Attachment P-3.3

Operations Plan (Operations Manual)

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KEKAHA MUNICIPAL SOLID WASTE LANDFILL OPERATIONS MANUAL

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua‘i

Prepared for

County of Kaua‘i
Department of Public Works
4444 Rice Street
Lihu‘e, Hawai‘i 96766

Prepared by
Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project number: WG3074

February 20, 2023

Revised November 22, 2023

KEKAHA MUNICIPAL SOLID WASTE LANDFILL
OPERATIONS MANUAL

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SECTION I – GENERAL CONDITIONS

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua'i

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SECTION I – PART A
GENERAL INFORMATION

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua‘i

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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawai‘i
ft	feet or foot
HAR	Hawai‘i Administrative Rules
HELP	Hydrologic Evaluation of Landfill Performance
KLF	Kekaha Municipal Solid Waste Landfill
MDOF	material drop-off facility
MOLO	Manager of Landfill Operations
msl	mean sea level
MSW	municipal solid waste
RCRA	Resource Conservation and Recovery Act
SWS	Solid Waste Section
USGS	United States Geological Survey
WMH	Waste Management of Hawai‘i, Inc.

1. INTRODUCTION

The purpose of this Site Operations Manual is to establish and standardize the procedures needed to conduct daily operations at the Kekaha Municipal Solid Waste Landfill – Phase II (KLF). The KLF is comprised of two refuse disposal areas, Phase I and Phase II. The KLF Phase I ceased operations in 1993, at which point Phase II area began operations. Phase II was constructed per the Resource Conservation and Recovery Act (RCRA) Subtitle D criteria and currently receives all Municipal Solid Waste (MSW) and demolition/construction debris generated on the island of Kauaʻi. Several expansions of Phase II have occurred during the lifespan of the site: a vertical expansion in 1998 from 37 feet (ft) mean sea level (msl) to 60 ft msl; a second vertical expansion in 1998 to 85 ft msl; a lateral expansion in 2010, designated Cell 1; a third vertical expansion in 2013 to 120 ft msl; and the Cell 2 lateral expansion which added roughly 6.5 acres of additional disposal area in 2020. Another vertical expansion to a final elevation of 171.5 ft msl is proposed and is currently under permit review.

The KLF is owned and operated by the County of Kauaʻi, Department of Public Works, Solid Waste Division. This Site Operations Manual has been prepared in accordance with the requirements of the following:

- Federal Regulations (Federal Register, Code of Federal Regulations [CFR] Title 40 – Protection of the Environment);
- State of Hawaiʻi Regulations:
  - Hawaiʻi Revised Statutes
  - Chapter 342H Solid Waste Pollution
  - Chapter 3421 Special Wastes Recycling
- Hawaiʻi Administrative Rules (HAR):
  - Section (§)11-54 & 55, Water Quality Standards & Water Pollution Control
  - §11-58.1, Solid Waste Management Control
  - §11-60.1, Air Pollution Control
- Permits issued by the State of Hawaiʻi Department of Health (DOH):
  - Solid Waste Operating Permit No. LF-0042-16 (Solid Waste Section [SWS])
- Internal Policies of County of Kauaʻi
- Environmentally sound operating practices & effective safety programs.

The manual is intended to be a "living" document and will be reviewed at least annually by KLF staff/County of Kauaʻi and their consultants (if necessary) and updated as necessary to reflect current operations at the KLF Phase II. The KLF Site Manager is responsible for coordinating and implementing manual updates, including distributing controlled copies of the manual.

Keeping the manual current through updates is an on-going process. As updates are proposed, the KLF Site Manager will assess whether an alteration requires notification of the DOH. This manual is a controlled document and copies are assigned as follows:

Controlled Copy Number	Assigned
1 & 2	KLF
3	DOH Solid Waste Section
4	County of Kauaʻi, Solid Waste Division

It is the responsibility of each manual holder to keep their copy current by inserting all changes into the manual and destroying/archiving the obsolete pages. The County of Kauaʻi Solid Waste Management Division is responsible for ensuring that KLF personnel understand and adhere to the policies and procedures established in this manual.

2. SITE INFORMATION

2.1 Site Description

The KLF is a permitted MSW landfill for the disposal of non-hazardous solid wastes. The KLF property covers a total area of approximately 98 acres. The Landfill is located near the southwest coast of the island of Kaua‘i, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 ft from the Pacific Ocean shoreline. The Landfill (Phase II) is bounded to the northeast by Kaumuali‘i Highway (an unpaved access road) and agricultural land to the southeast, aquaculture facilities to the northwest, and the Phase I area to the southwest. The site location and topography are shown on Figure 1.

The current permitted waste footprint, covering approximately 45 acres, is roughly rectangular, and includes the Phase II and Cell 1 expansion disposal cells (see Figure 1). Phase II consists of approximately 32.1 acres subdivided into 14 smaller waste disposal sub-cells, each about two acres; the Cell 1 expansion, 6.4 acres subdivided into 4 smaller waste disposal sub-cells each about one acre; and the Phase II Cell 2 lateral expansion is subdivided into two smaller disposal cells (the cells are approximately 3 and 3.5- acres and are roughly 200 ft wide 750 ft long). The Phase II landfill (including the Cell 1 expansion) is currently permitted to receive waste up to 120 ft msl; a vertical expansion to a final elevation of 171.5 ft msl is proposed and is currently under permit review.

KLF Phase II is hydraulically upgradient of KLF Phase I, which is a closed and unlined MSW landfill. No established natural streams or lakes exist within or near the facility. Streams on the inland edge of the coastal plain are diverted to the sugarcane plantation irrigation system (R.M. Towill Corp 1993). The site location and topography are shown on Figure 1.

The landfill office, scale house, maintenance building, leachate evaporation pond, and infiltration basin are located along the northeast property line. A materials drop-off facility (MDOF) is located between the leachate evaporation pond and the office. The MDOF allows public drop-off of green waste, recyclables, MSW, tires, and white goods. A used oil drop-off is located in the maintenance building. The site layout is shown in Figure 2.

2.2 Climate and Topography

The Kekaha-Mana coastal plain is relatively arid compared to the rest of the island due to the “rain-shadow” effect. Average annual rainfall in the area averages between 10 to 40 inches per year, while areas near the center of the island average more than 280 inches of rain per year (Oregon Climate Services 1998).

The landfill base elevation of Phase II varies from approximately 6 ft to 16 ft above msl. The Phase II-Cell 2 expansion base elevation will vary from approximately 11 to 21 ft msl. The current maximum permitted elevation for Phase II is 120 ft msl; however, a vertical expansion to a final elevation of 171.5 ft msl is proposed and is currently under permit review.

2.3 Regional Geology

The subsurface formations of the Kekaha-Mana coastal plain consist primarily of older alluvium and contemporary coralline and marl sedimentary rocks of marine, littoral, and terrestrial origin (Sanifill and Baquerizo 1996). These sedimentary rocks were deposited in lagoon and estuarine environments and in a flanking terrestrial environment. The thickness of the coastal plain sedimentary deposits ranges from zero on the inland edge to more than 400 ft along the seaward edge of the plain. The surface deposits (to a depth of 50 ft) consist predominantly of loose sand, coral fragments, and shell debris. The sedimentary deposits beneath the KLF are estimated to be over 400 ft thick and are underlain by basalt; the top of the basalt is a drowned, wave-cut bench sloping gently seaward (Sanifill and Baquerizo 1996).

2.4 Regional Hydrogeology

Two aquifers with distinctly different hydrogeologic properties underlie the Kekaha-Mana coastal plain: a coastal plain aquifer within the near-surface sedimentary (cap rock) deposits, and a deep aquifer within the underlying fractured basalt. The basaltic aquifer occurs within lava flows of the Nāpali Formation. This aquifer typically yields large quantities of water from wells and shafts with relatively little drawdown, reflecting generally high hydraulic conductivity, estimated by the United States Geological Survey (USGS) as approximately 400 ft/day. Saturated sediments of the cap rock formation (the cap rock aquifer) overlie the basaltic aquifer and retard the seaward discharge of groundwater from the deeper aquifer. According to the USGS, the regional average hydraulic conductivity of the coastal plain aquifer is relatively low (i.e., approximately 0.12 ft/day) (Burt, 1979).

The uppermost groundwater is encountered within the coastal plain aquifer at approximately 5 to 7 ft below ground surface, which is approximately 3 to 5 ft above msl. According to previous reports, the water table level in the site area is artificially controlled by the Kekaha Agricultural Association groundwater management system (Sanifill and Baquerizo 1996). If the groundwater management system pumps were shut down, lower elevations on the Mana Plain would reportedly be flooded due to a rise in the groundwater level (Sanifill and Baquerizo 1996).

2.5 Site Geology

Borings have been advanced to more than 50 ft below existing grade without reaching the bottom of the coastal plain aquifer, and it is estimated that the thickness of the coastal plain aquifer may exceed 400 ft beneath the landfill area (Sanifill and Baquerizo 1996). The upper 50 ft of these deposits consist of surficial alluvial sediments composed of loose, sand-size coral and shell debris. Below a depth of 50 ft, these deposits become increasingly consolidated and indurated, and represent the coralline and marl sedimentary rocks reported in regional investigations.

2.6 Site Hydrogeology

Shallow groundwater underlying the KLF occurs within the surficial sedimentary deposits of the coastal plain aquifer. The historical water level monitoring data indicate that groundwater typically flows toward the ocean in a west-southwest direction, with a hydraulic gradient of approximately

0.0005 feet per foot, and with an elevation of approximately 3 to 5 ft msl. The historical monitoring data indicate that the direction of groundwater flow at the site can periodically shift toward the north or south relative to the typical west-southwest flow direction, and the gradient sometimes becomes nearly flat.

Several factors may contribute to periodic shifts in the groundwater flow direction at the landfill. The direction of the local hydraulic gradient may be affected by variations in pumping rates for the agricultural wells and other production wells near the site. These nearby wells are used to supply water for irrigation and other non-potable purposes and to draw down the groundwater table to prevent saturation of surface soil by the brackish groundwater, thus allowing cultivation of sugarcane and other crops on the Mana Plain. Infiltration from leaks in the aquaculture (shrimp farm) ponds located immediately northwest of the Phase II landfill site may also contribute to periodic fluctuations in the hydraulic gradient. Similarly, the landfill's storm- and surface-water controls systems, particularly the infiltration basin, may affect localized groundwater patterns, especially after rain events. As discussed below, previous tidal study results suggest that tidal effects do not significantly influence the prevailing groundwater flow direction; however, short-term tidal effects may also contribute to the flow direction and gradient variations indicated by the historical monitoring data.

Although the shallow groundwater beneath the KLF occurs within the cap rock formation, the local hydraulic conductivity is significantly greater than the 0.12 ft/day regional average value reported by the USGS (Burt 1979). The results of an aquifer test performed during the week of October 16, 1995, indicate that the hydraulic conductivity of the cap rock aquifer underlying the KLF site is approximately 162 ft/day (6×10^{-2} centimeters per second). The aquifer test was implemented by pumping monitoring well MW-l at a rate of 0.56 cubic feet per minute for approximately 36 hours while measuring the corresponding drawdown at monitoring well MW-II-5. The hydraulic conductivity value indicated by this test is about three orders of magnitude greater than the 0.12 ft/day value reported by the USGS for the regional coastal plain sedimentary aquifer (Burt 1979). This difference is likely due to field scale effects such as the unconsolidated nature of the surficial alluvial sediments in the shallow coastal plain aquifer underlying the KLF. Based on previous geotechnical investigations of soil types and relatively flat groundwater gradients observed, the higher conductivity value is likely more representative of site conditions than the lower value reported in the literature.

The vertical component of groundwater flow at the site is negligible; the groundwater flows horizontally beneath the facility, ultimately discharging into the ocean southwest of the site. The KLF Phase II monitoring wells therefore target the upper interval of the coastal plain aquifer.

3. LOCATION RESTRICTIONS

As detailed in 40 CFR 258 (Location Restrictions) and HAR §11-58.1-13 (Site Analysis), new, existing, and laterally expanded MSW landfill units must comply with certain location restrictions. In compliance with 40 CFR 258 and HAR §11-58.1-13, the KLF Phase II site is not located:

- Within 10,000 ft of any runway used by turbojet aircraft or 5,000 ft of an airport runway used by piston-type aircraft (Airport safety)
- Within a 100-year floodplain area, as delineated by the Federal Emergency Management Agency of the Federal Insurance Administration (Floodplains)
- In or near a wetland, as defined by the U.S. Interior Department of Fish and Wildlife (Wetlands)
- Within 200 ft of a fault having had displacement in Holocene times (Fault areas)
- In a seismic impact zone (Seismic impact zones)
- Near any known geologic faults or rifts (Unstable areas)
- Within a tsunami hazard or floodway, as defined by HAR §11-58.1-13 (g) (1) (Tidal wave [tsunami] zone)

Detailed location restriction documentation is kept on site at the KLF Phase II in the Site Operating Record/Files.

4. OPERATING HOURS

The KLF Phase II current operating hours are 8:00 a.m. to 4:00 p.m. 7 days per week, up to 352 days per year (closed New Year's Day, Martin Luther King Junior Day, President's Day, Prince Kuhio Day, Good Friday, Memorial Day, King Kamehameha Day, Independence Day, Admission Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day). If the holidays fall on Monday through Thursday, the KLF Phase II is open a half day from 8:00 a.m. to 11:00 a.m. If the holidays fall on Friday through Sunday, the KLF Phase II is closed. Signage that displays normal operating hours, facility name and address of operator, days of operation, and telephone contact information will be displayed at the KLF entrance on the Kaumualiʻi Highway. This information is provided below.

Facility Owner:

- County of Kauaʻi
- Department of Public Works – Solid Waste Division
- 4444 Rice Street, Moʻikeha Building, Suite 295
- Lihuʻe, Hawaiʻi 96766
- Phone: (808) 241-4993
- Contact: Troy Tanigawa, P.E., County Engineer

Facility Operator:

- County of Kauaʻi
- Department of Public Works – Solid Waste Division
- 4444 Rice Street, Moʻikeha Building, Suite 295
- Lihuʻe, Hawaiʻi 96766
- Phone: (808) 346-4393
- Contact: John Ruiz, Site Manager

Pre-disposal activities, including but not limited to, equipment fueling/lubing, prior day daily cover removal/active face preparation may occur before the scale house is opened. Post-disposal activities including, but not limited to, equipment cleaning/maintenance, daily cover placement and litter management may occur after the scale house is closed. At least one KLF Phase II equipment operator shall be present at the KLF whenever loads are dumped.

5. PERSONNEL

Duties for managing and operating the KLF Phase II are assigned to a variety of staff positions, both on and off site. The County of Kaua‘i provides trained personnel and appropriate equipment to safely and efficiently manage the incoming waste volume at the KLF Phase II. The staff and equipment listed below are adequate to handle the daily volume of waste accepted for disposal at the site.

Personnel	Number of Personnel
Manager/Supervisor	2
Equipment Operators	10
Traffic Controller/Laborer	3
Scale Attendant	3
Total	18

The Site Manager directly oversees and manages KLF Phase II operations personnel involved in the daily operation of the landfill.

The KLF Site Manager directs and supervises the equipment operators and other County landfill employees.

KLF equipment operators and traffic controllers work under the direct supervision of the Site Manager and are responsible for the safe and efficient operation of heavy or specialized equipment. Principal duties performed consist of the following:

- Screening waste at the landfill working face
- Checking random loads
- Directing the unloading of waste at designated locations
- Spreading and compacting refuse at the landfill working face
- Placing daily cover at the end of each day
- Keeping the unloading area accessible

Additionally, County of Kaua‘i personnel and their consultants provide operational, managerial, engineering, and compliance support to the KLF Phase II and are listed below.

- **Site Manager** – Responsible for overall planning, operations, environmental and contract compliance, business development, customer relations, engineering support, and financial management for the KLF. Develops the capability of managers and other staff to meet or exceed objectives. Directly oversees and manages the KLF operations personnel involved in the daily operation of the landfill. Is knowledgeable about the applicable federal, state, local regulations, county policies, and permit requirements that apply to the Landfill. Has

successfully completed a Manager of Landfill Operations (MOLO) training course administered by the Solid Waste Association of North America or DOH-approved alternative. A record of this certification will be documented in the operating record.[1]

- **Solid Waste Environmental Services Manager** - Responsible for overall environmental management, and monitoring and reporting of environmental control systems and networks of the KLF. Oversees compliance status of the KLF with applicable federal, state, local regulations, County policies, and permit requirements that apply to the landfill. Also acts as the point of contact for the regulatory agencies.
- **Solid Waste Superintendent** - Provides leadership, communication, and training on topics such as waste acceptance, permit compliance, regulatory requirements, landfill environmental control plans, operating plans, and environmental audits.
- **Environmental Compliance Consultant** - Environmental Compliance Consultant is responsible for monitoring the compliance status of the KLF with applicable federal, state, local regulations, county policies, and permit requirements that apply to the landfill.

[1] The title of Site Manager and Site Supervisor may be used interchangeably in the text of this operations plan. Both titles have the same meaning.

6. EQUIPMENT

The equipment at the KLF Phase II is adequate to handle the daily volume of waste accepted for disposal at the site, to provide support for routine and non-routine related tasks, and to conduct the ongoing excavation and construction activity needed for cell development and generation of cover soil. The current inventory is as follows:

- Two (2) compactors (CAT 826G and CAT 836) – used to push and compact MSW
- One (1) bulldozer (CAT D8) – used to push/cover MSW, and for excavation and construction activities
- One (1) dump truck (International) – used to move cover material from the soil stockpile to the fill area, or excavated rock and soil to the processing area
- One (1) front end loader (CAT 950G) –used to load cover material, handle excavated materials, site maintenance
- Two (2) excavators (Case and Takeuchi 290) – used to load trucks with cover material and other site development and maintenance requirements
- One (1) 4,000-gallon international water truck (Ford) – used for application of water on landfill roads for dust control, and fire control
- One (1) roll-off truck – used for transport refuse and recyclable materials from the public drop-off area
- One (1) tractor with mowing attachment – used to manage vegetation
- Auxiliary equipment – pickup trucks, pumps, etc.

In the event of an equipment breakdown, other site equipment will be used or rental equipment can be obtained from local heavy equipment dealers. A preventive maintenance program is implemented to minimize equipment downtime and ensure the availability of adequate equipment to manage the waste load.

7. ACCESS CONTROL

In accordance with HAR 11-58.1-15(f), public access to the KLF Phase II is controlled by site perimeter chain link fencing to prevent unauthorized vehicular traffic and illegal waste dumping and protect human health and the environment. Scavenging is not allowed. A gate to the main access road from Kaumualiʻi Highway is locked during non-operating hours.

Only KLF Phase II personnel and approved contractors have unrestricted access to the site, and only authorized vehicles have access beyond the scale house. All trucks/vehicles enter the facility from Kaumualiʻi Highway. Waste haulers proceed directly to the scale house, check in with the scale house attendant and have their loads weighed prior to proceeding to the disposal area. All site visitors must proceed to the main office to sign in.

During working hours, the attendant in the scale house provides security to prevent unauthorized access or illegal dumping at the KLF.

8. WASTE ACCEPTED AT THE KLF

Types and Quantities of Waste

- **Municipal Solid Waste**

  The KLF Phase II receives approximately 260 tons per day of non-hazardous MSW from residential, commercial, and industrials sources on the island of Kaua‘i. The peak daily disposal rate is limited to 600 tons.

- **Special Waste**

  The KLF Phase II receives certain “special wastes” that must be managed under special operating procedures for disposal, including but not limited to, wastewater treatment sludge, septic tank and cesspool pumpings, petroleum-contaminated soil, treated medical waste, dead animals, and asbestos-containing materials.

  The full list of accepted wastes (including special wastes), unacceptable wastes, and methods used to prevent and detect the disposal of unacceptable waste at the landfill are described in Section I – Part B, *Waste Acceptance / Hazardous Waste Exclusion Program*.

9. TRAINING

KLF management conduct weekly, monthly, and annual training sessions for all KLF Phase II personnel to establish and maintain a high level of employee knowledge of safety and emergency procedures, compliance and waste acceptance policies at the KLF Phase II, as well as environmental protection practices. Annual training for supervisors, equipment operators, traffic controllers, and other personnel involved with site operations and maintenance includes sessions to familiarize them with the contents of this Site Operations Manual. Training topics and modules are discussed in more detail throughout the various sections of this manual. Copies of applicable portions of the manual may be handed out during training sessions for KLF Phase II personnel to review and refer to as needed. In addition, employees are informed of their responsibilities to implement procedures specified in the manual. Records of personnel attending each training session and the topics covered are maintained on site as part of the KLF Phase II Operating Record/Files.

10. RECORDKEEPING REQUIREMENTS

The following records are maintained on site at the KLF as part of the Site Operating Record/Files in accordance with state and federal requirements, as detailed in HAR §11-58.1-15(j) and 40 CFR 258:

- Location restriction demonstration
- Inspection records, training procedures, and notification procedures
- Perimeter gas monitoring results and any associated remediation plans
- Any MSW landfill unit design documentation for placement of leachate in an MSW landfill unit
- Any demonstration, certification, finding, monitoring, testing, or analytical data relating to groundwater protection (including calibration & maintenance records & original recordings of monitoring instrumentation)
- Specific environmental monitoring information such as date, exact location, and time of sampling or measurements; the person who performed the sampling or monitoring; the date(s) that the analyses were performed; the person who performed the analyses; analytical techniques; and analytical sampling results
- Closure and post-closure care plans and any associated monitoring, testing, or analytical data
- Cost estimates and financial assurance documentation

10.1 KLF Phase II Operational Records

The KLF Phase II maintains records of operational information as part of the Site Operating Record/Files that include, but are not limited to:

- Type, volume/weight, and origin/source of waste received/rejected/disposed of
- Type & quantity of cover material used, and verification program results
- Final cover inspections
- Number of vehicles disposing of waste
- Asbestos waste disposal locations
- Random load checks (waste accepted & rejected)
- Facility (vector control) environmental (spill prevention, control, and countermeasures), and litter inspections and control measures
- Leachate control and groundwater monitoring systems inspections, special waste loads/ handling, waste manifest forms, and special waste profile sheets

- Equipment breakdowns causing interruption of services
- Equipment repairs
- Incident reports (spills, fires, accidents, natural disasters, odorous loads, complaints)
- Climatic data (temperature, wind speed & direction, humidity, rainfall, solar radiation, evaporation, etc.) (evaporation data are collected from an off-site source)
- User population
- Stop work occurrences due to high wind
- Monthly gas monitoring probe and settlement marker measurements, leachate levels and quantity pumped
- Personnel training records

The Site Operating Record / Files are maintained in various forms such as spreadsheets, logbooks, scale house tickets, files / filing system, and binders, etc. that allow the information to be easily located and retrieved. Any information, records, or plans contained in the Site Operating Record / Files that must be kept under the conditions of the KLF Phase II Solid Waste Permit must be furnished upon request to the DOH or made available for inspection by authorized DOH personnel.

The KLF Phase II Solid Waste Permit, this Site Operations Manual, and any other required plans or reports (e.g., Groundwater & Leachate Monitoring Reports; Annual Operating Reports, etc.) are maintained on site at the KLF as part of the Site Operating Record / Files for a minimum of five years. Refer to Section IX – *Permits* for copies of the above-listed KLF permits.

11. REPORTING

11.1 Incident Notification Reporting

The KLF Phase II shall notify the DOH by phone or facsimile within 24 hours (8 hours if possible) when there are incidents such as fire, explosion, or release of regulated material/waste that, which could threaten human health or the environment. Notification requirements for releases only apply to releases of quantity equal or exceeding the reportable quantity listed in HAR § 11-451.

A written or facsimile Incident Notification Report shall be submitted to the DOH within three days of the incident and include the following:

- Owner and operator information (name, address, and telephone number)
- Facility information at which the incident occurred (name, address, and telephone number)
- Date, time, and type of incident (i.e., fire, explosion, release, etc.)
- Name and quantity of material involved
- Extent of injuries, as applicable
- An assessment of the actual or potential hazards to human health or the environmental, as applicable
- Estimated quantity and disposition of recovered and un-recovered material that resulted from the incident
- Evaluation of the circumstances that led to the incident
- Steps being taken to reduce, eliminate, and prevent recurrence, including an implementation schedule
- Other information or monitoring, as required by the DOH

11.2 Non-Compliance Reporting

The KLF Phase II shall notify the DOH if the facility is unable to comply with the conditions of the solid waste permit. Verbal notification must be given to the DOH within 24 hours of the occurrence, and the written report must be filed within three calendar days of the verbal notification. Each Incident Report shall contain the following information (at a minimum):

- A description and cause of the non-compliance
- The period of non-compliance (dates and times), or the length of time the period of non-compliance is expected to last
- Steps being taken to correct the area of non-compliance
- Steps being taken to reduce, eliminate, and prevent recurrence of the issue
- Other information or monitoring as required by the DOH

11.3 Disposal Outside Working Hours

In the event that the KLF facility proposes any waste acceptance and disposal outside normal operating hours, the KLF Site Manager or a designated employee shall notify the DOH in writing of this event. The notification shall be provided at least 24 hours in advance of the event. If the event is unanticipated, the KLF shall provide verbal notice of the event within 4 hours and written notification within 8 hours of commencement of the event. The written notification shall specify the affected dates and times, the nature and reason for the extended operations, identification of any considerations associated with the extended operations, and controls/procedures that will be implemented to mitigate any adverse impacts of the extended operations.

11.4 Annual Surface Water Management Plan

The KLF Phase II shall update the Surface Water Management Plan annually and submit to the DOH by September 1 of each year. Additional information on the Surface Water Management Plan is presented in Section V – *Surface Water Management Plan.*

11.5 Master Plan

The KLF shall prepare a Master Plan that provides information on future landfill capacity requirements in both numerical and graphical presentations with a minimum projection of 20 years and shall include the waste footprints and service lives of Phase II and future lateral expansion phases and/or future landfills. The Master Plan shall include the proposed Basis of Design, buffer areas, and appurtenant and support facilities. Updates and revisions to the plan shall be submitted annually in conjunction with the Annual Operating Reports, described below.

11.6 Annual Operating Report

The KLF Phase II shall submit an Annual Operating Report for the annual reporting period of July 1 through June 30. The Annual Operation Report shall be submitted to the DOH by July 31 of each year and contain the following information:

- Types of solid waste received (MSW, green waste, industrial/commercial, tires, wood, metals, asbestos, and other special wastes)
- Quantities of solid wastes received, by type with totals using an appropriate unit of measure
- Quantities of leachate generated and how it was handled or disposed of
- Results of the Hydrologic Evaluation of Landfill Performance (HELP) model using site specific data and a demonstration of the validity of the alternative liner design with respect to point of compliance requirements (to be submitted as meteorological conditions require further evaluation)
- Quantities of filled airspace for the present year, past filled airspace, and remaining airspace (provided in both cubic yards and years). The airspace information shall be provided in both numerical and graphical presentations

- An annual topographic survey prepared by a land surveyor registered in the state of Hawai‘i, aerial surveys, or an approved alternate method. The survey shall show the vertical and horizontal dimensions of the landfilled area in comparison to the final grades as outlined in the solid waste permit
- A Sequencing Plan, including a drawing identifying the cell areas planned to be filled in the coming year, including identification of wet weather areas. The square footage or acreage of cells and wet weather areas will be computed and shown on the plan
- Final fill areas, intermediate fill areas, and future unused fill areas projected for the next year
- Daily MSW cell construction plan, including cell geometry, estimated daily cover volumes, and soil to waste ratios
- A soil-balance report of the reporting year and the coming year (reported separately). The soil daily cover and intermediate cover, including erosion replacement soil, also shall be reported separately. The source and type of soil shall be recorded separately for daily cover and intermediate cover. The soil-balance report for the past year shall be based on records of actual use on a daily, weekly, and monthly basis. Any exceedance of permit grades or incomplete/non-application of daily cover shall be identified
- Date of final receipt of waste at each cell in the landfill, including a schedule and description of anticipated closure and post-closure activities to be performed within the next five years
- A summary of closure and post-closure activities performed during the reporting period
- A copy of the detailed written estimates and documentation of financial assurance
- Updates/Revisions to the Master Plan

11.7 Environmental Monitoring Reports

The KLF Phase II shall submit environmental monitoring reports for perimeter gas monitoring and groundwater/leachate monitoring.

11.7.1 Perimeter Gas Monitoring

Perimeter gas monitoring reports shall be submitted to the DOH within 60 days of each monitoring event and include the following information:

- Date and time of monitoring
- Gas concentrations by volume
- Barometric pressure
- Site conditions
- Name of personnel conducting monitoring

- Description of equipment and calibration results
- Description of monitoring procedure
- Identification of any procedures or observations outside of normal conditions

Additional information on the gas migration monitoring is presented in Section VII - *Perimeter Gas Monitoring Plan*.

11.7.2 Groundwater and Leachate Monitoring

Groundwater and leachate monitoring reports shall be submitted to the DOH within 90 days of each sampling event and include the following information:

- Identification of wells/manholes sampled during the event
- Sample collection dates and methodology
- Identification of analytical laboratory that performed the sample analysis
- Analytical data
- Statistical evaluation of analytical data
- Comparison of analytical data to drinking water standards and Environmental Action Levels
- Identification of deviations from sampling plan, including reason for deviation and any impact to sample results
- Statement of any detections of volatile organic compounds or statistically significant increases that were identified

Additional information on the groundwater and leachate mentoring is presented in Section VI – *Groundwater and Leachate Monitoring Plan*.

12. REFERENCES

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FIGURES

Site Location Map

Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

Geosyntec consultants

WG3074	July 2021

Figure 1

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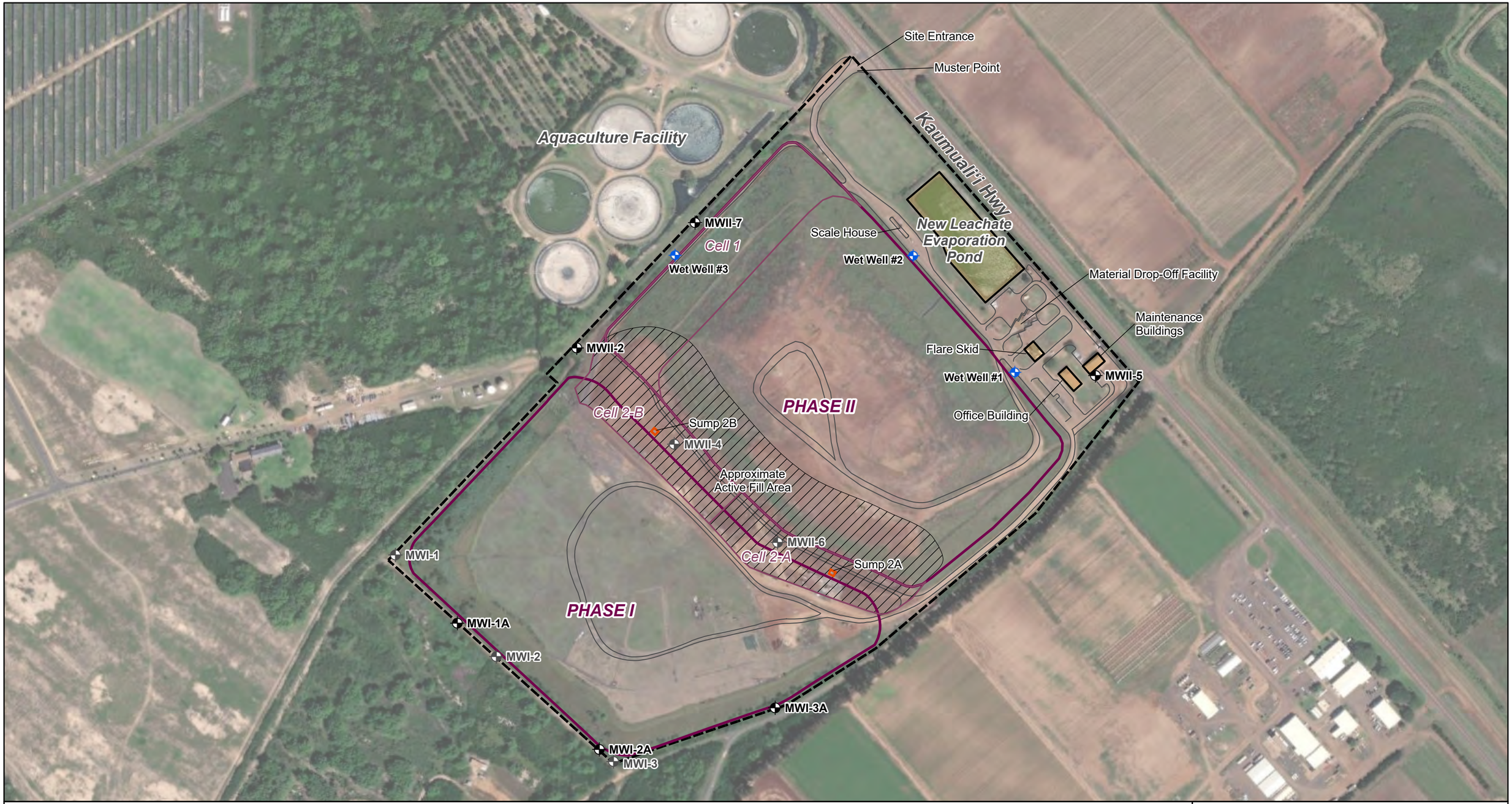

Legend

- Wet Well (Leachate Sump)
- Groundwater Monitoring Well
- Decommissioned Groundwater Monitoring Well
- Approximate Active Landfill Area
- Sump Location
- Phase Boundary
- Cell Boundary
- Roads
- Property Boundary

N

0 350 Feet

Site Layout

Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

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WG3074 | August 2022

Figure 2

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engineers | scientists | innovators

SECTION I – PART B
WASTE ACCEPTANCE/HAZARDOUS WASTE EXCLUSION PROGRAM
Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua‘i

Prepared for

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Department of Public Works
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Project number: WG3074

February 20, 2023

Revised November 22, 2023

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Attachment A: Conditionally Exempt Small Quantity Generator Certification

Attachment B: Generator's Waste Profile Sheet & Disposer's Indemnification Agreement

Attachment C: Load Check Data Sheet

ACRONYMS AND ABBREVIATIONS

%	percent
CESQG	conditionally exempt small quantity generator
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
DOT	United States Department of Transportation
DOH	Department of Health, State of Hawai'i
EPA	Environmental Protection Agency
ft	feet or foot
HAR	Hawai'i Administrative Rules
KLF	Kekaha Municipal Solid Waste Landfill
MDOF	materials drop-off facility
msl	mean sea level
MSW	municipal solid waste
MSWLF	municipal solid waste landfill
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
TSCA	Toxic Substances Control Act
WMH	Waste Management of Hawaii, Inc.

1. INTRODUCTION

The County of Kaua‘i has implemented a Waste Acceptance / Hazardous Waste Exclusion Program at the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II to:

- Define acceptable and unacceptable wastes
- Establish procedures for preventing, detecting, and managing wastes that are not are not suitable for disposal at the landfill
- Define special wastes
- Establish procedures for reviewing, approving, and handling special wastes for disposal at the landfill

This program complies with the operating criteria for municipal solid waste (MSW) landfills as detailed in the Code of Federal Regulations (CFR) [40 CFR §258.20] and the Hawai‘i Administrative Rules (HAR §11-58-15a):

> *“Owners or operators of all MSWLF units must implement a program at the facility for detecting and preventing the disposal of regulated hazardous wastes as defined in part 261 of this chapter and polychlorinated biphenyls (PCB) wastes as defined in part 761 of this chapter.”*

The specific requirements of these regulations include: 1) random inspections or other steps to ensure incoming loads do not contain regulated hazardous waste or polychlorinated biphenyl (PCB) waste; 2) records of inspections; 3) training personnel to recognize regulated hazardous waste or PCB waste; and 4) notification of the State of Hawai‘i Department of Health (DOH) if a regulated hazardous waste or PCB waste is discovered.

These regulations define "regulated hazardous waste" as solid waste that is a hazardous waste, as defined in 40 CFR §261.3, that is not excluded for regulation as a household hazardous waste under 40 CFR §261.4(b), or was not generated by a conditionally exempt small quantity generator (CESQG), as defined in 40 CFR §261.5. Household hazardous waste and hazardous waste generated by a CESQG are exempt from the screening requirements (see Attachment A for a CESQG certification form).

2. SITE INFORMATION

The KLF property covers a total area of approximately 98 acres. The KLF is located near the southwest coast of the island of Kaua‘i, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The Phase II facility is bounded by Kaumuali‘i Highway to the northeast, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the KLF Phase I area to the southwest. The site location and topography are shown on Figure 1.

2.1 Site Description

The KLF is comprised of two refuse disposal areas, Phase I and Phase II. The KLF Phase I ceased operations in 1993, at which point Phase II area began operations. Phase II was constructed per the Resource Conservation and Recovery Act (RCRA) Subtitle D criteria and currently receives all Municipal Solid Waste (MSW) and demolition/construction debris generated on the island of Kaua‘i. Several expansions of Phase II have occurred during the lifespan of the site: a vertical expansion in 1998 from 37 ft mean sea level (msl) to 60 ft msl; a second vertical expansion in 1998 to 85 ft msl; a lateral expansion in 2010, designated Cell 1; and a third vertical expansion in 2013 to 120 ft msl; and the Cell 2 lateral expansion. A fourth vertical expansion to a final elevation of 171.5 feet above msl is proposed and is undergoing permit review. The Cell 2 expansion is expected to extend the operating life of the Phase II landfill by approximately 3.2 years.

The current permitted waste footprint, covering approximately 45 acres, is roughly rectangular and includes the Phase II, the Cell 1 expansion disposal cells, and the Cell 2 expansion disposal cells (see Figure 1). Phase II consists of approximately 32.1 acres subdivided into 14 smaller waste disposal sub-cells, each about two acres, the Cell 1 expansion, 6.4 acres subdivided into 4 smaller waste disposal sub-cells, each about one acre, and the Cell 2 lateral expansion, which is approximately 6.5 acres divided into two sub-cells with one cell approximately 3.5 acres and the other 3 acres. The Phase II landfill (including the Cell 1 expansion) is currently permitted to receive waste up to 120 ft msl; a vertical expansion to a final elevation of 171.5 ft msl is proposed and is currently under permit review. The landfill office, scale house, maintenance building, leachate evaporation pond, and infiltration basin are located along the northeast property line. A materials drop-off facility (MDOF) is located between the leachate evaporation pond and the office. The MDOF provides residential drop-offs of green waste, electronic waste, recyclables, scrap metals, MSW, tires, and white goods. A used oil drop-off is located in the maintenance building. The site layout is shown on Figure 2.

3. WASTE ACCEPTANCE POLICY

The KLF Phase II’s waste acceptance policy is described below. The lists of acceptable, unacceptable, and special wastes are subject to change as regulatory requirements warrant.

3.1 Acceptable Wastes

The following waste materials are accepted for disposal at the KLF Phase II or temporary storage at the MDOF:

- Non-hazardous solid waste from municipal, commercial, industrial, and household sources
- Construction and demolition debris (as allowed by local regulations)
- Used tires (recycling only)
- White goods (recycling only)
- Used oil (recycling only)

- CESQG waste
- Scrap metal
- Pre-approved special waste (see Section 3.3 for details regarding special waste)

3.2 Unacceptable Wastes

The following waste materials are not accepted for disposal at the KLF Phase II:

- Regulated hazardous waste (as defined in HAR 11-261 through 268)
- Radioactive waste
- PCB-containing solid waste (as defined in 40 CFR Part 761):
  - PCB concentration greater than 50 milligrams per kilogram or parts per million (small non-leaking capacitors contained in fluorescent light ballasts, white goods, and other electrical appliances are not considered regulated PCB wastes)
- Explosive materials
- Untreated infectious waste
- Bulk or non-containerized liquids, as provided in HAR 11-58.1-15(i):
  - Any waste determined to contain "free liquids" by the paint filter test (United States Environmental Protection Agency [EPA] Method 9095A)
- Containers holding liquid waste, as provided in HAR 11-58.1-15(i)(2)
- Commercial loads containing >25 percent (%) green waste and household loads containing >50% green waste, in accordance with HAR 11-58.1-65(b)
- Any waste that:
  - Is deemed to have a reasonable likelihood of damaging the facility or processing equipment
  - May pose a threat to health or safety
  - May cause a violation of any applicable law
- Chlorofluorocarbon (CFC) - containing appliances (except for residential drop off at the MDOF, see Appendix B)
- Electronic waste (e-waste) (except for residential, see Appendix C)
- Lead acid batteries, in accordance with Hawaii Revised Statutes 3421
- Tires (whole, cut, sliced, chipped, or shredded)
- Hot loads:
  - Waste that is on fire or capable of igniting other materials; smoldering waste
- Compressed gas tanks
- Scrap metal, including automobile bodies

3.3 Special Waste

The term "special waste" refers to non-hazardous waste that requires special processing and handling/disposal techniques due to the quantity or volume of the material, or its unique physical, chemical, or biological characteristics. Types of special wastes that are accepted at the KLF Phase II include, but are not limited to:

- Asbestos (friable and non-friable) (See Appendix A for the *Asbestos Management & Disposal Plan*)
- Water separation, car and equipment washes (residues fromwater separators/ steam car washes/equipment washes)
- Sewage sludge
- Underground storage tank and other sludges
- Off-specification and outdated products
- Used oil-contaminated debris*
- Solid resins and chemical debris*
- Petroleum (and other) contaminated soils
- Gasoline/jet fuel/kerosene-contaminated debris*
- Diesel/motor-type fuel-contaminated debris*
- Sandblast grits
- Baghouse dusts
- Inorganic filter cakes
- Paint waste from removal, construction, and demolition
- Treated poles and lumber
- Empty containers
- Dead animals and offal
- Treated infectious waste (to be made non-infectious) including medical waste. Properly managed/treated (rendered non-hazardous) materials that are of a toxic nature, such as insecticides, poisons, or radioactive materials
- Other contaminated industrial/commercial waste & non-Toxic Substances Control Act (TSCA)-regulated PCB soils, provided such materials are not regulated hazardous waste. Certain exempted TSCA-regulated waste may also be accepted.
- Fresh or frozen uncooked shrimp and other crustaceans (Ordinance No. 893)

NOTE: debris* = contaminates / waste generated when manufacturing a product or performing a service

See Section 5 for an explanation of the KLF Special Waste Acceptance Program.

4. KLF PERSONNEL TRAINING

The KLF Phase II provides special waste training to all employees specific to their responsibilities in the hazardous waste exclusion program. KLF Phase II personnel involved in disposal operations are trained to recognize, identify, and handle hazardous waste, PCB waste, and unacceptable waste. Training will also include safety precautions, proper use of personal protective equipment (as required and emergency response procedures), typical hazardous waste labels, container identification, and notification and record-keeping requirements associated with the hazardous waste exclusion program. The training program will be administered at least once a year.

Upon completion of the training, each employee will sign and date a Hazardous Waste Exclusion Program Training acknowledgment form. All training records are maintained on site in the KLF Phase II Operating Record/Files.

5. SPECIAL WASTE ACCEPTANCE PROGRAM

All special waste materials must be pre-approved prior to acceptance at the KLF. Generators are required to properly characterize their waste through analysis or process knowledge to determine if the waste is non-hazardous. After the waste has been characterized, the generator completes a *SPECIAL WASTE PROFILE KEKAHA MUNICIPAL SOLID WASTE (MSW) LANDFILL* (see Attachment B or online[1]) for submittal to the landfill. The special waste profile form also includes an Indemnification Agreement for the generator to sign, which certifies as to the truth, completeness, and accuracy of the information provided (see Attachment B).

5.1 Special Waste Evaluation

Information about the waste and its process of generation, along with laboratory analyses, or other information, such as Safety Data Sheets are required as part of the waste profile submittal. All profile sheets, laboratory analyses, and supporting documentation are reviewed and evaluated prior to acceptance for disposal. The use of process/generator knowledge may be used to modify or reduce the analytical testing required for a given waste stream. Factors considered include state regulations, the process by which the waste was generated, its physical and chemical properties, its volume, and its method of packaging.

Certain special waste streams may also require individual approval by the DOH or the County of Kauaʻi. Any required special management / handling of the waste (to ensure compliance with permit conditions and regulations) will be noted on the waste approval form.

Generators of special waste are required to re-analyze their waste at least every three years (after the approval date) or when there is a change in the process or chemical makeup of the product or

[1]https://www.kauai.gov/Landfill

waste stream. This requirement is needed to ensure that the waste has not significantly changed from the initial characterization.

5.2 Special Waste Receiving and Verification

The KLF Phase II must be notified 24 hours prior to receipt of waste that requires special handling. Special wastes are generally accepted for disposal at the KLF Phase II between 8 a.m. and 2 p.m., Monday through Saturday.

A Non-Hazardous Waste Manifest must accompany all special waste loads. Upon arrival at the KLF, the scale house attendant will direct the customer to the landfill office where the manifest will be checked with the schedule and the approved special waste profile sheet. The waste being delivered must be the same as the waste that is described on the profile sheet. Customers are required to identify any material changes in the waste stream or the process generating the waste that might affect the status of the approval. The KLF reserves the right to inspect or sample any load to verify that the load conforms to the information provided by the generator. Undocumented special waste loads or loads that are not consistent with the approved profile will be rejected.

6. EXCLUDING UNACCEPTABLE & HAZARDOUS WASTE

Procedures implemented at the KLF Phase II to detect and control the inadvertent receipt of hazardous and other unacceptable waste include notification, ongoing visual screening, and random load checks.

6.1 Notification

KLF Phase II customers are informed of wastes prohibited from disposal at the landfill by means of published information or signs posted at the facility. A one-page flyer or handout is available to the general public and KLF Phase II customers that describes the landfill's waste acceptance policy and provides a list of acceptable and unacceptable wastes. The KLF also communicates with local transporters, generators, and state agencies regarding waste management issues.

6.2 Ongoing Visual Screening

All incoming waste is subject to visual screening. Visual screening begins at the scale house. The scale house attendant questions incoming customers about the contents and source of their load. Cameras are set up at the scale house to allow for visual examination of a truck's load. If the scale house attendant encounters a questionable-looking load, KLF Phase II Management will be called for further evaluation of the load.

Questionable waste loads or customers who have a history of attempting to deliver inappropriate material to the landfill may also be inspected. If unacceptable wastes are detected by the scale house, the attendant will reject the load and direct the transporter to seek appropriate resources for proper disposal of the rejected waste. The scale house attendant must notify KLF Phase II Management so the incident can be documented in the *KLF Daily Log Book*, and details such as date, hauler, waste type, estimated quantity, and alternative disposal destination will be recorded.

KLF Phase II equipment operators and traffic controllers at the landfill working face also observe and monitor disposal operations for hazardous and other unacceptable wastes. Should wastes that contain questionable looking materials be observed, the KLF Phase II Site Manager will be called upon to determine the acceptability of the waste. If unacceptable wastes are detected at the working face, the procedures listed in Section 7 will be followed.

6.3 Random Load Checks

Random load checks are conducted at the KLF Phase II by a County of Kauaʻi employee or other designated and trained person at the working face to detect unacceptable wastes, such as hazardous waste, tires, batteries, PCB waste, CFC-containing appliances, etc. One random load check is performed daily. All waste loads brought to the KLF Phase II are subject to random load checks.

6.3.1 Random Load Check Procedures

A load will be selected for inspection at random, and the driver will be notified at the working face. The randomly selected transporter will then be directed to a designated area of the working face. Prior to the load check, the inspector will give the driver/transporter a brief explanation of the load check program, and then instruct the driver to pull forward while dumping so the waste load can be adequately inspected for the presence of hazardous or other unacceptable wastes.

If unacceptable wastes are identified during a load check, the prohibited portion will be rejected. If hazardous or PCB wastes are detected, the entire load will be rejected, and the generator will be notified. Arrangements will be made with the generator to have the waste retrieved or otherwise properly managed (transporters / generators will be directed to appropriate state or local agencies or vendors, for assistance in finding appropriate handling or disposal of their wastes).

Information such as the date and time of inspection, transporter information (vehicle license plate number, name, phone number, type of vehicle), generator information (source of the load as stated by the driver), description of the load, and actions taken are recorded on a *Load Check Data Sheet* (see Attachment C). At the end of the inspection, both the driver and the inspector sign the load check sheet. These sheets are maintained on site as part of the KLF Phase II Operating Record/Files.

7. ON-SITE MANAGEMENT OF WASTE

The following procedures are implemented at the KLF Phase II when unacceptable waste is detected:

1. If the waste has not been unloaded, reject the load and notify the generator/transporter that unacceptable waste was in the load. Document the incident in the KLF Phase II Daily Log Book, including details such as date, hauler, waste type, estimated quantity, and alternative disposal destination.

   (a) If it is a hazardous waste or PCB waste, follow the notification procedures listed in Section 7.3.

2. If the waste has been unloaded (i.e., the waste cannot be returned to the transporter), segregate or cordon off the material. KLF Phase II personnel will decide if the waste can be handled/managed on site (i.e., hazardous vs. non- hazardous):

   (a) If the material is a hazardous waste, segregate or cordon off the material to establish a safe zone. Other vehicles will be directed to dump in another location.

      (i.) The KLF Phase II will contact the generator so they can coordinate a qualified contractor to undertake proper management methods (see Section 7.2.2).

      (ii.) The KLF Phase II will follow notification procedures in Section 7.3.

   (b) If the waste material is unacceptable but non-hazardous (tires, vehicle batteries, compressed gas tanks, white goods, electronics waste, recyclables), it will be managed in a manner appropriate to the risks of handling/storing the material (see Section 7.2.1).

If the characteristics of the waste are unknown, the procedures detailed in 2(a) should be followed. Handling and management procedures will be determined on a case-by-case basis in consultation with experienced personnel or agencies.

7.1 Hazardous Waste Management

In the event a generator cannot affect the removal of a delivered load determined to be unacceptable/hazardous, the KLF Phase II will contact a licensed contractor to respond to and manage the removal and disposal of the load. Hazardous wastes will be removed from the site by a licensed hazardous waste transporter under proper manifesting and disposed of or treated at a permitted facility. Anyone transporting hazardous waste from the landfill must comply with 40 CFR §262, and is required to:

- Obtain an EPA identification number.
- Package the waste in accordance with the United States Department of Transportation (DOT) regulations under 49 CFR §173, 178, and 179. The container must be labeled,

marked, and a placard must be displayed in accordance with DOT regulations for hazardous waste materials (49 CFR §172).

- Properly manifest the waste, designating a permitted facility to treat, store, or dispose of the hazardous waste.

7.2 On Site Storage of Waste

7.2.1 Unacceptable Waste Storage

If the wastes are characterized as unacceptable and *non-hazardous* (tires, compressed gas tanks, white goods, electronics waste, recyclables), KLF Phase II personnel will transport the wastes to designated materials storage area. The waste will be identified, logged, placed in bins or separated onto pallets, labeled, and stored until a contractor transports the waste off site for proper disposal as required by federal and state regulations.

7.2.2 Hazardous Waste Storage

The KLF Phase II is classified as a conditionally exempt small quantity generator. Hazardous wastes may be stored at the KLF Phase II indefinitely provided that the procedures required by 40 CFR §261 are followed. In general, the following practices will be followed for the storage of hazardous wastes:

- The waste is placed in tanks or containers
- The date of receipt of the waste is clearly marked and visible on the container
- The container is clearly marked with the words “Hazardous Waste"
- The employee designated as the emergency coordinator is responsible for coordinating all emergency response measures
- The name and telephone number of the emergency coordinator and the number of the fire department is posted next to the facility phone. Emergency response telephone numbers are posted throughout the site

7.3 Agency Notification

If a regulated hazardous waste or PCB waste is detected during a random load check or at the KLF Phase II, a written report will be sent to the DOH Solid and Hazardous Waste Branch within 24 hours, or the next working day. The report will include the following information:

- Date of detection
- Type and volume of waste
- Generator and transporter, if known
- Any environmental or safety issues or mitigation measures conducted
- Anticipated or final disposition of waste

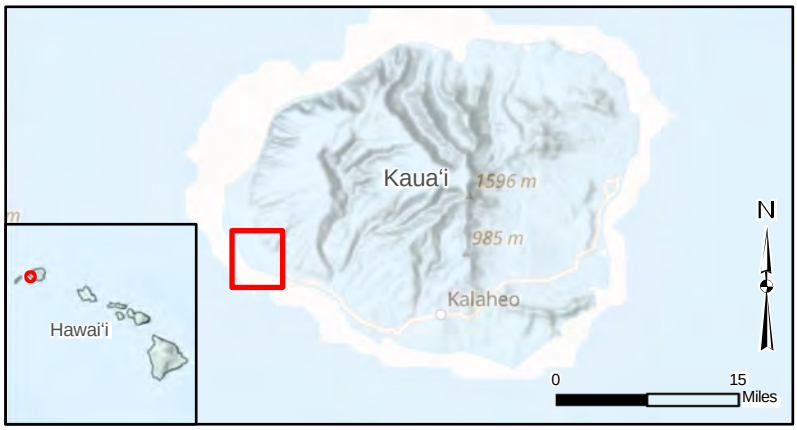
Following removal of regulated hazardous waste or PCB waste from the facility, a written notification will be submitted to DOH along with associated manifests within 7 days of removal of the waste from the facility.

8. RECORD KEEPING

The following records are maintained on site as part of the KLF Site Operating Record/Files that relate to the *KLF Waste Acceptance / Hazardous Waste Exclusion Program*:

- Records of employee training in the prevention, detection, and management of acceptable and unacceptable wastes, including hazardous waste and PCBs
- Records documenting results of random load checks and rejected loads
- Records of special waste approvals, special waste schedules, approvals with conditions, and rejections
- Records of hazardous and unacceptable wastes found at the facility where the generator is unknown and anticipated or final disposition of waste
- Agency correspondence and notifications

FIGURES



Site Location Map

Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

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Figure 1

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Site Entrance
Muster Point
Kaumualiʻi Hwy
Aquaculture Facility
@ MWII-7
Cell 1
Wet Well #3
Scale House
New Leachate Evaporation Pond
Wet Well #2
Material Drop-Off Facility
Maintenance Buildings
@ MWII-2
Flare Skid
Wet Well #1
@ MWII-5
PHASE II
Cell 2-B
Sump 2B
Office Building
MWII-4
Approximate Active Fill Area
MWII-6
Cell 2-A
Sump 2A
MWI-1
PHASE I
@ MWI-1A
MWI-2
@ MWI-3A
@ MWI-2A
MWI-3

Legend

- A Wet Well (Leachate Sump)
- A Groundwater Monitoring Well
- A Decommissioned Groundwater Monitoring Well
- Approximate Active Landfill Area
- Sump Location
- Phase Boundary
- Cell Boundary
- Roads
- Property Boundary

0 350 Feet

3

Site Layout

Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

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WG3074 | August 2022

Figure 2

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APPENDIX A

Asbestos Management and Disposal Plan

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ACRONYMS AND ABBREVIATIONS

%	percent
ACM	asbestos-containing materials
CAB	Clean Air Branch
CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawai‘i
DOT	United States Department of Transportation
EL	Excursion Limit
EPA	United States Environmental Protection Agency
GPS	global positioning system
HAR	Hawai‘i Administrative Rules
KLF	Kekaha Municipal Solid Waste Landfill
msl	mean sea level
MSW	municipal solid waste
NESHAP	National Emission Standard for Hazardous Air Pollutants
OSHA	Occupational Safety and Health Administration
PEL	Permissible exposure limit
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
WTA	time weighted average

1. INTRODUCTION

In accordance with the requirements of the Code of Federal Regulations (CFR) 1910.1001 *"Asbestos,"* 40 CFR Subpart M "National Emission Standard for Hazardous Air Pollutants (NESHAP [Asbestos])" 61.154 *"Standard for active waste disposal sites,"* and the Hawai'i Administrative Rules (HAR) Title 11, Chapters 501 through 504, the County of Kaua'i has implemented this *Asbestos Management And Disposal Plan* at the Kekaha Municipal Solid Waste Landfill (KLF) to provide site-specific guidelines for the safe management and disposal of asbestos-containing materials (ACM) and describe procedures utilized to minimize potential exposure to asbestos or ACM at the site.

2. DEFINITIONS

- **Asbestos** – There are two general forms of asbestos:

  1. ***"Friable asbestos materials"*** contain more than 1 percent (%) asbestos (as determined by 40 CFR 763), and when dry, can be crumbled, pulverized, or reduced to powder by hand.

     Dry, friable asbestos becomes an inhalation hazard when it is broken up or damaged because asbestos fibers are released into the air. Some examples of friable asbestos materials are sprayed-on acoustic ceiling material and ceiling tiles, pipe and duct insulation, insulating boards, and insulating textiles (Mesothelioma Hub, 2022; ODEC, 2021).

  2. ***"Non-friable asbestos-containing materials"*** contain more than 1% asbestos, (as determined by 40 CFR 763), and when dry, cannot be crumbled, pulverized, or reduced to powder by hand.

     Dry, non-friable asbestos materials are not likely to release asbestos fibers because the fibers have been bound in a tight matrix. Only sanding or cutting this type of material could release asbestos fibers. Materials such as floor tile, sheet vinyl flooring, roof felts, asphalt tiles, ceiling tiles, and caulking are considered non-friable forms of asbestos, unless they are or will be damaged during demolition or renovation activities (Mesothelioma Hub, 2022; ODEC, 2021).

- **Excursion Limit (EL)** – The 30-minute time weighted average (TWA) airborne concentration of asbestos (1 fiber per cubic centimeter) to which no employee shall be exposed.
- **Permissible exposure limit (PEL)** – The 8-hour TWA airborne concentration of asbestos (0.1 fiber per cubic centimeter) above which no employee shall be exposed.

3. KLF PERSONNEL AND TRAINING

It is the responsibility of all KLF personnel to follow the work practices/requirements of this Plan. KLF personnel involved with asbestos management and disposal operations and/or have waste screening responsibilities are trained prior to the work assignment and annually thereafter on the following topics:

- Health effects associated with asbestos exposure
- Relationship between smoking and exposure to asbestos, producing lung cancer and access to smoking cessation programs
- Quantity, location, manner of use, release, and storage of asbestos, and the specific nature of operations that could result in exposure to asbestos
- Engineering controls and work practices associated with the employee's job assignment
- Specific procedures implemented to protect employees from exposure to asbestos, such as appropriate work practices, emergency and clean-up procedures, and personal protective equipment (PPE) to be used
- Purpose, proper use, and limitations of respirators and protective clothing
- Purpose and description of the medical surveillance program
- Content of the Occupational Safety and Health Administration (OSHA) asbestos regulations, including the appendices
- Labeling and signage requirements

The following documentation is maintained for each KLF employee on-site, as part of the KLF Operating Record/Files:

- Medical and health surveillance records (retained for employees working history plus 30 years).
- Training records (retained for a minimum of one year after the end of employment.

4. HEALTH SURVEILLANCE

4.1 Exposure Monitoring

Past air monitoring activities at the KLF demonstrated that ACM disposal operations do not result in exposures to airborne concentrations of asbestos fibers at or above the PEL or EL (KLF operations personnel do not handle or offload ACM waste). Therefore, KLF personnel are not required to wear Level C PPE (air-purifying respiratory protection and disposable body covering). KLF personnel wear only standard, Level D safety apparel (hard hat, safety vest, steel toes, steel shank boots).

If necessary, the KLF will ensure that any potential employee exposure to ACM at or above the PEL will result in the initiation of a respiratory protection program in accordance with applicable regulations.

4.2 Medical Surveillance

The County of Kaua‘i institutes a medical surveillance program for KLF operations personnel, even though they are not exposed to asbestos above the PEL. This program consists of pre-employment, post-employment, and annual physical medical examinations. All exams and procedures are performed by or under the supervision of a licensed physician under the medical surveillance provisions of the applicable standard.

5. ACM DISPOSAL AREA

The perimeter of the KLF property is fenced to adequately deter non-authorized public access. Asbestos is disposed at the KLF by excavating a trench into existing waste. The active ACM disposal area is a controlled area and access is restricted to authorized personnel and approved customers. This area of the landfill is the only reasonably anticipated area of any exposure; however, since exposures have not been found to be at or above the PEL or EL, the area is not considered an OSHA-regulated area. In areas that may pose a potential for exposure to asbestos at or above the PEL or EL, OSHA-regulated areas shall be established.

When an asbestos load is scheduled for disposal at the KLF, the designated disposal area is prepared by KLF personnel, and temporary warning signs to identify and restrict access to the disposal location are clearly posted. In accordance with regulatory requirements, the temporary warning signs (20 inches x 14 inches, with a yellow background and black appropriately sized letters/fonts) display the following:

ASBESTOS WASTE DISPOSAL SITE
DO NOT CREATE DUST
BREATHING ASBESTOS DUST
IS HAZARDOUS TO YOUR HEALTH

KLF employees who work with or near ACM must wash prior to eating, drinking, smoking, or chewing tobacco or gum, and employees are not to engage in these activities in an area where asbestos waste is being disposed of.

6. PRE-DISPOSAL PROCEDURES

In accordance with the Special Waste Guidance Manual requirements for approvals and appointments, 40 CFR part 61 subpart M (NESHAP), 29 CFR 1910.1001 (OSHA), and 49 CFR 100-199 United States Department of Transportation (DOT), a *Generator’s Waste Profile Sheet*

and *Waste Manifest* (available on the County of Kaua'i website[1]) must be completed by the generator and submitted to the KLF for approval prior to transporting ACM to the site.

- At least 24-hours advance notice must be given by the generator/hauler before ACM can be delivered to the site. Coordination for ACM disposal is handled by the County of Kaua'i. ACM is accepted only on Tuesdays and Thursdays (2 loads per day on a first come, first served basis). The same contractor cannot occupy both slots on the same day.
- ACM pipe is not accepted.
- A certified/licensed asbestos contractor shall accompany the ACM delivery and shall remain on site until landfill management gives clearance for the unloaded ACM.
- Each incoming asbestos load must be accompanied by properly completed documentation. All asbestos waste loads are verified prior to disposal. The scale house attendant weighs all ACM loads and checks that the ACM is properly packaged and labeled. *All asbestos-containing waste is required to be contained in metal or plastic drums or barrels or be double-wrapped or double-bagged in six millimeter-thick (minimum) plastic or 55-gallon or smaller bags. The generator/hauler is responsible for providing proper packaging and labeling of the ACM. Certain ACM may necessitate the use of packaging alternatives that meet OSHA and NESHAP requirements. Void space within the packaging should be minimized to reduce the potential for puncturing the plastic and causing airborne emissions.*
- The scale house attendant will then check the quantity of the ACM designated on the waste shipping papers vs. the quantity received. Attempts will be made to reconcile quantity discrepancies, if any, with the generator, so that reportable discrepancies do not occur. Loads may be rejected if the manifests are not properly completed, or ACM are not properly prepared for disposal.
- The scale house attendant will direct the transporter to the landfill working face and notify KLF operators via two-way radio so that a disposal trench can be excavated (i.e., the designated disposal area).

Note: See attached *General Notice to All Contractors for Asbestos Disposal at the Kekaha Landfill* provided by the County of Kaua'i, Department of Public Works

7. ASBESTOS DISPOSAL PROCEDURES

KLF equipment operators oversee the unloading of ACM at the designated disposal area. All asbestos loads are visually inspected prior to being unloaded to ensure that all packaging and labeling requirements are met. Improper packaging includes torn bags, broken or unsealed containers, or any loose material visible in the load. If the asbestos load is not properly contained, it must be wetted prior to unloading to prevent any potential asbestos particulates from becoming

[1] https://www.kauai.gov/Landfill

airborne. If significant tearing of the plastic wrapping is noted, the customer may be required to re-wrap and properly seal the waste prior to unloading.

KLF personnel have the right to reject ACM loads that are improperly packaged and/or labeled.

Following the visual inspection, KLF personnel will determine the method by which ACM will be unloaded. The method used shall minimize the risk of rupture to containers or bags. The asbestos load will be placed in a trench, pit, or otherwise pre-prepared area at the designated disposal area. If possible, trenches will be cut perpendicular to the prevailing wind. Trenches should be cut in an area that is at least 100 feet away from other site activities. The trench should not be within 10 feet of the perimeter or the side slopes of any fill area, or within 10 feet of the base of any final cover.

The hauler is directed (by the operator or traffic controller) to dump their load directly into the trench/pit and reminded not to break the seal on any containers or rupture any bags.

Under no circumstances are KLF personnel allowed to handle or unload any ACM. UNLOADING is performed by the hauler.

There must be no visible asbestos emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited. The disposal trench is covered with 24 inches of MSW immediately after dumping and daily cover at the end of the day. To maintain the integrity of the double wrapping, asbestos waste is not directly compacted or otherwise disturbed by equipment after being unloaded.

The KLF utilizes the leachate collection lines as coordinates for the disposal of asbestos. In addition, a handheld global positioning system (GPS) is used to obtain X-Y coordinates (latitude-longitude) and elevations of ACM disposal locations. Records of these disposal locations will be preserved.

8. ASBESTOS EMERGENCY RESPONSE PROCEDURES

The emergency procedures listed below will be implemented if asbestos fibers become airborne (due to a rupture or breach in the integrity of a bag/container) above the PEL or EL in an uncontrolled manner.

KLF Operators Will Not Handle, Relocate, Or Repair Any Improperly Packaged ACM Containers

- All landfill operations will cease within 100 feet of the release until the area is remediated. If there is a tear in a bag or container at the designated disposal area, the equipment operator will immediately cover the material with at least 15 centimeters (6 inches) of compacted non-ACM (cover soil) or a minimum of 2 feet of MSW. The material may be remotely (50 to 100 feet and upwind from the release) wetted prior to covering.
- If there is a spill or release of friable asbestos outside of the designated disposal area, the following actions will be taken:

- Cease all disposal operations and evacuate all personnel/landfill customers to an upwind location
- Notify KLF management immediately
- Prevent and control access to the location of the release and downwind areas until clean-up is complete
- Quantify the release and identify potential receptors
- Contact local hazardous material emergency response company to complete appropriate response actions (i.e., air or waste sampling, designate safe zones, remediate the spill, and dispose of contaminated media). The spilled ACM shall be double-bagged/containerized and properly labeled and sealed. The bag will then be placed in an excavated disposal trench
- Ensure that the emergency response company cleans any KLF equipment that may have been contaminated by the release
- Notify agency(s) as required
  - The Reportable Quantity for asbestos = 1 pound (of actual asbestos, not just ACM). Call the National Response Center @ (800) 424-8802

Although an off-site abatement contractor would be called in to deal with an emergency, on-site personnel will be part of the initial response. In the event of a ruptured ACM bag, KLF personnel will take immediate action to contain the release and prevent unnecessary exposures. Any KLF personnel that enter the regulated area must wear a respirator, be medically qualified, and will have been properly trained (complete "first responder operations level" training [8 hours plus annual refresher]), and fit-tested.

9. REPORTING REQUIREMENTMENTS

The KLF maintains the following information for all ACM waste shipments received at the landfill.

1. Waste shipment records documenting:
   - The name, address, and telephone number of the generator
   - The name, address, and telephone number of the transporter(s)
   - The quantity of the asbestos-containing waste material in cubic yards. The scale at the KLF records asbestos loads in tons, and the tonnage is then converted into cubic yards
   - If a significant amount of improperly packaged ACM is brought to the landfill, written notification (and a copy of the waste shipment record) will be submitted to the State of Hawai‘i Department of Health (DOH) by the next working day
   - Disposal date

2. A copy of the signed waste shipment record is sent back to the generator as soon as possible and no longer than 30 days after receipt of the ACM.
3. Any discrepancies in the quantity of ACM received vs. the quantity designated on a waste shipment record will be reconciled with the generator. If the discrepancy is not resolved within 15 days after receiving the waste, written notification describing the issue and a copy of the waste shipment record will be submitted to the DOH immediately.
4. Copies of all required records and reports are maintained on site as part of the KLF's Operating Record/Files for at least 2 years. All ACM disposal location and quantity (cubic yards) records are maintained until closure.

10. ASBESTOS EXCAVATION

The DOH Clean Air Branch (CAB) and United States Environmental Protection Agency (EPA) will be notified, in writing, at least 45 days prior to excavating or disturbing any ACM that has been landfilled. The notification will include:

- Scheduled starting and completion dates
- Reason for disturbance of waste
- Procedures that will be used to control emissions during excavation, storage, transfer, and final disposal of the excavated ACM
- The temporary storage location of the ACM and its final disposition

If any changes are made to the scheduled start date or completion date, the KLF will re- notify the DOH CAB and EPA at least 10 days prior to the scheduled change.

11. REFERENCES

Mesothelioma Hub. 2022. What is Friable and Non-Friable Asbestos Material? 17 October.

Oregon Department of Environmental Quality (ODEQ). 2021. Fact Sheet – Asbestos Information – What contractors and business owners need to know before starting renovation or demolition. 16 August.

APPENDIX B

Refrigerant Management Plan

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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
CFCs	chlorofluorocarbons
DOH	Department of Health, State of Hawai‘i
HAR	Hawai‘i Administrative Rules
KLF	Kekaha Municipal Solid Waste Landfill
MDOF	material drop-off facility

1. OVERVIEW

Title VI (Stratospheric Ozone Protection) of the Clean Air Act (Public Law 101-549) Amendments of 1990 establishes regulatory and voluntary programs to monitor ozone depleting substances such as chlorofluorocarbons (CFCs). CFCs are used as refrigerant for air conditioners, freezers, and refrigeration equipment in buildings, homes, supermarkets, and automobiles. Sections within Title VI cover the production of ozone depleting chemicals; recycling and handling requirements; bans on intentional venting or releasing of CFCs; evaluation of substitutes; and public education programs.

2. PURPOSE

The United States Environmental Protection Agency (EPA) has numerous federal regulations about protecting the stratospheric ozone. These regulations include equipment certification, maintenance and service practices, refrigerant reclaiming requirements, training, and record keeping for the purchase, use, sale, transfer, and disposal of these substances.

This Refrigerant Management Plan has been prepared for the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II to ensure compliance with 40 Code of Federal Regulations (CFR) Part 82, Subpart B & F – *Management & Disposal of Freon (CFCs) Containing Appliances*.

3. FACILITY ACTIVITIES

The KLF Phase II does **not** accept items or appliances for disposal that contain refrigerants (i.e., refrigerators, air conditioners, or freezers). Residential users may drop of such items at a designated area within the KLF Phase II's Materials Drop-Off Facility (MDOF). These items are removed from the MDOF by a certified contractor working for the County of Kaua'i. They are transported off site to a scrap metal contractor, who properly removes the refrigerant and recycles the appliance.

KLF Phase II employees are trained to correctly handle refrigerant-containing appliances using the following procedures. All incoming waste is subject to ongoing visual screening, which begins at the scale house and includes random and select load checks. KLF Phase II operators monitor incoming waste loads as they are tipped at the landfill working face. If a residential hauler/customer brings refrigerant-containing appliances into the landfill, KLF Phase II personnel will direct the customer not to unload the items and refer them to the MDOF or scrap metal yard. If a commercial hauler/customer brings refrigerant-containing appliances into the landfill, KLF Phase II personnel will reject the item and instruct the hauler to take the item with them out of the facility to be disposed of by other approved means. Per EPA and State of Hawai'i Department of Health (DOH) requirements, commercial refrigerant-containing appliances must be properly emptied of refrigerants prior to being accepted by the scrap metal yard.

If refrigerant-containing items are discovered at the working face, and the hauler/landfill customer cannot be identified, KLF Phase II personnel will remove the items from the active disposal area.

They will transfer the items to the MDOF. The MDOF is away from normal traffic flow, which provides a safe storage environment.

4. REFRIGERANT REMOVAL

KLF Phase II personnel do not perform refrigerant removal procedures. Therefore, since items discovered at the working face may not have undergone refrigerant removal procedures, KLF Phase II employees are instructed to handle items as if they contain refrigerant. Items are handled with care to prevent damage to the refrigerant system.

Refrigerant-containing items are removed from the MDOF by a certified contractor working for the County of Kaua‘i. The items are transported off site to the scrap metal contractor, who properly removes the refrigerant and recycles the appliance.

When it is necessary to remove refrigerant at the landfill, a certified contractor is hired to perform the process. The contractor assumes all responsibility for the proper management of the refrigerant.

5. TRAINING & RECORD KEEPING

KLF Phase II operations personnel are trained in the proper management of refrigerant-containing appliances and are instructed to carefully remove these items from the landfill. Documentation of completed training sessions is maintained on site in the KLF Phase II Site Operating Record / Files.

Refrigerant-containing items recovered from the working face are inventoried on the *KLF Daily Operations Log*. No other documentation is required by this plan or EPA, unless the facility begins managing refrigerant recovery operations.

6. RELEASE REPORTING

In the case of a refrigerant release or spill occurs on site, the KLF Site Manager will record the incident in the *KLF Daily Log Book*. If appropriate, the KLF Site Manager to notify the DOH by phone or facsimile within 24 hours (8 hours if possible) after the release. Notification requirements for releases of refrigerants only apply to releases of quantity equal or exceeding the reportable quantity listed in HAR § 11-451[1].

A written or facsimile Incident Notification Report shall be submitted to the DOH within 3 days of the incident and include the following:

- Owner and operator information (name, address, and telephone number)
- Facility information at which the incident occurred (name, address, and telephone number)

[1] The primary source of reportable quantities for refrigerants is identified in 40 CFR Part 302, Table 302.4

- Date, time, and type of incident (i.e., fire, explosion, release, etc.)
- Name and quantity of material involved
- Extent of injuries, as applicable
- An assessment of the actual or potential hazards to human health or the environment, as applicable
- Estimated quantity and disposition of recovered and un-recovered material that resulted from the incident
- Evaluation of the circumstances that led to the incident
- Steps being taken to reduce, eliminate, and prevent recurrence, including an implementation schedule
- Other information or monitoring, as required by the DOH

APPENDIX C
Electronic Waste

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ACRONYMS AND ABBREVIATIONS

CESQG	conditionally exempt small quantity generators
CFR	Code of Federal Regulations
CRT	Cathode Ray Tube
DOH	Department of Health, State of Hawai‘i
e-waste	electronic waste
EPA	United States Environmental Protection Agency
HAR	Hawai‘i Administrative Rules
KLF	Kekaha Municipal Solid Waste Landfill
LCD	Liquid Crystal Display
MDOF	material drop-off facility
PCBs	polychlorinated biphenyls
TCLP	Toxicity Characteristic Leaching Procedure

1. HAZARDOUS WASTE EXCLUSION PLAN – ELECTRONIC WASTE

Federal and state laws prohibit hazardous waste disposal at solid waste landfills. To protect human health and the environment, the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II and County of Kaua‘i have developed and implemented a program to detect and prevent the disposal of these regulated hazardous wastes.

One of these programs is the KLF Phase II Hazardous Waste Exclusion Program. This program requires the generator of a commercial/industrial waste stream to properly characterize the waste and complete a special waste profile. Only waste characterized as non-hazardous is accepted for disposal. While this requirement also applies to electronic wastes (e-waste), the County of Kaua‘i is submitting an amended hazardous waste exclusion plan to further describe e-wastes. A summary of the changes is found below:

1.1 Electronic Wastes

E-waste is increasing in volume and contains substances such as lead, mercury, and polychlorinated biphenyls (PCBs) that can pollute air and water. Examples of e-water per the County of Kaua‘i website[1] include:

- Computer Systems and Accessories such as hard drives, laptops, keyboards, computer mice, wires and cables
- Audio and video equipment such as cameras, radios, and televisions
- Office equipment such as fax machines, printers, and telephones
- Handheld and household devices such as cell phones, cordless phones, and pagers

This list is not comprehensive, and there are other materials that would fall within the category of e-waste.

As stated in a June 9, 2006, letter from the State of Hawai‘i Department of Health to the City and County of Honolulu, recent studies have indicated that some e-waste have tested as hazardous, (“Based on studies conducted by the United States Environmental Protection Agency (EPA), CRTs [Cathode Ray Tubes] and LCDs [Liquid Crystal Displays] will fail the Toxicity Characteristic Leaching Procedure (TCLP) test for heavy metals such as lead, mercury, and cadmium”).

County of Kaua‘i encourages customers to donate working electronics to organizations in need. Recycling these devices is the best course of action whenever possible.

[1] https://www.kauai.gov/eWaste

1.2 Electronic Waste Disposal

Commercial/business generators of computer and television monitors are subject to hazardous waste laws and must determine whether items are hazardous waste using one of following methods:

- Determine whether the item is listed under Hawai‘i Administrative Rules (HAR) 11-261
- Test for hazardous waste constituents under the TCLP
- Use generator knowledge of the waste

Commercial/business shipments suspected of containing regulated hazardous e-waste will be prohibited unless TCLP data is submitted to support the non-hazardous classification made by the generator.

1.3 Household E-Waste Exemption

Used CRTs and LCDs generated by households are not considered hazardous waste and are not regulated under federal regulations. 40 CFR 261.4 (b)(1):

> (b) Solid wastes that are not hazardous wastes. The following solid wastes are not hazardous wastes:
>
> (1) Household waste, including household waste that has been collected, transported, stored, treated, disposed, recovered (e.g., refuse-derived fuel) or reused. ``Household waste" means any material (including garbage, trash, and sanitary wastes in septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas).
>
> *****Note (1) above applies only to residents of the facilities listed above and should not be construed to mean the commercial or government entities controlling the listed facilities.

CRTs and other e-wastes in non-bulk shipments from residential sources will be *accepted* for disposal. It will be assumed that these items are from households and, therefore, exempt from federal hazardous waste disposal restrictions. As such, the items will be accepted at the landfill as long as they are delivered in household quantities (one per household).

1.4 Conditionally Exempt Small Quantity Generators

Businesses and other organizations that discard less than 100 kilograms (approximately 220 pounds) per month of hazardous waste (including e-waste) are considered conditionally exempt small quantity generators (CESQG). CESQGs are not regulated under most federal requirements (See 40 CFR 261.5).

However, to apply this exemption, County of Kaua‘i and the KLF Phase II must rely on the generator to appropriately monitor and apply the correct generator status. Therefore, only e-waste shipments accompanied by a statement certifying the material was generated by a CESQG will be accepted. Copies of the statement will be maintained on site.

E-waste that has been properly tested and profiled may be accepted from commercial/industrial sources.

