**9595C**	$101.55
L-150C	**9598C**	$126.93
L-160	**9600**	$132.50
L-180C	**9602C**	$143.33
L-190	**9605**	$154.28

LEADS, PILE DRIVING [LEADS]

DELAY FACTOR = 0.46 **OVERTIME FACTOR = 0.59**

FIXED **[FIXD]**

Includes headblock, taper top, tip sled and connector, foot yoke, foot yoke sheave, intermediate flights, and all attachments and accessories. Rated in accordance with height of the lead measured in meters (linear feet)

OVER	TO		Code	Rate
0	16.8 (55)	(w/o spotter)	**0100**	$19.41
16.8 (55)	32.0 (105)	(w/o spotter)	**0200**	$24.75
over	32.0 (105)	(w/o spotter)	**0300**	$31.00
0	16.8 (55)	(w/ spotter)	**1100**	$32.80
16.8 (55)	32.0 (105)	(w/ spotter)	**1200**	$39.15
over	32.0 (105)	(w/ spotter)	**1300**	$46.42

SWINGING **[SWNG]**

Includes headblock, taper top, tip sled and connector, foot yoke, foot yoke sheave, intermediate flights, and all attachments and accessories. Rated in accordance with the height of the lead measured in meters (linear feet).

OVER	TO		Code	Rate
0	16.8 (55)	(w/o spotter)	**0400**	$12.86
16.8 (55)	32.0 (105)	(w/o spotter)	**0500**	$17.92
over	32.0 (105)	(w/o spotter)	**0600**	$24.17
0	16.8 (55)	(w/ spotter)	**1400**	$26.26
16.8 (55)	32.0 (105)	(w/ spotter)	**1500**	$32.32
over	32.0 (105)	(w/ spotter)	**1600**	$39.59

NON-OPERATED EQUIPMENT (DAILY RATES) [NONOP]

DELAY FACTOR = 0.55 **OVERTIME FACTOR = 1.00**

Note various units for different items. The following allowance is entered on the extra work bill by using the (unit listed x number of days) in the hours worked column. The following list is limited to items with long estimated lives. Additional traffic related items such as cones and barricades, are still listed under TRAFC in this publication. Other non-operated items with short estimated lives should be treated as materials and should not be "rented". Non rented items are 1) intended to be job specific (amortized over the life of the project) and 2) have an estimated life measured by number of uses rather than a length of time.

MISCELLANEOUS **[MISC]**

Model	Code	Rate
Casing, 450 mm dia, per 0.3 m (Casing, 18" dia, per lf)	**0120**	$0.03
Casing, 650 mm dia, per 0.3 m (Casing, 26" dia, per lf)	**0130**	$0.06
Casing, 900 mm dia, per 0.3 m (Casing, 36" dia, per lf)	**0140**	$0.08
Casing, 1800 mm dia, per 0.3 m (Casing, 72" dia, per lf)	**0150**	$0.20
Casing, 2400 mm dia, per 0.3 m (Casing, 96" dia, per lf)	**0160**	$0.24

Casing, 2700 mm dia, per 0.3 m (Casing, 108" dia, per lf)	**0170**	$0.28
Casing, 3000 mm dia, per 0.3 m (Casing, 120" dia, per lf)	**0180**	$0.37
Pile, all depths "H" pile, per 45.0 kg (Pile, all depths "H" pile, per hundred-weight)	**0190**	$0.04
Pipe, 250-300 mm dia, per 0.3 m (Pipe, 10-12" dia, per lf)	**0200**	$0.02
Plate, 22 mm thick, per 9.3 sm (Plate, 7/8" thick, per 100 sf)	**0210**	$1.18
Plate, 25 mm thick, per 9.3 sm (Plate, 1" thick, per 100 sf)	**0220**	$1.35
Plate, 38 mm thick, per 9.3 sm (Plate, 1.5" thick, per 100 sf)	**0230**	$2.02

SCAFFOLDING, SHORING, FALSEWORK **[SSFW]**

Model	Code	Rate
Metal form, 1.8 m x3.0 m, per 14.6 m (Metal form, 6x10 box culvert, per 48 lf)	**0310**	$41.24
Metal form, 2.4 m x3.7 m, per 15.2 m (Metal form, 8x12 box culvert, per 50 lf)	**0320**	$45.70
Metal form, 2.1 m x4.3 m, per 15.2 m (Metal form, 7x14 box culvert, per 50 lf)	**0330**	$50.23
Metal form, type 25 barrier, per 3.0 m (Metal form, type 25 barrier, per 10 lf)	**0340**	$2.51
Metal form, type 26 barrier, per 3.0 m (Metal form, type 26 barrier, per 10 lf)	**0350**	$2.66
Metal form, type 27 barrier, per 3.0 m (Metal form, type 27 barrier, per 10 lf)	**0360**	$2.29
Metal form, type 50 barrier, per 3.0 m (Metal form, type 50 barrier, per 10 lf)	**0370**	$2.48
Metal form, 1.8 m x 3.7 m girder panel, per 0.1 sm (6x12 girder panel, per sf)	**0380**	$0.17
Metal form, all heights paving, per 3.0 m (Metal form, all heights paving, per 10 lf)	**0390**	$0.04
Scaffolding, 1.5 m section, per section (Scaffolding, 5' section, per section)	**0410**	$0.52
Scaffolding, 3.0 m section, per section (Scaffolding, 10' section, per section)	**0420**	$1.15
Scaffolding, 4.6 m section, per section (Scaffolding, 15' section, per section)	**0430**	$1.52
Scaffolding, bottom/top section, per 1.5 m section (per 5 ft section)	**0440**	$0.72
Scaffolding, 2.1 m high, rolling (Scaffolding, 7' high, rolling)	**0450**	$1.08
Scaffolding, spider staging, plus air compressor	**0460**	$22.92
Shoring, 1.1 m deep x 2235 mm wide, per section (Shoring,3.5' deep x 88" wide trench, per section)	**0510**	$1.18
Shoring, 1.2 m deep x 3.7 m wide box, per 7.3 m (Shoring, 4' deepx12' wide trench box, per 24')	**0515**	$10.93
Shoring, 1.5 m deep x 2235 mm wide, per section (Shoring, 5' deep x 88" wide trench, per section)	**0520**	$1.24
Shoring, 2.1 m deep x 1397 mm wide, per section (Shoring, 7' deep x 55" wide trench, per section)	**0530**	$1.09
Shoring, 2.1 m deep x 2235 mm wide, per section (Shoring, 7' deepx88" wide trench, per section)	**0540**	$1.31
Shoring, 2.4 m deep x 4.6 m wide, per 3.0 m (Shoring, 8' deepx15' wide trench box, per 10')	**0550**	$9.03
Shoring, 2.4 m deep x 2.4 m max width, per 7.3 m(8' deep x 8' max width trench box, per 24')	**0560**	$17.77
Shoring, 3.0 m deep x 2.4 m max box, per 4.9 m (Shoring, 10' deepx8' max trench box, per 16')	**0570**	$15.96
Shoring, 3.0 m deep x 2.4 m max box, per 7.3 m (Shoring, 10' deepx8' max trench box, per 24')	**0580**	$22.19
Wood, 50 mm x255 mm, per 30.5 m (Wood, 2"x10", per 100 lf)	**0605**	$0.15
Wood, 50 mm x305 mm, per 30.5 m (Wood, 2"x12", per 100 lf)	**0610**	$0.19
Wood, 100mm x100mm, per 30.5 m (Wood, 4"x4", per 100 lf)	**0615**	$0.13
Wood, 100 mm x150 mm, per 30.5 m (Wood, 4"x6", per 100 lf)	**0620**	$0.18
Wood, 100 mm x205 mm, per 30.5 m (Wood, 4"x8", per 100 lf)	**0625**	$0.26
Wood, 100 mm x305 mm, per 30.5 m (Wood, 4"x12", per 100 lf)	**0630**	$0.39
Wood, 150 mm x305 mm, per 30.5 m (Wood, 6"x12", per 100 lf)	**0635**	$0.65
Wood, 150 mm x455 mm, per 30.5 m (Wood, 6"x18", per 100 lf)	**0640**	$1.04
Wood, 205 mm x405 mm, per 30.5 m (Wood, 8"x16", per 100 lf)	**0645**	$1.28
Wood, 305 mm x455 mm, per 30.5 m (Wood, 8"x18", per 100 lf)	**0650**	$1.44
Wood, 305 mm x305 mm, per 30.5 m (Wood, 12"x12", per 100 lf)	**0655**	$1.24
Wood form, type 27 barrier, per 2.4 m (Wood form, type 27 barrier, per 8 lf)	**0660**	$0.27
Wide flange beam, all depths, per 45 kg (Wide flange beam, all depths, per hundred wt.)	**0670**	$0.03

TANK **[TANK]**

Model	Code	Rate
Tank, metal, 0-2270 liters (0-600 gallons)	**0710**	$0.70
Tank, metal, 2270-4540 liters (600-1200 gal)	**0720**	$0.96
Tank, metal, 4540-9840 liters (1200-2600 gal)	**0730**	$2.38
Tank, metal, 22 710 liters (6000 gallons)	**0740**	$4.78
Tank, metal, 28 390 liters (7500 gallons)	**0750**	$6.00
Tank, metal, 30 280 liters (8000 gallons)	**0760**	$6.35
Tank, metal, 37 850 liters (10000 gallons)	**0770**	$7.04

TRAFFIC SAFETY **[TRAF]**

Model	Code	Rate
Crash cushion barrel, filled, each	**0810**	$1.19
K-rail, temporary concrete barrier, per 6.1 m (20 lf)	**0820**	$0.46

PAVEMENT GRINDERS, DIAMOND BLADES [PGDIA]

DELAY FACTOR = 0.10 **OVERTIME FACTOR = 0.91**

Includes water(but not water truck or trailer), coolant, cutting compounds and all attachments and accessories. Replacement blades are included in the rates listed below.

CONCUT **[CCUT]**

Model	Code	Rate
BC-38 (136 blades)	**0500**	$162.05
BC-244 (187 blades)	**0505**	$202.52
BC-1268 (48 blades)	**0510**	$63.82

CUSHION CUT **[CUCT]**

Model	Code	Rate
HG-130A (127 blades)	**0600**	$159.08
PC-390(171 blades)	**0610**	$244.59

PENHALL **[PENH]**

Model	Code	Rate
G-38 (172 blades)	**0800**	$310.06

TARGET **[TARG]**

Model	Code	Rate
CG-65 (41 blades)	**0900**	$100.64
PRM-3804 (170 blades)	**0905**	$340.85

PAVEMENT GRINDERS, TUNGSTEN-CARBIDE BITS [PGT-C]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.88**

Includes water(but not water truck or trailer), coolant, cutting compounds and all attachments and accessories. Replacement bits or tips are included in the rates listed below.

BARBER-GREENE **[B-G]**

Model	Code	Rate
RX-20	**0100**	$157.88
RX-30	**0105**	$250.23
RX-40B	**0110**	$287.00
RX-50	**0115**	$337.74
RX-80B	**0120**	$555.40

CATERPILLAR **[CAT]**

Model	Code	Rate
PM-800	**0200**	$437.44
PR-105	**0201**	$78.84
PR-275	**0205**	$213.31
PR-450	**0210**	$306.85
PR-750	**0215**	$440.54
PR-750B	**0216**	$465.16
PR-1000	**0220**	$607.60

C.M.I. **[CMI]**

Model	Code	Rate
PR-275 RT	**0150**	$201.64
PR-375	**0155**	$254.17
PR-450	**0160**	$291.38
PR-525	**0165**	$308.77
PR-500FL	**0170**	$342.49
PR-750	**0175**	$423.31
PR-800-7	**0177**	$464.42
PR-1000	**0180**	$521.45

INGERSOLL-RAND **[I-R]**

Model	Code	Rate
MW-175	**0280**	$88.20
MW-250	**0285**	$96.19
MW-250C	**0286**	$116.53
MT-6520 (crawler)	**0300**	$284.63
MW-6520	**0305**	$206.98
MW-6520HC	**0310**	$260.77
MT-7000	**0315**	$358.30

WIRTGEN **[WIRT]**

Model	Code	Rate
300VC	**0380**	$34.96
1000VC	**0390**	$134.70
1900DC	**0395**	$306.15
2000VC	**0400**	$296.47
2100VC	**0402**	$383.01
2200VC	**0405**	$492.42
3500VC	**0410**	$504.92
4200VC	**0420**	$522.51

PUMPS, WATER HOSE [PUMWA]

DELAY FACTOR = 0.37 **OVERTIME FACTOR = 0.66**

Centrifugal and diaphragm types (including submersibles). Rate includes power (gas, diesel or electric generator), 7.6 meters(25 lineal feet) of suction hose, 15.2 meters (50 lineal feet) of discharge hose, foot valve and all fittings, attachments and accessories.

A PUMP **[APMP]**

Listed by Mfr's rated capacity measured in thousands of liters per minute (thousands of gallons per hour) at 3.0 meters (10 feet) of suction head.

OVER	TO	Code	Rate
0	0.6 (10)	**000-010**	$2.91
0.6 (10)	1.3 (20)	**010-020**	$4.31
1.3 (20)	1.9 (30)	**020-030**	$5.37
1.9 (30)	3.2 (50)	**030-050**	$18.44
3.2 (50)	7.9 (125)	**050-125**	$22.46
7.9 (125)	15.8 (250)	**125-250**	$26.90

INLET-SUCTION HOSE **[INHS]**

Additional 7.6 meter (25 foot) lengths of suction hose shall be paid based on the inside hose diameter in millimeters (inches).

OVER	TO	Code	Rate
0	60 (2.5)	**0-2.5**	$0.07
60 (2.5)	80 (3)	**2.5-3.5**	$0.12
80 (3)	100 (4)	**3.5-4**	$0.17
100 (4)	150 (6)	**4-6**	$0.27

OUTLET-DISCHARGE HOSE **[OUHS]**

Additional 15.2 meter (50 foot) lengths of discharge hose shall be paid based on the inside hose diameter in millimeters (inches).

OVER	TO	Code	Rate
0	60 (2.5)	**0-2.5**	$0.05
60 (2.5)	90 (3.5)	**2.5-3.5**	$0.09
90 (3.5)	100 (4)	**3.5-4**	$0.14
100 (4)	150 (6)	**4-6**	$0.19

ROLLERS, TANDEM STEEL WHEELS [ROL-2]

DELAY FACTOR = 0.13 **OVERTIME FACTOR = 0.88**

Includes all attachments and accessories.

BOMAG **[BMAG]**

Model	Code	Rate
BW-4AS	**1150**	$20.25
BW-6AS	**1155**	$21.86
BW-10AS	**1160**	$36.79
BW-12AS	**1165**	$37.56

DRESSER **[DRES]**

Model	Code	Rate
S3-5B	**2500**	$26.16
S8-12A	**2520**	$34.90
S10-14A	**2525**	$35.66

FERGUSON **[FERG]**

Model	Code	Rate
3-5 ton	**4048**	$15.60
3-5A	**4048A**	$16.82
4-6A	**4142A**	$16.96
5-8 ton	**4236**	$37.24
5-8A	**4240**	$29.44
8-12 ton	**4424**	$30.29
8-12B	**4424B**	$32.87
8-12A	**4430**	$30.42
10-14 ton	**4450**	$31.18
10-14A	**4455**	$30.93
10-14B	**4455B**	$33.43

GALION **[GALN]**

Model	Code	Rate
4-6 ton roll-o-static	**4650**	$24.32
S4-6A, S4-6B	**4670**	$26.86
5-8 ton roll-o-static	**4800**	$28.45
S5-8A	**4820**	$31.54
8-10.5 ton roll-o-static	**4988**	$29.10
S8-10.5A	**5000**	$32.24
8-12 ton roll-o-static	**5176**	$29.40
S8-12A	**5190**	$32.88

HYSTER **[HYST]**

Model	Code	Rate
C 330A 3-5 ton	**6520**	$26.62
C 330B 3-5 ton (Hypac)	**6520B**	$21.69
C 330A 4-6 ton	**6525**	$27.96
C 330B 4-6 ton (Hypac)	**6526**	$23.80
C 340A 5-8 ton	**6530**	$31.90
C 340A 8-10 ton	**6540**	$32.45
C 340B 5-8 ton	**6545**	$29.68
C 340C 5-8 ton (Hypac)	**6546**	$32.55
C 340B 8-10 ton	**6548**	$30.38
C 340C 8-10 ton (Hypac)	**6549**	$33.02
C 350B 8-12 ton	**6710**	$33.33
C 350B 10-14 ton	**6740**	$33.82
C 350C 8-12 ton	**6750**	$31.65
C 350C 10-14 ton	**6755**	$32.35
C 350D 8-12 ton	**6757**	$33.10

INGRAM **[INGM]**

Model	Code	Rate
4-6 ton FB	**6900**	$20.45
5-6.5 ton FB	**6965**	$21.98
8-12 ton HB	**7175**	$30.58
10-14 ton HB	**7275**	$31.19

REXNORD **[RXND]**

Model	Code	Rate
3-5 ton	**8566**	$19.00
4-6 ton	**8572**	$19.57
5-8 ton	**8578**	$42.39
7-10 ton	**8584**	$42.58
8-12 ton	**8590**	$42.93
10-14 ton	**8596**	$43.27

ROLLERS, RUBBER TIRE, SELF PROPELLED [ROLRT]

DELAY FACTOR = 0.19 **OVERTIME FACTOR = 0.83**

Includes all attachments and accessories.

BUFFALO-BOMAG [B-B]

Model	Code	Rate
BW 20R	**2624**	$31.75

CATERPILLAR [CAT]

Model	Code	Rate
PS 110	**3460**	$35.19
PS 130	**3465**	$34.60
PS 180	**3470**	$36.80
PS 200B	**3480**	$46.19

DYNAPAC [DYPC]

Model	Code	Rate
CP 15	**3500**	$33.63
CP 21	**3510**	$42.92
CP 27	**3520**	$54.74

GALION [GALN]

Model	Code	Rate
3500	**4310**	$32.60
P 3000	**4315**	$31.03
P 3500A	**4320**	$33.78

HYSTER [HYST]

Model	Code	Rate
C 530A	**5401**	$34.12
C 550A	**5494**	$37.77

ROLLER-TAMPING, SEGMENTED, SHEEPSFOOT, SELF PROPELLED [ROTAM]

DELAY FACTOR = 0.12 **OVERTIME FACTOR = 0.90**

Includes all attachments and accessories.

BUFFALO-BOMAG [B-B]

Model	Code	Rate
K 300	**1630**	$64.49
K 301	**1635**	$74.52
K 401	**1638**	$90.55

CATERPILLAR [CAT]

Model	Code	Rate
815	**2300**	$78.37
815B	**2310**	$119.91
815F	**2320**	$131.48
825B	**2500**	$130.17
825C	**2510**	$177.71
835	**2700**	$163.77

RAYGO [RAGO]

Model	Code	Rate
30	**6490**	$63.78
45	**6500**	$97.64
RAM PAK 45	**6505**	$105.38

REXNORD [RXND]

Model	Code	Rate
3-30	**7120**	$77.34
3-35 PACTOR	**7127**	$98.74
3-45 PACTOR	**7130**	$124.59
3-50, 3-50A PACTOR	**7140**	$134.69
3-55, 3-55B PACTOR	**7150**	$168.51

ROLLERS-TAMPING, SEGMENTED, SHEEPSFOOT, TOWED [ROTAT]

DELAY FACTOR = 0.43 **OVERTIME FACTOR = 0.62**

Includes all attachments and accessories. Listed by drum dimensions in millimeters (feet) in either direction. The first digit is the diameter and the second digit is the length of each drum.

SINGLE DRUM UNIT [ADRU]

Model	Code	Rate
1220 mm x1220 mm (4'X4') & under	**4X4**	$1.82
over 1220 mm (4') - not over 1520 mm (5')	**4X5**	$2.06
over 1520 mm (5')	**5**	$3.74

DOUBLE DRUM UNIT [DDRU]

Model	Code	Rate
1220 mm x1220 mm (4'X4') & under, each	**4X4**	$4.41
over 1220 mm (4') - not over 1520 mm (5'), each	**4X5**	$13.34
over 1520 mm (5'), each	**5**	$24.56

ROLLERS, VIBRATORY, SELF PROPELLED [ROVIB]

DELAY FACTOR = 0.20 **OVERTIME FACTOR = 0.83**

Includes all attachments and accessories.