ATTACHMENT A

Conditionally Exempt Small Quantity Generator Certification

Kekaha Municipal Solid Waste Landfill

6900-D Kaumauli‘i Highway
Kekaha, Hawai‘i 96752

Conditionally Exempt Small Quantity Generator Certification

_____, certifies to any interested parties, that we are a Conditionally Exempt Small Quantity Generator (CESQG) based on conditions specified in 40 CFR 261.5, Resource Conservation and Recovery Act (RCRA). We certify that we:

- Generate no more than 100 kilograms (Kg) (220 pounds) in one calendar month, of RCRA-regulated hazardous waste in one calendar month
- Generate no more than 1 Kg (2.2 pounds) of acutely hazardous waste as per RCRA
- Did not exceed the storage limits of 1,000 Kg (2,200 pounds) of RCRA regulated hazardous waste at any one time

_____
Authorized Representative Signature

_____
Title

_____
Business/Organization

_____
Date

ATTACHMENT B

Generator's Waste Profile Sheet & Disposer's Indemnification Agreement

SPECIAL WASTE PROFILE KEKAHA MUNICIPAL SOLID WASTE (MSW) LANDFILL

Profile #

A. GENERATOR INFORMATION

1. Generator Name:
2. Site Address (Street, City, Zip):
3. Contact Name:
4. Email:
5. Phone: 7. Fax:
7. State ID:

B. BILLING INFORMATION

1. Bill To:
2. Billing Address (Street, State, Zip):
3. Contact Name:
4. Email:
5. Phone: 6. Fax:

C. WASTE INFORMATION

1. Waste Name:
   Process Generating Waste:
2. Waste Composition (Waste Type): % of Total
   1.
   2.
   3.
   4.
   Total (Must add to 100%):
3. Color:
4. Liquid/Solid:
5. Percent Liquid:
6. pH:
7. Odor:
8. Flash Point:

D. REGULATORY INFORMATION

1. EPA Hazardous Waste? ☐ YES ☐ NO
2. Is this Material non-hazardous due to treatment, delisting, or an exclusion? ☐ YES ☐ NO
3. CERCLA or State Regulated Cleanup? ☐ YES ☐ NO
4. Regulated Radioactive or NORM Waste? ☐ YES ☐ NO
5. Contains PCBs as defined in 40 CFR Part 761? ☐ YES ☐ NO
6. Regulated and/or Untreated Medical/Infectious Waste? ☐ YES ☐ NO
7. Contains Asbestos? ☐ YES ☐ NO
   Friable? ☐ YES ☐ NO
   Non-Friable? ☐ YES ☐ NO
   Non-Friable Regulated? ☐ YES ☐ NO

E. SHIPPING INFORMATION

1. One-Time Event? ☐ YES ☐ NO
2. Repeat Event? ☐ YES ☐ NO
3. Estimated Quantity:

F. REPRESENTATIVE SAMPLE INFORMATION

1. Analytical Attached? ☐ YES
2. Sample Date:
3. Sample ID Numbers:

G. INDEMNIFICATION

I hereby certify that I am an authorized employee or agent of the company and that I have confirmed with the company that the information contained herein is a true, complete and accurate description of the waste material being offered for disposal and that all relevant information necessary to properly characterize the materials and to identify known and suspected hazards has been provided. Additionally, I certify that all Analytical Results or Material Safety Data Sheets submitted are truthful and complete and are representative of the waste.

I further certify that by utilizing this profile, neither myself nor any other employee or agent of the company will deliver for disposal or attempt to deliver for disposal any waste which is classified as toxic waste, hazardous waste, infectious waste, or any other waste material this facility is prohibited from accepting by law. I shall immediately give written notice of any change or condition pertaining to the waste that was not provided herein prior to delivering the material to the facility. I certify that the company hereby agrees to fully indemnify this disposal facility and the County of Kaua'i against any damages resulting from this certification being inaccurate or untrue.

I understand that by attaching an electronic signature I am executing this document and consent to complete this transaction and receive all related communication electronically, and agree that this document will be binding as though I had physically signed it. A printout of this document may be accepted with the same authority as the original.

If a wet signature is preferred or required by your company, please submit the completed (unsigned) form(s) to your Special Waste Coordinator or Special Waste Sales Executive to initiate the signature process.

I further certify that no employee or agent of the company has altered the form or content of this profile sheet as provided by the County of Kaua'i.

NAME: _____

SIGNATURE: _____ **DATE:** _____

Email completed form to CPembrook@Geosyntec.com . Call (808) 337-1416 with questions

INSERT SHEETS HERE

ATTACHMENT C

Load Check Data Sheet

Geosyntec consultants

Inspection Type:

Date_____ Time_____

Random_____ Requested_____

Transporter Information:

Hauling Firm or Vehicle Owner_____

Telephone Number _____

Type Of Vehicle _____

License Plate No. / Truck No. _____

Driver's Name _____

Print Name _____

Signature _____

Origin of Load / Generator Information:

Industrial_____ Commercial_____

Source_____

Waste Description: _____

Action Taken (check one):

a) Load Accepted (No Hazardous/Unacceptable Waste)_____

b) Entire load rejected* _____

Why? _____

c) Partial load rejected* _____

Why? _____

*If load was rejected, who was notified (transporter, generator, KLF personnel?) _____

d) Household Hazardous Waste Collected_____

Describe: _____

Inspector: Print Name_____

Signature _____

Inspection Type:

Date_____ Time_____

Random_____ Requested_____

Transporter Information:

Hauling Firm or Vehicle Owner_____

Telephone Number _____

Type Of Vehicle _____

License Plate No. / Truck No. _____

Driver's Name _____

Print Name _____

Signature _____

Origin of Load / Generator Information:

Industrial_____ Commercial_____

Source_____

Waste Description: _____

Action Taken (check one):

a) Load Accepted (No Hazardous/Unacceptable Waste)_____

b) Entire load rejected* _____

Why? _____

c) Partial load rejected* _____

Why? _____

*If load was rejected, who was notified (transporter, generator, KLF personnel?) _____

d) Household Hazardous Waste Collected_____

Describe: _____

Inspector: Print Name_____

Signature _____

Geosyntec consultants

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SECTION I – PART C
SAFETY AND HEALTH

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua‘i

Prepared for

County of Kaua‘i
Department of Public Works
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ACRONYMS AND ABBREVIATIONS

KLF	Kekaha Municipal Solid Waste Landfill
SDS	Safety Data Sheets

INJURY AND ILLNESS PREVENTION PROGRAM

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kauaʻi

HAZARD COMMUNICATION

PURPOSE

Kekaha Municipal Solid Waste Landfill (KLF) employees at times may use certain materials requiring specific precautions. It is the policy of KLF to communicate any known hazards associated with these materials and to train our employees in safe handling techniques.

DEFINITIONS

Chemical – any element, chemical compound or, mixture of elements and/or compounds.

Chemical manufacture – an employer with a workplace where chemical(s) are produced for distribution or us.

Combustible liquid – any liquid having a flashpoint at or above 100 degree F (37.8 degree C), but below 200 degree F (93.3 degree C), except any mixture having components with flashpoints of 200 degree F (93.3 degree C), or higher, the total volume of which make up 99 percent or more the total volume of the mixture.

Common name- any designation or identification such as code name, code number, trade name, brand name, or generic name used to identify a chemical other than by its chemical name.

Container – any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical.

Explosive – a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Exposure or exposed – an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g., accidental or possible) exposure.

Flashpoint – the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested.

Health hazard – includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, neurotoxins, agents that act on the hematopoietic system, and agents that damage the lungs, skin, eyes, or mucous membranes.

Labels – any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

Physical hazard – a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Trade secret – any confidential formula, pattern, process, device, information, or compilation of information that is used in an employer's business and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it.

Unstable – a chemical which in pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure, or transfer.

Water-reactive – a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

Work area – a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

Workplace – an establishment, job site, or project, at one geographical location containing one or more work areas.

RESPONSIBILITIES

Management and supervisors must ensure that proper information is obtained and communicated to appropriate employees. Employees must follow the safe work practices outlined in training sessions, Safety Data Sheets (SDS), warning labels, and/or operating procedures.

The effectiveness and success of this program depend on the active support and involvement of all personnel.

SAFETY DATA SHEETS (SDS)

SDS contain information necessary to safely handle specific materials. It is important for KLF to obtain the SDS from suppliers concerning hazardous materials purchased. Workers are advised of the following information:

- Name, address, and telephone number of manufacturer, distributor, or importer
- Chemical name and/or common name of material
- Chemical analysis or formula
- Ingredients and hazards associated with chemicals used
- Physical data
- Fire and explosion hazard data
- Reactive data

- Health hazard data
- Spill leak and disposal data
- Special protection information
- Special precautions and comments
- SDS identification number

Vendors are required to provide SDS for all hazardous materials, including solvents, soaps, oils, maintenance supplies, lubricants, cleaners, compressed gases, welding and brazing wires and rods, fluxes, etc. These sheets should be sent to the KLF Site Manager. Records should be maintained of all verbal and written requests for SDS from suppliers of hazardous materials.

Records of verbal requests must include date of request, supplier's name, product for which the sheet is being requested, name of person from whom sheet is being requested, and name of the person making the request. Written requests can be kept in a separate file.

Master copies of the SDS binder will be maintained in the shop and in the landfill office.

STATE-SPECIFIC ITEMS

Each SDS will be maintained for at least 30 years.

Each SDS is available for review by any employee upon request. In addition, the Site Manager will screen each SDS received to ensure that the information listed above is included. If sheets are incomplete, the supplier will be notified and an updated and/or complete SDS will be requested. Records of these requests will be maintained also.

Generally, County of Kauaʻi does not become aware of new and significant health hazards associated with materials used at the KLF unless notified by the supplier or manufacturer. Upon receipt of an updated SDS, the Site Manager or a designated County employee will replace the outdated SDS with the updated version and inform employees of the changes.

LABELS AND OTHER FORMS OF WARNING

Labels and similar forms of warning list any hazards associated with containerized materials. Therefore, all hazardous materials will be placed in labeled containers. Labels must not be defaced or removed. Labeled containers must always be positioned with the labels clearly visible. If a container is without a label, it must be labeled immediately. Until the container is properly labeled, the materials will not be used. Labels are to include:

- A list of hazardous materials within the container
- Appropriate hazard warnings
- Name, address and phone number of the manufacturer, distributor, or importer

Labels are to be in English, with other languages optional. Labels will contain the material name. If the chemical name is used, the common name can be found by referring to the Workplace Chemical List.

Employees are trained not to rely solely on the information inscribed on a label, but also to read the SDS for additional information.

TRAINING AND LOCATION OF HAZARD DATA

A program has been established to ensure that all employees are trained prior to beginning work with hazardous materials. Procedures have also been established to train new hires and transferred employees. This training is to inform employees of any hazardous materials known to be present in the workplace.

- This written program and copies of the SDS forms covering hazardous materials in a specific work area are maintained by the County Environmental Professional and supervisors in appropriate places to permit ready access to employees, physicians, and employee representatives at all times. (A location within a locked office or filing cabinet and not readily accessible is unacceptable.)
- The Site Manager maintains the facilities Workplace Chemical List and a master copy of all the SDS forms. The SDS forms from this file are not to be removed from the facility. Employees may review this information at any time.
- Employee training includes, as a minimum:
  - A briefing on the OSHA Hazard Communication Standard concerning employee and County of Kaua‘i rights and responsibilities.
  - Identification of hazardous materials in the employee’s work area and potential dangers associated with them.
  - Location of the written program and SDS forms appropriate to the employee’s work area.
  - How to use an SDS (e.g., what information they contain, where to find the information, how to use it).
  - How to use labels and other forms of warning—what information they communicate, and how to use that information for protection.
  - Specific training appropriate to the employee.
  - Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.)
  - The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from

exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protection equipment (PPE) to be used.

- Employee's protection against discharge or other discrimination due to the employee's exercise of the rights afforded pursuant to the provisions of the Hazardous Substances Information and Training Act.
- Whenever KLF receives a new or revised SDS, such information will be provided on a timely basis not to exceed 30 days after receipt, if the new information indicates significantly increased risk to, or measures necessary to protect, employee health as compared to those stated on a SDS previously provided.

- Schedule
  - All new employees will be trained prior to working with hazardous materials.
  - All transferred employees will be trained prior to assignment in an area where hazardous materials are used.
  - All employees will be trained on the hazards of materials at the time they are introduced into their work area.
  - All employees, prior to being assigned to a non-routine task involving hazardous materials, will receive special training.
  - All employees will be retrained annually.
  - The Site Manager will schedule such annual training as a safety-meeting topic. Ongoing responsibility for training employees in the situations described above rests with the supervisor of the applicable work area.
- Documentation - All training is to be documented and the information kept at the KLF. Documentation will show the following:
  - Date of training session
  - Type of training given (brief description or outline)
  - Name and signature of employees receiving the training
  - Name(s) of instructor(s)

HAZARD DETERMINATION AND EVALUATION

KLF will accept the hazard determination and evaluation conducted by the supplier.

EMPLOYEE HAZARD COMMUNICATION REGARDING NON-ROUTINE TASKS

KLF RECOGNIZES THAT EMPLOYEES WILL BE REQUIRED TO PERFORM NON-ROUTINE TASKS (EMERGENCY REPAIRS AND/OR CLEAN-UP OF CHEMICAL SPILLS, ETC.), WHICH COULD EXPOSE THEM TO UNUSUAL RISKS FROM HAZARDOUS MATERIALS. THEREFORE, SPECIAL ATTENTION WILL BE GIVEN BY THE COUNTY OF KAUA'I

Manager and supervisors instruct employees on how to protect themselves in the performance of these tasks.

- Instructions by the supervisor take place immediately before the employee(s) perform(s) the non-routine task.
- Written records are kept by the supervisor showing:
  - Date
  - Non-routine task involved
  - Name(s) of employee(s) involved
  - Name of person doing the communication and training
- Employees are issued special protective equipment and instructions for its use in the performance of non-routine tasks.

INFORMING CONTRACTORS

- The following information will be communicated to all contractors:
  - Hazardous chemicals to which they may be exposed while on the job site.
  - Precautions the contractor's employees may take to lessen the possibility of exposure by usage of appropriate protective measures.
- It is the responsibility of the contractor to communicate this information to their employees and to sign and return the attached acknowledgment form.
- Contractors must provide a copy of each SDS for chemicals they bring to our site.

ACKNOWLEDGMENT OF CONTRACTOR RESPONSIBILITY FOR HAZARD COMMUNICATION

I, _____, representing the company named _____ do acknowledge receipt of the contractor portion of the KLF and Resource Recovery Facility Hazard Communication Program. I understand the responsibility of my Company under this program. I will ensure that the personnel of my company comply with all applicable provisions while at the KLF.

_____ _____

Signature *Date*

Work Area:_____ **Date Prepared:**_____/_____/_____

Name of Product/Material (label/SDS name, if different)	**Physical Hazards** F= Flammable C= Combustible R= Reactive NA= None Applicable	**Health Hazards** C= Cancer R= Reproductive Harm S= Skin Hazard T= Toxin (target organ)	**Special handling Precautions**

Employee Hazard Communication Regarding Non-Routine Tasks

Date	Non-routine task involved	Name(s) of employee(s) involved	Name of Supervisor conducting training

Program: Confined Space

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Emergency Action Plan

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Fire Prevention Plan

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Hearing Conservation Program

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Lockout/Tagout Program

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Personal Protective Equipment

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Respiratory Protection Program

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Welding, Cutting, Brazing, and Hot Work Guidelines

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Bloodborne Pathogens

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Program: Substance Abuse

Facility: Kekaha Municipal Solid Waste Landfill

Facility Location: 6900 D – Kaumualiʻi Highway, Kekaha 96752

Geosyntec consultants

engineers | scientists | innovators

SECTION I – PART D
EMERGENCY ACTION PLAN

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ACRONYMS AND ABBREVIATIONS

ADC	Agribusiness Development Corporation
DOH	Department of Health, State of Hawai‘i
EC	Emergency Coordinator
FEMA	Federal Emergency Management Agency
KLF	Kekaha Municipal Solid Waste Landfill
ft	feet or foot
HAR	Hawai‘i Administrative Rules
KAA	Kekaha Agriculture Association
KLF	Kekaha Municipal Solid Waste Landfill
mgd	million gallons per day
MSW	municipal solid waste
OSHA	Occupational Safety and Health Association
PMRF	Pacific Missile Range Facility
PPE	personal protective equipment
SPCC	Spill Prevention, Control, and Countermeasures
WMH	Waste Management of Hawai‘i, Inc.

1. INTRODUCTION

This Emergency Action Plan was prepared by County of Kaua‘i for the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II and contains procedures to be implemented in the event of an emergency at the KLF. All personnel on site at the KLF, including contractors and subcontractors, will be informed of the procedures and requirements of this Plan, as they relate to potential fire, explosion, health, safety, or other hazards.

If there are any questions regarding the procedures described in these plans, please contact KLF Management.

1.1 Emergency Response Personnel

In the event of an emergency, the Emergency Coordinator (EC) (i.e., Site Manager) has primary responsibility for responding to, correcting, documenting, and reporting emergencies. This includes responding appropriately to ensure the safety of KLF personnel and the public. Possible actions may involve evacuation from the site or evacuation of adjacent residents.

Section 2.0 contains a list of emergency response telephone numbers, including the key KLF personnel. This list is posted in the main administration office, in the scale house, and in the maintenance shop. The first person on the scene will follow the normal procedures for emergency response, as outlined in this Plan, until the designated EC (or alternate) arrives at the scene. All EC's will be properly trained in this procedure.

1.2 Release of Information to the Public / Media

Inquiries from the media are likely in the event of an emergency. The County of Kaua‘i Public Information Officer or other designated spokesperson will coordinate all media relations and responses to any media request. Any release of information to the public shall be channeled through the County’s Public Information Officer (808) 241-4903). If approached or contacted by the press, unauthorized personnel should not answer any questions or make any statement to the media. The primary contacts at the County of Kaua‘i are as follows:

- Environmental Services Manager: (808) 241-4837
- Solid Waste Program Development Coordinator: (808) 241-4195
- County Engineer: (808) 241-4993

1.3 Site Maps

A KLF site location map (Figure 1), site evacuation route map (Figure 2), and building evacuation route map (Figure 3) are attached to this Plan. These figures detail exits, evacuation routes, locations of fire extinguishers, fire alarms, first aid kits, emergency shower, emergency shutoffs, and the designated KLF evacuation area, which is currently in front of the main gate facing Kaumuali‘i Highway (see Figure 2).

1.4 Alternate Waste Disposal Plan

In the event the liner associated with any landfill cell is damaged, the alternate waste disposal plan is to seek authorization to temporarily place municipal solid waste (MSW) in other areas of the landfill that will have minimal impact on the damaged portion of the landfill.

2. EMERGENCY RESPONSE AGENCIES / TELEPHONE NUMBERS:

AMBULANCE **911**

FIRE DEPARTMENT **911**

POLICE DEPARTMENT **911**

HOSPITAL: Kaua‘i Veterans Memorial Hospital
4643 Waimea Canyon Dr.
Waimea, Hawai‘i 96796
Telephone: (808) 338-9431

A map and driving directions to Kaua‘i Veterans Memorial Hospital are included in Figure 4.

KLF KEY PERSONNEL:

PRIMARY EMERGENCY COORDINATOR (EC):

John Ruiz (KLF Site Manager):
Office: (808) 337-1416
Mobile: (808) 645-1290

ALTERNATE ECS:

OTHER AGENCIES, UTILITIES, AND RESPONSE SUPPORT PROVIDERS:

County of Kaua‘i Environmental Services Manager:	(808) 241-4837
Kaua‘i Emergency Management Agency:	(808) 241-1800
Kaua‘i Police Department	(808) 241-1711
American Red Cross, Kaua‘i County:	(808) 245-4919
National Response Center:	(800) 424-8802
Poison Center:	(800) 222-1222
Hawai‘i Gas Company (Kaua‘i) – 24-hour emergency hotline:	(808) 526-0066
Kaua‘i Island Utility Cooperative:	(808) 246-4300
Kekaha Agriculture Association:	(808) 337-9262
Kaua‘i County Department of Water:	(808) 245-5400
Department of Water After Hours, call Police Department:	(808) 241-1711
U.S. EPA Region 9:	(415) 947-8000
S. EPA Region 9 – Pacific Islands Office:	(808) 541-2710
FBI Honolulu:	(808) 566-4300
National Spill Response Center:	(800) 424-8802

State of Hawai‘i -

Clean Air Branch:	(808) 586-4200
Clean Water Branch:	(808) 586-4309
Solid & Hazardous Waste Branch:	(808) 586-4226
Hazard Evaluation & Emergency Response:	(808) 586-4249
After hours:	(808) 236-8200

3. EMERGENCY PROCEDURES

Listed below are specific types of emergencies and detailed procedures to be followed by site personnel in the event of an emergency. After an emergency, waste disposal will resume at the KLF only after key County of Kaua‘i personnel or Site Manager have deemed the situation safe.

Following emergencies with the potential to affect landfill integrity (including, but not limited to, earthquakes, severs storms, hurricanes, tsunamis), KLF personnel shall inspect the landfill and associated systems (including the liner system, leachate collection system, surface water management system, and any other affected portions of the landfill) to identify if any damage was sustained. If necessary, waste acceptance will be suspended to address the damage to prevent any threat to human health or the environment if waste acceptance was continued. In the case that waste acceptance was suspended at the facility and after corrective actions have been implemented, a written evaluation will be prepared by a licensed engineer in the state of Hawai‘i and the KLF Site Manager, certifying that the landfill and associated controls are adequate, or better than required, and that resumption of waste acceptance would not cause any violations of applicable federal, state, or local environmental regulations. The evaluation will summarize the damages and corrective actions taken to address those issues. The KLF submit the evaluation to Department of Health, State of Hawai‘i (DOH) and will resume waste acceptance following approval by DOH.

The County of Kaua‘i will ensure that human health and the environment are protected prior to restoring disposal services/operations in the aftermath of an emergency or disaster.

3.1 Evacuation Procedure

All personnel on site will be notified of the evacuation via telephones, cellular phones, and/or hand-held two-way radios. If radios/phones are not operational, KLF personnel will be alerted verbally by the EC and/or EC alternates.

Evacuating Buildings:

- Walk; do not run to the nearest exit. Personnel and visitors will be directed to immediately reconvene at the KLF evacuation area (via the safest route), which is located **IN FRONT OF THE MAIN GATE FACING KAUMUALI‘I HIGHWAY** (see Figure 2).
- When the evacuation is ordered, the Operations Specialist will bring the contractor sign-in log to the evacuation point (located in the office reception area, on the counter in front of the Operations Specialist). This is to identify any visitors present on site.
- EC or EC alternates will be responsible for checking the facilities to ensure that everyone leaves the buildings.
- If outside emergency support is required, call 911 and report the emergency. Inform the 911 operator that there is an emergency and give the following information:
  - Caller’s name and location
  - Type of emergency
  - Type of emergency aid required

- Answer any questions that the emergency operator asks. Stay on the phone with the operator until told to hang up.

Evacuating the Landfill:

- Administration personnel will contact any contractors or consultants working on site via cellular phones, hand-held two-way radios, and/or verbally to give the order to evacuate.
- Key KLF personnel or Site Supervisor will coordinate movement of landfill customers/waste haulers from the disposal area onto the main haul road. Construction personnel will do the same. All persons will then proceed to the designated evacuation area located **IN FRONT OF THE MAIN GATE FACING KAUMUALI'I HIGHWAY** (see Figure 2).

The EC (or Alternate EC) responsibilities:

- Coordinating evacuation of the KLF, including notification of adjacent property owners/tenants, as required
- Coordinating with incoming emergency response personnel
- Conducting a head count at the designated assembly area/evacuation point
- Notifying incoming drivers/haulers via hand-held two-way radios or cellular phone to avoid the site
- Notifying KLF/County of Kaua'i Management of the emergency
- Notifying the County of Kaua'i, Solid Waste Division of the emergency
- Notifying County of Kaua'i Safety personnel of the emergency (if appropriate) – determine if a 24-Hour Report[1] is required
- Determining when the "all clear" signal can be given to return to the site

3.2 Fire Procedure

Procedures outlined below will be followed for emergencies involving fire, including structure or large surface fires, buffer zone fires, incoming waste load fires, vehicle/equipment fires, and subsurface fires. A 4,000-gallon water truck, loader, and bulldozer are available 24 hours a day to aid in firefighting. Fire extinguishers are provided in all buildings and site vehicles for use in extinguishing small fires. See Appendix A for additional information on the KLF Fire Prevention Plan.

[1] A 24-Hour Report is a time log which documents key events, decisions, communications regarding the emergency event.

3.2.1 Structure Fire Or Surface Fire

The EC will notify all personnel on site at the KLF of the fire via oral information and/or hand-held two-way radios. If possible, cellular phone communication will be established. In the event of a large structure fire or surface fire:

1. Assess the fire - Identify its location, source, and size.
2. If the fire is small (less than one cubic yard), can be approached safely with an evacuation route, and available personnel are trained in the appropriate use of fire equipment, an attempt can be made to put it out with a fire extinguisher. Do not attempt to fight the fire alone.
3. If the fire is large, evacuate the building immediately and proceed to the designated evacuation area. Avoid entering a burning structure for any reason.
4. Call 911 to report the fire. Inform the 911 operator that there is a fire emergency and give the following information:
   - Caller's name and location
   - Location of the fire
   - Materials involved, if known
   - Whether medical aid is required
5. Limit access to area and isolate electrical power at main breaker.
6. Remove vehicles from the area if time allows and does not present a risk to personnel.
7. Remove fuel sources (i.e., flammables from shop) if time allows and does not present a risk to personnel.
8. Upon arrival of the local Fire Department personnel, direct them to the location of the fire and provide assistance as appropriate.

3.2.2 Buffer Zone or Brush Fire

If a brush fire/buffer zone fire exists in the area surrounding the landfill, maximum effort will be made to prevent the fire from reaching refuse fill areas by utilizing on-site assets (i.e., fire extinguishers, 4,000-gallon water truck, loader, bulldozer). In the event of a brush fire/buffer zone:

1. Maintain existing firebreaks between MSW fill areas and surrounding vegetation. Roads are maintained on the landfill perimeters, which also serve as a firebreak.
2. Excavate additional firebreaks between the landfill and the oncoming fire. Excavated soils will be bermed on the fireside of the firebreak for additional protection.
3. Water down areas between the firebreak and the disposal area using the on-site water truck.
4. If the fire threatens the landfill, daily cover will be put on the active face and it will be wetted down to prevent a landfill fire caused from flying cinders.

5. Equipment and fuel sources will be moved to safe locations as practicable.
6. Unnecessary personnel will be evacuated from the site/area.
7. If unable to extinguish the fire, follow the procedures for calling 911 as detailed in Section 3.2.1 above, and summon the help of the local fire department.

3.2.3 Incoming Waste Load/Disposal Area Fires

Scale house attendants and KLF operations personnel are trained and directed to notice any smoke, steam, heat, or burning material in incoming waste loads and prevent it from contacting combustible materials or being buried at the working face before all combustion is extinguished. If there is a fire in an incoming waste load or if a fire occurs at the disposal area:

1. Determine the source of the fire.
2. If the fire is small, put out with a fire extinguisher.
3. Cut the fire out of the active face with a dozer (excavate) and move (separate) burning waste from the disposal area to the table. Isolate the fire before it spreads.
4. Smother the fire by covering it with soil. The faster that soil can be placed over the fire, the more effective this method will be in controlling and extinguishing the fire.
5. If necessary, apply water from the on-site water truck to soak the fire.
6. Spread the waste to ensure that the fire is out and does not re-flash.
7. If unable to extinguish the fire, follow the procedures for calling 911 as detailed in Section 3.2.1 above and summon the help of the local fire department.

3.2.4 Vehicle or Equipment Fire

To avoid equipment fires, do not operate equipment with trash, paper, or other objects in or near the engine compartment. Always stay alert – watch for hot spots in the equipment, blistering paint, or other signs of a fire (smoke or the smell of smoke). If detected, contact KLF Management or other operations personnel via two-way radio immediately.

In the event of a vehicle or equipment fire, the operator will:

1. Bring the vehicle or equipment to a safe stop. If safe to do so, the vehicle/equipment should be parked away from fuel supplies, uncovered solid wastes, or other machinery.
2. Immediately (or as soon as possible), shut off the engine and engage the brake to prevent movement of the vehicle/equipment.
3. Get out of the equipment.
4. Alert KLF Management/personnel via two-way radio immediately.
5. Attempt to control the fire using fire extinguishers or an on-site water truck (depending on the size of the fire).

6. If unable to control the fire, follow the procedures for calling 911 as detailed in Section 3.2.1 above, and summon the help of the local fire department.

In the event of any of the above-mentioned fires, the EC will:

- Assess the situation and possible hazards that may result
- Order evacuations, medical care, shutdowns, etc. (as necessary)
- Notify adjacent property owners/tenants (as necessary)
- Coordinate with incoming emergency response personnel
- Conduct a head count at the designated evacuation point
- Notify incoming drivers/haulers via two-way radio or cellular phone to avoid the site
- Notify KLF/County of Kauaʻi Management of the emergency
- Notify the County of Kauaʻi, Solid Waste Division of the emergency
- Notify County of Kauaʻi Safety personnel of the emergency (if appropriate) - determine if a 24- Hour Report is required
- Determine when the "all clear" signal can be given to return to the site

3.2.5 Landfill Subsurface Fire

There are two primary causes of subsurface fires at landfills:

1. When smoldering waste is buried at the working face. Typically, this occurs at relatively shallow depths and is detected by surface expression such as visible smoke or depressions forming in recently placed waste.
2. When excess oxygen is allowed to enter the waste mass. This may occur at any depth depending on the oxygen source. At relatively shallow depths, visible smoke and surface depressions are likely. If the fire is deep, it is more likely to burn slowly without visible flame or large quantities of smoke and is characterized by rapid oxidation of an organic waste. Underground combustion/oxidation may go undetected until a sinkhole or smoke appears.

The methods used to extinguish the near surface fire may include:

- Cutting off the oxygen supply by smothering with fine-grained soil and/or the use of plastic membranes; or
- Physically putting the fire out, which involves excavating down to the fire, removing and extinguishing burning material, confirming that all burning material is extinguished, and placing waste back into the excavation area. *This procedure should only be done under supervision of personnel experienced with extinguishing landfill fires.*

The primary method used to extinguish subsurface combustion within the landfill is to smother the smoldering area. However, if a subsurface fire is suspected, the appropriate County of Kaua‘i engineer will be contacted and the fire will be dealt with using appropriate and industry-accepted measures.

If a landfill subsurface fire is suspected at the KLF, the Site Manager will be notified,

Criteria For Internal & DOH notification:

- The presence of smoke coming from the landfill (requires immediate notification).
- The presence of visible fire (requires immediate notification).
- Sudden subsidence, typically less than 25 ft across, particularly in areas recently filled. Irregular subsidence due to factors other than fires is common at landfills

When there is any doubt regarding why an area has subsided, the appropriate County of Kaua‘i Engineering and Environmental Protection Manager will be consulted to determine whether the presence of a fire is likely.

Once a subsurface fire has been verified, the DOH shall be notified orally within 24 hours and a detailed plan outlining steps to control the fire shall be provided, in writing, within 7 days.

The response required will be determined by the location of the fire. No personnel shall be permitted within the area until it is confirmed that the fire is extinguished, and the area is determined to be safe. However, if a subsurface fire is suspected, the appropriate County of Kaua‘i engineer will be contacted and the fire will be dealt with using appropriate and industry-accepted measures.

3.3 Medical Emergency Procedure

3.3.1 Injury Accident Response Procedures

If an accident occurs, KLF Management will be notified immediately. First aid kits are maintained in the office, the break room, and in the KLF vehicles (see Figure 3). If the KLF employee responding to the injured person is properly certified, they may begin first aid (e.g., stop bleeding, begin CPR, etc.). The victim is not to be moved unless necessary to prevent further injury. If the nature of an injury requires additional treatment, the local emergency response provider is to be notified by dialing 911. The person making the call should inform the operator of the following:

- The nature and location of the emergency
- What first aid measures have been initiated
- The need for any special equipment (i.e., hazardous materials response, confined space rescue, or vehicle extrication)

Persons with major injuries should never be moved without professional assistance. Major injuries include second or third-degree burns, unconsciousness, severe bleeding, broken limbs, and any head, back, or neck injury.

Records of all site accidents and first aid treatments will be maintained at the KLF office. Accident reports will be filed with insurance companies and state agencies as required.

After the situation has stabilized, KLF Management will arrange for investigation of the cause of the accident. A complete investigation report should be completed within seven days of the incident. The report should include a review of the actions leading up to the incident, factors that contributed to or mitigated the severity of the incident, and recommendations to prevent reoccurrence.

The EC will be responsible for:

- Coordinating with incoming emergency response personnel
- Notifying KLF/County of Kauaʻi Management of the emergency
- Notify the County of Kauaʻi, Solid Waste Division of the emergency
- Notifying County of Kauaʻi Safety personnel of the emergency (if appropriate) - determine if a 24-Hour Report is required
- Notifying the Occupational Safety and Health Association (OSHA) or other regulatory agency, if required

3.4 Spill/Release Response Procedure

In the event of a spill/release, immediately alert all personnel in the area and notify the EC and/or KLF Management. If necessary, secure the facility and evacuate to an upwind area or designated evacuation point. The KLF has a low potential for spills of hazardous materials, but incidents are possible in the event of vehicle accidents or malfunctions that could cause spills of coolant, fuel, or lubricants.

3.4.1 Minor Spill

A release is considered “minor” if it extends outside the secondary containment provisions and the spill/release is limited to the immediate area with no potential for it to enter into the existing drainage facilities or for it to present an immediate fire hazard or exposure danger.

In the event of a minor spill/release, KLF personnel will:

1. Secure the area to protect all personnel and public from any immediate danger.
2. Extinguish any sources of ignition. Vehicles should be turned off. Avoid sparks, movement, or any activity that may create static electricity.

3. Ensure that no danger to human health exists and then stop the flow at the source only if it is safe to do so (e.g., shut off power, turn off valves, and plug leaks). No site personnel shall come into contact with unknown or hazardous substances that have been brought into the facility.
4. If it is safe to do so and available personnel are trained in the proper use of required personal protective equipment (PPE), contain the spill with soil berms, equipment from the spill kit (i.e., absorbent pads, particulate sorbent, shovels, hand tools, etc.) and/or block off drains downstream. Used sorbent pads will be collected in a drum for proper disposal.

3.4.2 Major Spill/Hazardous Materials Spill

KLF personnel are not trained as first responders in the event of a major spill/release. A spill/release is considered "major" if it extends outside the secondary containment provisions and the spill has traveled beyond the immediate area, if the spill/release has entered the existing drainage facilities, or if the spill is of hazardous materials at or above reportable limits, as defined by HAR § 11-451.

In the event of a major spill/release of petroleum products, KLF personnel will:

1. Secure the area to protect all employees and public from any immediate danger.
2. Extinguish any sources of ignition. Vehicles should be turned off. Avoid sparks, movement, or any activity that may create static electricity.
3. Ensure that no danger to human health exists and then stop the flow at the source only if it is safe to do so (e.g., shut off power, turn off valves, and plug leaks).
4. Call 911 to alert the fire department or qualified emergency response contractor and give the following information:
    - Caller's name and location
    - Location of the spill/release
    - If known, materials and volumes involved
    - Whether medical aid is required
    - Whether fire hazard exists

The EC will be responsible for the following:

- Coordinating with incoming emergency response personnel
- Notifying KLF/County of Kauaʻi Management of the emergency
- Notifying the County of Kauaʻi, Solid Waste Division of the emergency
- Notifying County of Kauaʻi Safety personnel of the emergency (if appropriate) - determine if a 24-Hour Report is required

- Notify the KLF Site Manager who will then report the incident to the proper regulatory agencies and arrange for the proper disposal of any waste materials (if necessary). The waste material from the cleanup will be characterized, transported, and disposed of according to state and federal Regulations. Refer to the KLF Spill Prevention, Control, and Countermeasures (SPCC) Plan (Section IV of the Operations Plan) for more information regarding spills and spill response.

3.5 Earthquake

A "significant earthquake" is defined here as one that produces any sign of damage to on-site structures, including but not limited to, overturned furniture, wall cracks, or structural shifts.

During a significant earthquake:

- Remain calm
- Immediately cease or limit landfilling operations
- If indoors, stay there. Objects that fall due to the shaking generally cause hazards and injuries. Move quickly away from windows, shelves, cabinets, and glass partitions. Get under a desk or table, or sit in an interior doorway or corner. Do not leave the building unless the building is unsafe
- If outdoors, get to an open area away from structures, power lines, and trees
- If driving, pull over to the side of the road and stop. Avoid overpasses and power lines. Stay inside vehicle until shaking has stopped
- If in a crowded public place, do not rush for the doors. Crouch and cover head with hands and arms

After the significant earthquake:

- Unless there is an immediate life-threatening emergency, do not attempt to use the telephone.
- Promptly (when it is safe to do so) conduct a visual survey of the site to identify any slope failures, downed power lines, gas and water leaks, broken electrical wiring or sewage lines fires, tank leaks/spills, or other conditions that could threaten worker or public safety.
    - If there is damage, turn the utility off at the source and immediately report damage to the utility company
    - Warn others to stay away
    - If a fire occurs, follow the procedures set forth in Section 3.2
    - If injuries occur, follow the procedures set forth in Section 3.3

  - In the event of inoperable telephone systems, notification of the appropriate agencies/businesses will be accomplished in the most expedient manner available (two-way radios, cellular phones, person to person, overnight mail, etc.)
- Check buildings for cracks and damage including the roof and foundation
- Turn on portable radio for instructions and news reports. Cooperate fully with public safety officials and instructions
- Do not use vehicles unless there is an emergency. Keep the streets clear for emergency vehicles
- Be prepared for aftershocks
- Remain calm and lend a hand to others
- If the site is evacuated, leave a message telling others where personnel can be found

The EC will be responsible for the following:

1. Coordinating evacuation of the KLF including notification of adjacent property owners/tenants, as required.
2. Coordinating with incoming emergency response personnel.
3. Conducting a head count at the designated evacuation point.
4. Notify incoming drivers/haulers via two-way radio or cellular phone to avoid the site.
5. Notify KLF/County of Kauaʻi Management of the emergency.
6. Notify the County of Kauaʻi, Solid Waste Division of the emergency.
7. Notifying County of Kauaʻi Safety personnel of the emergency (if appropriate) - determine if a 24-Hour Report is required.
8. Determining when the "all clear" signal can be given to return to the site.
9. Notify the KLF Site Manager who will fill out Post-Earthquake Forms (Appendix B) and report the incident to the proper regulatory agencies (if necessary).

3.6 Severe Storm Response Procedures

The KLF is not located within a 100-year floodplain area, as delineated by the Federal Emergency Management Agency (FEMA) of the Federal Insurance Administration *(Floodplains).* The following measures will be taken to protect against excessive erosion, flooding, and wind damage before and during severe storms. Severe storms are defined either as 2-year storm event or greater, 24-hour storm or greater, or continued rainy conditions over a duration of 14-days or greater.

Prior to a forecasted severe storm:

1. KLF personnel will inspect all drainage on-site structures to verify that they are in working order.

2. Diversion berms will be constructed around the current disposal area as needed to prevent run-on from entering the waste fill, and to prevent runoff from the waste fill areas of the site.
3. Interim cover will be placed over exposed waste at the end of the working day prior to the forecasted beginning of a severe storm.

At the discretion of KLF/County of Kaua‘i Management, the site may be closed for business during storm periods. In this event, the working face will be closed and covered with interim cover and graded to direct run-off to the drainage features.

The KLF Site Manager conducts monthly inspections, which include checking and monitoring the integrity of the site’s drainage systems. A Severe Storm Inspection (Post-Hurricane/Severe Storm Forms [Appendix B]) will be conducted, if necessary, during any prolonged storm event to correct or repair any conditions that have damaged or that may cause damage to on-site or off-site facilities.

3.7 Hurricanes

Hurricane season occurs from June through November in the northern hemisphere. Typically, the National Weather Service provides 24 to 48-hour warnings before a hurricane is likely to approach. There are two types of warnings – a “Hurricane Watch” is a notice that is given when hurricane conditions threaten within 48 hours; a “Hurricane Warning” is a notice that is given when hurricane conditions are expected within 36 hours or less. Typically, waste management facilities support cleanup efforts by providing disposal capacity for debris and other solid wastes generated by the hurricane. Demands on solid waste management facilities are highest immediately following the hurricane and through the early phase of recovery. Local authorities and emergency coordinators rely on waste management facilities to provide capabilities and capacities for waste management so a prioritized and coordinated cleanup can begin as quickly as possible. Hurricanes and storms may generate contaminated debris or other atypical wastes that require special handling, processing, or disposal procedures that are not addressed by the facility permit and require special approval for disposal from the DOH.

Once a “Hurricane Watch” is issued and the potential effects of a hurricane are verified by local authorities (i.e., severe flooding, storm surge, high winds, etc.), KLF Management will consider acquiring the following supplies and materials to ensure adequate equipment to handle the increase in waste and ensure airspace availability following a hurricane:

- Fuel
- Additional Soil Cover or alternate material
- Vehicles and Heavy Equipment
- Grinders/Chippers
- Auxiliary Lighting

- Pumps
- Generators
- Fire Suppressant Equipment
- Rain Gear
- PPE

In the event of a hurricane-making landfall on the island of Kaua‘i, KLF personnel will perform the following as preparation:

- Conduct a briefing to entire staff on the status of conditions and severity of the hurricane and how it may impact the facility and service area/region. Discuss emergency operating procedures for facility.
- Power outages should be anticipated and procedures will be employed (when the KLF re-opens to accept waste) as needed to manually track the date the waste was received, the quantity by weight or volume, and the origin of the waste.
- Inspect all on-site drainage structures to verify that they are in working order.
- Diversion berms will be constructed around the current disposal area as needed to prevent run-on from entering the waste fill, and to prevent runoff from the waste fill areas of the site.
- Interim cover will be placed over exposed waste at the end of the working day.

Once a “Hurricane Warning” is issued the EC will track the hurricane front (via radio, television, internet, etc.) and implement the following procedures to properly shut down all operations at the KLF:

- If possible, all electrical lines, breakers, and gas valves should be shut down to prevent any potential fires. Unplug all appliances.
- Secure facility property, structures, landfill equipment, and office (preserve records and data [electronic and hard copies]) in case of flooding or power failure. Anything that is not secured may become a damaging projectile in the event of high winds. Cover all windows with wood panels (if possible).
- Check batteries and stock up on first aid supplies and drinking water.
- Gas up vehicles, generators, and emergency tanks.
- KLF Management will require that site personnel return to their homes. If on site, evacuate to the main office building and stay there (shelter in place) and stay away from windows.

After the Hurricane:

1. KLF/County of Kauaʻi Management will promptly (when it is safe to do so) conduct a visual survey and damage assessment of the site to identify any compromised building structures, slope failures, downed power lines, and water leaks, broken electrical wiring, fires, tank leaks/spills, or other conditions that could threaten worker or public safety.
    - If fires have occurred, follow the procedures set forth in Section 3.2.
    - If injuries have occurred, follow the procedures set forth in Section 3.3.
2. Turn on portable radio for instructions and news reports. Cooperate fully with public safety officials and instructions.
3. Do not use vehicles unless there is an emergency. Keep the streets clear for emergency vehicles.
4. Remain calm and lend a hand to others.
5. If the site is evacuated, leave a message telling others where personnel can be found.

The EC will be responsible for:

- Ensuring that KLF safety programs are fully implemented
- Coordinating evacuation of the KLF, including notification of adjacent property owners/tenants, as required
- Communicating with the County of Kauaʻi and the State of Hawaiʻi, as well as local authorities and emergency response personnel to inform them
- When the KLF becomes operational after the storm
- The situation at the KLF, such as waste storage capacity, transportation coordination, site conditions, personnel status, etc.
- In the event of inoperable telephone systems, notification of the appropriate agencies/businesses will be accomplished in the most expedient manner available (cellular phones, person to person, overnight mail, etc.)
- Notifying incoming drivers/haulers via radio or cell phone to avoid the site
- Notifying County of Kauaʻi Safety personnel of the emergency - determine whether a 24-Hour Report is required
- Conducting a Post-Hurricane Inspection (Post-Hurricane/Severe Storm Forms [Appendix B])

Hurricanes leave behind debris made up of construction materials, damaged buildings, sediments, green waste, and personal property. Hurricane debris obstructs roads and disables electrical power and communication systems over wide areas. The goals of post-hurricane efforts will be to increase

debris diversion rates, minimize environmental impacts, reduce waste management costs, minimize threats to health and safety, and shorten the duration of the cleanup effort.

3.8 Bomb Threat (Phone Call)

The most basic preventative measures are properly securing the site so that an explosive device cannot be easily placed without detection.

A higher probability of bomb threats due to a history of past threats, a neighborhood or community trend, or a situation involving a particularly vengeful individual may warrant more extensive measures such as more stringent security, training programs, package instructions, more involved search and evacuation procedures, and recorders on appropriate telephones. Such a high probability will also warrant more contact with local law enforcement authorities. The KLF does not have a high probability of bomb threats. A bomb call threat checklist is included in Appendix C.

If the Bomb Threat is Called In:

1. Listen while the caller talks and fill out the attached bomb threat call checklist (see Appendix C).
2. Inform the caller that the building is occupied and that the detonation of a bomb could result in death or serious injury to many innocent people.
3. Attempt to determine the location and description of the bomb and time of detonation. Obtain as much information as possible including time of call, background noise, etc.
4. Notify the KLF Site Manager or other on-site manager.
5. KLF Management will report the bomb threat to the local police department.
6. Search the area if time permits. Do not touch any suspicious items. Report any suspicious items to the KLF Site Manager and the local police department.
7. Evacuate the area where any suspicious items are located.

3.9 Civil Disturbance/Demonstration

1. Do not become a spectator. Leave the area of the disturbance to avoid injury or arrest.
2. Lock all doors, gates, and windows. Close all drapes and avoid window areas. Do not argue with or agitate the participants.
3. Remain calm, be courteous, and do not do anything to provoke an incident.
4. Contact the KLF Site Manager and local police department as soon as possible.
5. If required to protect employees and company property, service may have to be limited and/or access to the building may have to be restricted.
6. Keep telephone lines open and avoid unnecessary inquiries regarding the incident.

3.10 Armed Robbery

1. If confronted by an armed robber, do not argue with the individual.
2. Give the individual what they want. Do not block their option to escape.
3. Remember what you can about the incident including individual's height, weight, hair length, color of eyes, color of hair, race, distinguishing marks or scars. If a weapon or vehicle is visible, try to remember as much detail about it as possible.
4. After the incident is over, call the police immediately.
5. Under no circumstances should you try to intercede or stop the robbers involved in the incident.

3.11 Terrorist Threats

In the office:

1. Close business.
2. If there are customers or visitors in the building, provide for their safety by asking them to stay – not leave. When authorities provide directions to shelter-in-place,[2] they want everyone to take those steps immediately, where they are, and not drive or walk outdoors.
3. Unless there is an imminent threat, ask employees, customers, and visitors to call their emergency contact to let them know where they are and that they are safe. Turn on call-forwarding or alternative telephone answering systems. Change the recording on voice mail to indicate that the business is closed, and that staff and visitors are remaining in the building until authorities advise it is safe to leave.
4. Close and lock all windows, exterior doors, and any other openings to the outside. If you are told there is danger of explosion, close window shades, blinds, or curtains.
5. Have employees familiar with your building's mechanical systems turn off all fans and heating and air conditioning systems. Some systems automatically provide for exchange of inside air with outside air – these systems in particular need to be turned off, sealed, or disabled.
6. Gather essential disaster supplies, such as nonperishable food, bottled water, battery-powered radios, first aid supplies, flashlights, batteries, duct tape, plastic sheeting, and plastic garbage bags.

[2] One of the instructions you may be given in an emergency where hazardous materials may have been released into the atmosphere is to shelter-in-place. This is a precaution aimed to keep you safe while remainingindoors (this is not the same thing as going to a shelter in case of a storm). Shelter-in-place means selecting a small, interior room, with no or few windows, and taking refuge there. It does not mean sealing off your entire home or office building.

7. Select interior room(s) above the ground floor, with the fewest windows or vents. The room(s) should have adequate space for everyone to be able to sit in. Avoid overcrowding by selecting several rooms if necessary. Large storage closets, utility rooms, pantries, copy and conference rooms without exterior windows will work well. Avoid selecting a room with mechanical equipment like ventilation blowers or pipes, because this equipment may not be able to be sealed from the outdoors.
8. It is ideal to have a hard-wired telephone in the room(s) you select. Call emergency contacts and have the phone available if you need to report a life-threatening condition. Cellular telephone equipment may be overwhelmed or damaged during an emergency.
9. Use duct tape and plastic sheeting (heavier than food wrap) to seal all cracks around the door(s) and any vents into the room.
10. Bring everyone into the room(s). Shut and lock the door(s).
11. Write down the names of everyone in the room, and call your business' designated emergency contact to report who is in the room with you, and their affiliation with your business (employee, visitor, and customer).
12. Keep listening to the radio or television until you are told all is safe or you are told to evacuate. Local officials may call for evacuation in specific areas at greatest risk in your community.

In a Vehicle:

1. If you are driving a vehicle and hear advice to shelter-in-place on the radio, take these steps:
2. If you are very close to home, your office, or a public building, go there immediately and go inside. Follow the shelter-in-place recommendations for the place you pick described above.
3. If you are unable to get to a home or building quickly and safely, pull over to the side of the road. Stop your vehicle in the safest place possible. If it is sunny outside, it is preferable to stop under a bridge or in a shady spot, to avoid being overheated.
4. Turn off the engine. Close windows and vents.
5. If possible, seal the heating/air conditioning vents with duct tape.
6. Listen to the radio regularly for updated advice and instructions.
7. Stay where you are until you are told it is safe to get back on the road. Be aware that some roads may be closed or traffic detoured. Follow the directions of law enforcement officials.

Local officials on the scene are the best source of information for your particular situation. Following their instructions during and after emergencies regarding sheltering, food, water, and clean-up methods is your safest choice.

Remember that instructions to shelter-in-place are usually provided for a duration of a *few hours, not days or weeks.* There is little danger that the room in which you are taking shelter will run out of oxygen – suffocation is not likely.

3.12 High Groundwater Levels

The primary pumping station in the Kekaha area (Kawaiele) is a drainage pumping station that is operated and maintained by the State of Hawai‘i Agribusiness Development Corporation (ADC) and the Kekaha Agriculture Association (KAA), in coordination with the U.S. Navy. The Kawaiele pumping station uses three pumps that can achieve a flow of 50 million gallons per day (mgd) to prevent flooding of the Mana Plains, while maintaining groundwater levels for agricultural and Navy Pacific Missile Range Facility (PMRF) activities. The pump station uses a transducer level control system to maintain a groundwater level at approximately 2 feet (ft) below sea level. A variable frequency drive controller automatically controls the pumps, operating on an uninterrupted basis 24 hours a day.

The County relies on the ADC and the Navy to continue to maintain and operate the pump station, and they have indicated their commitment to do so into the indefinite future.

Due to the remote possibility that the Kawaiele pumping station becomes temporarily inoperable due to maintenance or other issues, the groundwater in the area of the KLF may rise. If KLF staff observe conditions (i.e., unusual muddy areas, flooding conditions not due to rain, etc.) indicating high groundwater levels, the ADC and the KAA will be immediately contacted. Phone numbers for the ADC and KAA are provided in Section 2.0.

3.13 Tsunami Hazard

Tsunamis are a series of waves that can travel an average of 450 miles per hour in the open ocean and are typically produced by unpredicted earthquakes or underwater landslides. The Pacific Tsunami Warning Center provides warnings before a tsunami is likely to approach. There are three types of warnings—a “Tsunami Watch” is a notice that is given when an event may impact an area without confirmation that a tsunami is underway; a “Tsunami Advisory” is a notice that is issued due to dangerous coastal conditions produced by a tsunami without major widespread inundation; a “Tsunami Warning” is a notice that is given when major widespread inundation is imminent or expected. Although, the KLF is located within the tsunami evacuation zone, it is outside the tsunami inundation zone.

The following measures will be taken to protect against excessive erosion and flooding during tsunamis.

Prior to an anticipated tsunami:

1. KLF personnel will inspect all drainage on-site structures to verify that they are in working order.
2. Diversion berms will be constructed around the current disposal area as needed to prevent run-on from entering the waste fill, and to prevent runoff from the waste fill areas of the site.
3. Interim cover will be placed over exposed waste following the forecasted beginning of a Tsunami Warning.

At the discretion of County of Kaua‘i Management, the site may be closed for business during Tsunami Warning periods. In this event, the working face will be closed and covered with interim cover and graded to direct run-off to the drainage features. Appropriate local authorities and emergency coordinators will be contacted should a Tsunami Warning be issued (Section 2.0).

Once a “Tsunami Watch” or “Tsunami Advisory” is Issued:

A tsunami may generate contaminated debris or other atypical wastes that require special handling, processing, or disposal procedures that are not addressed by the facility permit and require special approval for disposal from the DOH. After the potential effects of a tsunami are verified by local authorities (i.e., severe flooding, storm surge, high winds, etc.), the KLF will consider acquiring supplies and materials (fuel, additional soil cover or alternate material, vehicles, heavy equipment, grinder/chippers, auxiliary lighting, pumps, generators, fire suppressant equipment, rain gear, personnel protective equipment, etc.) to ensure adequate equipment to handle the increase in waste and ensure airspace availability following a tsunami.

In the event of a tsunami reaching the island of Kaua‘i, KLF personnel will perform the following as preparation:

1. Conduct a briefing to entire staff on the status of conditions & severity of the tsunami and how it may impact the facility and service area / region. Discuss emergency operating procedures for facility.
2. Power outages should be anticipated, and procedures will be employed (when the KLF re-opens to accept waste) as needed to manually track the date the waste was received, the quantity by weight or volume, and the origin of the waste.
3. Inspect all drainage on-site structures to verify that they are in working order.
4. Diversion berms will be constructed around the current disposal area as needed to prevent run-on from entering the waste fill, and to prevent runoff from the waste fill areas of the site.
5. Interim cover will be placed over exposed waste at the end of the working day.

Once a "Tsunami Warning" is Issued:

1. The EC (or manager in charge) will track the tsunami front (via radio, television, internet, etc.) and implement the following procedures to properly shutdown all operations at the KLF:
    - If possible, all electrical lines/breakers/gas valves should be shut down to prevent any potential fires. Unplug all appliances.
    - Secure facility property, structures, landfill equipment, and office (preserve records and data [electronic and hard copies]) in case of flooding or power failure. Anything that is not secured may become a damaging projectile in the event of high winds. Cover all windows with wood panels (if possible).
    - Check batteries and stock up on first aid supplies and drinking water.
    - Vehicles, generators, and mobile refuelers will be moved to the top of the Phase II.
    - KLF Management will require that site personnel return to their homes. If on site, evacuate to the main office building and stay there (shelter in place) – stay away from windows.

After the Tsunami:

1. KLF / County of Kaua'i Management will promptly (when it is safe to do so) conduct a visual survey & damage assessment of the site to identify any compromised building structures, slope failures, downed power lines, and water leaks, broken electrical. Appropriate agencies will be contacted (Section 2.0).
2. Identify severed wiring, fires, tank leaks/spills, or other conditions that could threaten worker or public safety.
    - If fires have occurred, follow the procedures set forth in Section 3.2.
    - If injuries have occurred, follow the procedures set forth in Section 3.3.
3. Turn on portable radio for instructions and news reports. Cooperate fully with public safety officials and instructions.
4. Do not use vehicles unless there is an emergency. Keep the streets clear for emergency vehicles.
5. Remain calm and lend a hand to others.
6. If the site is evacuated, leave a message telling others where personnel can be found.

The EC (or manager in charge) will be responsible for:

1. Ensuring that KLF safety programs are fully implemented.
2. Coordinating evacuation of the KLF, including notification of adjacent property owners/tenants, as required.

3. Communicating with the County of Kauaʻi and the State of Hawaiʻi, as well as local authorities and emergency response personnel to inform them:
    - When the KLF becomes operational after the storm
    - The situation at the KLF, such as waste storage capacity, transportation coordination, site conditions, personnel status, etc.
    - In the event of inoperable telephone systems, notification of the appropriate agencies/businesses will be accomplished in the most expedient manner available (cellular/mobile phones, person to person, overnight mail, etc.)
4. Notifying incoming drivers/haulers via radio or cell phone to avoid the site.
5. Notifying County of Kauaʻi Safety personnel of the emergency - determine whether a 24-Hour Report is required.
6. Conducting a Post-Tsunami Inspection (Post-Tsunami / Severe Storm Forms [Appendix B]).

If a tsunami hazard causes the acceptance of waste to cease, the KLF will submit a written evaluation to the DOH prior to resuming waste acceptance. The evaluation (Appendix B) will certify that the landfill and its associated environmental controls are functional, equivalent, or better than required, and that operation of the landfill will not cause a violation of environmental regulations. Any findings and corrective actions will furthermore be described and evaluated. The KLF can resume acceptance of waste upon submission of the evaluation to the DOH.

4. EMERGENCY EQUIPMENT & PPE

The EC monitors and stores all emergency equipment and PPE supplies stocked. Any deficiencies in supply or operation are corrected as soon as possible.

KLF emergency equipment and locations (Figure 3]) consists of:

- Eye wash station (maintenance shop)
- Shovels
- Spill kit - contains absorbent (kitty litter), containment booms, sorbent pads (maintenance shop & mobile tank trucks)
- First aid kits (site vehicles & buildings)
- Fire extinguishers (all buildings, site vehicles & landfill equipment)

KLF PPE includes:

- Hard hats
- High visibility safety vests
- Dust masks
- Ear plugs
- Steel toed work boots
- Safety glasses (as needed)
- Gloves

5. ADMINISTRATIVE PROCEDURES

The KLF Site Manager will work with the EC to ensure that corrective measures (if necessary) are implemented, follow-up reports / inspections are completed, and that the appropriate agencies and parties are notified.

5.1 Emergency Reporting

Emergency reporting will be in compliance with federal, state, local and County of Kaua‘i requirements. KLF reporting includes:

- Reporting of significant events/emergency incidents to the KLF Site Manager and County of Kaua‘i
- Reporting of significant events/emergency incidents to the proper agencies (if necessary) as soon as possible. Additional details on reporting procedures and requirements are described in Section I of the Operations Plan - *General Conditions* - Section 11.1

If it is determined that the KLF has had a release, fire, or explosion involving hazardous materials that could threaten human health, or the environment outside the facility, the following actions should be taken:

- The EC shall immediately notify the appropriate local authorities and help these local officials decide whether local areas should be evacuated
- The KLF Site Manager will immediately notify the DOH. This report shall include:
  - Owner and operator information (name, address, and telephone number)
  - Facility information at which the incident occurred (name, address, and telephone number)
  - Date, time, and type of incident (i.e., fire, explosion, release, etc.)
  - Name and quantity of material involved
  - Extent of injuries, as applicable
  - An assessment of the actual or potential hazards to human health or the environment, as applicable
  - Estimated quantity and disposition of recovered and un-recovered material that resulted from the incident
  - Evaluation of the circumstances that led to the incident
  - Steps being taken to reduce, eliminate, and prevent recurrence, including an implementation schedule
  - Other information or monitoring as required by the DOH

- After the initial notification, a written or facsimile Incident Notification Report shall be submitted to the DOH within 3 days of the incident and document the information covered in the initial notification.

5.2 Training

In accordance with federal, state, local, and County of Kaua‘i requirements, KLF personnel are trained annually on the *Emergency Action Plan* and what their roles/responsibilities are in the event of an emergency. The KLF emergency training requirements include:

- As required, testing of the plan by key staff
- Semi-annual drills with all employees (documentation form attached)
- Location of all emergency shut down and main electrical power switches
- Fire hazards of the materials and hazards to which employees are exposed
- Location and operation of fire extinguishers
- Proper and safe handling of gasoline and other petroleum products including cleanup of minor spills
- Location of the KLF Emergency Action Plan
- Location of evacuation routes and re-assembly/evacuation points for the site
- Training documentation forms are included in Appendix D. All trainings and drills are documented and placed in the KLF Operating Record/Files

5.3 Plan Update and Distribution

THE *EMERGENCY ACTION PLAN* IS A LIVING DOCUMENT AND WILL BE REVIEWED AT LEAST ANNUALLY FOR ACCURACY AND RELEVANCE AND UPDATED AS WARRANTED BY CHANGES IN SITE CONDITIONS OR PROCEDURES. UPDATES TO THIS PLAN WILL BE SUBMITTED TO APPROPRIATE AGENCIES IN A TIMELY MANNER.

The *Emergency Action Plan* is part of the KLF Site Operations Manual, of which there are three controlled copies – one copy will remain on site at the KLF, one copy will be submitted to the DOH, and one copy will be submitted to the County of Kaua‘i. A copy of the Plan will also be placed in the break room at the KLF.

FIGURES

Site Location Map

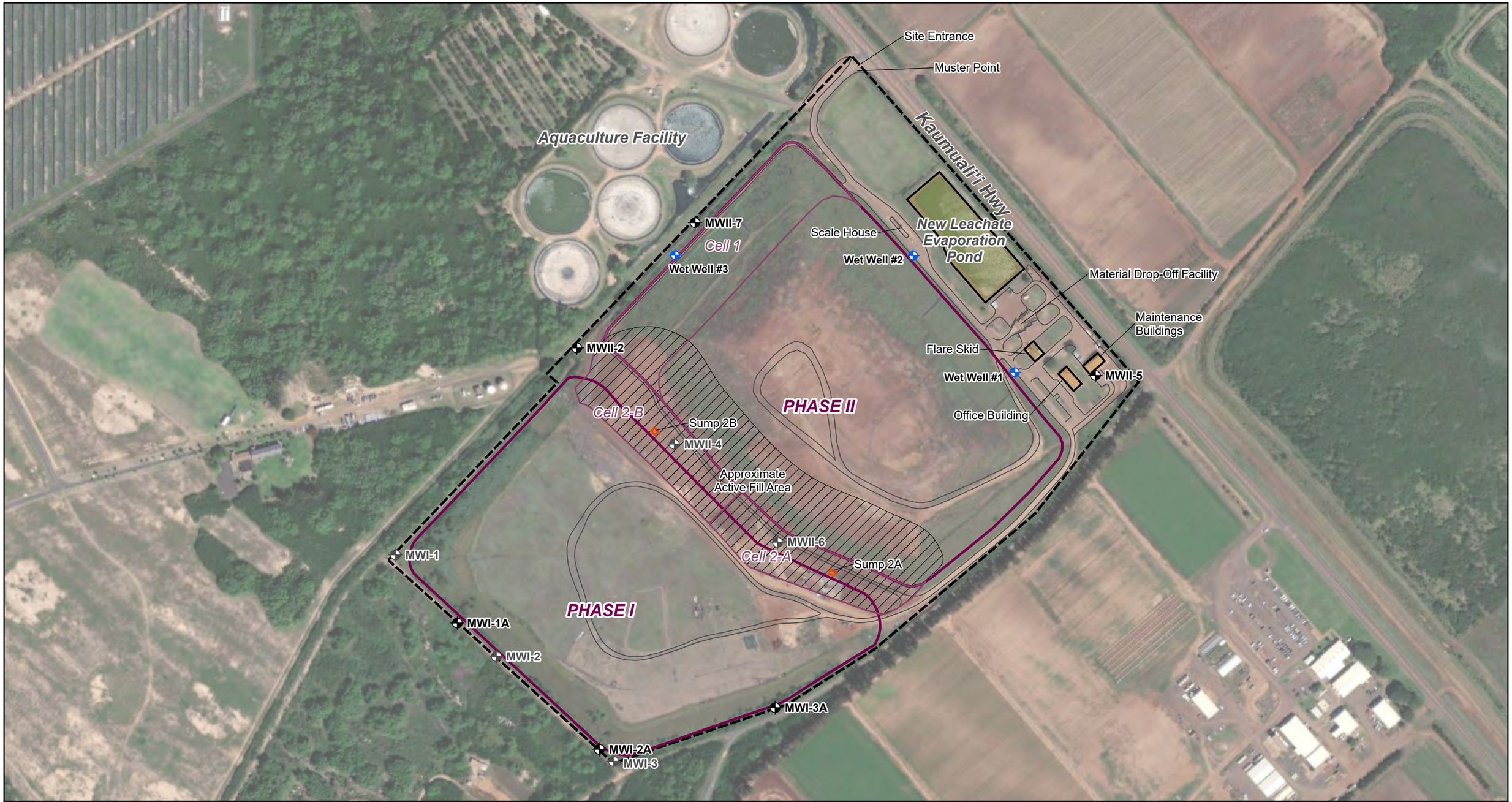
Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

Geosyntec consultants

WG3074	July 2021

Figure 1

P:\GIS\WM\KekahaLF\Project\2021Q3_GWMR\2021Q3_GWMR.aprx\Fig01_SiteLocationMap 7/30/2021 7:09 PM (KWalton)



Legend

- Wet Well (Leachate Sump)
- Groundwater Monitoring Well
- Decommissioned Groundwater Monitoring Well
- Approximate Active Landfill Area
- Sump Location
- Phase Boundary
- Cell Boundary
- Roads
- Property Boundary

N

0 350 Feet

Site Layout

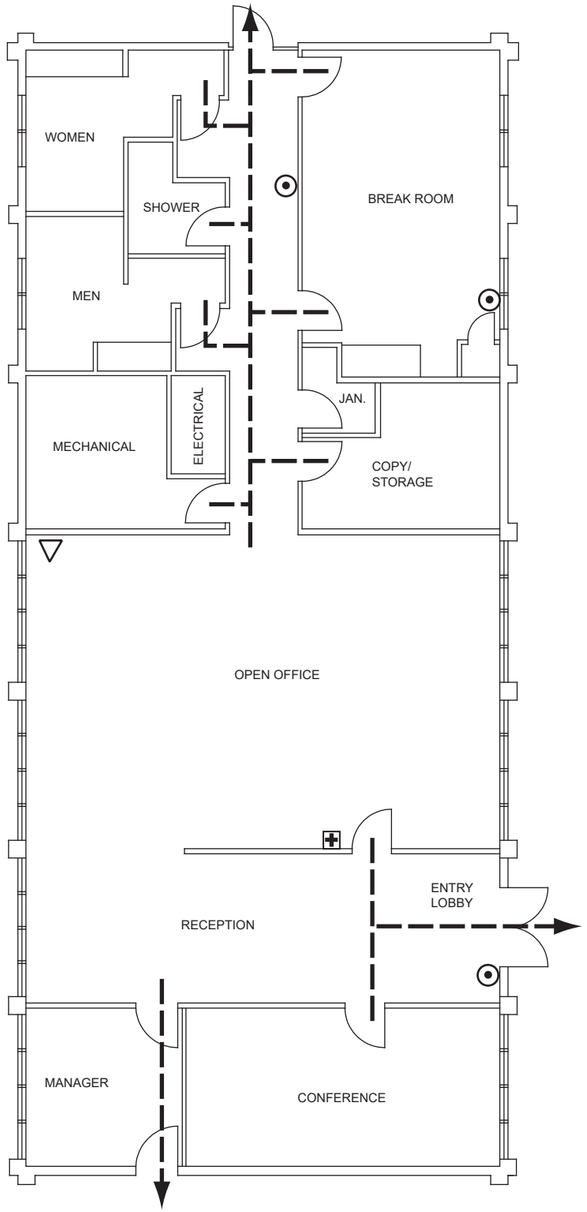
Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

Geosyntec consultants

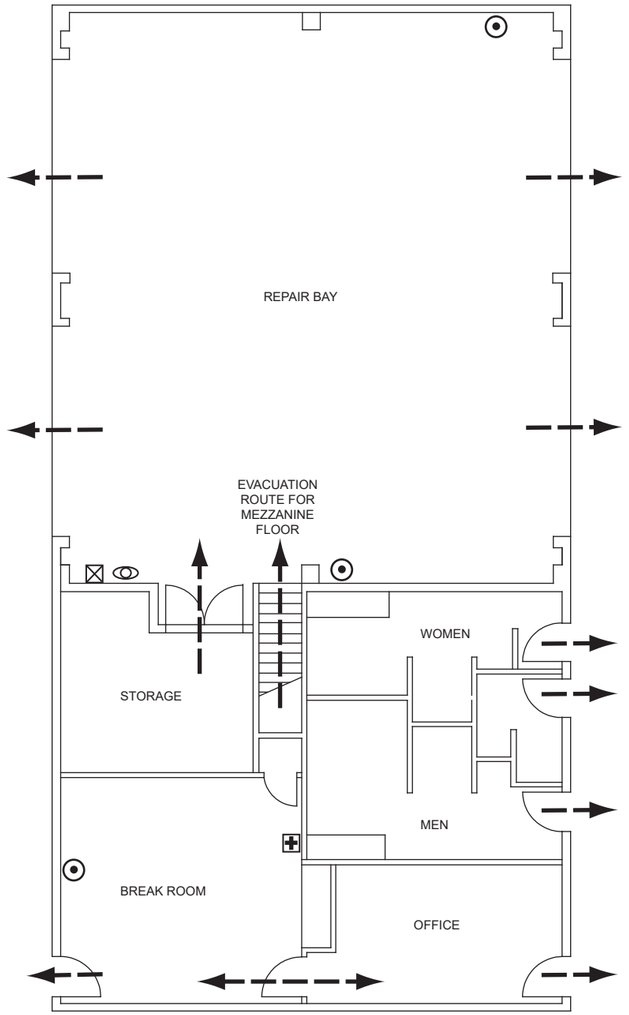
WG3074 | August 2022

Figure 2

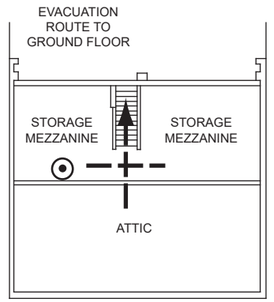
P:\GIS\WM\KekahaLF\Project\2022Q1_GWMR\2022Q1.aprx\Fig02_SiteLayout 7/21/2022 10:23 AM (KWalton)



Office Building

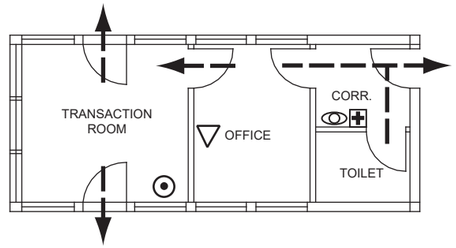


GROUND FLOOR



MEZZANINE FLOOR

Maintenance Shop



Scale House

Legend

- Methane Monitor
- First Aid Box
- Fire Extinguisher
- Emergency Shower
- Eyewash Station
- Evacuation Route

Figure source: Figure 3 of Emergency Action Plan, prepared by AECOM, March 2016.

Building Emergency Evacuation Routes

Kekaha Municipal Solid Waste Landfill
Kaua'i, Hawai'i

Geosyntec consultants

Figure 3

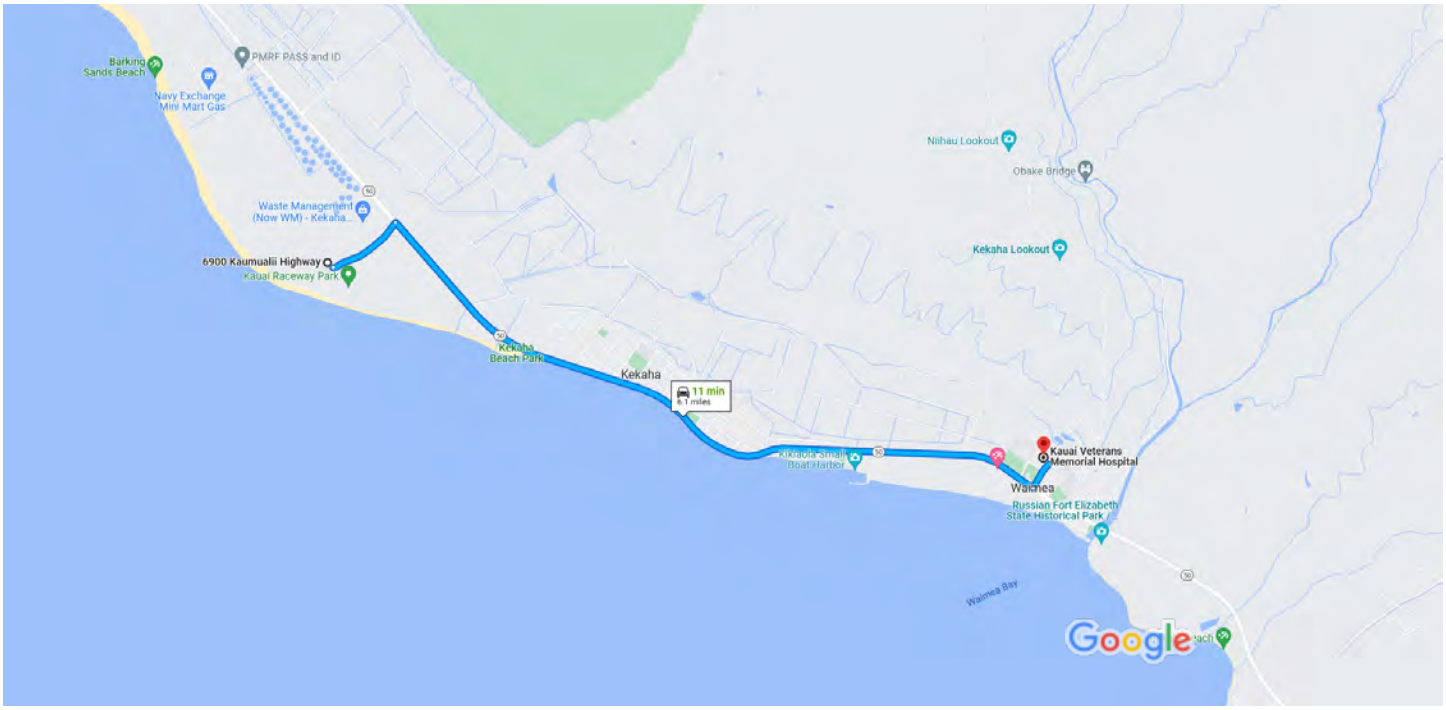
WG3074 | February 2023

P:\GIS\WM\KekahaLF\Project\2023-02_OpsManual\Fig03_BuildingEvacuationRoutes.ai

Google Maps

6900 Kaumualii Hwy, Kekaha, HI 96752 to Kauai Veterans Memorial Hospital

Drive 6.1 miles, 11 min



Map data ©2022 Google 2000 ft

6900 Kaumualii Hwy
Kekaha, HI 96752

1. Head east toward HI-50 E — 0.6 mi
2. Turn right onto HI-50 E/State Hwy 50 — 5.3 mi
3. Turn left onto Waimea Canyon Dr — 0.2 mi

Kauai Veterans Memorial Hospital
4643 Waimea Canyon Dr, Waimea, HI 96796

Insert Figure 1

APPENDIX A
FIRE PREVENTION PLAN

This Fire Prevention Plan for the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II designates:

- Housekeeping procedures that help to prevent fires
- Potential fire hazards
- Proper handling and storage procedures for combustible materials
- Potential ignition sources and their control procedures
- Type of fire protection equipment available to control fire hazards

The names and job titles of personnel responsible for maintenance of equipment and systems installed to prevent or control ignition of fires and control of accumulation of flammable or combustible waste materials are:

- KLF Site Manager: John Ruiz
- KLF Emergency Coordinator: John Ruiz
- County of Kaua‘i Environmental Professional: Allison Fraley

HOUSEKEEPING PROCEDURES FOR FIRE PREVENTION:

- Avoid the accumulation of combustible materials
- Keep flammable and combustible materials away from ignition sources
- Keep all stairways, fire-fighting equipment locations, and exit paths clear
- Report spill/leaks promptly to management to assure corrective action is taken
- Remove all waste at the end of each shift and placing it in the appropriate waste receptacles
- Store all oily rags in an approved receptacle
- Store flammables in an approved flammable cabinet a minimum of 25 feet from sources of ignition
- Store work clothes in metal lockers
- Use correct cleaning agents and avoiding the use of flammable/combustible materials for cleaning
- Contain and clean up fuel spills immediately. Soil contaminated with spilled fuel will be excavated and, if authorized, disposed of at the working face

POTENTIAL FIRE HAZARDS, POTENTIAL IGNITION SOURCES, PROPER HANDLING/STORAGE PROCEDURES, AND FIRE PROTECTION EQUIPMENT:

Tables A-1 and A-2 list the potential fire hazards, potential ignition sources, proper handling/storage procedures, and fire protection equipment that can control these hazards.

Table A-1. Site Locations with Potential Fire Hazards and Potential Ignition Sources

LOCATION	POTENTIAL FIRE HAZARDS	POTENTIAL IGNITION SOURCES
Administrative Offices	Combustible materials (e.g., paper, cardboard, etc.) Electrical cords/outlets/wiring Flammable/combustible liquids (e.g., aerosol cans, solvents, etc.)	Open flames (e.g., smoking materials, etc.) Hot surfaces (e.g., appliances, electrical wiring, etc.) Open flames (e.g., smoking materials, etc.)
Maintenance Shop	Flammable/combustible liquids (e.g., diesel, solvents, product oils, etc.) Combustible materials (e.g., paper, cardboard, etc.) Electrical cords/outlets/wiring Flammable/oxidizing gases (e.g., acetylene, oxygen, etc.) Open flames (e.g., welding, cutting, etc.) Contaminated materials (e.g., oily rags, etc.)	Open flames (e.g., welding, smoking materials, etc.) Sparks from friction (e.g., grinding) Hot surfaces (e.g., power tools, electrical wiring, etc.) Static electricity Internal combustion engines (e.g., vehicles, forklifts, etc.) Open flames (e.g., welding, smoking materials, etc.)

Table A-2. Control Procedures and Fire Protection Equipment for Potential Fire Hazards and Potential Ignition Sources

LOCATION	POTENTIAL FIRE HAZARDS POTENTIAL IGNITION SOURCES
Combustible Materials	Avoid accumulation of combustible materials (e.g., empty boxes, cartons, loose paper, etc.) Keep combustible materials away from ignition sources including establishment/enforcement of no smoking/no open flame areas Keep all stairways, firefighting equipment locations and exit paths clear Remove all waste (e.g., dust, lint, loose paper, etc.) at the end of each shift in each work area (including floors, ceilings, walls, ledges, beams, and equipment) and place in appropriate waste receptacle Store work clothes in metal lockers Maintain fire extinguishing equipment capable of handling Class A fires within 75 feet of combustible materials. Perform annual maintenance and monthly inspections on fire extinguishing equipment Train personnel in use of fire extinguishing equipment
Electrical cords/ outlets/wiring	Inspect power cords for damaged insulation and damaged plugs Discontinue use of a power cord that gets warm, Maintain electrical motors in good operating condition Do not overload motors, cords, or other electrical equipment Maintain fire-extinguishing equipment capable of handling Class C fires near electrical equipment. Perform annual maintenance and monthly inspections on fire extinguishing equipment Train personnel in use of fire extinguishing equipment
Flammable/ combustible liquids	Keep materials in covered containers when not in use Do not transport materials in open containers Store flammable liquids in containers with appropriate warning labels, Do not store near sources of heat/ignition

LOCATION	POTENTIAL FIRE HAZARDS POTENTIAL IGNITION SOURCES
	Inert and verify inert atmosphere of containers, piping, tanks that have contained flammable/combustible liquids prior to exposure to heat/flame Maintain fire-extinguishing equipment capable of handling Class B fires within 50 feet of flammable/combustible liquids. Perform annual maintenance and monthly inspections on fire extinguishing equipment Train personnel in use of fire extinguishing equipment
Welding/cutting operations	Establish approved areas for cutting and welding Establish approved procedures for a hot work program to restrict cutting/welding in all other areas along with a designated individual for approving such cutting/welding Utilize only approved equipment for cutting/welding Train all personnel that perform cutting/welding Verify training of contractors who perform cutting/welding Provide contractor orientation of potential fire hazards on site Do not perform cutting/welding within 35 feet of combustible materials Implement hot work permit program Maintain fire extinguishing equipment capable of handling Class A, B, and C fires near the welding operation Perform annual maintenance and monthly inspections on fire extinguishing equipment Train personnel in use of fire extinguishing equipment
Flammable/ oxidizing gas cylinders	Do not store cylinders near sources of heat/flame Cylinders stored inside buildings will be in a well-protected, well-ventilated, dry location at least 20 feet from highly combustible materials Cylinders storage will be located where passing/falling objects will not damage cylinders Do not store cylinders where they could be subject to tampering by unauthorized personnel Do not store cylinders near elevators, stairs, or passageways Do not store cylinders in unventilated enclosures

LOCATION	POTENTIAL FIRE HAZARDS POTENTIAL IGNITION SOURCES
	Do not store oxygen cylinders near highly combustible materials such as oil/grease Maintain fire extinguishing equipment capable of handling Class A, B, and C fires within 75 feet of welding areas
Open flames	Keep sources of ignition, including open flames, away from combustible materials. Establish and enforce no smoking/no open flame areas Establish and enforce a hot work program Maintain fire extinguishing equipment capable of handling Class A, B, C fire near areas with open flames
Contaminated materials	Keep sources of ignition away from contaminated materials Store contaminated materials in appropriate waste receptacle (e.g., oil rag container) Maintain fire extinguishing equipment capable of handling Class A, B, and C fires where contaminated materials are stored.
Hot surfaces	Keep sources of ignition, including hot surfaces, away from combustible materials Maintain fire extinguishing equipment capable of handling Class A, B, and C fires near areas with hot surfaces
Sparks from friction	Keep sources of ignition including sparks from friction away from combustible materials Maintain fire extinguishing equipment capable of handling Class A, B, and C fires near areas where sparks from friction may occur
Static electricity	Utilize proper grounding/bonding procedures when moving volatile liquids. Verify continuity of grounds on a regular basis Maintain fire extinguishing equipment capable of handling Class A, B, and C fires within 50 feet of flammable/combustible liquid storage

LOCATION	POTENTIAL FIRE HAZARDS POTENTIAL IGNITION SOURCES
Internal combustion engines	Maintain internal combustion engines in good repair Clean up spills/leaks from internal combustion engines promptly and store contaminated material safely Report spills/leaks from internal combustion engines promptly to supervision to assure corrective action is taken. Maintain fire extinguishing equipment capable of handling Class A, B, and C fires on all vehicles

FIRE PROTECTION EQUIPMENT

The KLF is equipped with fire extinguishers that are fully charged and ready for use at all times. Each extinguisher is inspected on an annual basis and recharged as necessary. A qualified service company performs the annual inspections, and all extinguishers display a current inspection tag. Inspection and recharging will be performed following each use. The main office, scale house, vehicle maintenance building, all landfill equipment, and landfill vehicles are equipped with fire extinguishers.

The fire prevention plan and fire control procedures for the KLF will be revisited following the occurrence of a significant fire to determine if modifications are warranted.

FIRE EXTINGUISHER USE

All KLF equipment operators are trained annually on the proper usage of fire extinguishers. Documentation of training sessions are kept on site as part of the KLF Operating Record/Files.

All landfill equipment has a charged ABC fire extinguisher with at least a 20-pound rating. This type of extinguisher is good for:

- A – Ordinary combustibles (paper, leaves, general trash, etc.)
- B – Flammable liquids (diesel fuel, hydraulic oil, motor oil, etc.)
- C – Electrical equipment (electrical wiring system on the equipment)

Use the P.A.S.S. method for extinguishing a small fire:

P ull the pin.

A im at the base of the flame.

S queeze the handle.

S weeping motion from side-to-side.

If the fire has grown beyond a small fire, clear the area and allow the fire department to extinguish the fire.

APPENDIX B
Post-Earthquake Forms & Post Severe Weather Forms

KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II
EARTHQUAKE DAMAGE REPORT FORM

Date / Time of Seismic Event: _____

Date / Time of Inspection: _____

Note: Fill out one form for each damage observation.

1. What is damaged?_____
2. Location of damage:_____
3. Description of Damage:_____

Log of Corrective Actions Implemented:_____

_____

_____

_____

_____

_____

_____

_____

Date damage was repaired: _____

Damage repaired by: _____

KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II
POST EARTHQUAKE INSPECTION SHEET

Date of Earthquake: _____
Date of Inspection: _____

Distance from Epicenter: _____
Epicenter Location: _____

Time of Earthquake: _____
Time of Inspection: _____

Person(s) Conducting Inspection: _____

_____

	Damage Evident	
	Yes	**No**
Drainage Structures		
• down drains	_____	_____
• inlet/outlet structures	_____	_____
Fueling/Maintenance Area		
• Maintenance buildings	_____	_____
• 2,000-gallon diesel AST	_____	_____
• Mobile #1, 300-gallon diesel tank	_____	_____
• Mobile #2, 182-gallon engine oil tank	_____	_____
• Miscellaneous 55-gallon drums	_____	_____

Any leaks/spills? _____

	Damage Evident	
	Yes	**No**
Side Slopes	_____	_____
Landfill Cover	_____	_____
Access Roads	_____	_____
Landfill Heavy Equipment	_____	_____
Fencing	_____	_____
Facility Buildings		
• Admin office	_____	_____
• Scale house	_____	_____
• Telephones	_____	_____
• Computers	_____	_____
• Scales	_____	_____
• Maintenance Shop	_____	_____
Water Supply		
• Main water meter	_____	_____
• Mainline	_____	_____
• Water truck	_____	_____
• Backflow preventer	_____	_____
Power Line(s)	_____	_____

	Damage Evident Yes	No
Leachate Collection System		
• Wet Well #1	_____	_____
o manhole	_____	_____
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps	_____	_____
o power		
• Wet Well #2		
o manhole	_____	_____
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps	_____	_____
o power	_____	_____
• Wet Well #3		
o manhole	_____	_____
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps		
o power		
• Sump 2a		
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps	_____	_____
o power	_____	_____
• Sump 2b		
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps	_____	_____
o power	_____	_____

Any leaks/spills? _____

Any vapors evident? _____

	Damage Evident	
	Yes	**No**
Leachate Evaporation Pond		
• Aerator mooring posts and guide wires	_____	_____
• Aerators	_____	_____
• Batten Strip on aerator support pad	_____	_____
• Forcemain outlet	_____	_____
• Forcemain meter	_____	_____
• Sideslope geocell system	_____	_____
• Geocell and geosynthetic anchor trench	_____	_____
• Float level switch, junction box, and wires	_____	_____
• Float supports and floats	_____	_____
• 2-inch gravel protection layer on base	_____	_____
• Observational geotextile	_____	_____
o Observational geotextile torn or cut?	_____	_____
o If geotextile damaged, was granular operations layer disturbed?	_____	_____
o If granular operations layer disturbed, was damage done to cushiongeotextile?	_____	_____
o If cushion geotextile was damaged, is geomembrane damaged?	_____	_____

Any leaks/spills? _____

Any vapors evident? _____

	Damage Evident Yes	No
Perimeter Gas Probes		
• GPII-1		
o concrete pad	_____	
o casing	_____	
• GPII-2		
o concrete pad	_____	
o Casing	_____	
• GPII-3		
o concrete pad	_____	
o casing	_____	
• GPII-7		
o concrete pad	_____	
o casing	_____	
• GPII-8		
o concrete pad	_____	
o casing	_____	
• GPII-9		
o concrete pad	_____	
o casing	_____	

	Damage Evident Yes	No
Groundwater Monitoring Wells		
• MWII-2		
o concrete pad	_____	
o protective housing	_____	
o casing	_____	
o guard posts	_____	
• MWII-4		
o concrete pad	_____	_____
o casing	_____	_____
• MWII-5		
o concrete pad	_____	_____
o casing	_____	_____
• MWII-6		
o Concrete Pad	_____	
o Casing	_____	

- MWII-7
  - concrete pad _____ _____
  - protective housing _____ _____
  - casing _____ _____
  - guard posts _____ _____

Any evidence of damage to wells such as:

- ponded water? _____
- settlement around the wells? _____

Was there any damage to landfill structures, cover or systems caused by the above seismic event?

YES _____ NO _____

If yes, complete an Earthquake Damage Report Form.

KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II

SEVERE WEATHER (POST HURRICANE / SEVERE STORM / TSUNAMI) DAMAGE REPORT FORM

Date/Time of Earthquake: _____

Date / Time of Inspection: _____

Note: Fill out one form for each damage observation.

1. What is damaged? _____
2. Location of damage: _____
3. Description of Damage: _____

Log of Corrective Actions Implemented: _____

_____

_____

_____

_____

_____

_____

_____

Date damage was repaired: _____

Damage repaired by: _____

KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II

SEVERE WEATHER (POST HURRICANE / SEVERE STORM / TSUNAMI) INSPECTION SHEET

Type of Storm (Depression, Tropical Storm, Hurricane): _____

Date of Storm: _____

Date of Inspection: _____

Category of Hurricane (if applicable): _____

Recorded Wind Speed(s): _____

Time of Hurricane: _____

Time of Inspection: _____

Person(s) Conducting Inspection: _____

	Damage Evident	
	Yes	**No**
Drainage Structures		
• down drains		
• inlet/outlet structures		
Fueling/Maintenance Area		
• Maintenance buildings		
• 2,000-gallon diesel AST		
• Mobile #1, 250-gallon diesel tank		
• Miscellaneous 55-gallon drums		

Any leaks/spills? _____

	Damage Evident	
	Yes	**No**
Side Slopes	_____	_____
Landfill Cover	_____	_____
Access Roads	_____	_____
Landfill Heavy Equipment	_____	_____
Fencing	_____	_____
Facility Buildings		
• Admin office	_____	_____
• Scale house	_____	_____
• Telephones	_____	_____
• Computers	_____	_____
• Scales	_____	_____
• Maintenance Shop	_____	_____
Water Supply		
• Main water meter	_____	_____
• Mainline	_____	_____
• Water truck	_____	_____
• Backflow preventer	_____	_____
Power Line(s)	_____	_____

	Damage Evident Yes	No
Leachate Collection System		
• Wet Well #1	_____	_____
o manhole	_____	_____
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps	_____	_____
o power		
• Wet Well #2		
o manhole	_____	_____
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps	_____	_____
o power	_____	_____
• Wet Well #3		
o manhole	_____	_____
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps		
o power		
• Sump 2a		
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps	_____	_____
o power	_____	_____
• Sump 2b		
o sump/riser	_____	_____
o transducer system/panel	_____	_____
o pipes/hoses	_____	_____
o pumps	_____	_____
o power	_____	_____

Any leaks/spills? _____

Any vapors evident? _____

	Damage Evident	
	Yes	**No**
Leachate Evaporation Pond		
• Aerator mooring posts and guide wires	_____	_____
• Aerators	_____	_____
• Batten Strip on aerator support pad	_____	_____
• Forcemain outlet	_____	_____
• Forcemain meter	_____	_____
• Sideslope geocell system	_____	_____
• Geocell and geosynthetic anchor trench	_____	_____
• Float level switch, junction box, and wires	_____	_____
• Float supports and floats	_____	_____
• 2-inch gravel protection layer on base	_____	_____
• Observational geotextile	_____	_____
o Observational geotextile torn or cut?	_____	_____
o If geotextile damaged, was granular operations layer disturbed?	_____	_____
o If granular operations layer disturbed, was damage done to cushiongeotextile?	_____	_____
o If cushion geotextile was damaged, is geomembrane damaged?	_____	_____

Any leaks/spills? _____

Any vapors evident? _____

	Damage Evident Yes	No
Perimeter Gas Probes		
• GPII-1		
o concrete pad	_____	_____
o casing	_____	_____
• GPII-2		
o concrete pad	_____	_____
o Casing	_____	_____
• GPII-3		
o concrete pad	_____	_____
o casing	_____	_____
• GPII-7		
o concrete pad	_____	_____
o casing	_____	_____
• GPII-8		
o concrete pad	_____	_____
o casing	_____	_____
• GPII-9		
o concrete pad	_____	_____
o casing	_____	_____

	Damage Evident Yes	No
Groundwater Monitoring Wells		
• MWII-2		
o concrete pad	_____	_____
o protective housing	_____	_____
o casing	_____	_____
o guard posts	_____	_____
• MWII-4		
o concrete pad	_____	_____
o casing	_____	_____
• MWII-5		
o concrete pad	_____	_____
o casing	_____	_____
• MWII-6		
o Concrete Pad	_____	_____
o Casing	_____	_____

- MWII-7
  - concrete pad _____ _____
  - protective housing _____ _____
  - casing _____ _____
  - guard posts _____ _____

Any evidence of damage to wells such as:

- ponded water? _____
- settlement around the wells? _____

Was there any damage to landfill structures, cover or systems caused by the above seismic event?

YES _____ NO _____

If yes, complete a Hurricane / Severe Storm / Tsunami Damage Report Form.

KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II

SEVERE WEATHER (POST HURRICANE / SEVERE STORM / TSUNAMI) DAMAGE REPORT FORM

Type of Event (Depression, Tropical Storm, Hurricane, Tsunami):_____

Date / Time / Duration: _____

Date / Time of Inspection: _____

Note: Fill out one form for each damage observation.

1. What is damaged? _____
2. Location of damage: _____
3. Description of Damage:_____

Log of Corrective Actions Implemented:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Date damage was repaired: _____

Damage repaired by: _____

APPENDIX C

BOMB THREAT CALL CHECKLIST

Date: _____ Time: _____ A.M. / P.M.

Call Received by: _____

Exact words of caller: _____

_____

_____

_____

_____

_____

Questions to Ask:

When will bomb explode? _____

Where is the bomb located? _____

What does the bomb look like? _____

What kind of bomb is it? _____

Why did you place the bomb? _____

What do you hope to accomplish by this action? _____

What is your name? _____

Where are you calling from? _____

***Voice Characteristics*:**

Male ____ Female ____ Child ____ Loud ____ Soft ____ Nazal ____

Raspy ____ High ____ Low ____ Familar ____ Pleasant ____

Other _____

***Speech Characteristics*:**

Fast ____ Slow ____ Stutter ____ Slurred ____ Intoxicated ____

Other _____

***Accent Characteristics*:**

Local ____ Region ____ Foreign ____

Other _____

Manner of Caller:

Calm ____ Angry ____ Deliberate ____ Emotional ____

Laughing ____ Incoherent ____

Other _____

Background Noises:

Office Machines ____ Street Traffic ____ Factory Machines ____ Music ____

Airplanes ____ Trains ____ Trucks ____ Animals ____

Other _____

Origin of Call:

Internal ____ External ____ Local ____ Long Distance ____

Other _____

Did caller appear to be familiar with the facility? _____

Number/extension at which call was received: _____

Contacts Made:

Operations/District Manager: Date: _____ @ _____ am / pm

Police Department: Date: _____ @ _____ am / pm

Fire Department: Date: _____ @ _____ am / pm

Other: Date: _____ @ _____ am / pm

Other: Date: _____ @ _____ am / pm

APPENDIX D

TRAINING FORMS

TRAINING

Training will be per the "Training" subsection of the Emergency Action Plan and Fire Prevention Plan.

This Program is hereby approved:

SIGNATURE	DATE

DOCUMENTATION OF SEMI-ANNUAL DRILL

Date Performed_____

Facility Name_____

Certified By_____Title _____

Comments

_____

_____

_____

_____

_____

_____

_____

_____

_____

ACKNOWLEDGEMENT FORM

I, (print name)_____have received training on the Kekaha Municipal Solid Waste Landfill – Phase II Emergency Action Plan Program. I had the opportunity to have questions answered pertaining to the training material and instructions that were presented to me by the Company. I understand the training I have received and agree to abide by the standards presented.

_____
(Employee) Print Name

_____
(Employee) Signature

_____
(Instructor) Print Name

_____
(Instructor) Signature

_____
Date

Geosyntec consultants

engineers | scientists | innovators

SECTION II – OPERATIONS PLAN

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua‘i

Prepared for

County of Kaua‘i
Department of Public Works
4444 Rice Street
Lihu‘e, Hawai‘i 96766

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February 20, 2023

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ADC	alternate daily cover
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
cm/sec	centimeters per second
CQA	Construction Quality Assurance
CWA	Clean Water Act
CSP	Covered Source Permit
DOH	Department of Health, State of Hawai‘i
DST	double-sided textured
EALs	environmental action levels
EPA	United States Environmental Protection Agency
ft	feet or foot
GCCS	Gas Collection and Control System
GCL	Geosynthetic clay liner
HAR	Hawai‘i Administrative Rules
HDPE	high-density polyethylene
KLF	Kekaha Municipal Solid Waste Landfill
KOP	knock-out pot
LCRS	leachate collection and removal system
LFG	landfill gas
m^3	cubic meters
MDOF	material drop-off facility
Mg	megagram
mph	miles per hour
MSW	municipal solid waste
MSWLF	municipal solid waste landfill
NMOC	non-methane organic compounds
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standard
PCB	polychlorinated biphenyl
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
SST	single-sided textured
TSCA	Toxic Substances Control Act

1. INTRODUCTION

This section of the Kekaha Municipal Solid Waste Landfill (KLF) – Phase II Site Operations Manual provides information regarding existing landfill facilities and operating systems and describes general procedures, requirements, and methodologies to be used by KLF Phase II personnel in the landfill's daily operation. This material was developed based on operating permits, applicable regulations, County of Kaua'i policies and directives and incorporates proven operations techniques. This section should be used in conjunction with other applicable sections of the *Kekaha Municipal Solid Waste Landfill Operations Manual* to ensure that landfill operations are conducted in the best possible manner.

2. SITE UTILIZATION CONCEPT

2.1 Landfill Disposal Areas

The KLF is a municipal solid waste (MSW) disposal area situated on approximately 98 acres of land in Kekaha on the island of Kaua‘i (Figure 1). The MSW disposal area comprises two distinct refuse fill areas identified as Phase I and Phase II. Phase I began operations in 1953 and continued until operations ceased on October 8, 1993. Phase II began operations on October 9, 1993. Features of Phase II include a materials drop-off facility (MDOF), scale house, maintenance shop, and administration building. A used oil drop-off is located in the maintenance building. A Site Layout Map is provided as Figure 2.

The current permitted Phase II fill area (approximately 4438.4 acres) consists of the original Phase II (31.22.1 acres), the Cell 1 lateral expansion (6.34 acres) of Phase II, and the Phase II Cell 2 lateral expansion (6.55 acres). The original Phase II area is subdivided into 14 waste disposal cells (each about 2.3 acres in size and approximately 100 feet (ft) wide and 800 to 1,100 ft long), the Cell 1 lateral expansion of Phase II is subdivided into four smaller waste disposal cells (each about 200 ft wide and 200 ft to 280 ft long), and the Phase II Cell 2 lateral expansion is subdivided into two smaller disposal cells (the cells are approximately 3 and 3.5acres and are roughly 200 ft wide 750 ft long). The Phase II Landfill (including the Cell 1 expansion) is currently permitted to receive waste up to 120 feet above mean sea level (ft msl), and an increase to 171.5 ft msl is proposed in the vertical expansion currently under review.

2.2 Site Life and Capacity

Aerial surveys are flown for KLF Phase II annually and are located on site at the landfill. Quantities of airspace filled and remaining and a landfill cell fill sequencing plan are updated annually as part of the KLF Phase II Annual Operating Report, which is submitted to the State of Hawai‘i Department of Health (DOH) by July 31 of each year. These documents are also maintained on site as part of the KLF Phase II Operating Record/Files.

2.3 Landfill Ancillary Facilities

Listed below are the KLF Phase II ancillary facilities and areas designated for activities that are essential to the overall functioning of the landfill as a waste disposal site:

- Administration building
- Scale house
- Maintenance shop
- Landfill gas flare complex
- MDOF

The landfill disposal areas and locations of the items listed above are shown on Figure 2.

2.4 Site Utilities

Existing KLF Phase II utilities include:

- Water supply
- Telephone
- Electrical power
- Septic tanks and leaching field systems

2.5 Environmental Monitoring & Control Systems

Existing environmental monitoring and control systems at the KLF Phase II include the following:

- Liner and Leachate Collection and Removal System (LCRS)
- Perimeter Gas Monitoring System
- Landfill Gas Collection and Control System Flare
- Surface Water Management System
- Storm Water Pollution Management and Control System
- Groundwater Monitoring Well Network

2.5.1 Liner and Leachate Collection and Removal System

With the exception of the closed Phase I area, all disposal areas at the KLF Phase II are equipped with a bottom and side slope composite liner and LCRS meeting Federal Resource Conservation and Recovery Act (RCRA) Subtitle D criteria and State (Hawai‘i Administrative Rules [HAR] §11-58.1-14) requirements. Refer to Section 3 Landfill Construction (below) for details of the liner systems at the KLF.

The current Phase II LCRS consists of a drainage gravel layer on the cell floor, trenches constructed within the liner system (containing drainage gravel & perforated high-density polyethylene [HDPE] pipes), leachate collection manholes, pump stations (e.g., wet wells and sumps), automatic sump pumps, discharge pipes, pump sensors and controls, and an evaporation pond. The KLF Phase II landfill is graded as to direct leachate towards collection pipes or sumps. The current extraction program in place at the KLF Phase II maintains the Site’s leachate levels in compliance with federal (RCRA Subtitle D) and state regulations, which require that leachate not be allowed to accumulate on the landfill bottom liner to a depth of more than 1 ft, not including leachate contained in the collection sumps. When the leachate level in a wet well or sump reaches a pre-determined height, the pump will automatically start and pump leachate out of the wet well or sump until the level has dropped to a set height. Leachate is pumped into the leachate evaporation lagoon.

Data such as leachate levels (depths in the wet wells and sumps), pump run times, total flow, and gallons of leachate pumped are recorded in a leachate log, which is maintained on site as part of the KLF Phase II Operating Record/Files. Leachate levels in each existing Phase II wet well and Cell 2 sump should be checked at least monthly, except during periods of heavy rain, at which time the levels should be checked daily.

The leachate lagoon occupies two acres on the northeast side of the landfill and has a capacity of approximately 3,699,000 gallons. The leachate level in the evaporation pond should be checked at least weekly, except during periods of heavy rain, at which time the levels should be checked at least once per day. The leachate level in the evaporation pond shall not exceed a 6-ft depth, leaving about 2 ft of freeboard. The permittees shall make contingency plans to address potential exceedances, such as pumping leachate into tanks and disposing of pumped leachate at a permitted wastewater treatment facility in accordance with applicable regulations. County of Kaua‘i will maintain a contract with a local pumping and hauling company that can haul leachate to a permitted wastewater treatment facility in the event that the leachate evaporation pond becomes overfilled.

The major components of the KLF Phase II LCRS are shown on Figure 3. Refer to Section III of this Site Operations Manual – *Leachate Management Plan* for a detailed description of operation, maintenance, and management procedures associated with leachate at the KLF Phase II.

Leachate monitoring and sampling activities are conducted annually at the KLF Phase II in conjunction with the site’s groundwater monitoring program. Refer to Section 2.5.5. Groundwater Monitoring Network (below) and Section V~~I~~ of this Site Operations Manual - *KLF Groundwater and Leachate Monitoring Plan* for a detailed description of the groundwater monitoring program.

2.5.2 Perimeter Gas Monitoring System

In accordance with the landfill gas monitoring requirements of the RCRA Subtitle D criteria, HAR and the KLF Solid Waste Permit (No.LF-0042-16), a perimeter gas monitoring system is installed at the KLF Phase II to detect landfill gas migration from the KLF Phase II. The gas probe network is monitored quarterly. Refer to Section VI~~I~~ of this Site Operations Manual – *Perimeter Gas Monitoring Plan* for a detailed description of the perimeter gas monitoring system at the KLF Phase II Landfill

In December 2016, the County installed a Gas Collection and Control System (GCCS) consisting of 57 vertical extraction wells (23 in Phase I and 34 in Phase II) fitted with orifice plate-style wellheads, HDPE collection header and lateral piping, three condensate collection sumps, one condensate drip leg, a 2,500-gallon condensate storage tank, and a skid-mounted control system comprising an enclosed flare, dual-blower system, knock-out pot (KOP), and a programmable logic controller with a supervisory control and data acquisition system for remote system monitoring and paperless electronic recording of operational parameters. In 2021, the County installed 10 horizontal gas collector pipes in Cell 2. It is anticipated that the horizontal collectors will be fitted with wellheads, laterals, and major collector header pipe to tie into the existing GCCS in the next 2 to 3 years. Preliminary GCCS design plans of potential future modifications are

included within the *Engineering Report for the Phase II Vertical Expansion, Kekaha Municipal Solid Waste Landfill, Kaua'i County Hawaii* (Tetra Tech, 2023).

An air and moisture separator vessel, known as a KOP, is used to prevent liquids from passing to the blower. The three condensate sumps and the KOP use QED-made electric pumps to move landfill gas (LFG) condensate into the leachate collection system and eventually into the leachate evaporation lagoon. The flare system has a capacity to handle variable LFG flow and uses two centrifugal blowers (duty and standby) each with a variable frequency drive to extract LFG.

2.5.3 Surface Water Management System

Pursuant to the *surface water requirements* in 40 Code of Federal Regulations (CFR) §258.27, and HAR Title 11, Chapter 58.1-15(h):

Municipal solid waste landfill units shall not:

(a) Cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirements of the Clean Water Act (CWA), including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to Section 402.

(b) Cause the discharge of a nonpoint source of pollution to waters of the United States, including wetlands, that violates any requirement of an area-wide or state-wide water quality management plan that has been approved under Sections 208 or 319 of the CWA, as amended.

The surface water management system for the Phase II system includes diversion berms located on the side slopes approximately 10 to 30 ft below the perimeter of the landfill top deck and along the perimeter road that directs surface water to rock-lined downdrains (currently geosynthetic liner is used for downdrains), which in turn convey water to perimeter infiltration drainage ditches or to the infiltration basin near the entrance to the facility.

Refer to Section IV of this Site Operations Manual – *Surface Water Management Plan* for a detailed description of the surface water management system at the KLF Phase II.

2.5.4 Storm Water Pollution Management and Control System

Storm water run-off associated with industrial activities is typically regulated by a NPDES General Permit (HAR §11-55, Appendix B). However, there is no storm water discharge point from the KLF Phase II, therefore, no NPDES General Permit for the KLF.[1]

[1] A request for exclusion under the NPDES General Permit was submitted to the DOH by the County of Kaua'i, on September 7, 2007, and resubmitted on February 27, 2013. The request for exclusion was verbally granted by DOH July 1, 2021 (Moises, 2021).

In addition, the KLF Phase II implements a *Spill Prevention Control and Countermeasure Plan* (see Section IV of this Site Operation Manual) to prevent releases of petroleum products used on site from being discharged into surface water.

2.5.5 Groundwater Monitoring Network

In accordance with HAR §11-58.1-16, a groundwater monitoring program is in place at the KLF Phase II for the purpose of early detection of changes to groundwater in the area of the Landfill. The program includes a groundwater well network, and sampling, monitoring, and analytical procedures.

KLF Phase II groundwater and leachate monitoring activities are conducted pursuant to the KLF Phase II Groundwater and Leachate Monitoring Plan, which complies with the CFR, Solid Waste Disposal Facility Criteria (and its revisions) in 40 CFR §258, and HAR §11-58.1. Refer to Section V~~I~~ of this Site Operations Manual – *Groundwater and Leachate Monitoring Plan*, for a complete description of the KLF Phase II Groundwater Monitoring Program.

3. LANDFILL CONSTRUCTION

3.1 Composite Liner

The Phase II liner consists of the following elements, listed from bottom to top, as shown in the Phase II as-builts:

- 6-inch-thick granular foundation (sideslopes only)
- Prepared granular sub-base grade
- Geosynthetic clay liner (GCL) consisting of a smooth 20-mil HDPE geomembrane with an adhered bentonite powder layer on one side (Gundseal). The GCL was installed with the smooth side in direct contact with the granular subbase base grade and foundation layer on the sideslope, and with the bentonite component side up
- Single-sided textured (SST) 60-mil HDPE geomembrane (textured side down) against bentonite component of the GCL on the side slope
- Smooth 60-mil HDPE geomembrane against bentonite component of the GCL on the base
- 24-inch sand drainage layer (base and side slope)

The Cell I expansion liner consists of the following elements, listed from bottom to top, as shown in the Cell 1 as-builts:

- Prepared subbase grade
- 60-mil HDPE geomembrane (textured on both sides)
- GCL composite consisting of bentonite powder/granules encapsulated between a carrier non-woven geotextile and a cover of non-woven geotextile, needle punched for additional strength
- 60-mil HDPE geomembrane (textured on both sides)
- 16 oz/yd^2 non-woven cushion geotextile
- 12-inch granular drainage layer (leachate collection) consisting of gravel, with a maximum rock size of 1.5 inches, with a permeability of $3x10^{-1}$ centimeters per second (cm/sec) or greater, and containing less than 12 percent calcium
- 6 oz/yd^2 separator geotextile
- 24-inch gravel operations layer
- The side slope liner of Cell 1 consists of a layer of internally reinforced GCL sandwiched between two 60-mil HDPE geomembranes textured on both sides. The geotextiles, 12-inch drainage, and 24-inch operations layers on the base liner shall extend up the entire length of the side slopes

- The side slope liner of Cell 2 over Phase I also includes, in certain areas, a reinforcement grid and a non-woven geotextile between the prepared subbase grade and secondary HDPE geomembrane, which is smooth on the bottom side

The Cell 2 expansion liner consists of the following elements, listed from bottom to top, as shown in the Cell 2 expansion as-builts:

- Prepared subbase which includes a 6-inch-thick granular foundation layer
- Reinforcement geogrid (east and west ends of the Phase I slope only)
- 16 oz/yd^2 non-woven cushion geotextile (except on the Phase I slope)
- Composite liner system consisting of (from bottom to top):
  - Secondary 60-mil-thick HDPE geomembrane SST on the Phase I slope with smooth side facing down and double-sided textured [DST] on the floor and Phase II slope GCL
  - Primary 60-mil thick DST HDPE geomembrane
  - 16 oz/yd^2 non-woven cushion geotextile
  - 12-inch-thick granular drainage layer;
  - 6 oz/yd^2 non-woven separator geotextile
- 24-inch-thick operations layer, of which the lower 18 inches on the southern side slope over Phase I comprises soils from the Puhi Metals Recycling Facility

3.2 Construction Requirements

In cases where construction or repairs are made to the landfill or monitoring systems, which includes, but is not limited, to base grades, liner grades, leachate lines, sumps, storm water and leachate management systems, gas and groundwater monitoring systems, and other features needed to assist in any future site repairs and development, construction plans will be developed by a registered professional engineer of Hawai‘i. A registered surveyor will provide accurate as-built documentation for any construction or repairs made at the KLF Phase II.

Construction Quality Assurance (CQA) documents will be prepared. CQA documents prepared for the existing Phase II cells are located on site at the KLF Phase II. In general, the following requirements shall be followed during construction:

- Geosynthetic installation must be performed by a qualified contractor who has installed a minimum of 500,000 square feet of similar liners or who is working under the supervision of the liner manufacturer. All geosynthetic installation must be performed under CQA protocols developed by a registered professional engineer in the state of Hawai‘i and implemented by a qualified CQA inspector with at least five years of experience in landfill

CQA, which is responsible to the professional engineer. The KLF Phase II must notify the DOH, in writing, five days prior to any liner installation work.

- Grade survey control markers will be installed in sufficient numbers during construction to delineate the boundaries and elevations of the MSW landfill areas to demonstrate compliance with permitted grades.
- No waste may be placed in newly constructed cells until the CQA engineer has reviewed all inspections, text records, and drawings for each sector, as certified by the liner manufacturer or manufacturer's representative and certified the construction in a CQA report containing a documented control program of all phases of liner installation. The report will certify that the construction was prepared according to plans and specifications and the liner manufacturer and will be submitted to the DOH for approval. If the DOH requests, an inspection of the new cell can be arranged with the engineer and KLF Phase II site management.

In addition to the above requirements, the CQA report shall also include the following, as applicable:

- A map of each sector showing panel layouts as installed
- A letter of certification signed by the Quality Assurance/Quality Control (QA/QC) engineer stating that all weld test results and vacuum or pressure testing of all welded seams were visually observed
- Liner inspection reports
- QA/QC testing procedures
- Laboratory analyses
- As-built and survey drawings documenting the cell construction, including the bottom and top of sump elevations, location and elevation of base grades, liner system, and leachate collection system
- Written certification, by the liner contractor and installer, certifying the acceptability of the soil cushion layer prior to liner placement
- Documentation showing that panels were properly joined within the cell, as well as with liner systems in adjacent cells
- Documentation and as-built drawings to show supporting berms constructed beneath areas where new liner systems are connected with previously installed liner systems
- Documentation and as-built drawings of anchor trenches and berms (temporary and permanent) located around each cell
- Documentation and description of any temporary storm water control measures implemented

- Identification of any deviations from the construction plan, reason for the deviation, and effects on the stability and integrity of the design. Any deviations shall be reviewed and approved by the design engineer, who shall verify that the deviation is comparable or improved in its capability to protect human health and the environment
- Written certification by a professional engineer that the liner system, leachate collection system, and any other associated items were installed in accordance with the approved documents and HAR 11-58.1

3.3 Other Landfill Construction Requirements

The County shall submit any significant proposed changes affecting the design or structural integrity of the installed liner system or leachate collection system in writing at least 180 days prior to commencement of the proposed change. Regular maintenance procedures, such as replacing broken valves with a similar valve for example, do not require DOH approval. At a minimum, the written proposal shall include the identification of affected cells or areas, reason for the proposed change, engineering design, point of compliance evaluation, implementation schedule, and other pertinent information.

Construction of additional disposal cells or modification of the lateral or vertical extent of disposal cells shall not occur without written approval by the DOH. Modification requests shall be submitted at least one year prior to commencement of the proposed construction or modification. The construction and design plans shall be prepared and certified by a professional engineer, with at least five years' experience in designing landfills and registered in the State of Hawai‘i.

4. OPERATIONAL PROCEDURES

4.1 KLF Waste Acceptance Policy

Certain wastes are prohibited from being disposed of at the KLF Phase II. Refer to Section I, Part B of this Site Operations Manual – *Waste Acceptance / Hazardous Waste Exclusion Program*, for a detailed description of the KLF Phase II's waste acceptance policy, methods used to detect and prevent the disposal of hazardous/unacceptable wastes, and special waste identification and handling procedures.

KLF Phase II personnel take necessary steps to ensure compliance with all operating and regulatory requirements associated with waste acceptance. Landfill personnel have the authority and responsibility to reject unauthorized loads, have unauthorized material removed by the transporter, assess appropriate surcharges, and have unauthorized materials properly managed by the facility.

KLF Phase II will cease accepting waste once the KLF Phase II has reached its design capacity as defined in Drawing No. 4 of the December 2015 ~~*Engineering Report*~~ *Kekaha Landfill Phase II – Cell 2 Lateral Expansion Kekaha Sanitary Landfill*, or when the land use permits are terminated (AECOM, 2015). Upon approval of the proposed vertical expansion, the design capacity will be defined by the grading depicted on Sheet C-102 of the *Permit Design Drawings for the Phase II Vertical Expansion, Kekaha Municipal Solid Waste Landfill, Kaua'i County Hawaii* (Tetra Tech, 2023). Closure actions will then be initiated according to details provided in Section VIII~~IX~~ of this Site Operations Manual - *Closure/Post-Closure Plan*.

4.2 Operating Hours

The KLF Phase II current operating hours are 8:00 a.m. to 4:00 p.m. 7 days per week, up to 352 days per year (closed New Year's Day, Martin Luther King Junior Day, President's Day, Prince Kuhio Day, Good Friday, Memorial Day, King Kamehameha Day, Independence Day, Admission Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day). If the holidays fall on Monday through Thursday, the KLF is open a half day from 8:00 a.m. to 11:00 a.m. If the holidays fall on Friday through Sunday, the KLF is closed.

If any waste is to be accepted outside of the normal operating hours, then the KLF Phase II Site Manager[2] or designated personnel will notify the DOH in writing with at least 24 hours of advanced notice. If the event is unanticipated, the permittees shall provide verbal notice of the event within four hours and written notification within eight hours of commencement of the event. A fax or email submission of the notification is acceptable. The written notification shall specify the affected dates and times, the nature and reason for the extended operations, identification of

[2] The title of Site Manager and Site Supervisor may be used interchangeably in the text of this operations plan. Both titles have the same meaning.

any considerations associated with the extended operations, and controls/procedures that will be implemented to mitigate any adverse impacts of the extended operations.

4.3 User Population

A list of the types of users of the KLF Phase II will be prepared for operator reference and regulatory review. In the event that a change is required for the user population or the screening and review process to identify legitimate users, a written update of the change shall be submitted to the DOH. The written update shall include details describing the appropriate adjustments to the screening and review process that will be needed to accommodate the user population change.

4.4 Incoming Waste

Waste from the island of Kaua‘i arrives at the KLF Phase II using the following delivery methods:

- Transfer trailers from off-site transfer stations
- Direct commercial haul
- Residential self-haul

Scale house attendants and KLF Phase II equipment operators (operations personnel) monitor the incoming waste. They are trained annually on the KLF Phase II Waste Acceptance / Hazardous Waste Exclusion Program and are familiar with the rules and regulations governing the various types of waste that can or cannot be accepted at the KLF Phase II. The scale house and site layout have been constructed to allow adequate space for queueing of vehicles waiting for waste drop-off. The KLF Phase II is not required to accept any solid waste that may cause problems in maintaining full and continuous compliance with the solid waste permit. If the scale house attendant or operations personnel have any doubt or concern regarding the acceptability of a particular waste load, they will contact KLF Phase II Management for guidance prior to the load being deposited at the working face.

Once a waste load has been determined to be acceptable by the scale house attendant, it is weighed and the hauler proceeds to either the MDOF (residential self-haul) or the active disposal area (transfer trailers and commercial haul). The active disposal area is a designated portion of the waste cell, which is any lined area that has or will receive waste and has not been closed. Waste tonnage data are entered into the scale house records.

In some situations, the KLF Phase II shall cease acceptance and disposal of waste in high wind conditions, as necessary for safety and environmental compliance and as determined by the foreman and Site Manager or Environmental Professional. The permittees shall maintain a log of such events, including the date, time of shutdown, and associated estimated wind speed.

Signage will be posted to inform drivers/operators of non-household vehicles that their loads should be covered prior to entering the facility.

4.5 Traffic Control

Signs are posted to direct incoming traffic from the front gate to the scale house. After being processed at the scale house, waste haulers are directed to the disposal area by signs, traffic barricades, cones, or traffic controllers. KLF Phase II operations personnel are posted at key locations, as needed to direct traffic to the MSW disposal areas. Traffic signs posted along the main haul road also inform customers of the on-site speed limit of 15 miles per hour (mph).

In addition, rules for waste disposal and prohibited waste are prominently displayed on signs at the site entrance and at the scale house.

4.6 Waste Unloading

At least one landfill operator is present (at all times) at the disposal area during hours when the landfill is accepting waste. Landfill equipment is to be operated at least 15 ft away from an unloading vehicle. At the landfill disposal area, KLF Phase II traffic controllers stop vehicles/trucks at a staging area and then direct the waste haulers to unload in a specific area known as the "tipping area." KLF Phase II equipment operators and traffic controllers communicate using two-way radios to coordinate the vehicle/truck traffic in the disposal area so that landfill customers enter the tipping area safely when landfill equipment is pushing waste from the unloading area to the working face. Vehicle/truck traffic will be directed to unload at the tipping area away from landfill equipment pushing trash in the area.

During waste unloading, a 15-ft clearance between vehicles is maintained at all times, and no more than two people should be out of a vehicle at any time. The traffic controller will also ensure that children and pets are kept in their vehicles at all times. Drivers / landfill customers must stay within 6 ft of their vehicle.

KLF Phase II equipment operators observe the unloading operations to monitor the waste for unacceptable materials. All KLF Phase II personnel at the working face are equipped with two-way radios to facilitate coordinated and safe traffic control, and also to stop any attempts to salvage materials from waste deposited at the working face. Scavenging is prohibited at the KLF Phase II.

4.7 Waste Placement

Waste placement within the KLF Phase II must conform to standard procedures to provide maximum protection of the synthetic liners, to ensure adequate stability of the base and waste mass, and to ensure the best performance of the leachate collection system.

In general, the "area fill" method of land filling is used, which consists of spreading and compacting waste in horizontal layers ("lifts") that form the waste cells.

4.7.1 General Lift Construction

After waste is unloaded at the tipping area, waste placement procedures are as follows:

- A bulldozer enters the tipping area, pushes the waste to the working face, and spreads it into layers up to 2 ft thick
- A compactor traverses the working face area to compact the waste
    - Large or bulky objects are separated from the waste at the working face, placed in the upper portion of the advancing waste layer, and crushed by compaction equipment to prevent bridging and voids that could result in localized subsidence
    - Successive layers of compacted waste form lifts advance/build up to form the waste cell
    - At the end of each working day, the exposed waste at the working face is covered with a minimum of six inches of soil or an alternative daily cover (ADC) (as approved by the DOH)
    - Waste placement and compaction proceeds until final elevations and grades are achieved

During waste placement operations, the waste surface will be graded to prevent surface water run-on and promote water run-off.

4.7.2 Wet Weather Disposal Operations

Wet weather operations are implemented when excessive precipitation may make normal operations difficult. In advance of the rainy season or extended wet periods, a specific wet weather disposal area and access road are designated for use based on filling plan progress and the approximate waste volume expected. A wet weather pad is constructed by covering the disposal area (and road[s] leading to, if necessary) with crushed rock-type material or an effective alternative. This allows for safe driving and continuous unloading during rainy weather. It also helps to minimize the tracking of mud onto public roads. During wet weather, and if practical, the active working face is kept relatively small, and soil is stockpiled nearby for daily cover.

4.7.3 Initial Select Lift

The first layer of solid waste shall be a minimum of 5 ft of select waste (pre-compaction). Any objects with dimensions greater than 24 inches will be removed prior to placement to prevent damage to the liner. The initial lift within each landfill cell will consist of a mixture of MSW, household trash, etc., not to include large, sharp, or possibly damaging objects such as pipe, re-bar, lumber, or bulky materials. This lift, in addition to the 24-inch-thick operations layer and the 12-inch-thick drainage gravel layer, will provide adequate protection to the underlying geosynthetic liner.

Placement of a minimum 5-ft-thick select waste layer is monitored by the County of Kaua‘i Site Manager (or properly trained KLF Phase II personnel) to ensure compliance with the site’s

operating permit and maintain liner integrity. Select waste refresher training is conducted (as necessary) to ensure that KLF Phase II operations personnel are aware of the importance of select waste placement in new cells. Operators are instructed on what materials are appropriate for use in the select lift, and that they should pull any unacceptable objects from waste loads that may have been dumped for use as select waste. Documentation of training is kept on site as part of the KLF Phase II Operating Record/Files.

KLF Phase II equipment operators follow the standard operational procedures listed below to ensure that landfill equipment does not damage the underlying liner.

- Only tracked, low ground pressure bulldozers or landfill equipment with rubber wheels are allowed on the surface of lining system (the operations layer)
- A minimum of 5 ft of select waste is placed above the operations layer before any heavy point-load landfill equipment, such as compactors, are operated over the area
- Only moderate compaction is applied to the top portion of the initial select lift

If damage to the liner or liner system is suspected, the KLF Phase II operator must notify the Foreman immediately. The Foreman will contact the KLF Phase II Site Manager and appropriate personnel.

4.7.4 Landfill Side Slopes

For waste mass and liner system stability, special care is given to the configuration of the waste as it rests against the side slope of the liner system. As stated earlier in this section, waste configurations are based on a slope stability analysis specific to each cell or area of the landfill. The top surface of the cells will be sloped at least ~~five~~ three percent to facilitate drainage. Side slopes in the MSW landfill area will not exceed a slope of 3.5H:1V (horizontal to vertical).

4.7.5 Buffer Zone

Waste disposal will not occur within a designated buffer zone defined as the following:

- 52 ft from the edge of waste to the property line along the west/northwest edge of Cell 1. This would provide an approximate 82-ft distance from the closest edge of waste of Cell 1 to the nearest agricultural activity. This distance comprises about 52 ft from the edge of waste to the landfill property line and 30 ft from the landfill property line to the far edge of a federal roadway right-of-way for the Lae-O-Kokole Lighthouse.
- 300 ft from the edge of waste to the property line along Kaumualiʻi Highway.
- 1,000 ft from the property line of any future urban area known at the time of solid waste permit issuance.

4.8 Cover Material Requirements

Landfill operations require various phases of cover to be utilized throughout the life of the landfill. This section describes the requirements for cover at the KLF Phase II. Soil cover material or ADC is used at the KLF Phase II to reduce infiltration of surface water (leachate reduction); to minimize odors; and to deter nuisance vectors such as insects, rodents, and birds. In addition, tarps are used as ADC where appropriate.

4.8.1 Daily Cover

In accordance with HAR §11-58.1-15(b)(1), the active MSW disposal area is covered at the end of each day with a minimum of 6 inches of daily cover soil, or ADC, to control disease vectors, fires, odors, or blowing litter. Trucks deliver daily cover to the refuse disposal area where it is applied to the working face by bulldozers at the end of each day (under normal operating conditions). If additional waste is to be placed in the same area, the upper part of the cover soil may be scraped off for subsequent reuse, prior to further lift progression. The volume and type of daily cover, location placed, cell geometry, and volume of waste disposed of will be recorded in the daily operations manual.

4.8.2 Alternative Daily Cover

The use of ADC is limited to daily cover use. If a new proposed ADC or alternative thickness of earthen material is required, a formal written request will be submitted to the DOH to begin demonstration projects to demonstrate that the ADC is capable of controlling disease vectors, fires, odors, blowing litter, or scavenging. The results of the ADC demonstration project will be submitted to the DOH before continued use of ADC beyond the demonstration project.

ADC in the form of tarps have been approved for use at the KLF Phase II if appropriate conditions exist. Specific tarps used as ADC shall be approved by the DOH prior to use. The tarps shall be Griffolyn TX1200 (with a minimum 10-millimeter thickness and nylon scrim reinforcement) or equivalent.

Areas where tarps are used as ADC are subject to additional requirements. Any areas in which the tarps have been used shall be covered with waste or daily cover within 24 hours after initial placement. The tarp placement is limited to 100 ft x 100 ft (approximately three tarps). The areas that are not covered with ADC shall be covered with at least 6 inches of compacted daily cover consisting of soil. An intermediate cell construction method shall be used, with the intermediate cells being limited to 2,000 tons. The approximate dimensions of a 2,000-ton intermediate cell at the KLF Phase II are to be 100 ft by 100 ft by 10 ft high. Once the intermediate cell is completed, all faces of the cell shall receive a compacted six-inch layer of soil. Additional soil to 12 inches thick shall be added to the 6-inch cover material for all-weather haul roads, at the tipping pad, and areas needing intermediate cover. Intermediate cell construction soil shall use a fine grain, clay-type soil.

4.8.3 Intermediate Cover

Intermediate cover, consisting of a minimum of 12 inches of soil (including 6 inches of daily cover), is required over all inactive waste areas, which are defined as areas that do not receive waste within a 30-day period. Inactive areas shall be graded to promote surface water drainage. Effective drainage minimizes ponding, infiltration, and erosion. Intermediate cover shall be selected to have a particle size adequate to minimize infiltration and to promote surface water drainage. Any areas that have vehicular traffic shall also be covered with intermediate cover. Intermediate cover shall be inspected at least once per month, and issues shall be addressed as they are identified, such as repairs for erosion and cracking. The permittees shall maintain a log of inspections, findings, and corrective actions, if needed.

4.8.4 Final Cover

A final cover system will be placed over the final lift of waste in filled areas that have reached design final grades. A final cover performs the following functions:

- Separates the waste from the environment
- Adjusts the landfill surface topography to provide appropriate slopes to promote run-off and controlled drainage of surface water
- Controls erosion by conveying run-off at non-scouring flow rates
- Minimizes surface-water infiltration into the waste
- Controls and contains landfill gas

The proposed final cover configuration for the KLF Phase II will meet or exceed the existing state and federal regulatory requirements and will be constructed in accordance with the KLF Phase II *Closure and Post Closure* Plan, included in Section VIII~~I~~~~X~~ of this Site Operations Manual. Refer to the Plan for a detailed description of the proposed final cover design, associated CQA program, and additional closure and post-closure activities for the KLF Phase II.

4.8.5 Cover Integrity

Intermediate and daily cover integrity is inspected and monitored by the KLF Phase II Site Manager or other qualified KLF personnel for proper placement, the presence of vectors, “flagging” waste, and erosion as part of monthly inspections, vector control inspections, and internal site compliance tasks. Site operations will mitigate any deficiencies in the intermediate cover by restoring or adding the cover material, grading, track-walking, or compacting the area. A log shall be maintained to document inspections, findings, and corrective actions (if needed).

Additionally, a Daily Cover Monitoring Verification Program is being implemented. The KLF Phase II Site Manager or other qualified KLF personnel will take digital photos of the active workface at the middle and end of each day (Monday through Sunday), from the same perspective, to document the placement and thickness of daily cover. Digital photo records shall be maintained

at the KLF office and submitted to the DOH via email by noon on the following business day, with cell location information provided in photographs and in emails.

4.9 Temporary Storage

Stockpiled materials within the KLF waste boundary shall be restricted to cover material, gravel for roads/wet weather areas, and landfill equipment, except as otherwise approved by the DOH. The volume of material storage stockpiles shall not exceed 30-day capacity. If temporary storage exceeds or is anticipated to exceed 30 days, the permittees shall construct temporary berms or implement other measures to prevent erosion of the stored material and allow for proper surface water flow.

5. SPECIALIZED LANDFILL PROCEDURES

5.1 Storage and Disposition of Unacceptable Waste

Information regarding all hazardous or unacceptable wastes that are managed, transported off site, or generated on site is maintained on site as part of the KLF Phase II Operating Record/Files.

5.1.1 Hazardous Waste

The KLF Phase II *Waste Acceptance / Hazardous Waste Exclusion Program* (Section I – Part B of this Site Operation Manual) establishes procedures for preventing, detecting, and managing wastes that are not suitable for disposal at the landfill. If hazardous wastes are detected at the landfill working face and the hauler/generator is unknown, the KLF Phase II has procedures in place to manage or temporarily store the waste in a designated area until a licensed contractor transports the waste off site for proper disposal (see Section I – Part B). Any hazardous wastes generated on site by equipment maintenance activities are properly stored in appropriate containers in the maintenance shop area or an appropriate alternative storage area.

5.1.2 Non-Hazardous Unacceptable Waste

In accordance with HAR§11-58.1-65(b) and (c), green wastes, scrap vehicles, tires, compressed gas tanks, vehicle batteries, and chlorofluorocarbon (CFC) [Freon]-containing appliances (white goods such as refrigerators, freezers, and air conditioners) may not be disposed of at the KLF Phase II. Scrap vehicles are readily identifiable at the scale house and will be rejected at the scale house. Tires, CFC-containing appliances, and compressed gas tanks are occasionally encountered in mixed loads after they have been dumped at the working face. In these cases, KLF Phase II personnel will carefully transport the waste to the temporary storage area, and the waste will be identified, logged, placed in bins or separated onto pallets, labeled, and stored until a licensed contractor transports the waste off site for proper disposal, as required by federal and state regulations. This temporary storage area is away from normal traffic flow and allows for a safe storage environment. Waste-specific storage and disposition guidelines are described below.

5.1.2.1 Tires

Tires that are pulled from the working face are temporally stored at the tipping area until they are moved to the MDOF. The number of tires collected is recorded on the KLF Phase II Daily Operations Log. The tires are taken for recycling on an as-needed basis by the County of Kaua‘i, typically monthly.

5.1.2.2 CFC-Containing Appliances

CFC-containing appliances are handled and stored in a manner to prevent damage, spills or releases of oil, lubricants, or CFCs. Refrigerators, freezers, air conditioners, and any other items containing CFCs are handled in accordance with 40 CFR §82.156(f), as amended. Refer to the KLF Phase II *Refrigerant Management Plan*, located in Section I – Part B (Appendix B of the *Waste Acceptance / Hazardous Waste Exclusion Program*) of this Site Operations Manual. CFC-containing items are removed from the designated storage area and transported off site by a

certified contractor working for the County of Kaua‘i to a scrap metals recycler (or location with equivalent capabilities) where the refrigerant is properly removed and the appliance is properly recycled.

5.1.3 Site Generated Waste

A site’s generator status is determined by the quantity of hazardous waste generated at the site monthly. The KLF Phase II is classified as a conditionally exempt small quantity generator. Wastes that are generated on site at the KLF Phase II include, but are not limited to:

Table 1: Site-Generated Waste

Oil Filters	Spent Lead Acid Batteries
Transmission Filters	Scrap Tires
Fuel Filters	Spent Anti-Freeze
Water Filters	Empty Paint, Aerosol Cans
Hydraulic Filters	Empty Containers
Used CRTs	Used Tires
Air Filters	Paint Solvent/Thinner
Used Oil	Scrap Metal
Lubricating Oil	Welding Slag
Spent Solvent	Leachate
Spent Absorbents/Rags	

The quantity of site generated waste streams is identified and tracked on the *Waste Accumulation / Generation Waste Log* (see Attachment A). Load check items and items pulled from the working face are included on this log. The KLF Phase II utilizes third-party contractors for transportation, recycling, and disposal of site-generated waste. Each vendor signs an Environmental Service Agreement. Wastes are properly managed on site according to applicable regulations:

- Appropriate containers and tanks are used for temporary storage
- Wastes are proper marked and labeled
- The temporary storage location of these wastes is inspected as part of the KLF Phase II monthly facility inspections

All documentation related to waste generation and characterization (e.g., waste log, lab analytical data, material safety data sheet, off-site shipping records, etc.) is maintained on site at the KLF Phase II as part of the Operating Record/Files for at least three years, as required by federal regulations.

5.2 Special Handling Procedures

All special waste materials must be pre-approved prior to acceptance at the KLF Phase II. Refer to the KLF Phase II *Waste Acceptance / Hazardous Waste Exclusion Program* (Section I – Part B of this Site Operations Manual) for a description of the KLF's special waste acceptance policy.

Specialized handling and operating procedures are implemented at the KLF to manage the following waste streams for disposal at the KLF:

5.2.1 Friable and Non-friable (Non-hazardous) Asbestos Waste

Refer to the KLF *Asbestos Management and Disposal Plan* (see Section I – Part B - Appendix A) for detailed management and disposal procedures of asbestos/asbestos-containing wastes. If the asbestos waste is properly packaged, there are no operational cut-offs that would preclude the KLF Phase II from accepting asbestos waste.

5.2.2 Treated Medical Waste

Treated medical wastes that have been rendered non-infectious (sterilized or incinerated) may be disposed of at the KLF Phase II. Treated medical waste may pose a physical threat to KLF Phase II operations personnel or the public due to the presence of sharps. The KLF Phase II must be notified at least 24 hours prior to the actual receipt of the waste.

When the load arrives on site, the scale house attendant will notify KLF Phase II equipment operators so that a disposal pit or trench can be excavated into the waste at the working face. The medical waste is unloaded near the trench/pit and pushed (by landfill equipment) into the excavated trench/pit. To protect public health as well as the health of the KLF Phase II employees, treated medical waste is backfilled with a minimum of 2 ft of waste and compacted as soon as possible after dumping.

5.2.3 Contaminated Materials

Contaminated materials (soils, debris, and other materials contaminated with petroleum or other chemical products, and polychlorinated biphenyl [PCB] contaminated soils not regulated under the Toxic Substances Control Act [TSCA]) may be accepted for disposal at the KLF Phase II following approval from the County of Kaua‘i. The DOH will be notified any time the KLF Phase II accepts contaminated materials. All correspondence incorporated in this policy will include the following: acceptance date(s), quantity and description, origin of waste, waste profile sheet/approval manifest, proposed management of material, and special management / handling procedures for the waste.

Contaminated soils that are below the DOH Environmental Action Levels (EALs) for Direct Exposure in an Industrial Setting may be used as daily cover, provided that the daily cover is not exposed for more than 24 hours. Contaminated soil that exceeds the DOH EALs in a residential setting shall not be used as intermediate or final cover. DOH's Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material will be implemented to determine whether contaminated soil is appropriate for use as cover (DOH, 2017).

Trucks delivering contaminated material must be covered. KLF Phase II personnel will oversee the unloading of all contaminated materials and will ensure that the materials are removed completely from the trucks. If necessary, a water truck will be available during dry or windy conditions to suppress dust while contaminated materials are being unloaded. Other special disposal methods may be employed during dry and dusty conditions, such as the use of synthetic or soil barriers or waste containerization. If appropriate, air monitoring may be required during disposal operations. Disposal of contaminated material will not occur during high wind speeds. The decision to cease disposal will be at the discretion of the Site Supervisor or designated County employee. All documentation relating to contaminated materials acceptance and use of special disposal procedures is maintained on site as part of the KLF Phase II Site Operating Record/Files.

5.2.4 PCB-Contaminated Waste

PCB-contaminated solid waste can be accepted for disposal at the KLF Phase II following verification that the waste contains less than 50 parts per million (ppm) PCBs. Small non-leaking capacitors contained in fluorescent light ballasts, white goods, and other electrical appliances are not considered regulated PCB wastes. If approved, the KLF Phase II must be notified at least 24 hours prior to the actual receipt of the waste.

Proper manifest documents are required to accompany the hauler into the landfill. The generator is required to ensure that the load does not pose any air emission problems (i.e., dust conditions). The hauler is then directed to a designated unloading area away from the tipping area to ensure a reduced chance of exposing the general public and KLF Phase II employees to PCB-contaminated waste. If necessary, a water truck will be available to provide dust control during unloading. Disposal of PCB-contaminated waste will not occur during excessive wind speeds. This decision to cease disposal will be at the discretion of the Site Supervisor or designated County employee.

5.2.5 Dead Animals and Offal

Dead animals and offal (hides, intestines, and other waste from slaughtered animals) and fresh or frozen uncooked shrimp and other crustaceans can be brought to the KLF Phase II for disposal. The transporter must inform the scale house attendant that they have dead animals, offal, or crustaceans, and the scale house attendant will notify KLF Phase II equipment operators at the working face. A disposal pit or trench will be excavated into the waste at the working face, and the animal/animal waste will be placed in it. To protect public health and the health of the KLF Phase II employees, dead animals and offal are covered with a minimum of 2 ft of MSW or soil and compacted as soon as possible after dumping. Odor neutralizers and additional soil cover shall be used to minimize/reduce odors. Additionally, uncooked shrimp and other crustaceans shall also be containerized and double bagged.

Special measures shall be taken to prevent birds from alighting at the workface during delivery and disposal of loads of fresh or frozen uncooked shrimp and other crustaceans. Such measures may include producing noise, deploying balloons, and/or having active equipment guard the load.

5.2.6 High Moisture Content & Odorous Waste

High moisture content waste (e.g., municipal sludge) must be stabilized, solidified, or dried with absorbent by the generator prior to disposal at the KLF Phase II. All waste except expired/off-spec food products must meet liquids restriction criteria (paint filter test).

Odorous loads must be deodorized by the generator either by bagging the material or treating the load with odor-control products prior to disposal at or delivery to the KLF Phase II.

Odorous / high moisture content wastes are unloaded close to the working face and then covered immediately with dry solid waste.

5.2.7 Radioactive Waste

Radioactive waste is not accepted for disposal at the KLF Phase II.

6. SITE MAINTENANCE AND CONTROL

This section sets forth policies and procedures of the KLF Phase II that help to prevent and control air pollution, explosive gas, mud and dust, litter, odor, and disease vectors, in addition to maintaining the site and its roadways. The KLF Phase II operates in compliance with State (HAR §11-58.1-15 [e] and HAR§11-60.1) and Federal Clean Air Act requirements for air pollution control.

6.1 Access Roads

All access roadways used by KLF Phase II customers are maintained as passable, all-weather roads by surfacing with rock, gravel, or asphalt/concrete rubble. Roads are re-graded as needed to minimize depressions, ruts, and potholes and maintain safe operating conditions. The landfill haul roads and access roads are maintained in a reasonable dust-free condition by periodic spraying from an on-site water truck throughout the day. Roadside drainage ditches and swales are cleaned or otherwise maintained on an as-needed basis to prevent erosion/damage.

Two-way access roads have a minimum width of 30 ft, and one-way roads have a minimum width of 15 ft. Roads are constructed with a maximum grade of eight percent, except for short distances where less steep grades cannot be achieved.

Temporary roads may be constructed as other than all-weather roads, provided they are not needed for maintenance of drainage facilities, emergency access, or truck routes for exiting the facility during wet weather.

6.2 Air Criteria & Gas Control

Pursuant to 40 CFR 60, Subpart WWW, the New Source Performance Standard (NSPS) for Municipal Solid Waste Landfills, facilities that commence construction, reconstruction, or modification after May 30, 1991, are subject to the requirements of the rule. The rule specifies that both volume and mass after a landfill modification must exceed both 2.5 million megagrams (Mg) and 2.5 million cubic meters (m^3) to trigger Tier 1 emission rate calculations. With the permitting of the 2013 vertical expansion, the KLF Phase II exceeded the 2.5-million Mg design capacity criteria requiring additional analysis of non-methane organic compounds (NMOC) emissions. As required by the rule, the County submitted an Amended Design Capacity report reflecting the modification to greater than 2.5 million Mg and 2.5 million m3 to the DOH and United States Environmental Protection Agency (EPA) on June 2, 2014, within 90 days of the approval of the 2013 vertical expansion. The report included a Tier 1 calculation prepared in accordance with 40 CFR §60.752(b) demonstrating that the NMOC emission rate exceeded 50 Mg/yr making the facility subject to the gas collection and control requirements of the landfill NSPS.

Geosyntec operates KLF Phase II and Phase I in accordance with the Covered Source Permit (CSP) No. 0802-01-C, and the site complies with NSPS operational, monitoring, and reporting requirements. The DOH has indicated in email communication to the County that the site may operate using the current expired permit until the new permit is issued. Geosyntec assumes the

operational requirements under the new permit will be consistent with the operational requirements under existing permit except a few changes to surface emission under the updated NSPS.

The KLF implements control and monitoring procedures and plans such as the KLF Odor Control Plan, Fire Prevention Plan, Mud and Dust Prevention Program, and the Perimeter Gas Monitoring Plan, to ensure compliance with state and federal regulations regarding air criteria, the prohibition of open burning, explosive gases control, and air pollution control.

Activities conducted at the KLF Phase II in relation to air programs include:

- Management and disposal of asbestos-containing waste, in conformance with National Emission Standards for Hazardous Air Pollutants (See Asbestos Management & Disposal Plan, located in Section I – Part B, *Waste Acceptance / Hazardous Waste Exclusion Program*).
- Implementation of "Fire Control Procedures" and a Fire Prevention Plan as part of the KLF Phase II Emergency Action Plan to prevent, detect, and suppress several types of fires at the KLF Phase II (fires at the landfill working face; incoming waste load fires; landfill surface and structure fires; landfill subsurface fires; brush/buffer zone fires; and equipment fires). The open burning of solid waste is prohibited at the KLF Phase II (see Section I – Part D, *Emergency Action Plan*, of this Site Operations Manual).
- Controlling dust and odors at the site according to procedures that have been written specifically for these purposes (see Sections 6.3 and 6.4).

6.3 Mud and Dust Prevention Program

KLF Phase II personnel are responsible for preventing the emission of excessive dust from the facility. Site operations personnel utilize a 4,000-gallon water truck to apply water to areas that may be potential dust problems, such as access roads, work areas, and stockpiles. Each "water run" is recorded on the KLF Daily Water Log, with the date the water truck was filled up, the driver's name, and the amount of water used (in gallons). The volume of water and frequency of spraying are increased as needed during particularly dry or windy conditions, or during times of increased truck traffic on site.

The following precautions and operations are implemented on site to prevent the discharge of visible fugitive dust beyond the site property boundary:

- Grading and watering haul roads
- Periodically applying a fine water spray to work areas throughout the day. More frequent applications of water are required during the windy season or when fugitive dust is observed migrating from these areas
- Using sprayers on screening operations
- Applying water on intermediate soil cover

During wet weather, the KLF Phase II implements measures to minimize the tracking of mud onto public roads. Wet weather pads and access routes to the MSW disposal areas may be constructed using rock, gravel, or asphalt/concrete rubble to minimize the exposure of trucks and other vehicular traffic to excessively muddy conditions. On-site and off-site roads (Kaumualiʻi Highway in front of the KLF) are monitored by County employees for the presence of mud, debris, or litter that may have been tracked out. If mud is observed off site, then the mud will be cleaned and considerations will be made for additional mud prevention measures, such as rumble strips, drive-through tire wash, and/or wash pad.

6.4 Odor Control Program

Common landfill odor sources include the wastes being delivered to the landfill and the active disposal area (working face). Other wastes have the potential for becoming odor sources as they biodegrade and decompose.

Odor impacts from landfill operations must be addressed and managed. The KLF Phase II takes a proactive approach to odor management through the implementation of the KLF Phase II Odor Control Program, which consists of the following elements:

- Identification and special handling of odorous wastes
- Effective application of daily and intermediate cover

6.4.1 Management of Odorous Wastes

Waste streams capable of creating off-site odor problems require special handling to minimize potential odor problems. Some of the wastes received at the KLF Phase II are a potential source of odor upon receipt, such as sewage sludge, bulk shipments of off-specification foods and food wastes, and dead animals and offal. These wastes are among those generally handled as "special wastes" in accordance with the KLF Phase II *Waste Acceptance / Hazardous Waste Exclusion Program* (see Section I – Part B, of this Site Operations Manual). Upon receipt at the scale house, odorous loads will be directed to the office to process the Special Waste paperwork and verify that they are on the schedule. The truck will then be directed to a designated area of the landfill working face, and the odorous loads disposed of in the following manner:

- A bulldozer will excavate a trench or pit in previously placed solid waste (known to contain no odorous special wastes), which was placed that same day if possible. The pit will be large enough to contain approximately twice the volume of the anticipated load.
- The odorous load will be off-loaded into the pit.
- The bulldozer will immediately cover the odorous material with at least two ft of MSW or soils and compacted. If needed, additional soil may be placed to minimize the odor.
- If necessary, an odor control agent can be sprayed at the working face to help manage odors and wind transport issues (see next section).
- At the end of the day, daily cover soil will be placed over the working face.

The KLF Phase II may require pre-treatment of odorous loads (addition of oxidizing agents/odor neutralizers) at the generator's site to minimize odor emanation during transport and while on site at the landfill.

Daily scale house records and the KLF Phase II Special Waste Schedule reflect the receipt of odorous loads designated for special handling.

The KLF Phase II requires advance notification for the disposal of known odorous loads.

6.4.2 Soil Cover Material

Odor is also controlled through the application of daily and intermediate soil cover material to MSW. As described in Section 4.8.1, a minimum of six inches of soil cover or ADC is placed over the landfill working face at the end of each day, and the soil compacted by track-walking the area with a bulldozer. Intermediate cover, consisting of an additional six inches, further controls odors on a long-term basis. Regular inspection and maintenance of cover integrity to identify and mitigate cracks or fissures in the cover layers also aids in controlling odor that may emanate from MSW after it is buried.

6.5 Litter Control Plan

The KLF Phase II uses various strategies to confine litter to the landfill working face area, to prevent on-site litter accumulation, and to prevent litter from leaving the landfill premises. Wind-blown litter is controlled through proper management of the landfill working face, the use of portable litter fences, and utilizing laborers to pick up litter. Elements of the KLF Phase II litter management program are described below.

- Managing the landfill working face to control litter entails good waste compacting practices: keeping the working face small; orientating the trucks that are dumping so their cabs are facing into the wind, thus sheltering the waste being off-loaded from becoming airborne; and placing soil cover material or ADC over the working face at the end of each day to keep litter from being picked up by wind. The working face may also be sprayed with limited amounts of water to suppress any potential flyaway waste.
- Portable litter fencing is placed down-wind within 100 yards from where the refuse is being off-loaded at the working face (primary fencing) and relocated as necessary based on wind changes. The fences catch and contain litter that may be picked up by the wind and otherwise carried away from the active face. Litter that is caught by the fences is picked off daily. Additional fences can be placed further down-wind (secondary fencing) to capture litter that may stray past the primary litter fences during gusty wind conditions.
- Landfill employees clean and pick litter along the main haul road and in front of the landfill, along the Kaumualiʻi Highway, to help maintain cleanliness around the facility property. If laborers need to go onto an adjacent property (not owned by the landfill owner), permission from the landowner will be obtained in advance. The collected litter is bagged and disposed of at the landfill working face.

Occasionally, special conditions such as severe gusty winds may require closure of the facility to protect the safety of workers and the public. In general, however, supplementary measures to control or clean-up excessive litter at the KLF during above normal winds may include the following:

- The progressive application of soil cover to the working face throughout the day (rather than waiting until the end of the day) to keep the minimum surface area of waste exposed at any given time
- Erecting additional sections of portable litter fencing
- Hiring extra labor personnel to pick up litter

At the end of each day, the number of laborers hired and the quantity of litter bags that were filled up are recorded on the KLF Phase II Daily Operations Log. There is also a "comments" column on the log where KLF Phase II personnel can make daily notes of severe weather conditions, such as excessive wind. If litter control measures were observed to be inadequate, then additional litter control measures may be implemented.

6.6 Vector Control Plan

This Vector Control Plan was for the KLF Phase II to comply with the operating criteria for MSW landfills as detailed in 40 CFR §258.22 and HAR §11-58.1-15(c), "*Disease Vector Control*". These regulations state, "*Owners or operators of all MSWLF units must prevent or control on-site populations of disease vectors using techniques appropriate for the protection of human health and the environment.*"

This plan explains existing procedures at the KLF Phase II to prevent, detect, and manage on-site populations of disease vectors and minimize nuisance conditions.

An inventory of possible vector species at the KLF Phase II includes rodents, termites, flies, mosquitoes, other insects, and birds. To date, the KLF Phase II has not experienced any vector problems.

The placement of a minimum of six inches of daily cover or ADC on the MSW active working face and a minimum of 12 inches of intermediate cover on inactive portions of the KLF Phase II is essential to controlling vectors. KLF Phase II operators are trained annually to promote compliance awareness with operational practices such as proper depth and frequency of cover material placement on the landfill. Minimizing the size of the active working face is another method utilized at the KLF Phase II to reduce the likelihood of vectors feeding on MSW. Public health and vector control concerns are addressed at the KLF Phase II through the implementation of inspections and subsequent control and abatement activities. KLF Phase II personnel inspect the facility monthly for any signs of vectors or indications of vector attractants that may cause nuisance or disease. The integrity of the landfill cover material is also inspected as part of the KLF Phase II Vector Control Plan to verify that vectors are not an issue. If vectors are identified at the landfill, the County will develop and implement a specific plan to control or eradicate the on-site

populations. As a preventative measure, the administration and scale house buildings are routinely sprayed for rodents, termites, and insects by a licensed exterminator.

All vector control activities and inspection results are documented monthly using a *Vector Control Summary Form* (see Attachment B). Receipts for extermination services and the *Vector Control Summary Form* are maintained on file as part of the KLF Phase II Operating Record/Files.

6.7 Equipment & Vehicle Cleaning

Operators clean the tracks/wheels of landfill equipment at the working face of the landfill at least once per day or more often, if necessary, typically using shovel/dry methodology. Occasionally, equipment may be washed (during disassembly or repair) with a high-pressure steam/water cleaner, within the lined portion of the landfill. Site vehicles are washed at the designated wash rack area.

7. REFERENCES

AECOM, 2015. Engineering Report Kekaha Landfill Phase II – Cell 2 Lateral Expansion Kekaha Sanitary Landfill.

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Tetra Tech BAS, Inc. 2023. *Engineering Report, Kekaha Sanitary Landfill, Phase II Vertical Expansion Kekaha, Kaua‘i, Hawai‘i.* May.

FIGURES

Site Location Map

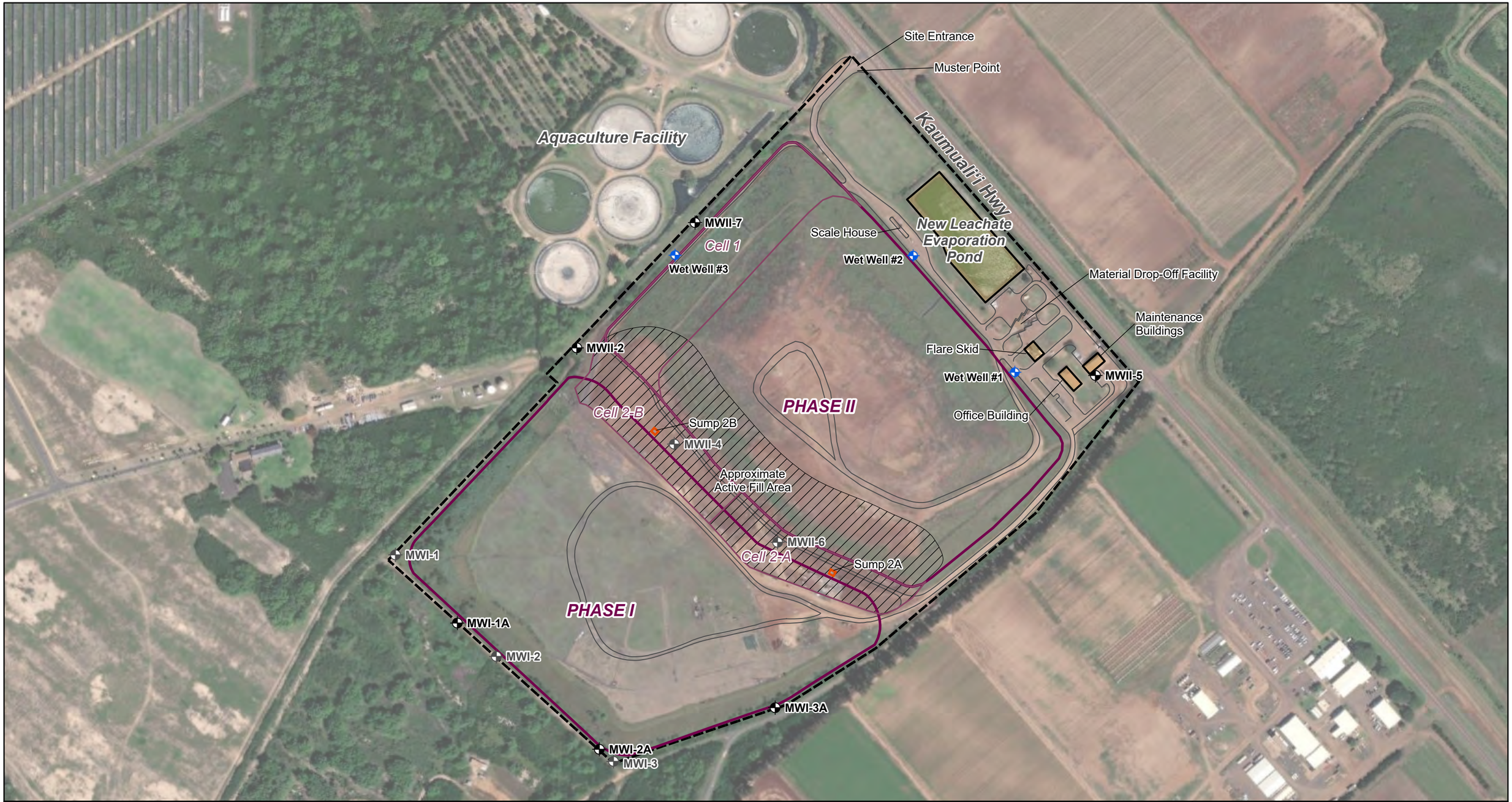
Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

Geosyntec consultants

WG3074	July 2021

Figure 1

P:\GIS\WM\KekahaLF\Project\2021Q3_GWMR\2021Q3_GWMR.aprx\Fig01_SiteLocationMap 7/30/2021 7:09 PM (KWalton)



Legend

- Wet Well (Leachate Sump)
- Groundwater Monitoring Well
- Decommissioned Groundwater Monitoring Well
- Approximate Active Landfill Area
- Sump Location
- Phase Boundary
- Cell Boundary
- Roads
- Property Boundary

N

0 350 Feet

Site Layout

Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

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WG3074 | August 2022

Figure 2

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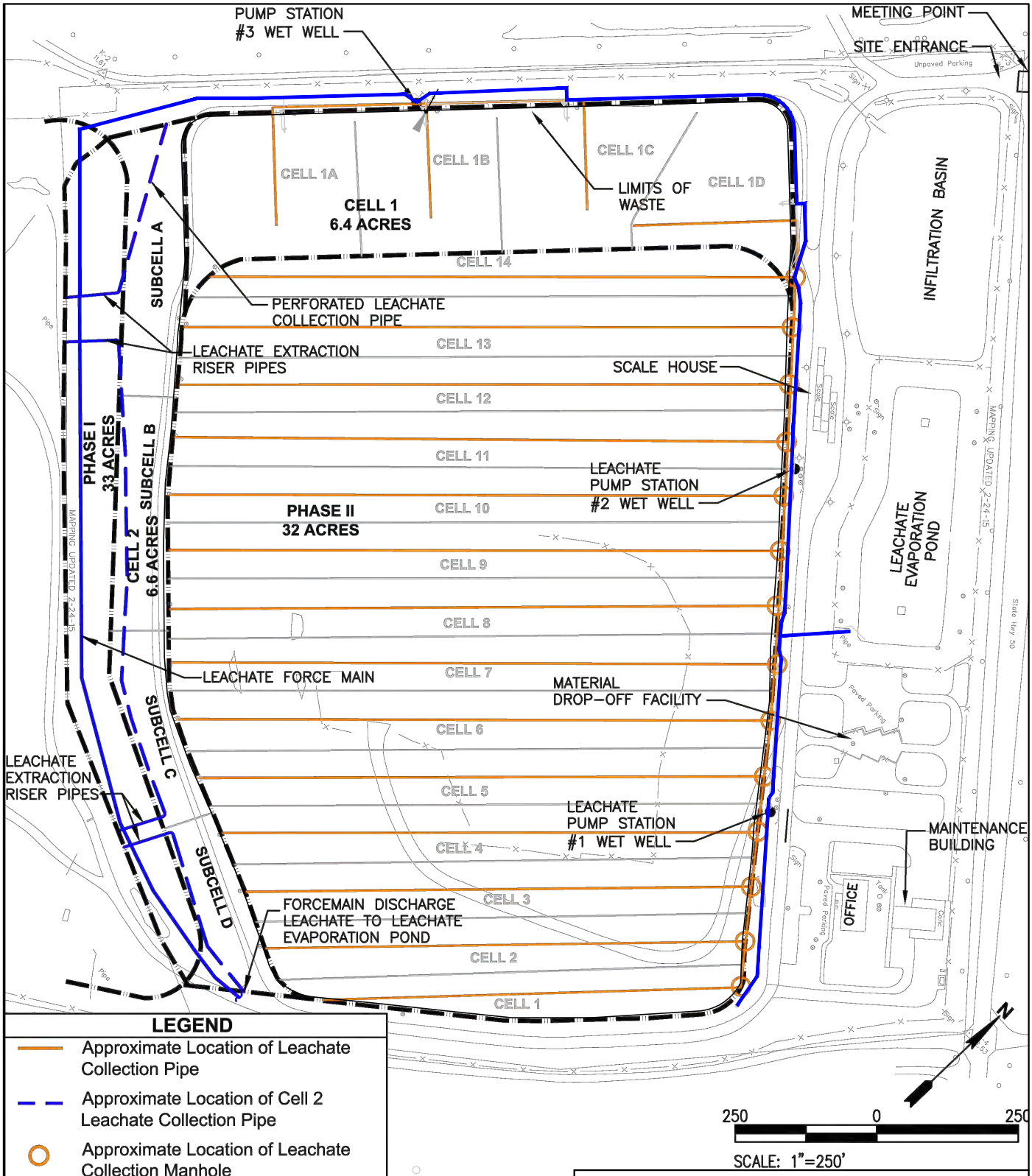

LEGEND

- Approximate Location of Leachate Collection Pipe
- Approximate Location of Cell 2 Leachate Collection Pipe
- Approximate Location of Leachate Collection Manhole
- Approximate Location of Leachate Force Main

SOURCE:
FIGURE 3 OF OPERATIONS REPORT, KEKAHA SANITARY LANDFILL, BY AECOM.