BUFFALO-BOMAG [B-B]

Model	Code	Rate
BW 210	**2060**	$50.55
BW 210A	**2070**	$52.54
BW 213	**2080**	$51.65
BW 214	**2090**	$53.38

BOMAG [BMAG]

Model	Code	Rate
BW 35	**0700**	$5.98
BW 60, 60S	**0800**	$8.87
BW 65, 65S	**0900**	$6.27
BW 75, 75S	**1000**	$9.91
BW 85T	**1200**	$17.72
BW 90	**1300**	$11.29

BW 100AD-3	**1325C**	$28.52
BW 120AD	**1350**	$28.69
BW 142PD	**1359**	$34.77
BW 151AD	**1365**	$50.26
BW 170AD, D	**1380**	$42.88
BW 172AD, D	**1385**	$43.64
BW 202AD	**1400**	$68.68

BROS **[BROS]**

Model	Code	Rate
VM 255	**2023**	$43.82
VM 268, VM 268H	**2024**	$54.11
VM 278	**2025**	$80.41

CASE **[CASE]**

Model	Code	Rate
50B	**2228**	$6.17
W 251	**2400**	$20.49
252, W 252	**2405**	$25.87
752, W 752	**2450**	$47.04
1102, W 1102	**2500**	$60.61
1102D, W 1102D	**2505**	$63.07
602D	**2510**	$41.84
752B	**2520**	$50.03

CATERPILLAR **[CAT]**

Model	Code	Rate
CB 54	**7000**	$85.70
CS 56	**7020**	$94.10
CB 64	**7400**	$101.00
CB 214	**8025**	$25.07
CB 214B	**8026**	$26.28
CB 224	**8030**	$26.17
CB 224B	**8031**	$28.13
CB 224C	**8031C**	$28.92
CB 224E	**8031E**	$32.02
CB 314	**8035**	$27.88
CP 323 padfoot drum	**8040**	$46.25
CS 323 smooth drum	**8042**	$44.55
CB 414	**8045**	$44.86
CS 431	**8050**	$41.11
CS 431B	**8051**	$55.53
CP 433 padfoot drum	**8055**	$47.52
CP 433B padfoot drum	**8056**	$61.80
CP 433E	**8056E**	$77.35
CS 433 smooth drum	**8060**	$46.87
CS 433B smooth drum	**8061**	$58.87
CB 434	**8062**	$52.03
CB 434D	**8062D**	$65.19
CB 514	**8065**	$56.73
CB 534	**8067**	$72.11
CB 534C	**8067C**	$72.44
CB 534D OR XW	**8067D**	$92.21
CS 551	**8070**	$76.70
CP 553 padfoot drum	**8075**	$81.45
CS 553 smooth drum	**8080**	$77.92
CP 563 padfoot drum	**8082**	$85.01
CS 563 smooth drum	**8083**	$81.19
CS 563C	**8083C**	$87.30
CB 614	**8085**	$87.61
CB 634	**8095**	$87.20
CB 634C	**8095C**	$89.14

DYNAPAC **[DYPC]**

Model	Code	Rate
LR 90	**2401**	$12.16
A 36V, A 36D	**2405**	$29.74
CA 12	**2409A**	$38.02
CA 12D	**2409B**	$33.68
CA 12PD	**2409E**	$34.17
CA 12PDB strikeoff blade	**2409H**	$32.88
CA 15	**2410**	$51.57
CA 15A	**2420**	$46.82
CA 15D	**2421**	$55.03
CA 20D	**2422**	$46.06
CA 15PD	**2425**	$47.68
CA 25	**2430**	$66.42
CA 25S	**2440**	$64.48
CA 25A, CA 25D	**2450**	$69.42
CA 25PD	**2455**	$72.14
CA 25T	**2460**	$58.33
CA 30	**2462**	$70.44
CA 30D	**2464**	$74.92
CA 51S, CA 51D	**2466**	$87.98
CA 55D	**2468**	$90.85
CA 151PDB	**2469**	$66.27
CC 10, CC 10 series II	**2470**	$26.18
CC 10A	**2472**	$22.24
CC 102	**2472C**	$28.65
CC 12	**2472E**	$28.74
CC 14	**2473**	$41.38
CC 21	**2474**	$44.17
CC 21 II	**2474B**	$47.29
CC 211	**2474C**	$55.37
CC 42 II Dynatronic	**2475**	$70.19
CC 42A	**2476**	$69.13
CC 50	**2482**	$73.97
CC 50A	**2488**	$85.92
CC 50PD	**2488E**	$135.13
CC 50S	**2489**	$126.98
DD 18	**2498**	$10.18
300V	**2499E**	$13.27

2100V	**2499H**	$12.80

ESSICK **[ESIK]**

Model	Code	Rate
VR 30RE	**2700**	$7.98
VR 42RE	**2820**	$20.38
V 30WR, V 30W2-R	**2902**	$8.54

HYSTER **[HYST]**

Model	Code	Rate
C 612B	**3450**	$48.31
C 610A	**3500**	$34.54
C 610B	**3540**	$46.55
C 615B	**3562**	$48.67
C 617B	**3563**	$49.17
C 620B	**3566**	$48.06
C 625B	**3570**	$49.77
C 627B	**3572**	$50.44
C 727A	**3572E**	$69.39
C 748A (Hypac/Hyster)	**3572F**	$30.38
C 766A	**3572G**	$62.82
C 766B (Hypac/Hyster)	**3572H**	$75.29
C 850A	**3572J**	$72.93
C 850B (Hypac/Hyster)	**3572K**	$87.44
C 852A	**3572N**	$78.43
C 852B (Hypac/Hyster)	**3572P**	$90.93
C 860A	**3572S**	$77.13
C 860B (Hypac/Hyster)	**3572T**	$85.62

INGERSOLL-RAND **[I-R]**

Model	Code	Rate
DD 22	**3565**	$33.34
DD 23	**3570**	$24.80
DD 24	**3572**	$33.00
DA 30	**3573**	$26.16
DD 35	**3573C**	$27.64
DA 40	**3573E**	$48.00
DA 41	**3573G**	$50.34
DD 34HF	**3573HF**	$41.45
DA 48	**3573M**	$66.01
DA 50	**3574**	$67.48
DD 65	**3574A**	$54.03
DF 84	**3574B**	$109.37
DS 84	**3574C**	$106.12
DD 90	**3574D**	$73.95
DD 110	**3574F**	$81.64
DD 130	**3574H**	$107.68
DD 145	**3574J**	$91.78
SPA 56	**3810**	$52.63
SP 48	**3880**	$49.82
SP 48DD	**3885**	$51.42
SPF 48	**3890**	$53.71
SPF 48B	**3892**	$54.93
SP 54	**4000**	$50.01
SP 54DD	**4005**	$52.02
SPA 54	**4010**	$50.90
SPF 54	**4020**	$55.78
SP 56	**4030**	$59.47
SP 56DD	**4035**	$62.35
SP 56DH	**4037**	$83.01
SPF 56	**4040**	$64.15
SPF 56B	**4050**	$67.06
SPF 56DH	**4080**	$84.50
SPF 56DHB	**4090**	$88.38
SP 60	**4100**	$102.76
SP 84	**4105**	$87.78
SP 60DD	**4110**	$125.90
SPF 60	**4120**	$130.57
SPF 60B	**4130**	$138.53
SPF 60C	**4132**	$119.92
SPF 84	**4133**	$89.49
SPF 84B	**4134**	$93.93
SD 40D	**4138**	$46.66
SD 40F w/ blade	**4138FB**	$48.17
SD 70	**4139**	$53.01
SD 100	**4140**	$69.61
SD 100D	**4140D**	$83.24
SD 100F	**4140F**	$83.79
SD 115D	**4141D**	$101.23
SD 150D	**4143D**	$109.31

KOEHRING-BOMAG **[KOBO]**

Model	Code	Rate
BW 120AC	**4168E**	$28.33
BW 120AD	**4169**	$28.66
BW 121AD	**4193**	$25.65
BW 130AD	**4193E**	$30.48
BW 140AD	**4194**	$47.52
BW 141AC	**4194B**	$48.68
BW 141AD	**4194E**	$43.24
BW 142D	**4194H**	$33.58
BW 172	**4212**	$40.78
BW 172D	**4212E**	$43.42
BW 213D	**4237**	$67.86
BW 214D	**4238**	$83.75
BW 215D	**4240**	$81.56
BW 217D	**4242**	$102.89
BW 220D	**4250**	$75.81

MIKASA **[MIKA]**

Model	Code	Rate
MDR 7DW	**4404**	$7.08
MDR 9G	**4405**	$10.41
MDR T38S	**4407**	$7.22
MRV 10GA	**4409**	$11.93

RAYGO **[RAGO]**

Model	Code	Rate
1-36 REBEL	**4805**	$11.74
2-36 ROMPER	**4810**	$25.63
2-66 RANGER	**4820**	$68.54
2-84 RANGER	**4830**	$93.76
220A RASCAL	**4840**	$40.03
320A RASCAL	**4876**	$48.72
320S RASCAL	**4890**	$46.00
400A RASCAL	**5010**	$47.80
404B RUSTLER	**5110**	$53.14
410A RASCAL	**5150**	$51.37
600A RASCAL	**5220**	$64.34
4000 RASCAL	**5235**	$68.98
4200 RASCAL	**5236**	$74.94
4404 RUSTLER	**5236E**	$27.61

RAMMAX **[RAMX]**

Model	Code	Rate
P 33/24	**4605**	$16.45
P 33/24 w/ remote	**4606**	$15.75
P 51	**4625**	$62.87
S 51	**4630**	$31.40
P 47	**5290**	$31.29

SAKAI **[SAKI]**

Model	Code	Rate
SV 70	**8025**	$48.76
SV 70D	**8026**	$51.10
SV 91	**8050**	$72.05
SV 91D	**8051**	$74.02
SV 200D	**8060**	$37.53

TAMPO **[TAMP]**

Model	Code	Rate
RP 16D (HD)	**5990**	$46.55
RP 28D	**5995**	$61.85
RP 48D	**6110**	$77.96
RP 58D	**6115**	$73.39
RS 16 (HD)	**6170**	$43.68
RS16A (HD)	**6180**	$45.64
RS 16D (HD)	**6185**	$46.14
RS 28C	**6315**	$57.74
RS 28D	**6320**	$58.96
RS 58D	**6327**	$71.93
RS 156A	**6340**	$49.12
RS 166A	**6350**	$63.99
RS 188A	**6370**	$80.48
RS 210	**6400**	$63.31

WACKER **[WACK]**

Model	Code	Rate
R 900	**7850**	$17.26
R 1000	**7855**	$28.00
W 55T	**7860**	$9.36
W 74L, W 74T	**7880**	$9.24
W 74	**7890**	$8.90
W 75	**7900**	$8.97
WDH 84	**7910**	$13.07
WDH 86-110	**7912**	$16.65
WHK 90, WHK 90L	**7915**	$15.83

SHOVELS & CRANES CRAWLER [S&CCL]

DELAY FACTOR = 0.21 **OVERTIME FACTOR = 0.82**

Includes all attachments and accessories when used as a crane, clamshell, dragline or for pile driving (not including leads or driving equipment).

LINK-BELT **[L-B]**

Model	Code	Rate
LS 78	**4702**	$59.72
LS 78 pipeliner	**4724**	$61.72
LS 98	**4826**	$66.10
LS 98 pipeliner	**4852**	$72.11
LS 98A	**4924**	$67.17
LS 108B	**4980**	$76.41
LS 108D	**4981**	$102.70
LS 118	**4998**	$108.21
LS 218H	**5010**	$184.36
LS 318	**5012**	$108.62
LS 338	**5020**	$119.80
LS 518	**5124**	$177.13

MANITOWOC **[MTWC]**

Model	Code	Rate
222EX (WEST)	**5600**	$218.68
2900 WC	**5764**	$94.17
3000 W	**5812**	$111.99
3900B (100 ton)	**6036**	$155.75
3900 W VICON series 2	**6132**	$214.85
4000 W VICON	**6180**	$191.62
4100 W VICON series 1	**6196**	$298.34
4100 W VICON series 2	**6198**	$307.63
4600 VICON series 1	**6328**	$454.75
4600 VICON series 3	**6332**	$498.42

P&H **[P&H]**

Model	Code	Rate
535	**7716**	$92.50
550	**7748**	$98.52
670 WLC	**7892**	$117.42

SHOVELS & CRANES, TRUCK MOUNTED [S&CTK]

DELAY FACTOR = 0.24 **OVERTIME FACTOR = 0.79**

Includes truck/carrier. Includes all attachments and accessories when used as a crane, clamshell, dragline or for pile driving (leads and driving equipment not included).

AMERICAN HOIST & DERRICK **[AMHD]**

Model	Code	Rate
5470	**1015**	$101.43
5530	**1080**	$180.91
7450	**1130**	$90.78
7460	**1140**	$135.92
7530	**1170**	$151.76
8460	**1178**	$195.45
8470	**1179**	$319.09

LINK-BELT **[L-B]**

Model	Code	Rate
HC 48A	**4332**	$58.68
HC 108B	**4960**	$67.45
HC 108C	**4970**	$107.86
HC 138	**4992**	$77.36
HC 138A	**4995**	$170.53
HC 218	**5050**	$99.49
HC 218A	**5051**	$169.77
HC 228H	**5054**	$214.48
HC 238A, 238B	**5065**	$176.63

P&H **[P&H]**

Model	Code	Rate
440 TC	**7240**	$75.89
650A TC	**7720**	$106.35
670 TC	**7790**	$109.93
790 TC	**7880**	$99.34
8115A TC	**7950**	$137.42

SANBLASTING EQUIPMENT [SANBL]

DELAY FACTOR = 0.51 **OVERTIME FACTOR = 0.52**

Includes helmets, gauntlets, 30.5 meters(100 feet) of hose, pot, all control valves, nozzles and other attachments and accessories. Rated in accordance with the capacity of the pot measured in kilograms(pounds)of sand.

REMOTE CONTROL ONLY **[REMC]**

OVER	TO	Code	Rate
45 (100)	159 (350)	**010-035**	$1.57
159 (350)	272 (600)	**035-060**	$2.08
272 (600)	454 (1000)	**060-100**	$2.10
454 (1000)	680 (1500)	**100-150**	$2.64
680 (1500)	907 (2000)	**150-200**	$2.94

SAWS, CHAIN AND EARTH AUGER ATTACHMENT [SAWCH]

DELAY FACTOR = 0.15 **OVERTIME FACTOR = 0.86**

Hand held type, one or two man, gas, air or electric powered including all attachments and accessories. Blades, chains and tips shall be paid separately. Saws which cost less than $500 are considered minor tools and are no longer listed. Rated in accordance with Mfr's kilowatts (horsepower).

SAWS **[SAW]**

Model		Code	Rate
>3.7 (5)	30 amps @ 120V	**5-HP**	$2.10

SAWS, CONCRETE AND MASONRY [SAWCO]

DELAY FACTOR = 0.18 **OVERTIME FACTOR = 0.83**

Self powered gas, air or electric powered. Includes water (but not water truck or trailer), coolant, cutting compounds and all attachments and accessories. Saw blades or abrasive discs shall be paid in accordance with the following sawkerf codes.

SINGLE & MULTI-BLADE **[ABOP]**

OPERATION

Listed in accordance with Mfr's rated kilowatts (horsepower).

OVER	TO	Code	Rate
0	7.5 (10)	**0-10**	$2.68
7.5 (10)	14.9 (20)	**10-20**	$5.91
14.9 (20)	24.6 (33)	**20-33**	$11.72
24.6 (33)	33.6 (45)	**33-45**	$13.51
33.6 (45)	48.5 (65)	**45-65**	$16.57

BLADE SAWKERF **[ABSK]**

The following allowance is entered on the extra work bill by using the length x depth per blade.

UNITS	Code	Rate
Rate /blade/ 30.5 m (100 lin ft) / 25 mm (inch) depth	**100'/IN**	$18.00
Rate/blade/ 0.3 m (lin ft) / 25 mm (inch) depth	**LF-INDE**	$0.18

SCRAPERS, SELF PROPELLED [SCRSP]

DELAY FACTOR = 0.16 **OVERTIME FACTOR = 0.85**

Includes all attachments and accessories.

CATERPILLAR [CAT]

Model	Code	Rate
613	**1395**	$54.22
613B	**1400**	$62.42
613C	**1402**	$79.30
615	**1415**	$108.59
615C	**1416**	$119.39
621B cushion hitch	**1680**	$137.01
623B	**1700**	$142.23
623E	**1702**	$171.01
623F	**1703**	$180.69
627B push pull	**1770**	$180.35
627E non push-pull	**1772**	$195.43
627E push-pull	**1773**	$199.98
631C 67M5012 serial	**2170**	$153.06
631D	**2180**	$195.20
631E	**2185**	$218.06
633C non cushion hitch	**2305**	$148.00
633C cushion hitch	**2315**	$147.81
633C 66M693 serial	**2320**	$158.29
633D	**2330**	$204.72
637 cushion, non-push-pull	**2375**	$223.37
637 non-cushion, push-pull	**2410**	$225.53
637D non push-pull	**2460**	$280.06
637D push-pull	**2470**	$283.86
639D	**2475**	$293.21
637E	**2476**	$311.98
637E push-pull	**2477**	$317.18
641B non cushion hitch	**2620**	$187.70
641B cushion hitch	**2655**	$229.40
651B non cushion hitch	**2935**	$234.82
651B cushion hitch	**2970**	$237.18
651E	**2975**	$304.10
657B non cushion, non p-p	**3360**	$364.99
657B cushion, push-pull	**3370**	$371.21
657E non push-pull	**3375**	$446.30
657E push-pull	**3380**	$464.49
660B	**3470**	$214.19
666B	**3600**	$334.76

JOHN DEERE [DEER]

Model	Code	Rate
JD 760A	**3845**	$53.64
JD 762	**3860**	$67.53
JD 762A	**3865**	$71.58
JD 762B	**3866**	$86.08
JD 860A	**3920**	$79.58
JD 860B	**3930**	$83.69
JD 862	**3940**	$100.76
JD 862B	**3942**	$126.70

INTERNATIONAL [INTL]

Model	Code	Rate
412B	**5631**	$69.09
431B	**5637**	$134.86
433B	**5643**	$193.61

TEREX [TERX]

Model	Code	Rate
S 11EB	**8245**	$54.45
S 23E 33TOT-H-93SH, elev	**8250**	$130.88
S 24 49LOT-76SH serial	**8260**	$164.94
S 24B 023-024 serial	**8270**	$203.51
S 24C	**8275**	$224.33

WABCO [WAB]

Model	Code	Rate
101F	**8570**	$61.34
101G	**8575**	$63.73
111A	**8640**	$59.21
222G	**8700**	$116.53
222H	**8704**	$133.35

TRACTORS, CRAWLER [TRACC]

DELAY FACTOR = 0.17 **OVERTIME FACTOR = 0.84**

Includes all attachments and accessories such as dozer blade and power control blocks when needed, but does not include backhoe, winch or ripper units listed elsewhere in this schedule.