LCRS SYSTEM LAYOUT
KEKAHA SANITARY LANDFILL
KAUAI, HAWAII

Geosyntec consultants

PROJECT NO: WG3074 | OCTOBER 2022

FIGURE 3

P:\CADD\CIVIL 3D\COUNTY OF KAUAI\WG2790 (2020 AOR AIRSPACE)\FIGURES\FIG3_4- LCRS LAYOUT & LINER DETAILS - Last Saved By: SKhalameyzer on 10/11/22

ATTACHMENT A

Waste Accumulation/Generation Waste Log

Kekaha Unacceptable Waste Log				
Date	**Hauler**	**Waste Type**	**Quantity**	**Destination/Comments**

ATTACHMENT B
Vector Control Summary Form

Geosyntec consultants

KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II
VECTOR CONTROL SUMMARY FORM

Inspection Date: Time:		Inspector: Title:	
1. Any vectors/signs of vectors present in: (Look for nests, droppings, chew marks, tracks, etc.)	Yes	No	Type?
Active Working Face	☐	☐	
Material Drop-Off Facility	☐	☐	
Admin Building (interior? exterior?)	☐	☐	
Scale House (interior? exterior?)	☐	☐	
Maintenance Shop	☐	☐	
Other (please list)	☐	☐	

2. Any indication of vector *attractants*, such as food, water, exposed rubbish, shelter?

☐Yes ☐No If Yes, please describe.

3. Any vector *breeding sources* observed that might cause nuisance or disease (standing water, nests, burrows)?

☐Yes ☐No If Yes, please describe.

4. Is daily cover adequate to deter vectors?

☐Yes ☐No If No, please explain.

5. Is intermediate cover intact and adequate to deter vectors?

☐Yes ☐No If No, please explain.

6. Describe *vector control activities* conducted at WGSL this month (at the working face, in facility structures, chemical controls, etc.)?

7. Any nuisances related to vectors/wildlife reported?

☐Yes ☐No If Yes, please explain.

ATTACHMENT C
MDOF Operations Plan

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   1.1 Background 1
2. MDOF OPERATIONS 1
   2.1 Facility 1
      2.1.1 Access Control 2
      2.1.2 Traffic Control 2
      2.1.3 Recordkeeping 2
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Figure 2a and 2b: Site Plan

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Appendix A: Refrigerant Management Plan

ACRONYMS AND ABBREVIATIONS

AOR	Annual Operations Report
CFCs	chlorofluorocarbons
DOH	Department of Health, State of Hawai‘i
KLF	Kekaha Landfill Facility
LABs	lead acid batteries (new)
MDOF	materials drop-off facility (materials)
PCB	polychlorinated biphenyl
SPCC	Spill Prevention, Countermeasure and Control Plan (new)

1. INTRODUCTION

As required in the solid waste permit, this Materials Drop-Off Facility (MDOF) Operations Plan has been prepared on behalf of the Kekaha Landfill Facility (KLF). This plan provides operational, environmental control, and closure information pertaining to the MDOF. Table 1 contains specific topics outlined in the Solid Waste Permit for Phase II.

1.1 Background

The KLF is located at 6900 D Kaumualiʻi Highway approximately 1.3 miles northwest of the town of Kekaha on the island of Kauaʻi. The site is owned and operated by the County of Kauaʻi Department of Public Works under permit number LF-0042-16. The KLF operates primarily as a municipal solid waste landfill, accepting waste from commercial, municipal, and private residential customers. To help meet community needs, KLF accepts for recycling or processing: green waste, recyclables, tires, white goods, propane tanks, scrap metals, electronic waste, and used oil. Recyclables include cardboard, newspaper, glass, aluminum cans, plastic bottles (#1 and #2), and mixed paper. Pertinent background information and information relating to the MDOF operations included in these plans are referenced in this MDOF Operations Plan. Updates and addendums to the plans supersede previous versions; therefore, all references to the plans should be considered to refer to the most current version of each plan.

2. MDOF OPERATIONS

The MDOF operations include drop-off areas for green waste, recyclables, mixed wastes, tires, white goods, propane tanks, scrap metals, electronic waste, and used oil (located at the maintenance shop). Recyclables include cardboard, newspaper, glass, aluminum cans, plastic bottles (#1 and #2), and mixed paper.

2.1 Facility

The site entrance to the KLF is located at the north corner of the site. The scale house is located southeast of the site entrance road. The MDOF is located southeast of the scale house, as indicated on Figure 1. The layout of the MDOF is shown on Figure 1. The solid waste permit allows operation of the MDOF from 8:00 a.m. to 4:00 p.m. 7 days per week. Current KLF operation hours are 8:00 a.m. to 4:00 p.m. 7 days per week. The site is closed on the holidays, as discussed in Section I Part A of the KLF Phase II Operations Manual. MDOF operating hours are subject to change at the operator's discretion. Table 2 shows MDOF capacity and maximum storage time information.

Table 2: MDOF Storage Area Information

Area	Storage Capacity	Maximum Storage Time
Green Waste Storage	Two 30 cubic-yard roll-off containers	30 days
Tire Storage	100 tires	30 days (typically 1 week)
White Goods Storage	35 units	30 days
Lead Acid Battery Storage	prohibited waste	--
Used Oil Storage	Six 55-gallon drums, 55-gallon drum (for "Used-Oil Filters")	30 days
Clean Recyclables Storage	30 cubic-yard container, 10 cubic-yard container, 6 cubic-yard container	30 days
Propane Tanks	20-foot shipping container	30 days
Scrap Metal	30 cubic-yard container	30 days
Electronic Waste	20-foot shipping container	15 days
Drop-Off Area (MSW)	Two 30 cubic-yard containers	0 days (emptied when full, typically twice per day)

2.1.1 Access Control

Access to the KLF is controlled through a single access road into the facility. Waste hauling vehicles check in at the scale house, and visitors are instructed to sign in at the office. Unauthorized access to the facility is restricted by a 6-foot chain link fence, as well as natural topography. Gates are locked when the facility is not in operation. Access control is discussed further in Section I Part A of the KLF Phase II Operations Manual.

2.1.2 Traffic Control

The MDOF is laid out to provide for efficient traffic flow and minimize cross traffic between collection vehicles and vehicles using the MDOF. Except for the green waste drop-off area, the MDOF area layout does not require customers to back up. In general, vehicles using the MDOF will enter the KLF through the main access road. Signs instruct the vehicles to proceed to the scale to be weighed, if necessary. The scale house attendant then directs the vehicles using the MDOF to the appropriate area. The vehicles then proceed to the MDOF area. After unloading, vehicles using the MDOF will proceed back to the scale to be weighed, if necessary, and then exit the KLF.

2.1.3 Recordkeeping

The KLF will maintain records of MDOF materials quantities, and types accepted; load screenings; and copies of receipts of sale, recycling, or disposal of materials for at least five years. Spills, injuries, and other incidents will also be recorded as outlined in the Section I of the KLF Phase II Operations Manual.

2.1.4 Emergency Services

Police, fire protection, and emergency care services for the Facility are available from local agencies. Two-way communication will be maintained between the drop-site attendant/spotter and the administrative office. Should an emergency arise, the attendant is normally in the area and immediate communication can be made from the emergency location to the administrative office to contact the appropriate emergency responder. On-site emergency measures include applicable personnel being trained in the use of fire extinguishers and the fundamentals of fire prevention, and the posting of emergency numbers for local responders will be posted at all telephones. Emergency procedures are discussed in detail in Section I Part D of the KLF Phase II Operations Manual

2.2 Equipment

The equipment used at the MDOF may vary based on need, availability, and other factors. Processing equipment is not used at the MDOF. The MDOF is used for temporary storage only. However, some landfill heavy equipment may be used as necessary to move and manage materials. All the landfill equipment, as listed in Section I Part A of the Kekaha Landfill Phase II Operations Manual, is available for use at the MDOF. Basic functions to be performed at the MDOF include managing and loading green waste materials and hauling full and empty bins and roll-off containers. The primary equipment to be used to handle MDOF materials are bins, roll-off containers, roll-off trucks, and loaders. Additional equipment may be utilized, if necessary. To provide a safe working environment for employees and visitors, mobile facility equipment operating in the MDOF areas open to the public will be equipped with noise creating backup safety signals.

In the event of an equipment breakdown, other site equipment will be used or rental equipment can be obtained from local heavy equipment dealers. A preventive maintenance program is implemented to minimize equipment downtime and ensure the availability of adequate equipment to manage the waste load.

2.3 Waste Streams

The KLF and the MDOF is open to all private citizens on the island of Kaua‘i. All individuals on the island are allowed to utilize the KLF and, therefore, no individual identification or screening is required. Commercial customers are not allowed to use the MDOF and can be identified by their license plates. The KLF reserves the right to reject or deny access to any vehicle known or suspected to be hauling unacceptable wastes. Questionable loads will be held until a final determination of waste acceptability is made by the Site Manager. The monitoring procedures for identifying unacceptable wastes at the Facility are discussed in Section I Part B of the KLF Phase II Operations Manual. A listing of waste materials that may be accepted at the facility, as well as a specific list of unacceptable waste materials, is posted at the scale house and other locations of the KLF. Additionally, KLF reserves the right to deny access to any vehicle operated in an unsafe manner or that is not tarped.

All incoming waste streams pass over the scale, and waste types and tonnages are recorded. All recyclable materials are also weighed as they leave KLF. The various waste streams are stored separately and not mixed with other solid waste materials. MDOF is for temporary storage of waste and recyclables. The County will contract services for recycling and composting from only Department of Health, State of Hawaii (DOH)-permitted facilities and or end destinations approved for receipt of those materials.

2.3.1 Green Waste

Individuals will deposit green waste in designated roll-off containers. No processing of green waste is done in the MDOF area. When containers become full, the County contracts a private contractor to collect and shred the stockpiled green waste.

2.3.2 Recyclables

Tires, containers of used oil, and other recyclables are dropped off by customers in designated bins and roll-off containers at the MDOF. Recyclables placed into the drop-bin include cardboard, newspaper, glass, aluminum cans, plastic bottles (#1 and #2), and mixed paper. Customers place white goods, electronic waste, propane tanks, and scrap metal at designated drop-off areas of the MDOF where they are temporarily stored until being removed from the KLF for recycling. All white goods, electronic waste, propane tanks, and scrap metals are handled and stored in a manner to prevent spills or releases of oil, lubricants, chlorofluorocarbons, or freon (see *Refrigerant Management Plan* in Appendix A for additional information), as applicable. White goods are stored upright and are not stacked on each other. At no time will the quantity of white goods and metals stored at the MDOF exceed the storage capacity of the white goods storage area.

Tires are stored in roll-off containers until they are transported to a DOH-approved tire recycler. At no time will the volume of tires stored on site exceed the storage capacity of the tire storage area. Tires accepted and stored at the MDOF will be inspected to verify that the tires are free of contaminants (such as oil, grease, gasoline, diesel, etc.), which could potentially act as fire hazards. If contaminants are identified, then efforts will be made to remove the contaminants from the tire. The tires are also stored in a manner to prevent accumulation of water in the tires. The collection, storage, and recordkeeping of used tires shall be conducted in accordance with Hawaii Revised Statutes Chapter 342I, *Used Motor Vehicle Tire Recovery*.

As conditions warrant, used oil and clean recyclables are transported to designated storage areas and stored until removed from the site. Containers filled with used oil will be clearly labeled as "Used Oil." The collection, storage, transport, and recordkeeping of used oil shall be conducted in accordance with Hawaii Administrative Rules §11-279, *Standards for the Management of Used Oil*. Customers with used oil for drop-off are escorted to the temporary storage drums located at the maintenance shop. Used oil containers will be placed in areas with secondary containment to contain the fluids in case of any leaks.

The County will either hire a contractor to collect/remove all recyclables or conduct the removal in-house. Only DOH-certified and/or DOH-permitted recyclers are used by the County.

2.3.3 Mixed Waste

Mixed waste is placed by customers in bins and roll-off containers in the designated drop-off area at the MDOF. Bins and roll-off containers are transported from the drop-off area, and wastes disposed of at the working face of the KLF as necessary. Bins and roll-off containers containing mixed waste will be emptied when full.

2.3.4 Wastes Not Accepted

Scrap vehicles, lead acid batteries (LABs), and recyclable materials from commercial customers are not accepted at the MDOF. Other unacceptable wastes are listed in Section I Part B of the KLF Phase II Operations Manual and includes toxic materials, radioactive materials, hazardous materials as designated under 40 CFR Part 261, and polychlorinated biphenyl (PCB) waste as defined in 40 CFR Part 761. Scale house attendants question each incoming customer as to the source and contents of each load. All facility personnel are trained in the identification of unacceptable wastes. Unacceptable wastes are rejected at the scale house or where identified. Occasionally, LABs are found in loads that have been deposited at the site. These LABs are removed once they are discovered and temporarily stored in a covered, leak-proof container on the paved area outside the maintenance building. No storage of LABs occurs at the MDOF. Any LABs that have been discovered at the KLF are taken to a recycler by the County Supervisor on a weekly basis.

Should unacceptable material inadvertently enter the MDOF, the material shall be properly stored, managed, and disposed of at appropriate DOH-permitted solid waste facilities prior to causing or creating a health, safety, or environmental hazard or nuisance condition. If any of this waste or waste generated at the MDOF is determined to be hazardous, the waste shall be properly managed and disposed of in accordance with state hazardous waste rules.

2.4 Personnel

Personnel from the KLF, as indicated in Section I Part A of the KLF Phase II Operations Manual, are available to assist with MDOF operations. Staffing will be maintained at a level commensurate with the amount of activity and waste volume anticipated at the MDOF. Typical personnel will include:

- Scale House Attendant – Responsible for recording the date, time, and weight and type of incoming material. Also directs individuals to the appropriate MDOF area
- Laborer – Responsible for assisting in general site maintenance
- Spotter – Responsible for providing direction to MDOF users. Monitors loads to prevent disposal of prohibited wastes and prevents scavenging by MDOF users
- Heavy and Light Equipment Operators – Responsible for the hauling of full bins and roll-off containers to the active face or appropriate storage areas

- Site Manager –The Site Manager's responsibilities include coordinating equipment and employees, maintaining records and reports, and implementing employee and safety training

2.5 Fire Prevention and Control

The Fire Prevention Plan prepared as part of the KLF Phase II Emergency Action Plan will be implemented at the MDOF, where applicable, to prevent, detect, and suppress fires at the MDOF. The open burning of solid waste is prohibited at the KLF Phase II (see Section I – Part D, Emergency Action Plan, of this Site Operations Manual).

3. ENVIRONMENTAL CONTROLS

Comprehensive environmental controls at the KLF are discussed in Section 2 and 6 of the KLF Phase II Operations Plan. Select controls that specifically relate to the MDOF are discussed in the following paragraphs.

3.1 Vector Control

The facility is operated to eliminate the harboring, feeding, and breeding of vectors, insects, and birds. Site personnel are trained to observe and identify the first signs of vectors. General housekeeping and cleaning practices eliminate the feeding potential for vectors, insects, and birds. Routine inspections of the MDOF for potential vector habitat will be carried out, and corrective action will be taken when needed. In the unlikely event that vectors become a problem, operations will be modified as necessary to eliminate the problem or a professional exterminator may be retained to alleviate the problem. Operations modifications may include more frequent emptying of the bins and roll-off containers, using bins and roll-off containers with covers, or installing bird-deterrent measures.

3.2 Stormwater Management

Stormwater, run-on and run-off at the MDOF is controlled with site grading and concrete berms that direct stormwater from the paved parking areas of MDOF into catch basin inlets and through oil-water separators, prior to flowing into perforated culverts within infiltration ditches. Silt fence and other controls will be used as necessary to control erosion. Stormwater that comes in contact with the mixed waste at the MDOF is treated as leachate. The roll-off containers used to collect the mixed waste are located in a depressed area that drains into the landfill's leachate collection system and is disposed of in the leachate evaporation pond. The stormwater and leachate control systems are inspected and maintained as necessary after storm events. Figure 1 depicts the stormwater and leachate collection system at the MDOF.

3.3 Spill Control

Spills of used oil and other hazardous fluids will be handled as discussed in the site Spill Prevention, Countermeasure and Control Plan (SPCC) located within Section IV of the Operations Manual.

3.4 Storage And Drop-Off Areas

Regular good housekeeping practices will keep the MDOF and adjacent areas clear of litter. The chain link fence surrounding the entire KLF property will prevent windblown litter from leaving the KLF. Laborers will be used to collect wind-blown litter as necessary. The first line of defense against odors involves minimizing the potential for odor generation. Bins and roll-off containers will be emptied as necessary to control odors. All road and access drives of the MDOF open to the public are paved, with the exception of the green waste drop-off. Dust suppression methods, which include watering, will be carried out in the green waste drop-off area as necessary. Any mud or dirt carried out of the green waste drop-off on vehicles will be dropped as the vehicles drive over the paved areas, preventing the tracking of mud and dirt to public roadways. Paved areas will be cleaned as necessary.

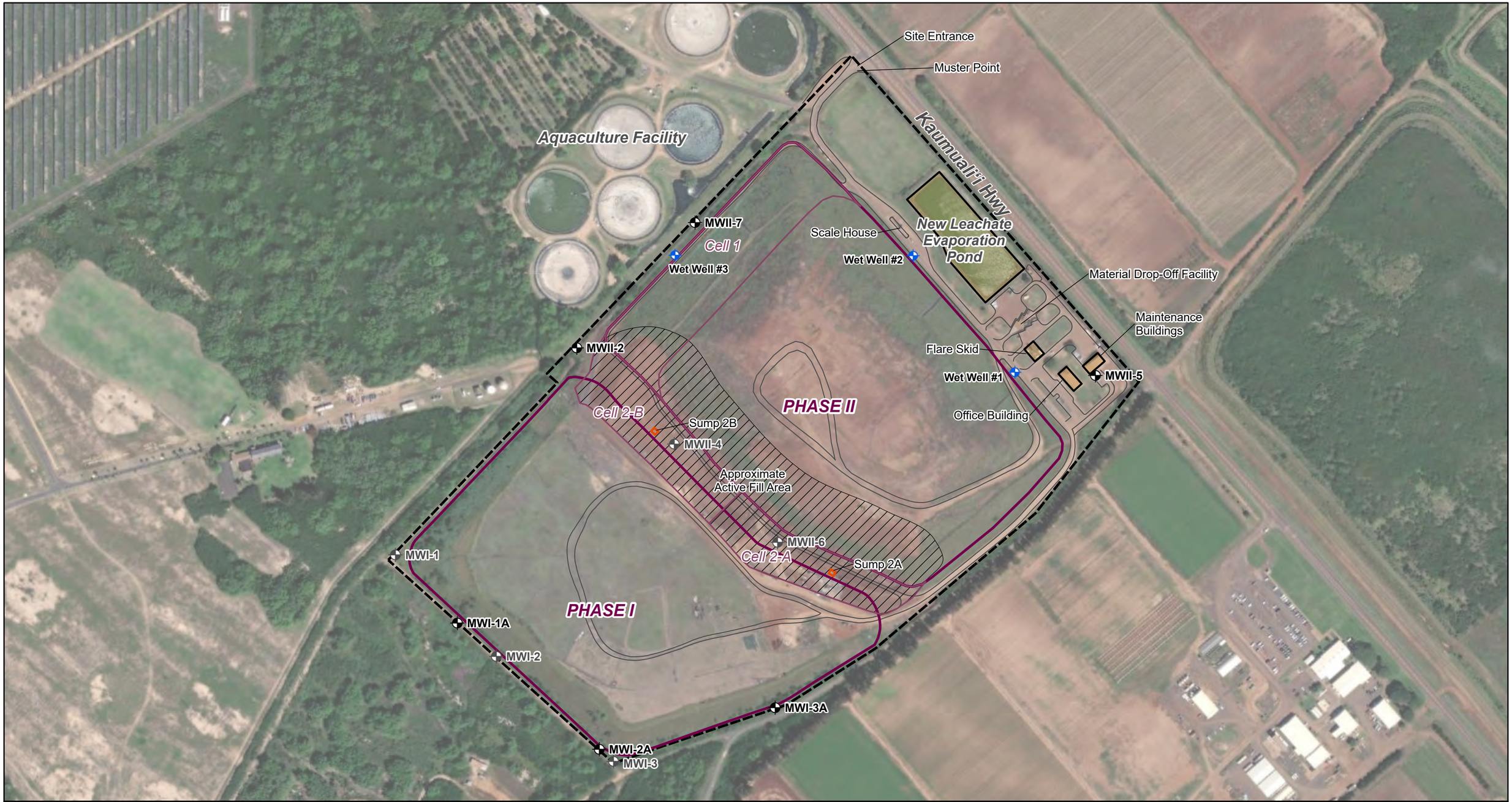
4. CLOSURE PLAN

The KLF closure plan is included in Section IX of the KLF Phase II Operations Manual. Closure of the MDOF requires no special procedures. All waste and recyclables should be removed and handled as stated within this MDOF Operations Plan. Upon removal of all wastes and recyclables from the MDOF area, all removable equipment should be removed from MDOF areas. Disturbed areas should be graded to ensure drainage during post-closure and seeded and mulched if needed. No waste or waste residues will remain in the MDOF areas after closure and, therefore, no additional closure procedures are required.

5. ANNUAL OPERATIONS REPORT (AOR)

The MDOF annual operations information will be prepared each operating year (July 1 to June 30) and will be submitted to the DOH not later than 30 days after June 30 of each year. The MDOF operations information may be prepared in a separate report or included in the site's overall AOR. The information will detail the volume in tons, or other appropriate measure, of each recoverable material collected, processed, shipped, and disposed of, and provide quantities, in appropriate measure, of residues and leachate.

FIGURES



Legend

- Wet Well (Leachate Sump)
- Groundwater Monitoring Well
- Decommissioned Groundwater Monitoring Well
- Approximate Active Landfill Area
- Sump Location
- Phase Boundary
- Cell Boundary
- Roads
- Property Boundary

N

0 350 Feet

Site Layout

Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

Geosyntec consultants

WG3074 | August 2022

Figure 1

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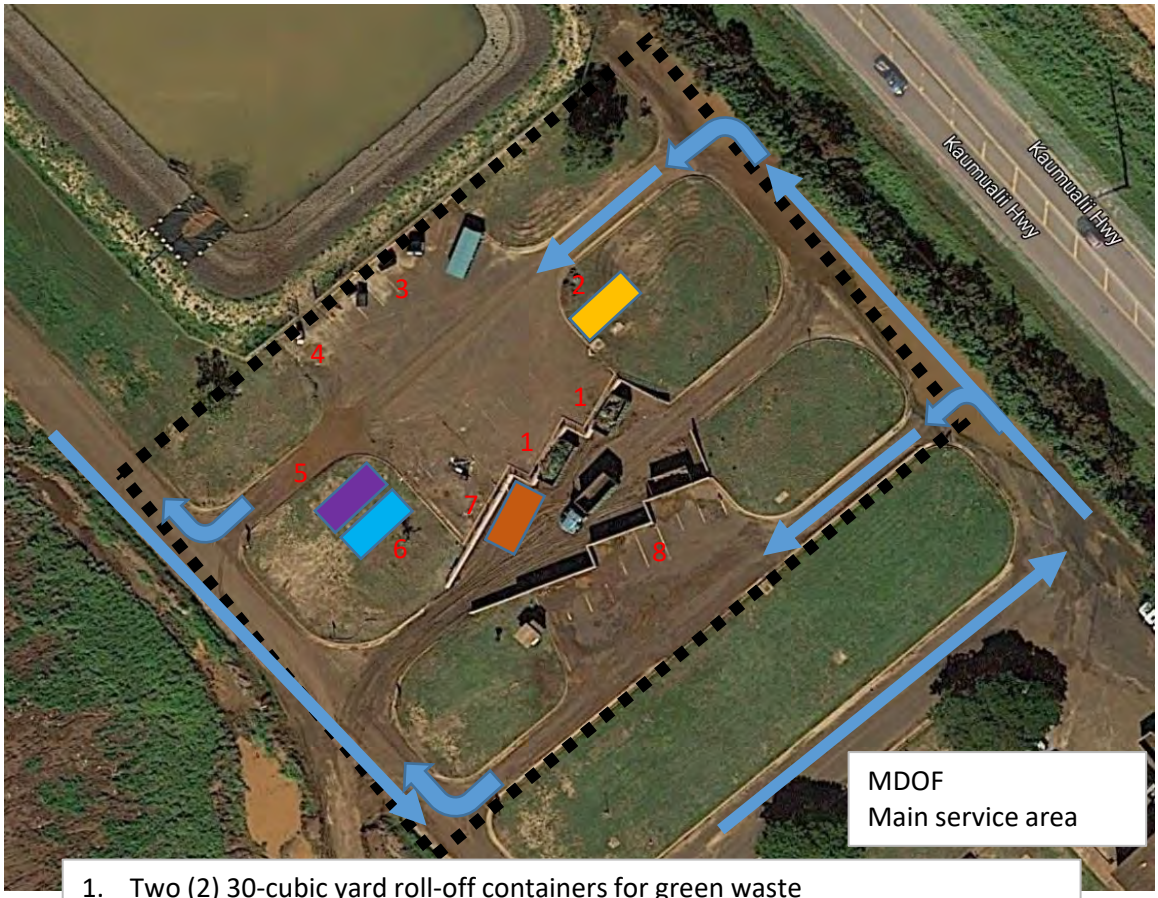
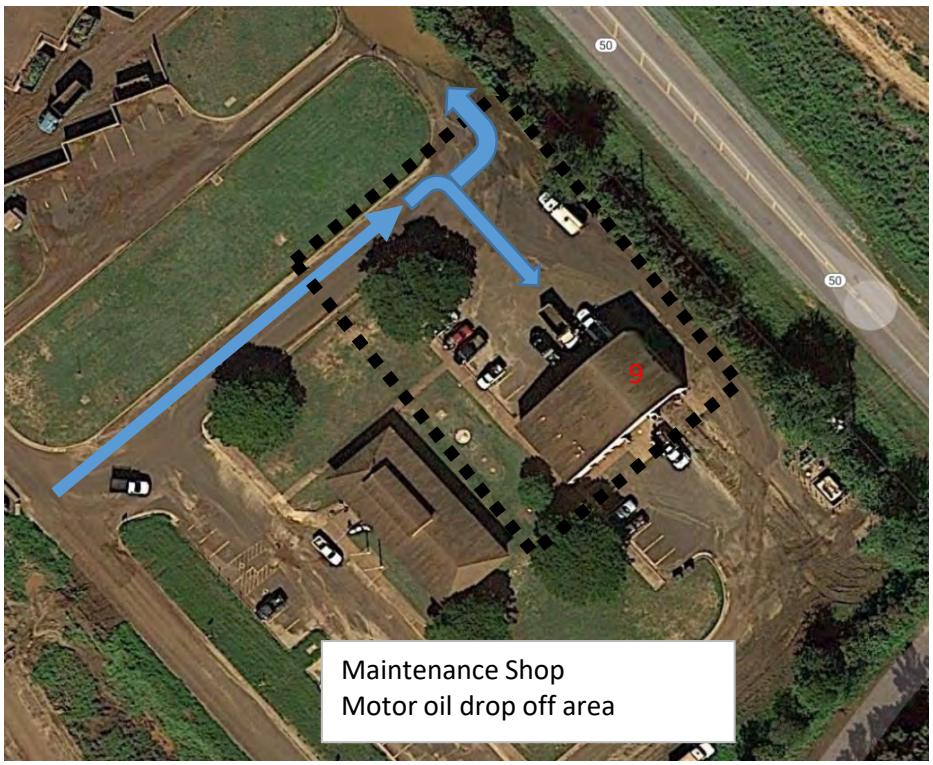
Residential Materials Drop off Facility (MDOF)

No Commercial drop-off accepted



1. Two (2) 30-cubic yard roll-off containers for green waste
2. One hundred (100) tire limit to be stored in 20 foot shipping container
3. One (1) 30-cubic yard container (6 ports) for clean cardboard, mixed paper, and glass containers, and one (1) 10 yard containers for clean mixed paper,and two (2) 6 yard containers for aluminum/steel cans and #1 & #2 plastic bottles and jars. Smaller containers may be used if lower than expected quantities received.
4. Approximately 20ft.x30ft. open area for white goods drop off with a max capacity of 35 units. Material will be left in an upright position in this area.
5. Forty (40) propane tank limit to be stored in 20 foot shipping container.
6. One (1) 20 foot shipping container for electronic waste.
7. One (1) 30-cubic yard roll-off container for scrap metal.
8. Two (2) 30-cubic yard roll-off containers for residential refuse.
9. (Next page) Six (6) 55-gallon drums for motor oil and one (1) 55-gallon drum for motor oil filters.


50
50
9
Maintenance Shop
Motor oil drop off area

APPENDIX A
Refrigerant Management Plan

Refrigerant Management Plan
Kekaha Landfill
Kaua'i, Hawai'i

Overview:

Title VI, Stratospheric Ozone Protection, of the Clean Air Act Amendments of 1990 (Public Law 101-549), signed November 15, 1990, established among other things a production phase-out schedule and yearly reduction percentages for ozone-depleting chemicals. One of the primary applications of these chemicals is refrigerant for air conditioning and refrigeration equipment in buildings, homes, supermarkets, and automobiles. This amendment requires recycling; bans the intentional venting or releasing of refrigerants during maintenance, service, repair, or disposal; restricts emission of refrigerants; and establishes strict control over their use.

Purpose:

The purpose of this management plan is to ensure compliance with EPA regulations, including equipment certification requirements, maintenance and service practices, refrigerant reclaiming requirements, training, and record keeping on the storage, transfer, and disposal of these substances.

Facility Activities:

Chlorofluorocarbon (CFC)-containing appliance refrigeration systems contain products which are under pressure and therefore should not be handled, transported, or stored in such a manner that the refrigerant system may be damaged, potentially releasing CFC-refrigerant into the atmosphere. Transport of the appliance(s) should be by flatbed truck, trailer, or other similar equipment that would allow the appliance to be properly secured during transport.

Crushing or damaging the refrigerant system in any way, which may release CFC-refrigerant into the atmosphere, is strictly prohibited.

This facility accepts appliances containing refrigerant, including refrigerators, air conditioners, and freezers from residential sources. Many of the items are damaged and/or do not have the compressors attached. Occasionally, an appliance is received with a refrigerant removal certification label already attached. These items are stored as well, reviewed by the refrigerant removal contractor, and then sent off site for metal recycling.

When a refrigerant-containing appliance is received at the facility, the driver is directed to unload the item in the designated handling area.

Refrigerant Removal:

Refrigerant is not removed from items while they are stored on site. Once there are a sufficient number of refrigerant-containing items stored on site to warrant cost effective removal of the refrigerant, the items are transported to the Puhi Metals Recycling Center, where they are

processed, which includes the removal of refrigerants. Puhi Metals Recycling Center is currently operated by Resource Recovery Solutions LLC.

Storage and Management:

The refrigerant-containing appliances are stored near the recycling area near the public drop area. This location is out of the way of normal traffic flows and allows for a safe storage environment. The area is included in routine site inspections, and any abnormal conditions are noted and corrected. Care is taken to not damage the compressor units when moving the appliances.

Employee Training:

Employees are trained in the proper management of refrigerant-containing appliances and are instructed to remove these items from the landfill.

Record Keeping:

White goods are regularly hauled from the drop-off area at the landfill to the Puhi Metals Recycling Center. The County maintains records (i.e., tonnage) of these removal events.

Release Reporting:

In the event of an unintentional refrigerant release from the facility, a note will be made in the special occurrence log.

Facility Contact: John Ruiz

White Goods Handling Training

The information below is to help identify requirements and best management practices for managing white goods that contain CFCs, such as Freon. CFC-containing appliance refrigeration systems contain products that are under pressure and therefore should not be handled, transported, or stored in such a manner that the refrigerant system may be damaged, potentially releasing CFC-refrigerant to atmosphere.

ISSUE:

Title VI, Stratospheric Ozone Protection, of the Clean Air Act Amendments of 1990 (Public Law 101-549), signed November 15, 1990, established among other things, a production phase-out schedule and yearly reduction percentages for ozone-depleting chemicals. One of the primary applications of these chemicals is refrigerant for air conditioning and refrigeration equipment in buildings, homes, supermarkets, and automobiles. This amendment requires recycling; bans the intentional venting or releasing of refrigerants during maintenance, service, repair, or disposal; restricts emission of refrigerants; and establishes strict control over their use.

Requirements:

1. Handle appliances with care. Crushing or damaging the refrigerant system in any way, which may release CFC-refrigerant into the atmosphere, is strictly prohibited.
2. Store appliances in an upright position. Large refrigerators or freezers may be stored with the door side down to prevent someone from entering the unit.
3. Remove appliances from the landfill if inadvertently or illegally dumped at the active area. Transport to the storage area in a safe manner that prevents damage to the unit.

I have read and understand the above:

Employee Signature	Employee Name Printed	Date

Geosyntec consultants

engineers | scientists | innovators

SECTION III
LEACHATE MONITORING PLAN

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua‘i

Prepared for

County of Kaua‘i
Department of Public Works
4444 Rice Street
Lihu‘e, Hawai‘i 96766

Prepared by

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Project number: WG3074

February 20, 2023

Revised November 22, 2023

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Figure 3: LCRS System Layout

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Appendix A: Inspection Forms

ACRONYMS AND ABBREVIATIONS

%	percent
amsl	above mean sea level
BMP	best management practices
CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawai‘i
ft	feet or foot
GCL	geosynthetic clay liner
HAR	Hawai‘i Administrative Rules
HDPE	high-density polyethylene
KLF	Kekaha Municipal Solid Waste Landfill – Phase II
LEP	leachate evaporation pond
LCRS	leachate collection and removal system
MDOF	materials drop-off facility
MSW	municipal solid waste
PGL	protection granular layer
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act

1. INTRODUCTION

County of Kaua‘i (County) has prepared this Leachate Management Plan to establish standard operating and maintenance procedures for leachate generated at the Kekaha Municipal Solid Waste Landfill – Phase II (KLF).

Pursuant to Resource Conservation and Recovery Act (RCRA) Subtitle D regulations 40 Code of Federal Regulations (CFR) §258.40, and Hawai‘i Administrative Rules (HAR) Title 11, Chapter 58.1 municipal solid waste (MSW) landfills are to be constructed:

- §258.40 (a)(2) "*With a composite liner and a leachate collection system that is designed and constructed to maintain less than 30-cm depth of leachate over the liner*."

1.1 Responsibilities

The KLF Site Manager has overall responsibility for implementation of this plan and all operational activities related to leachate management. The Site Manager supervises and interfaces with outside contractors and treatment facilities, schedules the necessary tanker trucks required to manage leachate, and ensures that observed deficiencies are corrected and documented in a timely manner.

The County Environmental Professional works with the Site Manager to ensure that leachate levels in the wet wells are maintained and kept in compliance with permit and regulatory requirements. The Environmental Professional is the point of contact for regulatory agencies and handles permit compliance issues and notifications to the Department of Health, State of Hawai‘i (DOH), as necessary.

The Environmental Compliance Consultant provides additional support to the County Environmental Professional and Site Manager to ensure compliance with permit and regulatory requirements. They coordinate the sampling and analytical testing of leachate and ensure that the required reports are submitted to the DOH.

1.2 Supporting Documentation

This Leachate Management Plan is part of the KLF Site Operations Manual and should be used as the primary document for leachate management at the facility. There are other documents that support this Plan, which include, but are not limited to the following:

- As-built drawings
- Cell 2 Engineering Report drawings (AECOM 2015)
- Groundwater and Leachate Monitoring Plan
- Leachate pump specifications and operation manual

2. GENERAL SITE INFORMATION

2.1 Site Description

The KLF is a permitted MSW landfill for the disposal of non-hazardous solid wastes. The KLF property covers an area of approximately 98 acres. The Landfill is located near the southwest coast of the island of Kaua‘i, approximately 1.5 miles northwest of the town of Kekaha and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The KLF Phase II area is bounded to the northeast by Kaumuali‘i Highway, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the KLF Phase I area to the southwest. The KLF Phase II is hydraulically upgradient of the KLF Phase I, which is a closed and unlined MSW landfill. No established natural streams or lakes exist within or near the facility. Streams on the inland edge of the coastal plain are diverted to the sugarcane plantation irrigation system (R.M. Towill Corp 1993). The site location and topography are shown on Figure 1.

The current permitted waste footprint, covering approximately 45 acres, is roughly rectangular, and includes the Phase II and Cell 1 expansion disposal cells (see Figure 1). Phase II consists of approximately 32.1 acres subdivided into 14 smaller waste disposal sub-cells (each about two acres), the Cell 1 expansion, 6.4 acres subdivided into 4 smaller waste disposal sub-cells (each about one acre), and the Cell 2 lateral expansion which is approximately 5.9 acres divided into two sub-cells with one cell approximately 3.2 acres, and the other 2.7 acres. The Phase II landfill (including the Cell 1 expansion) is currently permitted to receive waste up to 120 ft above mean sea level (amsl); a vertical expansion to a final elevation of 171.5 ft msl is proposed and is currently under permit review.

The landfill office, scale house, maintenance building, leachate evaporation pond (LEP), and infiltration basin are located along the northeast property line. A materials drop-off facility (MDOF) is located between the LEP and the office. The MDOF provides public drop- offs of green waste, recyclables, MSW, tires, white goods, propane tanks, scrap metals, and electronic waste. A used oil drop-off is located in the maintenance building. The site layout is shown on Figure 2.

3. LEACHATE GENERATION

Leachate is generated when water percolates through or purges out of disposed refuse. This percolation can occur when precipitation infiltrates directly into the waste or when moisture in the refuse (whether present when landfilled or generated after landfilling as a product of bio-decomposition) filters or leaches out. Stormwater that comes into contact with solid waste will be handled as leachate. Leachate generation is minimized by using the following best management practices (BMPs):

- Maintaining positive drainage on top of the landfill to minimize infiltration. Runoff from covered areas of the landfill is directed away from the active cells. Precipitation that falls on the active face is managed there and not directed off the landfill

- Maintaining surface water drainage around the perimeter of the landfill to prevent surface water run-on into the active disposal area

4. LEACHATE COLLECTION AND REMOVAL SYSTEM

All disposal areas at KLF are equipped with a bottom and side slope composite liner and leachate collection and removal system (LCRS) meeting federal (Subtitle D equivalent) and State of Hawaii requirements (HAR 11-58.1-14). A description of the liner systems that are in place at the KLF are detailed in Section II (*KLF Operations Plan – Section 3.0 Landfill Construction*) of this Site Operations Manual.

The LCRS consists of a drainage gravel layer on the cell floor, trenches constructed within the liner system (containing drainage gravel & perforated high-density polyethylene [HDPE] pipes), leachate collection manholes, pump stations (e.g., wet wells and sumps), automatic sump pumps, discharge pipes, pump sensors and controls, and an evaporation pond. The KLF Phase II landfill is graded as to direct leachate towards collection pipes or sumps. The current extraction program in place at the KLF maintains the leachate levels in compliance with federal (RCRA Subtitle D) and state regulations, which require that leachate not be allowed to accumulate on the landfill bottom liner to a depth of more than 1 foot (30 cm), not including leachate contained in the collection sumps. When the leachate level in a wet well or sump reaches a pre-determined height, the pump will automatically start and pump leachate out of the wet well or sump until the level has dropped to a set height. A force main transfers the leachate from the wet well to the LEP. The LEP occupies two acres on the northeast side of the landfill and has a capacity of approximately 3,600,000 gallons.

4.1 Leachate Collection

Phase II is divided into 14 subcells, each graded at a slope of 3 percent (%) toward a central trench for leachate collection. The central trenches are sloped at 0.5% and drain towards two wet wells (Wet Well-1 and Wet Well-2), which are located outside the lined cell perimeter. Cell 1 consists of three subcells that drain towards a central trench that drains into a wet well (Wet Well-3) that is located outside the lined cell perimeter. When the wet wells reach the “pump start” level (set below the compliance elevation), the leachate is pumped through underground pipes to the LEP.

The expanded Cell 2 features two subcells and an LCRS system consistent with Cell 1. The central trenches are sloped at 2% and direct drainage towards 8-in diameter perforated HDPE collection pipes that route leachate into one of two collection sumps (Sumps 2A and 2B), which are located outside the lined cell perimeter. A riser pipe with a submersible sump pump extends from the bottom of each sump to the top of the Cell 2 south slope (Phase I side) and daylight along the perimeter road. The pumps extract leachate collected in the sumps into a new forcemain located below the perimeter road and connects to the existing pump station Wet Well #3. The forcemain is 4-in diameter HDPE pipe and transitions to a dual containment pipe (8-inch pipe inside a 12-inch pipe) where present outside of the Phase I limits of waste. Leachate from Wet Well #3 is then routed to the LEP through the existing forcemain along the northwest edge of KLF Phase II.

4.2 Leachate Maintenance Levels

The KLF actively extracts leachate from the collection system. The current extraction program at the KLF maintains the site's leachate levels in compliance (below the maximum allowable levels) with federal and state regulations, which require that leachate not accumulate on the landfill bottom liner to a depth of more than 1 ft, not including that contained in the wet wells. See **Table 4-1** for leachate compliance elevations.

Table 4-1: Leachate Compliance Elevations

Leachate Sump	Lowest Pipe Invert Elevation (ft)	Lowest Sump Elevation (ft)	Compliance Elevation (ft)
Wet Well 1[a]	6.5	n/a	7.5
Wet Well 2[a]	7.03	n/a	8.03
Wet Well 3[b]	8.11	n/a	9.11
Sump 2A[b]	n/a	10.5	12.56
Sump 2B[b]	n/a	10.5	12.61

Notes:
a. Vertical datum correlates to designated USGS brass monument G1000 plus 1.21 ft.
b. Vertical datum correlates to local tidal.

4.2.1 Leachate Sump Pump Systems

Automatic, variable speed, leachate pumping systems and instrumentation (automatic pumps, flow meters, sensor float switch, and pressure transducer) are installed at each wet well and sump. This instrumentation automatically starts, stops, and modulates pump speeds to efficiently and reliably pump variable flow rates. The pump systems utilize electric submersible leachate pumps, a sensor float switch, and a submersible electronic pressure transducer. The pressure transducer is used to monitor the leachate levels (in inches) in the wet wells and sumps. The pump controls are configured to pump the leachate level down to within 6 inches of the wet well or sump bottom without any loss of performance or damage to the pump. The pumping systems automatically maintain a specified flow rate based on the leachate levels in the wet wells or sumps up to the maximum capacity of the pump. Each leachate pump system has the ability to display alarms and shutdowns, which are indicated by a red flashing light located on top of the control panel enclosure.

The sensor float switch measures liquid levels and transmits signals to a pump controller. Leachate levels in the wet wells and side slope riser are controlled by the use of pressure transducers set for specific elevations to trigger pump on, pump off, and high-level alarm, based on minimum leachate head requirements. The controls for the leachate pump are housed in a control panel near each leachate sump riser or wet well.

Leachate levels and the interstitial monitoring system in each wet well and sump are manually checked at least monthly. During periods of heavy rain, levels in each wet well are manually

checked daily. These checks are documented at least weekly in the KLF Leachate log provided in Appendix A. A surveyed elevation control point is established at each wet-well/sump/manhole to be used as the reference point to measure the leachate level for each wet-well/sump/manhole. This point is surveyed at least once every five years and is clearly marked. Additionally, a daily log will be used to record the leachate levels wells in each sump and wet well measured by the automated leachate level sensors, and a recording will be made whether any moisture was detected in the interstitial spaces of the wet wells. Manual inspections and daily log entries shall be recorded in the KLF Leachate Log and include the following:

- Date
- Level of leachate in each sump and wet well
- Results of interstitial monitoring
- Volume of leachate pumped into the LEP as measured by the flowmeters, or other approved methods
- Name of person conducting the inspection
- Condition and integrity of wet well or sump, pumping system, and instrumentation

If manual measurements are determined to be inconsistent with automated readings or other problems are identified with the system that challenges the accuracy of the automated readings, manual measurements shall be taken and recorded daily until accuracy is again verified for at least five consecutive days. Records of these daily checks shall include the date, leachate level, and the name of the person conducting the inspection.

In the event that any portion of the automated monitoring or recordkeeping systems is under repair or inoperable, a County employee shall take and record manual measurements daily to monitor the leachate levels in the associated wet wells or sumps. The leachate levels will also be recorded before and after pumping when the system is in manual mode. Within 7 days of triggering the requirement for manual measurements, the KLF Site Manager or designated KLF employee shall submit written notification to the DOH describing the situation, corrective actions, and schedule. After the repair/maintenance is completed, the County will continue recording daily measurements for a minimum of 3 days, and weekly for 3 weeks to verify that all automated readings are consistent with manual measurements. The KLF Site Manager or designated KLF employee shall submit written notification, including documentation, of the 3-week verification test, prior to reducing the frequency of manual measurements.

The County or an outside electrical contractor handles any repairs or maintenance activities that need to be performed on the LCRS or associated equipment.

4.2.2 Pump Settings

The leachate level in the wet wells and sumps will rise until it reaches the "pump on" level, which will start the pump. The pump will then continue to run until the "pump off" level has been reached. The pump start and stop levels are presented in Table 4-2.

Table 4-2: Leachate Sump Pump Levels

Leachate Sump	Pump Start Level (ft amsl)	Pump Stop Level (ft amsl)
Wet Well-1	5.25	3.88
Wet Well-2	5.50	4.78
Wet Well-3	7.00	4.19
Sump 2A	11.6	11.6
Sump 2B	11.1	11.1

ft amsl: feet above mean sea level

4.3 Inspections

Components of the LCRS will be inspected at least monthly to identify the condition and integrity of the system. These components include:

- Pumps installed in the wet wells and sumps
- Collection lines
- Sumps and wet wells

The findings of these observations will be recorded. A sample LCRS monthly inspection form is included in Appendix A. Appropriate repair and maintenance options will be evaluated if needed, and corrective activities shall be performed as necessary. If any portion of the LCRS is inoperable, contingency measures will be implemented to ensure compliance with the applicable regulatory requirements for the system.

4.4 Notification

Any leachate levels that exceed compliance levels shall be reported to the DOH verbally within 24 hours, followed by a written notification within 3 calendar days of the initial notice. The written report shall be submitted by the County Environmental Professional or designated County employee and contain the following information:

- Description and cause of noncompliance
- Period of noncompliance, including exact dates and times; and, if not corrected, the anticipated duration that the noncompliance is expected to continue
- Steps that will be taken to correct the area of noncompliance

- Steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance, including an implementation schedule
- Other information or monitoring as required by the DOH

Should any of these sumps/wet-wells/manholes become damaged, destroyed, or vandalized, the KLF Site Manager or the designated KLF employee shall notify the DOH immediately. The notification shall include pertinent information as to the cause of the destruction, description of measures to replace and/or repair the sumps/wells/manholes, and actions taken to prevent the recurrence of such problems in the future.

4.5 New Construction or Changes to Existing LCRS

If a wet-well/manhole/sump will be constructed, modified, or repaired, a construction plan shall be submitted to the DOH prior to commencement of construction. The plan shall include the proposed wet-well/manhole/sump location; the rationale for the wet-well/manhole/sump location; a description of the well/manhole/sump design, modification, or repair; and installation procedures. The repair/construction shall be implemented following DOH approval.

Following construction, a wet-well/manhole/sump completion report shall be sent to the DOH within 60 days of any new groundwater monitoring well and leachate manhole/wet well/sump (as appropriate) construction or repair. At a minimum, the report shall include geologic logs, well/manhole/wet well/sump design, installation activities, surveyed location, as-built drawings (with depths and elevations of all pertinent components, such as top of casing, total depth of well, screened interval, groundwater elevation, pipe inverts, and pump intake placement), and pump level information. Upon well/manhole/wet well/sump completion, the permittees shall incorporate wells/manholes/wet wells/sumps into the leachate/groundwater monitoring program.

5. LEACHATE EVAPORATION POND

The LEP occupies 2 acres on the northeast side of the landfill and has a capacity of approximately 3,699,000 gallons. The operation liner of the LEP consists of the following materials, listed from bottom to top:

- Prepared sub-base grade
- 60-mil HDPE geomembrane (textured on both sides)
- Geosynthetic clay liner (GCL) composite consisting of bentonite powder/granules encapsulated between a carrier non-woven geotextile and a cover of woven geotextile, needle punched for additional strength
- 60-mil HDPE geomembrane (textured on both sides)
- GCL composite, consisting of bentonite powder/granules encapsulated between a carrier non-woven geotextile and a cover of woven geotextile, needle punched for additional strength
- 60-mil HDPE geomembrane (textured on both sides)

- 16 oz/yd^2 non-woven cushion geotextile
- 12-inch-thick granular operations layer with maximum rock size of 3/4 inch and less than 12 percent calcium (leachate collection)
- 6 oz/yd^2 non-woven separator geotextile
- 2-inch-thick protection granular layer (PGL)

The operation liner does not extend up the side slopes of the LEP; however, a geoweb filled with granular materials covers the side slopes of the LEP.

The KLF maintains a log of the status of the LCRS at least once per week. The log includes the date and volume of leachate pumped into the LEP. Leachate volumes are measured by a flowmeter installed in the leachate pond inlet line. When the flowmeter is not operational, volumetric measurements are calculated based on the size of the wet well and the depth of leachate in the wet well before and after pumping. A sample LEP log form is included in Appendix A.

5.1 LEP Inspection/Maintenance

All activities associated with the LEP should be completed in accordance with the site-specific health and safety plan or any specific project health and safety plan for work associated near and with the LEP. This includes all monitoring, permits, and personal protective equipment (PPE).

5.2 Access into the LEP

Access into the LEP should be primarily by foot. For safety purposes and whenever possible, the ingress into the LEP should occur when liquid levels are below the top of the PGL and from one of the four LEP corners. Slopes are gentler in the corners than the side slopes. If entrance to the LEP is required with a visible liquid level, activities should be coordinated with the site safety officer before commencing work.

If access is required for light duty equipment, such as a rubber-tracked skid steer, the equipment should be lifted/lowered into place by an excavator or similar piece of equipment to avoid vehicle traffic on the LEP sidewalls. No equipment will be operated on the LEP side slopes and the base. Equipment should avoid quick and tight turns over the indicator geotextile located directly over the PGL. Access for equipment proposed for any maintenance and repair activities will be coordinated with the design engineer.

5.3 Inspections

Inspections of the LEP will be conducted monthly to identify damaged components, erosion, and other malfunctions that could prevent proper functioning of the LEP. Components to be inspected include the following:

- Force main outlet and metering system
- Side slope geo-cell system/granular fill

- 2-inch granular protection layer
- Observational geotextile layer (non-woven geotextile separating the protection granular layer and the granular operations layer)
- Floats, float supports, float level switch, junction box, and wires

Components that are not regularly accessible (e.g., 2-inch thick PGL and the observational geotextile layer) due to site conditions or as a result of other maintenance activities, may be inspected at reduced intervals. Appropriate repair and maintenance options will be evaluated and maintenance activities performed as necessary. Inspection results and any corrective actions implemented shall be recorded. A sample LEP monthly inspection form is included in Appendix A.

The leachate level in the evaporation pond will be checked at least weekly and after significant environmental events (i.e., large storms, hurricanes, earthquakes, etc.). During periods of heavy rain, levels will be checked at least once per day. The leachate level in the evaporation pond shall not exceed a 6-ft depth, leaving about 2 ft of freeboard. Inspections and leachate level measurements shall be recorded and include details such as the date, leachate level, and name of the person conducting the inspection. A sample LEP log form is included in Appendix A. In a case in which leachate is removed from the LEP by means other than evaporation, then the removal event will be recorded. Details of the record shall include the date of removal action, volume of leachate removed, beginning and ending depths of leachate, and manner of disposal.

In the event that the leachate level exceeds the compliance level, the DOH will be notified using the procedures discussed in Section 4.4, Notification.

5.4 Soil, Silt, and Debris Removal

Soil, silt, and debris can potentially collect in the LEP. Soil can collect from wind events and settle in the pond. Silt can enter the LEP through conveyance of leachate into the pond. Debris, such as litter, leaves, or other matter can be blown into the LEP.

For removal of silt and soil on the indicator geotextile, flat shovels and brooms should be used to manually remove material from the geotextile surface. Caution should be taken to avoid damaging the geotextile. If soil is dried and adhering to the geotextile, the soil can be moistened as needed to assist in removal and to avoid damage to the geotextile. Bulk removal of soil can be accomplished through hand buckets, light equipment, or by direct shoveling into an excavator bucket extended from outside the LEP limits.

A final walkover of the indicator geotextile should be performed following soil, silt, and/or debris removal to determine that no damage to the geotextile has occurred, and it remains continuous.

5.5 Geotextile Repair

If damage occurs to the indicator geotextile, the type and size of damage and associated repair technique should be documented in the site files. For all repairs, a smaller piece of similar geotextile should be sewed to the geotextile surrounding the damaged area. If sewing is not available, using a heat gun (Leister or similar) to thermally weld a patch is also acceptable; however, it should be verified that no burn holes or damage to the patch or surrounding geotextile has occurred. Repairs should be extended approximately 1 foot past the damaged edge.

6. LEACHATE MONITORING AND SAMPLING

Leachate is sampled annually at the KLF, in conjunction with the site's groundwater monitoring program. KLF groundwater and leachate monitoring activities are conducted pursuant to the *KLF Groundwater and Leachate Monitoring Plan* (located in Section VI of this Site Operations Manual), which complies with CFR, Solid Waste Disposal Facility Criteria (and its revisions) in 40 CFR Part 258 (Subtitle D) and HAR Title 11, Chapter 58.1.

The KLF Groundwater and Leachate Monitoring Plan (Section IV) describes the leachate monitoring system, including, but not limited to leachate monitoring locations, monitoring parameters, data evaluation methods, and sampling and analytical procedures.

7. REFERENCES

AECOM, 2015. Engineering Report Kekaha Sanitary Landfill Phase II, Cell 2 Lateral Expansion, Kekaha, Kaua'i, Hawai'i. September.

R. M. Towill Corporation, 1993, *Revised Environmental Impact Statement, Kekaha Sanitary Landfill Expansion Project.* Report prepared for the County of Kauai, Department of Public Works. December.

FIGURES

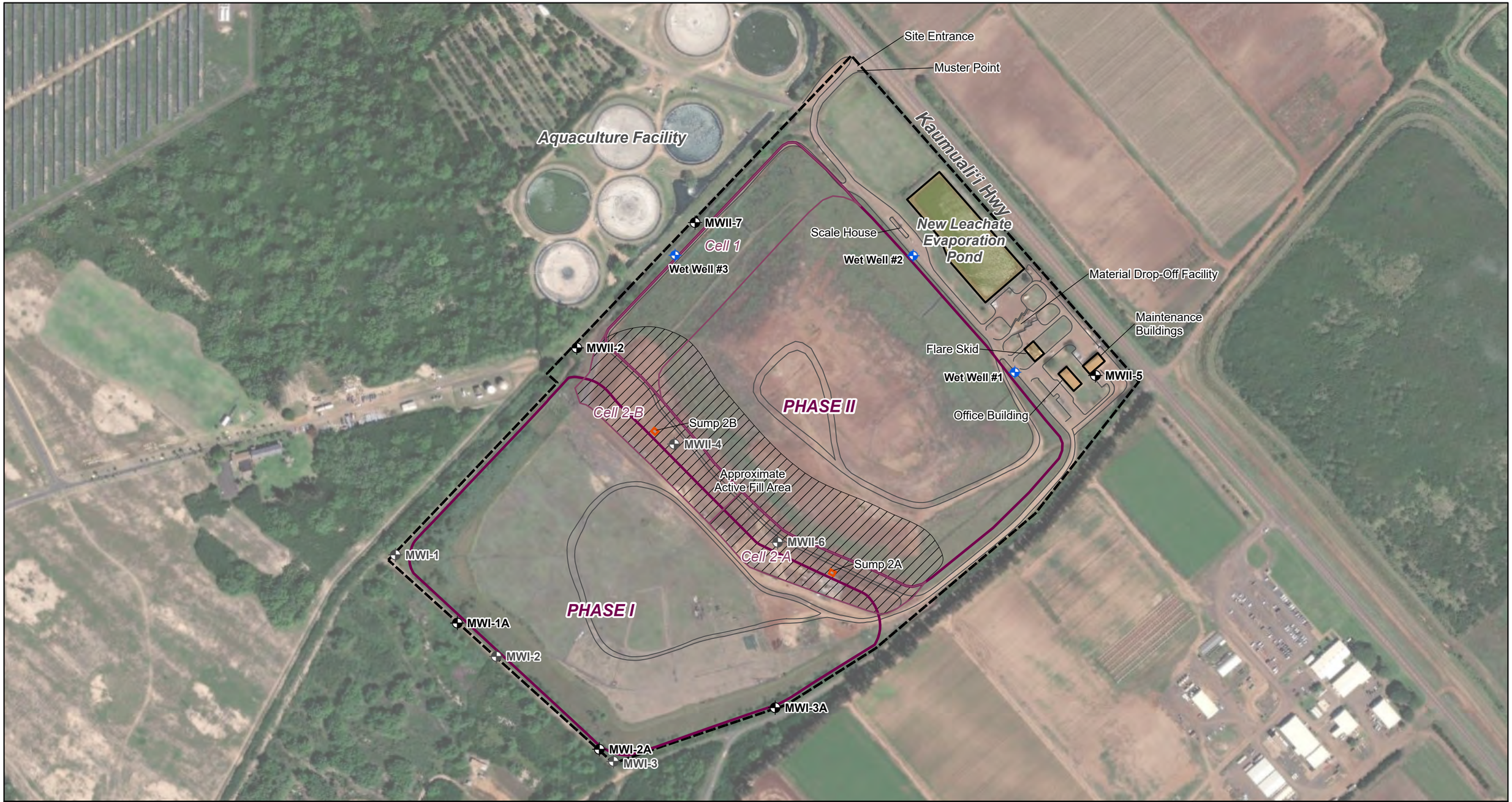
Site Location Map

Kekaha Municipal Solid Waste Landfill
Kaua'i, Hawai'i

Geosyntec consultants

WG3074	July 2022	Figure 1

P:\GIS\WM\KekahaLF\Project\2022Q1_GWMR\2022Q1.aprx\Fig01_SiteLocationMap 6/13/2022 4:43 PM (KWalton)



Legend

- Wet Well (Leachate Sump)
- Groundwater Monitoring Well
- Decommissioned Groundwater Monitoring Well
- Approximate Active Landfill Area
- Sump Location
- Phase Boundary
- Cell Boundary
- Roads
- Property Boundary

N

0 350 Feet

Site Layout

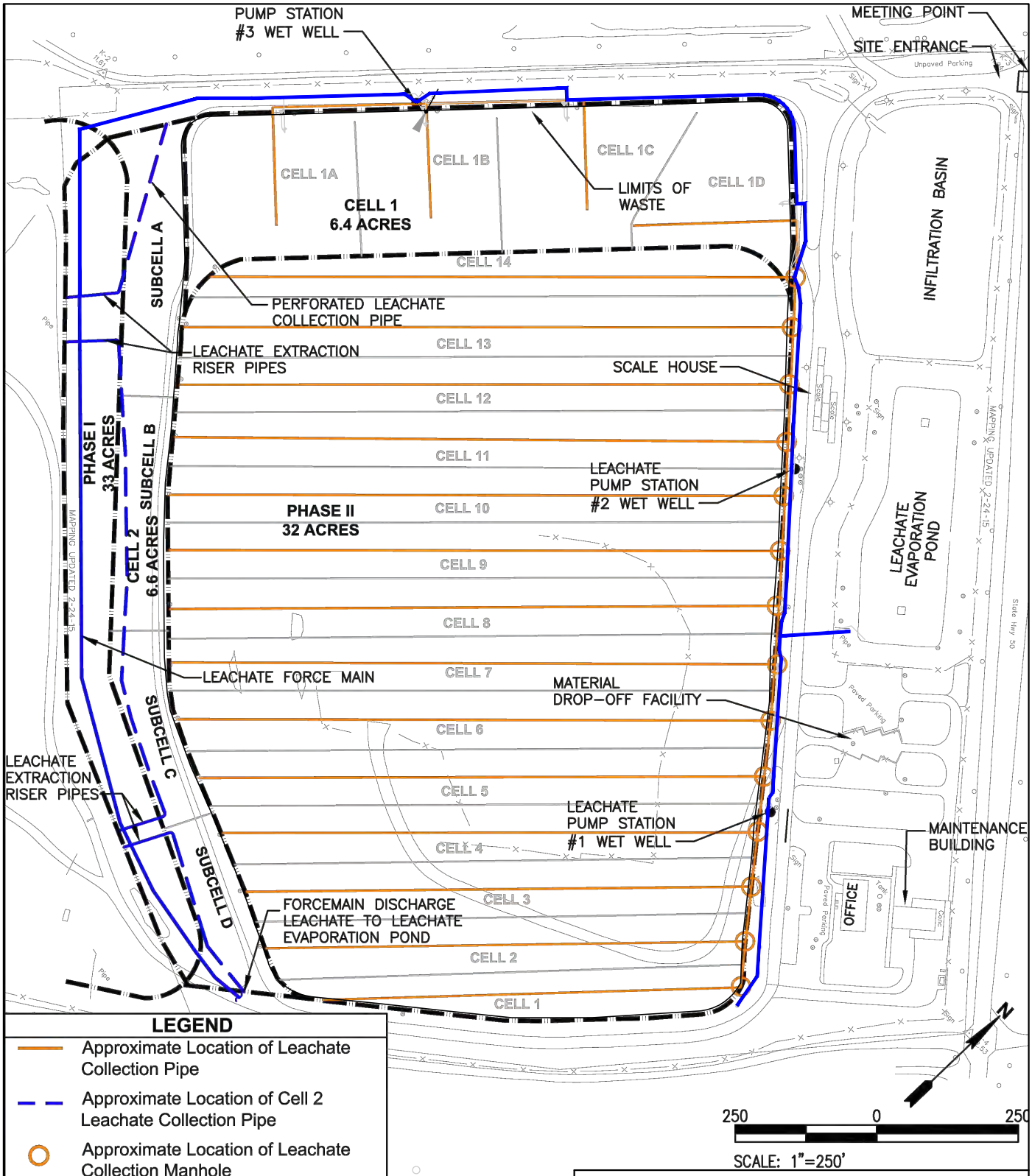
Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

Geosyntec consultants

WG3074 | August 2022

Figure 2

P:\GIS\WM\KekahaLF\Project\2022Q1_GWMR\2022Q1.aprx\Fig02_SiteLayout 7/21/2022 10:23 AM (KWalton)



LEGEND

- Approximate Location of Leachate Collection Pipe
- Approximate Location of Cell 2 Leachate Collection Pipe
- Approximate Location of Leachate Collection Manhole
- Approximate Location of Leachate Force Main

SOURCE:
FIGURE 3 OF OPERATIONS REPORT, KEKAHA SANITARY LANDFILL, BY AECOM.

LCRS SYSTEM LAYOUT
KEKAHA SANITARY LANDFILL
KAUAI, HAWAII

Geosyntec consultants

PROJECT NO: WG3074 | OCTOBER 2022

FIGURE 3

P:\CADD\CIVIL 3D\COUNTY OF KAUAI\WG2790 (2020 AOR AIRSPACE)\FIGURES\FIG3_4- LCRS LAYOUT & LINER DETAILS - Last Saved By: SKhalameyzer on 10/11/22

APPENDIX A

KEKAHA SANITARY LANDFILL _____ LEACHATE LOG

DATE	TIME	TECHNICIAN	DIGITAL READING (IN.)	DIGITAL ELEV. (FT. AMSL.)	MANUAL DEPTH OF LEACHATE (FT. BTOC.)	MANUAL ELEV. (FT. AMSL.)	INITERSTITIAL SPACE FREE OF LIQUID?	INTERSTITIAL SPACE ALARM FUNCTIONAL? (ONE TIME PER MONTH)	FLOWMETER READING (GAL.)/COMMENTS

Technician should alert management if the manual measurement is ___ ft. btoc. or less.

Compliance Elevation = ____ ft. amsl. This corresponds to a manual measurement of ____ ft. btoc.

Top of Wet Well Elevation =___ ft. amsl.

MONTHLY LEACHATE SYSTEM INSPECTIONS

MONTH	DATE	TIME	TECHNICIAN	LEACHATE SYSTEM INSPECTION COMMENTS
December				
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Inspections to include pumps installed in each wet well and sump, conditions of sumps and wet wells, and leachate collection lines.

Kekaha Sanitary Landfill Leachate Flowmeter Total

DATE	TIME	TECHNICIAN	POND LEVEL (EST. FT.)	DIGITAL READING (GALLONS)	FLOW TOTAL OF WWS AND SUMPS (GALLONS)	DIFFERENCE BETWEEN LEACHATE POND FLOWMETER AND WW AND SUMP FLOWMETERS (GALLONS)	COMMENTS

MONTHLY LEACHATE EVAPORATION POND INSPECTIONS

MONTH	DATE	TIME	TECHNICIAN	LEACHATE POND INSPECTION COMMENTS
December				
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Components to inspect include: force main outlet and metering system, side slope geo-cell system/granular fill, 2-inch granular protection layer, geotectile layer, floats, float supports, float level swtich, junction box, and wires.

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SECTION IV– SURFACE WATER MANAGEMENT PLAN (SWMP) 2022-2023 ANNUAL UPDATE

KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II
6900 KAUMUALI‘I HWY
KEKAHA, KAUA‘I 96752

Prepared for

County of Kaua‘i
County of Kaua‘i Solid Waste Division
4444 Rice Street, Suite 295
Lihue, Hawai‘i 96766

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project Number: WG3074

September 1, 2023

SOLID WASTE MANAGEMENT DIVISION
DEPARTMENT OF PUBLIC WORKS
TROY K. TANIGAWA, P.E., COUNTY ENGINEER
BOYD GAYAGAS, DEPUTY COUNTY ENGINEER

DEREK S.K. KAWAKAMI, MAYOR
REIKO MATSUYAMA, MANAGING DIRECTOR

September 1, 2023

Mr. Glenn Haae
Environmental Management Division
Hawai'i Department of Health
Solid & Hazardous Waste Branch
2827 Waimano Home Road, Room 225
Pearl City, HI 96782

Subject: RY2022-2023 Annual Update of the Surface Water Management Plan
Kekaha Municipal Solid Waste Landfill, Phase II, County of Kaua'i
Solid Waste Management Permit No. LF-0042-16

Dear Mr. Haae:

The enclosed Surface Water Management Plan (SWMP) Annual Update has been prepared for the Kekaha Municipal Solid Waste Landfill (Landfill), Phase II, located at 6900-D Kaumuali'i Highway in Kekaha, on the island of Kaua'i. The Landfill is owned and operated by the County of Kaua'i Department of Public Works.

The SWMP Annual Update was prepared in accordance Solid Waste Management Permit No. LF-0042-16, which was issued on September 13, 2019, by the State of Hawai'i Department of Health (DOH) Solid and Hazardous Waste Branch. Section E, *Surface Water Management* requires a submittal of a SWMP and annual updates to the SWMP, which must be filed with the Department of Health (DOH) by September 1 of each year.

If you have any questions or require additional information, please contact me at (808) 241-4837.

Sincerely,

Allison Fraley
Environmental Services Manager

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ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practices
CWA	Clean Water Branch, Department of Health
DOH	Department of Health, State of Hawai‘i
DPW	Department of Public Works
ft	feet
HAR	Hawai‘i Administrative Rules
KLF	Kekaha Municipal Solid Waste Landfill – Phase II
MDOF	Materials Drop-Off Facility
msl	mean sea level
MSW	Municipal Solid Waste
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
SHWB	Solid Hazardous Waste Branch, Department of Health
SPCC	Spill Prevention, Control, and Countermeasure
SWMP	Surface Water Management Plan
U.S.	United States

1. INTRODUCTION

This Surface Water Management Plan (SWMP) has been prepared for the Kekaha Municipal Solid Waste Landfill (Landfill), Phase II, located at 6900-D Kaumualiʻi Highway in Kekaha, on the island of Kauaʻi. The Landfill is owned and operated by the County of Kauaʻi Department of Public Works (County).

This SWMP has been prepared in accordance Solid Waste Management Permit No. LF-0042-16 (Permit), which was issued on September 13, 2019, by the State of Hawaiʻi Department of Health (DOH) Solid and Hazardous Waste Branch. Section E, Surface Water Management requires a submittal of a SWMP and annual updates to the SWMP, which must be filed with the Department of Health (DOH) by September 1 of each year. This 2022-2023 Annual Update includes an Annual Inspection Report (see Appendix A), as required by the Permit.

The existing surface water management system includes an infiltration basin at the north corner of the Landfill near the site entrance, two perimeter infiltration ditches on the northwest and southeast sides of the Landfill to infiltrate stormwater sheet flow, earthen berms and grades slopes to divert stormwater from around active workface areas, and down drains to convey stormwater to the perimeter surface water collection and infiltration features.

The figures show the following surface water management features and facilities:

- Figure 1 – Site Location Map
- Figure 2 – Site Plan and 03-25-2023 Topography.
- Figure 3 – Surface Water Management System shows the surface drainage pathways (blue arrows) and conveyances (down drains, infiltration ditches, and infiltration basin), and the active (Phase II and Cell 2) and inactive areas (Phase I) of the Landfill.
- Figure 4 – Observations and Recommendations show the areas where corrective actions are recommended.

Additionally, Appendix B includes an Annual Inspection Photographic Log corresponding to Figure 4.

1.1 Purpose of Surface Water Management Plan

The purpose of the SWMP is the following:

- To describe the design basis and storm used to estimate surface water run-on and run-off at the Landfill.
- To describe the surface water features to direct and manage surface water run-on and run-off at the Landfill.
- To describe how run-off from the active portion of the Landfill will be handled so as not to cause a discharge of pollutants into Waters of the United States (US), including wetlands that violates any requirements of the Clean Water Act (CWA), including,

but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to Section 402.

Other requirements in the Solid Waste Management Permit are:

- Control site run-off from a 24-hour storm, 25-year design storm.
- Minimize soil erosion and exposure of waste due to soil erosion.
- Prevent discharge of pollutants into Waters of the US, and comply with the requirements of the federal CWA or statewide water quality management plan.
- Prevent stormwater from coming into contact with the geosynthetic clay liner in the Landfill and leachate evaporation pond.
- Manage stormwater that comes in contact with solid waste as leachate.

1.2 Solid Waste Regulations

Solid Waste Regulations HAR 11-58.1-15(g) provides requirements to ensure adequate control of stormwater events at landfills. The regulation requirements for run-on or run-off control systems and surface water management are listed below.

1.2.1 Requirements for Run-On or Run-Off Control Systems

Owners or operators of all municipal solid waste (MSW) landfill units must design, construct, and maintain the following:

- A run-on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 24-hour, 25-year storm.
- 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.
- Run-off from the active portion of the landfill unit must be handled in accordance with surface water requirements.

Surface water management for the Landfill is designed for a 25-year return frequency, 24-hour duration rainfall event as well as the 100-year, 1-hr storm event. The 25-year, 24-hour storm event is 8 inches and the 100-year, 1-hr storm event is 3 inches (AECOM, 2017).

1.2.2 Requirements for Surface Water Management

MSW landfill units shall not:

- Cause a discharge of pollutants into Waters of the US, including wetlands, which violates any requirement of the CWA, including, but not limited to, the NPDES requirements, pursuant to Section 402 of the CWA.
- Cause the discharge of a non-point source of pollution to Waters of the US, including wetlands, which violates any requirement of an area-wide or state-wide water quality

management plan that has been approved under Sections 208 or 319 of the CWA, as amended.

1.2.3 National Pollutant Discharge Elimination System

A NPDES Industrial General Permit for the Landfill is not required as there is no planned discharge of stormwater from the Site. Matt Kurano from DOH reiterated this to Dustin Moises, County Staff, during an DOH NPDES inspection in June 2021.

The DOH determined that the NPDES determination only applies to the surface water requirements of HAR 11-58.1-15(h). As such, a SWMP is still required for the Landfill.

1.2.4 Spill Prevention, Control, and Countermeasures Plan

A revised Spill Prevention, Control, and Countermeasures (SPCC) Plan is included in Appendix C (Geosyntec, 2023). The SPCC Plan must comply with Title 40 Code of Federal Regulations Part 112 and addresses measures for prevention and control of fuel and oil related spills.

2. SITE INFORMATION

2.1 Site Description

The Landfill is located near the southwest coast of the island of Kaua‘i, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The Landfill is bounded to the northeast by Kaumuali‘i Highway, an unpaved access road and agricultural land to the southeast, Federal Reserve land and aquaculture facilities, to the northwest, and Hawai‘i National Guard facilities to the southwest. The site location and topography are shown on Figures 1 and 2.

The current permitted waste footprint, covers approximately 75 acres, is roughly rectangular, and includes the inactive Phase I, Phase II, and Cells 1 and 2 expansion disposal cells (see Figure 1). The inactive Phase I is approximately 33 acres. The original Phase II consists of approximately 32.1 acres subdivided into 14 smaller waste disposal sub-cells each about 2acres, the Cell 1 expansion, 6.4 acres subdivided into four smaller waste disposal sub-cells (1A though 1D), and the Cell 2 lateral expansion which is approximately 5.9 acres divided into two cells (2A and 2B), both of which “piggy-back” partially over existing Phase I (see Figure 2).

The landfill office, maintenance building, scale house, landfill gas flare facility, leachate evaporation pond (formerly known as the new leachate evaporation pond, or NLEP), and stormwater infiltration basin are located along the northeast property line (see Figure 3). A public drop-off area is located between the leachate evaporation pond and the office. The public drop-off area provides the public a location to drop-off of green waste, recyclables, e-waste, tires, white goods, and municipal solid waste. A used oil drop-off is located in the maintenance building. The site layout is shown on Figure 3.

2.2 Surface Water Management System

The surface water system design at time of closure includes diversion berms located on the final cover of the landfill slopes and along the perimeter road that direct surface water to downdrains

and culverts which carry runoff to the infiltration ditches. Surface water diversion berms, ditches, downchutes, and culverts were designed to convey run-off from the 100-year, 1-hour storm event and the 25-year, 24-hour storm event with minimal freeboard in place (AECOM, 2017).

Since Phase II has not been filled to final grade and a final cover has not yet been built, the current stormwater drainage features on Phase II include interim diversion berms, geomembrane-lined downdrains, perimeter infiltration ditches, and an infiltration basin. Each downdrain has a trapezoidal cross-section with each downdrain conveying water to a perimeter channel or a culvert in select locations. The infiltration drainage ditch conveys surface water to the infiltration basin located near the entrance of the facility. The current surface water management system is shown on Figure 3.

The County is pursuing a vertical expansion of Phase II and engineering design is currently underway by others, but is not yet complete. As part of the vertical expansion, surface water management features of Phase II may be re-designed and included in the NPDES permit application. Calculations for the new design are anticipated to be complete by the next SWMP Annual Update.

The infiltration basin is large enough to accommodate both design storms and associated surface water from the entire Phase II landfill, including Cell 1 and Cell 2 (AECOM, 2017). The infiltration rate from the bottom of the basin has a design rate of 1 inch per 6 minutes (AECOM, 2017). The infiltration basin has a bottom elevation of 7.5 ft (local datum), which correlates to the invert elevation of the infiltration ditches (AECOM, 2017). With the Cell 2 expansion, the existing 2.2-acre infiltration basin is expected to perform in the same manner and in conjunction with the existing infiltration ditches (AECOM, 2017).

3. SWMP IMPLEMENTATION

3.1 Best Management Practices

Best Management Practices (BMPs) for erosion and sediment controls are implemented in conjunction with the surface water management features described in Section 2.0. BMP measures include geosynthetic lined downdrains, perimeter infiltration ditches, gravel resurfacing of access roads, diversion berms, and vegetative growth and the placement of mulch on the side slopes. In addition, fiber rolls and silt fences may be used for sediment control and geosynthetic tarps and riprapped lined downdrains may be used for erosion control.

3.2 Inspections

The Annual Inspection Report that is included in Appendix A.

Additionally, after all major rainstorm events (i.e. greater than 1.0 inch of rainfall), post-rain inspections of the drainage system, infiltration basin, and erosion and sediment measures should be performed to identify failures, breaches, or sediment deposition requiring repair or cleanout.

3.3 Recordkeeping

Records of the inspections and follow-up actions should be maintained in the landfill operating files.

3.4 Reporting

The effectiveness of the landfill stormwater run-on and run-off drainage systems is reviewed on an annual basis and an SWMP Annual Update is submitted to the DOH no later than September 1 of each year. The Annual Inspection Log is used to document the effectiveness and appropriateness of the existing erosion and sediment control measures and drainage system features for current site conditions. The SWMP Annual Update contains the following information:

- Report of an annual inspection of surface water management features and facilities, together with a description of required maintenance and changes.
- Updated drawings showing current topography of the landfill, surface water drainage paths and conveyances, and drainage system modifications planned for the next year in response to waste filling, as applicable.
- Engineering calculations documenting the capability of the surface water management system to comply with the run-on and run-off requirements outlined in the KLF Solid Waste Permit, as applicable.
- Any updates to the SPCC Plan prepared pursuant to federal requirements under the CWA.

4. 2022-2023 ANNUAL UPDATE

This 2022-2023 SWMP Annual Update contains the following information per SWMP Special Conditions E.5:

E.5.a: *An annual inspection report of surface water management features and facilities, together with a description of required maintenance and changes.*

The Annual Inspection of the Phase II surface water management features was conducted on July 10, 2023 by Adrienne Miller, Geosyntec Consultants. On July 10, Ms. Miller met with John Ruiz, Landfill Supervisor, from the County of Kauaʻi. On July 11, Ms. Miller met with Allison Fraley, Environmental Services Manager, and Keola Aki, Solid Waste Program Manager, from the County of Kauaʻi. The Annual Inspection consisted of a review of the permit requirements, a review of the current site conditions at the Landfill, and a site visit of the Landfill. Follow-up or action items will be implemented prior to the rainy season and are listed in both Appendix A. (Annual Inspection Report) and in Appendix B. (Annual Inspection Photographic Log), and are also shown on Figure 4. (Observations and Recommendations). This Annual Update will be placed in an accessible location on-site as a hardcopy and with the County electronically.