CASE [CASE]

Model	Code	Rate
350	**1820**	$24.30
350B	**1825**	$26.28
450	**1868**	$21.52
450B	**1869**	$25.03
450C	**1869E**	$27.88
475	**1870**	$36.06
550	**2000**	$29.05
650	**2100**	$34.21
850	**2128**	$28.71
850B	**2130**	$31.36
850C	**2135**	$34.78
850D	**2140**	$36.81
1150B	**2250**	$43.34
1150C	**2255**	$48.69
1150D	**2257**	$49.97
1150E	**2258**	$51.86

CATERPILLAR **[CAT]**

Model	Code	Rate
D-3	**2340**	$24.98
D-3B	**2345**	$28.01
D-3 LGP	**2350**	$25.59
D-3B LGP	**2355**	$29.21
D-3B SA	**2370**	$31.00
D-3C	**2380**	$29.93
D4C Series III	**2450**	$38.83
D-4D	**2655**	$30.10
D-4E direct drive	**2660**	$32.05
D-4E power shift	**2665**	$33.29
D-4H	**2670**	$41.96
D-4H LGP	**2675**	$42.33
D-4H Series II	**2680**	$43.12
D-4E SA	**2772**	$38.09
D-4E LGP power shift	**2780**	$33.47
D-4E LGP direct drive	**2782**	$33.47
D-4G XL	**2790XL**	$39.69
D-5	**3194**	$43.56
D-5B power shift	**3206**	$46.72
D-5B SA	**3325**	$50.33
D-5B LGP	**3345**	$49.28
D-5C	**3346**	$41.93
D-5H	**3347**	$56.36
D-5H Series II	**3348**	$60.18
D-5H LGP	**3350**	$59.27
D-6C direct drive	**3645**	$56.09
D-6C power shift	**3688**	$56.70
D-6C LGP	**3710**	$59.11
D-6D	**3720**	$67.01
D-6D SA	**3725**	$74.45
D-6D LGP	**3730**	$67.44
D-6H	**3732**	$75.61
D-6H Series II	**3733**	$80.03
D-6H LGP	**3735**	$79.98
D-6M LGP	**3745**	$75.70
D-6N XL	**3755**	$78.12
D-6R DS	**3800**	$85.81
D-6R XL	**3815**	$89.93
D-7G	**4180**	$102.01
D-7G LGP	**4200**	$97.99
D-7G SA	**4210**	$104.66
D-7H	**4215**	$104.53
D-7H Series II	**4216**	$113.58
D-7H LGP	**4220**	$110.74
D-8K	**4858**	$131.77
D-8L	**4862**	$160.92
D-8L SA	**4863**	$170.29
D-8N	**4864**	$146.04
D-8R	**4870**	$161.55
D-9H	**5160**	$174.38
D-9L	**5165**	$211.92
D-9N	**5170**	$183.73
D-9R	**5175**	$217.46
D-10	**5220**	$325.48
D-10N	**5225**	$267.32
D-10R	**5227**	$299.51
D-11N	**5230**	$420.62

JOHN DEERE **[DEER]**

Model	Code	Rate
JD 350C	**5360**	$27.26
JD 350D	**5365**	$30.39
JD 400G	**5405**	$26.36
JD 450C	**5474**	$28.04
JD 450D	**5476**	$29.16
JD 450E	**5478**	$29.41
JD 450G	**5479**	$32.45
JD 450J LT/LGP	**5479J**	$40.53
JD 550	**5480**	$31.78
JD 550A	**5481**	$34.45
JD 550B	**5483**	$33.23
JD 550G	**5484**	$38.00
JD 650G	**5484A**	$42.48
JD 650H LGP	**5484H**	$46.25
JD 750	**5485**	$49.98
JD 750B	**5486**	$54.89
JD 750 LGP	**5487**	$52.81
JD 750B LGP	**5488**	$67.28
JD 850	**5490**	$65.25
JD 850B	**5491**	$75.39
JD 850 LGP	**5492**	$69.82
JD 850B LGP	**5495**	$82.32

DRESSER **[DRES]**

Model	Code	Rate
TD 7E	**9100**	$29.01
TD 7G	**9102**	$32.46
TD 8E	**9105**	$35.51
TD 8G	**9107**	$38.56
TD 12	**9110**	$51.32
TD 12 LGP	**9115**	$58.68
TD 15C	**9120**	$73.80
TD 15E	**9122**	$89.32
TD 15C LGP	**9125**	$71.04
TD 20E	**9130**	$96.78
TD 20G	**9135**	$120.44
TD 20G LGP	**9137**	$127.80
TD 25E	**9139**	$136.79
TD 25G	**9140**	$175.47

FIAT-ALLIS **[F-A]**

Model	Code	Rate
10C	**6043**	$56.92
10C LGP	**6044**	$57.78
14C	**6048**	$71.65
FD 20	**6056**	$102.42
21C	**6060**	$117.25
FD 30	**6060E**	$139.05
31	**6061**	$187.10
FD 40	**6061E**	$216.72

KOMATSU **[KOMA]**

Model	Code	Rate
D 21P-6	**7965**	$30.07
D 31A-16	**7970**	$26.39
D 31A-17	**7972**	$29.30
D 31E-17	**7976**	$30.41
D 31E-18	**7977**	$32.72
D 31P-16	**7980**	$26.77
D 31P-17	**7981**	$30.01
D 31P-17B	**7981E**	$31.40
D 58E-1	**8003**	$59.64
D 58P-1	**8003H**	$67.30
D 65E-6	**8070**	$68.36
D 65E-7, E-8	**8072**	$77.00
D 65P-6	**8080**	$71.00
D 65P-7 / D 65P-8	**8082**	$80.35
D 68P-1	**8083**	$88.75
D 68E-1	**8085**	$83.74
D 83E-1	**8087**	$103.74
D 83P-1	**8088**	$105.08
D 85P-18	**8090**	$111.98
D 85A-18	**8114**	$95.25
D 85E-12	**8120**	$82.82
D 85E-18	**8140**	$105.22
D 135A-1	**8150**	$135.07
D 155A-1	**8160**	$157.08
D 155A-2	**8161**	$156.68
D 375A-1	**8175**	$249.46
D 375A-2	**8176**	$281.13
D 455A-1	**8180**	$306.30
D 475A-2	**8186**	$444.80

TRACTORS, HEAVY [TRACH]

DELAY FACTOR = 0.17 **OVERTIME FACTOR = 0.84**

Includes all attachments and accessories such as dozer blade, power control units and push blocks, when needed, but does not include backhoe, winch or ripper units listed elsewhere in this schedule.

CATERPILLAR **[CAT]**

Model	Code	Rate
814	**1400**	$92.91
814B	**1410**	$140.63
824B	**1720**	$148.00
824C	**1730**	$186.74
834B	**2010**	$283.71

TRACTORS, RUBBER TIRE, INDUSTRIAL, FARM & SKID STEER [TRACS]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.87**

37.3 kW (50 HP) OR LESS **[<50]**

Including, but not limited to the following:
Bobcat--440B, 443B, 450, 453, 542B, 543B, 553, 742B, 743B, 753, 763, 773, 1840, 7753
Case-- 1818, 1825, 1835C, 1838
Deere-- 3375, 4475, 5200, 5575, 6675, 7775
Ford-- L250, L454, L455, L553, L555, L781
Gehl-- SL3310, SL3410, SL3725, SL3825, SL4525, SL4625
Hydra-Mac-- 1300, 1600, 1700D
JCB-- 165Robot, 165Robot Ser II
Massey-Ferguson-- MF30E
Mahto-- LS70, LS75, L933
Mustang-- 920, 920E, 921, 930A, 930AE, 940, 940E, 910, 911, 2040
New Holland-- 1220, 1320, 1620, 1920, 2120, 3415, 3930, L250, L255, L465, LX465, LX485, L565, LX565, LX665
Ramrod-- 230B, 300B, 584B, 784B, 550, 750, 1350, 1550
Thomas-- T-82, T-83, T-83S, T-103, T-132, T-133, T-133S
Trak-- 1300HD, 1300C, 1300CX, 1500C

Model	Code	Rate
with loader or dozer	**A**	$21.70
auger, w/ or w/o loader or dozer	**B**	$22.12
backhoe, w/ or w/o loader or dozer	**C**	$23.65

OVER 37.3 kW (50 HP) **[>50]**

Including, but not limited to the following:
Bobcat-- 853, 863, 873, 943, 953, 980
Case-- 1845C
Deere-- 5300, 5400, 6200, 6300, 6400, 8875
Ford-- L783, L785, 250C, 260C
Gehl-- SL5625, SL6625, SL6635
Hydra-Mac-- 1850, 2650, 2650D
JCB-- 185Robot
Massey-Ferguson-- MF40E, MF50EX
Mustang-- 960, 2060
New Holland-- 4630, 5030, 5640, 6640, 7740, 7840, 8240, 8340, L865, LX865, LX885, 345D, 545D
Ramrod-- 1750, 1950
Thomas-- T-173HL, T-173HLS, T173HLS II, T-203HD, T-233HD
Trak-- 1700HD, 1700C, 1700CX, 1700XHP

Model	Code	Rate
with loader or dozer	**A**	$29.46
auger, w/ or w/o loader or dozer	**B**	$29.99
backhoe, w/ or w/o loader or dozer	**C**	$31.59

TRAFFIC CONTROL & SAFETY DEVICES (HOURLY RATES) [TRAFA]

DELAY FACTOR = 0.37 **OVERTIME FACTOR = 0.68**

CHANGEABLE MESSAGE SIGN **[CMSN]**

Model	Code	Rate
Generator	**GEN1**	$13.18
Generator w/ cell remote	**GEN2**	$14.46
Solar	**SOL1**	$9.89
Solar w/ cell remote	**SOL2**	$11.17

FLASHING ARROW SIGN **[FLAS]**

Including supplies, replacements and servicing.

Model	Code	Rate
Roof mounted	**RM**	$0.87
Trailer mounted	**TM**	$2.85

TRAFFIC CONTROL & SAFETY DEVICES (DAILY RATES) [TRAFC]

DELAY FACTOR = 0.72 **OVERTIME FACTOR = 1.00**

Includes supplies and servicing. The following allowance is entered on the extra work by using days instead of hours worked. Crash cushion barrels and K-rail sections are now listed with Non-Operated items[NONOP].

(1) BARRICADES **[1BAR]**

(A) 750 mm to 900 mm high & 600 mm to 900 mm wide (30 to 36 inches high & 24 to 36 inches wide)
(B) 1500 mm high by 1200 mm wide min. (60" high by 48" wide min.)

Model	Code	Rate
each with flasher	**A1**	$0.47
each without flasher	**A2**	$0.24
each	**B3**	$1.06

(2) TRAFFIC CONES **[2TC]**

Lost or destroyed are no longer paid on invoice.

Model	Code	Rate
450 mm (18") high, per 100	**A100**	$8.53
700 mm (28") high, per 100	**B100**	$14.83
700 mm (28") high w/ refl sleeve, per 100	**D100**	$22.92
1,050 mm (42") high w/ refl sleeve, per 100	**E100**	$38.12

(3) PORTABLE DELINEATOR **[3DEL]**

Lost or destroyed are no longer paid on invoice.

Model	Code	Rate
per 100	**100**	$24.31

(4) ILLUMINATED SIGNS **[4SIG]**

Model	Code	Rate
incl 900 mm x900 mm (3'x3') sign & batteries	**12V**	$5.92

(5) FLASHING BEACON **[5BEA]**

Model	Code	Rate
portable 12 volt	**12V**	$6.04

(6) FLAG/SIGN STAND **[6FSS]**

Model	Code	Rate
incl sign, stand & 3 flags	**EACH**	$2.73

(7) DELINEATOR DRUM **[7DDR]**

Model	Code	Rate
Del. drum w/ base per 100	**100**	$60.36

TRAILERS, EQUIPMENT, LOW BED [TRAIL]

DELAY FACTOR = 0.42 **OVERTIME FACTOR = 0.64**

Includes all attachments and accessories related to hauling. The rates cover drop deck type with and without folding/removable gooseneck or oscillating trunion. Pilot vehicles are extra. Listed in accordance with number of axles and tires per axle. Includes jeeps, booster axles, and dollies. All loads shall be hauled legally or within Caltrans Permit Policy.

LOW BED A **[LB-A]**

2 axle

Model	Code	Rate
4 Tires per axle	**100**	$14.57
8 Tires per axle	**200**	$18.37

LOW BED B **[LB-B]**

3 axle

Model	Code	Rate
4 Tires per axle	**300**	$19.55
8 Tires per axle	**400**	$22.66

LOW BED C **[LB-C]**

4 axle

Model	Code	Rate
4 Tires per axle	**500**	$31.39
8 Tires per axle	**600**	$38.96

LOW BED D **[LB-D]**

6 axle

Model	Code	Rate
8 Tires per axle	**700**	$62.39

TRAILERS, EQUIPMENT, TILT BED [TRAIT]

DELAY FACTOR = 0.42 **OVERTIME FACTOR = 0.64**

Includes all attachments and accessories related to hauling. Pilot vehicles are extra. Listed in accordance with the Mfr's rated capacity in tonnes(tons).

TILT BED 1 AXLE **[TB-1]**

OVER	TO	Code	Rate
0	1.8 (2)	**00-02**	$0.78
1.8 (2)	3.6 (4)	**02-04**	$0.83

TILT BED 2 AXLES **[TB-2]**

OVER	TO	Code	Rate
3.6 (4)	5.4 (6)	**04-06**	$1.38
7.3 (8)	9.1 (10)	**08-10**	$4.27
9.1 (10)	10.9 (12)	**10-12**	$4.92
10.9 (12)	12.7 (14)	**12-14**	$5.54
12.7 (14)	14.5 (16)	**14-16**	$6.16
14.5 (16)	16.3 (18)	**16-18**	$5.95
16.3 (18)	18.1 (20)	**18-20**	$5.75
18.1 (20)	20.0 (22)	**20-22**	$6.59
20.0 (22)	22.7 (25)	**22-25**	$6.41

TRENCHING MACHINES [TRENC]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.88**

Includes all attachments and accessories. When used, tungsten carbide tips shall be replaced by separate invoice.

BOBCAT **[BCAT]**

Model	Code	Rate
T 116	**2000**	$10.48
T 135	**2010**	$24.32
T 136	**2020**	$24.64
T 208	**2030**	$5.47
3022	**2040**	$25.10

CASE **[CASE]**

Model	Code	Rate
TL 70	**9051**	$4.38
TL 100	**9053**	$6.32
TL 120	**9055**	$7.63
TL 200	**9070**	$7.80
16+4	**9120**	$11.51
25+4	**9170**	$15.96
25 + 4 XP	**9171**	$20.23
30+4 standard	**9224**	$22.72
DH 4	**9255**	$30.18
DH 4B	**9256**	$33.14
DH 5	**9257**	$29.83
DH 5 QUAD	**9259**	$31.14
DH 7	**9261**	$35.21
360	**9263**	$24.83
ROAD RUNNER 380	**9277**	$32.57
TF 300	**9374**	$15.64
TF 700	**9398**	$20.23
TF 800	**9405**	$26.34
TF 1000	**9460**	$31.60
760	**9465**	$33.05

DITCH WITCH **[D-W]**

Model	Code	Rate
R 30	**5390**	$20.44
R 36D	**5400**	$25.02
R 40	**5432**	$26.80
R 65	**5556**	$27.42
R 100	**5565**	$70.83
V 30	**5618**	$19.28
1410	**5620**	$7.96
1420	**5625**	$8.62
1500	**5630**	$5.90
1620	**5635**	$11.21
1810	**5640**	$11.57
2020	**5645**	$14.81
2200	**5650**	$13.86
2300	**5660**	$20.80
2310	**5662**	$21.79
3210	**5670**	$23.98
3210 Combo	**5675**	$24.85
3500	**5676**	$28.32
4010	**5677**	$35.69
4010 Combo	**5678**	$28.59
5010	**5679**	$28.22
6510	**5680**	$34.09
6510 Combo	**5685**	$37.19

MIDMARK **[MDMK]**

Model	Code	Rate
300 A	**7945**	$20.26
321	**7950**	$21.53
400 A	**7955**	$26.08
440	**7960**	$33.19

VERMEER **[VERM]**

Model	Code	Rate
CC-135	**8350**	$76.72
M 220	**8380**	$13.50
M 455 / M455A	**8480**	$33.58
M 475	**8570**	$35.80
M 475A	**8571**	$40.03
M 485	**8580**	$39.91
M 495	**8585**	$63.14
T 300B, T 300A	**8718**	$21.23
T 400C, T 400B, T 400A	**8781**	$48.33
T 600D, C, B, A	**8842**	$70.03
T 650	**8843**	$119.32
T 800B, T 800A, T800	**8870**	$112.74
T 800C	**8871**	$122.77
T 850	**8875**	$219.13
V 430	**8950**	$24.38
V 430A	**8951**	$27.54
V 434 / M 434	**9000**	$23.50
V 440	**9015**	$26.55
V 450	**9017**	$32.08
V 454	**9020**	$27.41
V 1550	**9025**	$12.71

TRUCK, TRUCK TRAILERS, EXCL. DUMP TRUCKS & EQPT TRAIL [TRUCK]

DELAY FACTOR = 0.18 **OVERTIME FACTOR = 0.84**

Includes all attachments and accessories related to hauling, with and without trailers as needed. Includes water trucks, freight trucks and passenger vehicles, including 4wd option. Listed by Mfr's Gross Vehicle Weight in Kilograms(pounds). For tractor-trailer units, the gross vehicle weight of the cargo carrying unit or units will control. In the case of water trucks, the tank capacity expressed in kilograms (pounds) of water plus 20%, will determine the gross vehicle weight. For attachment allowance, see attachment class.

TRUCKS **[T&TT]**

OVER	TO	Code	Rate
CARS , LIGHT TRUCKS		**00-06**	$16.34
3175 (7000)	5443 (12000) No small pickups	**06-12**	$20.29
5443 (12000)	9072 (20000)	**12-20**	$25.30
9072 (20000)	12701(28000)	**20-28**	$27.77
12701 (28000)	16330 (36000)	**28-36**	$36.46
16330 (36000)	21773 (48000)	**36-48**	$42.54
21773 (48000)	27216 (60000)	**48-60**	$51.63
27216(60000) & Over		**60**	$65.21

TRUCKS, OFF-HIGHWAY [TRUOF]

DELAY FACTOR = 0.24 **OVERTIME FACTOR = 0.78**

Includes all attachments and accessories. Includes end dump, belly dump and earthmover types. Listed in accordance with Mfr's rated capacity in tonnes (tons). In the case of earthmover types, rated by Mfr's volumetric capacity, a factor of 1.4 tonnes per cubic meter (1-1/2 tons per cubic yard) of struck capacity shall be used.

TRUCK OFF-HIGHWAY **[TRU]**

OVER	TO	Code	Rate
9.1 (10)	13.6 (15)	**10-15**	$40.28
16.3 (18)	20.0 (22)	**18-22**	$72.63
20.0 (22)	24.5 (27)	**22-27**	$90.38
24.5 (27)	29.0 (32)	**27-32**	$103.55
29.0 (32)	36.3 (40)	**32-40**	$139.88
36.3 (40)	49.9 (55)	**40-55**	$205.30
49.9 (55)	60.8 (67)	**55-67**	$231.02

TRUCKS, DUMP, ON-HIGHWAY [TRUON]

DELAY FACTOR = 0.21 **OVERTIME FACTOR = 0.81**

Includes all end dump, side dump and belly dump types; including all attachments and accessories.

TRUCK ON-HIGHWAY **[TRUN]**

Model	Code	Rate
2 axles	**2AXL**	$42.84
3 axles	**3AXL**	$57.70
4 axles	**4AXL**	$66.21
5 axles	**5AXL**	$72.78

WELDING EQUIPMENT [WELD]

DELAY FACTOR = 0.22 **OVERTIME FACTOR = 0.81**

ARC WELDING MACHINES **[AWM]**

Diesel, gas or electric powered. Includes helmets, holders, cable and all attachments and accessories. Rate capacity in amps.

OVER	TO	Code	Rate
0	250	**0-250**	$4.36
250	500	**250-500**	$8.33
over	500	**500**	$8.94

GAS WELDING OUTFIT **[GWO]**

Includes regulator, 7.6 meters (25 feet) of hose, torch, goggles, lighter and attachments and accessories. Gas and rod shall be paid separately.

Model	Code	Rate
ALL	**ALL**	$0.27

ATTACHMENT 3

THIRD PARTY ESTIMATE FOR LINER MATERIAL PURCHASE AND INSTALLATION

Eastlake LF BUDGET

Description	Unit	Approx. quantity	Material Unit Price	Waste Factor	Install Unit Price	Sales Tax	Total Unit Cost	Total unit	Total	Profit	Total Unit Cost	Total
Supply 60 mil DS textured	sf.	1,751,220	$0.2690	$0.00	$0.00	$0.00	$0.269	$0.31	$535,316	$64,238	$0.306	$535,873.32
Supply SS 8 oz composite	sf.	1,766,241	$0.3080	$0.00	$0.000	$0.00	$0.308	$0.350	$618,184	$74,182	$0.350	$618,184.35
Supply Bentomat DN	sf.	615,525	$0.3630	$0.00	$0.000	$0.00	$0.363	$0.413	$253,904	$30,468	$0.413	$254,211.83
Install 60 mil DS textured	sf.	1,578,200	$0.0000	$0.00	$0.286	$0.00	$0.286	$0.325	$512,915	$61,550	$0.325	$512,915.00
Install SS 8 oz composite	sf.	1,578,200	$0.0000	$0.00	$0.214	$0.00	$0.214	$0.243	$383,790	$46,055	$0.243	$383,502.60
Install Bentomat DN	sf.	588,600	$0.0000	$0.00	$0.21	$0.00	$0.214	$0.243	$143,137	$17,176	$0.243	$143,029.80
Sales Tax at a rate of 8.00%	ls.	1	$0.0000	$0.00	$0.000	$0.00	$0.000	$0.000	$0	$0	$112,661.56	$112,661.56
												$2,560,378.45

		Overhead Profit Margin	Total Cost	Cost per Sq. Ft.
Supply and Install 60 mil (w/tax)	**$1,091,658.19**	**1.15**	**$1,255,406.91**	**$0.72**
Supply and Install SS 8oz Comp (w/ tax)	**$1,051,141.70**	**1.15**	**$1,208,812.95**	**$0.68**
Install Bentomat (w/ tax)	**$417,578.57**	**1.15**	**$480,215.36**	**$0.78**

Project Total **$2,944,435.22**

Appendix J

CalRecycle January 22, 2018 Approval
Financial Assurance Demonstration Acceptance

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

1001 I STREET, SACRAMENTO, CALIFORNIA 95814 • WWW.CALRECYCLE.CA.GOV • (916) 322-4027
P.O. BOX 4025, SACRAMENTO, CALIFORNIA 95812

January 22, 2018

Mr. Lars Ewing
Public Services Director
Lake County Public Services Department
333 Second Street
Lakeport, CA 95463

RE: Financial Assurances Review for Eastlake Landfill, Facility No. 17-AA-0001

Dear Mr. Ewing:

Title 27, California Code of Regulations, Division 2, Subdivision 1, Chapter 6, (the Regulations) Subchapter 2, Articles 1-4 requires operators of disposal facilities to demonstrate the availability of financial resources to conduct closure, postclosure and corrective action activities. Article 3 of the Regulations further explains that operators must demonstrate adequate financial ability to compensate third parties for bodily injury and property damage caused by facility operation prior to closure.

The Eastlake Landfill utilizes two enterprise funds to assure the costs of closure, postclosure maintenance and corrective action costs. As an active landfill, the operator is required to demonstrate financial responsibility for operating liability claims and has submitted an acceptable Certificate of Self Insurance and Risk Management.

The Department of Resources Recycling and Recovery's (CalRecycle) Financial Assurances Unit (FAU) received the updated enterprise fund balance information on April 27, 2017 and based on the cost estimates and the fund balance information provided, the enterprise funds are adequately funded at this time. As required by section 22225 of the Regulations, the operator must submit updated enterprise fund balance information on the anniversary date of the establishment of each fund. The operator has requested to change the anniversary date for both enterprise funds to December 15th and as allowed by section 22225 of the Regulations, CalRecycle hereby approves this request.