There have been no significant modifications to the surface water management system since the 2021-2022 SWMP Annual Update was submitted to DOH on September 1, 2022. The active Cell 2 module continues to be filled per approved design.

E.5.b: *Updated drawings showing current topography of the landfill, surface water drainage paths and conveyances, and drainage system modifications planned for the next year in response to waste filling.*

Per discussions with County staff, there are no significant drainage system modifications planned for the next year in response to waste filling other than routine maintenance.

Figure 1. Site Location Map, shows the general site location, Figure 2. Site Plan and 03-25-2023 Topography, shows the current topography, Figure 3. Surface Water Management System, shows the surface drainage pathways and conveyances, as well as the active and inactive areas of the Landfill. Figure 4. Observations and Recommendations show the areas where corrective actions are recommended. Appendix B. Annual Inspection Photographic Log, provides photographs of the corresponding areas.

E.5.c: *A statement that all areas with intermediate cover were graded to direct stormwater away from the workface and towards the stormwater collection system.*

The areas with intermediate cover, which consist of Phase II, have been graded to allow stormwater to be directed away from the working face and towards the surface water management system that includes the stormwater infiltration basin and the infiltration ditches (see Figure 2). The County constructed earthen diversion berms along the east access road to divert stormwater from Phase II away from Cell 2 and along the east property boundary to retain stormwater on-site and prevent discharge off-site.

Per the approved design, Cell 2 will continue to be graded to allow stormwater to be directed away from the working face and towards the surface water system. Any commingled stormwater will be handled as leachate and sent to the leachate evaporation pond (see Figure 2).

E.5.d: *Engineering calculations documenting the capability of the surface water management system to comply with the run-on and run-off requirements listed under Special Conditions, Section E.1. Top deck areas shall have minimum slopes 3% to promote drainage. Side slopes shall not exceed 3.5 horizontal to 1 vertical (final slope design).*

Engineering calculations for the surface water management system design were included in Appendix C of the Cell 2 Engineering Report (AECOM, 2017). That design was approved as part of the Cell 2 lateral expansion by the DOH on September 13, 2019. Subsequent to that design, minor down drain modifications were made to the flow from a portion of the Phase I top deck. In 2019, AECOM provided engineering calculations corresponding to these modifications which are included in Attachment D of the 2020-2021 Annual Update.

There have been no significant changes since the 2020-2021 Annual Update was submitted on September 2, 2021. Therefore no engineering calculations were included in the 2021-2022 Annual Update or in this 2022-2023 Annual Update.

As noted above, an update to the engineering calculations by others is anticipated in conjunction with the proposed vertical expansion and with the submittal of an NPDES permit application. Any available updates will be included in the 2023-2024 Annual Update.

E.5.e: *Any updates to the Storm Water Pollution Control Plan (SWPCP) or Spill Prevention, Control, and Countermeasures Plan (SPCC) prepared pursuant to federal requirements under the Clean Water Act.*

After a review of the SPCC Plan dated September 1, 2022, the following SPCC sections were updated:

- Agency Contacts
- Section 6 General Requirements [40 CFR 112.7]
- Table 3: Petroleum Products - Service Truck and Aboveground Storage Tank
- Figures 1 through 4
- Appendix A: Inspection Forms

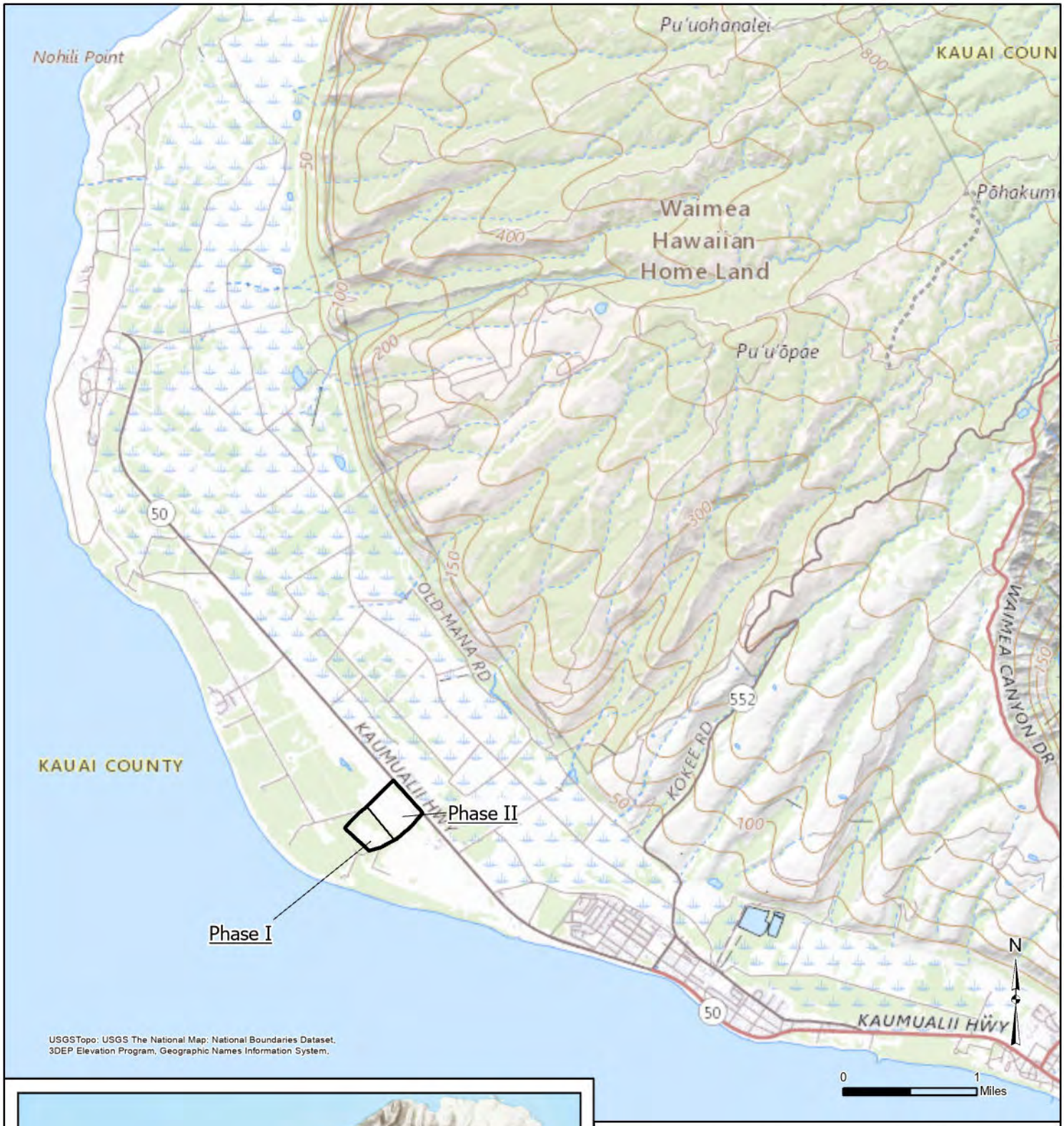
SWMP Appendix C provides the revised SPCC with the above sections updated.

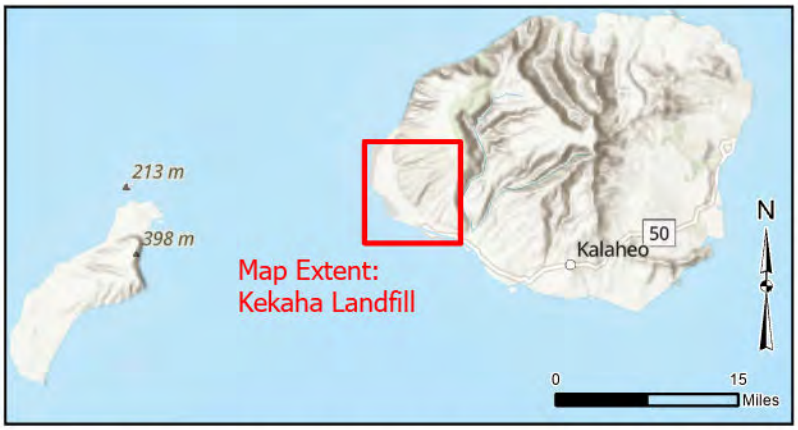
5. REFERENCES

AECOM, 2017. Engineering Report, Kekaha Sanitary Landfill Phase II, Cell 2 Lateral Expansion, Kekaha, Kaua'i, Hawai'i. October 2017.

Geosyntec Consultants, Inc., 2023. Spill Prevention Control and Countermeasure Plan, Kekaha Landfill, Kekaha, Kaua'i, Hawai'i. September 2023.

FIGURES





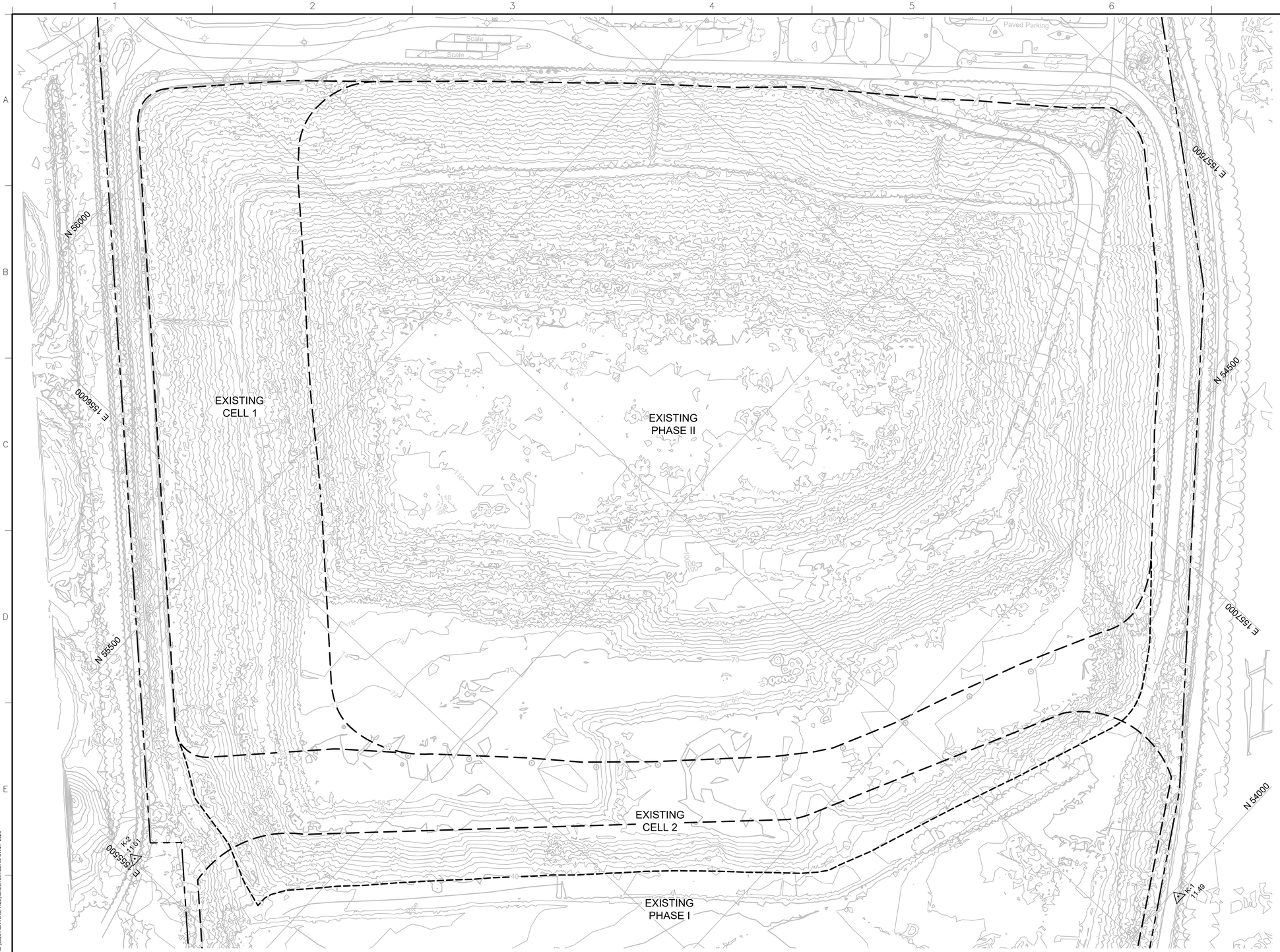
Kekaha Municipal Solid Waste Landfill
County of Kaua'i
Site Location Map

6900 Kaumuali'i Hwy,
Kekaha, HI 96752

Geosyntec consultants

WG3074	September 2023	**Figure 1**

P:\GIS\Kekaha Landfill\Kekaha_Landfill\Kekaha_Landfill.aprx\8.5 x 11 Site Location Map 7/20/2023 4:02 PM (Emily.Meyers)



0 80 160
SCALE IN FEET

LEGEND

- EXISTING GROUND ELEVATION (10-FT AND 2-FOOT CONTOUR) (NOTES 1 AND 2)
- APPROXIMATE PROPERTY LINE (NOTE 4)
- APPROXIMATE PHASES I AND II WASTE LIMIT (NOTE 4)
- APPROXIMATE CELL 2 LIMIT
- EXISTING SITE SURVEY BENCHMARK

NOTES:

1. EXISTING GROUND CONTOURS PREPARED BY R.M. TOWILL CORPORATION (RMTC) AND BASED ON DRONE SURVEY DATED 03-25-23. EXISTING SITE FEATURES ARE FROM TOPOGRAPHIC MAP PREPARED BY MILLER CREEK AERIAL MAPPING, LLC, DATED 02-24-15.
2. DRONE SURVEY DATED 03-25-23 NOT CORRECTED IN AREAS OF VEGETATION.
3. HORIZONTAL DATUM AND COORDINATES ARE BASED ON LOCAL COORDINATE SYSTEM. VERTICAL DATUM AND ELEVATIONS ARE BASED ON LOCAL TIDAL AND SITE SURVEY BENCHMARKS (MSL).
4. EXISTING INFRASTRUCTURE LOCATIONS ARE APPROXIMATE.
5. APPROXIMATE PROPERTY LINE AND PHASES I AND II WASTE LIMITS ARE FROM CONSTRUCTION DRAWING C-1 "EXISTING SITE CONDITIONS", PROJECT 6558519 "CELL 2 BASE LINER - PHASE II LATERAL EXPANSION", PREPARED BY AECOM, DATED 09-04-18.
6. FOR CELL 2, THE FINAL TOP DECK AREAS WILL HAVE MINIMUM SLOPES OF 3% AND THE FINAL SIDE SLOPES WILL NOT EXCEED 3.5H:1V.
7. THE LANDFILL IS DESIGNED TO RETAIN STORMWATER ON-SITE FOR UP TO A 25-YEAR RETURN FREQUENCY, 24-HOUR DURATION RAINFALL EVENT AS WELL AS THE 100-YEAR, 1-HR STORM EVENT (AECOM, 2017). IF A MAJOR STORM EVENT ABOVE THE DESIGN STORMS, CAUSE DISCHARGE OFF-SITE, THE COUNTY NOTIFIES THE HI DEPARTMENT OF HEALTH WITHIN 24 HOURS AND IMPLEMENTS BEST MANAGEMENT PRACTICES (BMPS) TO MANAGE THE STORMWATER.

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

DATE

DESIGN BY:	AVM
DRAWN BY:	ABK
CHECKED BY:	JHL
REVIEWED BY:	MJM
APPROVED BY:	MJM

TITLE: FIGURE 2 - SITE PLAN AND 03-25-23 TOPOGRAPHY

PROJECT: 2022-2023 SWMP ANNUAL UPDATE

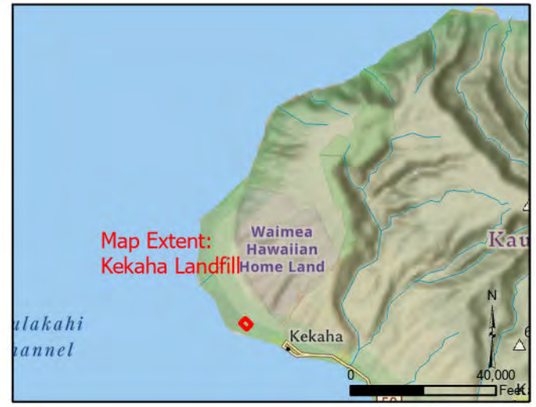
SITE: KEKAHA MUNICIPAL SOLID WASTE LANDFILL
KEKAHA, COUNTY OF KAUAI, HAWAII

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION
4444 RICE STREET, SUITE 295
LIHUE, HAWAII 96766
PHONE: 808.241.4841

Geosyntec consultants
1111 BROADWAY, 6TH FLOOR
OAKLAND, CALIFORNIA 94607 USA
PHONE: 510.836.3034

DATE: SEPTEMBER 2023
PROJECT NO.: WG3074
FILE: WG2790-SWMP-2023
DRAWING NO.: 1 OF 1

P:\CADD\CIVIL 3D\COUNTY OF KAUAI\WG2790 (2020 AOR AIRSPACE)\SHEETS\WG2790-SWMP-2023



Legend

- Label
- Leachate Structures
- Flow Arrows
- Access Road
- Down Drain
- Diversion Berm
- Infiltration Ditch
- Drainage Ditch
- Infiltration Basin
- Leachate Evaporation Pond
- Permitted Limit of Waste
- Property Line

Map Source:
Esri, CGIAR, USGS, Sources: Esri, USGS, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, Resource Mapping Hawaii, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, US Census Bureau, USDA

Kekaha Municipal Solid Waste Landfill
County of Kaua'i
Surface Water Management System
6900 Kaumuali'i Hwy,
Kekaha, HI 96752

Geosyntec consultants

Figure 3

WG3074 | September 2023

P:\GIS\Kekaha Landfill\Kekaha_Landfill\Kekaha_Landfill.aprx\Figure 2 7/20/2023 4:06 PM (Emily.Meyers)

Legend

- Label
- Leachate Structures
- Flow Arrows
- Access Road
- Down Drain
- Diversion Berm
- Infiltration Ditch
- Drainage Ditch
- Infiltration Basin
- Leachate Evaporation Pond
- Permitted Limit of Waste
- Property Line

Map Source:
Esri, CGIAR, USGS, Sources: Esri, USGS, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, Resource Mapping Hawaii, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, US Census Bureau, USDA

Kekaha Municipal Solid Waste Landfill
County of Kaua'i
Observations and Corrective Actions
6900 Kaumuali'i Hwy,
Kekaha, HI 96752

Geosyntec consultants

WG3074	September 2023

Figure 4

P:\GIS\Kekaha Landfill\Kekaha_Landfill\Kekaha_Landfill.aprx\Figure 3 9/1/2023 3:19 PM (Emily.Meyers)

APPENDIX A
Annual Inspection Report

Annual Inspection Report
Kekaha Municipal Solid Waste Landfill
Surface Water Management Plan

Geosyntec consultants
engineers | scientists | innovators

General Information	
Project Name: Kekaha Municipal Solid Waste Landfill	**Address:** 6900 Kaumuali'i Hwy Kekaha, HI 96752
Project Location: Kekaha, Kaua'i HI	
Date of Inspection: 7/10/23	**Personnel:** Adrienne Miller, Geosyntec Consultants
Weather: Partly Sunny	**Runoff:** __Yes **X** No
Raining: __Yes **X** No	**Flow Observed:** __ Yes **X** No
Time Since Last Rainfall: 25 d	**Type of Flow:** __ Sheet __ Rill __ Concentrated **X** N/A

Inspection of Active Areas

Inspect the following areas and note whether there was evidence of or the potential for pollutants to enter the stormwater conveyance system: (If yes, describe corrective action(s) that will be taken.)

Area	Inspection	Observed during inspection?	Observations / Corrective Actions
Landfill Cover (Phase II)	Gullies caused by erosion	__Yes **X** No	The Phase II top deck and side slopes were heavily vegetated with little to no sign of gullies caused by erosion at the time of inspection. (see Photo 1). No action needed.
	Indicator of leachate seepage	__Yes **X** No	There was no indication of leachate seepage at the time of inspection. No action needed.
Active Area (Cell 2)	Properly graded and bermed	__Yes **X** No	Along the west access road near the Phase II/Cell 2 boundary, the area is being filled and graded to the edge of the Cell 2 liner to promote runoff (see Photo 2). Recommend designing and building a conveyance system to effectively convey the runoff from this slope, across the access road, and to the stormwater infiltration ditch along the property boundary. At a minimum, recommend creating a discrete channel lined with rock/rip rap, along the side slope immediately downgradient of the lowpoint of the access road, where blowout of the berm and erosion during heavy rains have previously occurred (see Photo 3).
Surface Drainage System	Sediment in down drains	__Yes **X** No	No sediment observed in down drains at the time of inspection (see Photo 4). Recommend continue to inspect for clogging of drains. The County stated that they plan to inspect weekly.
	Down drains can contain runoff	**X** Yes __No	There was no runoff at the time of inspection. The down drains were clear of vegetation and debris. The County stated that they plan to inspect weekly. No action needed.
	Sediment in infiltration trenches	**X** Yes __No	Compacted sediment in the infiltration trenches due to grading to reestablish berms along the east property boundary (see Photo 5). Vegetation overgrown in the infiltration trench with no berm along the west property boundary (see Photo 6). Recommend excavating sediment and building berm along property boundary in the west infiltration trench prior to wet season to increase capacity. Recommend continued inspection that the property boundary is bermed and intact. The County stated that they plan to build berm along west fence line immediately.

Area	Inspection	Observed during inspection?	Observations / Corrective Actions
Infiltration Basin	Sediment in infiltration basin	__Yes **X** No	Stormwater either sheet flows or flows through culverts under the main access road to the vegetated infiltration basin. No standing water or obstructions to flow observed at the time of inspection (see Photo 7). No action needed.
Site Facilities	Sediment on pavement	**X** Yes __No	The site is mostly unpaved. Some sediment on pavement throughout site. No tracking off-site observed at time of inspection. The County stated that they plan to inspect during rain events for track-out. (see Photo 8).
	Exposure of other pollutants	__Yes **X** No	Liquids were either undercover in the maintenance shop and on top of secondary containment pallets. A spill kit with absorbent pads/booms was observed next to the above ground tank. The spill kit in the Maintenance Building was empty (see Photos 9 and 10). Recommend keeping all liquids under cover or within secondary containment. Recommend ordering more absorbent pads/booms for the spill kit in the Maintenance Building, cleaning out the secondary containment pallets, then replacing the absorbent boom around the Used Oil drums. Recommend ordering a spill kit to be kept on the mobile diesel fuel truck. Prior to August 31, 2023, the County ordered more absorbent pads/booms and restocked the spill kit in the Maintenance Building and for the mobile diesel fuel truck (see Photo 11). The County also stated that they plan to clean the secondary containment starting September 4, 2023.
	Oil Water Separator (OWS) operating properly	**X** Yes __No	Some sediment and standing water in the oil water separator (OWS). Sediment and debris around the OWS (see Photo 12). County staff indicated that OWS was currently functioning. Recommend clearing sediment and debris from around the OWS and pumping it out quarterly. Prior to August 31, 2023, the County cleaned the sediment and debris from around the OWS (see Photo 13). The County plans to pump it out quarterly as scheduled.
Access Roads	Evidence of erosion	**X** Yes __No	Along the east access road along Phase II and Cell 2, County staff have built up the berm on the downgradient side of the access road (see Photo 14). This area is where blowout of the access road berm during heavy rains have previously occurred and cut an erosive channel to the infiltration ditch. Recommend designing and building a conveyance system to effectively convey runoff from the interim cover, along the access road, and to the stormwater infiltration ditch along the property boundary. At a minimum, recommend cutting the berm and creating a discrete channel lined with rock/rip rap along the cut channel immediately downgradient of the access road, where blowout of the berm previously occurred (see Photo 15). Prior to August 31, 2023, the County built up the berm on the downgradient side of the access road. The County plans to continue on improving this area by cutting the berm and creating a discrete channel lined with rock/rip rap to direct stormwater to the infiltration ditch.

APPENDIX B

Annual Inspection Photographic Log

DRAFT Annual Inspection Photographic Log

Conducted on July 10, 2023

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
1	**Top Deck of Phase II Area**	**Observation:** The Phase II top deck and side slopes were heavily vegetated with little to no signs of gullies caused by erosion. There was also no indication of leachate seepage at the time of inspection. **Recommendations:** None at this time.	
2	**West Active Area (Cell 2)**	**Observation:** Along the west access road near the Phase II/ Cell 2 boundary, the area is being filled and graded to the edge of the Cell 2 liner to promote runoff.	

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
3	**West Active Area (Cell 2)**	**Recommendations:** Recommend designing and building a conveyance system to effectively convey the runoff from this slope, across the access road, and to the stormwater infiltration ditch along the property boundary. At a minimum, recommend creating a discrete channel lined with rock/rip rap, along the side slope immediately downgradient of the lowpoint of the access road, where blowout of the berm and erosion during heavy rains have previously occurred.	
4	**Down Drains**	**Observation:** No sediment observed in down drains at the time of inspection. The down drains were clear of vegetation and debris. There was no runoff at the time of inspection. **Recommendations:** None at this time. **County Plan:** The County stated that they plan to inspect weekly.	

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
5	**Infiltration Trench Along East Property Boundary**	**Observation:** Compacted sediment in the infiltration trenches due to grading to reestablish berms along the east property boundary. **Recommendations:** Recommend continued inspection that the property boundary is bermed and intact.	
6	**Infiltration Trench Along West Property Boundary**	**Observation:** Vegetation overgrown in the infiltration trench with no berm along the west property boundary. **Recommendations:** Recommend excavating sediment and building berm along property boundary in the west infiltration trench prior to wet season to increase capacity. Recommend continued inspection that the property boundary is bermed and intact. **County Plan:** The County stated that they plan to build berm along west fence line immediately.	

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
7	**Storm water Infiltra-tion Basin**	**Observation:** Stormwater either sheet flows or flows through a culvert under the main access road to the vegetated infiltration basin. No standing water or obstructions to flow observed at the time of inspection. **Recommendations:** None at this time.	
8	**Site Entrance**	**Observation:** The site is mostly unpaved. Some sediment on pavement throughout site. No tracking off-site observed at time of inspection. **Recommendations:** Continue to inspect for track-out. **County Plan:** The County stated that they plan to inspect during rain events for track-out.	

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
9	**Main-tenance Building**	**Observation:** Liquids were either undercover in the maintenance shop and on top of secondary containment pallets. **Recommendations:** Recommend keeping all liquids under cover or within secondary containment. Recommend cleaning out the secondary containment pallets and replacing the absorbent boom around the Used Oil drums. **County Plan:** The County stated that they plan to clean the secondary containment starting September 4, 2023.	

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
10	**Main-tenance Building**	**Observation:** A spill kit with absorbent pads/booms was observed next to the above ground tank. The spill kit in the Maintenance Building was empty. **Recommendations:** Recommend ordering more absorbent pads/booms for the spill kit in the Maintenance Building. Also recommend ordering a spill kit to be kept on the mobile diesel fuel truck.	
11	**Main-tenance Building**	**Implemented by County by 8/31/23:** The County ordered more absorbent pads/booms and restocked the spill kit in the Maintenance Building and for the mobile diesel fuel truck.	

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
12	**OWS on Wash Rack**	**Observation:** Some sediment and standing water in the oil water separator (OWS). Sediment and debris around the OWS. County staff indicated that OWS was currently functioning. **Recommendation:** Recommend clearing sediment and debris from around the OWS and pumping it out quarterly.	
13	**OWS on Wash Rack**	**Implemented by County by 8/31/23:** The County cleaned the sediment and debris from around the OWS. The County plans to pump it out quarterly as scheduled.	

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
14	**Along East Access Road**	**Observation:** Along the east access road along Phase II and Cell 2, County staff have built up the berm on the downgradient side of the access road. This area is where blowout of the access road berm during heavy rains have previously occurred and cut an erosive channel to the infiltration ditch.	
15	**Along East Access Road**	**Recommendation:** Recommend designing and building a conveyance system to effectively convey runoff from the interim cover, along the access road, and to the stormwater infiltration ditch along the property boundary. At a minimum, recommend cutting the berm and creating a discrete channel lined with rock/rip rap along the cut channel immediately downgradient of the access road, where blowout of the berm previously occurred.	

Photo No.	Location	Observations and Recommendations (see SWMP Figure 4)	Photos
16	**Along East Access Road**	**Implemented by County by 8/31/23:** The County built up the berm on the downgradient side of the access road. The County plans to continue on improving this area by cutting the berm and creating a discrete channel lined with rock/rip rap to direct stormwater to the infiltration ditch.	

APPENDIX C

Spill Prevention, Control, and Countermeasures Plan (Geosyntec Consultants, 2023)

Geosyntec consultants

engineers | scientists | innovators

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN

KEKAHA MUNICIPAL SOLID WASTE LANDFILL – PHASE II
6900 KAUMUALI‘I HWY
KEKAHA, KAUA‘I 96752

Prepared for

County of Kaua‘i
County of Kaua‘i Solid Waste Division
4444 Rice Street, Suite 295
Lihue, Hawai‘i 96766

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project Number: WG3074

September 1, 2023

GENERAL INFORMATION

Facility Name: Kekaha Municipal Solid Waste Landfill Phase II

Facility Address: 6900-D Kaumualiʻi Highway, Kekaha, Kauaʻi, Hawaiʻi 96752

Facility Phone Number: (808) 337-1416

Designated Person Responsible for Spill Prevention: John Ruiz

Types of Operations: Municipal Solid Waste Landfill

Date of Last Plan Review: September 1, 2023

EMERGENCY NOTIFICATION [40 CFR 112.7(a)(3)(vi)]

FACILITY CONTACT

Name:	John Ruiz	Cell Number:	(808) 346-4393
Title:	Landfill Supervisor		

ENVIRONMENTAL CONTACT

Name:	Justin Lottig	Cell Number:	(808) 479-0749
Title:	Senior Scientist, Geosyntec Consultants		

SPILL RESPONSE CONTACT

Pacific Commercial Services, Inc.	(808) 545-4599

AGENCY CONTACTS

National Response Center:	(800) 424-8802
EPA Region 9:	(866) 372-9378
To report an environmental emergency:	(800) 300-2193
State of Hawaiʻi Department of Health	
Hazard Evaluation and Emergency Response Office	(808) 586-4249
After Hours:	(808) 236-8200

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Appendix A: Inspection Forms

1. GENERAL APPLICABILITY [40 CFR 112.1]

This Spill Prevention, Control, and Countermeasure (SPCC) Plan has been prepared for the Kekaha Municipal Solid Waste Landfill (Landfill) Phase II, pursuant to Federal Regulations promulgated in 1973 [Code of Federal Regulations (CFR), Title 40, Chapter I, Subchapter D, Part 112 – Oil Pollution Prevention]. The objective of this SPCC Plan is to describe the measures to be employed to prevent the discharge of oil from non-transportation related onshore facilities into or upon the navigable waters of the United States or adjoining shorelines.

For the purpose of this SPCC Plan, the following are defined in 40 CFR 112.2:

- "Oil" means oil of any kind or in any form, including, but not limited to: fats, oils, or greases of animal, fish, or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits, or kernels; and, other oils and greases, including petroleum, fuel oil, sludge, synthetic oils, mineral oils, oil refuse, or oil mixed with wastes other than dredged spoil.
- "Discharge" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of oil.
- "Navigable Waters" of the United States means "navigable waters" as defined in section 502(7) of the Federal Water Pollution Control Act, (FWPCA) (Pub. L. 92-500) also known as the Clean Water Act (CWA), and includes:
    - All navigable waters of the United States, as defined in judicial decisions prior to the passage of the 1972 FWPCA (Pub. L. 92-500) also known as the CWA, and tributaries of such waters as:
        - Interstate waters, including interstate wetland.
        - Intrastate lakes, rivers, and streams (including intermittent streams) which are utilized by interstate travelers for recreational or other purposes; and mudflats, sand flats, and wetlands, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.
        - Intrastate lakes, rivers, and streams from which fish or shellfish are taken and sold in interstate commerce.
        - Waters of the United States, including the territorial seas.
        - All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide. (40 CFR 110.2).
- "Oil-filled Operational Equipment" means equipment that includes an oil storage container (or multiple containers) in which the oil is present solely to support the function of the apparatus or the device. Oil-filled operational equipment is not considered a bulk storage container, and does not include oil-filled manufacturing equipment (flow-through process). Examples of oil-filled operational equipment include, but are not limited to, hydraulic systems, lubricating systems (e.g., those for

pumps, compressors and other rotating equipment, including pump jack lubrication systems), gear boxes, machining coolant systems, heat transfer systems, transformers, circuit breakers, electrical switches, and other systems containing oil solely to enable the operation of the device.

- "Mobile Tank" is a bulk storage container onboard a vehicle or being towed that is designed or used solely to store and transport fuel for transfer into or from an aircraft, motor vehicle, locomotive vessel, ground service equipment, or other oil storage container.

The SPCC Plan regulations apply to any owner or operator of a non-transportation related onshore and offshore facility engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, or consuming oil and oil products, which due to its location, could reasonably be expected to discharge oil in quantities that may be harmful as described in Part 110 into or upon navigable waters or adjoining shorelines.

Harmful quantities include discharges of oil that:

- Violate applicable water quality standards.
- Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

More specifically, the SPCC Plan regulations apply to:

- All facilities that have an above ground aggregate storage capacity exceeding 1,320 gallons of oil.
- All containers with volumes less than 55 gallons and motive power containers (i.e. fuel and hydraulic tanks on moving vehicles) are exempt. This does not include tanker trucks that are used as mobile refuelers.
- All facilities that have a completely buried storage capacity greater than 42,000 gallons of oil, excluding containers that are "permanently closed."

Table 1, below, cross references the requirements of 40 CFR 112 with the Sections of the SPCC Plan which address them.

Table 1: SPCC Plan Cross-Reference

Provision	Plan Section
112.3(d)	2.0 Professional Engineer Certification
112.3(e)	5.0 Location of SPCC Plan
112.5	4.0. SPCC Plan Amendment
112.7	5.0 Management Approval and Designated Person
112.7	1.0 Table 1: SPCC Plan Cross-Reference
112.7(a)(3)	6.2-6.7 Facility Information Figures 1 - 3: Facility Maps
112.7(a)(4)	6.8 Discharge Notification
112.7(a)(5)	6.5 Discharge Response
112.7(b)	6.10 Potential Discharge Volumes and Direction of Flow
112.7(c)	6.11 Containment and Diversionary Structures
112.7(d)	Not applicable
112.7(e)	6.12 Inspections, Tests, and Records
112.7(f)	6.13 Personnel, Training and Discharge Prevention Procedures 9.0 Record of Annual Discharge Prevention Briefings and Training
112.7(g)	6.13 Security
112.7(h)	6.14 Tank Truck Loading/Unloading Rack Requirements
112.7(i)	6.15 Field Constructed Aboveground Storage Tank
112.7(j)	Conformance With Applicable Standards State Specific Requirements
112.8(b)	7.1 Facility Drainage
112.8(c)(1)	7.2.1 Construction
112.8(c)(2)	7.2.2 Secondary Containment
112.8(c)(3)	7.1 Drainage of Diked Areas
112.8(c)(4)	7.2.4 Corrosion Protection
112.8(c)(5)	7.2.5 Partially Buried and Bunkered Storage Tanks
112.8(c)(6)	7.2.6 Inspections and Tests 10.0 Annual SPCC Plan Applicability Review Checklist Appendix A: Monthly and Annual Inspection Forms
112.8(c)(7)	7.2.7 Heating Coils
112.8(c)(8)	7.2.8 Overfill Prevention Systems
112.8(c)(9)	7.2.9 Effluent Treatment Facilities
112.8(c)(10)	7.2.10 Visible Discharges
112.8(c)(11)	7.2.11 Mobile and Portable Containers
112.8(d)	7.3 Transfer Operations, Pumping and In-Plant Processes
112.20(e)	8.0 Certification of Substantial Harm Determination

Note:

* Only selected excerpts of relevant rule text are provided. For a complete list of SPCC requirements, refer to the full text of 40 CFR 112.

2. PROFESSIONAL ENGINEER CERTIFICATION [40 CFR 112.3 (D)]

By means of this Certification/Re-Certification, I attest that I am familiar with the requirements of provisions of 40 CFR 112, that I or my designated agent have visited and examined the Landfill along with County personnel, that this SPCC Plan has been prepared in accordance with good engineering practices, including consideration of applicable industry standards, and with the requirements of 40 CFR 112, that procedures for required inspections and testing have been established and that the Plan is adequate for the Landfill.

1 SEPTEMBER 2023

Engineer: Michael J. Minch, PE
Registration Number: 14901
State: Hawai'i

Date

3. WRITTEN REPORTS [40 CFR 112.4]

A written report is required to be sent to the Region 9 Administrator of the United States Environmental Protection Agency (EPA Region 9) and the appropriate state agencies in charge of oil pollution control activities, State of Hawai‘i Department of Health (DOH) Hazard Evaluation and Emergency Response Office (HEER), within 30 days of any spill event.

Reportable spill events are defined by multiple sections of the Act:

- 40 CFR 112.4(a)—The following amounts of oil that, if reaching navigable waters or adjoining shoreline, are reportable under 40 CFR 110.
  - A discharge of over 1,000 U.S. gallons of oil occurs in a single spill.
  - It is the second spill event occurring within any 12-month period of more than 42 U.S. gallons of oil.
- 40 CFR 110.3—Discharge of oil in such quantities as “may be harmful” pursuant to section 311(b)(4) of the Act.
- IMPORTANT NOTE: State Reporting Requirements are more stringent, see below.
- For purposes of 40 CFR 311(b)(4) of the Act, discharges of oil in such quantities that the Administrator has determined may be harmful to the public health or welfare or the environment of the United States include discharges of oil that:
  - Violate applicable water quality standards, local, state, or federal.
  - Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.
- 40 CFR 110.1—Sheen means an iridescent appearance on the surface of water.

The written report is to contain the following information (a Spill Report Form is provided in Section of this Plan):

- Name of the facility.
- Name(s) of the person reporting.
- Location of the facility.
- Maximum storage or handling capacity of the facility and normal daily throughput.
- Corrective action and countermeasures taken, including a description of equipment repairs and replacements.
- An adequate description of the facility including maps, flow diagrams, and topographical maps as necessary.
- The cause of such discharge as described in 40 CFR 112.1(b), including a failure analysis of the system or subsystem in which the failure occurred.

- Additional preventive measures taken or contemplated to minimize the possibility of recurrence.
- Such other information as the Regional Administrator may reasonably require pertinent to the Plan or discharge.

Hawai‘i Administrative Rules (HAR) §11-451 imposes additional requirements on a written report. In addition to the above, reportable quantities are defined as follows: (1) Any amount of oil which, when released into the environment, causes a sheen to appear on surface water, or any navigable waters of the State; (2) Discharge of more than 25 gallons of oil in a single spill event; (3) Any amount of oil that is less than 25 gallons, but which is not contained and remediated within 72 hours. State requirements also dictate written notification within 30-days (HAR §11-451-7[e]).

Section 13.0, below, includes a written report form. Table 2, below, summarizes the historical oil discharges reported at the site.

Table 2: Oil Discharge History

Description of Discharge	Corrective Actions Taken	Plan for Preventing Recurrence
According to facility personnel, no major spill events have occurred since operations at the site began in 1993.		

4. SPCC PLAN AMENDMENT [40 CFR 112.5(B)]

Amendments to this SPCC Plan will be prepared within six months following any change, and implemented as soon as possible following any technical amendment, but no later than 6 months from the date of the amendment. A review and evaluation of this SPCC Plan also should be conducted at least once every five (5) years by the manager or their designee. The development of a Cycle Task for an annual review is recommended. As a result of this review and evaluation, the Landfill will amend the SPCC Plan within six months of the review to include more effective prevention and control technology if:

- Such technology will significantly reduce the likelihood of a spill event from the facility.
- Such technology has been field-proven at the time of the review.

In accordance with 40 CFR 112.5(a), the Landfill periodically reviews and evaluates this SPCC Plan for any change in the Landfill design, construction, operation, or maintenance that materially affects the Landfill's potential for an oil discharge, including, but not limited to:

- Commissioning or decommissioning of containers.
- Replacement, reconstruction, or movement of containers.
- Reconstruction, replacement, or installation of piping systems.
- Construction or demolition that might alter secondary containment structures.
- Changes of product or service.
- Revision of standard operation or maintenance procedures.

Amendments to the Plan made to address changes of this nature are referred to as technical amendments, and must be certified by a Professional Engineer (PE). Non-technical amendments can be done, (and must be documented in this section), by the Landfill owner and/or operator. Non- technical amendments include the following:

- Change in the name or contact information (i.e., telephone numbers) of individuals responsible for the implementation of this Plan.
- Change in the name or contact information of spill response or cleanup contractors.

Any technical amendment to the SPCC Plan will be certified by a PE in accordance with 40 CFR 112.3(d). Completion of the review and evaluation is documented in Section 11.0.

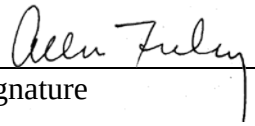
5. MANAGEMENT APPROVAL [40 CFR 112.7]

This SPCC Plan establishes preparedness, prevention, planning, spill response, and spill notification procedures as set forth in applicable state and federal regulations. This Plan has been compiled by an agent of and reviewed and certified by a professional engineer (internal or third party) following the sequence specified in 40 CFR 112. Any future updates that require the Plan to deviate from that sequence will include a cross reference in the Plan.

As specified in 40 CFR 112.3(e), a copy of this Plan will be maintained at the Landfill and made available upon request for on-site review by the Regional Administrator of the EPA during normal business hours. If the Landfill is attended less than 4 hours a day, the plan may be kept at the nearest field office.

The Landfill is committed to the prevention of discharges of oil to navigable waters and the environment and maintains the highest standards for spill prevention control and countermeasures through regular review, updating, and implementation of the SPCC Plan. This Plan has the full approval of management at a level of authority to commit the necessary resources to fully implement the Plan.

Allison Fraley, Environmental Services Manager



Signature

August 1, 2023

Date

Plan Distribution

Copies of the Spill Prevention, Control and Countermeasures Plan are kept on file at the following locations:

- Main Office of Landfill

6. GENERAL REQUIREMENTS [40 CFR 112.7]

There are no additional facilities or procedures, methods, or equipment not yet fully operational identified in the SPCC Plan that require details of installation and operational start-up. The Landfill is in conformance with section 112.7(a)(1).

6.1 Compliance With Applicable Requirements [40 CFR 112.7(a)(2)]

This SPCC Plan is in conformance with all applicable requirements of 40 CFR Part 112, except for minor deviations, as allowed by section 112.7(a)(2) of the regulation. The deviations, and the equivalent environmental protection provided, are described below:

- 40 CFR 112.8(b)(3) requires designing drainage systems from un-diked areas with a potential for a discharge (such as where piping is located outside containment walls or where tank truck discharges may occur outside the loading area) to flow into ponds, lagoons, or catchment basins designed to retain oil or return it to the Landfill.

  Mobiles 1 & 2 (aka. Portable #2) contain single-walled tanks that are mounted on the respective refueling/servicing trucks. During operational hours, the mobile refueling/servicing truck is temporarily staged throughout the Landfill. The operational and emergency oil storage capacity of the Landfill liner system is sufficient to handle the maximum quantity of oil expected to be discharged in un-diked areas from overfills or transfer. The bermed wash rack and Landfill liner system, in combination with monitoring of all product transfers, provides environmental protection equivalent to the requirements under 112.8(b)(3).

- 40 CFR 112.8(c)(6) - Smaller oil storage containers and drums are not integrity tested (per the Steel Tank Institute (STI) standard); instead, they are stored off the ground on spill containment pallets and visually inspected on a regular basis. This is further discussed in Section 6.18 of this SPCC Plan.

  EPA has issued guidance stating that “for well-designed shop-built containers with a shell capacity of 30,000 gallons or under,” a program of visual inspections for the container(s) may provide equivalent environmental protection. In accordance with that guideline, the oil storage containers and drums at the Landfill are not integrity tested; instead, the Landfill has implemented a program of visual inspection for these containers and drums, to ensure that any leaks are readily detected.

  During site inspections, the containers and drums should be clean and well-maintained with no signs of deterioration or leaks. The tanks and drums will be maintained clean so that any bottom leaks can be readily observed, and the exterior of the tanks and drums will be maintained clean and in good condition so that any shell leaks can be readily detected. If cracks develop in the concrete floor of the containment area, they will be repaired within one (1) week of detection.

  If the visual inspections indicate signs of deterioration or leaks of a tank or drum, then the tank or drum will either be replaced or integrity tested, in accordance with STI SP001, to verify the appropriateness of continuing the visual inspection program. As discussed in Section 6.4, spill response equipment is available in the maintenance

shop in close proximity to fuel tanks, and an Oil Contingency Plan has been implemented at the Landfill.

- 40 CFR 112.8(d)(5) requires warning all vehicles entering the Landfill to be sure that no vehicle will endanger aboveground piping or other oil transfer operations. As an environmental equivalence to the driver warning requirement in 112.8(d)(5), alternative methods of protecting equipment from the possibility of a collision such as installing fences, barriers, curbing or other physical obstacles are employed.

  Aboveground piping runs from the diesel fuel AST#1, to day tank and pump, and to an emergency generator engine. As an environmental equivalence to the driver warning requirement in 112.8(d)(5), the diesel fuel AST#1, emergency generator, and aboveground piping connecting the AST to the emergency generator are all surrounded by concrete-filled steel traffic bollards to prevent damage from vehicle traffic. Temporary physical obstacles and monitoring by trained staff will be used to protect equipment from the possibility of a collision during any other temporary oil transfer operations.

6.2 Facility Information [40 CFR 112.7(a)(3)]

Facility Owner, Address and Telephone:

County of Kauaʻi
Department of Public Works – Solid Waste Division
4444 Rice Street, Moʻikeha Building, Suite 275
Lihuʻe, Hawaiʻi 96766
Phone: (808) 241-4993
Contact: Troy Tanigawa, County Engineer

Facility Operator, Address and Telephone:

County of Kauaʻi
Department of Public Works – Solid Waste Division
4444 Rice Street, Moʻikeha Building, Suite 275
Lihuʻe, Hawaiʻi 96766
Phone: (808) 346-4393
Contact: John Ruiz, Landfill Supervisor

6.2.1 Location of Facility

The Kekaha Municipal Solid Waste Landfill (Landfill) Phase II, is located near the southwest coast of the Island of Kauaʻi, approximately 1.5 miles northwest of the town of Kekaha, and approximately 2,000 feet (ft) from the Pacific Ocean shoreline. The Landfill is bounded by Kaumualiʻi Highway to the northeast, an unpaved access road and agricultural land to the southeast, aquaculture facilities to the northwest, and the Phase I area to the southwest. Figure 1 provides the Site Location Map, Figure 2 provides the Surface Water Management System, and Figure 3 provides the Oil Storage Area.

6.2.2 General Description of Facility

The Landfill is a municipal solid waste (MSW) landfill, permitted by DOH for disposal of non-hazardous solid wastes. The Landfill is owned and operated by the County of Kauaʻi. The Landfill is located at 6900-D Kaumualiʻi Highway Kauaʻi, Hawaiʻi 96752. The Landfill is permitted under Solid Waste Management Permit No. LF-0042-16 (Permit), which was issued on September 13, 2019, by the State of Hawaiʻi Department of Health (DOH) Solid and Hazardous Waste Branch.

The current permitted waste footprint, covers approximately 75 acres, is roughly rectangular, and includes the inactive Phase I, Phase II, and Cells 1 and 2 expansion disposal cells (see Figure 2). The inactive Phase I is approximately 33 acres. The original Phase II consists of approximately 32.1 acres subdivided into 14 smaller waste disposal sub-cells each about two acres, the Cell 1 expansion, 6.4 acres subdivided into four smaller waste disposal sub-cells (1A though 1D), and the Cell 2 lateral expansion which is approximately 5.9 acres divided into two cells (2A and 2B), both of which "piggy-back" partially over existing Phase I.

The site also includes an office, scale house, landfill gas flare facility, wash rack area, maintenance shop, leachate evaporation pond (formerly known as the New Leachate Evaporation Pond, or NLEP), and infiltration basin, which are located along the northeast property line. A materials drop-off facility (MDOF) is located between the leachate evaporation pond and the landfill office. The MDOF provides public drop-offs (green waste, recyclables, tires, and white goods, etc.). A used oil drop-off is located within the maintenance shop. The site layout is shown on Figure 2 and 3.

The Landfill is open 7 days per week from 8:00 a.m. to 4:00 p.m., 12-12:30 (lunch break), except for the following holidays: New Year's Day, Martin Luther King Junior Day, President's Day, Prince Kuhio Day, Good Friday, Memorial Day, King Kamehameha Day, Independence Day, Admission Day, Labor Day, Veteran's Day, General Election Day, Thanksgiving Day, and Christmas Day. If the holidays fall on Monday through Thursday, the Landfill is open a half day from 7:00 a.m. to 11:00 a.m. If the holidays fall on Friday through Sunday, the Landfill is closed.

The Landfill is not located in or near a wetland, and the Landfill is outside any designated 100-year floodplain. All site drainage flows to on-site infiltration ditches, and no offsite drainage occurs.

The Landfill stores and uses petroleum products such as diesel fuel, lubricating oils, and waste oil. This SPCC Plan specifically addresses the fuel and oil storage and use facilities that exist at the Landfill:

- Maintenance shop and equipment fueling areas.
- Stationary aboveground storage tank (AST).
- Mobile refueling service truck.
- Other containers (e.g., 55-gallon drums).

This SPCC Plan has been updated to reflect changes to the Landfill that occurred since the last SPCC Plan Revision dated September 1, 2023.

Figure 3 shows the location and contents of fixed oil storage containers and the storage area where mobile or portable containers are located, transfer areas, and connecting piping. The diagrams may also show secondary containment, storm drains inlets and surface waters, direction of flow in the event of a discharge, location of spill response equipment, and location of valves or drainage controls.

6.2.3 Topography and Surface Water Flow

The existing surface water management system on the Landfill include diversion berms, downdrains, perimeter infiltration ditches, and an infiltration basin. The Phase II downdrains are temporary, geomembrane-lined trapezoidal ditches conveying water to a perimeter channel or a culvert in select locations. The infiltration drainage ditch conveys surface water to the infiltration basin located near the entrance of the facility. The Surface Water Management System is shown on Figure 2.

The Landfill's topography around the maintenance/equipment fueling area generally slopes to the northeast. Should secondary containment systems (curbing and berm) for the maintenance / equipment fueling area be breached, stormwater could drain via sheet flow to the shoulder drainage swale along Kaumualiʻi Highway. However, considering the potential volume of rainwater and the high permeability of the sandy on-site soils, it is likely that the rainwater would infiltrate the ground surface before flowing offsite. Tank locations and stormwater drainage patterns in the vicinity of AST#1 are shown on Figure 3.

6.2.4 General Description of Petroleum Storage Areas [112.7(a)(3)(i)]

Table 3 details the various types of oil products stored at the Landfill. Oil storage areas are listed and described by location, container type, contents, storage device, oil amount and whether it is an above or a below ground container. For purposes of this inventory, only containers that have a capacity of 55-gallons and greater are listed. Refer to Figure 3 for locations of oil handling activities.

One mobile refueling service truck is used for daily fueling and servicing of Landfill equipment. When not in use, the mobile refueling service truck is maintained and parked near the Maintenance Building wash rack that is equipped with an oil water separator. A spill kit for minor spills is located on/near the mobile refueling service truck.

Table 3: Petroleum Products – Service Truck and Aboveground Storage Tank

Tank ID	Tank Size (gal)	Tank Type	Contents	Transfer Mechanism	Secondary Containment	Overfill/Spill Protection
Mobile #1	115	Steel Single-Wall Horizontal	Diesel Fuel	Pneumatic Pump	Spill Kit	Visual Inspections/Attended Transfers
AST #1	2,000	Double-Walled Horizontal	Diesel Fuel	Fuel Pump	Containment structure (Dual wall)	Visual Inspections, Visual Gauge, Attended Transfers, and tertiary containment dike structure (1,475 gallon)
Drum Area	55 (11) [1]	Single Walled Drum	Misc. Hydrocarbons	Manual	Spill Pallets & Garage	Spill Kits

Notes:
(1) Eleven (11) drums are located in the Maintenance Building and are owned by the County.

All small containers and 55-gallon drums are stored inside the maintenance shop on spill control pallets or other devices that provide secondary containment. A spill kit containing materials to properly absorb spills (absorbent pads, socks, pillows, and bags) is located in the maintenance building and between the backup generator and AST#1 (2,000 gallon diesel fuel).

The maximum potential quantities of liquid that could be released in a single incident are:

- 115 gallons (mobile truck-mounted tank capacity).
- 2,000 gallons (maximum double-walled AST capacity), assuming the containment was breached).
- 300 gallons (11 x 55 gal drums in maintenance shop).
- Total Oil Storage: Approximately 2,500 gallons

Any third-party (contractor) tanks that may be located on-site are subject to the Landfill SPCC rules. Landfill staff will notify contractors that they are subject to and must have/provide Landfill staff with the following:

- Secondary containment at all times for any tank.
- Documentation of training.
- Adequate spill response materials at the location of the tank.
- A copy of their SPCC Plan/Spill Response Plan.

6.3 Discharge Prevention Measures [40 CFR 112.7(a)(3)(ii)]

This section discusses procedures for routine handling of oil products at the Landfill, including loading, unloading, and fuel transfers. These activities occur primarily at the maintenance shop

area and areas over the landfill liner system. Drums are stored in the maintenance shop area. In general, the system of structural and non-structural control measures consists of spill containment structures, operating procedures that are specifically designed to minimize potential for a release of oil, training of personnel, Landfill security measures, routine inspections and record keeping, and regular SPCC Plan review (Review and Evaluation Log is presented in Section 11.0).

6.3.1 Fuel Storage in Stationary AST

The AST#1, a stationary, double-walled, 2,000-gallon capacity tank used to store diesel fuel is filled by contractors from tanker trucks. Prior to transferring fuel, it is determined whether adequate storage is available to receive the entire contents of the compartment on the delivery vehicle. The 2,000-gallon AST is equipped with a visual gauge, and ports are available for manual gauging. If the Landfill's storage tank cannot receive the entire contents, the surplus portion of the shipment is not transferred. Additionally, trained personnel are present during the filling of the diesel fuel tank to monitor the transfer and ensure overfilling does not occur.

6.3.2 Fuel Storage in Mobile/ Portable Tanks

The Mobile 1 diesel fuel tank are mounted onto a mobile refueling service truck. The tank is manually gauged before filling. Transfer operations occur as needed, and the fuel is off-loaded from the tank in small quantities to on-site Landfill equipment. Trained personnel are present during transfers from tank to monitor against overfilling.

6.3.3 Drum Storage in the Maintenance Shop Area

Drums of various oils (e.g., gear, motor, and hydraulic) are stored inside the covered maintenance shop. All drums inside the shop are stored on spill containment pallets capable of containing the full contents of a 55-gallon drum. The County of Kaua‘i accepts waste motor oil at the Landfill from individual homeowners. Waste oil is dropped off by homeowners and transferred via a drum funnel into 55-gallon drums by County of Kaua‘i personnel. When the drums are full, they are removed from the Landfill by an outside vendor. Additionally, drums of new gear, motor, and hydraulic oil are brought in full by vendors, for use at the Landfill. Oil is manually removed from the drums by use of spigots or similar device, in small quantities as needed.

6.4 Discharge and Drainage Controls [40 CFR 112.7(a)(3)(iii)]

This section discusses discharge and drainage control such as secondary containment around oil storage containers and other structures, equipment, and procedures for the control of a discharge. Oil storage containment activities occur primarily at the stationary diesel fuel AST, the mobile refueling service truck parking area, and the drum storage area at the maintenance shop.

The AST, associated containment structure, and the mobile refueling service truck with its tank are the only exterior storage units of oil and are checked weekly for stormwater that has collected or for any leaks from the tanks. Any accumulation of oils or other liquid in the containment areas or spill pallets in the maintenance shop would be pumped out into another container, and properly disposed of.

6.4.1 Fuel Storage in Stationary AST

The 2,000-gallon capacity AST secondary containment structure that can contain 100 percent of the tank's rated capacity and can fully support the loaded fuel tank and pumping system. In the event of a moderate oil spill (tank leak, overfill, etc.) there is a tertiary containment system, which consists of a low concrete dike built around the perimeter of the tank. This containment system is capable of holding approximately 1,475 gallons (i.e., roughly 75 percent of the tank capacity). The tertiary containment system would contain the spill until detection and spill response actions are initiated.

A spill kit is located adjacent to the backup generator. An outside contractor will be called in to control and clean up spills greater than 50 gallons. Additionally, an oil contingency plan is in place (Section 16 of the record keeping binder) such that spills are quickly responded to and cleaned up.

6.4.2 Fuel Storage in Mobile Tanks

Mobile Tank 1 is mounted on a mobile refueling service truck. While refueling on the Landfill areas, the transfer procedures used are drip pans and attended transfers; as well as the Landfill liner system. In the event of an oil spill from one the tank, the Landfill liner system would contain the spill until detection and spill response actions are initiated. When Mobile 1 is not refueling, it is parked at the Maintenance Building near the wash pad that is equipped with an oil water separator. A spill kit for minor spills is located on/near the mobile refueling service truck.

6.4.3 Drum Storage in Maintenance Shop Area

The maintenance shop area contains 55-gallon drums and other smaller containers containing various oils. Drums are stored on spill pallets capable of containing a minimum of 55 gallons each. A spill kit is located within the maintenance shop area to clean up minor spills. An outside contractor would be called in to control and clean up larger spills.

6.5 Spill Response and Countermeasures [40 CFR 112.7(a)(3)(iv)]

Upon discovery of an oil spill, the person making the discovery should immediately notify the Landfill Supervisor. Any and all response equipment and staff at the Landfill's disposal will be used as needed to contain the spill and prevent oil from discharging offsite or into a navigable waterway. Personnel will consult with the District Manager to determine if outside spill response contractors are required. If management determines that outside resources are necessary, Spill Response Contractors, listed in the front of this report, may be utilized.

Any discharge will be contained and cleaned up using appropriate spill response equipment which may include shovels, pumps, and absorbent materials (pads, booms, oil-dry, etc.). Response equipment (i.e., spill kits) is located in the maintenance shop area as indicated on the site map and near the backup generator. Response equipment locations will be identified to all Landfill personnel upon employment and during SPCC training. The supply of response equipment will be replenished as needed. Copies of material safety data sheets (MSDS) for all petroleum products and other relevant material are located at the Landfill.

6.6 Recovery and Disposal Of Material Spilled [40 CFR 112.7(a)(3)(v)]

All material will be recovered into appropriate containers such as 55-gallon drums, or if the size of the spill warrants, into leak-proof roll-off container(s). When containers are filled after a cleanup, the containers will be secured and the container appropriately labeled identifying the substance(s), the date of the spill/clean up, and the location. Waste material generated during cleanup activities will be characterized in accordance with federal and state regulations. The spill residual will be characterized and disposed of by a licensed waste handler or disposed of on-site if appropriate.

6.7 Emergency Contact List [40 CFR 112.7(a)(3)(vi)]

The Emergency Contact List includes emergency contact names and phone numbers for Landfill personnel, division environmental personnel, and appropriate agencies, and is included in the front of this SPCC Plan. A Spill Response Contractor List including phone numbers is also included in the front of this SPCC Plan.

6.8 Spill Reporting Procedures [40 CFR 112.7(a)(4)]

Any spill with an estimated volume of greater than 10 gallons should be reported to the Landfill Supervisor. Records of each spill event should be documented using the Spill Investigation and Spill Documentation Forms in Sections 8.0. This information will facilitate the proper reporting of a discharge to the appropriate individuals and agencies.

Any spill that results in the discharge of oil, petroleum based product, or hazardous material into navigable or contiguous waters must immediately be reported to the District Manager and to the agencies listed below. The National Response Center should be contacted first.

National Response Center:	**(800) 424-8802**
EPA Region 9 Number:	(866) EPA-WEST or (866) 372-9378
To report an environmental emergency	**(800) 300-2193**
State of Hawai‘i Department of Health	(808) 586-4249
Hazard Evaluation and Emergency Response Office	After Hours: (808) 236-8200

This information is also provided in the Emergency Contact List in the front of this report. For written reporting requirements, refer to Section 3.0 of this Plan.

6.9 Spill Response Procedures [40 CFR 112.7(a)(5)]

Landfill personnel are properly trained to immediately respond to oil spills. Only trained personnel shall perform cleanup activities. Spill response contractors will be responsible for cleanup activities as a result of spills or leaks when the Landfill does not have the necessary training, equipment, or materials to clean up the spill.

The Landfill standard approach toward “incidental release,” as defined in 29 CFR 1910.120, spill response is as follows:

- Assess hazards:
  - Assess the quantity of substance spilled and integrity of containment.
  - Stop operations if necessary.
  - Secure the area.
  - Determine if the spill could potentially impact waterways or leave the site.
- Close open valves and deactivate pumps contributing to the discharge.
- Immediately notify supervisory personnel (person responsible for spill prevention).
- Use all equipment and staff at Landfill's disposal to minimize the amount of oil discharged and to prevent it from entering any navigable waterways.
- Ensure proper PPE is used during cleanup activities (consult Landfill's PPE plan for more information).
- Once the discharge is stopped and contained, use absorbent materials to absorb the spilled oil. The oil-soaked material must be disposed of according to federal, state, and local regulations. (For a spill greater than 10 gallons, notify the Landfill Supervisor).
- If spill is reportable (i.e., greater than 25 gallons on land or a sheen on water), immediately notify authorities listed on Emergency Contact List in the front of this SPCC Plan.
- In the event a spill reaches a waterway:
  - Notify the National Response Center and local and state spill response agencies.
  - Notify spill response contractor if necessary.
  - Stop the source of the spill immediately.
  - Shut down all equipment and ignition sources in the area.
  - Deploy booms, damming materials, and absorbents to contain the spill.
  - Restore habitat if necessary.
  - Decontaminate the affected area, equipment, and surfaces that have contacted the spilled material.
- Complete Spill Investigation and Spill Documentation Forms (Sections 12.0 and 13.0)

6.10 Spill/Release Scenarios [40 CFR 112.7(b)]

Based on how and where oil and other petroleum products are used and stored at this Landfill, Table 4 describes potential types of spill/release scenarios; estimated release volumes, based on the volume of the largest oil tank in the area; and the predicted spill rate.

Table 4: Potential Spill Scenarios

Potential type Failure	Spill Flow Direction	Maximum Volume	Spill Rate
Leak in Mobile 1, Diesel Fuel	Diesel Fuel would infiltrate into underlying soils and MSW or into the oil water separator.	Ounces to 115 gallons	Minutes to hours
Rupture in Mobile 1, Diesel Fuel	Diesel Fuel would infiltrate into underlying soils and MSW or into the oil water separator.	115 gallons	Seconds to minutes
Leak in AST#1, Diesel Fuel	Diesel Fuel would spill into secondary containment.	Ounces to 2,000 gallons	Minutes to hours
Rupture in AST#1, Diesel Fuel	Diesel Fuel would spill into secondary containment.	2,000 gallons	Seconds to minutes
Breach in secondary containment system for AST#1, Diesel Fuel	Diesel Fuel would be contained by the tertiary containment system (up to 1,475 gallons), then would migrate onto the facility ground surface.	Ounces to 2,000 gallons	Seconds to hours
Leak in 55-gallon Drum, Oil	Oil would leak into the spill containment pallet and would be cleaned up.	Ounces to 55- gallons	Minutes to hours
Rupture in 55-gallon Drum, Oil	Oil would spill into the spill containment pallet and would be cleaned up.	55 gallons	Seconds to minutes
Spillage during attended transfers (i.e. transfer hose leak/failure)	Petroleum products would flow onto the adjacent ground surface and infiltrate into the soil.	Gallons up to capacity of source tank	Up to 50 gallons/ minute

6.11 Containment And Diversionary Structures [40 CFR 112.7(c)]

Appropriate containment and/or diversionary structures or equipment to prevent a discharge as described in 40 CFR 112.1(b) has been provided for the Landfill. The entire containment systems, including walls and floor, are capable of containing oil and are constructed so that any discharge from a primary containment system, such as a tank, will not escape the containment system before cleanup occurs.

Approved prevention systems include:

- Dikes, berms, or retaining walls sufficiently impervious to contain oil.
- Curbing or drip pans.
- Sumps and collection systems.
- Culverts, gutters, or other drainage systems.
- Weirs, booms, or other barriers.
- Spill diversion ponds.
- Retention ponds.
- Sorbent materials.

Systems utilized at the Landfill are described below.

6.11.1 Dikes, Berms, or Retaining Walls Sufficiently Impervious to Contain Spilled Oil [112.7(c)(1)(i)]

A concrete dike surrounds the 2,000-gallon, double-walled AST acting as a partial tertiary containment system, able to contain up to 1,475 gallons.

An earthen perimeter berm around the AST#1 fueling area will prevent and/or slow down potential spills from draining offsite.

The Landfill is a permitted MSW landfill, and all of the Phase II landfill cells have bottom-liners. The mobile refueling service truck, which service landfill equipment operate within the lined area of the Landfill; therefore, secondary containment for the mobile tank is provided by the landfill liner during re-fueling.

6.11.2 Curbing [112.7(c)(1)(ii)]

The tertiary containment system consists of a dike around the perimeter of the 2,000-gallon, double- walled AST and can contain 1,475 gallons.

6.11.3 Culverts, Gutters, or Other Drainage Systems [112.7(c)(1)(iii)]

No culverts, gutters or drainage systems are used at the Landfill other than those intended to manage stormwater. Stormwater does not discharge from the Landfill and is managed on-site by infiltration.

Along, the western, southern, and eastern boundaries of the Landfill, an infiltration ditch is in place to receive stormwater runoff from the landfill surfaces. On the northern boundary (facing the highway), runoff is directed to the infiltration basin via sheet flow and shallow swales. A drainage ditch is present immediately north of the Landfill outside the perimeter fence, along the highway.

6.11.4 Weirs, Booms, and Other Barriers [112.7(c)(1)(iv)]

No weirs, booms, or other barriers are used or stored at the Landfill.

6.11.5 Spill Diversion Ponds [112.7(c)(1)(v)]

No spill diversion ponds exist at the Landfill.

6.11.6 Retention Ponds [112.7(c)(1)(vi)]

No retention ponds exist at the Landfill.

6.11.7 Sorbent Materials [112.7(c)(1)(vii)]

Sorbent materials (absorbent pads, socks, and pillows) and hand tools are stored onsite to assist in containing small spills. Spill cleanup materials are supplied and kept in the maintenance area near the AST at all times.

6.12 Inspections, Tests, And Records [40 CFR 112.7(e)]

A December 5, 2008 amendment to the SPCC regulations includes integrity testing requirements. A facility owner or operator is required to:

- Test/inspect each aboveground container for integrity on a regular schedule and whenever material repairs are made.
- Determine, in accordance with industry standards, the appropriate qualifications of personnel performing tests and inspections and the frequency and type of testing and inspections, which take into account container size, configuration, and design.

Inspections and integrity testing are conducted in accordance with good engineering practices, as described in more detail below.

As stated above, visual inspections and/or integrity testing of bulk storage tanks at the Landfill must be conducted in accordance with applicable industry standards. The applicable industry standard for shop-built containers is the STI Standard SP001. All of the shop-built containers at the Landfill will be inspected and integrity tested (if applicable) in accordance with this standard. Records of visual inspections and integrity tests (if applicable); as well as problems and any corrective actions taken, will be kept in Sections 8 and 9 of the record-keeping binder, for a minimum of three (3) years.

6.12.1 Visual Inspections

All oil storage tanks and containers at the Landfill must be visually inspected on a monthly and annual basis, and documented on the forms included in Section 9 of the record-keeping binder. These checklists incorporate the requirements of STI SP001. In accordance with SP001, the individual at the Landfill who is responsible for oil spill prevention (or a designated representative) must conduct the visual inspections. Documentation of the inspections, and any corrective actions taken as a result of the inspections, are maintained in Section 9 of the record-keeping binder and will be kept for at least three (3) years. Additionally, Landfill employees and/or contractors visually inspect the status of Landfill equipment for signs of spills or other issues during the course of their normal workday.

The oil storage containers and Landfill shall be visually surveyed to discover conditions, if any, which indicate problems that could contribute to an oil leak or spill. It is appropriate to include the inspection with other activities performed by assigned personnel when they are in the tank storage area or at product transfer areas. As indicated on the inspection checklists, the following inspection procedures are followed:

- For all oil storage tanks and containers, inspect the containment area, tank shell, supports, and foundation for structural integrity.
- Check all associated piping for dripping, loose joints, damage to supports, and pipe deflection.
- Inspect all pumps, valves, hoses, and piping for cracks, leaks, and abnormal wear.
- For double-walled tanks, inspect the interstice for the presence of fuel, an indication of leaks in the primary tank.
- Inspect all containment bins for excess accumulation of water and the presence of oil (accumulations of oil must be promptly removed).

- Inspect the area surrounding the containment areas for signs of oil spills and stained soil.
- Inspect the containment area drain valve (if one is present) to assure the integrity and utility of the valve and locking device.
- Correct any deficiencies that are identified as soon as possible.

Attention should be directed to emergency shutdowns, high-level alarms, tank monitoring equipment, and communication systems to verify proper operating capabilities.

Problems are to be reported to the individual designated at the Landfill who is responsible for oil spill prevention (i.e., District Manager). Corrective action must be taken as soon as possible.

6.12.2 Daily Inspection

A Landfill person or qualified representative performs a complete walk-through of the Landfill each day. This daily visual inspection involves: examine perimeter fences for unauthorized entry and locked gates, testing leak alarms, looking for tank/piping damage or leakage, stained or discolored pavement, or excessive accumulation of water in the storm drain.

6.12.3 Monthly Inspection

The checklist provided within this plan is used for monthly inspections by authorized facilities maintenance personnel. The monthly inspections are consistent with Steel Tank Institute (STI) Standard SP-001. All problems regarding tanks, piping, containment, or response equipment must immediately be reported to the Facility Manager. Visible oil leaks from tank walls, piping, or other components must be repaired as soon as possible to prevent a larger spill or a discharge to navigable waters, adjoining shorelines, storm drains, or the environment. Pooled oil is removed immediately upon discovery.

Written monthly inspection records are signed by the inspector or supervisor and maintained for a period of three (3) years.

6.12.4 Annual Inspection

Landfill personnel perform a more thorough inspection of Landfill equipment on an annual basis. This annual inspection complements the monthly inspection described above and is performed in each year using either the checklist provided in Appendix A of this SPCC or an equivalent. The annual inspection may be performed after a large storm event in order to verify the imperviousness and/or proper functioning of drainage control systems but is normally performed in conjunction with annual preventative maintenance. Written annual inspection records are signed by the inspector or supervisor and maintained in a labeled binder in the office for a period of three (3) years. Annual inspections are consistent with the STI Standard SP-001.

6.12.5 Periodic Integrity Testing

Periodic Inspections are conducted by the owner’s inspectors using inspection form procedures that follow the Standard for the Inspection of Aboveground Storage Tanks, SP-001 manual. Since no ASTs at the Landfill exceed 5,001 gallons (STI: Category#1), a formal outside inspection is not required, but the operator may commission such an inspection should an

internal periodic AST inspection warrant such action. In addition, drums are not considered a bulk storage tank and are not subject to the STI guidance for inspections of bulk storage tanks and are to be visually inspected routinely, per the Landfill oil storage inspections.

6.13 Spill Prevention Training [40 CFR 112.7(f)]

Upon beginning employment, all oil handling personnel are instructed by management in: the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; applicable pollution control laws, rules, and regulations; general facility operations; and, the contents of the Landfill SPCC Plan. Existing employees will receive training within three months of the issuance of this amended SPCC Plan.

The Landfill Supervisor is responsible for spill prevention training at this Landfill.

Management will provide annual spill prevention briefings for all oil handling personnel to ensure adequate understanding of the SPCC Plan. These briefings highlight any past spill events or failures and recently developed precautionary measures. Training includes inspection methods, oil spill prevention, containment, and retrieval methods. The Spill Prevention Briefing Log is available in Section 9.0. Records of spill prevention training are kept in Section 4 of the record-keeping binder located at the Landfill office, and will be kept for at least three (3) years.

Topics discussed during all training sessions will include the following:

- Operation and maintenance of equipment to prevent oil discharges.
- Discharge procedure protocols.
- Applicable pollution control laws, rules, and regulations.
- General facility operations.
- Contents of the SPCC Plan.
- SPCC Plan procedures.
- Locations of spill and fire control equipment.
- Inspection and record keeping procedures.

In addition to training required in the SPCC regulations, Awareness Training for Response to Incidental Releases will be conducted. Incidental Release as defined in the Emergency Response definition under 29 CFR 1910.120 (a)(3) means, “Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses within the scope of this [HAZWOPER] standard.”

Employees who are anticipated to participate in any incidental release response and all other employees regularly working with or around oils that are likely to witness or discover an oil spill will be given awareness training.

Some employees may be required to respond to a spill of oil as follows:

- Employees may stop a leak at the source only if a spill would be considered an "incidental release" under 29 CFR 1910.120 and only if the spill is located in the employees' work area.
- Employees may contain a spill that is incidental in the employees' work area.
- Employees will call for help.
- Employees may cleanup the spilled oil if the spill could be considered an "incidental release" and only if the spill is located in an employee' work area.

Employees who will participate in emergency response to a hazardous materials release at the Landfill will be given training corresponding to their role within the Landfill emergency response program.

6.14 Security [40 CFR 112.7(g)]

Oil handling, processing, and storage areas are required to be secure with controlled access to prevent vandalism and prevent unauthorized access. Methods utilized at the Landfill are presented below.

6.14.1 Fencing and Gates [112.7(g)(1)]

The Landfill has gated access to exit roads, perimeter fencing, and other natural barriers to deter access. This security meets the criteria set forth by 40 CFR 112.7.g.1 to deter vandals and unwanted entry into the site. The fence limits access to the site from adjacent roadways, highways, and neighboring properties. The security gates are kept locked at night and when the Landfill is closed.

6.14.2 Flow and Drain Valve Locks [112.7(g)(2)]

No flow or drain valve locks are used on-site.

6.14.3 Pump Control Locks [112.7(g)(3)]

No pump control locks are used on-site.

6.14.4 Out-of-Service Piping Secured [112.7(g)(4)]

There is no out-of-service piping at the Landfill.

6.14.5 Facility Lighting [112.7(g)(5)]

Security lights are located around the office/administration building, and portable lights are available on-site, if needed, for night work. During hours of darkness, non-operating personnel would not be in the vicinity unless accompanied by operating personnel with vehicles and lighting. Additional lighting is provided by vehicles onsite, as needed. Lighting of coastal facilities at night on the island of Kaua‘i is limited due to endangered species concerns.

6.14.6 Security for Oil Flow Devices

During the workday, all oil flow devices are under the direct control of Landfill personnel. The storage tanks and internal equipment are under the direct control of Landfill personnel during

operation and standby status. When the Landfill is shut down for the day, all equipment will remain within the locked Landfill area.

6.14.7 Security for Oil Starter Devices

For the Landfill, only the diesel fuel AST is fitted with an oil starter pumping device. The diesel fuel station fuel pump is fitted with a locking mechanism. The Landfill secures and locks the fuel pump dispenser handle when not in use. At this time, all other pumps are hand-powered.

6.14.8 Security for Loading/Unloading Devices

During the workday, all oil loading and unloading devices are under the direct control of Landfill personnel. The storage tanks and internal equipment are under the direct control of Landfill personnel during operation and standby status. When the Landfill is shut down for the day, all equipment will remain within the locked Landfill area.

6.15 Tank Truck Loading/Unloading Rack Requirements [40 CFR 112.7(h)]

Offsite contract delivery tanker trucks periodically fill the diesel storage tank (Tank 1). Deliveries typically occur on a weekly basis, consistent with the site's fuel consumption of approximately 750 gallons per week, and the need to maintain approximately 1,000 gallons of diesel fuel in the tank for potential emergency generator use. Tanker trucks that deliver diesel fuel are typically single- cylinder tankers with 3,000 gallon capacities. Transfer of the diesel fuel to the AST occurs on an asphalt pad adjacent to the tank. The AST is located in a remote, low-traffic area of the site with limited potential for contact from other site vehicles. All transfers are attended by trained personnel.

6.15.1 Loading/Unloading Area Drainage Containment System [112.7(h)(1)]

Under the EPA Settlement Agreement with the American Petroleum Institute and Marathon Oil Company, this section is not applicable to the Landfill, which does not have a truck loading/unloading rack. The EPA notices related to this settlement have not yet been published in the Federal Register. If changes are required to this SPCC Plan as a result of these notices, it will be revised within six months of publication of the notices.

6.15.2 Prevention of Vehicles Moving Before Disconnected [112.7(h)(2)]

Delivery vehicle operators are trained by their employers in the use of the unloading equipment associated with his/her truck, and are responsible for its proper use in accordance with U.S. Department of Transportation regulations. Contractors are required to have the following items at all times:

- Secondary containment for any tank.
- Adequate spill response materials at the location of the tank.

Vendors/delivery vehicle operators are required to provide the Landfill with copies of:

- Documentation of training for a company's operators.

- A copy of the vendor's SPCC Plan/Spill Response Plan (or equivalent).

6.15.3 Inspection of Vehicle to Prevent Leakage in Transit [112.7(h)(3)]

The fuel delivery truck operator is responsible for assuring that all fittings are tightly closed in order to prevent leakage from the vehicle. Tank filling is performed at the tank fill-port by qualified vendors.

During the transfer to the AST, the following procedures shall be followed to protect against overfilling of the storage tank:

- A fuel vendor is dispatched to the Landfill based upon product inventory information obtained from the electronic monitoring system or based upon available, periodic fuel delivery.
- Prior to filling the tank, the tanker truck operator verifies fuel/oil needs based upon electronic level and manual gauge readings to confirm adequate capacity.
- The fuel tanker truck operator is present the entire time the AST is being filled. During tank loading and unloading operations, the tanker truck operator is required to be out of the truck to monitor the operations. The operator is also involved in connecting and disconnecting the fuel transfer lines, so an interlocking warning system is not necessary to prevent departure before complete disconnection of transfer lines.
- Before the fuel tanker truck operator leaves the site, he/she is required to examine the lower- most drain in addition to their outlets for any sign of leakage. When necessary, outlets are adjusted to prevent leakage while in transit.
- In the event that the diesel fuel AST is overfilled, an automatic shut-off valve would halt additional pumping. The fuel delivery tanker truck operator will ensure that all appropriate valves and connections are secured once fueling is complete.
- Transferring diesel fuel from the AST to the Landfill equipment is also conducted on the asphalt pad. Site vehicles/equipment are fueled directly from this tank only when the mobile refueling service truck(s) is unavailable.

6.16 Field Constructed Aboveground Storage Tanks [40 CFR 112.7(i)]

There are no field-constructed ASTs at the Landfill.

6.17 Qualified Oil-Filled Operational Equipment [40 CFR 112.7(k)]

Oil-filled operational equipment means equipment that includes an oil storage container (or multiple containers) in which the oil is present solely to support the function of the apparatus or the device. Oil-filled operational equipment is not considered a bulk storage container, and does not include oil- filled manufacturing equipment (flow through process). No oil-filled operational equipment at is presently in use at the Landfill.

6.18 Conformance With Applicable Standards [40 CFR 112.7(j)]

This SPCC Plan is in conformance with all applicable requirements of 40 CFR Part 112, except for minor deviations, as allowed by section 112.7(a)(2) of the regulation. The deviations, and the equivalent environmental protection provided, are described below.

[112.8(c)(6)] Smaller oil storage containers and drums are not integrity tested; instead, they are stored off the ground or on impermeable liners or in secondary containment areas and visually inspected on a regular basis. This is further discussed in Section 6.12 of this Plan.

Drainage of all un-diked areas with a potential for an oil discharge does not flow into a pond, lagoon, or catch basin designed to retain oil or return it to the Landfill. The original site drainage design did not consider the location of oil storage facilities. As discussed in Section 6.3, spill response equipment is available at the Landfill in close proximity to the petroleum tanks.

6.19 State Specific Requirements [40 CFR 112.7(j)]

This plan has been prepared in accordance with State of Hawai‘i and local rules. The Hawai‘i Department of Health (DOH), Environmental Health Administration, Hazard Evaluation and Emergency Response Office (HEER), has primary responsibility for regulation of oil and petroleum spill prevention activities in Hawai‘i.

The State of Hawai‘i has included oil in the Hawai‘i Emergency Planning and Right-to-Know Act (HEPCRA). The reportable quantities limits are defined in Chapter 11-451, Hawai‘i Administrative Rules, entitled "State Contingency Plan" adopted August 2, 1995. Chapter 11-451-5 designates oil as a hazardous substance. Chapter 11-451-6 (b)(5) defines the reportable quantity for releases of oil:

- Any amount of oil which when released into the environment causes a sheen to appear on surface water, or any navigable water of the State.
- Any free product that appears on groundwater.
- Any amount of oil released to the environment greater than 25 gallons.
- Any amount of oil released to the environment, which is less than 25 gallons, but which is not contained and remediated within 72 hours.

Facilities subject to SPCC Plan and Facility Response Plan (FRP) requirements also fall directly under the jurisdiction of the EPA Region 9 Oil Spill Prevention and Response Program.

6.19.1 Contingency Plan

The petroleum AST at the Landfill are maintained in full compliance with applicable federal regulations. Hawai‘i State regulations define oil as a hazardous substance subject to notification requirements under HAR §11-451-5.

HAR §11-451-6(5) defines reportable quantities, as any amount of oil that when released causes a sheen on surface water, or any navigable water of the State; any free product that appears on ground water; any amount of oil released greater than 25 gallons; and any amount of oil less than

25 gallons that is not contained and remedied within 72 hours requires immediate verbal reporting, followed by written notification within 30 days per HAR §11-451-7.

7. SPECIFIC REQUIREMENTS [40 CFR 112.8]

In accordance with 40 CFR 112.8(a), the Landfill has met the general requirements for this SPCC Plan listed under 40 CFR 112.7 and the specific discharge prevention and containment procedures listed in 40 CFR 112.8.

7.1 Facility Drainage [40 CFR 112.8(b)]

Surface water management for the Landfill is designed for a 25-year return frequency, 24-hour duration rainfall event. The 25-year, 24-hour storm event at Kekaha is 8 inches (AECOM, 2017). The Landfill includes diversion berms at the perimeter of the Landfill top deck and side slopes that direct surface water to down-drains. Each down-drain conveys water to a culvert or swale, which then conveys the surface water to either infiltration ditches along the perimeter of the Landfill, or the infiltration basin located near the main entrance to the Landfill. Drainage in the area of the fueling tank generally flows in a northeastern direction into the southern shoulder of the Kaumualiʻi Highway, and then drains towards the east. An earthen perimeter berm has been placed around the fueling area to contain any potential spills from draining off site.

7.2 Bulk Storage Containers [40 CFR 112.8(c)]

An on-site review of oil storage and handling areas was performed at the Landfill. This review identified bulk oil storage containers located within the Maintenance Building drum area (locations noted on Figure 3). This section discusses the conformance of these containers with federal guidelines.

Any visible discharge resulting in a loss of oil from container, including but not limited to seams, gaskets, piping, pumps, valves, rivets, and bolts is promptly corrected. Any accumulations of oil in the containment areas are promptly removed. Uncontaminated rainwater will not be pumped or discharged from the containment bins into an open watercourse, lake, or pond.

No areas with a potential for discharge that are not in containment or do not have a dike system (such as haul roads, pipes, valves, dispensers, etc.) have been identified. There are no effluent treatment systems at the Landfill.

As defined in 40 CFR 112.2, oil-filled electrical equipment, operating, or manufacturing equipment are not bulk storage containers. There is no equipment of this type present or in use at the Landfill.

There are no partially buried or bunkered oil storage tanks at the Landfill. Any buried oil storage tanks that are installed in the future will be protected from corrosion by coatings or cathodic protection that is compatible with local soil conditions. No bulk oil containers at the Landfill are equipped with internal heating coils. No field-constructed aboveground storage tanks are located at the Landfill.

Each bulk storage container installation is engineered or updated in accordance with good engineering practice to avoid discharge. Before filling any tank, a Landfill employee verifies with the fuel vendor the level of the tank and the amount to be unloaded.

7.2.1 Construction [112.8(c)(1)]

The bulk storage containers and the secondary containment systems at the Landfill are compatible with all grades of gasoline, distillates, and lubricant oils. A copy of MSDSs for stored oils are located onsite.

7.2.2 Secondary Containment [112.8(c)(2)]

40 CFR 112.8(c)(2) requires constructing all bulk storage tank installations (except mobile refuelers and other non-transportation-related tank trucks) so a secondary means of containment is provided for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. Diked areas must be sufficiently impervious to contain discharged oil. Dikes, containment curbs, and pits are commonly employed for this purpose. An alternative system consisting of a drainage trench enclosure may also be used so that any discharge will terminate and be safely confined in a Landfill catchment basin or holding pond.

Federal Register Vol. 74, No 218 states "*In the December 2008 amendments, EPA extended the exemption from the sized secondary containment requirements provided to mobile refuelers in the December 2006 amendments (71 FR 77266, December 26, 2006) to non-transportation-related tank trucks at a facility subject to the SPCC rule. Other non-transportation related tanker trucks may be transferring non-fuel oils (i.e., transformer oils, lubrication oils, or certain AFVOs) and operate similarly to mobile refuelers; therefore, they may not be able to comply with the sized secondary containment requirements. Specifically, EPA amended §§112.6(a)(3)(ii), 112.8(c)(2), 112.8(c)(11), 112.12(c)(2), and 112.12(c)(11) to include the phrase ''except mobile refuelers and other nontransportation-related tank trucks.'' Such non-transportation-related tank trucks include those used to store and transport fuel, crude oil, condensate, non-petroleum, or other oils for transfer to or from bulk storage containers; for example, a truck used to refill oil-filled equipment at an electrical substation or a pump truck at an oil production facility. Under this approach, the general secondary containment requirements at §112.7(c) still apply*".

AST#1 is a double-walled tank that can contain 100 percent of the tank's rated capacity and can fully support the loaded fuel tank and pumping system. In addition to this concrete structure, there is a tertiary containment system that consists of a low concrete dike built around the perimeter of the tank; this containment system is capable of holding 1,475 gallons. The entire fueling area is protected from accidental traffic collisions by bollards, spaced at approximately 6-foot intervals.

When not in operation, Mobile 1 is maintained and parked within close proximity to the Maintenance Building wash pad. The drainage system is in the bermed wash rack that is connected to an OWS. During re-fueling operations, the emergency oil storage capacity of the landfill liner system is sufficient to handle the quantity of oil expected to be discharged in un-diked areas from overfills or transfer. The bermed wash rack and landfill liner system, along with monitoring all product transfers, provides environmental protection equivalent to the requirements under 112.8(b)(3).

Miscellaneous containers storing various oil products are also located at the Landfill. Typically, these containers are 55-gallon drums located in or around the maintenance/equipment fueling

area. These containers are stored on spill control pallets (plastic “poly-spill” secondary containment pallets). Should secondary containment be breached, oil product would spill onto the ground surface where it would be contained and cleaned-up with sorbent materials.

7.2.3 Drainage of Diked Areas [112.8(c)(3)]

AST#1 has a tertiary containment system consisting of a dike. Spills within diked area will be cleaned up with absorbent material. The bypass valve for the diked area is kept sealed closed. Accumulated rainwater is drained; If opening the valve is required, the rainwater must be inspected to ensure it will not cause a discharge as described in §112.1(b) or applicable state regulations. The opening, drainage and resealing of the valve will be conducted under the direction of responsible supervision (District Manager or his delegate). Records of these events must be documented on the Record of Containment Dike Drainage form in Section 14.0 of this plan and maintained at the Landfill for at least three (3) years.

7.2.4 Corrosion Protection [112.8(c)(4)]

This section is not applicable, as there are no buried tanks at the Landfill.

7.2.5 Partially Buried and Bunkered Storage Tanks [112.8(c)(5)]

This section is not applicable as there are no partially buried or bunkered storage tanks at the Landfill.

7.2.6 Inspections and Tests [112.8(c)(6)]

As required by the SPCC rule, Landfill staff performs the inspections, tests, and evaluations listed in the following table. Table 5 summarizes the various types of inspections and tests performed at the Landfill. The inspections and tests are described later in this section, and in the respective sections that describe different parts of the Landfill.

It is recommended that periodic inspections be conducted of exposed fiberglass piping, rubber, and other material that may deteriorate when exposed to ultraviolet light and weathering be inspected for deterioration.

Table 5: Inspection and Testing Program

Facility Component	Action	Frequency/Circumstances
Aboveground Tanks and associated piping	Combine visual inspection with another non-destructive tank integrity testing technique. Inspect outside of container for signs of deterioration and discharges.	Follow a regular schedule Daily undocumented visual facility inspections Monthly documented inspections for tanks
AST supports and foundation	Inspect container's supports and foundations.	Following a regular schedule (monthly, annual, and during scheduled inspections) and whenever material repairs are made.
Liquid level sensing devices, electronic (overfill)	Test for proper operation.	Annually
Liquid level sensing devices, positive shut down (overfill)	Test for proper operation. Document initial testing.	Annually
All aboveground valves, piping, and appurtenances	Assess general condition of items, such as flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces.	Monthly
Underground piping	No buried underground oil piping is located onsite.	n/a

Visual inspections of AST by Landfill personnel are performed according to the procedure described in this SPCC Plan. Leaks from tank seams, gaskets, and bolts are promptly corrected. Records of inspections and tests are signed by the inspector and kept at the Landfill for at least three (3) years.

The scope and schedule of certified inspections and tests performed on the Landfill's AST are specified in Steel Tank Institute (STI) Standard SP-001. The external inspections, as specified in the standard, would be conducted by a certified tank inspector to assess the integrity of the tank for continued oil storage, or per the recommendations of the tank manufacturer.

In regard to the proceeding sections: Continuous Release Detection Method (CRDM) – means of detecting liquid through inherent design. It is passive. Liquid releases are visually detected by Landfill operators.

- Release Detection Barrier (RPB)
- Secondary Containment (AST – double wall tank)
- Elevated AST

Release Prevention Barrier (RPB) - A liquid-containment barrier installed underneath an aboveground storage tank that is sufficiently impervious to the liquid being stored. Its purpose is to divert a product release toward an area where it can be easily detected and to prevent liquid from contaminating the environment. Release prevention barriers are composed of materials that are compatible with the liquid being stored in the aboveground storage tank and that meet proper

engineering standards. Examples include DW tanks, steel, concrete, elastometric liners or other suitable materials that meet the criteria described above.

Inspections

- Periodic Inspections are to be conducted by owner's inspectors.
- Formal External Inspections are to be performed by certified inspectors.

Tank damaged or corroded

- To be determined by a certified STI tank inspector.

At a minimum, the following tank components shall be inspected (as applicable)

- Primary tank
- Secondary tank
- Tank supports
- Tank anchors
- Tank foundation and external supports
- Tank gauges and alarms
- Insulation covering
- Tank appurtenances
- Normal vents
- Emergency vents
- Release prevention barriers
- Spill control systems
- OWS

Record keeping

- Retain each AST record for the life of the AST.
- Retain each monthly inspection checklist for at least 36 months.
- Retain each annual inspection checklist for at least 36 months.
- Retain all certified inspection reports for the life of the AST.

Standards for AST inspections

STI SP001 shop fabricated ASTs:

- < 50,000 gallons

- Limited to max shell height of 50’ and a max diameter of 30’.
- An AST without a nameplate < 50,000 gallons plus max height 50’ and max diameter of 30’.

AST inspection categories:

- Cat 1 = AST with spill control and CRDM
- Cat 2 = AST with spill control and no CRDM
- Cat 3 = AST without spill control and CRDM

Four types of inspections:

- P = Periodic AST inspection
- E = Formal external inspection by a certified AST inspector
- I = Formal internal inspection by a certified AST inspector
- L = Leak test by owner

Table 6: STI Standard for Bulk Storage Containers Inspections and Tests

Gal	Cat 1	Cat 2	Cat 3
0-1100	P	P	P,E & L (10)
1101-5000	P	P,E & L (10)	P,E & L (5) I (10) or P,L (2),E (5)
5001-30000	P,E (20)	P,E (10) ,I (20) or P,E (5),L (10)	P,E & L (5) I (10) or P,L (1), E (5)
30001-50000	P,E (20)	P,E &L (5), I (15)	P,E &L (5), I (10)

Table 7: Scope and Frequency of Bulk Storage Containers Inspections and Tests

AST #	Approx. Quantity (Gallons)	Double or Single Walled	STI Category	STI Inspection Required
1	2,000	DW	1	P = Periodic AST inspection
Oil Filled Equipment	n/a			
Drums	Not a bulk storage tank and not subject to the STI guidance for inspections of bulk storage tanks. Visually inspected routinely, per the facility oil storage inspections.			
Transformers	n/a			

7.2.7 Heating Coils [112.8(c)(7)]

This section is not applicable because the AST is not equipped with internal heating coils.

7.2.8 Overfill Prevention System [112.8(c)(8)]

Overfill prevention devices are required for all bulk tanks. Approved devices include:

- High liquid level alarms with an audible or visual signal at a constantly attended operation or surveillance station. In smaller facilities an audible air vent may suffice.
- High liquid level pump cutoff devices set to stop flow at a predetermined container content level.
- Direct audible or code signal communication between the container gauge and the pumping station.
- A fast response system for determining the liquid level of each bulk storage container such as digital computers, telepulse, or direct vision gauges. If you use this alternative, a person must be present to monitor gauges and the overall filling of bulk storage containers.

AST#1 at the Landfill is equipped with a direct vision gauge and spill bucket. All tanks require continuous presence of personnel to monitor filling operations for overfill protection. Venting capacity is suitable for the fill and withdrawal rates. General secondary containment is provided in the event of overfills, as described in this SPCC Plan.

Landfill personnel are present throughout the filling operations to monitor the product level in the tanks. Liquid level sensing devices must be regularly tested to ensure proper operation.

7.2.9 Effluent Treatment Facilities [112.8(c)(9)]

This section is not applicable as there are no regulated, routine plant effluent discharges to navigable waters.

7.2.10 Visible Discharges [112.8(c)(10)]

Tanks and equipment with visible oil leaks or deficiencies that could result in a leak are repaired or replaced as soon as practicable. Any oil accumulation or stained soils in the area are promptly remediated and materials used during clean-up are properly disposed of in accordance with good engineering practices.

7.2.11 Mobile and Portable Containers [112.8(c)(11)]

The mobile refueling truck equipped with a fuel tank (Mobile 1) and are used for daily refueling of landfill equipment.

All oil tanks used at the Landfill are constructed of steel, in accordance with industry specifications as described previously. The design and construction of all bulk storage containers are compatible with the characteristics of the oil product they contain, and with temperature and pressure conditions.

7.3 Facility Transfer Operations [40 CFR 112.8(d)]

Transfer operations at the Landfill include:

- The transfer of diesel fuel from third party vendor tanker trucks into the double-walled AST located near the maintenance shop.

- The transfer of diesel fuel from the AST to fill machinery and the mobile service truck is conducted via pneumatic suction pumps to dispenser hoses.
- The transfer of used oil from portable used oil drain pans via drum funnels into 55-gallon used oil drums in the maintenance shop.
- The filling of Landfill trucks and equipment using the diesel fuel dispenser at the AST. The suction pump uses a rubber dispenser hose.
- The filling of Landfill trucks and equipment using the diesel fuel dispenser on the mobile refueling service truck. The tank-mounted suction pump uses a rubber dispenser hose.

7.3.1 Buried Piping Protection [112.8(d)(1)]

This section is not applicable as there is no buried piping at the Landfill.

7.3.2 Out-of-Service Piping [112.8(d)(2)]

This section is not applicable as there is no out-of-service piping at the Landfill.

7.3.3 Pipe Supports [112.8(d)(3)]

This section is not applicable as there are no pipe supports used at the Landfill.

7.3.4 Inspection of Aboveground Valves, Piping, and Appurtenances [112.8(d)(4)]

All aboveground piping and valves are examined monthly to assess their condition. Inspection includes aboveground valves, piping, appurtenances, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces. Observations are noted on the monthly inspection checklist provided in this SPCC Plan.

7.3.5 Overhead Pipe Clearance [112.8(d)(5)]

All of the aboveground piping is located within areas that are not accessible to vehicular traffic (e.g., inside building, protected by vehicle barrier posts). Brightly painted bollards are placed where needed to prevent vehicular collisions with equipment.

8. CERTIFICATION OF THE APPLICABILITY OF THE SUBSTANTIAL HARM CRITERIA [40 CFR 112.20(E)]

The intent of this form is to determine if the Landfill for which this SPCC Plan is written must prepare a Facility Response Plan as defined by 40 CFR 112.20.

Facility Name: Kekaha Municipal Solid Waste Landfill Phase II

Facility Address: 6900-D Kaumualiʻi Highway, Kekaha, Kauaʻi, Hawaiʻi 96752

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?

   ☐ YES ☐ NO

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest above ground oil storage tank plus sufficient freeboard to allow for precipitation within any above ground storage tank area?

   ☐ YES ☐ NO

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Attachment C-III to this appendix or a comparable formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For further description of fish and wildlife and sensitive environments see Appendices I, II, and III to DOC/NOAA's "Guidance for Facility and Vessel Response Plans: Fish and Wildlife and Sensitive Environments" (see appendix E to this part, section 10, for availability) and the applicable Area Contingency Plan.

   ☐ YES ☐ NO

4. Does the facility have a total oil storage capacity of greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Attachment C-III to this appendix or a comparable formula) such that a discharge from the facility would shut down a public drinking water intake?

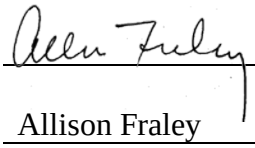
   ☐ YES ☐ NO

5. Does the facility have a total oil storage capacity of greater than or equal to 1 million gallons and has the facility experienced a reportable spill in an amount greater than or equal to 10,000 gallons within the last 5 years?

   ☐ YES ☐ NO

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

Signature	
Name (type or print)	Allison Fraley
Title	Environmental Services Manager

9. SPILL PREVENTION BRIEFING LOG

Date of briefing: _____

Briefing conducted by: _____

In accordance with 40 CFR 112.7(f), and in order to ensure adequate understanding of the SPCC Plan for this facility, spill prevention briefings must be conducted at least once per year for all oil- handling personnel, and should include at least the topics listed below. Use this form to document attendance at the spill prevention briefing.

The following topics were discussed at the meeting (check all that apply):

☐ SPCC Plan, including the contact list and telephone numbers, and including potential spill flow routes and strategic barricading points

☐ Facility operations, especially those pertaining to oil storage and handling

☐ Applicable pollution control laws, rules and regulations

☐ Spill events or failures at this or other sites

☐ Operation and maintenance of equipment to prevent oil spills

☐ Spill response and reporting procedures

☐ Other _____

Facility personnel in attendance:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Completed copies of this briefing log shall be kept with the SPCC Plan for a minimum of 3 years.

10. ANNUAL SPCC PLAN APPLICABILITY REVIEW CHECKLIST

Date Reviewed: _____ Reviewed by: _____

Date Last Reviewed: _____

On an annual basis, review the following items to evaluate if they are still accurate for your facility. If there is a change in the Landfill design, construction, operation, or maintenance that materially affects the potential for a discharge from the Landfill, you must prepare an amendment to this SPCC Plan within six months of the change, and implement the amendment as soon as possible, but not later than six months following preparation of the amendment [40 CFR 112.5(a)].

Examples of changes that may require amendment of the SPCC Plan include, but are not limited to:

- Commissioning or decommissioning of containers or tanks.
- Replacement, reconstruction, or movement of containers or tanks.
- Reconstruction, replacement, or installation of piping systems.
- Construction or demolition that alter secondary containment structures.
- Changes of product or service.
- Revision of standard operation of maintenance procedures at the facility.

ADMINISTRATIVE

Are the following documents available for use at the facility?

Yes	No	NA	
_____	_____	_____	SPCC Plan
_____	_____	_____	Oil Spill Contingency Plan

Are the site-specific sections of the above reports accurate?

Yes	No	NA	
_____	_____	_____	Area Descriptions
_____	_____	_____	Oil Storage
_____	_____	_____	Have facility/tank inspection checklists been completed and filed?
_____	_____	_____	Are spill response numbers posted?

Have employees received appropriate training/briefings including:

Yes	No	NA	
_____	_____	_____	SPCC Plan Briefings (oil handling personnel)

SPILL RESPONSE EQUIPMENT

Yes	No	NA	
_____	_____	_____	Is spill response equipment available as indicated in the SPCC Plan?
_____	_____	_____	Is all spill response equipment in good working order?

Additional equipment/materials that are needed?

_____

_____

_____

GENERAL

Yes	No	NA	
_____	_____	_____	Are all areas free of unnecessary clutter?
_____	_____	_____	Are small oil containers kept in flammable lockers or other acceptable locations?

DRUM STORAGE AND HANDLING AREAS

Yes	No	NA	
_____	_____	_____	Are containers free of signs of leakage, rust, or other deterioration?
_____	_____	_____	Are containers kept closed when not in use?
_____	_____	_____	Are containers stored off the floor/ground, in containment areas?
_____	_____	_____	Are drip pans provided under spigots?
_____	_____	_____	Are spigots and valves free of leaks?
_____	_____	_____	Are containers labeled?

CONTAINMENT BERMS/STRUCTURES

Yes	No	NA	
_____	_____	_____	Are containment areas free of debris and liquid accumulations?
_____	_____	_____	Are containment/draining structures intact, and free of cracks, breaches, etc.?
_____	_____	_____	If present, are drainage valves secured?

ABOVEGROUND STORAGE TANKS

Yes	No	NA	
_____	_____	_____	Are fuel hoses, pumps, and valves drained and properly secured when not in use?
_____	_____	_____	Are valves, flanges, and gauges free of signs of leakage?
_____	_____	_____	Is monitoring equipment operational?

WASTE OIL STORAGE AREA

Yes	No	NA	
_____	_____	_____	Are all waste oil storage areas maintained in a neat and tidy fashion?
_____	_____	_____	Are all drums and other hazardous substance containers located within designated areas?
_____	_____	_____	Are all containers properly marked and dated?

DRAINAGE

Yes	No	NA	
_____	_____	_____	Are drainage ditches and culverts free of debris, trash, etc.?
_____	_____	_____	Are storm drain outlets adequately protected from erosion?

Remarks (Describe other problems or potential problems that may pose a hazard)

_____

_____

Completed copies of this form shall be kept with the SPCC Plan for a minimum of 3 years.

11. SPCC PLAN REVIEW AND EVALUATION LOG

The table below logs the review and evaluation of the SPCC Plan and documents amendments and/or P.E. certification that has been required.

"I have completed my review and evaluation of the SPCC Plan for the Kekaha Municipal Solid Waste Landfill Phase II on the date indicated, and as a result, will or will not amend the Plan as indicated below."

	Reviewer Name	Date	Plan Amended?		Nature of Changes Made	P.E. Cert Required?		Date Certified
1	Eddie Pettit, Waste Management	10/2015	**Yes**	No		**Yes**	No	10/2015
2	Tina Alder, Waste Management	03/2016	**Yes**	No		**Yes**	No	03/2016
3	Tina Alder, Waste Management	07/2016	**Yes**	No		**Yes**	No	07/2016
4	Adrienne Miller, Geosyntec Consultants	09/2021	**Yes**	No	Removed references to former Operator, Waste Management, and update contact information.	**Yes**	No	09/2021
5	Adrienne Miller, Geosyntec Consultants	09/2022	**Yes**	No	Updated petroleum storage inventory and figures.	**Yes**	No	09/2022
6	Adrienne Miller, Geosyntec Consultants	09/2023	**Yes**	No	Updated petroleum storage inventory and figures.	Yes	No	09/2023
7			Yes	No		Yes	No	

Each time an amendment to this plan occurs, a new Management Approval signoff in Section 5 needs to be completed.

12. SPILL INVESTIGATION FORM

1. When did the Incident occur? Date: _____ Time: _____
2. Where did the Incident occur? _____

   _____

3. How did the Incident occur (Describe the Cause)? _____

   _____

   _____

   _____

4. Under whose control was the material (chemical, petroleum, ash) at the time of the Incident?

   Name: _____

   Mailing Address and Street: _____

   Town:_____ State:_____ Zip:_____ Telephone: _____

5. What was spilled or discharged? Give an exact description of each of the materials involved in the incident, including chemical names, percent concentrations, trade names, etc.

   _____

   _____

   _____

   If the Chemicals are Extremely Hazardous substances or CERCLA hazardous substances they must be identified as such and include the reportable quantity (RQ). Please attach a Material Safety Data Sheet (MSDS) for each chemical involved.

6. What were the quantities (chemicals, petroleum, cooling water, lime, ash etc.) that were released, spilled or discharged to each environmental medium (air, surface water, soil, groundwater)?

   _____

   _____

   _____

7. Did any of the chemical or petroleum travel beyond the property line? [Note: materials that enter the groundwater are considered to have gone beyond the property line.]

_____

_____

_____

8. What actions were taken to respond to and contain the release, spill or discharge?

_____

_____

_____

9. What actions are being taken to prevent reoccurrence of an incident of this type?

_____

_____

_____

10. Was the Incident verbally reported to Management? (Contact EHS Manager, 25 gallons or more)

    Contacted/Title: _____

    Date:_____ Time: _____

11. Who reported the incident?

    Name/Title: _____

    Mailing Address and Street: _____

    Town:_____ State:_____ Zip:_____ Telephone: _____

12. Were there any injuries as a result of the Incident? If so, list the names of exposed individuals, their addresses, and phone numbers and describe their injuries. (Attach Additional Sheets if Necessary)

    Name: _____

    Mailing Address and Street: _____

    Town:_____ State:_____ Zip:_____ Telephone: _____

13. What is the appropriate advice regarding medical attention necessary for exposed individuals?

_____

14. Are there known or anticipated health risks, acute or chronic, associated with the release of this chemical or medical advice that should be communicated?

15. Was the incident completely cleaned up by the time this report was submitted? If not, what are the anticipated remedial actions and their duration?

16. Completed by:

Signature	Title	Date

13. SPILL DOCUMENTATION

(Date:_____)

FACILITY (DIVISION) ORIGINATING REPORT

Name:_____ Address: _____

City:_____ State:_____ Zip: _____

Phone: _____

Contact: _____

Other Responsible Persons: _____

INCIDENT DESCRIPTION

Location where spill occurred and cause (address; include description of area, i.e. industrial park, subdivision, etc.): _____

_____

Weather Conditions (temperature, windy, sunny, rain, snow, etc.): _____

_____

SPILL	Date Began:	_____	Date Ended:	_____
	Time Began:	_____	Time Ended:	_____
CLEANUP	Date Began:	_____	Date Ended:	_____
	Time Began:	_____	Time Ended:	_____

Material Spilled/Released: _____

Amount(s) Spilled/Released: _____

Spill/Release onto (type of soil [sand, clay, etc.]): _____

☐ Soil ☐ Asphalt ☐ Concrete ☐ Other (describe)

Ability of the spill to spread (where did spill end up and how fast did it flow?): _____

_____

Distance to closest water body: _____

Distance to: drains, sewers, ditches. _____

Agencies on site of spill (police, fire, etc.):_____

Contact name and number:_____

Spill/Release: Potential exposure to water wells, plants, animals, humans, sensitive environments.

NOTIFICATIONS (must Notify Emergency Government and DNR)

Agency	Phone Number	Contact Name	Date and Time
DOH-HEER Office	808-586-4249		
DOH-After Hours	808-236-8200		
National Response Center	800-424-8802		
EPA Region 9	800-300-2193		

Instruction given by agencies: _____

_____

_____

Evidence of contamination, visual & odor (describe): _____

_____

Impacts on the environment: _____

Corrective action taken: _____

Volume and Disposal of waste generated by spill: _____

_____

_____ _____

Signature Date

_____ _____

Printed/Typed Name Title

INSTRUCTIONS FOR COMPLETION OF SPILL REPORT DOCUMENTATION

Facility Originating Report: Identify the division including physical address (not Post Office Box).

Other Parties/Persons Responsible for Discharge: (Example) If a collision ruptures a fuel tank, name of driver of other vehicle.

Incident Description: Describe incident.

Location and Cause: Identify address of spill, description of area where spill occurred. Description to include zoning, distance to residences, etc. Identify cause of spill (hose ruptured, etc.)

Weather Conditions: Summary of temperature, wind direction and speed, precipitation, any other weather conditions of importance. Include any weather issues until spill clean-up is completed.

Spill: Approximate time spill started, duration of spill.

Cleanup: Approximate time clean-up began, how long it takes to complete clean-up.

Material Spilled and Amount: What was spilled and physical state (solid, liquid). The physical, chemical, hazardous, and toxicological characteristics of the substance spilled (off MSDS).

Amount Spilled/Released: Volume of substance spilled, and amount of absorbent used to clean up.

Spilled: Identify what spill came in contact with. If soil, identify soil type.

Ability of Spill to Spread: Is the weather (rain) washing the spill into a larger area? Is the surface sloping which is spreading the spill, wind blowing scattering material over greater distance? Where did spill end up going and how fast did it flow? Did other actions effect spill, i.e. fire hose washing contaminant?

Distance to closest water body: Is there a stream, river, pond or lake in close proximity, potential for contamination, identify distance?

Distance to drains, sewers, ditches: Is there a ditch or drain in close proximity to the spill. Identify distance to drain, ditch, etc.?

Agencies on site: If any agency responded (police and fire) list: contact and phone number and attach copy of any report issued by agency.

Spill/Release Potential Exposure to Water Wells, Plants, etc.: Are there any areas of special concern by the spill, such as wetlands, environmental corridors, trout streams, wildlife management areas, water wells, endangered plants, animals, etc.? If so, identify and contact Regional EMD.

Notifications: DOH must be notified when a spill occurs. NRC must be notified if a reportable quantity of a hazardous material is spilled. The only hazardous material we routinely haul is friable asbestos. Be sure to document time and date contacts were made.

Instructions Given by Agencies: When the spill was reported, was any information provided by the agencies on to how to manage, collect or remediate the spill?

Evidence of Contamination: The spill normally has an odor and visual appearance. Was the spill able to be removed? Any indicators of contamination remain after remedial activity.

Impacts on the Environment: Has cleanup been successful in removing any contaminants which would affect the environment?

Volume and Disposal of Waste Generated by Spill: Identify volume of residue and disposal of waste. Attach copies of manifest documenting disposal.

Corrective action taken: What was done to clean up the spill? Explain any unusual items of cleanup operation.

Signature: Signed by person supervising clean-up.

14. RECORD OF CONTAINMENT DIKE DRAINAGE

This record must be completed when rainwater from diked areas is drained into a storm drain or into an open watercourse, lake, or pond, and bypasses the water treatment system. The bypass valve must normally be sealed/locked in closed position. It must be opened and resealed/re-locked following drainage under responsible supervision.

IMPORTANT: If the area has an oil sheen present, rainwater cannot be drained until contamination has been removed.

Date	Diked Area Name	Presence of Oil Sheen	Time Started	Time Finished	Signature
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			
		☐ Yes ☐ No			

15. COMPLIANCE PLAN/SCHEDULE

The following action items have been identified at the Landfill as needing to be addressed in order to fully comply with the applicable requirements of 40 CFR Part 112, et seq., as currently promulgated and interpreted by U.S. Environmental Protection Agency (EPA):

No action items have been identified at the Landfill as needing to be addressed in order to fully comply with the applicable requirements of 40 CFR Part 112, et seq., as currently promulgated and interpreted by U.S. Environmental Protection Agency (EPA). The SPCC regulations regarding 5-year Plan reviews requiring changes be made within six months of the completion of this amended Plan are therefore not applicable.

Michael J. Minch, PE

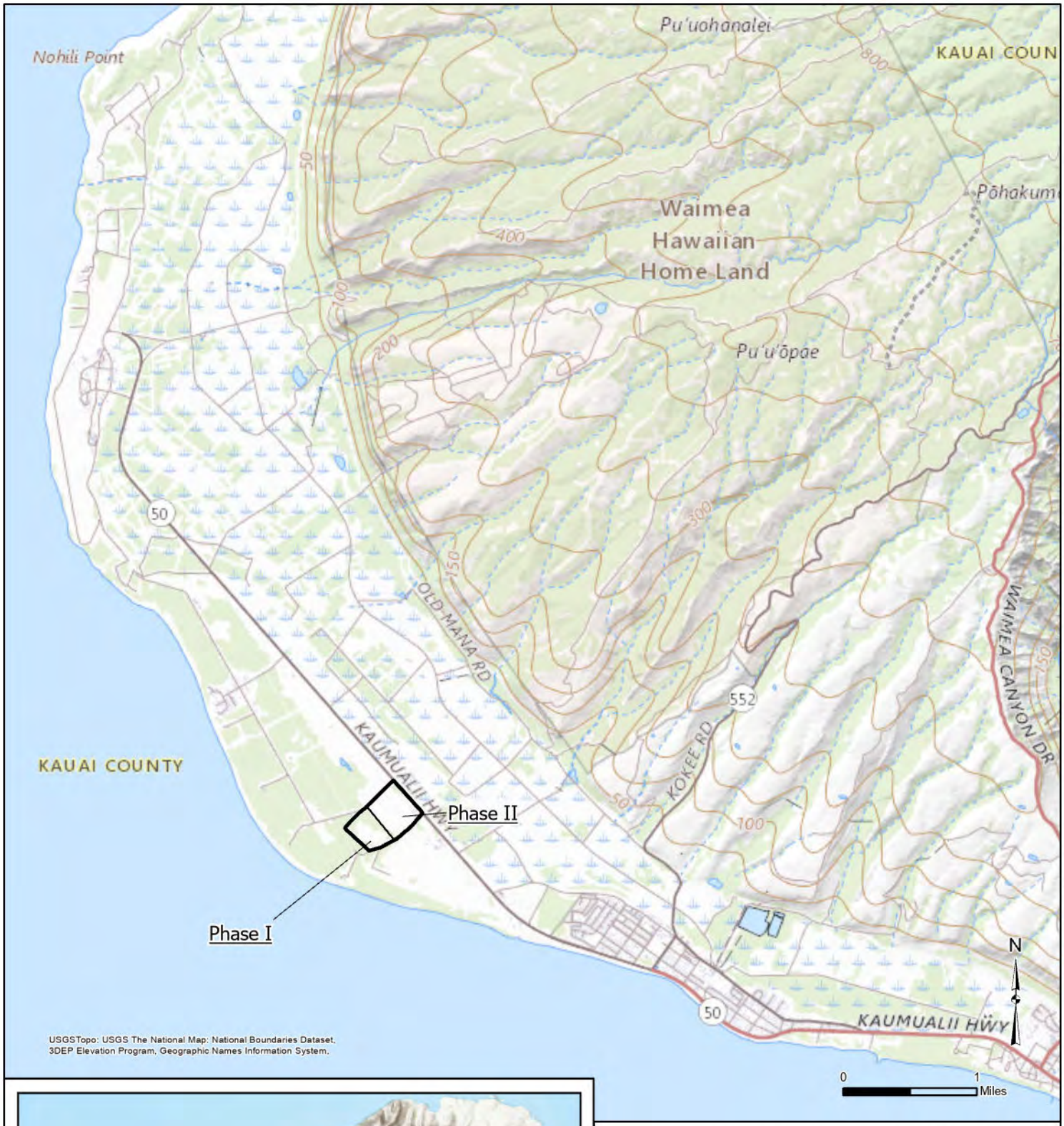
1 SEPTEMBER 2023
Date

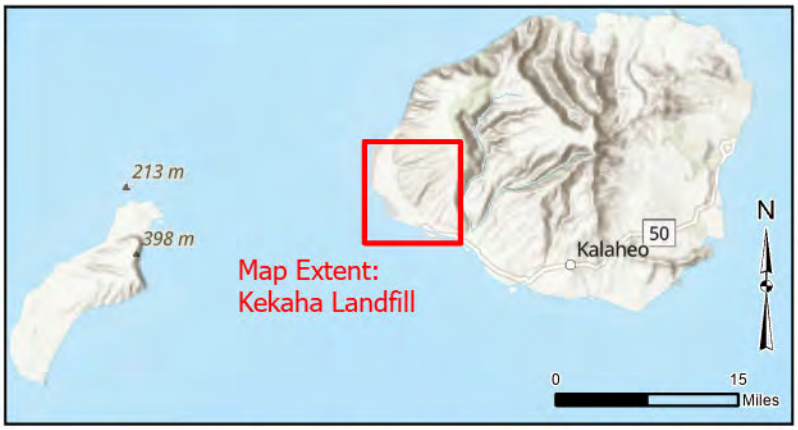
I certify that I am familiar with the action items identified in this Compliance Plan/Schedule, and agree to implement them as soon as possible, but not later than six months following the completion of this 5-year Plan review.

Name: _____ Title: _____

Signature: _____ Date: _____

FIGURES





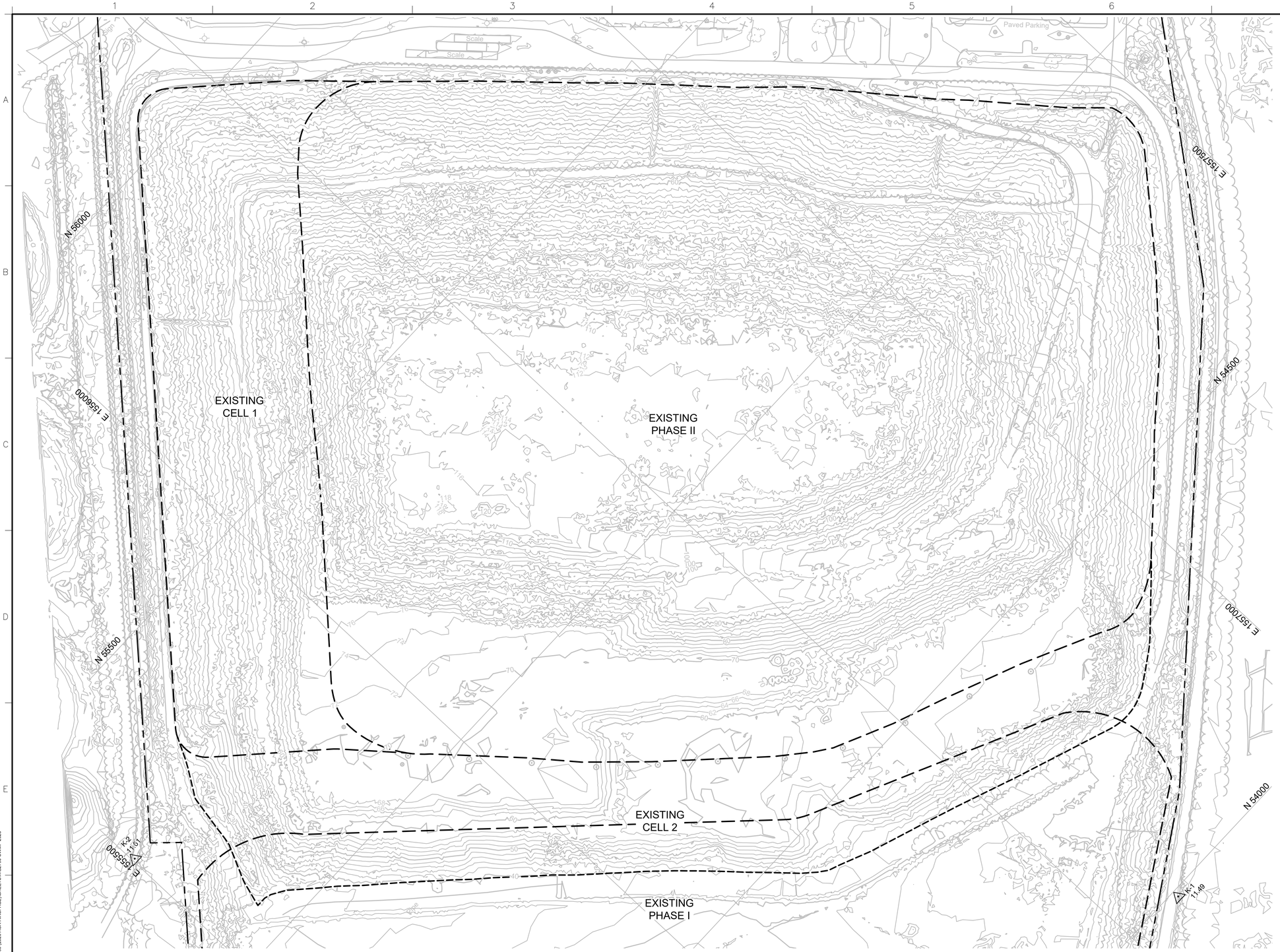
Kekaha Municipal Solid Waste Landfill
County of Kaua'i
Site Location Map

6900 Kaumuali'i Hwy,
Kekaha, HI 96752

Geosyntec consultants

WG3074	September 2023	**Figure 1**

P:\GIS\Kekaha Landfill\Kekaha_Landfill\Kekaha_Landfill.aprx\8.5 x 11 Site Location Map 7/20/2023 4:02 PM (Emily.Meyers)



0 80 160

SCALE IN FEET

LEGEND

- EXISTING GROUND ELEVATION (10-FT AND 2-FOOT CONTOUR) (NOTES 1 AND 2)
- APPROXIMATE PROPERTY LINE (NOTE 4)
- APPROXIMATE PHASES I AND II WASTE LIMIT (NOTE 4)
- APPROXIMATE CELL 2 LIMIT
- EXISTING SITE SURVEY BENCHMARK

NOTES:

1. EXISTING GROUND CONTOURS PREPARED BY R.M. TOWILL CORPORATION (RMTC) AND BASED ON DRONE SURVEY DATED 03-25-23. EXISTING SITE FEATURES ARE FROM TOPOGRAPHIC MAP PREPARED BY MILLER CREEK AERIAL MAPPING, LLC, DATED 02-24-15.
2. DRONE SURVEY DATED 03-25-23 NOT CORRECTED IN AREAS OF VEGETATION.
3. HORIZONTAL DATUM AND COORDINATES ARE BASED ON LOCAL COORDINATE SYSTEM. VERTICAL DATUM AND ELEVATIONS ARE BASED ON LOCAL TIDAL AND SITE SURVEY BENCHMARKS (MSL).
4. EXISTING INFRASTRUCTURE LOCATIONS ARE APPROXIMATE.
5. APPROXIMATE PROPERTY LINE AND PHASES I AND II WASTE LIMITS ARE FROM CONSTRUCTION DRAWING C-1 "EXISTING SITE CONDITIONS", PROJECT 6558519 "CELL 2 BASE LINER - PHASE II LATERAL EXPANSION", PREPARED BY AECOM, DATED 09-04-18.
6. FOR CELL 2, THE FINAL TOP DECK AREAS WILL HAVE MINIMUM SLOPES OF 3% AND THE FINAL SIDE SLOPES WILL NOT EXCEED 3.5H:1V.
7. THE LANDFILL IS DESIGNED TO RETAIN STORMWATER ON-SITE FOR UP TO A 25-YEAR RETURN FREQUENCY, 24-HOUR DURATION RAINFALL EVENT AS WELL AS THE 100-YEAR, 1-HR STORM EVENT (AECOM, 2017). IF A MAJOR STORM EVENT ABOVE THE DESIGN STORMS, CAUSE DISCHARGE OFF-SITE, THE COUNTY NOTIFIES THE HI DEPARTMENT OF HEALTH WITHIN 24 HOURS AND IMPLEMENTS BEST MANAGEMENT PRACTICES (BMPS) TO MANAGE THE STORMWATER.

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

DATE

DESIGN BY:	AVM
DRAWN BY:	ABK
CHECKED BY:	JHL
REVIEWED BY:	MJM
APPROVED BY:	MJM

TITLE: FIGURE 2 - SITE PLAN AND 03-25-23 TOPOGRAPHY

PROJECT: 2022-2023 SWMP ANNUAL UPDATE

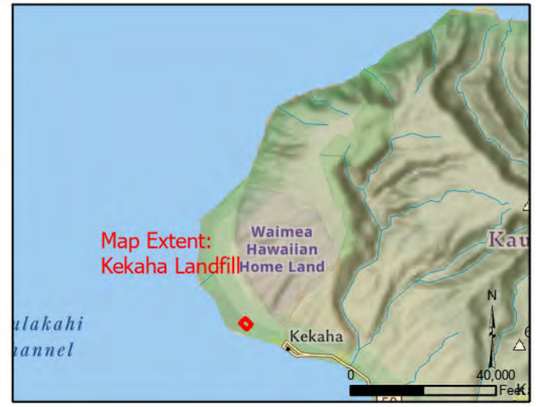
SITE: KEKAHA MUNICIPAL SOLID WASTE LANDFILL
KEKAHA, COUNTY OF KAUAI, HAWAII

COUNTY OF KAUAI
DEPARTMENT OF
PUBLIC WORKS
SOLID WASTE DIVISION
4444 RICE STREET, SUITE 295
LIHUE, HAWAII 96766
PHONE: 808.241.4841

Geosyntec consultants
1111 BROADWAY, 6TH FLOOR
OAKLAND, CALIFORNIA 94607 USA
PHONE: 510.836.3034

DATE:	SEPTEMBER 2023
PROJECT NO.:	WG3074
FILE:	WG2790-SWMP-2023
DRAWING NO.:	1 OF 1

P:\CADD\CIVIL 3D\COUNTY OF KAUAI\WG2790 (2020 AGR AIRSPACE)\SHEETS\WG2790-SWMP-2023



Legend

- Label
- Leachate Structures
- Flow Arrows
- Access Road
- Down Drain
- Diversion Berm
- Infiltration Ditch
- Drainage Ditch
- Infiltration Basin
- Leachate Evaporation Pond
- Permitted Limit of Waste
- Property Line

Map Source:
Esri, CGIAR, USGS, Sources: Esri, USGS, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, Resource Mapping Hawaii, Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, US Census Bureau, USDA

Kekaha Municipal Solid Waste Landfill
County of Kaua'i
Surface Water Management System
6900 Kaumuali'i Hwy,
Kekaha, HI 96752

Geosyntec consultants

Figure 3

WG3074 | September 2023

P:\GIS\Kekaha Landfill\Kekaha_Landfill\Kekaha_Landfill.aprx\Figure 2 7/20/2023 4:06 PM (Emily.Meyers)

COUNTY OF KAUA'I 1905 THE GARDEN ISLAND STATE OF HAWAII

Legend

- Flow Arrows
- Label

Notes:

1. Wash Rack has 600-gallon capacity oil/ water separator.
2. AST #1 is 2,000 gallon diesel.
3. Generator equipped with a 25-gallon day Tank and fuel transfer pump.
4. Concrete Containment berm surrounds AST #1: (1,475 gallons).
5. Maintenance shop drum area contains:
   a. (11) 55 gallon drums, county owned
   b. Misc. Hydrocarbons

Kekaha Municipal Solid Waste Landfill
County of Kaua'i
Oil Storage Areas
6900 Kaumuali'i Hwy,
Kekaha, HI 96752

Geosyntec consultants

Figure 4

WG3074 | September 2023

P:\GIS\Kekaha Landfill\Kekaha_Landfill\Kekaha_Landfill.aprx\Figure 3 - SPCC 7/20/2023 4:06 PM (Emily.Meyers)

APPENDIX A
Inspection Forms

MONTHLY AST INSPECTION CHECKLIST

Kekaha Municipal Solid Waste Landfill

Inspection Area	No Action Needed (Check)	Observations	Description/Action Taken	Initial/Date After Action Completed
BULK STORAGE TANKS				
AST #1 • 2,000 gallon diesel	☐	1.1 1.2 1.3 1.4 2.1 3.1 3.2 3.3 4.1		
MOBILE TANKS				
Mobile 1 (aka Portable #1) • 115 gallons diesel	☐	1.1 1.2 1.3 1.4 4.1		
DRUMS				
Drum Area: Maintenance Shop • 55* (11)[2] gallon misc. hydrocarbons [2] Eleven (11) of the drums are owned by the County.	☐	1.1 1.2 1.3 1.4 2.1 3.1 3.2 3.3 4.1		

Inspector's Name _____ Date _____ Time _____

Inspector's Signature _____

MONTHLY AST INSPECTION CHECKLIST

Kekaha Municipal Solid Waste Landfill

Inspection Guidance:

- For equipment not included in this standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a certified inspector. It shall be performed by an owner's inspector who is familiar with the site and can identify changes and developing problems.
- Upon discovery of water in the primary tank, secondary containment area, interstice, or spill container, remove promptly or take other corrective action. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a certified inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for 36 months.
- **In the event of severe weather (snow, ice, windstorms) or maintenance (such as painting) that could affect the operation of critical components (normal and emergency vents, valves), an inspection of these components is required immediately following the event.**

Legend:

1.0 Tank Containment	
1.1 Water in primary tank, secondary containment, interstice, or spill containers? 1.2 Debris or fire hazard in containment?	1.3 Drain valves operable and in a closed position? 1.4 Containment egress pathways clear and gates/doors operable?
2.0 Leak Detection	
2.1 Visible signs of leakage around the tank, concrete pad, containment, ring wall or ground?	
3.0 Tank Attachments and Appurtenances	
3.1 Ladder and platform structure secure with no sign of severe corrosion or damage? 3.2 Tank Liquid level gauge readable and in good condition?	3.3 All tank openings are properly sealed?
4.0 Other Conditions	
4.1 Are there other conditions that should be addressed for continued safe operation or that may affect the site SPCC Plan?	

Inspector Notes:

_____

_____

_____

_____

_____

_____

_____

ANNUAL AST INSPECTION CHECKLIST

Kekaha Municipal Solid Waste Landfill

Inspection Area	No Action Needed (Check)	Observations	Description/Action Taken	Initial/Date After Action Completed
BULK STORAGE TANKS				
AST #1 • 2,000 gallon diesel	☐	1.1 1.2 2.1 2.2 2.3 2.4 2.5 4.1 5.1 5.2 6.1 7.1 7.2 7.3 8.1 8.2 10.1 10.2 10.3 11.1 11.2		
MOBILE TANKS				
Mobile 1 (aka Portable #1) • 115 gallons diesel	☒	1.1 1.2 2.1 2.2 2.3 2.4 2.5 4.1 5.1 5.2 6.1 7.1 7.2 7.3 8.1 8.2 10.1 10.2 10.3		

Inspector's Name _____ Date _____ Time _____

Inspector's Signature _____

ANNUAL AST INSPECTION CHECKLIST

Kekaha Municipal Solid Waste Landfill

Inspection Guidance:

- For equipment not included in this standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a certified inspector. It shall be performed by an owner's inspector who is familiar with the site and can identify changes and developing problems.
- Inspect the AST shell and associated piping, valves, and pumps including inspection of the coating for Paint Failure.
- Inspect:
- Earthen containment structures including examination for holes, washout, and cracking in addition to liner degradation and tank settling.
- Concrete containment structures and tank foundations/supports including examination for holes, washout, settling, paint failure, in addition to examination for corrosion and leakage.
- Steel containment structures and tank foundations/supports including examination for washout, settling, cracking, and for paint failure, in addition to examination for corrosion and leakage.
- Inspection of cathodic protection system, if applicable, includes the wire connections for galvanic systems and visual inspection of the operational components (power switch, meters, and alarms) of impressed current systems.
- Remove promptly upon discovery standing water or liquid in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility must regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a certified inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for 36 months.
- Complete this checklist on an annual basis supplemental to the owner monthly-performed inspection checklists.
- Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.

Legend:

Item	Status			Comment
1.0 Tank Containment				
1.1 Containment structure in satisfactory condition?	Yes	No	N/A	
1.2 Drainage pipes/valves fit for continued service	Yes	No	N/A	
2.0 Tank Foundation and Supports				
2.1 Evidence of tank settlement or foundation washout?	Yes	No	N/A	

2.2 Cracking or spalling of concrete pad or ring wall?	Yes	No	N/A	
2.3 Tank supports in satisfactory condition?	Yes	No	N/A	
2.4 Water able to drain away from tank?	Yes	No	N/A	
2.5 Grounding strap secured and in good condition?	Yes	No	N/A	
3.0 Cathodic Protection				
3.1 CP system functional?	Yes	No	N/A	
3.2 Rectifier Reading:	Yes	No	N/A	
4.0 Tank External Coating				
4.1 Evidence of paint failure?	Yes	No	N/A	
5.0 Tank Shell/Heads				
5.1 Noticeable shell/head distortions, buckling, denting, or bulging?	Yes	No	N/A	
5.2 Evidence of shell/head corrosion or cracking?	Yes	No	N/A	
6.0 Tank Manways, Piping and Equipment within Secondary Containment				
6.1 Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	Yes	No	N/A	
7.0 Tank Roof				
7.1 Standing water on roof?	Yes	No	N/A	
7.2 Evidence of coatingcracking, crazing, peeling, blistering?	Yes	No	N/A	
7.3 Holes in roof?	Yes	No	N/A	
8.0 Venting				
8.1 Vents free ofobstructions?	Yes	No	N/A	
8.2 Emergency vent operable? Lift as required?	Yes	No	N/A	
9.0 Insulated Tanks				
9.1 Insulation missing?	Yes	No	N/A	
9.2 Are there noticeable areas of moisture on the insulation?	Yes	No	N/A	
9.3 Mold on insulation?	Yes	No	N/A	
9.4 Insulation exhibiting damage?	Yes	No	N/A	
9.5 Is the insulation sufficiently protected from water intrusion?	Yes	No	N/A	
10.0 Level and Overfill Prevention Instrumentation of Shop-Fabricated Tanks				
10.1 Has the tank liquid level sensing device been tested to ensure proper operation?	Yes	No	N/A	
10.2 Does the tank liquid level sensing device operate as required?	Yes	No	N/A	
10.3 Are overfill prevention devices in proper working condition?	Yes	No	N/A	
11.0 Electrical Equipment				
11.1 Are tank grounding lines in good condition?	Yes	No	N/A	
11.2 Is electrical wiring for control boxes/lights in good condition?	Yes	No	N/A	

Additional Comments:

Geosyntec consultants

engineers | scientists | innovators

SECTION V - GROUNDWATER AND LEACHATE MONITORING PLAN

KEKAHA MUNICIPAL SOLID WASTE LANDFILL KEKAHA, KAUA'I, HAWAI'I

NOT APPROVED

Prepared for

County of Kaua'i
Department of Public Works
4444 Rice Street, Room 275
Lihu'e, Kaua'i 96766

Prepared by

Geosyntec Consultants, Inc.
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Project Number: WG3074

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ACRONYMS AND ABBREVIATIONS

%	percent
°C	degree Celsius
ASTM	ASTM International
bgs	below ground surface
CaCO3	calcium carbonate
CFR	Code of Federal Regulations
COC	chain-of-custody
COD	chemical oxygen demand
CUSUM	cumulative sum
DOH	Department of Health, State of Hawai‘i
DQR	data quality review
EPA	Environmental Protection Agency, United States
FR	Federal Register
GCL	geosynthetic clay liner
GLMP	groundwater and leachate monitoring plan
H2SO4	sulfuric acid
HAR	Hawai‘i Administrative Rules
HCl	hydrochloric acid
HDPE	high-density polyethylene
HNO3	nitric acid
HRS	Hawai‘i Revised Statutes
ID	identification
IDW	investigation-derived waste
KLF	Kekaha Sanitary Landfill
MDL	method detection limit
mL	milliliter
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
MSW	municipal solid waste

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MW	monitoring well
no.	number
PCE	tetrachloroethylene
POC	point-of-compliance
PQL	practical quantitation limit
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SSI	statistically significant increase
TDS	total dissolved solids
TOC	total organic carbon
U.S.	United States
USGS	United States Geological Survey
VOA	volatile organic analysis
VOC	volatile organic compound
WBZ	water bearing zone
WMH	Waste Management of Hawaii

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1. INTRODUCTION

This Groundwater and Leachate Monitoring Plan (GLMP) describes methods and procedures for monitoring groundwater and leachate for the Kekaha Municipal Solid Waste Landfill (KLF). This GLMP replaces the previous Groundwater and Leachate Monitoring Plan Kekaha Sanitary Landfill (AECOM, 2017). The County of Kaua‘i (County) owns the KLF, which is located west of the town of Kekaha on the coastal plain on the southwest side of the island of Kaua‘i.

1.1 Site Background

The KLF is located near the southwest coast of the Island of Kaua‘i, about 2 miles west of the town of Kekaha, at mile marker 28 of Kaumuali‘i Highway (Highway 50). As shown on Figure 1-1, the seaward boundary of the landfill site is located approximately 4,000 feet northeast of the ocean shoreline. The KLF facility, as permitted, currently consists of two landfill phases, the Phase I landfill and the Phase II landfill (Figure 1-2).

The KLF Phase I landfill occupies approximately 33 acres and varies in elevation from approximately 10 to 49 feet (ft) above mean sea level (msl). The County opened the Phase I landfill in 1953 and accepted solid wastes at the facility until operations ceased on October 8, 1993. The Phase I landfill has no liner system beneath the refuse, however, the final cover of the Phase I Landfill was designed and constructed in accordance with the following environmental rules and regulations in effect at the time of construction:

- United States (U.S.) Environmental Protection Agency (EPA) Solid Waste Disposal Facility Criteria, under Resource Conservation and Recovery Act (RCRA) Subtitle D, published as 40 Code of Federal Regulations (CFR) Part 258.
- State of Hawai‘i Department of Health (DOH) Solid Waste Management Control and Interim Guidelines for Landfill Closure, Draft, Hawai‘i Administrative Rules (HAR) Title 11, Chapter 58.

The KLF Phase II landfill was constructed in 1993 and is bounded by Kaumuali‘i Highway to the northeast, an unpaved access road and agricultural area to the southeast, an aquaculture facility to the northwest, and the Phase I Landfill to the southwest. The Phase II Landfill was constructed to meet RCRA Subtitle D criteria and is currently an active municipal solid waste (MSW) landfill.

Since it opened in 1993, the Phase II landfill has been expanded five times: three vertical expansions (1998, 2005, and 2014) and two lateral expansions (2010 and 2019).

The first lateral expansion of the Phase II landfill was designated as Cell 1, which was constructed in 2010 and added approximately 6.4 acres to the west end of the Phase II landfill, increasing the total permitted footprint of the Phase II landfill to 38.5 acres.

In 2019 and 2020, the Cell 2 lateral expansion was constructed. The Cell 2 lateral expansion fills the area between the southwest bank of the Phase II landfill and the northeast bank of the unlined Phase I landfill (Figure 1-2). Construction of the Cell 2 expansion created a continuous Subtitle D

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base liner system that underlies all of the Phase II landfill, including Cell 2. Cell 2 extends the permitted footprint of the lined Phase II landfill by approximately 6.6 acres and provides an estimated 947,500 cubic yards of airspace based on a final cover elevation of 120 feet above mean sea level (msl). A vertical expansion to a final elevation of 171.5 feet above msl is proposed and is undergoing permit review. If current landfill waste density and daily disposal rates remain consistent, the Cell 2 expansion is expected to extend the operating life of the Phase II landfill by approximately 3.2 years. Unless otherwise noted, the term "Phase II landfill" includes all of the original Phase II landfill area, the Cell 1 and Cell 2 lateral expansions, and the three vertical expansions.

1.2 Program Overview

This GLMP describes the methods and procedures to monitor groundwater and leachate for the KLF Phases I and II. Locations of the existing monitoring wells (MWs) are shown on Figure 1-2.

All elements of the monitoring program described in this GLMP comply with the following regulations and permit requirements:

- 40 CFR part 258 (Subtitle D)
- Chapter 342H, Hawai'i Revised Statutes (HRS)
- HAR, Title 11 – DOH, Chapter 58.1 – Solid Waste Management Control (DOH 1994)
- State of Hawai'i Landfill Groundwater Monitoring Guidance Document (DOH Guidance Document), Version 1.8 – September 2002 – DOH Solid and Hazardous Waste Branch (DOH 2002)
- The KLF Phase II is currently authorized to operate under Permit Number (No.) LF 0042-16 issued by the DOH on September 13, 2019

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The State of Hawai'i is authorized to implement 40 CFR Part 258 (Subtitle D) and has adopted all elements of this federal statute into applicable state regulations (listed above), and the facility permit (Permit No. LF 0042-16 dated September 13, 2019). This GLMP describes the groundwater and leachate monitoring program for the KLF and serves as a technical guidance document for personnel performing site monitoring during the active life of the facility, and during the closure and post-closure periods.

The KLF groundwater monitoring program described in this GLMP is based on the hydrogeologic characteristics of the area. Groundwater monitoring involves the effective use of monitoring parameters (or "indicator" parameters) and locations to provide detection of a potential release from a facility.

The objectives of this groundwater monitoring program are to identify sampling locations, parameter, and procedures to estimate background concentration ranges for groundwater in the landfill area (i.e., local groundwater that has not been affected by chemicals released from the KLF) and evaluate potential changes in water quality using an effective statistical methodology.

The statistical methodology must be environmentally sensitive and account for the probability of false positive (i.e., indication of a release when none exists) and false negative errors (i.e., falsely concluding there is no release).

The monitoring activities outlined in this GLMP will be performed to verify attainment of performance objectives for the site at appropriate points of compliance, in accordance with Solid Waste Disposal Facility Criteria (and its revisions), initially promulgated on October 9, 1991, in 40 CFR Part 258 (Subtitle D). Environmental monitoring is required at the KLF in accordance with conditions specified in the facility permit LF-0042-16 issued on September 13, 2019.

2. HYDROGEOLOGIC SETTING

The KLF is located within the Kekaha-Mana coastal plain. The southern border of the Phase 1 Landfill is approximately 2,000 feet northeast of the Pacific Ocean shoreline. The coastal plain covers an area approximately 15 miles long and 2 miles wide between the leeward shore of Kaua‘i and the slopes of the interior mountains.

The coastal plain is a relatively flat outwash plain composed of alluvium washed down from the uplands, calcareous and earthy lagoon deposits, and calcareous beach and dune sands. Surface soils in the site area are classified in the Jaucas-Mokuleia Association and are more specifically defined as Jaucas loamy fine sands that are deep, nearly level to moderately sloping, excessively and well drained soils that have coarse-textured underlying materials (United States Department of Agriculture, Soil Conservation Service [USDA SCS] 1972).

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2.1 Climate and Topography

The Kekaha-Mana coastal plain is relatively arid compared to the rest of Kaua‘i due to the “rain shadow” effect of the mountains to the north. The annual rainfall in the area ranges between 10 to 40 inches per year, while areas near the center of the island average more than 280 inches of rain per year (Oregon Climate Services 1998).

2.2 Regional Geology

The geologic formations of the Kekaha-Mana coastal plain consist primarily of older alluvium and contemporary coralline and marl sedimentary rocks of marine, littoral, and terrestrial origin (Sanifill and Baquerizo 1996). These sedimentary rocks were deposited in lagoon and estuarine environments and in a flanking terrestrial environment. The thickness of the coastal plain sedimentary deposits ranges from zero on the inland edge to more than 400 feet along the seaward edge of the plain. The surface deposits extend to depths of approximately 50 feet below ground surface (bgs), and consist predominantly of loose sand, coral fragments, and shell debris. The sedimentary deposits beneath the KLF are estimated to be over 400 feet thick and are underlain by basalt; the top of the basalt is a drowned, wave-cut bench sloping gently seaward (Sanifill and Baquerizo 1996).

2.3 Regional Hydrogeology

Two aquifers with distinctly different hydrogeologic properties underlie the Kekaha-Mana coastal plain: a coastal plain aquifer within the near-surface sedimentary (caprock) deposits and a deep aquifer within the underlying sequence of basalt flows of the Nāpali Formation. This aquifer typically yields large quantities of water from wells and shafts with little drawdown, reflecting generally high hydraulic conductivity, estimated by the U.S. Geological Survey (USGS) as approximately 400 feet/day. Saturated sediments of the caprock formation (the caprock aquifer) overlie the basaltic aquifer and limit the seaward discharge of groundwater from the deeper aquifer. According to the USGS, the regional average hydraulic conductivity of the coastal plain aquifer is approximately 0.12 feet/day (Burt 1976).

Recharge to the uppermost water bearing zone (WBZ) of the coastal plain aquifer underlying the KLF occurs in the upland areas northeast of the facility. Groundwater flows from the higher elevations to the northeast, through the Napali basalts, and into the sedimentary coastal plain aquifer. The groundwater enters the coastal sedimentary units at their contact with the upland basalts, flows seaward, and discharges to the Pacific Ocean. Total dissolved solids (TDS) concentrations increase significantly from inland (Mauka) areas to seaward (Makai) areas as the groundwater flows through the coastal sediments and mixes with sea water. However, the results of an April 1994 tidal study indicate that tidal effects do not significantly influence the prevailing groundwater flow direction within the coastal plain aquifer at the site (Sanifill and Baquerizo 1996).

The water table level in the site area is controlled by pumping stations in the area operated and maintained by the State of Hawaii Agribusiness Development Corporation and the Kekaha Agricultural Association, in coordination with the U.S. Navy. The primary pumping station in the Kekaha area (Kawaiele). The groundwater management system controls flooding and facilitates cultivation of the lower elevations on the Mana Plain (Sanifill and Baquerizo 1996).

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2.4 Site Geology

Previous studies (e.g., Sanifill and Baquerizo 1996) report that borings near the KLF have been advanced to depths of more than 50 feet without reaching the bottom of the coastal plain aquifer, and it is estimated that the thickness of the coastal plain aquifer may exceed 400 feet beneath the landfill area. The upper 50 feet of these deposits consist of surficial alluvial sediments composed of loose, sand-size coral and shell debris. Below a depth of 50 feet, these deposits become increasingly consolidated and indurated that comprise the coralline and marl sedimentary rocks typical of the cap rock reported in regional investigations.

2.5 Site Hydrogeology

The uppermost groundwater at the KLF occurs within the surficial sedimentary deposits of the coastal plain aquifer at approximately 5 to 7 feet bgs, which is about 3 to 5 feet above msl. The historical water level monitoring data indicate that groundwater typically flows toward the ocean in a west-southwest direction, with a hydraulic gradient of approximately 0.0005 feet per foot.

As shown on the groundwater table contour maps presented in Appendix A, the historical monitoring data indicate that the direction of groundwater flow inferred from the contour maps can vary more than 90 degrees toward the north and more than 60 degrees toward the south relative to the typical west-southwest flow direction. However, the magnitude of the hydraulic gradient during the shifts in direction is small compared to the prevailing seaward-directed gradient, and at times the gradient becomes essentially flat, which indicates that inland-directed flow is relatively insignificant.

Several factors may contribute to apparent occasional shifts in the groundwater flow direction at the landfill, including variation of

- Pumping rates for the Mana Plain groundwater management system wells
- Pumping from other production wells near the site
- Water levels in irrigation canals near the site
- Infiltration of brackish water discharged to unlined drainage ditches in the aquiculture facility adjacent to the landfill
- Infiltration of water in the landfill's storm- and surface water control systems, particularly the infiltration basin

The vertical component of groundwater flow at the site is minor and groundwater ultimately discharges to the ocean southwest of the site. The KLF monitoring wells are completed in the surficial coastal plain sediments.

The unconsolidated surficial alluvial sediments that underlie the coastal plain in the vicinity of the KLF are more permeable than the deeper caprock. The results of an aquifer test performed during the week of October 16, 1995, indicate that the hydraulic conductivity of the caprock aquifer underlying the KLF site is approximately 162 feet/day (6×10^{-2} centimeters per second). The aquifer test was implemented by pumping MWI-1 (Figure 1-2) at a rate of 4.2 gpm for approximately 36 hours while measuring the corresponding drawdown at MWII-5.

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2.5.1 Hydrogeochemistry

The TDS and major cation and anion concentrations (i.e., calcium, potassium, magnesium, chloride, bicarbonate, and sulfate) indicate significant chemical variability at the site that is not related to the landfill (e.g., GeoChem Applications, 2012). Seawater intrusion in the shallow coastal plain sediment contributes to spatial and temporal variations in the hydrogeochemical characteristics of groundwater at the KLF. In addition, infiltration of nutrient-rich brackish water from the aquaculture (shrimp farm) facility immediately northwest of the Phase II Landfill site also contributes to variations in the hydrogeochemical characteristics of groundwater at the KLF.

3. GROUNDWATER MONITORING

This section describes the KLF groundwater monitoring program, including details of the monitoring well network, the monitoring parameters, and the sampling schedule. The monitoring program utilizes an intra-well detection monitoring approach in accordance with HAR Title 11, Chapter 58.1 and the DOH State of Hawai‘i Landfill Groundwater Monitoring Guidance Document (DOH 2002) to evaluate whether leachate from the KLF may be impacting groundwater.

3.1 Groundwater Monitoring Network

The groundwater monitoring network currently consists of six wells: MWI-1A, MWI-2A, MWI-3A, MWII-2, MWII-5, and MWII-7. The current groundwater monitoring network and a proposed additional groundwater monitoring well (MWII-6A) are shown on Figure 1-7.

MWII-6A is proposed[1] along the landfill perimeter road near the southeast margin of the Cell 2 expansion area. MWII-6A will be downgradient of the Phase II waste cells under the prevailing groundwater flow conditions. The purpose of this monitoring well is to detect potential releases of leachate from Wet Well 1 and the leachate pond.

Groundwater chemistry for all new monitoring wells will be established based on data from at least eight quarterly sampling events and the full range of background parameters, as discussed below in Section 3.3.

The rationale for the monitoring well locations is based on the local prevailing groundwater flow direction and the location of the most likely contaminant source areas at the site. The targeted detection monitoring zone is defined as the hydrostratigraphic unit nearest to the natural ground surface that provides the earliest possible detection of a potential release from the facility. Groundwater monitoring wells at the KLF are screened in the top of the upper-most water bearing zone within the coastal plain aquifer. Well construction details are presented in Table 3-1 and the function of each well is described in Table 3-2. The new and proposed monitoring wells are constructed in accordance with the Landfill Groundwater Monitoring Guidance Document (DOH 2002), and ASTM D5092 (ASTM 2004b).

Monitoring well inspections will be performed during all routine groundwater monitoring events, or more frequently if necessary. The groundwater sampling team will visually inspect each well and the surrounding area and record the observations on a well inspection form (Appendix C). Information to be documented as part of each well inspection includes the following:

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[1] March 3, 2020 letter to L. Ichinotsubo, PE, Solid and Hazardous Waste Branch, State of Hawaii DOH from A. Fraley and T. Tanigawa, PE, Solid Waste Division, Dept of Public Works, The County of Kaua’i.

- Condition of the well identification plate or sign
- Evidence that the well was recently painted
- Condition of the locking mechanism to confirm that the well is locked and the key works
- The integrity of well construction and sampling equipment, including:
  - Physical surroundings (e.g., high weeds, standing water, cleanliness, nearby activities)
  - Condition of dedicated pumps
  - Condition of protective casing
  - Obstructions or kinks in well casing
  - Condition of concrete footing (e.g., cracked or raised concrete, water in annular space)
  - Grease around top of well on threaded caps
  - Fit of cap
- Weather conditions during observations, including:
  - Wind direction (as necessary to evaluate the potential impact of upwind sources of volatile chemicals)
  - Whether or not sampling was performed downwind
- Visible evidence of contamination
- Well "guard-post" condition (if applicable)

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Table 3-1: Monitoring Well Construction Details

MW ID No.	MW Location	Easting	Northing	Top of Casing Elev.[a] (ft msl)	Total Well Depth[b] (ft btoc)	Boring Diameter (in.)	Well Diameter (in.)	Elevation of Well Screen Interval[c] (ft msl)
MWI-1 (destroyed)	Northwest corner of Phase I Landfill	1554884.42	54475.73	13.58	18.0	8	2	8.0 above msl to 7.0 below msl
MWI-1A[b]		1555126.09	54210.16	14.53	22.3	10	2	8.0 above msl to 12.0 below msl a
MWI-2 (destroyed)	Midway between northwest and southeast corners of Phase I Landfill	1555269.57	54077.57	12.27	18.0	8	2	6.5 above msl to 8.5 below msl
MWI-2A[b]		1555669.32	53720.00	13.33	22.2	10	2	8.0 above msl to 12.0 below msl
MWI-3 (destroyed)	Southeast corner of Phase I Landfill	1555724.07	53666.07	12.58	18.0	8	2	7.0 above msl to 8.0 below msl
MWI-3A[b]		1556347.04	53883.25	14.03	22.2	10	2	8.0 above msl to 12.0 below msl a
MWII-2	Northwest end of Phase II Landfill Cell #2; adjacent to site boundary fence line and MWII-1	1555586.05	55282.30	15.83	17.5	10	2	7.7 above msl to 2.3 below msl
MWII-4 (destroyed)	Midway between northwest and southeast corners of Phase II Landfill Cell #2; adjacent to MWII-3	1556009.39	54892.15	21.52	13.0	10	2	17.4 above msl to 7.4 above msl

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MW ID No.	MW Location	Easting	Northing	Top of Casing Elev.[a] (ft msl)	Total Well Depth[b] (ft btoc)	Boring Diameter (in.)	Well Diameter (in.)	Elevation of Well Screen Interval[c] (ft msl)
MWII-5	Northeast of Phase II Landfill Cell #1; adjacent to office building	1557574.44	55178.02	13.7	11.5	10	2	9.4 above msl to 0.6 below msl
MWII-6 (destroyed)	Southwest of Phase II Landfill Cell #2	1556410.64	54512.11	23.34	38.0	10	2	7.1 above msl to 12.9 below msl
MWII-7	Northwest of Phase II Landfill Cell #1; adjacent to site boundary fence line	1556039.23	55767.77	15.79	24.0	10	2	4.7 above msl to 15.3 below msl
MWII-6A (proposed new well)	Southeast end of Phase II Landfill Cell #2; along the Landfill perimeter road	TBD	TBD	TBD	TBD	10	2	8.0 above msl to 12.0 below msl a

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Notes:

Well installation logs are provided in Appendix B.

btoc	below top of casing
ft	feet
ID	identification
in.	inch
msl	mean sea level
N/A	not applicable
TBD	to be determined

[a] Top of casing elevations were provided by Waste Management and are from the May 11, 2018, survey, using the USGS brass monument G1000 plus 1.21 feet.

[b] Surveyed by Esaki Surveying and Mapping, Inc. on July 29, 2019, using USGS brass monument G1000 plus 1.21 feet.

Table 3-2: Proposed Groundwater Monitoring Well Network Summary

MW ID No.	MW Location	Function of Well as Part of KLF Groundwater Monitoring Network
MWI-1A	Southwest corner of Phase I Landfill; adjacent to site boundary fence line	Point of compliance (POC) well for long-term monitoring of groundwater level and chemistry in the shallow water bearing zone (WBZ) downgradient or crossgradient of the Phase I and Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). This well will be monitored on a quarterly basis until background groundwater chemistry is established.
MWI-2A	South end of Phase I Landfill; adjacent to site boundary fence line	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase I and Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). This well will be monitored on a quarterly basis until background groundwater chemistry is established.
MWI-3A	Southeast corner of Phase I Landfill; adjacent to site boundary fence line	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase I and Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). This well will be monitored on a quarterly basis until background groundwater chemistry is established.
MWII-2	Northwest end of Phase II Landfill Cell #2; adjacent to site boundary fence line	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). Background groundwater chemistry has already been established for MWII-2; therefore, this well will be monitored on a semi-annual basis for intra-well detection monitoring.
MWII-5	Northeast of Phase II Landfill Cell #1; adjacent to office building	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ northeast of the Phase II Landfill. Background groundwater chemistry has already been established for MWII-5; therefore, this well will be monitored on a semi-annual basis for intra-well detection monitoring.
MWII-7	Northwest of Phase II Landfill Cell #1; adjacent to site boundary fence line	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). Background groundwater chemistry has already been established for MWII-7; therefore, this well will be monitored on a semi-annual basis for intra-well detection monitoring.
MWII-6A (proposed new well)	Southeast end of Phase II Landfill Cell #2; adjacent to perimeter road.	POC well for long-term monitoring of groundwater level and chemistry in the shallow WBZ downgradient or crossgradient of the Phase II Landfill (depending on groundwater flow conditions at the time of monitoring). After background groundwater chemistry has been established based on data representing at least eight quarterly sampling events, this well will be monitored on a semi-annual basis for intra-well detection monitoring.

NOT APPROVED

3.2 Groundwater Detection Monitoring Parameters

The technical rationale used to select appropriate monitoring parameters for the KLF groundwater monitoring program is based on: (1) HAR Title 11, Chapter 58.1 (DOH 1994), (2) the State of Hawaii Landfill Groundwater Monitoring Guidance Document (DOH 2002), and (3) historical data for chemical constituents in the local groundwater and the Phase II Landfill leachate.

HAR Title 11, Chapter 58.1 (DOH 1994) specifies that MSW landfills should routinely monitor groundwater for the 15 metals and 47 volatile organic compounds (VOCs) listed in Appendix I of Chapter 58.1. This is the same list of monitoring parameters contained in the Federal Subtitle D regulations (40 CFR Part 258, Appendix I). This list includes many parameters that are generally viewed as ineffective monitoring parameters because of their limited mobility in most subsurface environments, or because they are not constituents of typical MSW landfill leachate. The EPA intended the Appendix I analytes to be default parameters for use in states that have not yet obtained Subtitle D authorization. In accordance with 40 CFR Part 258.54 (a)(1) and (2), the EPA has allowed authorized states, including Hawai‘i, to approve alternative lists of site-specific monitoring parameters. Therefore, this plan describes the approach for selecting site-specific groundwater monitoring parameters for the KLF groundwater monitoring program.

As noted in the State of Hawaii Landfill Groundwater Monitoring Guidance Document (DOH 2002), a combination of VOCs plus a carefully selected "short list" of site-specific water quality parameters (referred to herein as "site-specific detection monitoring parameters") will typically provide the most reliable monitoring parameters for most MSW landfills.

VOCs can be highly effective monitoring parameters for providing an early indication of a potential release from a landfill because they are: (1) rarely detected in background groundwater samples; (2) detected more frequently than any other class of organic compounds in MSW landfill leachate; (3) analytically sensitive (i.e., they can be detected at extremely low concentrations); and (4) relatively mobile in groundwater. Although commonly present in MSW landfill leachate, semi-volatile organic compounds, as a group, are significantly less mobile than VOCs in most subsurface environments and do not typically provide for substantial additional monitoring benefits.