Due to the dynamic nature of the financial assurance demonstrations, the results of this review are only valid for 60 days. CalRecycle is committed to assisting you in complying with the financial assurance regulations and procedures. If you have any questions regarding this information, please contact Christina Reese at (916) 341-6155 or by email at Christina.Reese@Calrecycle.ca.gov.

Sincerely,

Christina Reese
Financial Assurances Unit
Waste Permitting, Compliance, and Mitigation Division
Department of Resources Recycling and Recovery

cc: Christina Gearhart, Lake County Environmental Health Division
Kenny Croyle, Central Valley Regional Water Quality Control Board
Reinhard Hohlwein, Permitting and Assistance Branch – CalRecycle
Frank Davies Jr., Closure and Technical Support – CalRecycle

Appendix K

NonWater Corrective Action Cost Estimate

Site-Specific Non-Water Release Corrective Action Plan

Eastlake Landfill
Lake County, California

Prepared for:

County of Lake

Engineers & Geologists

March 2018

415031

Reference: 415031

Site-Specific Non-Water Release Corrective Action Plan

Eastlake Landfill
Lake County, California

Prepared for:
County of Lake

Prepared by:

SHN
Engineers & Geologists

335 S. Main St.
Willits, CA 95490-3977
707-459-4518

March 2018

QA/QC: EJN

REGISTERED PROFESSIONAL ENGINEER
ERIC ALLEN SCHNEIDER
69219
Exp. 6-30-18
CIVIL
STATE OF CALIFORNIA

\\Willitssvr\Projects\2015\415031-Eastlake-CA\PUBS\rpts\20180312-NWCAP.doc

Table of Contents

List of Illustrations

Abbreviations and Acronyms

--	not applicable
fps	feet per second
ft/ft	feet per foot
ft^3	cubic feet
ft^3/s	cubic feet per second
g	acceleration due to gravity
km	kilometer
mm/yr	millimeters per year
mps	meters per second
pcf	pounds per cubic foot
psf	pounds per square foot

A-P	Alquist-Priolo
ASCE	American Society of Civil Engineers
BMP	best management practices
CCR	California Code of Regulations
CDMG	California Department of Mines and Geology
CGS	California Geological Survey
CMP	corrugated metal pipe
CMP	corrugated metal pipe
DA-#	drainage area and number designation
ESL	Eastlake Sanitary Landfill
Fd	minimum factor of safety
FEMA	Federal Emergency Management Agency
Fs	factor of safety under static conditions
HDPE	high-density polyethylene
LCRS	leachate collection and recovery system
LFG	landfill gas
MCE	maximum capable earthquake
MSL	mean sea level
MSW	municipal solid waste
Mw	moment magnitude
MW-#	monitoring well-number
NOAA	National Oceanic and Atmospheric Administration
NR	no reference
NWCAP	non-water corrective action plan
PVC	polyvinyl chloride
RWQCB	Central Valley Regional Water Quality Control Board
SCS	SCS Engineers
SHN	SHN Engineers & Geologists
SRWWTP	Southeast Regional Wastewater Treatment Plant
SWPPP	stormwater pollution prevention plan
Ts	fundamental period of the failure wedge
USGS	United States Geological Survey
WMU	waste management unit

1.0 Introduction

This report presents the site-specific non-water release corrective action plan (NWCAP) for the Eastlake Sanitary Landfill (ESL). The ESL is an approximately 80-acre Class III solid waste disposal facility that is owned and operated by the County of Lake. The facility is located at the eastern paved end of Davis Avenue, in Clearlake, California, approximately ¾ of a mile east of State Highway 53. The facility is in the southern half of Section 23, and the northern half of Section 26, Township 13 North, Range 7 West, Mount Diablo Base and Meridian (Figure 1). This NWCAP was prepared by SHN Engineers & Geologists on behalf of the County of Lake.

This NWCAP has been revised from the original version submitted in August 2015 to address comments provided by the California Environmental Protection Agency Engineering Support Branch. This NWCAP contains updated costs spreadsheets, evaluation of impacts from a seismically induced causal event and 1,000 year storm drainage system analysis.

1.1 Site-Specific Non-water Release Corrective Action Plan

Owners and operators of all disposal facilities operated after July 1, 1991, are required to provide financial assurance for corrective action based on the highest amount of either the water release corrective action or non-water release corrective action (CalRecycle, 2011).

The NWCAP is required to provide an assessment of the known or reasonably foreseeable impacts due to causal events and the costs to remediate those impacts. The specific causal events identified in the regulations include earthquake, flood, precipitation, tsunami, seiche, and fire (CalRecycle, 2011).

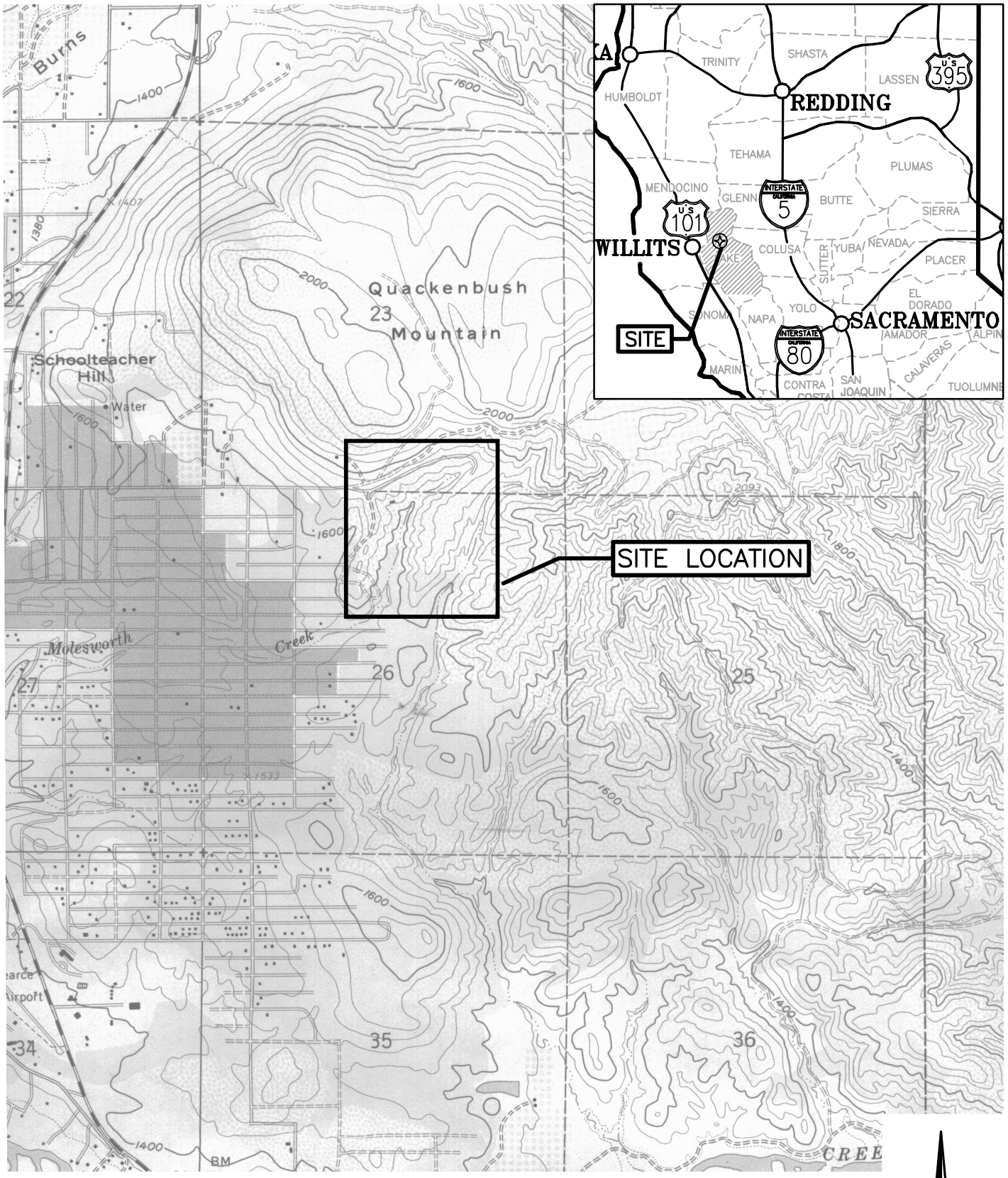
Additionally, the NWCAP must contain an evaluation of the long-term performance of the final cover system, and provisions to restore the integrity or establish the adequacy of a damaged or inadequate containment structure or environmental monitoring or control systems, to bring the landfill into compliance with the applicable requirements (CalRecycle, 2011).

1.2 Background

Refuse disposal activities at the ESL commenced in 1972 (RWQCB, 2006) and continue to the present. The permitted landfill boundary encompasses approximately 80 acres. The current permitted landfill footprint is approximately 35 acres shown in Figure 2. The County also owns approximately 100 additional acres northeast and south of the landfill property.

The ESL is the primary disposal facility for non-hazardous municipal solid wastes (MSW) generated within Lake County. Lake County residents and businesses currently generate approximately 40,000 tons of MSW per year requiring disposal at the landfill. Under the terms of a Solid Waste Disposal Agreement that commenced in 2012, approximately 22,250 additional tons per year, imported from Mendocino County, are also disposed of at the site. This import agreement expired December 31, 2016, and was not extended (SCS, 2015).

Waste disposal at ESL occurs in two primary areas shown on Figure 2. Area I is an approximate 22.4-acre unlined waste management unit (WMU). There is no engineered base liner in place. The module is equipped with a leachate collection and removal system (LCRS) that gravity-drains to the leachate pond



SOURCE: LOWER LAKE USGS 7.5 MINUTE QUADRANGLE

N

1"=2000'±

Consulting Engineers & Geologists, Inc.	Eastlake Sanitary Landfill Lake County, California	Site Location Map SHN 405057
	January 2009	405057-locmap	Figure 1

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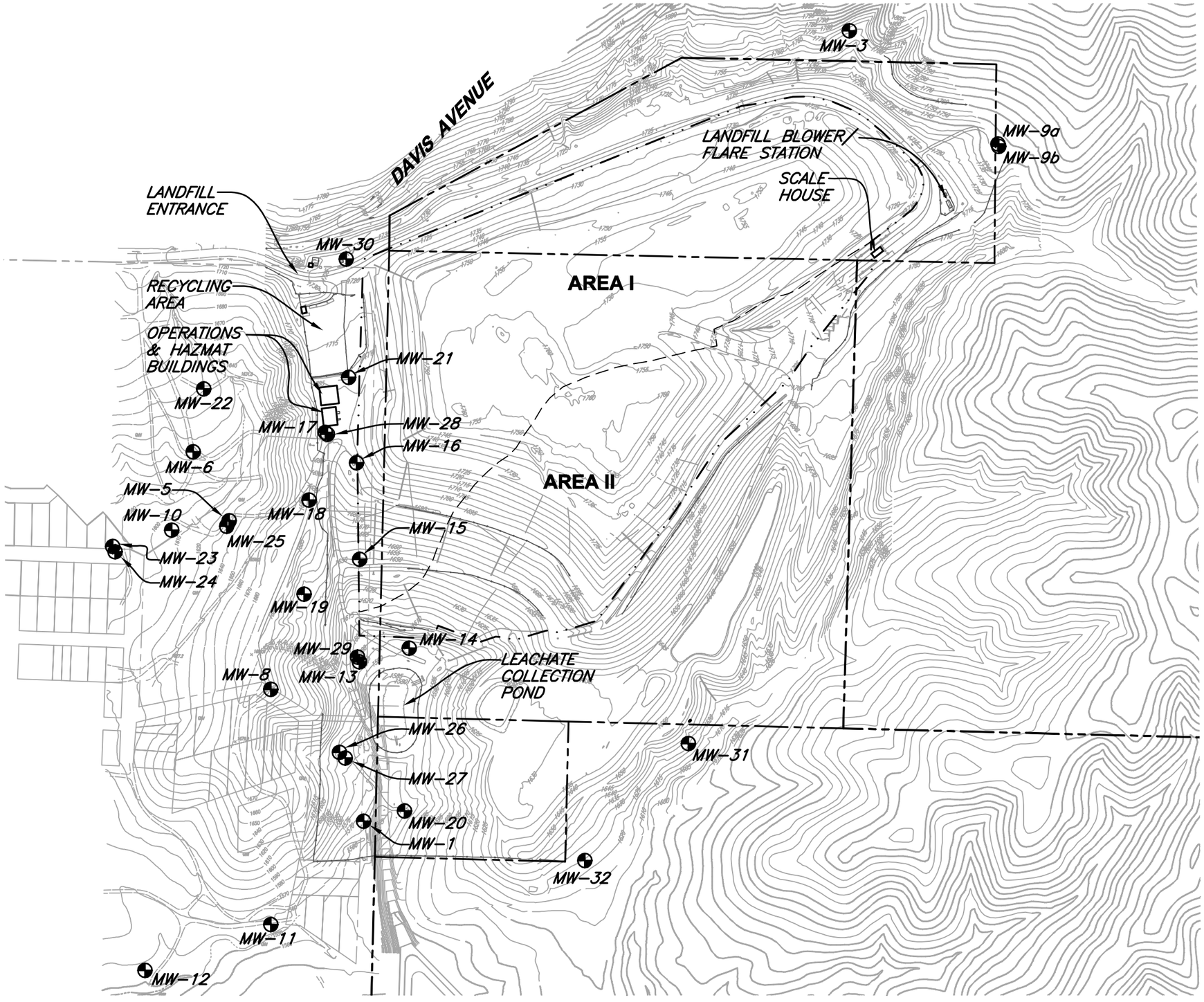


NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASE MAP A COMBINATION OF PARCEL LINES FROM LAKE COUNTY, AERIAL SURVEY FROM SCS ENGINEERS, "SITE PLAN," DATED 09-26-17, AND SURVEY DONE BY SHN ENGINEERS, 2017

EXPLANATION

- PARCEL LINE
- APPROXIMATE PERMITTED REFUSE LIMIT
- MW-31 MONITORING WELL LOCATION AND DESIGNATION

N

0 300

1"=300'

SHN Consulting Engineers & Geologists, Inc.

Lake County PSD Eastlake Landfill Lake County, California		Site Plan SHN 415031
March 2018	415031-SITE	Figure 2

(surface impoundment) located below the southern toe of the WMU. The County estimates that the lowest elevation of MSW placement in Area I is at approximately 1,600 feet above mean sea level (MSL). Current surface elevations at ESL reach up to 1,750 feet MSL.

Area II is an approximately 11.3-acre lined unit. This area was developed in two phases—Module 1 (6.5 acres), constructed in 1999; and Module 2 (4.8 acres) constructed in 2003 (SCS, 2015). Area II is comprised of a subdrain system, liner system, and an LCRS. The LCRS gravity drains to a lined 600,000-gallon surface impoundment and eventually pumped to the sanitary sewer system.

2.0 Causal Events

2.1 Earthquake

Several known active seismic sources are located in proximity to the ESL. Earthquakes are, therefore, presumably a foreseeable causal event. According to CalRecycle (2010) the best management practice (BMP) for an earthquake as a causal event is comprised of three elements to address the potential for 1) fault rupture, 2) liquefaction, and 3) ground motion.

The potential earthquake damage evaluation completed as part of this revision to SHN's previously submitted corrective action plan dated August 15, 2015, was prepared in conformance with 27 California Code of Regulations (CCR), Section 22101(b)(2). The purpose of the evaluation was to assess potential earthquake-induced damage, including liquefaction, landsliding, surface fault rupture, and permanent seismic deformation, for the maximum capable earthquake (MCE) or an earthquake with a 2,475-year return period. Included in the following sections are a description of the site geologic conditions, discussions regarding seismic demand, slope stability analysis, and estimation of permanent seismically induced deformations of representative cover slopes.

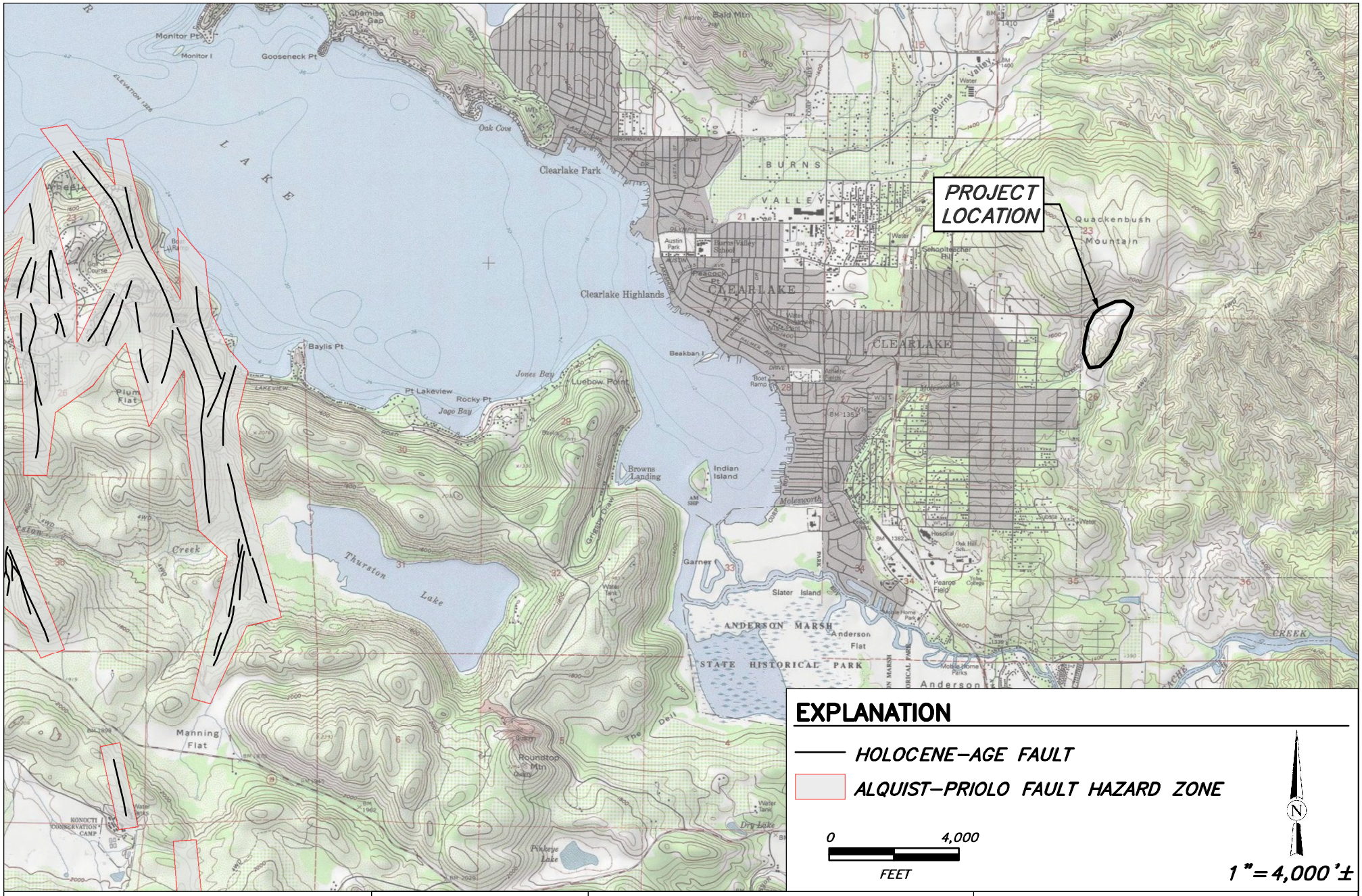
2.1.1 Fault Rupture

Active faults are defined as faults that have had surface displacement in the Holocene epoch (in the past 11,000 years) based on CCR Division 2, Title 14, also known as the Alquist-Priolo Earthquake Fault Zoning Act (A-P Act). Potentially active faults are defined by the A-P Act as faults showing surface displacement during Quaternary time (about 1.6 million years before present).

Based on the most recent available data, no active or potentially active fault is reported to be present within the boundaries of the project site. The ESL is not located within an A-P Earthquake Fault Hazard Zone (CDMG, 1983; CGS, 2010). Regional active faults within about 50 miles of the ESL include the Konocti Bay fault zone, Big Valley fault, Hunting Creek-Berryessa fault, the north section of the Maacama fault zone, San Andreas fault, Bartlett Springs fault (Bryant and Hart, 2007) and Great Valley 03 Mysterious Ridge blind thrust fault (USGS and CGS, 2018).

The nearest active fault to the ESL is the Konocti Bay fault zone located approximately 5 miles to the southwest of the site shown in Figure 3. Both the Maacama and Bartlett Springs faults are located approximately 23 miles from the site to the west and north, respectively. The San Andreas fault is located approximately 50 miles to the west of the site. In addition to the regional active faults, several Quaternary faults are located within 25 miles of the ESL, including the Cross Spring fault to the north, the Collayomi fault zone to the south, and the Healdsburg fault to the southwest (CGS, 2010).

Path: \\eureka\projects\GIS-Files\Willits\2015\415031_EastLakeLandfillCAP\PROJ_MXD\Jan_2018\Figure3_FaultMap.mxd



DATA SOURCE: ALQUIST-PRIOLO FAULT HAZARD ZONES: CLEARLAKE HIGHLANDS QUADRANGLE (CDMG, 1983)

SHN Consulting Engineers & Geologists, Inc.