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The detection monitoring parameter data will be subjected to statistical analysis as described in Section 5.0 to identify any statistically significant concentration increases that would trigger assessment monitoring (or an alternate source demonstration [ASD] if the detection is unrelated to a release from the landfill). In addition to VOCs and site-specific detection monitoring parameters, the groundwater samples will be analyzed for supplemental geochemical parameters to provide additional data for evaluating site groundwater conditions. The supplemental parameters will not be used for routine detection monitoring statistical analysis but can be used to evaluate local hydrogeologic conditions and distinguish between background groundwater impacts and groundwater impacted by leachate released from the landfill.

3.2.1 Approach for Selection of Site-Specific Detection Monitoring Parameters

Site-specific detection monitoring parameters for the KLF groundwater monitoring program have been selected based on regulatory requirements and chemical-specific properties (including persistence, detectability, and mobility). As a class, VOCs are detected more frequently than any other class of organic compounds in MSW landfill leachate. However, other chemical parameters referenced in HAR Title 11, Chapter 58.1 (DOH 1994) are not often found in landfill leachates. Research by Dr. Gibbons and others indicates that in addition to VOCs, certain leachate indicators

(e.g., TDS, alkalinity) and metals (e.g., magnesium, calcium, potassium) are more frequently detected in leachate than other constituents specified in the regulations (DOH 2002).

Consequently, a detection monitoring program based solely on the extensive list of parameters specified in the HAR Title 11 Chapter 58.1 regulations would be less effective than a program based on site-specific background groundwater and leachate chemistry data. Appropriate detection monitoring parameters for the KLF site are therefore based on background data for the constituent chemicals detected in both groundwater and leachate at the site, as well as the migration potential of the detected constituents. Characterization of background groundwater and leachate quality becomes progressively more accurate as detection monitoring continues at a site; therefore, the list of site-specific detection monitoring parameters may be updated based on new data as it becomes available (any changes to the list of detection monitoring parameters will require DOH approval).

The first step for selection of site-specific detection monitoring parameters was to identify chemicals that have been detected in the Phase II Landfill leachate at concentrations significantly higher than in groundwater. The resulting list of potential detection monitoring parameters was then refined by identifying and removing parameters that would provide redundant information (e.g., specific conductance and TDS). From the remaining parameters, those anticipated to provide the earliest and most reliable indication of a release were selected as detection monitoring parameters for statistical evaluation purposes. This determination was based on the relative mobility of the chemicals in soil and groundwater, local hydrogeologic conditions, the detectability and likelihood of false positive results for each parameter (based on existing analytical methods), and concentration changes that might be expected during migration through the unsaturated and saturated zones beneath the facility (e.g., due to variations in pH or redox conditions). As described in Section 4.0, an established leachate database exists for KLF Phase II. Leachate samples have been collected from three monitoring points (Wet Wells-1, -2, and -3 [Figure 3-1]) and analyzed for an extensive list of parameters on an annual basis. Wet Wells-1 and -2 have been sampled since 1994 and Wet Well-3 has been sampled since 2010. Analytical parameters include Subtitle D Appendix I constituents, major cations and anions, major leachate indicator parameters, metal constituents, VOCs, and field measurements.

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The State of Hawaii Landfill Groundwater Monitoring Guidance Document (DOH 2002) recommends that potential detection monitoring parameters should first be screened by calculating the concentration contrast between leachate and groundwater and suggests that an effective monitoring parameter should exhibit a concentration in leachate at least five times greater than the upper background limit in groundwater. If insufficient contrast exists for a specific chemical, then that chemical may be eliminated from further consideration as a potential site-specific detection monitoring parameter.

The effectiveness of the KLF groundwater monitoring program will be enhanced by using this approach because only those parameters that have been detected in the leachate and that pass specific performance criteria are identified as site-specific detection monitoring parameters for statistical evaluation. As leachate data are generated by annual or other leachate sampling events, the detection monitoring parameter list will be re-evaluated and updated, as appropriate. If the data

indicate that additional parameters should be added to the detection monitoring list, then background concentrations for the additional parameters will be estimated, and the parameters will be added to the program upon receiving DOH approval. Conversely, if parameters proposed for routine detection monitoring are not found in the site leachate during repeated sampling events, these parameters may be deleted from the KLF detection monitoring program (also upon receipt of DOH approval).

Average constituent concentrations based on the historical analytical data were calculated for the groundwater wells and leachate sumps (Wet Wells -1, -2, and -3). The ratio between average leachate and groundwater concentrations was then calculated for each constituent. These ratios were then evaluated to identify parameters that show significant differences between concentrations in the Phase II groundwater and the Phase II leachate, and therefore represent potential site-specific detection monitoring parameters.

Table 3-3 lists the constituent concentrations for the groundwater wells and leachate sumps, along with the average concentrations for the groundwater and Phase II leachate, and the corresponding leachate/groundwater concentration ratios. As shown in Table 3-3, five constituents have average leachate/groundwater concentration ratios of five or greater: ammonia (as N), chemical oxygen demand (COD), total iron, total arsenic, and total organic carbon (TOC). The ratios for dissolved constituents could not be estimated because the leachate samples were not filtered prior to analysis (as required to quantify dissolved concentrations). However, dissolved metals are more mobile than total metals, and therefore provide a better indication of an environmental impact. Because of this, dissolved metals are also considered for inclusion in the list of site-specific detection monitoring parameters, though the leachate to groundwater concentration ratio was not calculated.

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3.2.2 Site-Specific Detection Monitoring Parameters

The constituents listed in Table 3-4 were selected as site-specific detection monitoring parameters for intra-well statistical analysis. Data representing these constituents may provide indications of a potential leachate release because evaluation of the historical groundwater data and leachate data indicates that (with the exception of dissolved arsenic and dissolved iron) they have leachate/groundwater concentration ratios of five or greater.

Both ammonia (as N) and TOC have average leachate/groundwater ratios greater than 5 and are included in the list of site-specific detection monitoring parameters though the DOH accepted in a May 22, 2014, letter that previously published ASDs demonstrated that elevated concentrations of these constituents in groundwater are not related to Phase II landfill releases (GeoChem Applications 2012; Sanifill 1998; WMH 2006; WMH 2007; and WMH 2008). Because of this, provisions for site-specific consideration are necessary to qualify results of statistical analysis of ammonia as N and TOC.

Table 3-3: Comparison of Phase II Groundwater and Phase II Leachate Data

Constituent	Units	MWII-2	MWII-5	MWII-6	MWII-7	WW-1	WW-2	WW-3	WW AVG	MWII AVG	Ratio (WW/ MWII)	Acceptable Indicator Parameter	Comments
Alkalinity, bicarbonate (as caco3)	mg/L	410.00	326.43	388.95	306.74	1276.10	1690.91	1362.86	1443.29	340.71	4.24	N	Ratio too Low
Alkalinity, carbonate (as caco3)	mg/L	5.87	6.28	6.57	5.47	6.19	5.45	50.71	20.79	6.10	3.41	N	Ratio too Low
Alkalinity, total (as caco3)	mg/L	410.00	326.43	389.86	306.74	1276.10	1690.91	1405.71	1457.57	341.01	4.27	N	Ratio too Low
Ammonia (as n)	mg/L	0.16	0.41	1.09	0.84	95.96	170.45	33.34	99.92	0.78	**127.70**	Y	
Antimony, dissolved	µg/L	10.00	10.00	9.56	9.92					9.83		N	Leachate not analyzed for dissolved metals
Antimony, total	mg/L	0.01	0.01	0.01	0.01	0.02	0.04	0.06	0.04	0.01	4.26	N	Ratio too Low
Arsenic, dissolved	mg/L	0.01	0.02	0.03	0.02					0.02		N	Leachate not analyzed for dissolved metals
Arsenic, total	mg/L	0.01	0.02	0.03	0.02	0.16	0.18	0.04	0.13	0.02	**6.5**	N	
Barium, dissolved	µg/L	4.19	3.40	2.83	28.95					11.73		N	Leachate not analyzed for dissolved metals
Barium, total	mg/L	0.07	0.04	0.05	0.03	0.11	0.16	0.13	0.13	0.04	3.50	N	Ratio too Low
Beryllium, dissolved	µg/L	1.70	1.70	1.83	1.86					1.80		N	Leachate not analyzed for dissolved metals
Beryllium, total	mg/L	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	3.08	N	Ratio too Low
Bromide	mg/L	1.44	1.02	1.46	13.92	7.62	7.66	1.81	5.70	5.46	1.04	N	Ratio too Low
Cadmium, dissolved	µg/L	2.69	3.02	2.29	2.52					2.63		N	Leachate not analyzed for dissolved metals
Cadmium, total	mg/L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	N	Ratio too Low
Calcium, dissolved	mg/L	47.55	38.66	39.27	145.30					77.41		N	Leachate not analyzed for dissolved metals
Calcium, total	mg/L	53.53	42.15	43.09	152.90	88.68	79.36	42.57	70.21	79.38	0.88	N	Ratio too Low
Chemical oxygen demand	mg/L	14.55	15.48	14.54	51.20	304.55	411.82	122.27	279.55	27.07	**10.33**	Y	
Chloride	mg/L	310.93	200.72	312.05	3765.10	421.34	683.64	246.14	450.37	1425.96	0.32	N	Ratio too Low
Chromium, dissolved	µg/L	8.32	9.47	9.05	8.95					9.16		N	Leachate not analyzed for dissolved metals
Chromium, total	mg/L	0.01	0.01	0.01	0.01	0.03	0.03	0.01	0.02	0.01	2.87	N	Ratio too Low
Cobalt, dissolved	µg/L	11.32	12.16	12.16	12.07					12.13		N	Leachate not analyzed for dissolved metals
Cobalt, total	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.44	N	Ratio too Low
Copper, dissolved	µg/L	12.25	12.66	12.79	9.84					11.76		N	Leachate not analyzed for dissolved metals
Copper, total	mg/L	0.01	0.01	0.01	0.01	0.13	0.01	0.00	0.05	0.01	4.06	N	Ratio too Low
Cyanide	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.76	N	Ratio too Low
Iron, dissolved	mg/L	0.05	0.05	0.11	1.48					0.55		N	Leachate not analyzed for dissolved metals
Iron, total	mg/L	0.08	0.07	0.16	3.29	13.27	11.44	4.45	9.72	1.17	**8.28**	Y	
Lead, dissolved	µg/L	5.61	5.68	5.83	6.32					5.94		N	Leachate not analyzed for dissolved metals
Lead, total	mg/L	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.89	N	Ratio too Low
Magnesium, dissolved	µg/L	92837.21	64931.82	88125.00	300255.81					151104.21		N	Leachate not analyzed for dissolved metals
Magnesium, total	mg/L	98.89	66.42	92.94	314.70	168.29	242.73	202.57	204.53	158.02	1.29	N	Ratio too Low
Manganese, dissolved	µg/L	0.01	0.01	0.01	0.51					0.17		N	Leachate not analyzed for dissolved metals
Manganese, total	mg/L	0.01	0.01	0.01	0.64	0.43	0.61	0.21	0.42	0.22	1.92	Y	
Mercury, dissolved	µg/L	0.20	0.19	0.20	0.19					0.20		N	Leachate not analyzed for dissolved metals
Mercury, total	µg/L	0.20	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.20	0.93	N	Ratio too Low
Nickel, dissolved	µg/L	32.83	30.76	33.46	15.03					26.42		N	Leachate not analyzed for dissolved metals
Nickel, total	mg/L	0.03	0.03	0.03	0.01	0.04	0.06	0.04	0.05	0.02	2.30	N	Ratio too Low
Nitrogen, nitrate-nitrite	mg/L	4.98	0.17	0.09	1.86	0.19	2.93	2.16	1.76	0.71	2.49	N	Ratio too Low
pH (Field)	STD	7.40	7.44	7.35	7.44	7.20	7.04	7.38	7.21	7.41	0.97	N	Ratio too Low
Potassium, dissolved	mg/L	23.31	9.45	31.88	68.40					36.58		N	Leachate not analyzed for dissolved metals

NOT APPROVED

Constituent	Units	MWII-2	MWII-5	MWII-6	MWII-7	WW-1	WW-2	WW-3	WW AVG	MWII AVG	Ratio (WW/ MWII)	Acceptable Indicator Parameter	Comments
Potassium, total	mg/L	27.20	9.88	41.89	73.03	78.09	113.36	39.63	77.03	41.60	1.85	N	Ratio too Low
Selenium, dissolved	µg/L	16.18	16.08	15.60	16.36					16.01		N	Leachate not analyzed for dissolved metals
Selenium, total	mg/L	0.01	0.02	0.01	0.02	0.01	0.01	0.00	0.01	0.02	0.34	N	Ratio too Low
Silicon, dissolved	µg/L	10185.29	12428.57	9323.53	11324.32					11025.48		N	Leachate not analyzed for dissolved metals
Silicon, total recoverable	µg/L	10235.71	12353.57	9492.86	12603.45	29272.73	36363.64	38285.71	34640.69	11483.29	3.02	N	Ratio too Low
Silver, dissolved	µg/L	9.23	9.00	9.73	8.32					9.02		N	Leachate not analyzed for dissolved metals
Silver, total	mg/L	0.01	0.01	0.02	0.01	0.03	0.02	0.00	0.02	0.01	1.40	N	Ratio too Low
Sodium, dissolved	µg/L	199000.00	124545.45	172750.00	1977604.65					758300.04		N	Leachate not analyzed for dissolved metals
Sodium, total	mg/L	213.19	121.23	202.53	2085.67	279.88	418.18	255.86	317.97	803.14	0.40	N	Ratio too Low
Specific conductance (field)	um/cm	1541.27	1110.87	1559.79	9469.57	3887.67	4291.33	2278.00	3485.67	4046.74	0.86	N	Ratio too Low
Sulfate	mg/L	108.91	29.69	110.59	570.67	40.46	44.78	52.94	46.06	236.98	0.19	N	Ratio too Low
Sulfide	mg/L	0.05	0.05	0.05	0.05	ND	ND	ND	ND	0.05		N	Sulfide was not detected above the reporting limit in leachate samples
Thallium, dissolved	µg/L	9.91	9.78	9.89	10.95					10.20		N	Leachate not analyzed for dissolved metals
Thallium, total	mg/L	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.75	N	Ratio too Low
Total dissolved solids	mg/L	1065.35	683.57	1000.49	6750.47	1753.52	2236.36	1642.86	1877.58	281[illegible]51	0.67	N	Ratio too Low
Total organic carbon (toc)	mg/L	1.71	1.75	2.53	2.60	77.47	144.82	40.33	87.54	[illegible].29	**38.16**	Y	
Vanadium, dissolved	µg/L	5.18	13.81	22.53	21.84					[illegible].39		N	Leachate not analyzed for dissolved metals
Vanadium, total	mg/L	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.97	N	Ratio too Low
Zinc, dissolved	µg/L	17.73	19.12	19.07	19.12					[illegible].11		N	Leachate not analyzed for dissolved metals
Zinc, total	mg/L	0.02	0.02	0.02	0.01	0.05	0.03	0.01	[illegible]	0.02	1.95	N	Ratio too Low

Notes:

Based on historical sampling data from March 1996 through November 2019.

— not analyzed
µg/L microgram per liter
AVG Average (mean)
CaCO3 calcium carbonate
mg/L milligram per liter
WW Wet Well
MW Monitoring Well

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Table 3-4: Summary of KLF Site-Specific Monitoring Parameters

Site Specific Monitoring Parameters (for statistical analysis)
• Ammonia as Nitrogen • COD • Total Organic Carbon (TOC) • Iron (total and dissolved) • Arsenic (total and dissolved)

Several of the trace metal and mineral parameters referenced in HAR Title 11, Chapter 58.1 (DOH 1994) have been consistently present in KLF background groundwater samples at levels that would likely mask a release from the KLF waste cells and were therefore not selected as site specific detection monitoring parameters. However, as discussed below, these constituents are included on the list of supplemental geochemical parameters. These parameters are generally the same as the major dissolved chemicals found in sea water (sodium, magnesium, chloride, and sulfate) because the facility is located near the ocean and the aquifer includes marine sediments. Comparison of the concentrations of these parameters in background groundwater samples with concentrations of the major ions present in typical sea water suggests that the elevated constituent levels in groundwater are consistent with influence by sea water or marine sediments (Sanifill and Baquerizo 1996). Additional sources of dissolved chemicals similar to those found in seawater are associated with the nearby aquaculture (shrimp farm) facility located immediately northwest of the Phase II Landfill site, as presented in the 2012 ASD (GeoChem 2012).

In January 2006, sampling conducted for the KLF Phase II monitoring program, a statistically significant increase (SSI) in total arsenic was detected in a sample from MWII-6. Arsenic occurs naturally in native volcanic rocks and soil, so rocks in the west Kaua‘i watershed and soil on the Mana Plain are natural sources of arsenic. Other potential sources of Arsenic include soil impacted by pesticides (e.g., rat poison) and herbicides used in agricultural operations (e.g., sugarcane cultivation) on the Mana Plain upgradient of the KLF. In 2007, WMH prepared an ASD that identified possible sources of the arsenic (WMH 2007). The ASD report concluded that the elevated arsenic concentrations were most likely attributable to naturally occurring arsenic mobilized from the aquifer matrix due to the reducing conditions associated with the Phase I MSW and were due to a release of Arsenic from the Phase II MSW. Although arsenic may not be a reliable monitoring parameter for determining whether leachate is impacting groundwater, based on the ASD results and per DOH request, arsenic is included as a site-specific detection monitoring parameter for intra-well statistical analysis.

A similar SSI in total arsenic (as well as ammonia and TOC) was detected in June 2008, as described in an ASD dated November 14, 2008 (WMH 2008). A 1998 SSI for ammonia was described in an ASD dated June 19, 1998 (WMH 1998).

Concentration limits based on both statistical and non-statistical methods, as appropriate, will be established for each of the detection monitoring parameters (as described in Section 5.0). As additional leachate data are generated throughout the course of landfill operations, the detection

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monitoring parameter list will be re-evaluated and updated as required. If parameters are added to the site-specific detection-monitoring list, background concentrations will be established using appropriate statistical methods and added to the long-term monitoring program after the changes are approved by the DOH. If parameters are removed from the site-specific detection-monitoring list (with DOH approval), they may be added to the Supplemental Geochemical Parameters list.

3.2.3 Supplemental Geochemical Parameters

The supplemental geochemical parameters listed in Table 3-5 have been selected to provide additional data for non-statistical analysis as necessary to evaluate the general chemical characteristics of groundwater at the site and identify natural and anthropogenic mechanisms that may affect groundwater quality. The supplemental geochemical parameter data will not be evaluated statistically but can be used on an as-needed basis to evaluate data reliability and potential changes in groundwater quality without affecting the site-wide false-positive statistical error rate for the site-specific detection monitoring parameters. For example, the major cation and anion data can be used to construct Piper and Stiff geochemical plots, which can be useful for distinguishing between background groundwater and groundwater impacted by leachate released from the landfill.

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Table 3-5: Summary of KLF Supplemental Geochemical Parameters

Supplemental Geochemical Parameters (for non-statistical analysis)
• Metals (dissolved) listed in Appendix I of 40 CFR Part 258 (Subtitle D) • Bicarbonate (as CaCO3) • Bromide • Carbonate (as CaCO3) • Calcium, dissolved • Chloride • Magnesium, dissolved • Nitrate-Nitrite (as N) • Potassium, dissolved • Sodium, dissolved • Sulfate • Total Alkalinity (as CaCO3) • TDS • Specific Conductance, pH, Temperature, and Turbidity (field measurements)

Notes:
Nitrate-nitrite as nitrogen (N) will be analyzed instead of nitrate-N due to the short holding time required for analysis of nitrite-N for calculation of nitrate-N.

3.2.4 Summary of Groundwater Detection Monitoring Parameters

The full list of parameters identified for the KLF detection monitoring program is presented in Table 3-6. The parameter list is based on requirements detailed in state solid waste regulations and the current facility permit. Groundwater and leachate data collected during future groundwater

monitoring events will be evaluated to determine whether any parameters should be added to or deleted from this list. Proposed changes in the list of parameters will be submitted to the DOH for review and approval, and background concentrations for additional parameters will be estimated as required for future statistical analysis.

Table 3-6: Summary of KLF Detection Monitoring Parameters

Appendix I Constituents
• Chemicals listed in Appendix I of 40 CFR Part 258 (Subtitle D)
Major Cations and Anions, Not listed in Appendix I of 40 CFR Part 258 (Subtitle D)
• Calcium, dissolved • Magnesium, dissolved • Manganese, total and dissolved • Potassium, dissolved • Sodium, dissolved • Chloride • Sulfate • Carbonate (as CO3) • Bicarbonate (as HCO3)
Major Leachate Indicators, Not listed in Appendix I of 40 CFR Part 258 (Subtitle D)
• BromideTDS • Alkalinity, total (as CaCO3) • COD • Iron, dissolved and total • Nitrate-Nitrite (as N)
Field Measurements
• Specific conductance, pH, temperature, and turbidity, oxidation reduction potential

Notes:
Nitrate-nitrite as N will be analyzed instead of nitrate-N due to the short holding time required for analysis of nitrite-N for calculation of nitrate-N.

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3.3 Intra-well Detection Monitoring Approach

MWI-1A, MWI-2A, MWI-3A, MWII-2, MWII-5, MWII-6A, and MWII-7 will be used as point of compliance (POC) wells for intra-well detection monitoring at the KLF in accordance with the statistical evaluation methods and procedures described in Section 5.0. Intra-well detection monitoring is preferable to inter-well monitoring for the KSL setting because it is not influenced by the spatial component of background groundwater chemistry variability. This spatial component contributes a significant portion of the variability in background conditions that must be accounted for by the inter-well statistical methodology. Spatial and temporal variability are important issues for the Kekaha site due to the presence of the unlined Phase I Landfill, proximity of the northwestern margin of the Phase II Landfill to the aquaculture facility, and variations in the groundwater flow direction.

Intra-well monitoring requires a minimum of eight discrete groundwater sampling events (e.g., two years of quarterly sampling) to establish background conditions for each monitoring well prior to statistical evaluation. Data representing a minimum of eight discrete sampling events are required to account for seasonal trends or other causes of temporal variability. The newly installed wells will be sampled quarterly for at least two years to establish background conditions, and the background data will be evaluated to identify potential anomalies and outliers before they are used for statistical analysis as described in Section 5.0. Quarterly groundwater samples from the new wells will be analyzed for the following constituents: chemicals listed in 40 CFR 258, Appendix I, major cations and anions (Mg, Na, Ca, K, Cl, CO_3, SO_4, HCO_3), major leachate indicators (TDS, total organic carbon [TOC], total alkalinity, ammonia as nitrogen, Fe), COD, nitrate-N, bromide, and field measurements (electrical conductance, pH, temperature, turbidity, and groundwater surface elevation), or as required or otherwise approved by the DOH.

If an SSI is detected and verified for one or more of the site-specific detection monitoring parameters, or if one or more VOC concentrations exceeding the practical quantitation limits (PQLs) are reported and verified and the exceedance(s) cannot be attributed to a source other than the KLF, then assessment monitoring will be conducted within 90 days in accordance with HAR Chapter 11 58.1 (DOH 1994).

NOT APPROVED

3.4 Upgradient Groundwater Sampling

Monitoring of upgradient wells is not required for intra-well groundwater monitoring because data representing the chemical characteristics of groundwater at each well location are compared to historical data representing the same well to identify statistically significant changes. However, upgradient data may be useful to evaluate the chemical characteristics of groundwater entering the landfill area from upgradient sources and assess the potential impact of off-site chemical sources on the groundwater, if required.

Historically, MWII-5 had been utilized as an upgradient monitoring well at the KLF; however, as shown in the groundwater contour figures provided in Appendix A, some historical groundwater level data indicate that conditions may occur with groundwater flows toward MWII-5 from the landfill. Several factors, such as influence of nearby production wells or irrigation canals (Section 2.5) may contribute to the local variations of groundwater flow direction. Based on the recommendation of the DOH, MWII-5 will be utilized as a POC well, unless additional data show conclusively that the well is upgradient of the landfill. Therefore, groundwater samples will be collected from the MWII-5 on a semi-annual basis and analyzed for the parameters listed in Table 3-6. Additionally, MWII-5 data will be used for statistical analysis of the site-specific detection monitoring parameters as described in Section 5.0.

3.5 Groundwater Monitoring Schedule

Detection monitoring of the POC wells will be conducted on a semi-annual basis. All newly installed wells will be sampled quarterly until background statistics are established (typically eight quarters).

4. LEACHATE MONITORING

An established leachate database exists for the KLF. Leachate samples have been collected on a routine basis (from Wet Well-1 and Wet Well-2 since April 1994 and from Wet Well-3 since 2010) and analyzed for an extensive list of parameters. Leachate monitoring is not specifically required by HAR Title 11 Chapter 58.1 regulations; however, it is a permit requirement and the DOH Guidance Document (DOH 2002) recommends collecting leachate data to characterize the potential contaminant source (i.e., the landfill waste materials) and evaluate the suitability of site-specific monitoring parameters.

4.1 Leachate Monitoring System

The KLF Phase II leachate collects in Wet Wells-1 and -2 prior to discharge to the onsite leachate evaporation pond (Figure 1-2). The KLF Phase II Cell 1 leachate collects in Wet Well-3 prior to discharge to the evaporation pond. The KLF Phase II Cell 2 leachate accumulates in Sumps 2A and 2B within Cell 2, and then is pumped to the leachate evaporation pond. The KLF Phase I is unlined, and no leachate is collected.

As part of the KLF monitoring program, leachate samples will be collected from the three leachate wet wells on an annual basis. The Cell 2 leachate will be sampled semi-annually from Sumps 2A and 2B for the first two years following initial placement of MSW in the Cell 2 expansion and then the sampling frequency will be reduced to annually.

4.2 Leachate Monitoring Parameters

As required in state solid waste regulations and the current facility permit, leachate samples will be analyzed for the constituents listed in Table 4-1, and the results will be compared to the groundwater monitoring data. If chemical parameters that meet site-specific detection monitoring criteria (as outlined in Section 3.2.1) are detected in the leachate, those parameters may be proposed for addition to the KLF detection monitoring program. New analytes may also be proposed for addition to the list of leachate monitoring parameters. Conversely, as the leachate database becomes more fully developed, parameters that are not found in the site leachate may be removed from the KLF detection monitoring program (with DOH approval).

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Table 4-1: Summary of KLF Phase II Leachate Monitoring Parameters

Appendix II Constituents
• Chemicals listed in Appendix II of 40 CFR Part 258 (Subtitle D)
Major Cations and Anions, Not listed in Appendix II of 40 CFR Part 258 (Subtitle D)
• Calcium, total • Magnesium, total • Manganese, total • Potassium, total • Sodium, total • Chloride • Sulfide, total • Sulfate • Carbonate (as CO3) • Bicarbonate (as HCO3)
Major Leachate Indicators, Not listed in Appendix II of 40 CFR Part 258 (Subtitle D)
• Bromide • TDS • TOC • Alkalinity, total (as CaCO3) • Ammonia (as N) • COD • Iron (total and dissolved) • Nitrate-Nitrite (as N)
Field Measurements
• Specific conductance, pH, temperature, and turbidity, ORP

Notes:
Nitrate-nitrite as N will be analyzed instead of nitrate-N due to the short holding time required for analysis of nitrite-N for calculation of nitrate-N.

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5. DATA EVALUATION METHODS

The following sections describe the methods and procedures for statistical and non-statistical evaluation of the KLF monitoring data. These methods and procedures represent a conservative approach to evaluation of groundwater chemistry data for protection of groundwater quality and incorporate state-of-the-art statistical and other evaluation methodologies.

5.1 Statistical Methodology for Evaluation of Inorganic Parameters

Consistent with the existing groundwater monitoring program at the KLF, an intra-well monitoring strategy using Shewhart-CUSUM control charts will be used for routine detection monitoring. Shewhart-CUSUM control charts are useful for detecting both sudden and gradual changes in groundwater chemistry (DOH 2002). Shewhart-CUSUM control charts will be constructed for each POC well to provide a statistical and visual tool for detecting trends and abrupt changes in inorganic groundwater chemistry. The combined Shewhart-CUSUM procedure assumes that the data are independent and normally distributed. The most important assumption is independence (DOH 2002). Therefore, care should be taken to never sample wells more frequently than sample independence can be demonstrated based on site-specific hydrogeologic factors. The assumption of normality is somewhat less of a concern because the data can usually be adequately transformed for most applications. Non-detects can be replaced by one-half of the PQL without serious consequence, although this procedure should be applied only to constituents that are detected in at least 25% of all samples. For data sets with less than 25% detected values in the background data set, non-parametric prediction limits will be used in lieu of Shewhart-CUSUM control charts.

Intra-well monitoring is independent of spatial variability of background groundwater chemistry. For intra-well comparisons, a minimum of eight background samples (i.e., from each well in the monitoring program) are required for parametric (i.e., Shewhart-CUSUM) tests and 13 background samples for non-parametric (i.e., Prediction Limit) tests. Background data representing groundwater at all the KLF well locations, except proposed new well MWII-6A and replacement wells MWI-1A, MWI-2A, MWI-3A, have already been collected. New and replacement wells will be sampled quarterly until background is established (eight events). Statistical evaluation of groundwater monitoring data will continue to be performed using DUMPStat statistical modeling software, which is consistent with EPA and ASTM International guidance on groundwater monitoring at Subtitle D and Subtitle C facilities (DOH 2002).

5.2 Non-Statistical Methodology for Evaluation of VOCs

VOCs have been demonstrated to be effective indicators of a release from MSW landfills. However, because these compounds are rarely detected in background groundwater samples, establishing MW-specific limits for VOCs is generally not an option. Therefore, a detection monitoring decision rule based on laboratory specific PQLs will be used to identify statistically significant monitoring results with respect to VOCs. It is generally accepted that when a landfill releases leachate to groundwater, multiple constituents contained in the leachate are associated with the release from the landfill and are subsequently detected by the groundwater monitoring wells. A single constituent reported at very low concentration (i.e., below the PQL) typically is not

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indicative of a release. The calculation of laboratory specific PQLs already incorporates a measure of the statistical uncertainty that is associated with the measurement process (Sanifill and Baquerizo 1996). Therefore, any VOC detected and verified at a concentration above the PQL is considered statistically significant and would therefore trigger assessment monitoring (or an ASD if the detection is unrelated to a release from the landfill).

PQLs are designed to assure that the measured value reported for an analyte is close to the actual quantitative value. Method detection limits (MDLs), on the other hand, indicate that the analyte is present in the sample with a specified degree of confidence (Sanifill and Baquerizo 1996). For analytes with estimated concentrations greater than the MDL but less than the PQL, it can only be concluded that the true concentration is greater than zero; the actual concentration cannot be quantified. The actual concentration corresponding to an analytical result between the PQL and the MDL (often referred to as a "trace" result or a "J-flagged" result) may actually be less than the MDL. Therefore, comparison of a detected concentration to a maximum contaminant level, or any other concentration limit, is not meaningful unless the concentration is greater than the PQL. Although the use of VOC results reported between the MDL and PQL is not appropriate for identifying a potential leachate release, such trace/J-flagged results can be used to guide further investigation in the event that long-term, repeatable trace/J-flagged results are observed.

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5.3 Detection Verification Procedure

Once groundwater analysis results are compiled, checked for QA and consistency, and determined to be above the appropriate statistical level (i.e., the Shewhart-CUSUM control chart limit or non-parametric prediction limit for inorganic monitoring parameters, or the PQL for one or more VOCs), the results should be verified in accordance with the objective of 40 CFR Part 258.53, HAR Chapter 11-58.1 (DOH 1994), and the DOH Guidance Document (DOH 2002).

The Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance (EPA 2009) recommends that tolerance limits be used in conjunction with verification resampling of those wells suspected of possible contamination, in order to either verify or disconfirm the initial sampling results and thus avoid false positive errors. Without verification resampling, much larger statistical limits would be required to achieve site-wide false positive error rates of 5% or less. The procedures described in Section 5.3.1 and Section 5.3.2 will be performed for chemicals initially identified at concentrations above the statistical limits. Verification samples should be analyzed only for those chemicals that initially exceed their statistical limits; otherwise, an unacceptably high false positive error rate can be expected (e.g., if tetrachloroethylene [PCE] is the only compound detected during an EPA Method 8260B scan (EPA 1997), then only PCE is targeted and reported by the laboratory during the retest).

5.3.1 Volatile Organic Compounds

If concentrations above statistical limits (i.e., PQLs) are reported for one or more VOCs in groundwater samples from the POC wells, then prompt resampling and analysis should be conducted. If any single VOC is detected at a concentration above the PQL in the verification

resample, an SSI will be recorded and assessment monitoring will be initiated or, if the exceedance is not likely to be associated with a release from the facility, an ASD will be performed.

5.3.2 Inorganic Constituents

If one or more of the inorganic parameters are detected at concentrations above their statistical limits (i.e., Shewhart-CUSUM control chart limits or non-parametric Prediction Limits), one verification resample will be collected at the next scheduled sampling event. If verification of an elevated parameter is confirmed for one discrete verification resample, an SSI will be recorded and assessment monitoring will be initiated or, if the exceedance is not likely to be the result of a release from the facility, an ASD will be performed.

5.4 Groundwater Data Evaluation

This section outlines the evaluation methodology that will be used for detection of a release from the facility using PQLs as the concentration limits for VOCs, and Shewhart-CUSUM control chart limits for the other site-specific detection monitoring parameters.

As the background database is updated, it will be necessary to examine the database to identify outliers, anomalies, and trends that might confound the evaluation. Outliers and anomalies are inconsistently large or small values that can occur due to sampling, laboratory, transportation, or transcription errors, or even by chance alone. Significant trends may indicate a source of systematic error, which must be evaluated and corrected. The inclusion of such values in the historical database could lead to misinterpretation of the data set, which could result in high rates of false positive errors and/or false negative errors.

To reduce the possibility of this type of systematic error, outliers will be removed from consideration before the data are analyzed to establish background water quality parameters. Parameter concentrations that are designated as outliers using an outlier detection statistical technique presented in "Statistical Methods for Groundwater Monitoring" (Gibbons 1994) will be verified during the next sampling event or after a reasonable period (e.g., three months) to ensure sample independence. If the potential outlier result is not verified, the anomalous sample result will be removed from the database. Any detected systematic trends in the background database will be evaluated and reported to the DOH in a timely manner.

In addition to statistical analysis and comparison of groundwater monitoring data to leachate data, site conditions, historical data, environmental data such as rainfall, and influence of adjacent operations such as the aquiculture facility should be considered in determination of outlier status of analytical results for monitoring wells. Adjacent or upgradient conditions are important for evaluation of background conditions but specific monitoring may not be reflected in the statistical background determination of background data. In addition, adjacent or upgradient conditions can result in temporary impacts (e.g., seasonal, or operations of the aquiculture facility) to the landfill monitoring wells that are not related to a release from the landfill. Consideration of "big picture" factors can be helpful and important to interpret the data in addition to statistical analysis.

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Data reported for the non-VOC detection monitoring parameters will be evaluated using time versus concentration plots. If a significant trend, such as an unexpected geochemical signature is indicated, or an anomalously high concentration (i.e., greater than five times average background concentration) is verified for a constituent after results have been subjected to QA/QC, then the DOH will be notified in a timely manner. Potential outlier data will be evaluated in an associated Data Quality Report prepared by the laboratory to determine the quality and integrity of the data in question. Information provided in the Data Quality Report will be important for evaluating the significance of the analytical results and determining whether a result represents an outlier, potential cross contamination, or other laboratory error.

In addition, leachate characterization will be performed on a continuing basis, and the results will be used to modify the list of detection monitoring parameters (if modification is warranted and the DOH approves). Source characterization is an effective technique for reducing false positive and false negative errors because groundwater concentrations indicating a potential release must be correlated with source concentrations (i.e., source concentrations must be greater and in appropriate contrast with respect to groundwater concentrations). Therefore, if a chemical is detected in groundwater at a concentration of concern but is either not detected in leachate or is detected in leachate at a much lower concentration, then the data indicate that the chemical is not attributable to a release from the landfill. Verification sampling will be conducted if the evaluation indicates that leachate represents a potential source of a chemical detected in groundwater.

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5.5 Assessment Monitoring

If an SSI has been detected and verified for one or more of the detection monitoring parameters identified in Section 3.2.2 or if one or more VOC exceeding the PQL is identified and the increase is not attributed to a source other than the KLF, assessment monitoring will be initiated within 90 days in accordance with HAR Chapter 11 58.1 (DOH 1994). Further guidance on assessment monitoring is provided in the DOH Guidance Document (DOH 2002) and ASTM D7048 (ASTM 2004a).

5.5.1 General Procedures

Within 90 days of triggering an assessment monitoring program, and annually thereafter, the owner or operator must sample and analyze the groundwater for all constituents identified in Appendix II, or a site-specific subset of analytes approved by DOH (DOH 2002). A minimum of one sample from each downgradient well must be collected and analyzed during each sampling event, unless the DOH director approves an appropriate alternative subset of wells to be tested. The DOH director may also approve removal of Appendix II parameters from the analyte list for assessment monitoring if they are not reasonably expected to be in or derived from waste contained in the landfill. If any Appendix II constituents are detected in groundwater samples from the downgradient wells, then a minimum of four independent samples must be collected from each well (or from an approved subset of wells) and analyzed to establish background concentrations for the constituents.

If Appendix II parameters are detected in groundwater samples collected during the initial or subsequent sampling events described above, a notice will be placed in the operating record within twenty-four hours identifying the Appendix II constituents that have been detected, and the DOH director will be informed that this notice has been placed in the operating record. Within ninety days, and on at least a semi-annual basis thereafter, the groundwater monitoring well network must be sampled and analyzed for the Appendix II constituents detected during the sampling events described above. The DOH director may approve an alternative assessment monitoring frequency during the active life and post-closure period. Sampling and analysis of the constituents listed in Appendix I (or the alternative routine parameter list approved by the director) will continue throughout the assessment monitoring period.

The owner or operator must establish background concentrations and groundwater protection standards (GWPS) in accordance with HAR Chapter 11-58.1 for the constituents detected pursuant to the sampling described above. Based upon comparison to these threshold concentrations, the following actions are required:

- If the concentrations of all Appendix II constituents are shown to be at or below background values for two consecutive sampling events, the owner or operator must notify the DOH director of this finding and may return to detection monitoring.
- If the concentrations of any Appendix II constituents are above background values, but all concentrations are below the GWPS, the owner or operator must continue assessment monitoring as described above.
- If one or more Appendix II constituents are detected at statistically significant levels above the GWPS, the owner or operator must place a notice in the operating record within fourteen days of this finding indicating which constituents exceed the GWPS. The owner or operator must characterize the nature and extent of the release and notify all persons who own or reside on land that overlies the plume of contamination if impacts have migrated off site. Within 90 days, the owner or operator must also initiate assessment of corrective measures as outlined in HAR Chapter 11-58.1.

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In the event that a potential source other than the landfill is suspected, or the SSI may have resulted from error in sampling, analysis, statistical evaluation or natural variation in groundwater quality, the owner or operator may provide a technical report documenting this conclusion. These reports are typically referred to as Alternative Source Demonstrations (ASDs). If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program and may return to detection monitoring if Appendix II constituent concentrations are at or below background levels. Until a successful demonstration is made, the owner or operator must comply with the requirements for assessment of corrective measures as outlined in HAR Chapter 11-58.1.

5.5.2 Assessment Monitoring at Kekaha

This section provides a brief overview of the Kekaha landfill assessment monitoring program. Historically, two of the monitoring wells at the site have shown verified SSIs for one or more of

the detection monitoring parameters identified in Table 3-4. These verified SSIs have triggered additional action as summarized below:

- At well MWII-7, several parameters were verified to be above statistically established limits in March 2012. On July 3, 2012, WMH submitted an ASD (GeoChem Application 2012) for these exceedances in accordance with HAR Chapter 11-58.1. The ASD concluded that changes in groundwater quality resulted from brackish water impacts associated with off-site aquaculture facility. The DOH concurred with the ASD findings and noted that the water quality changes should be evaluated via time-series plots and Piper/Stiff plots until the data indicate that the groundwater is no longer impacted by the aquaculture facility (DOH 2014).
- At well MWII-6, there is a long history of confirmed SSIs dating back to at least 1998. Numerous ASDs have been prepared in response to these exceedances, with the most recent dated December 4, 2009. This ASD included data representing additional soil testing and empirical evaluation of the data to support previous findings that landfill gas (LFG) from the unlined Phase 1 landfill was the cause of groundwater quality changes. The most recent ASD supported previous conclusions, i.e., that LFG from Phase 1 is likely creating reducing geochemical conditions that increase the solubility and thus mobilization of arsenic (and other constituents that occur naturally in the minerals present in the water-bearing zone. In May 2017, a gas collection and control system that may make geochemical conditions less reducing to reduce impacts to groundwater was installed in both Phase 1 and Phase II.

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On July 18, 2016, WMH met with DOH to discuss resuming semi-annual detection monitoring using parameters previously established for the Kekaha Phase II landfill. All monitoring wells for the Phase II landfill had been switched to a quarterly monitoring frequency in 2008, including those wells which had not had prior SSIs and associated ASD investigations. The request to resume semi-annual testing was based on the conclusion that continued quarterly monitoring did not provide additional benefit. The recommendation was also based on the understanding that groundwater impacts at the facility are attributable to an off-site source (the aquaculture facility) and the closed Phase I landfill and are not associated with current Phase II landfill operations. WMH summarized their recommendation to return to semi-annual detection monitoring in a letter to DOH dated July 21, 2016.

In a letter dated October 18, 2016, DOH recommended that the detection monitoring frequency remain on a quarterly basis to determine whether the LFG collection and control system will effectively mitigate the background exceedances by reducing the mobility of arsenic and other constituents of concern. The DOH also noted that testing for Appendix II constituents should be performed on at least an annual basis and should include those Appendix II parameters that either exceeded established background concentrations or required additional sampling and analysis in order to establish background.

All monitoring wells at the Kekaha Landfill will be sampled and analyzed for the site-specific Appendix II constituents specified above on at least an annual basis. In order to assess the effect of the LFG collection system on groundwater quality, monitoring wells MWI-1A, MWI-2A, and MWI-3A, will be sampled on a quarterly basis. Monitoring Wells MWII-2, MWII-5, and MWII-7 will return to semi-annual sampling.

6. FIELD MONITORING AND SAMPLING PROCEDURES

The field procedures for monitoring, sampling, and analysis or groundwater and leachate at the KLF Phase II described in this section will be performed in accordance with the DOH Landfill Guidance Document (DOH 2002). Methods and procedures for laboratory analysis and QA/QC for the monitoring program are described in Section 7.0. Field forms are provided in Appendix C.

6.1 Groundwater Elevation Measurements

Water levels in the groundwater wells must be measured during a single event prior to purging or sampling of any well, and the time between measurements should be as short as possible to provide the data required to accurately evaluate the magnitude and direction of the hydraulic gradient.

6.2 Sample Collection and Handling Procedures

Groundwater samples for chemical analysis will be collected after the monitoring wells have been properly developed and purged. All sampling activities will be performed in accordance with the general requirements for groundwater, surface water, and leachate sample collection presented in the DOH Landfill Guidance Document and, in part, from the following ASTM Environmental Standards:

- ASTM Standard D1129-06a, (2006) – Standard Terminology Related to Water
- ASTM Standard D3370-95a, (2003) – Standard Practices for Sampling Water from Closed Conduits
- ASTM Standard D4840-99, (2004d) – Standard Guide for Sampling Chain-of-Custody Procedures
- ASTM Standard D3694-96, (2004c) – Standard Practice for Preparation of Sample Containers and for Preservation of Organic Constituents
- ASTM Standard D5088-02, (2002) – Standard Practice for Decontamination of Field Equipment Used at Non-Radioactive Waste Sites

Site conditions at the KLF or site-specific regulatory requirements may necessitate a deviation from the procedures described herein. Any such deviation must be documented by the sampling team leader in coordination with the KLF owner and operators.

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6.2.1 Monitoring Well Purging

A dedicated QED bladder pump will be installed in each monitoring well and will be used to purge the well before groundwater samples are collected. Before well purging begins, the groundwater level will be measured. Each well will be purged at a rate that does not create substantial drawdown. The purging rate will be reduced if the drawdown rate appears to exceed the recovery rate. The purge water will be monitored for pumping rate and total volume pumped and sampled at regular intervals (approximately every 5 minutes) with the Horiba U-52 meter and analyzed in the field for temperature, pH, specific conductance, dissolved oxygen, redox potential, and turbidity (field parameters). A minimum of four readings will be taken and recorded on field sheets at each monitoring well. Purging will be considered complete when three consecutive readings stabilize to within 10% of each other.

For the first quarter 2021 sampling event, the purge rate ranged from 200 mL/min to 600 mL/min, and the total volume purged ranged from 2 to 11.2 liters. Appendix A (Field Information Forms) included with each of the quarterly monitoring reports documents the sampling method and field data for each monitoring well.

Leachate will be sampled in the two wet wells with a bailer and from dedicated pumps in the leachate sumps.

6.2.2 Sample Collection Methods

The wells will be sampled directly from the Teflon discharge tubes of the dedicated pumps. If a well is slow to recharge, a sample will be collected no later than two hours after purging is completed. Water samples will be placed into appropriate laboratory-supplied containers. Samples will be preserved immediately after collection. Samples for VOC analysis will have zero headspace (no air bubbles trapped in the sample). When filling bottles containing preservative, the bottles will not be allowed to overflow any more than is necessary to eliminate headspace. Pre-measured amounts of preservative reagents are supplied with the sample bottles by the laboratory. Analytical methods identify the specific preservative (if any) and specify how much preservative is required. Bottles will not be overfilled and will be inverted (once capped) to mix the preservative with the sample. Bottle lids will not be placed on the ground or interchanged among sample bottles.

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Groundwater samples to be analyzed for dissolved metals and TOC will be filtered through 0.45-micron membrane in-line filters, transferred to containers, and preserved with nitric acid (for metals) or sulfuric acid (for TOC) to a pH less than 2.0. Prior to collecting the filtered samples, approximately 500 milliliters of groundwater will be discharged through the filter.

6.2.3 Sample Labeling

A sample label with adhesive backing will be affixed to each individual sample container. Clear tape will be placed over each label to prevent loss of information on the label. The following minimum information will be recorded with a waterproof marker on each label:

- Project name or number
- Sample identification number
- Date and time of collection
- Sample preservatives (if applicable)
- Analysis to be performed

The sample labels will be obtained from the analytical laboratory or printed on adhesive labels.

6.2.4 Chain-of-Custody

Sample integrity depends on strict COC procedures to track the sample containers and samples from the time the empty sample bottles leave the laboratory to the issuance of the analytical laboratory results.

To maintain the COC, the samples will be either in sight of the assigned custodian, locked in a tamper proof location, or sealed with a tamper proof seal. A record of sample bottle possession and any transfers of samples will be maintained and documented on the COC Form. The signature of the responsible party, time, and date will be recorded on the COC Form immediately before sealing the container for transport to the laboratory, and each time the sample container is transferred to the custody of another person.

Sample identification numbers, sample matrix, number of containers, date, and time of sampling will be recorded on the COC Form. The required analytical methods, use of pre filtration bottles, and any problems with the sample will also be noted on the form. Upon receipt of the sample cooler by the laboratory, the seal will be broken, and the condition of the samples, temperature, date, and time will be recorded on the COC Form.

6.2.5 Sample Handling and Storage

After collection, samples will be immediately placed in insulated coolers and chilled to 4 degrees Celsius with bagged wet ice. Each cooler will be "locked" with a custody seal. The sampling team will record sample designations on COC Forms and Field Information Forms. Both forms will be reviewed to ensure completeness, and all paperwork (with the exception of carbon copies that are held for documentation purposes) will be placed in a plastic bag, sealed, and placed inside the container. Analytical methods, sample containers, preservatives, and holding times for each analytical method are listed in Section 7.0. The containers and packing materials provided by the laboratory will be designed to prevent breakage and spillage during shipping. Shock resistant bottle holders or other materials will be used for this purpose. Volatile organic analysis (VOA) vials will be arranged such that they are never in direct contact with the ice packs.

6.3 Equipment Decontamination

All non-disposable, non-dedicated equipment that contacts potentially contaminated groundwater will be decontaminated prior to reuse. Equipment will be decontaminated by steam cleaning or by

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a non-phosphate detergent scrub, followed by tap water and distilled or deionized water rinses. Decontamination will be performed on plastic sheeting. Clean equipment will be stored on plastic sheeting in an uncontaminated area. Equipment stored for an extended period will also be covered by plastic sheeting.

6.4 Investigation-Derived Waste Management

Investigation-derived waste (IDW) will include water generated during decontamination of the sampling equipment, well development, and purge water. IDW will be minimized throughout the fieldwork as much as possible. It is anticipated that the water IDW will be disposed of on site in accordance with the Hawaii State Landfill Groundwater Monitoring Guidance (DOH 2002).

6.5 Field Forms

Field forms will be completed with each field activity. Each field form will clearly identify the name of the site, name of the record keeper, and the beginning and ending dates of the entries. Field forms will be maintained in a clean area and used only when outer gloves have been removed. Field form entries will be corrected by drawing a single line through the incorrect entry, and then initialing and dating the change. Corrections of more than a simple mistake will be accompanied by an explanation. At the end of each day, the record keeper will sign that day's field forms. The record keeper will photocopy completed pages weekly. A technical review of the field forms will be conducted by the field manager, and the field forms will be included in the quarterly monitoring reports.

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7. LABORATORY ANALYSIS PLAN

This section describes the methods and procedures for laboratory analysis and QA/QC for the KLF groundwater and leachate sampling program.

7.1 Program Quality Assurance/Quality Control Procedures

Duplicate, trip blank, equipment blank, field blank, and laboratory method blank samples will be collected and analyzed in accordance with DOH requirements and standard practice to provide QA/QC data for the KLF groundwater monitoring program, as described below.

7.1.1 Duplicates

Duplicate samples will be collected at a frequency of one duplicate every ten samples in the field from the groundwater monitoring wells, wet wells, and leachate sumps. Duplicates should not be physically different in color, turbidity, or other physical parameters. Sampling locations (MWs or leachate sumps) from which duplicates are collected must be identified in the field records along with any information/observations that may be useful to explain potentially anomalous results (e.g., physical differences between samples, prevailing winds, upwind contaminant sources, etc.). Each duplicate should be collected using matching sets of laboratory-supplied sample containers by alternating between the regular sample containers and the duplicate sample containers. The duplicates should be blind (i.e., the well designation is not listed on the COC form). Once a duplicate is collected, it must be handled and shipped in the same manner as the rest of the samples.

7.1.2 Trip Blanks

Trip blanks are a required part of the field sampling QA/QC program. They are used to detect VOC contamination that may be introduced in the field (either atmospheric or from sampling equipment), in transit (to or from the sampling site), or in the bottle preparation, sample log-in, or sample storage stages at the laboratory.

Trip blanks are samples of VOC-free water (e.g., deionized) prepared at the laboratory. They remain with the sample bottles while in transit to the site, during sampling, and during the return trip to the laboratory. Trip blank sample bottles must not be opened at any time during this process. Upon return to the laboratory, trip blanks will be analyzed for VOCs using the same procedures and methods that are used for the collected field samples. One trip blank will be placed in each cooler containing samples for VOC analysis.

Trip blank results should be reported in the laboratory results as separate samples, using the designations TB-(well#) as their sample point designation.

7.1.3 Field Blanks

Field blanks are a required part of the field sampling QA/QC program. The purpose of the field blank is to detect contamination that might be introduced into the groundwater samples through the air. For sites with sampling programs involving VOCs, at least one field blank should be analyzed for the first 20 samples or less. At least one field blank sample should be collected for

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each day of sampling, and for each subsequent 20 samples, whichever is greater. For the KLF, sampling is typically completed in one day, and comprises less than 20 samples, so a single field blank will be collected during each monitoring event.

Field blanks must be prepared in the field (at the sampling site) using laboratory-supplied bottles and deionized or laboratory reagent-quality water. Each field blank is prepared by pouring the deionized water into the sample bottles at the location of one of the wells in the sampling program. The well at which the field blank is prepared must be identified on a Field Information Form, along with any observations that may help explain anomalous results (e.g., prevailing wind direction, up-wind potential sources of contamination, etc.). Once a field blank is collected, it is handled and shipped in the same manner as the rest of the samples.

7.1.4 Equipment Blanks

At the KLF, all sampling equipment is dedicated, and in general, equipment blanks are not required or collected. For non-dedicated equipment, if used, decontamination procedures consist of rinsing the equipment once with deionized or laboratory reagent quality water, brushing the equipment with a laboratory-quality soap, and triple rinsing the equipment with deionized or laboratory reagent quality water.

Equipment blank samples will be collected (if required) by pouring deionized or laboratory reagent quality water into the sampling device (e.g., a bailer) and then placed in the sample container with the proper preservative. If the corresponding groundwater samples are filtered, then the field blank water should be filtered after it has contacted the sampling device and before it is placed in the sample container.

Equipment blank results should be reported in the laboratory results as separate samples, using the designations EB-(well#) as their sample point designation.

7.1.5 Method Blanks

The laboratory will prepare and analyze method blank samples to detect any laboratory-introduced contamination that may occur during the analytical process.

NOT APPROVED

7.2 Laboratory Quality Control Procedures

The QA program for the laboratory is described in their Quality Assurance Program Plan (QAPP), which is available from the laboratory upon request. The QAPP describes mechanisms the laboratory employs to ensure that all data reported meets or exceeds all applicable EPA and State requirements. It describes the laboratory's experience, its organizational structure, and procedures in place to ensure quality of the analytical data. The QAPP outlines the sampling, analysis, and reporting procedures used by the laboratory. The laboratory is responsible for the implementation of and adherence to the QA and QC requirements outlined in the QAPP.

Audits are an important component of the QA program at the laboratory. Audits are conducted by the laboratory. Internal system and performance audits should be conducted periodically to ensure adherence by all laboratory departments to the QAPP.

Data quality reviews (DQRs), or the equivalent, are requests submitted to the laboratory to formally review results that differ from historical results, or that exceed certain permit requirements or QC criteria. The laboratory should prepare a formal written response to each DQR explaining the discrepancy. The DQR is the first line of investigation following any anomalous result.

7.3 Practical Quantitation Limits

Laboratory-specific PQLs should be used as the reporting limits for applicable low detection frequency analytes (particularly organic compounds). The EPA developed the concept of the PQL to address the issue of analytical variability. The PQL concept was developed for compliance with the Safe Drinking Water Act (50 Federal Register [FR] 46906, Nov. 13, 1985) where it is defined: "The PQL thus represents the lowest level achievable by good laboratories within specified limits during routine laboratory operating conditions." The EPA states in 52 FR 25699 (July 8, 1987): "The EPA developed the PQL concept to define a measurement concentration that is time and laboratory independent for regulatory purposes. MDLs, although useful to individual laboratories, do not provide a uniform measurement concentration that can be used to set standards."

The EPA's defined MDL, as described in 40 CFR 136, has limited application. The Agency acknowledges that "MDLs are not necessarily reproducible over time in a given laboratory, even when the same analytical procedures, instrumentation, and sample matrix are used" (50 FR 46906, Nov. 13, 1985). As indicated in 52 FR 25699, the MDLs have had a tendency to be misunderstood by regulatory agencies developing policies for how low concentration standards (in this case, "detection of a contaminant") can be established. The use of MDLs may result in false positives, because (as the EPA has acknowledged) MDLs are ideal limits that cannot be reliably measured by even the best laboratories. Therefore, in its regulatory programs, the EPA has determined that the PQL is a more appropriate measure for compliance purposes.

While the EPA has defined PQLs, these limits are often based on consensus rather than operational definitions and experimental evidence. The actual PQL limit that may be achieved in a specific laboratory for a specific chemical may be higher or lower than the PQLs listed in SW-846 (EPA 1997). In contrast to the PQL, which is a measure of analytical precision, the MDL is a hypothesis test that leads to the binary decision of whether or not an analyte is present or absent in a sample. The MDL is defined by the EPA as the "minimum concentration of a substance that can be measured and reported with 99% confidence that the true value is greater than zero" (50 FR 46906, Nov. 13, 1985).

7.4 Analytical Methods

Table 7-1 and Table 7-2 summarize the analytical methodologies to be used by the laboratory for the routine analysis of groundwater and leachate, and list the sample containers, preservatives, and holding times for each analytical method. All methods are EPA-approved and are fully described in the laboratory method and standard operating procedure documents. The laboratory may substitute EPA-approved methods upon notification and approval of the DOH Environmental Protection Manager. Table 7-1 does not include additional analytical methodologies required for some of the Appendix II chemicals that are analyzed during assessment monitoring.

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Table 7-1: Groundwater Analytical Methods, Sample Containers, Volumes, Preservatives, and Holding Times

Analytical Parameters	Method No.	Quantity	Container	Preservative	Holding Time
VOCs App. I (preserved)	SW846 8260B	3	40 mL Glass-VOA vial	HCl and Cool to 4 °C	14 days
VOCs App. I (unpreserved)	SW846 8260B	3	40 mL Glass-VOA vial	Cool to 4 °C	3 days
Metals, Dissolved	SW846 6020/6010B	1	500 mL Polyethylene	HNO3 pH<2	6010/6020B – 6 months 7470A – 28 days
Metals, Total	SW846 6020/6010B	1	500 mL Polyethylene	HNO3 pH<2	6010/6020B – 6 months 7470A – 28 days
TOC, Field Filtered	SM 5310B	1	500 mL Amber Glass	H2SO4 pH<2	28 days
COD	EPA 410.4	1	500 mL Amber Glass	H2SO4 pH<2	28 days
Nitrate-Nitrite as Nitrogen	EPA 353.2				
Ammonia as Nitrogen	EPA 350.1				
Alkalinity: Total, Bicarbonate & Carbonate	SM 2320B	1	1000 mL Unpreserved Polyethylene	Cool to 4 °C	14 days
TDS	SM 2540C				7 days
Chloride, Sulfate, Bromide	EPA 300.0A				28 days

Notes:

°C degree Celsius
H2SO4 sulfuric acid
HCl hydrochloric acid
HNO3 nitric acid
mL milliliter
VOCs volatile organic compounds
TOC total organic carbon
COD chemical oxygen demand
TDS total dissolved solids

NOT APPROVED

Table 7-2: Leachate Analytical Methods, Sample Containers, Volumes, Preservatives, and Holding Times

Analytical Parameters	Method No.	Quantity	Container	Preservative	Holding Time
VOCs App. II (preserved)	SW846 8260B	3	40 mL Glass-VOA vial	HCl and Cool to 4 °C	14 days
VOCs App. II (unpreserved)	SW846 8260B	3	40 mL Glass-VOA vial	Cool to 4 °C	3 days
SVOCs App. II	SW846 8270C	8	1000 mL Amber Glass	Cool to 4 °C	8270C/8151A/8081A – 7 days 8280B – 30 days 8082A – 365 days
Herbicides App. II	SW846 8151A				
Organochlorine Pesticides App. II	SW846 8081A				
Dioxin App. II	SW846 8280B				
PCBs as Aroclors App. II	SW846 8082A				
Total Metals and Mercury App. II	SW846 6020/6010B/7470A	1	500 mL Polyethylene	HNO3 pH<2	6 months
COD	EPA 410.4	2	500 mL Amber Glass	H2SO4 pH<2	28 days
TOC	SM 5310B				
Nitrate-Nitrite as Nitrogen	EPA 353.2				
Ammonia as Nitrogen	EPA 350.1				
Total Cyanide	SM 9012A	1	250 mL Poly	NaOH pH>12	14 days
Total Sulfide	SM 4500	1	250 mL Poly	ZnAcetate/NaOH	7 days
Alkalinity: Total, Bicarbonate & Carbonate	SM 2320B	1	1000 mL unpreserved Polyethylene	Cool to 4 °C	14 days
TDS	SM 2540C				7 days
Chloride, Sulfate, Bromide	EPA 300.0A				28 days

Notes:

NaOH sodium hydroxide
PCB polychlorinated biphenyl
SVOC semivolatile organic compound
VOCs volatile organic compounds
TOC total organic carbon
COD chemical oxygen demand
TDS total dissolved solids

NOT APPROVED

8. DATA QUALITY REVIEW, REPORTING, AND RECORDKEEPING

Prior to submittal of a monitoring report to the DOH, several data evaluation, reporting, and recordkeeping tasks will be implemented. The following sections describe the evaluation, reporting, and recordkeeping procedures that should be followed upon receipt of an analytical report.

8.1 Data Quality Review

Each analytical report received from the laboratory shall undergo two levels of quality assessment. These quality assessment procedures are described below.

8.1.1 Initial QA/QC Checks

Before data are subjected to statistical analysis, a qualified hydrogeologist or groundwater scientist shall evaluate the data by examining the QC information accompanying the data report from the laboratory. Relevant QC data include measures of accuracy (percent recovery), precision (relative percent difference [RPD]), and sample contamination (blank determinations). Data that fail any of these checks should be flagged for closer evaluation and a DQR. Results of the DQR must be submitted with the analytical data in the routine monitoring report (see Section 7.2 for a description of DQR). A brief summary of relevant QC data follows. A more complete description should be contained in the laboratory QAPP.

NOT APPROVED

Accuracy defines the relationship between the laboratory's measurement of a sample's concentration and the "true," but unknown concentration of the sample. Because the "true" concentration is unknown, accuracy must be measured indirectly by determining the percent recovery of a sample called the matrix spike (MS). The MS is analyzed under the same conditions as the groundwater sample and its concentration is determined. Because the MS has a known concentration, the percent recovery can be calculated. It is assumed that the groundwater sample behaves exactly like the MS and thus the "true" concentration of the submitted groundwater sample can be back calculated. Control criteria for percent recovery are taken from regulatory method requirements.

Precision is the assessment of the variability that can be expected in data resulting from the analytical procedures employed. It provides a measure of the reproducibility, which is estimated through duplicate measurements of a MS. Two MS samples are prepared, an MS and a matrix spike duplicate (MSD). The MS and MSD samples are analyzed along with the unknown sample and the RPD between the two spikes is determined. Control criteria for RPDs are taken from regulatory method requirements.

The potential for sample contamination is assessed by measurements of "blank" samples. Blanks are samples of ultra-pure laboratory water that are not spiked with any analytes and are carried through the field sampling and laboratory environments. These samples are known as "field," "lab," and "equipment" blanks. It is assumed that any analytes that occur in the field or laboratory, which might add to the concentration of the analyte in the sample, will be picked up by the blank

samples and measured. If any of the analytes of interest are found in the blank samples, it is an indication of potential contamination of the unknown sample.

8.1.2 Qualitative Data Evaluation

Following the initial QA/QC checks, all data will undergo a second level of review by graphing historical trends and comparing new results with these historical trends to flag visual outliers or other anomalous data. If a clearly anomalous result is found, a DQR will be initiated with the laboratory to ascertain whether laboratory error is involved. In addition, field information should be checked for anomalous occurrences or observations that might help to explain an outlier result.

8.2 Data Recordkeeping Requirements

The laboratory maintains all analytical data indefinitely. The laboratory ensures that, at each stage of a process where a permanent data record is required, security measures are in place to guarantee the integrity of the data. Standard operating procedures are in place for computer security, computer data storage, and data back-up.

8.3 Data Reporting Requirements

Monitoring data will be submitted in reports that summarize all monitoring activities that took place during the preceding time periods in accordance with state and federal regulations. A semi-annual/mid-year report will be submitted to the DOH detailing the results and events of the previous six months. The semi-annual report will include graphs of all analytical data from each monitoring point and background monitoring point, as required, except for those constituents for which no new data were collected since the previous submittal. Monitoring reports summarizing results, exceedances, and/or deficiencies in the sample data will be submitted to the DOH within 90 days of sampling. Each report will include electronic files (e.g., laboratory data reports).

NOT APPROVED

9. REFERENCES

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NOT APPROVED

FIGURES

NOT APPROVED

NOT APPROVED

Site Location

Kehaha Sanitary Landfill
Kauai, Hawaii

Geosyntec consultants

WG2790	March 2020

Figure 1-1

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Legend

- Groundwater Monitoring Well
- Wet Well (Leachate Sump)
- Proposed Groundwater Monitoring Well
- Sump Location
- Phase Boundary
- Cell Boundary
- Property Boundary
- Roads
- Range of General Groundwater Flow Direction

N

0 350 Feet

Monitoring Well Network

Kehaha Landfill
Kauai, Hawaii

Geosyntec consultants

WG2790 | March 2020

Figure 1-2

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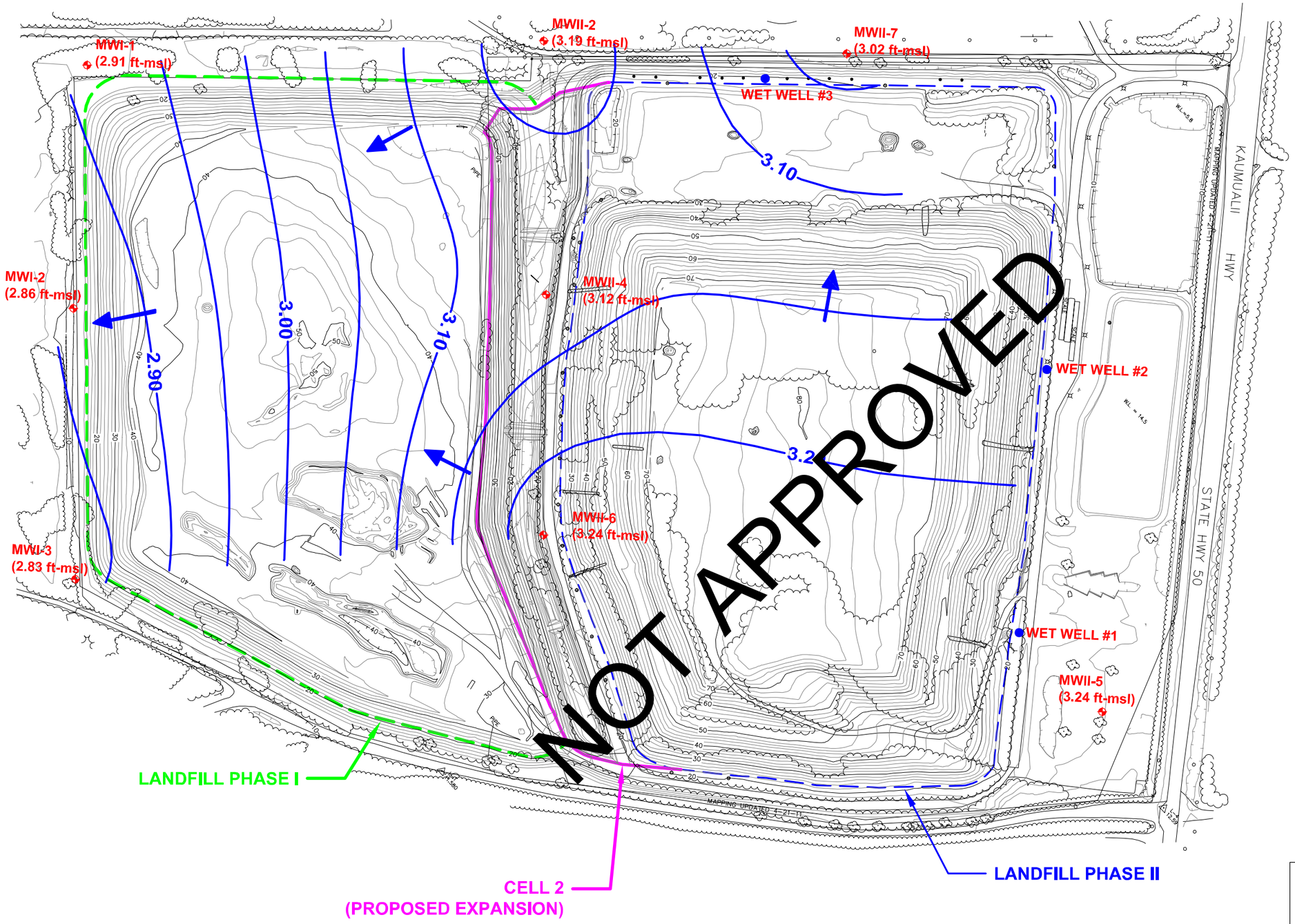
APPENDIX A
KLF Historical Groundwater Table Contour Maps



LEGEND

MWII-4 ELEV. ft-msl — PHASE II GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION

3.00 — GROUNDWATER POTENTIOMETRIC SURFACE

TRUE NORTH
SCALE: 1 INCH = 240 FEET

0 120 240 480
SCALE: 1" = 240'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(June 5, 2012)
Kauai, Hawaii

AECOM

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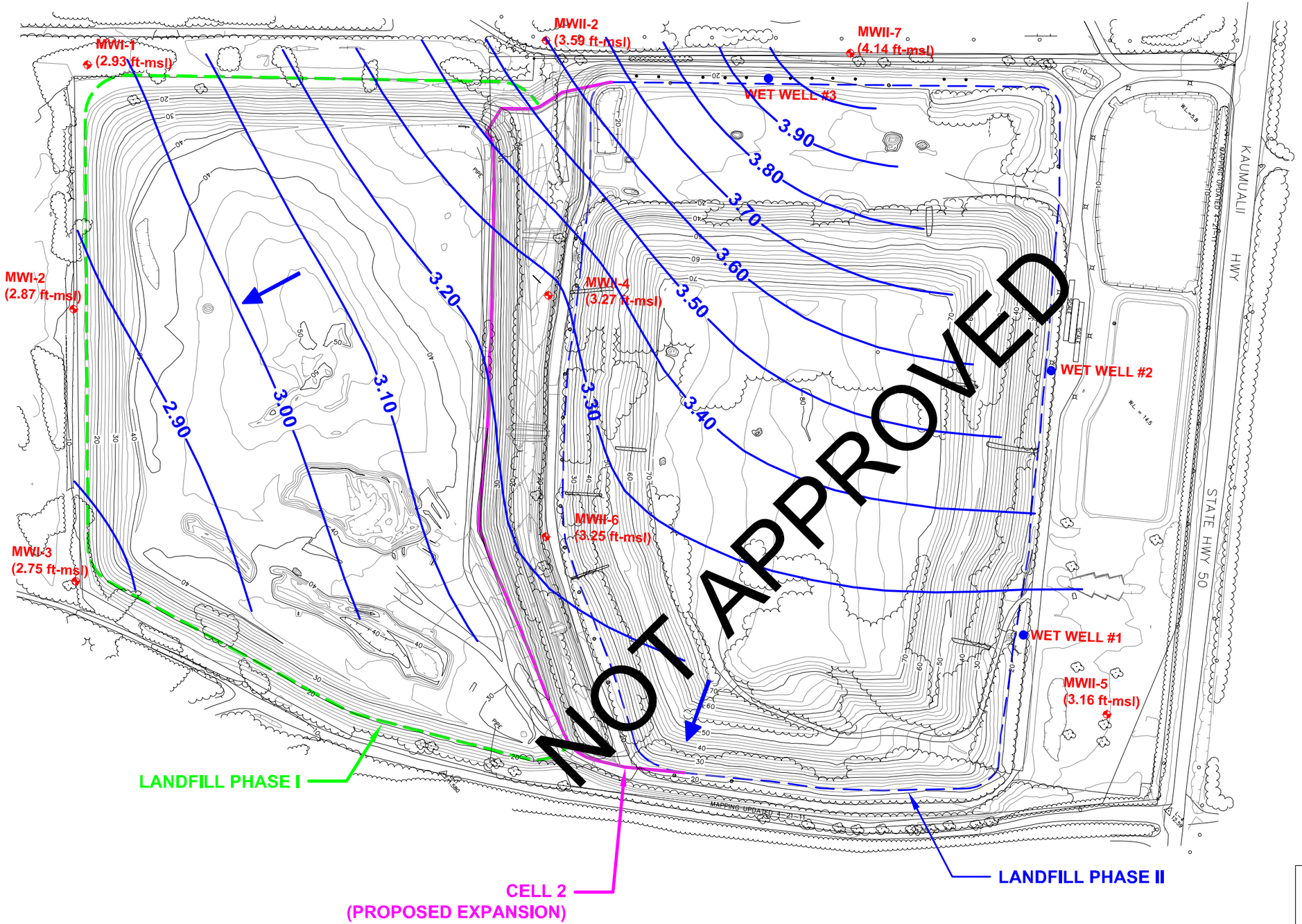

LEGEND

MWII-4 ELEV. ft-msl — PHASE II GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION

3.90 — GROUNDWATER POTENTIOMETRIC SURFACE

TRUE NORTH
SCALE: 1 INCH = 240 FEET

0 120 240 480
SCALE: 1" = 240'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(August 27, 2012)
Kauai, Hawaii

AECOM

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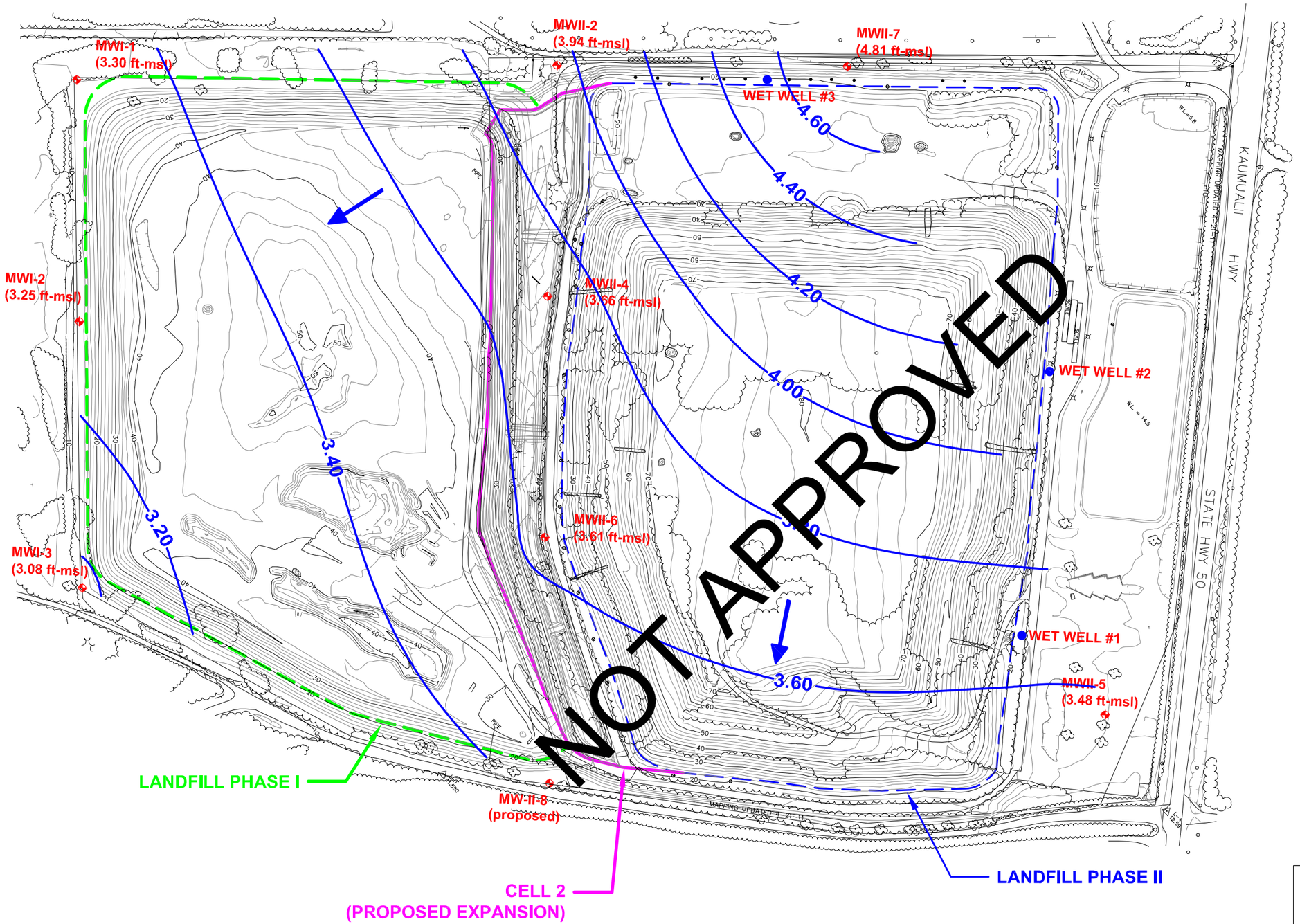

LEGEND

MWII-4 ELEV. ft-msl — PHASE II GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION

3.80 — GROUNDWATER POTENTIOMETRIC SURFACE

TRUE NORTH
SCALE: 1 INCH = 240 FEET

0 120 240 480
SCALE: 1" = 240'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(November 13, 2012)
Kauai, Hawaii

AECOM

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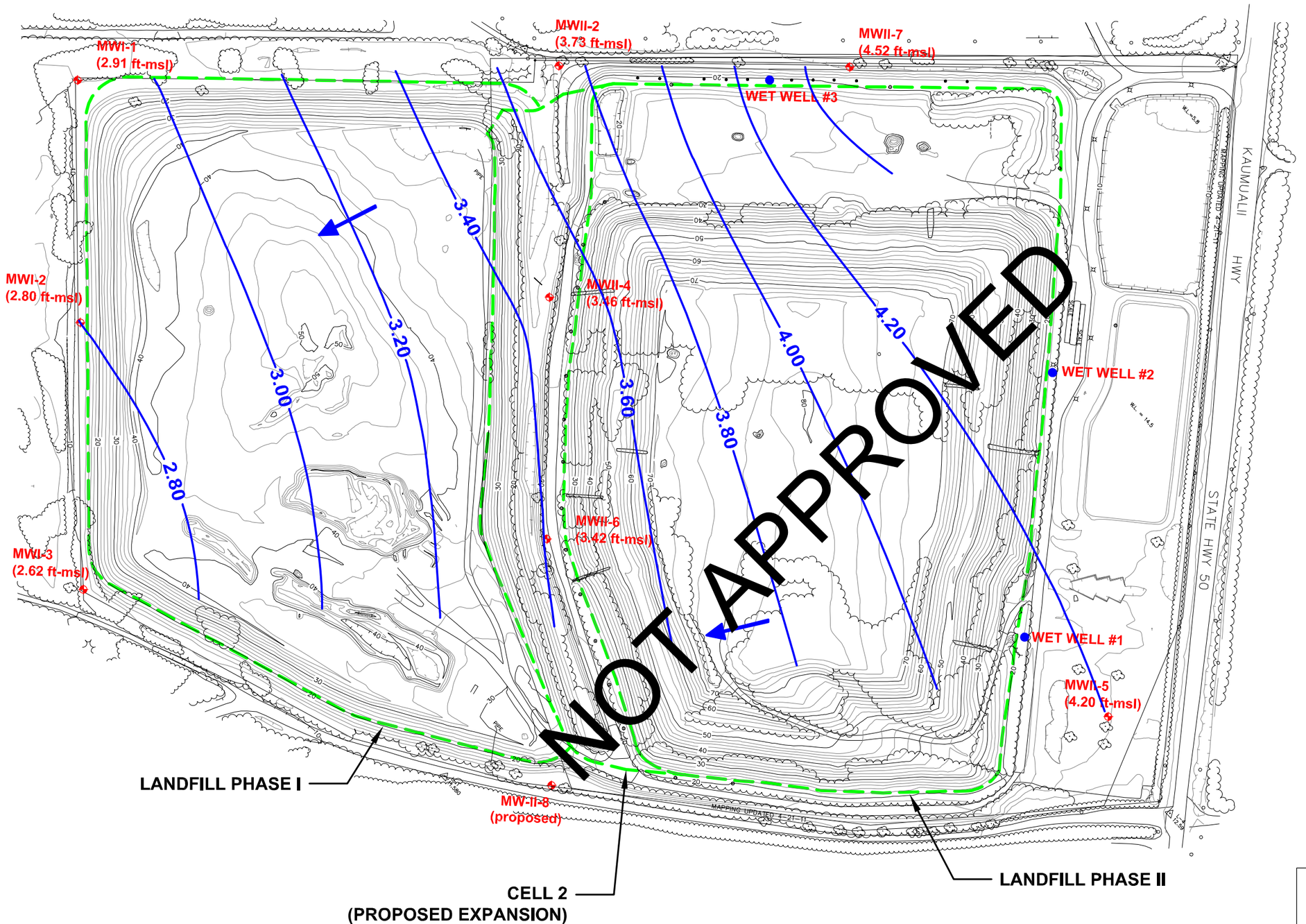