County of Lake
Site Specific Non-Water Release CAP
Eastlake Landfill, Clear Lake, California

Alquist-Priolo Earthquake Fault Hazard Zones Map
SHN 415031

January 2018 | Figure3_FaultMap | Figure 3

2.1.2 Liquefaction

The ESL is not located within an area susceptible to the hazards of seismically induced liquefaction due to the site being underlain by Pliocene age and Cretaceous age bedrock. Based on a review of the Earthquake Fault Zones map (Figure 3), the site is not located within 200 feet of a Holocene active fault.

2.1.3 Ground Motion

According to CalRecycle (2010), the basis for considering whether an earthquake causal event needs to be evaluated for NWCAP is a minimum of 12 inches of predicted permanent seismic deformation for the MCE or a 2,475-year return period event. For the ESL the MCE event, defined as the "maximum earthquake that appears capable of occurring under the presently known geologic framework," was used given the proximity of several active faults to the site.

The MCE earthquake causal event was established deterministically by the following procedure: Selection of causative faults near the site known to be capable of generating large earthquakes and representative of the MCE event; and development of acceleration response spectrum associated with the governing causative faults.

The MCE event was evaluated using the web-based tool ARS Online v.2.3.09 provided by the California Department of Transportation (Caltrans, April 2017). The deterministic spectrum is the average of median response spectra calculated using the ground motion prediction equations developed under the "Next Generation Attenuation" project.

The causative faults for the deterministic MCE event are 1) the Hunting-Creek-Berryessa fault zone (Hunting Creek section) located about 10.4 miles east of the site; 2) the Great Valley 03 Mysterious Ridge fault located 14.6 miles to the southeast of the site; and 3) the Konocti Bay fault zone located 6.3 miles southwest of the site. Table 1 summarizes the causative fault parameters.

Table 1. Summary of Active Faults Used for Seismic Hazard Evaluation
Eastlake Landfill, Lake County, California

Fault Name	Maximum Magnitude (M_w)[1]	Distance From Site		Fault Type	Slip Rate (mm/yr)[3]
		miles	km[2]		
Hunting Creek-Berryessa Fault Zone	7	10.4	16.8	Strike-Slip	3
Great Valley 03 Mysterious Ridge	7	14.6	23.5	Reverse	1.3
Konocti Bay	6.3	6.3	10.2	Normal	unknown

1. Mw: maximum moment magnitude
2. km: kilometers
3. mm/yr: millimeters per year

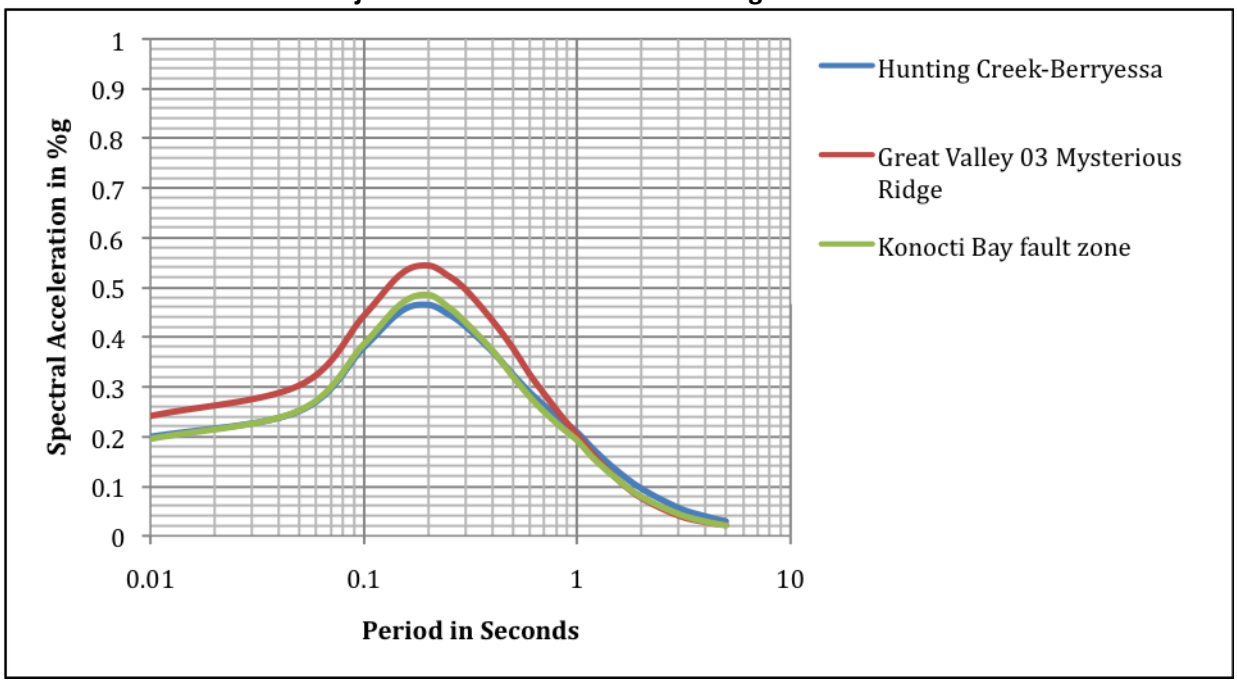
The site-specific deterministic MCE response spectrum was determined for the above causative faults based on magnitude, distance, fault type, and an estimated weighted average shear wave velocity of 1,450 feet per second (fps; 440 meters per second [mps]) for the top 100 feet of the subsurface profile.

This shear wave velocity was estimated based on three distinctive material layers defined as follows:

- Top 40 feet of the subsurface profile is made up of refuse material with an estimated shear wave velocity of 540 fps (160 mps);
- Underlying the refuse, a 40-foot thick layer of dense "soft rock" (Cache formation) with an average shear wave velocity of 1,800 fps (560 mps); and
- Decomposed sandstone bedrock with an average shear wave velocity of 2,500 fps (760 mps).

The deterministic acceleration response spectra for the three faults are shown in Figure 4. The deterministic response spectrum for the Great Valley 03 Mysterious Ridge Fault was used in the deformation analyses due to it being the most critical in terms of the seismic risk.

Figure 4. Deterministic MCE Response Spectra
Project Site Latitude 38.9533 N Longitude -122.6017 W



2.1.4 Slope Stability Analysis

The existing final slope configuration was used to evaluate the critical slope conditions in order to estimate permanent seismic deformations for the site. Quantitative slope stability analyses using the computer program Slide 7.0 (Rocscience, Inc.; March 2016) were performed to estimate permanent seismic deformations for the site. In general, the taller the slope, the greater the estimated deformation. Therefore, the topographic profile of the Area II south-facing slope was used for the stability analyses and represents the steepest slope and greatest refuse fill height of the landfill. Graphical representations of the stability analyses are included in Appendix 1.

A three-layer model was used to represent the subsurface conditions at the site. The refuse fill thickness, depth to bedrock formations, and elevation of the water table is based on borehole data collected at the site during previous monitoring well installations. The basal and middle layers consist of bedrock units composed of Cretaceous age bedrock (possibly Franciscan Complex or Great Valley Formation) and Tertiary age Cache Formation. In the site's vicinity, bedrock is composed of undifferentiated sedimentary rocks consisting of sandstone, siltstone, and claystone. Beneath the project site, the local bedrock has been observed to consist predominantly of fractured and decomposed sandstone. The Cache Formation consists of highly indurated and moderately cemented alluvial deposits composed of coarse gravel, sand, silt, clay, with a basal section of poorly sorted gravel with sand and silt. The upper surficial layer consists of refuse material with a tapered wedge-shaped cross-sectional geometry. Refuse material is limited to the portion of slope upslope of the leachate collection pond. The contact between the refuse material and Cache Formation was modeled as being moderately inclined toward the slope free face based on the slope configuration and depth encountered in our borings and our interpretation of the canyon's pre-landfill slope geometry.

Groundwater was conservatively modeled at 10 to 15 feet above the contact between the refuse material and underlying Cache Formation for most of the length of the profile. Circular failure surfaces were sought through a search routine to analyze the factor of safety along postulated critical failure surfaces using Spencer's method. Index properties and shear strength parameters for the refuse material and bedrock materials were conservatively estimated based on published correlations and our engineering judgment, and our experience with similar materials. Unit weight and strength parameters used in the slope stability analyses are presented in Table 2 below.

Table 2. Slope Stability Analysis Material Parameters
Eastlake Landfill, Lake County, California

Layer	Material Type	Dry Unit Weight (pcf)[1]	Saturated Unit Weight (pcf)	Friction Angle, Undrained (degrees)	Cohesion, Undrained (psf)[2]
3	Refuse	65	85	32	0
2	Cache Formation	125	140	35	0
1	Sedimentary Bedrock	150	--[3]	0	8,000

1. pcf: per cubic foot
2. psf: per square foot
3. --: not applicable

On the basis of our quantitative slope stability analysis, the minimum factor of safety under static conditions (Fs) was calculated to be 2.1 with the 10 most critical failure surfaces being confined to the refuse fill slope. For dynamic conditions under seismic loading at the 1 second period (0.2g), the minimum factor of safety (Fd) was calculated to be 1.2 with the 10 most critical failure surfaces passing through the refuse fill slope and underlying Cache Formation.

The slope stability analysis has demonstrated a factor of safety greater than 1.5 for the static condition and greater than 1.1 for the seismic condition for both the refuse fill slope and underlying native earth materials. The slope stability results indicate that the final landfill slopes are expected to remain stable

under both static and seismic loading conditions. Stability analysis for the final cover system with an estimate of permanent seismic displacements expected to be incurred during seismic loading (ground shaking) is presented below.

2.1.5 Permanent Seismic Displacement Estimate

Permanent seismic deformation of the cover slope was estimated for the MCE screening event using the simplified seismic slope displacement procedures outlined by Bray and Travasarou (2007).

The simplified deformation analyses were performed considering the following:

- earthquake magnitude,
- yield seismic coefficient of the slope,
- fundamental period of the failure wedge (Ts), and
- spectral acceleration corresponding to the degraded fundamental period at 1.5Ts and taken from the MCE acceleration response spectrum shown in Figure 1.

The fundamental period of the failing wedge, Ts, was estimated based on an assumed shear wave velocity of 540 fps for the top 40 feet of refuse. The analyses estimate a mean permanent seismic deformation of less than 1 inch for both the shallow cover system failure mode and the global slope failure mode for a circular slip surface encroaching into the underlying refuse. Details of the seismic deformation analyses are presented in Appendix 2.

2.1.6 Conclusions

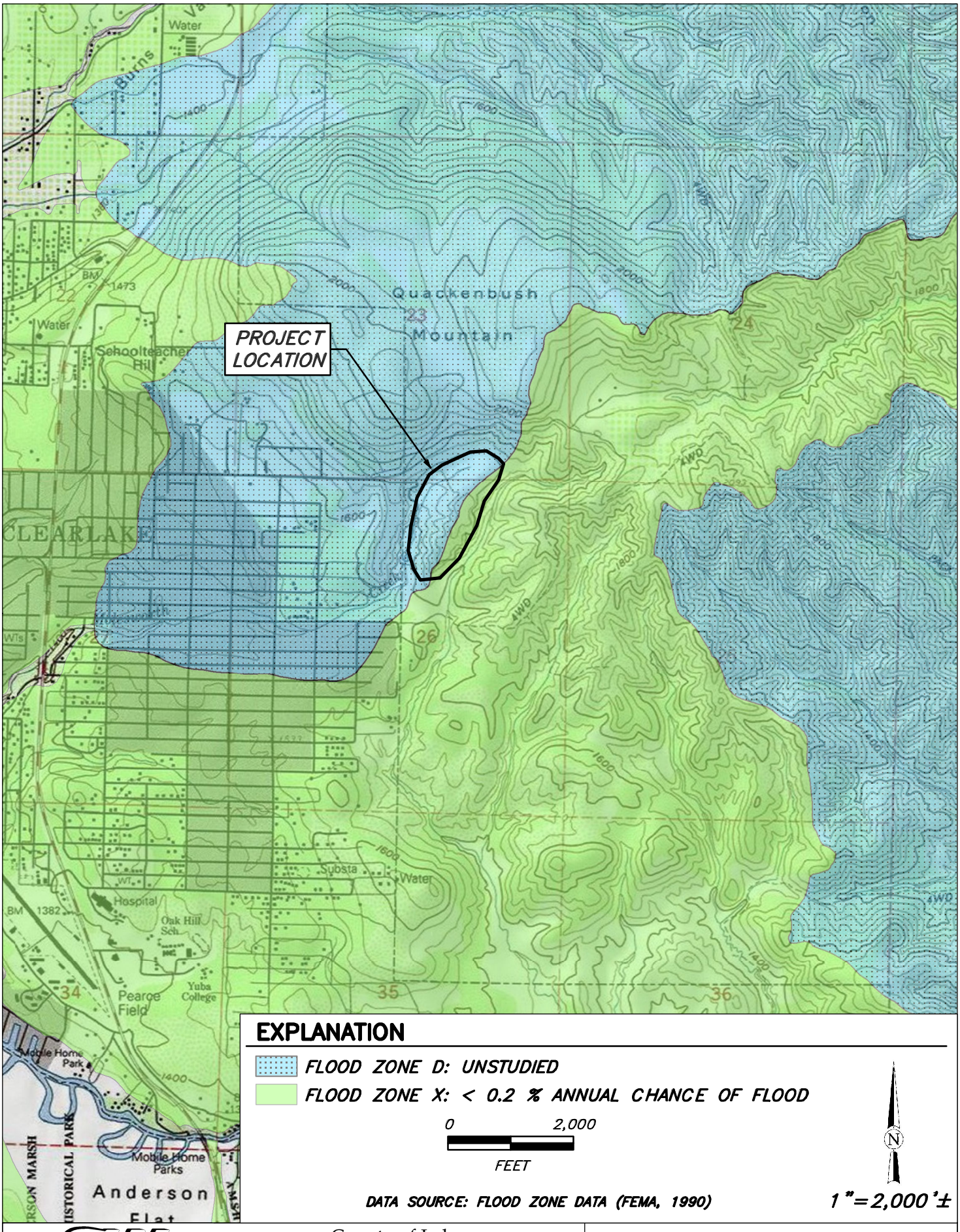
The mean permanent seismic deformations estimated for the MCE event are less than 1 inch. According to the BMPs, an earthquake is not considered a reasonably foreseeable causal event if a landfill is designed to the MCE and the estimated permanent deformation is less than 12 inches. The estimated mean permanent seismic deformations are considered tolerable with little to no anticipated damage to the slope or containment features and associated environmental controls, including:

- leachate collection and cover systems,
- landfill gas collection and control system,
- monitoring well network, and
- slopes and drainage control systems.

The ESL is not expected to sustain damage from earthquake causal effects. Therefore a corrective action cost estimate is not required for these hazards.

2.2 Flood

The ESL is not located in the 500-year flood zone (Figure 5). Therefore, no hazard from the 500-year flood exists.



Path: \\eureka\projects\GIS-Files\Willits\2015\415031_EastLakeLandfillCAP\PROJ_MXD\Jan_2018\Figure5_FloodZones.mxd

Consulting Engineers & Geologists, Inc.

County of Lake
Site Specific Non-Water Release CAP
Eastlake Landfill, Clear Lake, California

FEMA Flood Zones

SHN 415031

January 2018 | Figure5_FloodZones.mxd | Figure 5

2.3 Precipitation

2.3.1 Existing Drainage System

The ESL facility occupies a former canyon in the headwaters of Molesworth Creek. The drainage area associated with the landfill is approximately 58 acres, including the waste cell area, the borrow area, access roads, and storage areas. Specific drainage areas for the facility have been mapped into separate zones based on surface water flow. Drainage from the site discharges to either Molesworth Creek to the west or the unnamed tributary to Cache Creek to the south. Both creeks are ephemeral streams that primarily carry surface water in the winter and early spring months. Molesworth Creek drains into Clear Lake, near the southwestern limit of the City of Clearlake and the unnamed tributary to Cache Creek eventually reaches the Sacramento delta.

The existing drainage system consists of high density polyethylene (HDPE) and corrugated metal pipes (CMP) that route stormwater to lined and unlined ditches at the perimeter of the waste cell (Figure 6). Stormwater collected in the perimeter ditches discharge to Molesworth Creek on the west side of the facility and to an unnamed creek at the northeastern edge of the facility.

Stormwater runoff from the southeastern side of the waste cell collects in storage ponds located in the current borrow area, then discharges to Molesworth Creek.

The ESL is an active facility and alterations to the drainage system are made as necessary. Large areas of the site consist of bare earth and repair of erosion is regularly required. These repairs are generally accomplished by earth moving, seeding of eroded areas, and the addition of rock slope protection as needed.

2.3.2 Storm Information

Regulations require evaluation of a 1,000-year 24-hour storm event (CalRecycle, 2011). The 1,000-year 24-hour storm event for Eastlake landfill is estimated as 9.46 inches of rain, with a 90% confidence interval (Appendix 3; NOAA, 2018). The total quantity of stormwater generated by this storm over the approximately 58-acre drainage area is estimated at 1,994,000 cubic feet (ft^3) of water during a 24-hour period. The area contributing to volume generated by the storm was approximated using Figure 6 from the Eastlake landfill stormwater pollution protection plan (SWPPP).

The 1,000-year 24-hour storm event peak flow to the 24-inch corrugated metal outfall pipe to Molesworth Creek was estimated using the rational method, an assumed time of concentration of 10 minutes, and a rainfall intensity of 7.27 inches per hour (Appendix 3; NOAA, 2018). Stormwater over drainage areas DA-1 and DA-2 shown in Figure 6 were assumed to contribute to the 24-inch corrugated metal pipe (CMP) to Molesworth Creek. The peak flow for a 1,000-year 24-hour event is estimated to be 302.43 cubic feet per second (ft^3/s). The capacity of the 24-inch CMP to Molesworth Creek was estimated using Manning's equation, and an assumed slope of 0.02 feet per foot (ft/ft), for a capacity of 17.38 ft^3/s. The 24-inch CMP pipe to Molesworth Creek does not have the capacity to handle the 1,000-year 24-hour storm event. Drainage calculations are included in Appendix 3.

The 1,000-year 24-hour storm event peak flow to the 36-inch CMP outfall to the unnamed tributary to Cache Creek was estimated using the rational method, an assumed time of concentration of 5 minutes, and a rainfall intensity of 10.1 inches per hour (Appendix 3; NOAA, 2018). Stormwater over drainage area DA-3

LANDFILL ENTRANCE
DAVIS AVENUE
RUN ON DIVERSION DITCH
RECYCLING AREA
DA–1
DA–3
AREA I
BURIED CULVERT
OPERATIONS & HAZMAT BUILDINGS
DA–2
DL–4
36" CMP
24" HDPE
AREA II
LANDFILL BLOWER/ FLARE STATION
BURIED CULVERT
SCALE HOUSE
LCRS ACCESS MANHOLES
CONCRETE LINED DITCH
BURIED CULVERT
UNNAMED TRIBUTARY TO CACHE CREEK
DI
36" CMP
DETENTION POND
BURIED CULVERT
LEACHATE COLLECTION POND
DL–1B
DL–1A
24" CMP
SOIL BORROW AREA
SPILLWAY
DL–2
MOLESWORTH CREEK

EXPLANATION

- SURFACE DOWNDRAIN
- DL–1B — MONITORING LOCATION AND DESIGNATION
- ROCK ARMORED AREA
- BERM
- ROCK–LINED DRAINAGE DITCH/BASIN
- FACILITY BOUNDARY
- EXISTING IMPERVIOUS AREAS
- DRAINAGE INLET
- DRAINAGE AREA (DA–1)
- LIMITS OF LANDFILL AREA I & AREA II

0 200
1"=200'

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASE MAP FROM SCS ENGINEERS, "SITE PLAN," DATED 06–03–16.

SHN Consulting Engineers & Geologists, Inc.

Lake County PSD Eastlake Landfill Lake County, California		Site Drainage SHN 415031
February 2018	416094-SITE-DRNG	Figure 6

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in Figure 6 was assumed to contribute to the 36-inch CMP pipe that leads to the unnamed tributary to Cache Creek along the eastern facility boundary. The peak flow for a 1,000-year 24-hour event is estimated to be 48.48 ft^3/s. The capacity of the 36-inch CMP was estimated using Manning's equation, and an assumed slope of 0.02 ft/ft, for a capacity of 36.23 ft^3/s. The 36-inch CMP does not have the capacity to handle the 1,000-year 24-hour storm event. Drainage calculations for area DA-3 are included in Appendix 3.

The existing drainage system is not adequate to handle anticipated stormwater volume or peak flow from a 1,000-year, 24-hour storm event at the 24-inch culvert to Molesworth Creek or at the 36-inch culvert to Cache Creek.

2.3.3 Estimated Damage

The predicted rainfall volumes and peak runoff flow exceed the capacity of the existing drainage system. Therefore, possible damage to the landfill, due to the precipitation causal event, is expected and potentially includes the following:

- Erosion and damage to drainage features
- Damage to environmental monitoring and control systems

A narrative summary of anticipated damage is included below.

2.3.3.1 Erosion and Damage to Drainage Features

Runoff generated by rainfall in excess of the drainage system capacity would cause erosion on the landfill cover and side slopes and damage to the CMP and HDPE downdrains and culverts within the WMU. Additional erosion may occur at the foot of the waste cell resulting from localized flooding at slope benches and in the stormwater collection ditch along the perimeter of the waste cell. Erosion may also occur along discharge paths to Molesworth Creek and the unnamed creek on the northeastern side of the landfill.

Mitigating factors that would potentially decrease damage due to precipitation include the rock and concrete lined drainage ditches at the perimeter of the waste cell and the vegetative cover on inactive landfill areas and side slopes. The vegetative cover is in good condition in inactive areas, but is not well established on areas that were recently active, on upper side slopes, and areas subject to vehicle traffic.

2.3.3.2 Environmental Monitoring and Control Systems

The environmental monitoring and control systems may sustain limited damage due to precipitation. Most components of the drainage system are plastic or metal, and most repairs would consist of removing sediment deposited by erosion. Similarly, damage from precipitation to the leachate containment system and the landfill gas monitoring and control systems is expected to be minor.

2.3.3.3 Cost Estimates

The following assumptions are based on the information above, and were used to estimate repair costs associated with erosion due to the 1,000-year 24-hour storm:

- Approximately 30% of the landfill area would be damaged due to erosion or minor slope failure.
- Sediment would be deposited in drainage pipes and stormwater collection ditches.
- Components of the stormwater and leachate systems would be undamaged, although connections might require repair.

- Waste cleanup would be required for waste uncovered by erosion or dispersed by flooding.

Precipitation cost estimates are included in Appendix 4, Tables 4-2 and 4-3.

2.4 Tsunami

Elevations at the facility range between approximately 1,550 and 1,750 feet above mean sea level (SHN, 2015b). It is not located in an area designated as prone to be inundated by a tsunami.

2.5 Seiche

Eastlake landfill is located greater than one-half mile from a lake or landlocked bay. Clear Lake is located approximately 1.75 miles from the western boundary of the landfill. Therefore, no hazard from a seiche exists.

2.6 Fire

Eastlake landfill is located in a very high fire hazard zone (Figure 7). The site is bordered by forest or undeveloped grassland on all sides.

2.6.1 Surface Fire

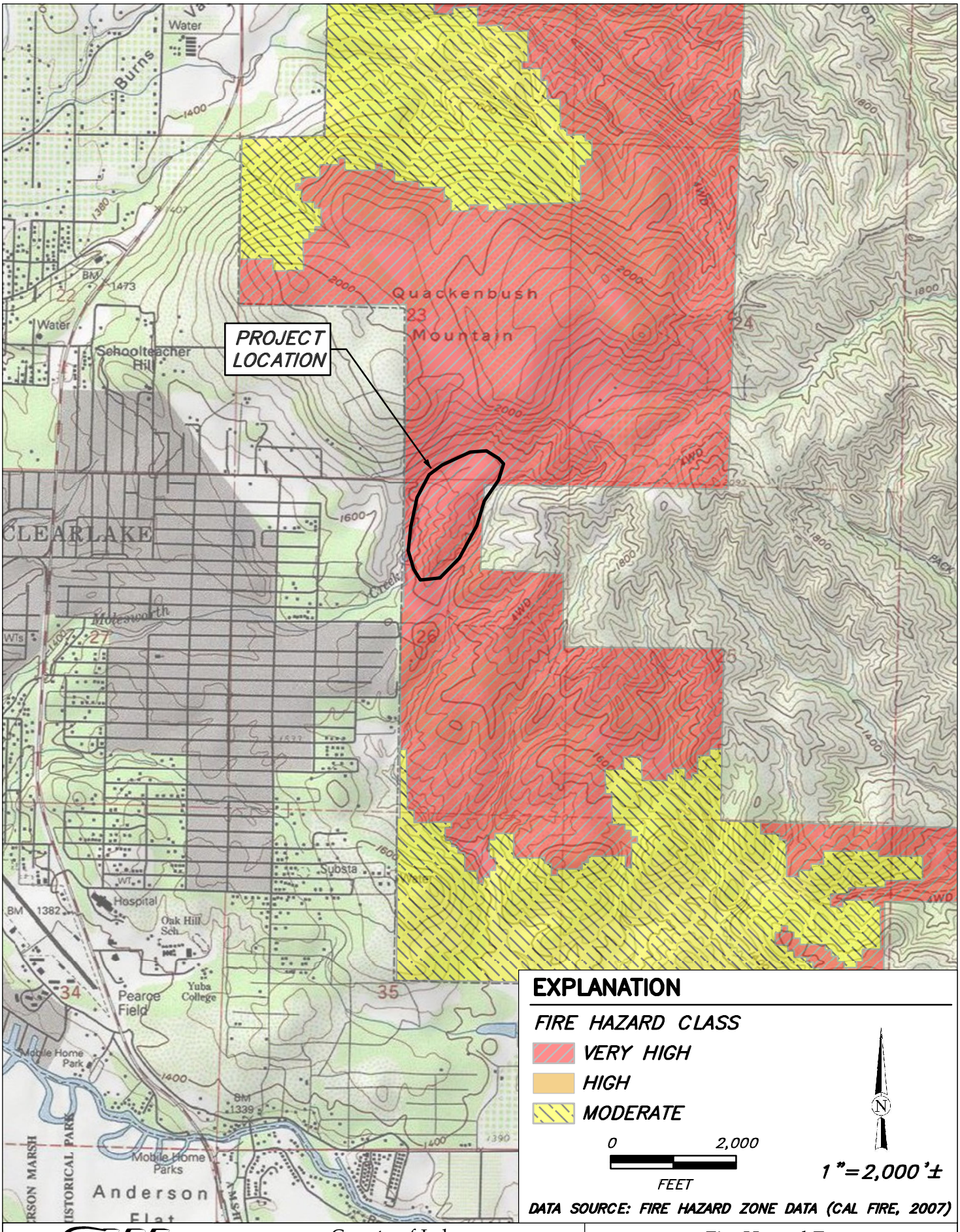
The recommended assumption for damage due to fire is destruction of 50% of structures required by CCR Title 14 and Title 27 within 300 feet of the landfill cell boundaries for a very high fire hazard zone (CalRecycle, 2011). The guidance also suggests a reduction in estimated damage for mitigation measures employed (CalRecycle, 2011). Mitigation measures employed include fire extinguishers in all trucks, equipment, and buildings and an onsite 3,000-gallon water truck. Annual employee hazardous materials training includes use of fire extinguishers. Therefore, it is assumed that 40% of aboveground, required structures within 300 feet of the landfill boundary would be destroyed. These structures include the LCRS surface impoundment and aboveground portions of the landfill gas system.

Cost estimates for repair of the landfill destroyed by surface fire as described above are included in Appendix 4, Tables 4-4 and 4-5.

2.6.2 Subsurface Fire

The technical guidance for NWCAPs recommends providing costs to extinguish a subsurface fire or providing a contingency for repair of the cover and landfill gas collection system. To estimate costs, it was assumed a subsurface fire would be localized in extent due to early detection from operating and monitoring procedures for the LFG collection system. The LFG system operates to not introduce excessive amounts of oxygen in the refuse prism and the LFG wells are monitored for oxygen and temperature. The subsurface fire would be limited to damage of a landfill gas extraction well, lateral piping, and potentially up to 10% of subsurface components of the LCRS. It was also assumed that an area approximately 150-feet in diameter of the landfill cover would be deformed, exposing waste and requiring reconsolidation and recovering of waste.

Cost estimates for repair of the landfill destroyed by subsurface fire as described above are included in Appendix 4, Tables 4-6 and 4-7.



Path: \\eureka\projects\GIS-Files\Willits\2015\415031_EastLakeLandfillCAP\PROJ_MXD\Jan_2018\Figure7_FireHazardZones.mxd

Consulting Engineers & Geologists, Inc.

County of Lake
Site Specific Non-Water Release CAP
Eastlake Landfill, Clear Lake, California

Fire Hazard Zone Map
SHN 415031

January 2018 | Figure7_FireHazardZones.mxd | Figure 7

3.0 Evaluation of Final Cover

Eastlake Landfill is an active landfill with no final cover in place. In April 2015, SCS Engineers prepared a project report entitled *Preliminary Design and Engineering Services for Landfill Expansion, Eastlake Landfill*, in which an alternative final cover design was proposed to meet the prescriptive standards in Title 27, CCR, section 21090. This report provides a preliminary final cover design for Areas I and II of the landfill. For Area I, the proposed final cover consists, from bottom to top, of a 1-foot thick compacted soil for the foundation layer, a 60-mil HDPE geomembrane and Geonet drainage layer as the low-hydraulic-conductivity layer, and 2-foot thick compacted soil for the erosion resistant layer. For Area II, the proposed final cover consists from bottom to top of a 1-foot thick compacted soil for the foundation layer, a geosynthetic clay liner, 60-mil HDPE geomembrane and Geonet drainage layer as the low-hydraulic-conductivity layer, and 2-foot thick compacted soil for the erosion resistant layer.

For estimating purposes, a cost for the final cover system, it is assumed that the final cover will be as proposed in the above referenced 2015 SCS preliminary design report. See Appendix 4 for a detailed cost estimate.

4.0 Evaluation of Environmental Monitoring and Control Systems

4.1 Landfill Gas Monitoring and Control

A landfill gas (LFG) collection and control system was installed at ESL in September 2013. The design for the LFG system consisted of a network of vertical gas extraction wells (16 total) and horizontal gas collection trenches installed in the refuse mass, collection piping, liquid condensate traps, extraction blowers, an enclosed ground flare for thermal destruction of collected LFG, and gas flow metering devices and controls (SCS, 2014).

The LFG system is functioning as intended. The system is visually inspected daily to ensure it is operating. The wellheads and flare system are inspected thoroughly on a monthly basis. Maintenance includes occasional greasing, good housekeeping, and immediate repair if needed. No repair has been necessary since the installation in September 2013.

4.2 Leachate Collection System

There are two LCRSs at the site: one associated with the unlined Area I constructed in 1974, and the other associated with Area II constructed in 1999. Each LCRS discharges into a 600,000-gallon Class II surface impoundment, located at the southern end of Area II, through its own discharge pipe. Leachate is discharged from the surface impoundment to Southeast Regional Wastewater Treatment Plant (SRWWTP) for treatment (SHN, 2015b).

Details regarding the construction of the Area I LCRS and how that system discharges to the existing surface impoundment are incomplete. Several documents have been reviewed attempting to glean details of the Area I LCRS construction. The Area I LCRS reportedly consists of perforated collection pipes in gravel trenches under the waste cell. The collection system captures water that percolates through the landfill and water from groundwater seeps that are under and around the landfill.

In 1997, Emcon oversaw the construction of the existing surface impoundment (Emcon, 1997). However, how the terminus of the Area I LCRS was modified to discharge into the surface impoundment was not clear. The wet wells were apparently abandoned and, presumably, a sump was constructed and plumbed with a 6-inch polyvinyl chloride (PVC) pipe to discharge to the surface impoundment by gravity (SHN, 2015b).

In Area II, the LCRS consists of a 1-foot layer of gravel on the lined cell floor, a perforated 6-inch diameter LCRS collection pipe placed along the toe of the east slope, and the LCRS geocomposite drainage layer on the slopes (Golder, 1999). A solid pipe conveys leachate from under the Area II cell by gravity to the surface impoundment.

The 600,000-gallon Class II surface impoundment consists of a primary 80-mil HDPE geomembrane placed over a Geonet, a 40-mil HDPE geomembrane and geosynthetic clay liner over a sand bed, and a compacted soil surface. Leachate is pumped from the pond into a sanitary sewer manhole where it is conveyed to the SRWWTP for treatment. The pump is controlled by a float switch. A fence surrounds the pond and prevents uncontrolled access (SHN, 2015a).

The current configuration meets applicable performance standards as described in Title 27 CCR Section 20790.

4.3 Drainage System

The drainage system is described in Section 2.3.1. The ESL is an active facility and alterations and repairs to the drainage system are made as necessary.

4.4 Erosion Control

Vegetation, benched slopes, rock lined drainages, and various linear sediment controls at the site provide erosion control. Additional erosion control measures are implemented as needed.

4.5 Monitoring Wells and Lysimeters

The groundwater and leachate monitoring system consists of 30 monitoring wells and 2 lysimeters. Monitoring of the lysimeters and monitoring wells is conducted in general accordance with monitoring reporting program Order No. R1-2006-61 (as amended by Order No. R1-2008-0100). The monitoring wells and lysimeters are used to monitor groundwater quality and liner performance at the site.

5.0 Summary of CAP Cost Estimate

The non-water release CAP cost estimates for the causal events evaluated at the ESL are summarized below in Table 3.

Table 3. Causal Event Cost Estimate Summary
Eastlake Landfill, Lake County, California

Causal Event	Estimated Cost
Earthquake	$0
Flood	$0
Precipitation	$287,832
Tsunami	$0
Seiche	$0
Surface Fire	$946,652
Subsurface Fire	$304,657

The reasonable foreseeable release scenarios identified for the ESL are associated with precipitation, surface fire, and subsurface fire. Surface fire is recognized as having the highest non-water release corrective action cost at $946,652.

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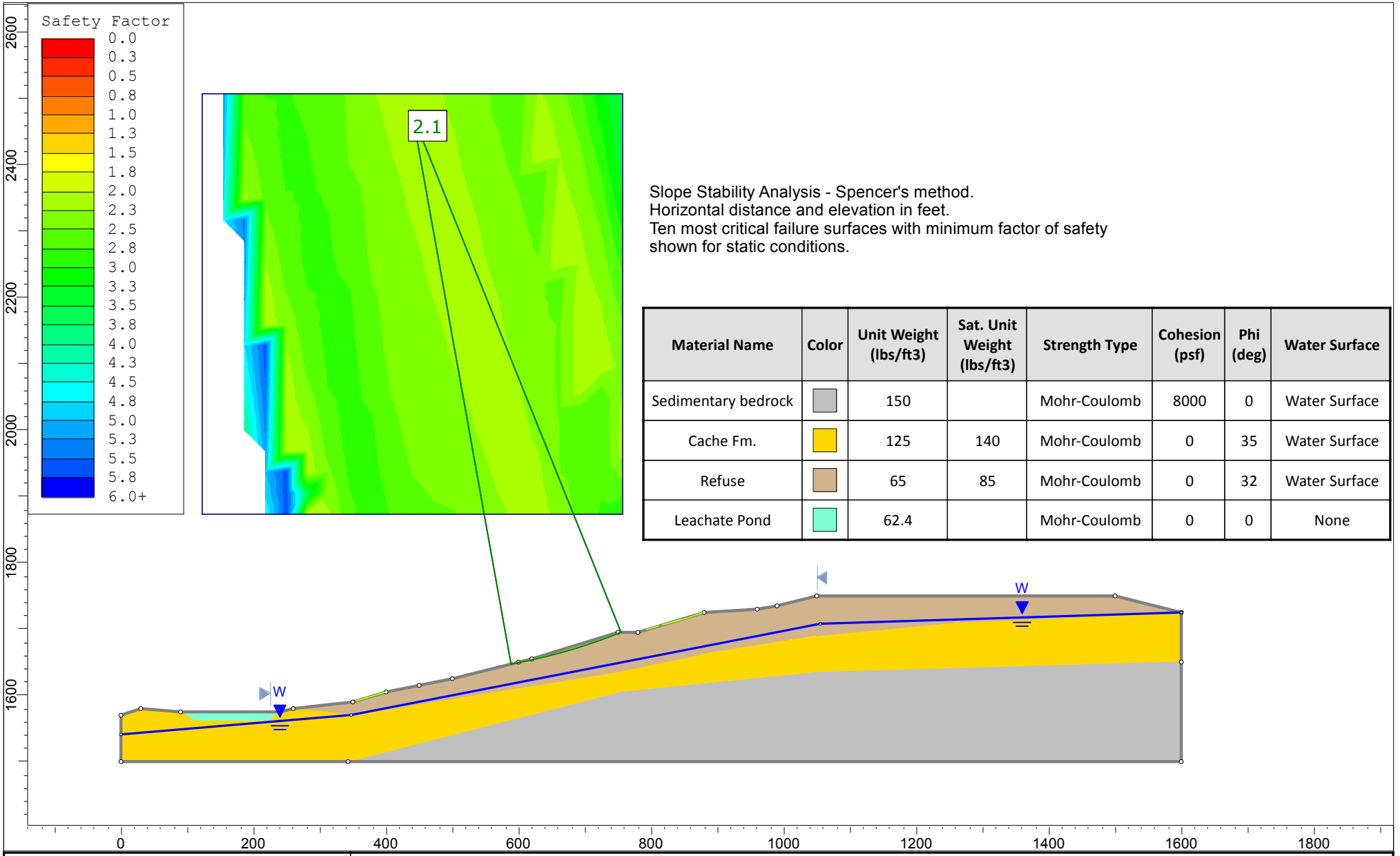
Slope Stability Analysis 1



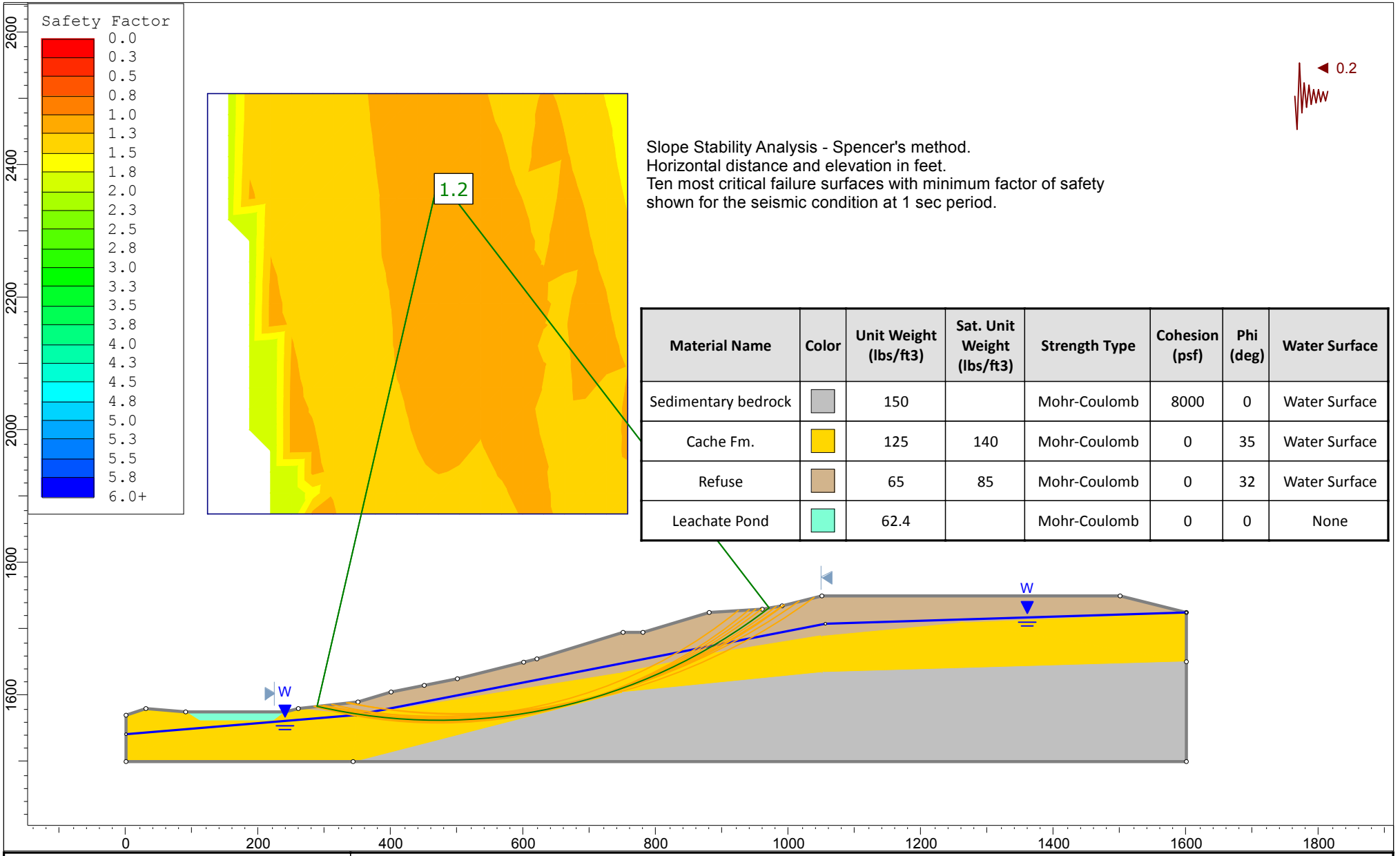
Slope Stability Analysis - Spencer's method.
Horizontal distance and elevation in feet.
Ten most critical failure surfaces with minimum factor of safety shown for static conditions.

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sedimentary bedrock		150		Mohr-Coulomb	8000	0	Water Surface
Cache Fm.		125	140	Mohr-Coulomb	0	35	Water Surface
Refuse		65	85	Mohr-Coulomb	0	32	Water Surface
Leachate Pond		62.4		Mohr-Coulomb	0	0	None

rocscience

SLIDEINTERPRET 7.014

Project	Eastlake Landfill CAP Slope Stability Analysis - Static Condition		
Analysis Description	Spencer's method		
Drawn By	G. Vadurro	Scale 1:2400	Company SHN Engineers & Geologists
Date	revised 11/7/2017		File Name Static Stability Analysis_Spencer method.slim



Slope Stability Analysis - Spencer's method.
Horizontal distance and elevation in feet.
Ten most critical failure surfaces with minimum factor of safety shown for the seismic condition at 1 sec period.

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sedimentary bedrock		150		Mohr-Coulomb	8000	0	Water Surface
Cache Fm.		125	140	Mohr-Coulomb	0	35	Water Surface
Refuse		65	85	Mohr-Coulomb	0	32	Water Surface
Leachate Pond		62.4		Mohr-Coulomb	0	0	None

rocscience

SLIDEINTERPRET 7.014

Project	Eastlake Landfill CAP Slope Stability Analysis - Seismic Condition		
Analysis Description	Spencer's method		
Drawn By	G. Vadurro	Scale 1:2400	Company SHN Engineers & Geologists
Date	revised 11/7/2017		File Name Seismic Stability Analysis_Spencer method.slim

Seismic Deformation Analysis

2

Simplified Procedure for Estimating Earthquake Induced Deviatoric Slope Displacements
by Jonathan D. Bray and Thaleia Travasarou
Journal of Geotechnical and Geonvironmental Engineering, ASCE, V. 133(4), pp. 381-392, April 2007

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

Input Parameters			
Yield Coefficient (ky)	0.26		Based on pseudostatic analysis
Initial Fundamental Period (Ts)	0.30	seconds	1D: Ts=4H/Vs 2D: Ts=2.6H/Vs
Degraded Period (1.5Ts)	0.45	seconds	
Moment Magnitude (M_w)	7.0		
Spectral Acceleration (Sa(1.5Ts))	0.45	g	

Additional Input Parameters		
Probability of Exceedance #1 (P1)	84	%
Probability of Exceedance #2 (P2)	50	%
Probability of Exceedance #3 (P3)	16	%
Displacement Threshold (d_threshold)	30	cm

Intermediate Calculated Parameters			
Non-Zero Seismic Displacement Est (D)	1.79	cm	eq. (5) or (6)
Standard Deviation of Non-Zero Seismic D	0.66		

Results			
Probability of Negligible Displ. (P(D=0))	0.51		eq. (3)
D1	<1	cm	calc. using eq. (7)
D2	<1	cm	calc. using eq. (7)
D3	2.4	cm	calc. using eq. (7)
P(D>d_threshold)	0.00		eq. (7)

Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1)
4. The 16%, 50%, and 84% percentile displacement values at selected ky values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. ky may range between 0.01 and 0.5, Ts between 0 and 2 s, Sa between 0.002 and 2.7 g, M between 4.5 and 9
7. Rigid slope is assumed for Ts < 0.05 s
8. When a value for D is not calculated, D is < 1cm
9. ky may be estimated using the simplified equations shown below.
10. Examples of how Ts is estimated are shown below.
11. Vs = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, Vs = [(h1)(Vs1) + (h2)(Vs2)]/(h1 + h2)

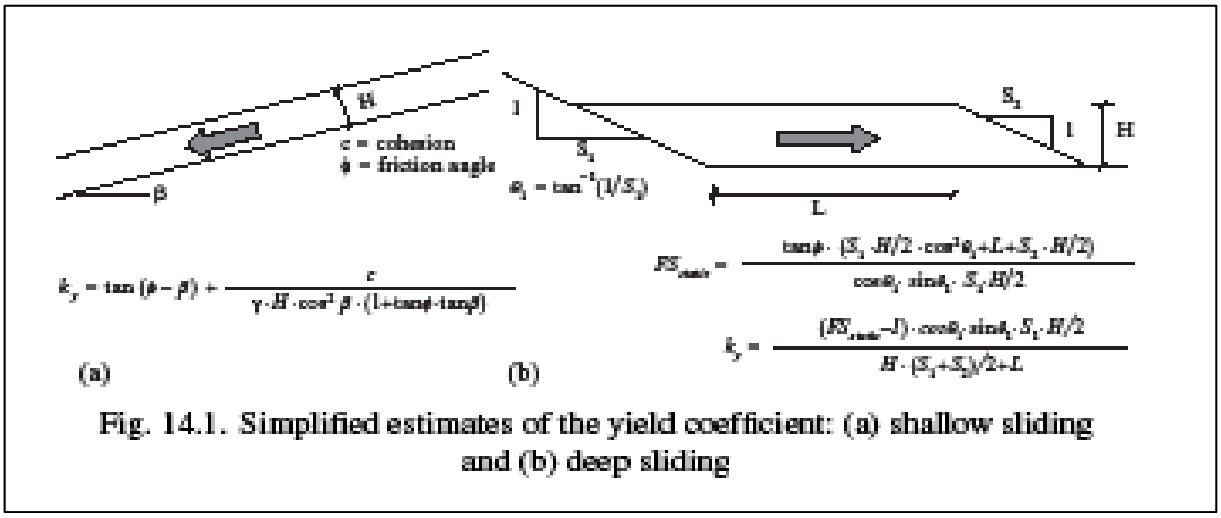


Fig. 14.1. Simplified estimates of the yield coefficient: (a) shallow sliding and (b) deep sliding

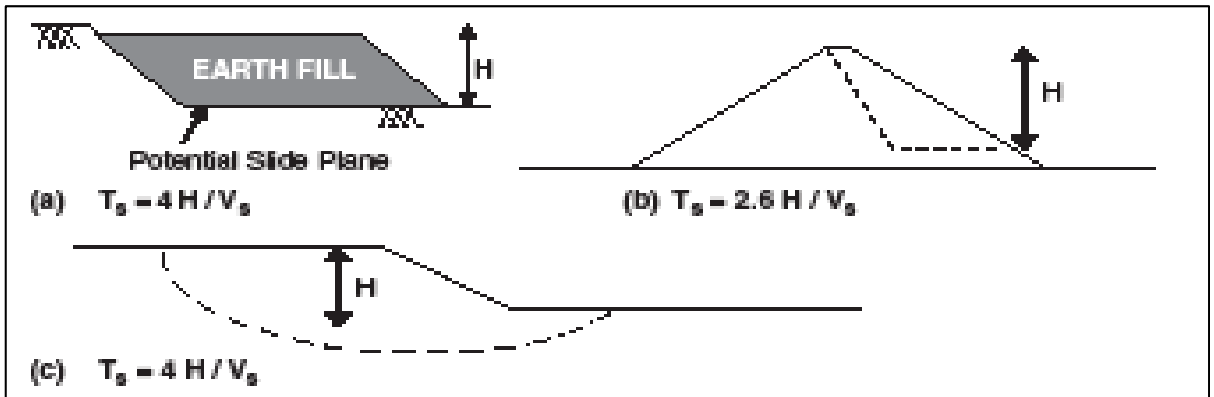
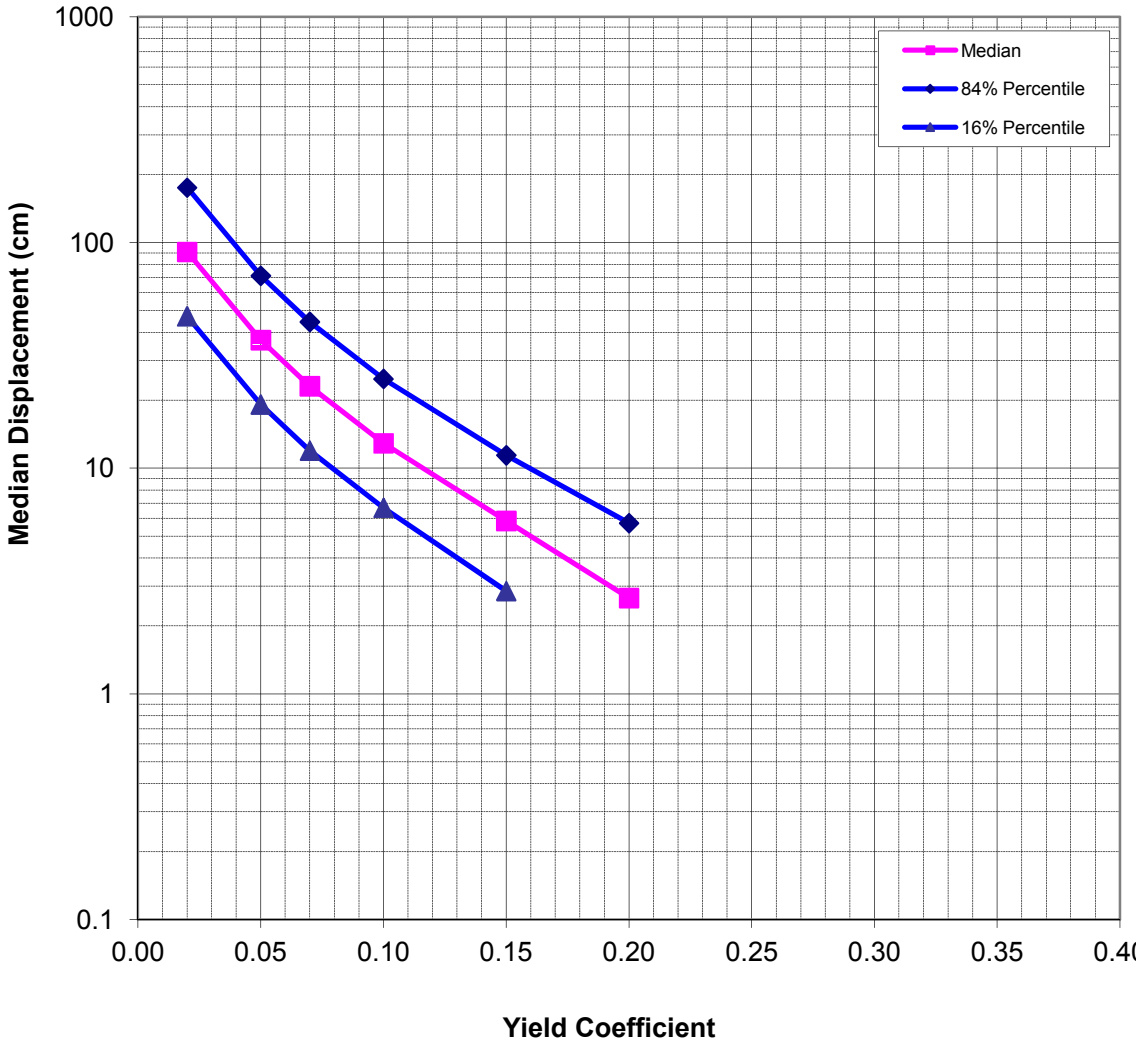


Fig. 14.4. Estimating the initial fundamental period of potential sliding blocks

Figures from Bray, J.D. (2007) "Chapter 14: Simplified Seismic Slope Displacement Procedures," Earthquake Geotechnical Engineering, 4th Inter. Conf. on Earthquake Geotechnical Engineering - Invited Lectures, in Geotechnical, Geological, and Earthquake Engineering Series, Vol. 6, Pitilakis, Kyriazis D., Ed., Springer, Vol. 6, pp. 327-353.

Dependence on ky

ky	P(D="0")	D (cm)	Dmedian (cm)	D-84% (cm)	D-16% (cm)
0.020	0.00	90.9	90.9	175.2	47.2
0.05	0.00	37.0	37.0	71.3	19.2
0.07	0.00	23.1	23.1	44.5	12.0
0.1	0.00	12.9	12.9	24.9	6.7
0.15	0.03	6.0	5.8	11.4	2.9
0.2	0.20	3.3	2.7	5.7	<1
0.3	0.70	1.3	<1	1.2	<1
0.4	0.93	0.6	<1	<1	<1



Simplified Procedure for Estimating Earthquake Induced Deviatoric Slope Displacements
by Jonathan D. Bray and Thaleia Travasarou
Journal of Geotechnical and Geonvironmental Engineering, Vol 133, No. 4, pp. 381-392, April 2007

Hydraulic Calculations 3

Point precipitation frequency estimates (inches)
NOAA Atlas 14 Volume 6 Version 2
Data type: Precipitation depth
Time series type: Partial duration
Project area: Southwest
Location n: California USA
Station Name: -
Latitude: 38.9536°
Longitude: -122.6014°
Elevation (USGS): 1674.99 ft

PRECIPITATION FREQUENCY ESTIMATES

by duratio	1	2	5	10	25	50	100	200	500	1000
5-min:	0.103	0.134	0.176	0.213	0.266	0.309	0.355	0.405	0.574	0.845
10-min:	0.148	0.191	0.252	0.305	0.381	0.443	0.509	0.58	0.823	1.21
15-min:	0.179	0.232	0.305	0.369	0.46	0.535	0.615	0.702	0.995	1.47
30-min:	0.246	0.32	0.421	0.509	0.636	0.739	0.849	0.968	1.37	2.02
60-min:	0.347	0.45	0.593	0.716	0.894	1.04	1.19	1.36	1.93	2.85
2-hr:	0.548	0.702	0.904	1.07	1.29	1.47	1.64	1.82	2.07	2.87
3-hr:	0.733	0.929	1.18	1.39	1.66	1.86	2.07	2.28	2.55	2.9
6-hr:	1.12	1.4	1.76	2.05	2.42	2.7	2.97	3.24	3.59	3.85
12-hr:	1.66	2.09	2.63	3.05	3.62	4.04	4.47	4.89	5.44	5.86
24-hr:	2.48	3.13	3.96	4.64	5.56	6.27	6.98	7.71	8.7	9.46
2-day:	3.21	4.04	5.14	6.04	7.28	8.24	9.23	10.3	11.7	12.8
3-day:	3.68	4.63	5.9	6.95	8.39	9.51	10.7	11.9	13.6	14.9
4-day:	4.03	5.08	6.48	7.62	9.2	10.4	11.7	13	14.8	16.2
7-day:	4.97	6.28	7.98	9.36	11.2	12.6	14.1	15.5	17.5	19
10-day:	5.62	7.11	9.03	10.6	12.6	14.1	15.7	17.2	19.3	20.8
20-day:	7.32	9.34	11.9	13.8	16.4	18.3	20.2	22	24.3	26
30-day:	8.82	11.3	14.3	16.7	19.7	21.9	24	26	28.6	30.5
45-day:	10.9	13.9	17.6	20.5	24	26.6	29	31.4	34.4	36.5
60-day:	12.8	16.3	20.5	23.7	27.7	30.5	33.2	35.8	39	41.3

Date/time (GMT): Tue Jan 30 21:39:59 2018
pyRunTime: 0.0942749977112

Point precipitation frequency estimates (inches/hour)
NOAA Atlas 14 Volume 6 Version 2
Data type: Precipitation intensity
Time series type: Partial duration
Project area: Southwest
Location n: California USA
Station Name: -
Latitude: 38.9536°
Longitude: -122.6014°
Elevation (USGS): 1674.99 ft

PRECIPITATION FREQUENCY ESTIMATES

by duratio	1	2	5	10	25	50	100	200	500	1000
5-min:	1.24	1.61	2.11	2.56	3.19	3.71	4.26	4.86	6.89	10.1
10-min:	0.888	1.15	1.51	1.83	2.29	2.66	3.05	3.48	4.94	7.27
15-min:	0.716	0.928	1.22	1.48	1.84	2.14	2.46	2.81	3.98	5.86
30-min:	0.492	0.64	0.842	1.02	1.27	1.48	1.7	1.94	2.75	4.04
60-min:	0.347	0.45	0.593	0.716	0.894	1.04	1.19	1.36	1.93	2.85
2-hr:	0.274	0.351	0.452	0.535	0.647	0.733	0.821	0.912	1.03	1.44
3-hr:	0.244	0.309	0.394	0.462	0.552	0.621	0.689	0.759	0.85	0.966
6-hr:	0.187	0.234	0.295	0.342	0.404	0.45	0.495	0.54	0.599	0.643
12-hr:	0.138	0.173	0.218	0.253	0.301	0.336	0.371	0.406	0.452	0.486
24-hr:	0.103	0.13	0.165	0.194	0.232	0.261	0.291	0.321	0.362	0.394
2-day:	0.067	0.084	0.107	0.126	0.152	0.172	0.192	0.214	0.243	0.266
3-day:	0.051	0.064	0.082	0.096	0.116	0.132	0.148	0.165	0.188	0.207
4-day:	0.042	0.053	0.067	0.079	0.096	0.109	0.122	0.135	0.154	0.169
7-day:	0.03	0.037	0.048	0.056	0.067	0.075	0.084	0.092	0.104	0.113
10-day:	0.023	0.03	0.038	0.044	0.053	0.059	0.065	0.072	0.08	0.087
20-day:	0.015	0.019	0.025	0.029	0.034	0.038	0.042	0.046	0.051	0.054
30-day:	0.012	0.016	0.02	0.023	0.027	0.03	0.033	0.036	0.04	0.042
45-day:	0.01	0.013	0.016	0.019	0.022	0.025	0.027	0.029	0.032	0.034
60-day:	0.009	0.011	0.014	0.016	0.019	0.021	0.023	0.025	0.027	0.029

Date/time (GMT): Tue Jan 30 21:41:32 2018
pyRunTime: 0.0953540802002

Table 3-1a
Peak Runoff to Outfall to Molesworth Creek
Eastlake Landfill, Lake County California

Peak runoff to 24-inch CMP outfall to Molesworth Creek from 1,000 year storm event

$$Q = CiA$$

Q=	302.43
C=	0.80
i=	7.27
A=	52.0

Assumptions:
* time of concentration is 10 minutes

Q= peak runoff in cubic feet per second

C= runoff coefficient (assumes light industrial(Caltrans, December 2015))

i = rainfall intensity for time of concentration, in inches per hour (see highlight in attached NOAA point precipitation frequency estimates (inches/hour))

A= area in acres (DA-1 and DA-2)

Rainfall intensity for the design storm from published intensities (NOAA, 2018)

Table 3-1b
Discharge Calculations Through Outfall to Molesworth Creek
Eastlake Landfill, Lake County California

Maximum flow capacity of the 24-inch CMP outfall to Molesworth Creek

$$Q = \frac{1.49}{n} * R_h^{\frac{2}{3}} * A * S^{1/2}$$

Q (ft^3/s)	17.38
n	0.024
R_h (ft)	0.5
A (ft^2)	3.14
S (ft/ft)	0.02
R (ft)	1
P (ft)	6.28

Assumptions:
*pipe is flowing full
*2% slope

Q= flow

n= manning's roughness coefficient for smooth interior corrugated HDPE

R_h= hydraulic radius, pipe cross-sectional area divided by pipe perimeter

A= pipe cross-sectional area

S= pipe slope (assumed slope)

R= pipe radius

P= pipe perimeter

Table 3-2a
Peak Runoff to Outfall to Cache Creek
Eastlake Landfill, Lake County California

Peak runoff to the 36-inch CMP outfall to Cache Creek from 1,000 year storm event

$$Q = CiA$$

Q=	48.48
C=	0.80
i=	10.1
A=	6.0

Assumptions:
* time of concentration is 5 minutes

Q= peak runoff in cubic feet per second

C= runoff coefficient (assumes light industrial(Caltrans, December 2015)

i = rainfall intensity for time of concentration, in inches per hour (see highlight in attached NOAA point precipitation frequency estimates (inches/hour))

A= area in acres (DA-3)

Rainfall intensity for the design storm from published intensities (NOAA, 2018)

Table 3-2b
Discharge Calculations Through Outfall to Cache Creek
Eastlake Landfill, Lake County California

Maximum flow capacity of the 36-inch CMP outfall to Cache Creek

$$Q = \frac{1.49}{n} * R_h^{\frac{2}{3}} * A * S^{1/2}$$

Q (ft^3/s)	36.23
n	0.024
R_h (ft)	0.75
A (ft^2)	7.07
S (ft/ft)	0.01
R (ft)	1.5
P (ft)	9.42

Assumptions:
*pipe is flowing full
*2% slope

Q= flow

n= manning's roughness coefficient for corrugated metal pipe

R_h= hydraulic radius, pipe cross-sectional area divided by pipe perimeter

A= pipe cross-sectional area

S= pipe slope (estimated based on conversation with field personnel)

R= pipe radius

P= pipe perimeter

4 Cost Estimates

Table 4-1 Existing Conditions Summary Eastlake Landfill, Lake County, California			
Item	**Unit**	**Estimated Existing Quantity**	**Basis of Estimate**
Waste Cell Area	acres	33.7	(SCS, 2015)
Waste Cell Area	SF[1]	1,467,972	(SCS, 2015)
Waste Cell Area	SY[2]	163,108	(SCS, 2015)
Area I Area	acres	22.4	(SCS, 2015)
Area I Area	SF	975,744	(SCS, 2015)
Area I Area	SY	108,416	(SCS, 2015)
Area II Area	acres	11.3	(SCS, 2015)
Area II Area	SF	492,228	(SCS, 2015)
Area II Area	SY	54,692	(SCS, 2015)
All Drainage Areas	acres	58	(SHN, 2015b)
All Drainage Areas	SF	2,526,480	(SHN, 2015b)
All Drainage Areas	SY	280,720	(SHN, 2015b)
Areas subject to erosion repair (excludes borrow area)	acres	43	Google Earth, 2013
Areas subject to erosion repair (excludes borrow area)	SF	1,873,080	Google Earth, 2013
Areas subject to erosion repair (excludes borrow area)	SY	208,120	Google Earth, 2013
Surface Impoundment[3]			
Geotextile Layer	SF	17,000	(Emcon, 1997)
Geosynthetic Clay Layer	SF	17,000	(Emcon, 1997)
40-mil HDPE[4] Geomembrane	SF	17,000	(Emcon, 1997)
80-mil HDPE Geomembrane	SF	17,000	(Emcon, 1997)
Area II			
LCRS[5] 1-foot gravel layer	CY[6]	20,000	(Golder, 1999)
6-inch diameter perforated pipe (toe drains)	LF[7]	2,000	(Golder, 1999)
6-inch solid pipe	LF	750	
Geotextile (toe drains)	SF	6,000	(SCS, 2015)
Geosynthetic clay liner	SF	492,228	(SCS, 2015)
60-mil HDPE geomembrane	SF	492,228	(SCS, 2015)
LCRS drainage geocomposite/ 8 ounce/SY geocomposite (on slopes)	SF	492,228	(SCS, 2015)
2-foot thick soil operations layer	CY	40,000	(SCS, 2015)
Area I			
8-inch perforated PVC[8] pipe	LF	1,500	(CQA Binder)
Drainage System			
24-inch HDPE Pipe	LF	2,500	Estimated from Figure 6 (SHN, 2018)
18-inch CMP[9]	LF	800	(SHN, 2015b)
36-inch CMP	LF	150	(SHN, 2015b)

Table 4-1
Existing Conditions Summary
Eastlake Landfill, Lake County, California

Item	Unit	Estimated Existing Quantity	Basis of Estimate
Landfill Gas System			
Vertical Extraction Wells	LF	1,000	(SCS, 2013)
Wellhead Assembly (19 vertical and 10 horizontal)	each	29	(SCS, 2013)
Horizontal Collection Trenches-6 ft depth	LF	2,350	(SCS, 2013)
Horizontal Collection Trenches-4 ft depth	LF	1,150	(SCS, 2013)
LFG[10] Laterals and Headers-8-inch diameter	LF	4,350	(SCS, 2013)
LFG Laterals and Headers-6-inch diameter	LF	1,050	(SCS, 2013)
LFG Laterals and Headers-4-inch diameter	LF	2,850	(SCS, 2013)
LFG Below Grade Laterals and Headers-8-inch diameter	LF	1,150	(SCS, 2013)
LFG Below Grade Laterals and Headers-6-inch diameter	LF	300	(SCS, 2013)
8-inch diameter Butterfly Valves	each	4	(SCS, 2013)
6-inch Diameter Butterfly Valves	each	3	(SCS, 2013)
LFG Skid Mounted Flaring System	each	1	(SCS, 2013)
2-inch Diameter Compressed Air Line	LF	3,700	(SCS, 2013)
2-inch Diameter Condensate Drain Line	LF	2,650	(SCS, 2013)
Double Walled Condensate Sumps	each	4	(SCS, 2013)
Air Rotary Screw Compressor System (includes all appurtenances, concrete pad and cover)	each	1	(SCS, 2013)
Leachate pump and control panel, HDPE pipe to sewer manhole	each	1	(County of Lake PSD landfill manager, 2018)[11]

1. SF: square feet
2. SY: square yard
3. Subsurface features of the surface impoundment were excluded since they are not vulnerable to fire or precipitation damage.
4. HDPE: high density polyethylene
5. LCRS: leachate containment and recovery system
6. CY: cubic yard
7. LF: linear foot
8. PVC: polyvinyl chloride
9. CMP: corrugated metal pipe
10. LFG: landfill gas
11. Conversation with County of Lake Public Services Department Manager, March 2018.

Table 4-2
Precipitation Cost Estimate Summary[1]
Eastlake Landfill, Lake County, California

Damage	Landfill Cover Corrective Action	Drainage System Corrective Action	Gas Collection System Corrective Action	Gas Monitoring System Corrective Action	Leachate Collection System Corrective Action	Site Security Corrective Action	Other Landfill Infrastructure Corrective Action
100%	--	--[2]	--	--	--	--	--
90%	--	--	--	--	--	--	--
80%	--	--	--	--	--	--	--
70%	--	--	--	--	--	--	--
60%	--	--	--	--	--	--	--
50%	--	--	--	--	--	--	--
40%	--	--	--	--	--	--	--
30%	$ 73,636	$ 214,196	--	--	--	--	--
20%	--	--	--	--	--	--	--
10%	--	--	--	--	--	--	--
0%	--	--	--	--	--	--	--

1. Detailed cost estimate is presented in Table 4-3
2. --: not applicable

Table 4-3
Causal Event Corrective Action Cost Estimate-Precipitation[1]
Eastlake Landfill, Lake County, California

Item No.	Description	Quantity	Unit	Unit Cost[2]	Overhead/Profit Margin[3]	Total	Assumptions and Notes:	Cost Reference:
1	Repair of erosion, slope failures	16,000	CY[4]	$ 1.88	33%	$ 40,006	Assumes 30% of areas subject to erosion and/or slope failure, 1 foot deep. Assumes offsite material. Assumes bulk excavation of a large area	(RSMeans, 2015)[5]
2	24-inch HDPE[6] Pipe	750	LF[7]	$ 85.60	15%	$ 73,830	Assumes 30% of existing drainage system.	(Caltrans, 2015)
	18-inch CMP[8]	240	LF	$ 225.00	15%	$ 62,100	Assumes 30% of existing drainage system. Corrugated steel pipe (0.079" thick)	(Caltrans, 2015)
	36-inch CMP	45	LF	$ 380.00	15%	$ 19,665	Assumes 30% of existing drainage system. Corrugated steel pipe (0.138" thick)	(Caltrans, 2015)
3	Hydroseeding	49,000	SY[9]	$ 0.37	15%	$ 20,850	Assumes 30% of waste cell area	(Caltrans, 2015)[10]
4	Labor (waste clean up, drainage system repair, repair of areas outside of waste cell foot print)	120	hour	$ 110.04	33%	$ 17,562	Assumes two man crew at prevailing wage.	California Department of Industrial Relations, 2015
5	Equipment rental	120	hour	$ 28.00	15%	$ 3,864	Assumes small equipment, less than 75 HP[11]	(RSMeans, 2015)
					Subtotal	**$ 237,877**		
					Mobilization (10%)	$ 23,788		
					Subtotal (including mobilization)	$ 261,665		
					Contingency (10%)	$ 26,167		
					Total	**$ 287,832**		

1. Cost based on estimated damage from the 1,000-year, 24-hour storm event.
2. Unit costs include labor and installation unless noted.
3. Overhead/Profit Margin percentages obtained from Caltrans 2015 Labor Surcharge and Equipment Rental Rate document.
4. CY: cubic yard
5. All RSMeans unit cost values used were unit costs including labor and installation without overhead and profit.
6. HDPE: high density polyethylene
7. LF: linear feet
8. CMP: corrugated metal pip
9. SY: square yard
10. All Caltrans unit costs were obtained from District 1
11. HP: horsepower

Table 4-4
Surface Fire-Cost Estimate Summary[1]
Eastlake Landfill, Lake County, California

Damage	Landfill Cover Corrective Action	Drainage System Corrective Action	Gas Collection System Corrective Action	Gas Monitoring System Corrective Action	Leachate Collection System Corrective Action	Site Security Corrective Action	Other Landfill Infrastructure Corrective Action
100%	--	--[2]	--	--	--	--	--
90%	--	--	--	--	--	--	--
80%	--	--	--	--	--	--	--
70%	--	--	--	--	--	--	--
60%	--	--	--	--	--	--	--
50%	--	--	--	--	--	--	--
40%	$ 49,220	$ 194,666	$ 320,625	--	$ 376,569	--	--
35%	--	--	--	--	--	--	--
20%	--	--	--	--	--	--	--
10%	--	--	--	--	--	--	--
0%	--	--	--	--	--	--	--

1. Detailed cost estimate is presented in Table 4-5
2. --: not applicable

Table 4-5
Causal Event Corrective Action Cost Estimate- Surface Fire[1]
Eastlake Landfill, Lake County, California

Item No.	Description	Quantity	Unit	Unit Cost[2]	Overhead/Profit Margin[3]	Total	Assumptions and Notes:	Cost Reference:
1	24-inch HDPE[4] pipe (Drainage System)	520	LF[5]	$ 85.60	15%	$ 51,189	Assumes 40% of existing drainage system.	(Caltrans, 2015) [6]
2	18-inch CMP[7] (Drainage System)	320	LF	$ 225.00	15%	$ 82,800	Assumes 40% of existing drainage system. Corrugated steel pipe (0.079" thick)	(Caltrans, 2015)
3	36-inch CMP (Drainage System)	60	LF	$ 380.00	15%	$ 26,220	Assumes 40% of existing drainage system. Corrugated steel pipe (0.138" thick)	(Caltrans, 2015)
4	Geotextile Layer (Surface Impoundment)	800	SY[8]	$ 2.15	15%	$ 1,978	Assumes 40% of existing material. Class A1 geotextile	(Caltrans, 2015)
5	Geosynthetic Clay Layer (Surface Impoundment)	6,800	SF[9]	$ 15.00	15%	$ 117,300	Assumes 40% of existing material. Geosynethetic reinforcement	(Caltrans, 2015)
6	40-mil HDPE Geomembrane (Surface Impoundment)	6,800	SF	$ 10.34	15%	$ 80,859	Assumes 40% of existing material. Geomembrane, water barrier	(Caltrans, 2015)
7	80-mil HDPE Geomembrane (Surface Impoundment)	6,800	SF	$ 11.17	15%	$ 87,349	Assumes 40% of existing material. Geomembrane, water barrier	(Caltrans, 2015)
8	Miscellaneous electrical components (Surface Impoundment)	1	LS[10]	$ 20,000.00	15%	$ 23,000	For electrical service and controls to pump and flow meters.	Estimated by SHN
9	LFG[11] Skid Mounted Flaring System	0.4	ea	$ 275,000.00	15%	$ 126,500	Cost of the equipment.	(Perennial Energy, 2016)[12]
10	LFG Skid Mounted Flaring System Demolition and Install	48	hour	$ 110.04	33%	$ 7,025	Assumes two man crew at prevailing wage.	California Department of Industrial Relations, 2015
11	Air Rotary Screw Compressor System	1.0	ea	$ 5,427.00	15%	$ 6,241	Cost of the equipment.	(Atlas Copco, 2016)
12	Air Rotary Screw Compressor System Concrete Pad and Cover	1.0	ea	$ 3,296.00	15%	$ 3,790	Includes the cost of the concrete, framework, and reinforcement of a 68" x 30" x 67" pad	(RSMeans, 2015)
13	Air Rotary Screw Compressor System Installation	48	hour	$ 110.04	33%	$ 7,025	Assumes two man crew at prevailing wage.	California Department of Industrial Relations, 2015
14	Vertical well head assemblies	8	ea	$ 650.00	15%	$ 5,980	Assumes 40% are damaged	(Landtec, 2016)
15	Repair above grade HDPE LFG laterals and headers (8-inch)	1,740	LF	$ 32.00	15%	$ 64,032	Assumes damage and repair costs will be 40% of installation cost	(Caltrans, 2015)
16	Repair above grade HDPE LFG laterals and headers (6-inch)	420	LF	$ 50.00	15%	$ 24,150	Assumes damage and repair costs will be 40% of installation cost	(Caltrans, 2015)
17	Repair above grade HDPE LFG laterals and headers (4-inch)	1,140	LF	$ 17.00	15%	$ 22,287	Assumes damage and repair costs will be 40% of installation cost	(Caltrans, 2015)
18	Labor (surface preparation)	80	hour	$ 110.04	33%	$ 11,708	Assumes two man crew at prevailing wage.	California Department of Industrial Relations, 2015
19	Equipment rental (surface preparation)	48	hour	$ 28.00	15%	$ 1,546	Assumes small equipment, less than 75 HP[13]	(RSMeans, 2015) [14]
20	Equipment Rental (waste disposal)	1	day	$ 760.00	15%	$ 874	Dump truck, 16-CY capacity, loading and drive time of 2 hours round trip	(RSMeans, 2015)
21	Driver (Waste Disposal)	40	hours	$ 23.91	33%	$ 1,272	Prevailing wage for dump truck driver	California Department of Industrial Relations, 2015
22	Mileage (Waste Disposal)	1,600	mile	$ 0.54	33%	$ 1,149	Mileage to Clover Flat Landfill, Clearlake, California, 80 miles round trip	(Caltrans, 2016)
23	Hydroseeding	66,000	SY	$ 0.37	15%	$ 28,083	40% of waste cell area	(Caltrans, 2015)
24	Leachate pump and control panel	1	LS	$ 25,000	15%	$ 28,750		Estimated by SHN
					Subtotal	**$ 782,357**		
					Mobilization (10%)	$ 78,236		
					Subtotal (including mobilization)	$ 860,593		
					Contingency (10%)	$ 86,059		
					Total	**$ 946,652**		

1. Damage for very high fire hazard location assumed to be 40% of combustible materials within 300 feet of the waste cell.
2. Unit costs include labor and installation unless noted.
3. Overhead/Profit Margin percentages obtained from Caltrans 2015 Labor Surcharge and Equipment Rental Rate document.
4. HDPE: high density polyethylene
5. LF: linear foot
6. All Caltrans unit costs were obtained from District 1
7. CMP: corrugated metal pipe
8. SY: square yard
9. SF: square feet
10. LS: lump sum
11. LFG: landfill gas
12. Flare Manufacturer's estimated cost of replacement; personal communication of December 19, 2016.
13. HP: horsepower
14. All RSMeans unit cost values used were unit costs including labor and installation without overhead and profit.

Table 4-6
Subsurface Fire Cost Estimate Summary[1]
Eastlake Landfill, Lake County, California

Damage	Landfill Cover Corrective Action	Drainage System Corrective Action	Gas Collection System Corrective Action	Gas Monitoring System Corrective Action	Leachate Collection System Corrective Action	Site Security Corrective Action	Other Landfill Infrastructure Corrective Action
100%	--	--[2]	--	--	--	--	--
90%	--	--	--	--	--	--	--
80%	--	--	--	--	--	--	--
70%	--	--	--	--	--	--	--
60%	--	--	--	--	--	--	--
50%	--	--	--	--	--	--	--
40%	--	--	--	--	--	--	--
30%	--	--	--	--	--	--	--
20%	--	--	--	--	--	--	--
10%	$ 31,087	--	$ 38,789.95	--	$ 29,277	--	$ 205,503
0%	--	--	--	--	--	--	--

1. Detailed cost estimate is presented in Table 4-7
2. --: not applicable

Table 4-7
Causal Event Corrective Action Cost Estimate- Subsurface Fire[1]
Eastlake Landfill, Lake County, California

Item No.	Description	Quantity	Unit	Unit Cost[2]	Overhead/Profit Margin[3]	Total	Assumptions and Notes:	Cost Reference:
Landfill Cover								
1	Reconsolidation of landfill waste	6,541	CY[4]	$ 1.67	33%	$ 14,528	Assume 150 ft diameter waste cell area, 10 feet depth. Assume track mounted front-end loader with 2-3/4 CY capacity	(RSMeans, 2015)[5]
2	Recovering of landfill waste	1,308	CY	$ 1.67	33%	$ 2,905	Assumes 150 ft diameter waste cell area, 24-inch thick, offsite material. Assume track mounted front-end loader with 2-3/4 CY capacity	(RSMeans, 2015)
3	Hydroseeding	654	SY[6]	$ 0.37	15%	$ 278	150 ft diamater landfill area	(Caltrans, 2015) [7]
4	Survey	1	LS[8]	$ 6,000.00	33%	$ 7,980	Assumes pre consolidation survey and grading plan, and post construction	Estimated by SHN
Landfill Gas System								
5	Drill and install replacement vertical extraction wells	100	LF[6]	$ 101.00	33%	$ 13,433	Assumes one subgrade LFG[9] system well is destroyed. Assumes 4" domestic water well, drilled and cased	(RSMeans, 2015)
6	Vertical wellhead assembly	1	each	$ 650.00	15%	$ 748	Assumes one subgrade LFG system well is destroyed	(Landtec, 2016)
7	Repair horizontal LFG collection trenches (6-foot depth, 150 LF)	33	CY	$ 55.75	15%	$ 2,116	Assumes one subgrade LFG system well is destroyed. Assumes medium clay trenches up to 6 feet deep	(RSMeans, 2015)
8	Repair horizontal LFG collection trenches (4-foot depth, 150 LF)	22	CY	$ 55.75	15%	$ 1,410	Assumes one subgrade LFG system well is destroyed. Assumes medium clay trenches up to 6 feet deep	(RSMeans, 2015)
9	Repair of below grade HDPE[10] LFG laterals (8-inch)	72	LF	$ 32.00	15%	$ 2,650	Assumes one subgrade LFG system well is destroyed.	(Caltrans, 2015)
10	Repair of below grade HDPE LFG laterals (6-inch)	20	LF	$ 50.00	15%	$ 1,150	Assumes one subgrade LFG system well is destroyed.	(Caltrans, 2015)
11	Repair 2-inch diameter compressed air lines	230	LF	$ 16.00	15%	$ 4,232	Assumes one subgrade LFG system well is destroyed	(Caltrans, 2015)
12	Repair 2-inch diameter condensate drain line	165	LF	$ 16.00	15%	$ 3,036	Assumes one subgrade LFG system well is destroyed	(Caltrans, 2015)
13	Replace double walled condensate sumps	1	each	$ 2,454.00	15%	$ 2,822	Assumes one subgrade LFG system well is destroyed	(Real Environmental Products, 2016)
14	Nylon 12 Jacketed Tubing Bundle for Pump	4	LF	$ 8.94	15%	$ 41	Assumes one subgrade LFG system well is destroyed	(Real Environmental Products, 2016)
15	Pump Fittings	1	each	$ 192.00	15%	$ 221	Assumes one subgrade LFG system well is destroyed	(Real Environmental Products, 2016)
16	Pump Rebuild	1	each	$ 150.00	33%	$ 200	Assumes one subgrade LFG system well is destroyed	(Real Environmental Products, 2016)
Area II Liner								
17	Geosynthetic clay liner	17,663	SF[11]	$ 4.32	15%	$ 87,750	Assumes 150 ft diamter of waste cell area, completely located in Area II (for reinforcement). Includes purchase, shipping and installation.	Layfield Group, Environmental Containment. January 2018
18	60-mil HDPE geomembrane	17,663	SF	$ 3.24	15%	$ 65,812	Assumes 150 ft diameter waste cell area, completely located in Area II (water barrier). Includes purchase, shipping and installation	Layfield Group, Environmental Containment. January 2018
19	LCRS[12] drainage geocomposite/ 8 ounce/SY geocomposite (on slopes)	5,500	SY	$ 2.18	15%	$ 13,789	Assumes 10% of Area II Slopes. Geocomposite drain	(Caltrans, 2015)
Leachate Collection and Recovery System								
20	6-inch diameter perforated PVC[13] pipe (Area II toe drains)	200	LF	$ 35.00	15%	$ 8,050	Assumes 10% damage. Perforated plastic pipe underdrain	(Caltrans, 2015)
21	8-inch diameter perforated PVC pipe (Area I)	150	LF	$ 60.00	15%	$ 10,350	Assumes 10% damage. Perforated plastic pipe underdrain	(Caltrans, 2015)
22	Geotextile (Area II toe drains)	600	SY	$ 2.15	15%	$ 1,484	Assumes 10% damage. Class A1 geotextile	(Caltrans, 2015)
23	6-inch diameter solid PVC pipe	75	LF	$ 50.00	15%	$ 4,313	Assumes 10% damage	(Caltrans, 2015)
Waste Disposal								
24	Equipment Rental (waste disposal)	2	day	$ 760.00	15%	$ 1,748	Dump truck, 16-CY capacity, loading and drive time of 2 hours round trip	(RSMeans, 2015)
25	Driver (Waste Disposal)	16	hours	$ 23.91	33%	$ 509	Prevailing wage for dump truck driver	California Department of Industrial Relations, 2015
26	Mileage (Waste Disposal)	320	mile	$ 0.54	33%	$ 230	Mileage to Clover Flat Landfill, Clearlake, California, 80 miles round trip	(Caltrans, 2016)
					Subtotal	**$ 251,783**		
					Mobilization (10%)	$ 25,178		
					Subtotal (including mobilization)	$ 276,961		
					Contingency (10%)	$ 27,696		
					Total	**$ 304,657**		

1. Unless noted, a subsurface fire was assumed to damage 10% if the waste cell
2. Unit costs include labor and installation unless noted.
3. Overhead/Profit Margin percentages obtained from Caltrans 2015 Labor Surcharge and Equipment Rental Rate document.
4. CY: cubic yard
5. All RSMeans unit cost values used were unit costs including labor and installation without overhead and profit.
6. SY: square yard SF: square foot
7. All Caltrans unit costs were obtained from District 1
8. LS: lump sum
9. LF: linear foot
10. LFG: landfill gas
11. HDPE: high density polyethylene
12. SF: square feet
13. PVC: polyvinyl chloride
14. LCRS: leachate collection and recovery system

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