LEGEND

MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.80	GROUNDWATER POTENTIOMETRIC SURFACE

TRUE NORTH
SCALE: 1 INCH = 240 FEET

0 120 240 480

SCALE: 1" = 240'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(February 24, 2013)
Kauai, Hawaii

AECOM

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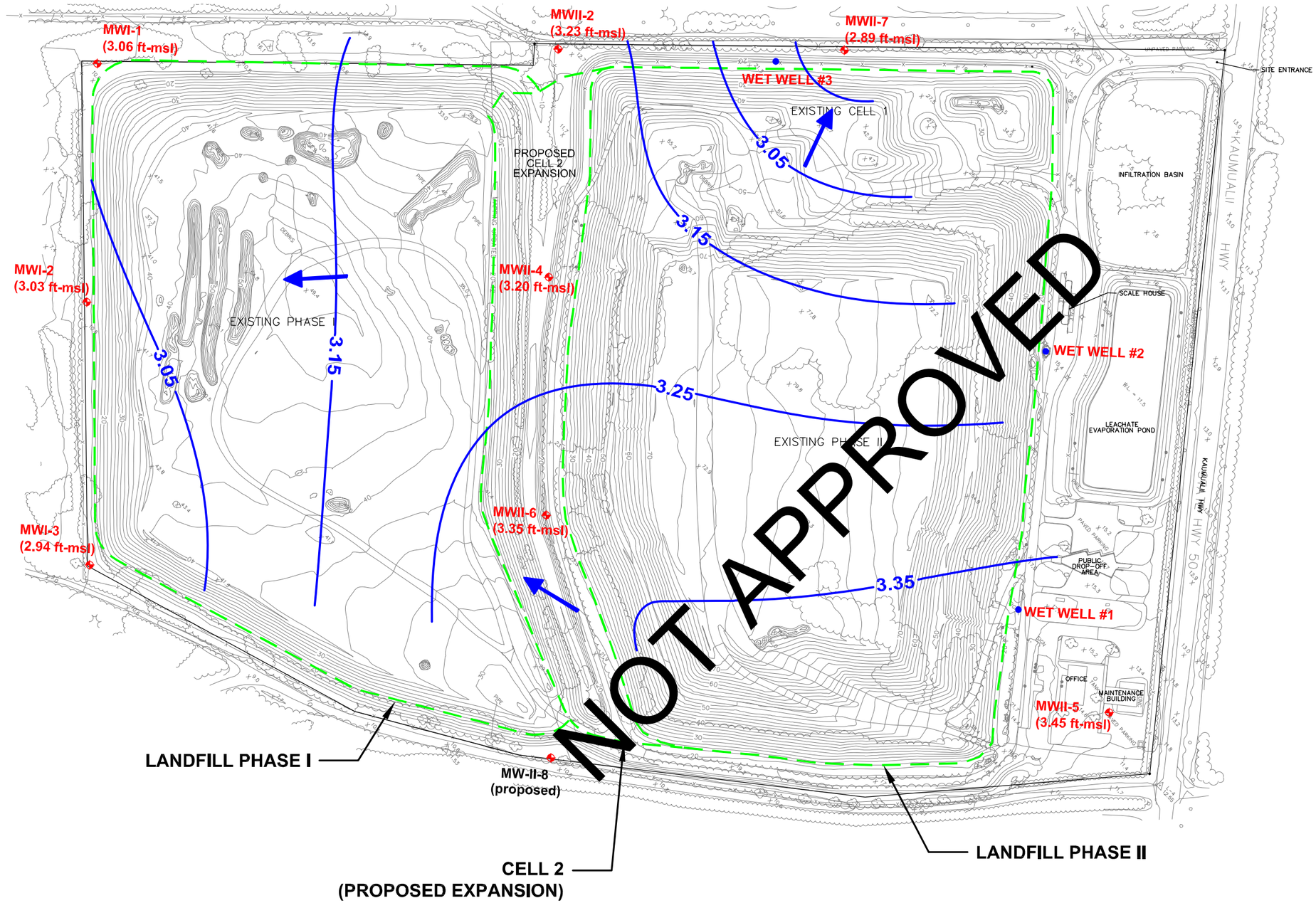

LEGEND

MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.05	GROUNDWATER POTENTIOMETRIC SURFACE
●	LEACHATE WET WELL

TRUE NORTH

0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(June 4, 2013)
Kauai, Hawaii

AECOM

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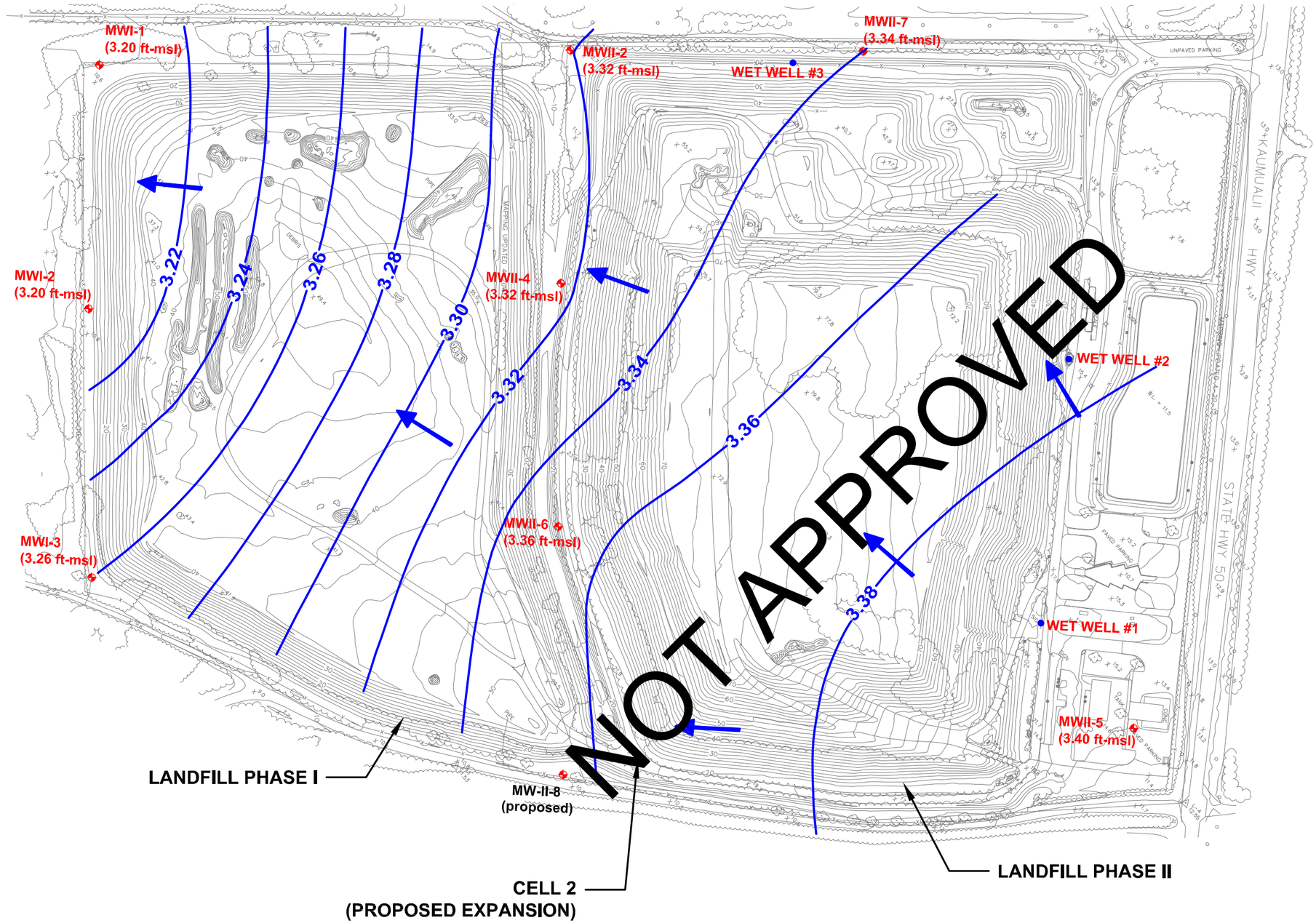

LEGEND	
MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.34	GROUNDWATER POTENTIOMETRIC SURFACE
●	LEACHATE WET WELL

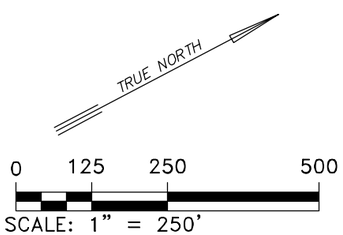

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(August 26, 2013)
Kauai, Hawaii

AECOM

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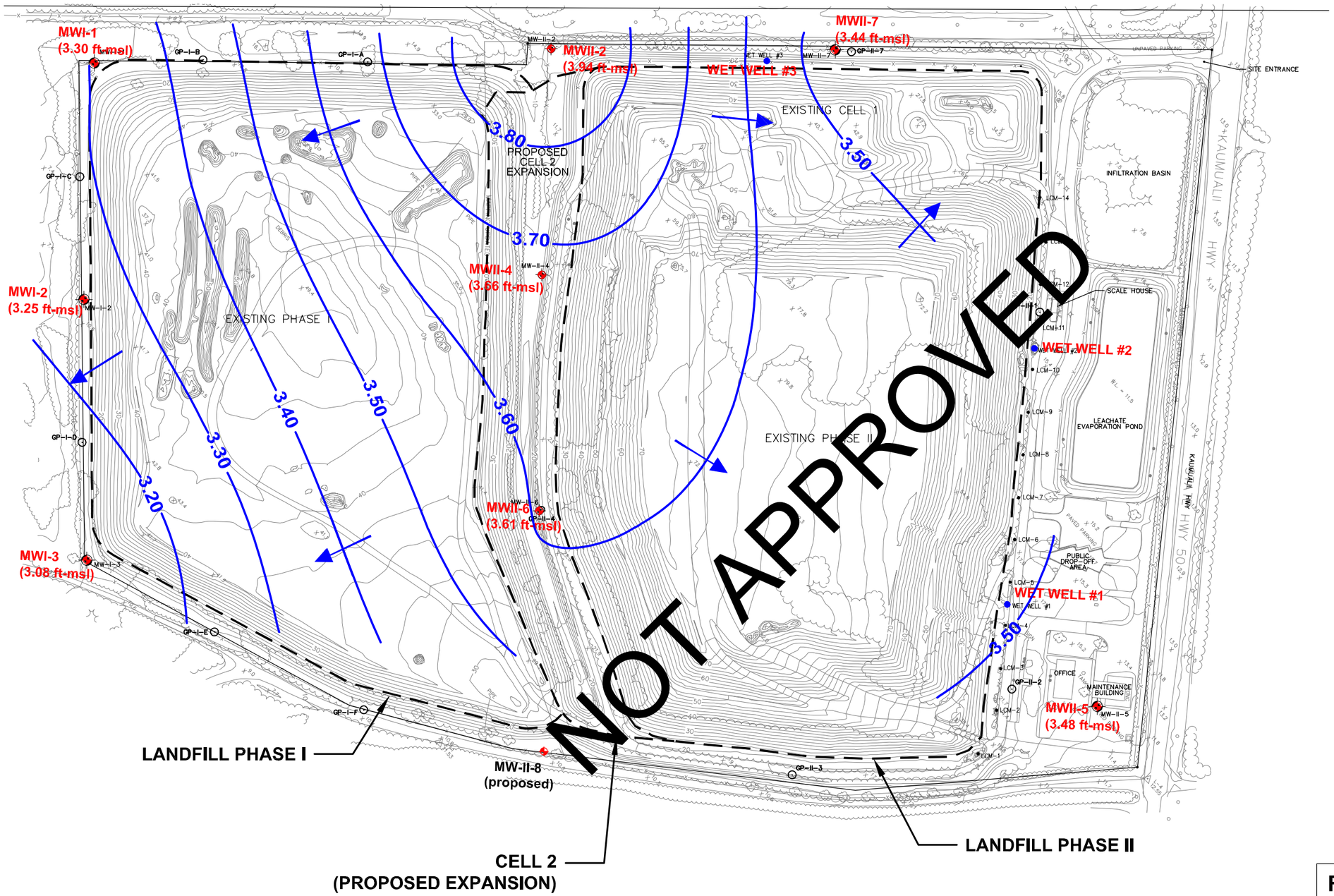

LEGEND

MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.94	GROUNDWATER POTENTIOMETRIC SURFACE
●	LEACHATE WET WELL

TRUE NORTH

0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring
Site Layout Map
Kekaha Landfill Phase II
(February 24, 2014)
Kauai, Hawaii

AECOM

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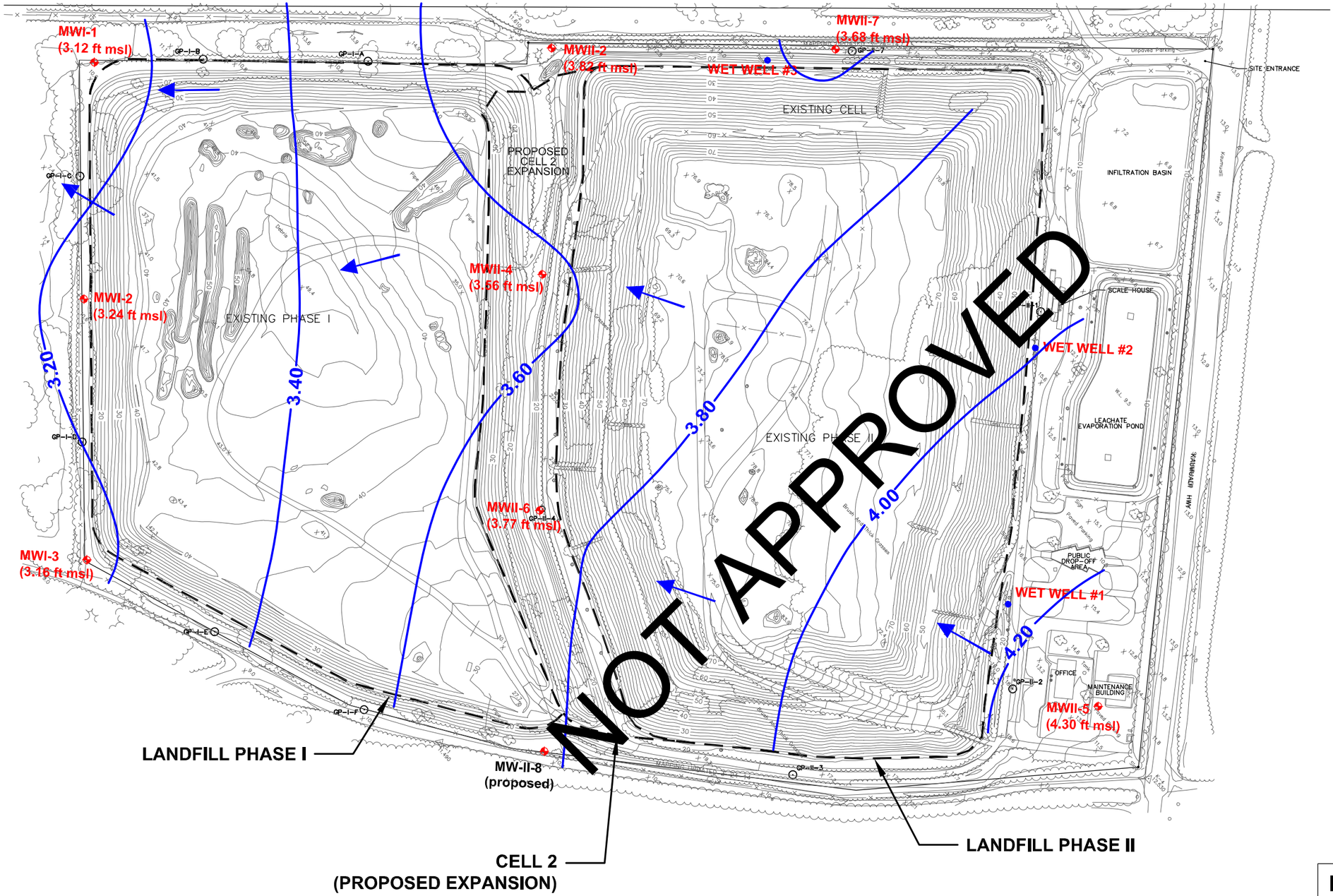

LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.60	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A MARCH 2014 AERIAL SURVEY.

TRUE NORTH

0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring
Site Layout Map
Kekaha Landfill Phase II
(May 27, 2014)
Kauai, Hawaii

AECOM

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MWI-1
(3.13 ft msl)

MWI-2
(3.13 ft msl)

MWI-3
(3.15 ft msl)

MWII-2
(3.49 ft msl)

MWII-4
(3.53 ft msl)

MWII-6
(3.58 ft msl)

MWII-7
(3.51 ft msl)

MWII-5
(4.38 ft msl)

WET WELL #3

WET WELL #2

WET WELL #1

MW-II-8
(proposed)

3.20

3.40

3.60

3.80

4.00

4.20

EXISTING PHASE I

EXISTING CELL I

EXISTING PHASE II

PROPOSED
CELL 2
EXPANSION

INFILTRATION BASIN

LEACHATE
EVAPORATION POND

SCALE HOUSE

SITE ENTRANCE

PUBLIC
DROP-OFF
AREA

OFFICE

MAINTENANCE
BUILDING

Kaumualii Hwy

LANDFILL PHASE I

CELL 2
(PROPOSED EXPANSION)

LANDFILL PHASE II

NOT APPROVED

LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.60	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A MARCH 2014 AERIAL SURVEY.

TRUE NORTH

0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring
Site Layout Map
Kekaha Landfill Phase II
(August 26, 2014)
Kauai, Hawaii

AECOM

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MWI-1
(4.84 ft msl)

MWI-2
(3.71 ft msl)

MWI-3
(3.59 ft msl)

MWII-2
(4.21 ft msl)

MWII-4
(3.98 ft msl)

MWII-6
(3.91 ft msl)

MWII-7
(5.95 ft msl)

MWII-5
(4.07 ft msl)

MW-II-8
(proposed)

WET WELL #3

WET WELL #2

WET WELL #1

EXISTING PHASE I

EXISTING PHASE II

EXISTING CELL 1

PROPOSED
CELL 2
EXPANSION

INFILTRATION BASIN

SCALE HOUSE

LEACHATE
EVAPORATION POND

PUBLIC
DROP-OFF
AREA

OFFICE

MAINTENANCE
BUILDING

SITE ENTRANCE

Unpaved Parking

Paved Parking

Kaumualii Hwy

KAUMUALII HWY

3.80
4.00
4.20
4.40
4.60
4.80
5.00
5.20
5.40
5.60

LANDFILL PHASE I

LANDFILL PHASE II

CELL 2
(PROPOSED EXPANSION)

NOT APPROVED

LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
4.60	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A MARCH 2014 AERIAL SURVEY.

TRUE NORTH

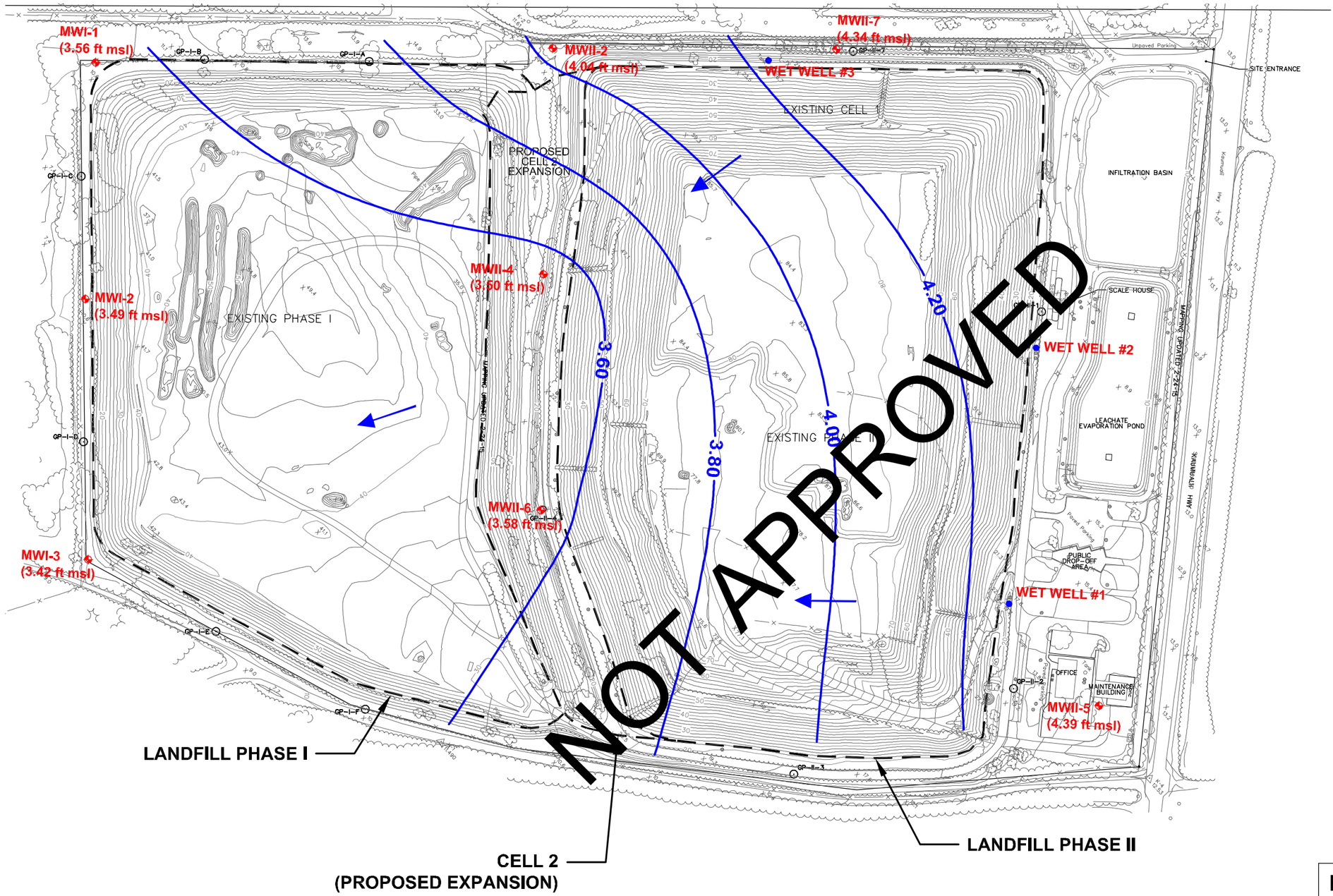
0 125 250 500

SCALE: 1" = 250'

AECOM

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(November 10, 2014)
Kauai, Hawaii

P:\DNV\Non-Federal\WMH\60315847 WMH-KLF Env Services 2014\Task 2 Groundwater\Feb Qtr\Report\01_Working Final\Figures\Figures\Fig2_GWM_Site Layout Map_10Nov2014.dwg 12/18/14 4:44 PM nsmcol



LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
4.20	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.

TRUE NORTH

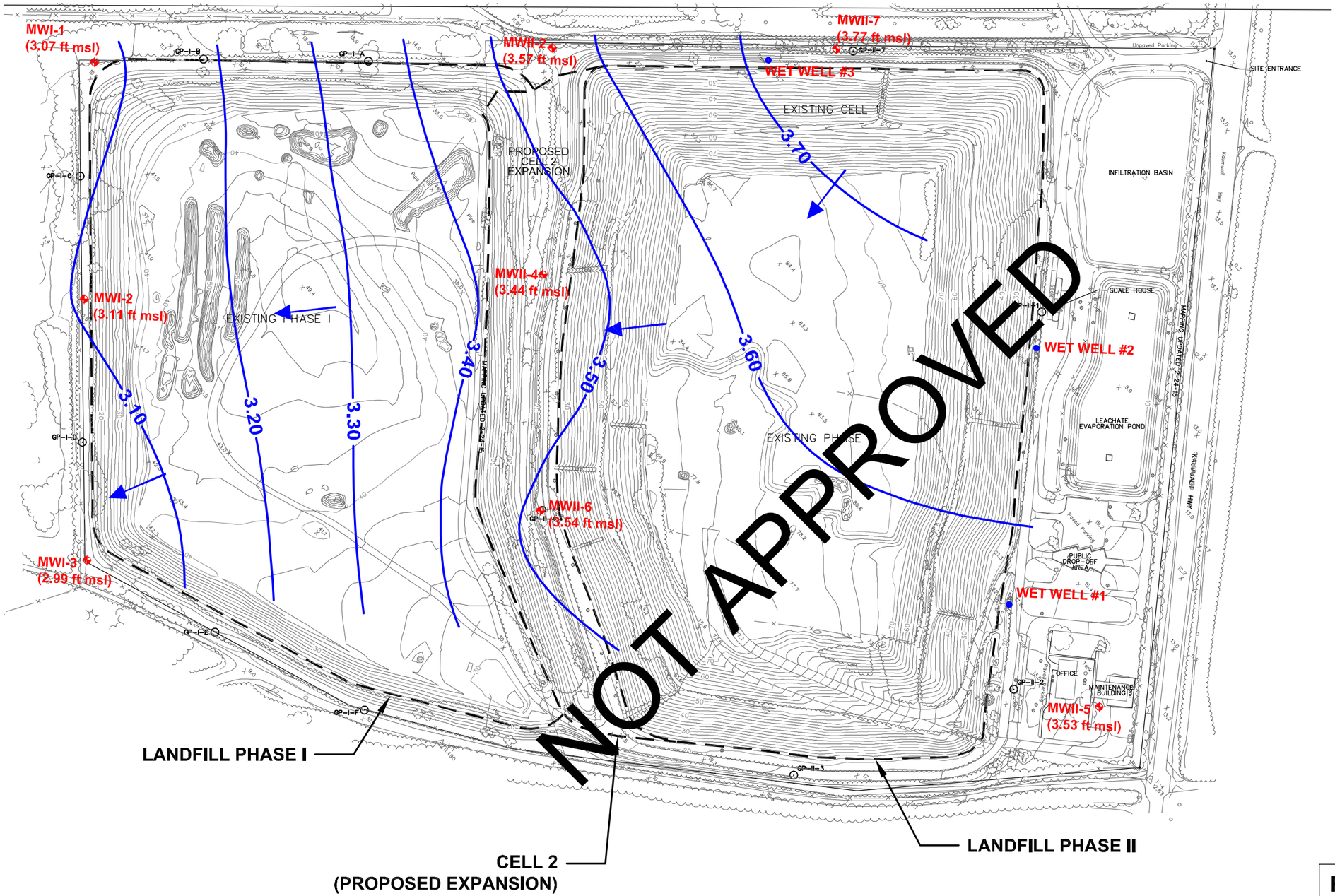
0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(February 23, 2015)
Kauai, Hawaii

AECOM

P:\KHV\Von--Federal\WMH\60338514 WMI--KLF Env. Services 2015\Task 2 Groundwater\1st Quarter Event\Report\Figures\Fig2_DRW_SiteLayoutMap_23Feb2015.dwg 03/09/15 5:03 PM namod



LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.10	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.

TRUE NORTH

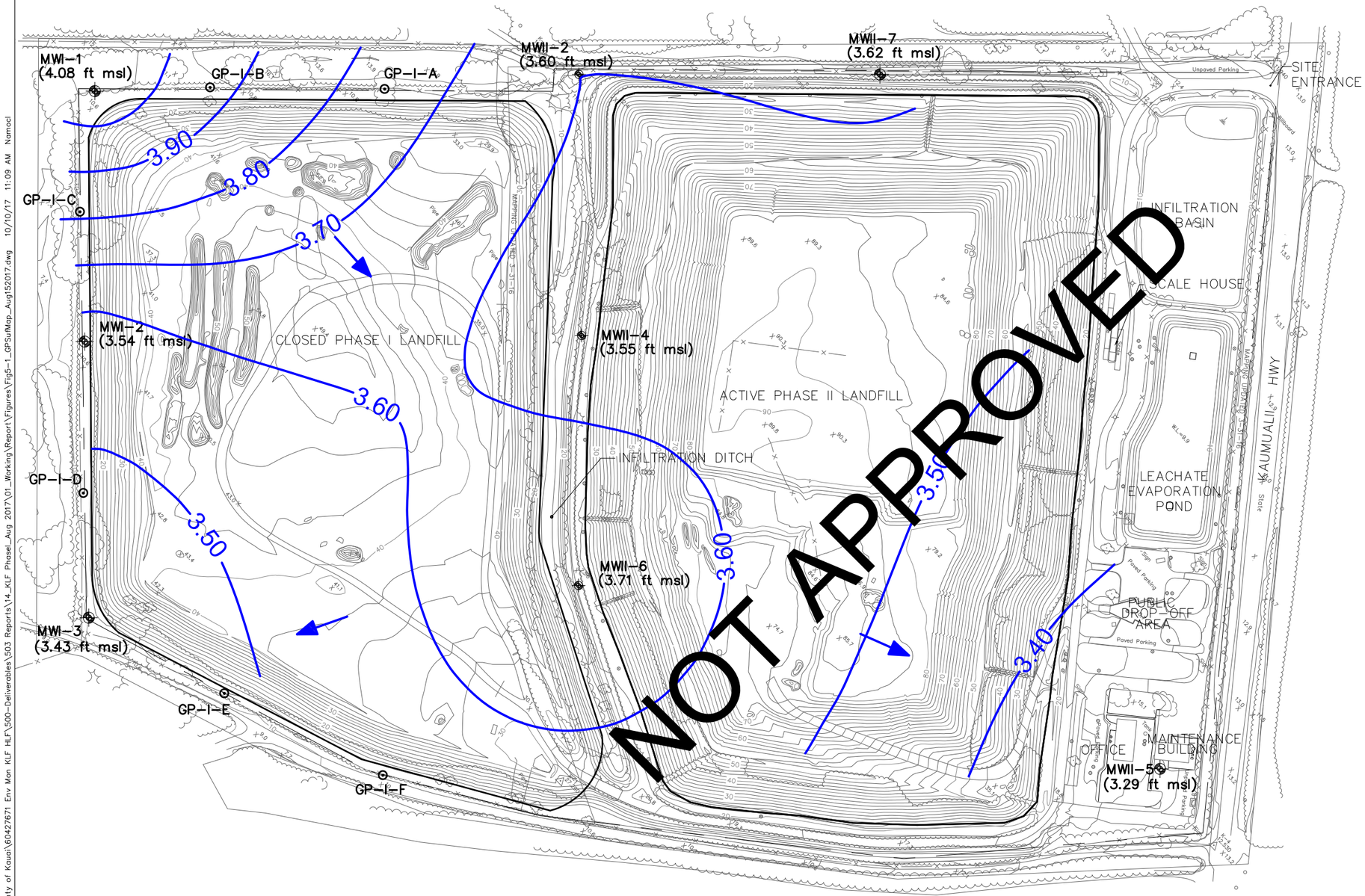
0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring
Site Layout Map
Kekaha Landfill Phase II
(May 31, 2015)
Kauai, Hawaii

AECOM

P:\ZDV\Von-Federal\WMH\60338514 WM-KLF Env Services 2015\Task 2 Groundwater\2nd Quarter Event\Report\01 Working\Figures\Fig2_GWAL_SiteMap_31May2015.dwg 07/20/15 2:02 PM nomood



Legend

- EXISTING TOPOGRAPHY (680)
- GROUNDWATER CONTOUR (FT MSL) (3.50)
- PROPERTY LINE
- EXISTING LIMITS OF WASTE
- GROUNDWATER FLOW DIRECTION
- MWI-3 (3.43 ft msl) — GROUNDWATER MONITORING WELL AND GROUNDWATER DEPTH
- GPI-E — GAS MONITORING PROBE

Notes

1. EXISTING GRADE IS BASED ON TOPOGRAPHIC MAP PREPARED BY AEROMETRIC, INC., SEATTLE, WASHINGTON. DATE OF FLIGHT: MARCH 31, 2016.
2. HORIZONTAL DATUM IS BASED ON NAD83 (1986), HAWAII ZONE 4. VERTICAL DATUM BASED ON LOCAL TIDAL.
3. WELLS MWI-1, MWI-2 AND MWI-3 ARE POINT OF COMPLIANCE WELLS FOR PHASE I.

TRUE NORTH
SCALE: 1 INCH = 250 FEET

0 125 250 500

SCALE: 1" = 250'

Figure 5-1
Groundwater Potentiometric Surface Map
August 15, 2017
County of Kauai
Kekaha Sanitary Landfill Phase I

S:\Projects_Legacy\ENV\Non-Federal\County of Kauai\60427671 Env Mon KLF HLF\500-Deliverables\503 Reports\14_KLF Phase1_Aug 2017\01_Working\Report\Figures\Fig5-1_GPSurfMap_Aug152017.dwg 10/10/17 11:09 AM Namocl

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Legend

680	EXISTING TOPOGRAPHY
3.50	GROUNDWATER CONTOUR (FT MSL)
	PROPERTY LINE
	EXISTING LIMITS OF WASTE
	GROUNDWATER FLOW DIRECTION
MWI-3 (3.14 ft msl)	GROUNDWATER MONITORING WELL AND GROUNDWATER DEPTH
GPI-E	GAS MONITORING PROBE

Notes

1. EXISTING GRADE IS BASED ON TOPOGRAPHIC MAP PREPARED BY AEROMETRIC, INC., SEATTLE, WASHINGTON.
   DATE OF FLIGHT: MARCH 31, 2016.
2. HORIZONTAL DATUM IS BASED ON NAD83 (1986), HAWAII ZONE 4.
   VERTICAL DATUM BASED ON LOCAL TIDAL.
3. WELLS MWI-1, MWI-2 AND MWI-3 ARE POINT OF COMPLIANCE WELLS FOR PHASE I.

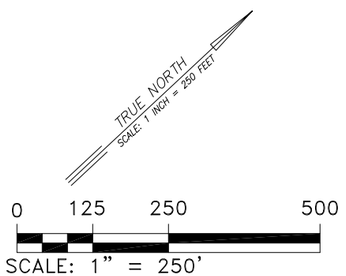

Figure 5-1
Groundwater Potentiometric Surface Map
November 14, 2017
County of Kauai
Kekaha Sanitary Landfill Phase I

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Legend

680	EXISTING TOPOGRAPHY
3.30	GROUNDWATER CONTOUR (FT MSL)
	PROPERTY LINE
	EXISTING LIMITS OF WASTE
	GROUNDWATER FLOW DIRECTION
MWI-3 (3.20 ft msl)	GROUNDWATER MONITORING WELL AND GROUNDWATER DEPTH
GPI-E	GAS MONITORING PROBE

Notes

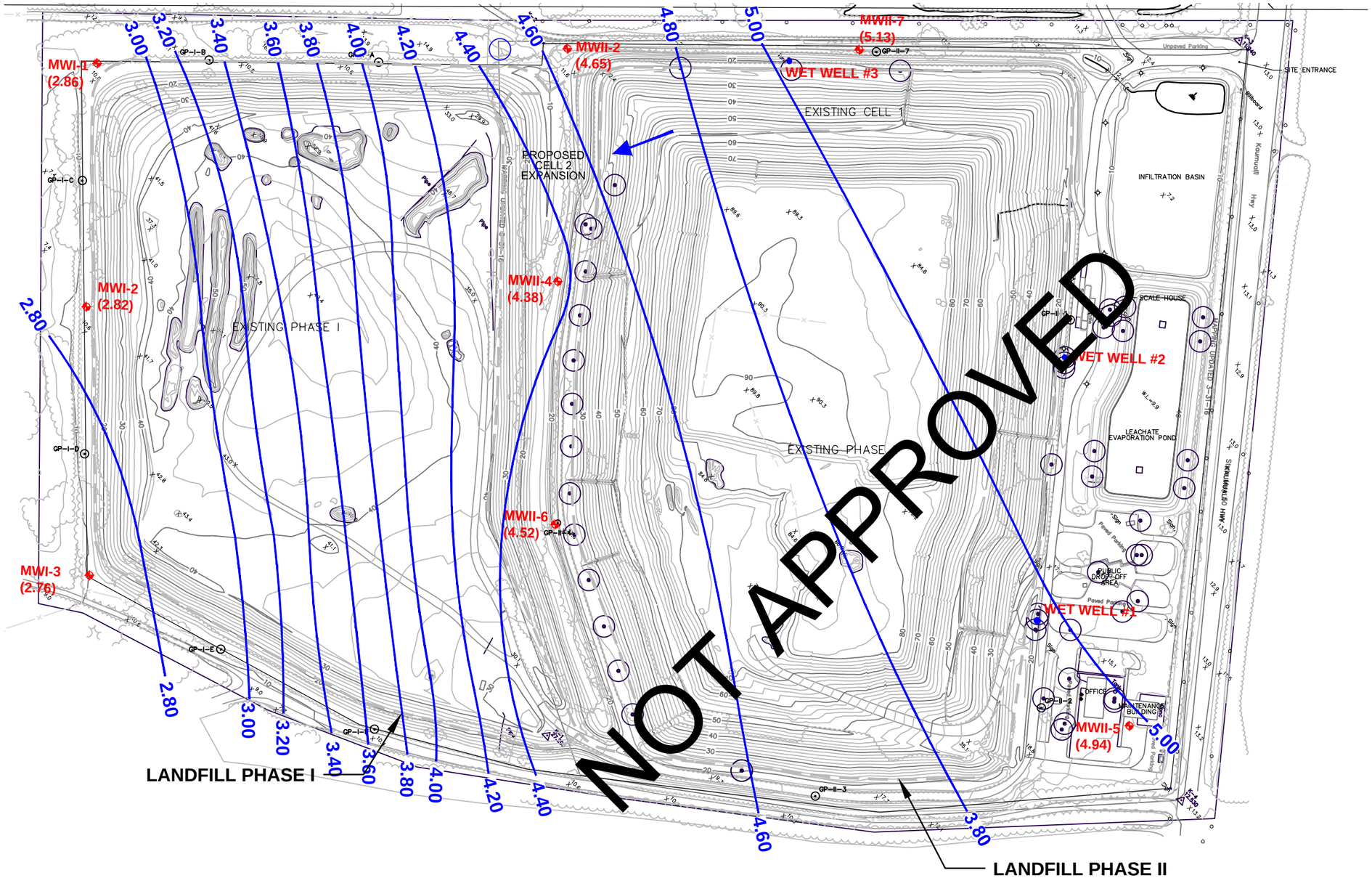
1. EXISTING GRADE IS BASED ON TOPOGRAPHIC MAP PREPARED BY AIRFRAME MAY 20, 2017.
2. BASIS FOR HORIZONTAL AND VERTICAL CONTROL. HORIZONTAL DATUM IS BASED ON NAD83 (1986), HAWAII ZONE 4. VERTICAL DATUM BASED ON LOCAL TIDAL.
3. WELLS MWI-1, MWI-2 AND MWI-3 ARE POINT OF COMPLIANCE WELLS FOR PHASE I.
4. GROUNDWATER ELEVATION FROM MWII-7 COULD NOT BE MEASURED.

TRUE NORTH
SCALE: 1 INCH = 250 FEET

0 125 250 500

SCALE: 1" = 250'

Figure 5-1
Groundwater Potentiometric Surface Map
February 13, 2018
County of Kauai
Kekaha Sanitary Landfill Phase I



0 250'

GRAPHIC SCALE

LEGEND

- MWII-4 (4.38) — GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
- 3.30 — GROUNDWATER SURFACE CONTOURS
- GROUNDWATER FLOW DIRECTION
- LEACHATE WET WELL

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY WMH ON MARCH 2016.
2. GROUNDWATER ELEVATIONS ARE LISTED AS FEET ABOVE MEAN SEA LEVEL.

REV. NO.	DATE	DESCRIPTION

APTIM

WASTE MANAGEMENT OF HAWAII
KEKAHA LANDFILL PHASE II

FIGURE 2
GROUNDWATER CONTOUR MAP
2Q2018

DRAWN BY:	TRS	APPROVED BY:	CT	PROJ. NO.:	631213741	DATE:	JUNE 2018

Files: C:\Users\Terrance.Schaeffer\Documents\Kekaha\Fig2_GWM_SiteLayoutMap_2Q18.dwg User: terrance.schaeffer Jun 25, 2018 - 10:50am
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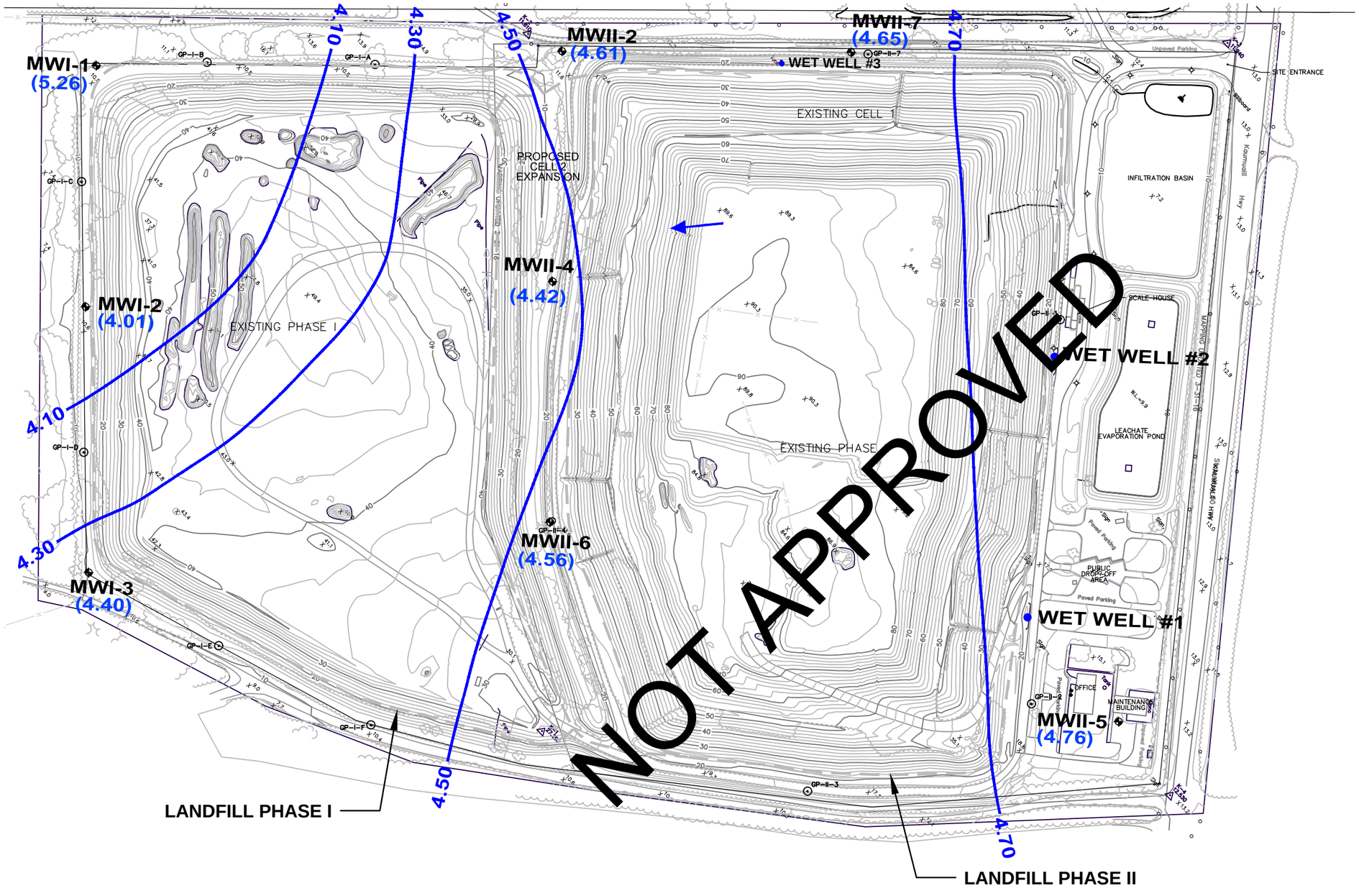

LEGEND

- MWII-4 (4.42) — GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
- 4.50 — GROUNDWATER SURFACE CONTOURS
- GROUNDWATER FLOW DIRECTION
- LEACHATE WET WELL

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY WMH ON MARCH 2016.
2. GROUNDWATER ELEVATIONS ARE LISTED AS FEET ABOVE MEAN SEA LEVEL.
3. MEASURED GROUNDWATER ELEVATION AT WELL MWI-1 WAS NOT USED FOR CONTOURING PURPOSES.

REV. NO.	DATE	DESCRIPTION

APTIM

WASTE MANAGEMENT OF HAWAII
KEKAHA LANDFILL PHASE II

FIGURE 2
GROUNDWATER CONTOUR MAP
4Q2018

DRAWN BY:	TRS	APPROVED BY:	CT	PROJ. NO.:	631213741	DATE:	JANUARY 2019

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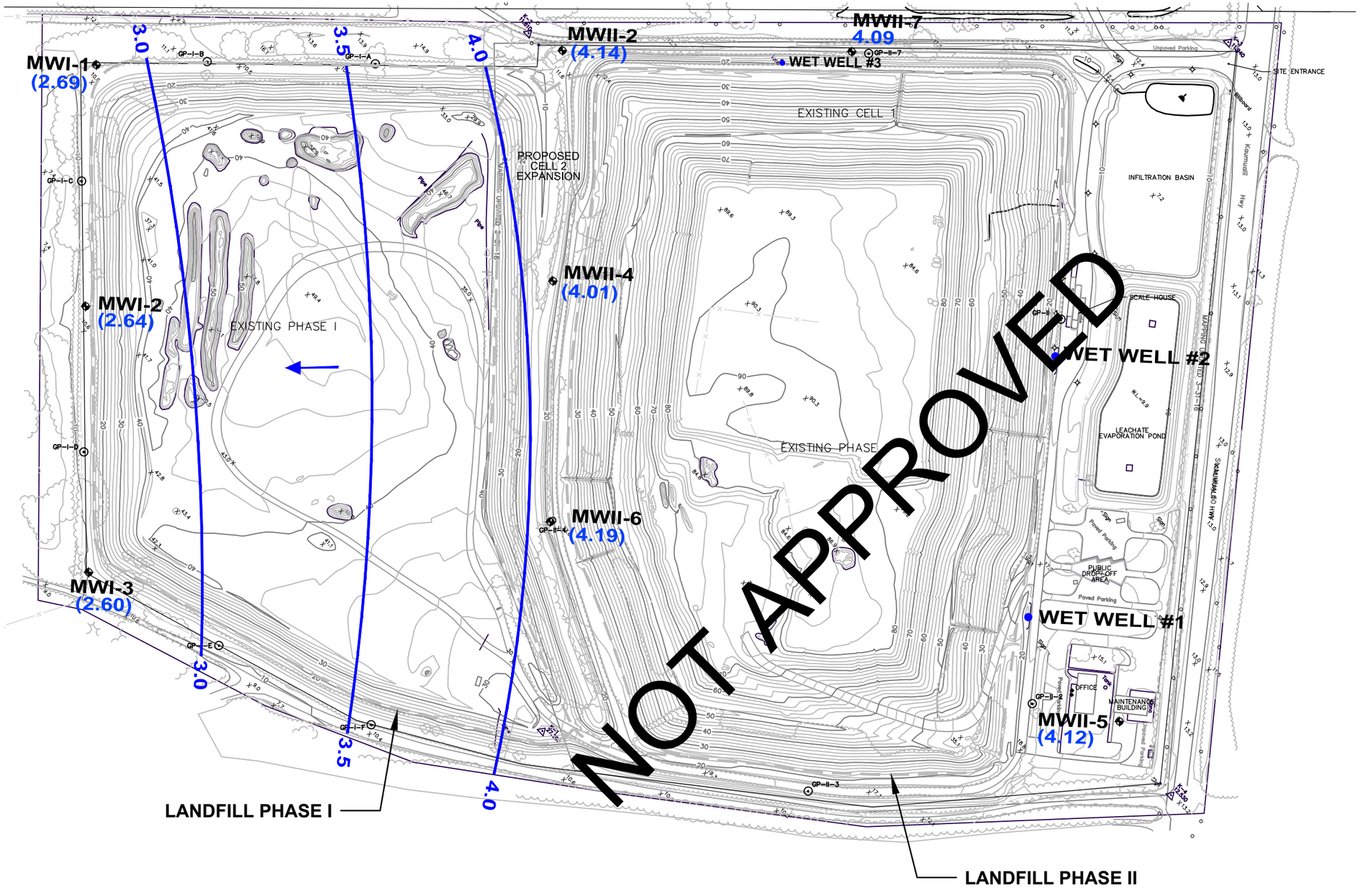

N

0 250'

GRAPHIC SCALE

LEGEND

MWII-4 (4.42)	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
4.50	GROUNDWATER SURFACE CONTOURS
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY WMH ON MARCH 2016.
2. GROUNDWATER ELEVATIONS ARE LISTED AS FEET ABOVE MEAN SEA LEVEL.

REV. NO.	DATE	DESCRIPTION

APTIM

WASTE MANAGEMENT OF HAWAII
KEKAHA LANDFILL PHASE II

FIGURE 2
GROUNDWATER CONTOUR MAP
1Q2019

DRAWN BY:	TRS	APPROVED BY:	CT	PROJ. NO.:	631213741	DATE:	MAY 2019

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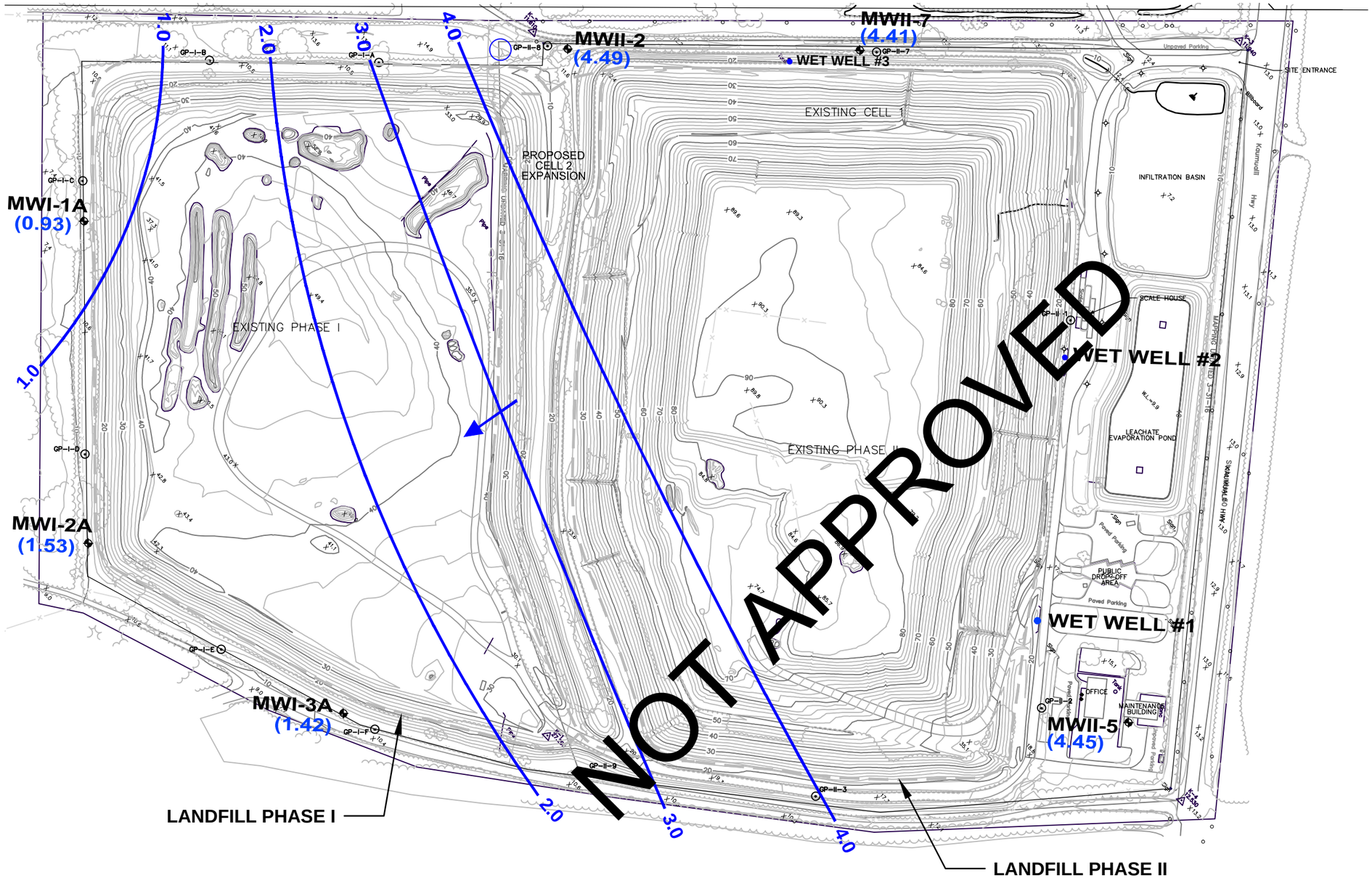

0 250'

GRAPHIC SCALE

LEGEND

- MWII-5 (4.45) — GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
- 4.0 — GROUNDWATER SURFACE CONTOURS
- GROUNDWATER FLOW DIRECTION
- LEACHATE WET WELL

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY WMH ON MARCH 2016.
2. GROUNDWATER ELEVATIONS ARE LISTED AS FEET ABOVE MEAN SEA LEVEL.

REV. NO.	DATE	DESCRIPTION

APTIM

WASTE MANAGEMENT OF HAWAII
KEKAHA LANDFILL

FIGURE 2
GROUNDWATER CONTOUR MAP
3Q2019

DRAWN BY:	TRS	APPROVED BY:	CT	PROJ. NO.:	631213741	DATE:	AUGUST 2019

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XREF Files: 01Exist_Site
HIO1115_2_11_15
HIO1116_3_31_16 IMAGE Files:

APPENDIX B
KLF Well Installation Logs

NOT APPROVED

Top of Casing 12.98 ft (MSL)

LOCKED PROTECTIVE CASING EXTENDS 2' ABOVE GRADE

CONCRETE

BENTONITE SEAL

2-INCH DIA. SCH. 40 PVC SOLID CASING

2-INCH DIA. SCH. 40 PVC SLOTTED CASING (0.02-inch slots)

MONTEREY SILICA SAND

8-INCH DIA. BORING

END CAP

COLLAPSED

Equipment Mobile B-34

Elevation ~11 feet *Date* 05/26/95

Depth (ft)	Sample	
0		LIGHT BROWN SAND (SP), loose, dry, coralline, with shell fragments.
		Becomes medium dense.
5		Becomes moist.
		Small pieces of coralline sandstone.
		Water level at 8.6 feet, 15:21, 6/2/95.
10		Color change to light gray, wet, with abundant shell fragments.
		Color change to very light gray.
15		
20		
		End of boring at 24 feet.
25		

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-I-1 *(Sheet 1 of 1)*
Kekaha Landfill Phase I
Kekaha, Kauai, Hawaii

FIGURE 2

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
kar	22924.804		KLFWI	6/95	

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWI-1

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

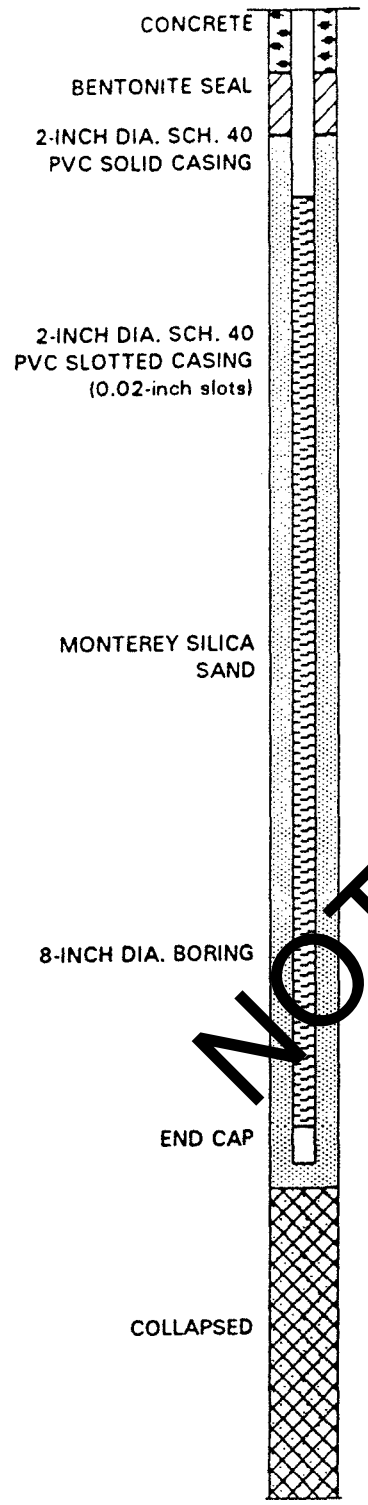
Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting: Coordinates are in	Phone Number: 241-4839 Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person: Mailing Address: P.O. BOX 621 HONOLULU, HI 96809 Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: 5/26/95	Casing Material: SCH 40 PVC Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 7.5'
Total Depth: 17.5'	Screen Material: SCH 40 PVC Slot Size: 020
Depth to Water: 7.72'	Screen Length: 10' Screen Depth: 7.5-17.5'
Was well set in an aquifer that is current or potential drinking water source? NO Boring Log/Well Construction diagram attached? YES	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT Depth: (See well diagram)
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767 Fax Number: 682-1768	Phone Number: 868-6536 Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/14/19	Sealing Material: CEMENT BENTONITE Depth: 20'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 3 BAGS Mixing Ratio: 5%
Casing/Screen Removed: YES If Yes, was annular material removed? YES If No, was casing cut off below surface?	Method of Sealing Material Placement: TREMMIE
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

Top of Casing **11.67 ft (MSL)**

Equipment **Mobile B-34**

Elevation **~9.5 feet** *Date* **05/24/95**



Depth (ft)	Sample	
0		LIGHT BROWN SAND (SP-SM), loose, dry, coralline, with shell fragments.
		LIGHT BROWN SAND (SP), medium dense, moist, coralline, with shell fragments and pieces of coralline sandstone.
5		
		Water level at 7.2 feet, 16:07, 6/2/95. Color change to brown.
		Color change to grayish brown with some refuse. Becomes moist to wet.
10		
		Color change to light gray with abundant shell fragments.
15		
20		
		End of boring at 24 feet.
25		

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-I-2 *(Sheet 1 of 1)*
Kekaha Landfill Phase I
Kekaha, Kauai, Hawaii

FIGURE **3**

DRAWN	*JOB NUMBER*	*APPROVED*	*FILE*	*DATE*	*REVISED DATE*
kar	22924.804		KLFWI	6/95	

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWI-2

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting: Coordinates are in	Phone Number: 241-4839 Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person: Mailing Address: P.O. BOX 621 HONOLULU, HI 96809 Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: 5/24/95	Casing Material: SCH 40 PVC Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 7.0'
Total Depth: 17.0'	Screen Material: SCH 40 PVC Slot Size: 020
Depth to Water: 8.26'	Screen Length: 10' Screen Depth: 7.0-17.0'
Was well set in an aquifer that is current or potential drinking water source? NO Boring Log/Well Construction diagram attached? YES	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT Depth: (See well diagram)
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767 Fax Number: 682-1768	Phone Number: 868-6536 Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/16/19	Sealing Material: CEMENT BENTONITE Depth: 20'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 3 BAGS Mixing Ratio: 5%
Casing/Screen Removed: YES If Yes, was annular material removed? YES If No, was casing cut off below surface?	Method of Sealing Material Placement: TREMMIE
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

Top of Casing **12.08 ft (MSL)**

LOCKED PROTECTIVE CASING EXTENDS 2' ABOVE GRADE

CONCRETE

BENTONITE SEAL

2-INCH DIA. SCH. 40 PVC SOLID CASING

2-INCH DIA. SCH. 40 PVC SLOTTED CASING (0.02-inch slots)

MONTEREY SILICA SAND

8-INCH DIA. BORING

END CAP

COLLAPSED

Equipment Mobile B-34

Elevation ~10 feet *Date* 05/25/95

Depth (ft)	Sample	
0		LIGHT BROWN SAND (SM-SP), loose, dry, coralline.
		BROWN SAND (SP), medium dense, moist, coralline, with shell fragments.
5		Color change to light brown, with abundant shell fragments.
		Water level at 7.6 feet, 16:46, 6/2/95. Color change to very light brown.
10		Becomes moist to wet.
		Color change to light gray.
15		
20		
		End of boring at 24 feet.
25		

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-I-3 *(Sheet 1 of 1)*
Kekaha Landfill Phase I
Kekaha, Kauai, Hawaii

FIGURE 4

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
kas	23924.004				

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWI-3

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA
	Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting:	Phone Number: 241-4839
Coordinates are in	Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person:
	Mailing Address: P.O. BOX 621 HONOLULU, HI 96809
	Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: 5/25/19	Casing Material: SCH 40 PVC Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 8.0'
Total Depth: 18.0'	Screen Material: SCH 40 PVC Slot Size: 020
Depth to Water: 8.18'	Screen Length: 10' Screen Depth: 8.0-18.0'
Was well set in an aquifer that is current or potential drinking water source? NO	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT Depth: (See well diagram)
Boring Log/Well Construction diagram attached? YES	
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767	Phone Number: 868-6536
Fax Number: 682-1768	Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/16/19	Sealing Material: CEMENT BENTONITE Depth: 20'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 3 BAGS Mixing Ratio: 5%
Casing/Screen Removed: YES	Method of Sealing Material Placement: TREMMIE
If Yes, was annular material removed? YES	
If No, was casing cut off below surface?	
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWII-6

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting: Coordinates are in	Phone Number: 241-4839 Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person: Mailing Address: P.O. BOX 621 HONOLULU, HI 96809 Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: UNKNOWN	Casing Material: SCH 40 PVC Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 15.0'
Total Depth: 35.0'	Screen Material: SCH 40 PVC Slot Size: 020
Depth to Water: 18.78'	Screen Length: 20' Screen Depth: 15.0-35.0'
Was well set in an aquifer that is current or potential drinking water source? NO Boring Log/Well Construction diagram attached? NO	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT Depth: (See well diagram)
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767 Fax Number: 682-1768	Phone Number: 868-6536 Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/9/19	Sealing Material: CEMENT BENTONITE Depth: 35.0'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 5 BAGS Mixing Ratio: 5%
Casing/Screen Removed: YES If Yes, was annular material removed? YES If No, was casing cut off below surface?	Method of Sealing Material Placement: TREMMIE
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

MWII-2

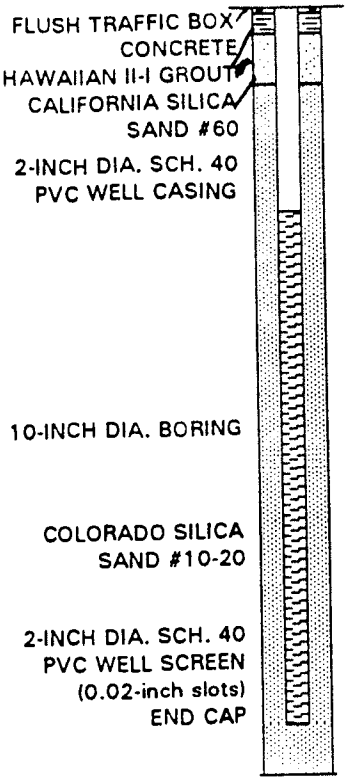
Harding Lawson Associates. 1993. Engineering Report, Kekaha Landfill Phase II, Kekaha, Kaua'i, Hawai'i. August.

Top of Casing **feet**

Equipment **Mobile B-61**

Elevation **feet** *Date* **01/22/93**

Laboratory Tests	*Moisture Content (%)*	*Blows/foot*	*Depth (ft)*	*Sample*
			0	
		22	5	
		38	10	
			15	
			20	
			25	
			30	



LIGHT BROWN CALCAREOUS SAND (SP), medium dense to dense, fine to medium, moist.

Becomes saturated.
Water level at 6.5 feet, 9:55, 1/22/93

Becomes white, light brown, medium to coarse.

End of boring at 15 feet.

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-II-2
Kekaha Phase II Design
Kekaha, Kauai, Hawaii

PLATE A-2

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
kar	22897.204	PBC	KEKII	2/93	

MWII-4

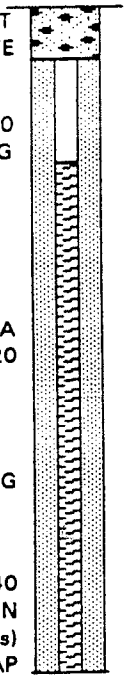
Harding Lawson Associates. 1993. Engineering Report, Kekaha Landfill Phase II, Kekaha, Kaua'i, Hawai'i. August.

Top of Casing **feet**

Equipment **Mobile B-61**

Elevation **feet** *Date* **01/22/93**

Laboratory Tests	*Moisture Content (%)*	*Blows/foot*	*Depth (ft)*	*Sample*
			0	
		36		
			5	
		50		
			10	
			15	
			20	
			25	
			30	



3' STICKUP MONUMENT CONCRETE

2-INCH DIA. SCH. 40 PVC WELL CASING

COLORADO SILICA SAND #10-20

10-INCH DIA. BORING

2-INCH DIA. SCH. 40 PVC WELL SCREEN (0.02-inch slots) END CAP

LIGHT BROWN CALCAREOUS SAND (SP), dense, fine to medium, moist.

Water level at 6.0 feet, 16:20, 1/22/93

End of boring at 13 feet.

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-II-4
Kekaha Phase II Design
Kekaha, Kauai, Hawaii

PLATE A-4

DRAWN	*JOB NUMBER*	*APPROVED*	*FILE*	*DATE*	*REVISED DATE*
kar	22897.204	PBC	KEKII	2/93	

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWII-4

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA
	Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting:	Phone Number: 241-4839
Coordinates are in	Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person:
	Mailing Address: P.O. BOX 621 HONOLULU, HI 96809
	Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: UNKNOWN	Casing Material: SCH 40 PVC
	Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 15.0'
Total Depth: 18.1'	Screen Material: SCH 40 PVC
	Slot Size: 020
Depth to Water: 17.10'	Screen Length: 10.0'
	Screen Depth: 8.1'-18.1'
Was well set in an aquifer that is current or potential drinking water source? NO	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT
	Depth: (See well diagram)
Boring Log/Well Construction diagram attached? NO	
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767	Phone Number: 868-6536
Fax Number: 682-1768	Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/14/19	Sealing Material: CEMENT BENTONITE
	Depth: 20'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 4 BAGS
	Mixing Ratio: 5%
Casing/Screen Removed: YES	Method of Sealing Material Placement: TREMMIE
If Yes, was annular material removed? YES	
If No, was casing cut off below surface?	
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

MWII-5

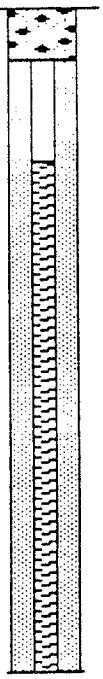
Harding Lawson Associates. 1993. Engineering Report, Kekaha Landfill Phase II, Kekaha, Kaua'i, Hawai'i. August.

Top of Casing **feet**

Equipment **Mobile B-61**

Elevation **feet** *Date* **01/23/93**

Laboratory Tests	*Moisture Content (%)*	*Blows/foot*	*Depth (ft)*	*Sample*
			0	
		47		
			5	
		30		
			10	
		25		
			15	
			20	
			25	
			30	



3' STICKUP MONUMENT CONCRETE

2-INCH DIA. SCH. 40 PVC WELL CASING

COLORADO SILICA SAND #10-20

10-INCH DIA. BORING

2-INCH DIA. SCH. 40 PVC WELL SCREEN (0.02-inch slots) END CAP

LIGHT BROWN CALCAREOUS SAND (SP), fine, moist.

Becomes saturated.

End of boring at 13 feet.

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-II-5
Kekaha Phase II Design
Kekaha, Kauai, Hawaii

PLATE A-5

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DA
kar	22897.204	PBC	KEKII	2/93	

MWII-7

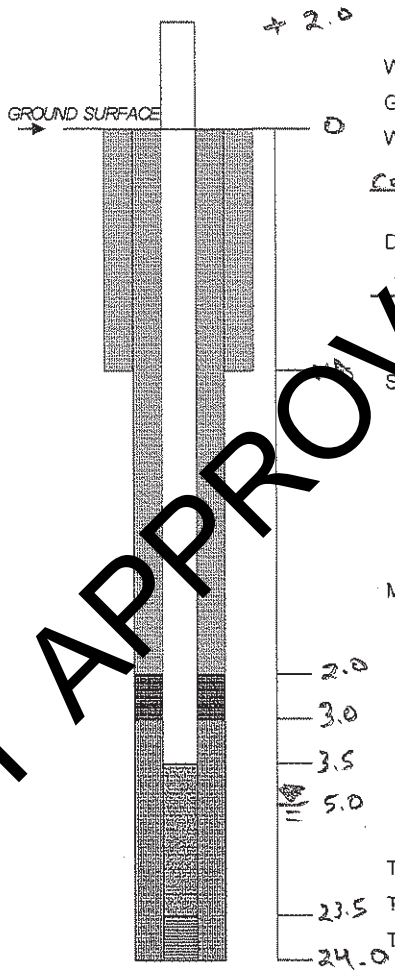
AMEC. 2008. Kekaha Phase II Landfill Well Construction (letter) Report. December.

WELL COMPLETION RECORD

JOB NO.: _____ WELL NO. MW-II-07 HYDROGEOLOGIST: Jeremy Haney

CLIENT: City and County of Kauai DRILLER: Tim Robertson

WELL LOCATION: Kekaha landfill DATE/TIME: Nov 19, 2008



Well Head Elevation +2ft

Ground Surface Elev. ?

Well Head Completion Method

concrete monument + bollards

Drilling Method/Rig Type

Hollow stem auger

Surface ~~Casing~~ monument

Type Steel

Diameter 8in

Length 5ft

DETAILS OF CONSTRUCTION

Date Completed 11/19/08

Borehole Diameter (in.) 8in

Type and Size of Casing (in.) Sch 40 PVC 2in

Type and Size of Screen (in.) 11 ~~2ft~~ 20ft

Screen Perforation Diameter (in.) 0.010

Screen Length (ft.) 20ft

Centralizer Depths (ft.) NA

Completion Technique

1. Type of Filter Pack and Placement Method
   Sand Monterey #2
2. Type of Bentonite and Placement Method
   pellets
3. Type of Grout Mixture and Placement Method
   cement

Description of Potential Problems With Well:
None

Development Technique
Surge + pump

MATERIALS

Cement (bags)	4
Sand (ft.^{3})	7 bags
Casing Material (ft.)	5 ft
Bentonite (ft.^{3})	1 Bag

Top of Bentonite	2.0	ft.
Top of Filter Pack	3.0	ft.
Top of Screen	3.5	ft.
Bottom of Screen	23.5	ft.
Bottom of Hole	24.0	ft.

NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE

GROUT
BENTONITE
FILTER PACK

NOT APPROVED

Field Log of Boring

BORING NUMBER: MW-I-1A

SHEET 1 OF 1

PROJECT NAME: KEKAHA LANDFILL	PROJECT NUMBER:	ELEVATION AND DATUM: Ground Surface 11.14 ft Local Tidal	LOCATION: KEKAHA LANDFILL
DRILLING COMPANY: VALLEY WELL DRILLING	DRILLER: BYRON MEACHAM	DATE AND TIME STARTED: 5/28/19 1230	DATE AND TIME COMPLETED: 5/29/19 0830
DRILLING EQUIPMENT: AMS POWER PROBE	DRILLING METHOD: HOLLOW STEM AUGER	COMPLETION DEPTH: 20	TOTAL NO. OF SAMPLES: NONE
SIZE AND TYPE OF BIT: 8"	HOLE DIAMETER: 8"	NO. OF SAMPLES: BULK / SS	DRIVE: NA / PITCHER: NA
DRILLING FLUID: NA	DRILLING ANGLE: NA	WATER LEVEL: FIRST 8' BGS	AFTER 1 HOURS: 8' BGS
SAMPLE HAMMER TYPE: NA AUTOMATIC; DRIVING WT.; DROP		HYDROGEOLOGIST/DATE	CHECKED BY/DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOWCOUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
Medium Sand 0-20'	0				Medium Sand, SM	SAND	0	100	0	
					Silty sand pale brown					
					5YR6/6 loose					PID@2.5' 0 PPM
	5			3-2-15						PID@5' 0 PPM
										PID@7.5' 0 PPM
					DRY WATER AT 8'BGS					
	10			5-8-12	WET					PID@10' 0 PPM
										PID@12.5' 0 PPM
	15				32-46-50 for 6 Pale Grey					PID@15' 0 PPM
										PID@17.5' 0 PPM
	20			5-3-4	Pale Grey					PID@20' 0 PPM

NOT APPROVED

No rock encountered. No presence of fill materials.

MONITORING WELL CONSTRUCTION DIAGRAM

WELL #: **MWI-1A** CONSULTANT: GOODFELLOW BROTHERS

CLIENT: COUNTY OF KAUAI SOLID WASTE BRANCH DRILLER: BYRON MEACHAM

WELL LOCATION: KEKAHA LANDFILL, KAUAI DATE/TIME: Monument Set 6/13/19

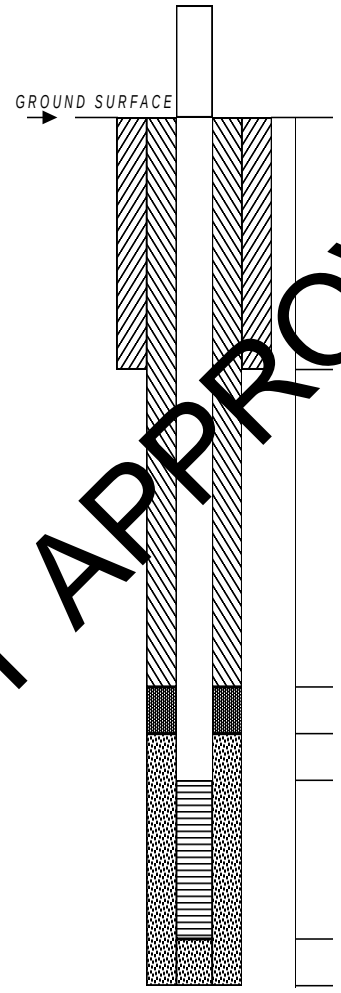
DETAILS OF CONSTRUCTION

Date Completed:	6/13/19
Borehole Diameter (in.)	8”
Type and Size of Casing (in.)	2” sch 40
Type and Size of Screen (in.)	2” sch 40
Screen Perforation Diameter (in.)	.020
Screen Length (ft.)	15’
Centralizer Depths (ft.)	NA

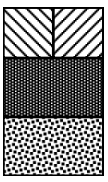
Completion Technique

1. Type of Filter Pack and Placement Method
   Monterey #3 HSA
2. Type of Bentonite and Placement Method
   3/8” HSA
3. Type of Grout Mixture and Placement Method
   Cement

Description of Potential Problems With Well:



NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE



GROUT

BENTONITE

FILTER PACK

Well Head Elevation	XXX 14.53 ft Local Tidal
	ABOVE GROUND
Ground Surface Elev.	XXX 11.14 ft Local Tidal
Well Head Completion Method	MONUMENT
Drilling Method/Rig Type	HSA Hollow Stem Auger

Surface Completion:

Type:	ABOVE
Diameter:	12”
Length:	5.5’

MATERIALS

Cement (bags)	2
Sand (ft)	17’
Casing Material (ft)	5’
Bentonite (ft)	2’

Top of Bentonite	1.5	ft
Top of Filter Pack	2.5	ft
Top of Screen	4.5	ft
Bottom of Screen	19.5	ft
Bottom of Hole	20	ft

NOT APPROVED

Field Log of Boring

BORING NUMBER: MW-I-2A

SHEET 1 OF 1

PROJECT NAME: KEKAHA LANDFILL	PROJECT NUMBER:	ELEVATION AND DATUM: Ground Surface 10.52 ft Local Tidal	LOCATION: KEKAHA LANDFILL
DRILLING COMPANY: VALLEY WELL DRILLING	DRILLER: MICHAEL SURIGAO	DATE AND TIME STARTED: 5/17/19 900AM	DATE AND TIME COMPLETED: 5/17/19 1200PM
DRILLING EQUIPMENT: AMS POWER PROBE	DRILLING METHOD: HOLLOW STEM AUGER	COMPLETION DEPTH: 20	TOTAL NO. OF SAMPLES: NONE
SIZE AND TYPE OF BIT: 8"	HOLE DIAMETER: 8"	NO. OF SAMPLES: BULK: SS:	DRIVE: NA PITCHER: NA
DRILLING FLUID: NA	DRILLING ANGLE: NA	WATER LEVEL: FIRST 8' BGS	AFTER 1 HOURS 8 BGS
SAMPLE HAMMER TYPE: NA AUTOMATIC	DRIVING WT.	DROP	HYDROGEOLOGIST/DATE: CHECKED BY/DATE

NOT APPROVED

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOWCOUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
Medium Sandy 0-20'	0				Medium Sand, SM	SAND	0	100	0	
					Silty sand pale brown					
					5YR6/6 loose					PID@2.5' 0 PPM
	5			7-11-29						PID@5' 0 PPM
										PID@7.5' 0 PPM
					DRY WATER AT 8'BGS					
	10			6-9-10	WET					PID@10' 0 PPM
										PID@12.5' 0 PPM
	15			4-11-8						PID@15' 0 PPM
										PID@17.5' 0 PPM
	20			3-11-11						PID@20' 0 PPM

No rock encountered. No presence of fill material.

MONITORING WELL CONSTRUCTION DIAGRAM

WELL #: **MWI-2A** CONSULTANT: GOODFELLOW BROTHERS

CLIENT: COUNTY OF KAUAI SOLID WASTE BRANCH DRILLER: MICHAEL SURIGAO

WELL LOCATION: KEKAHA LANDFILL, KAUAI DATE/TIME: Monument Set 6/13/19

NOT APPROVED

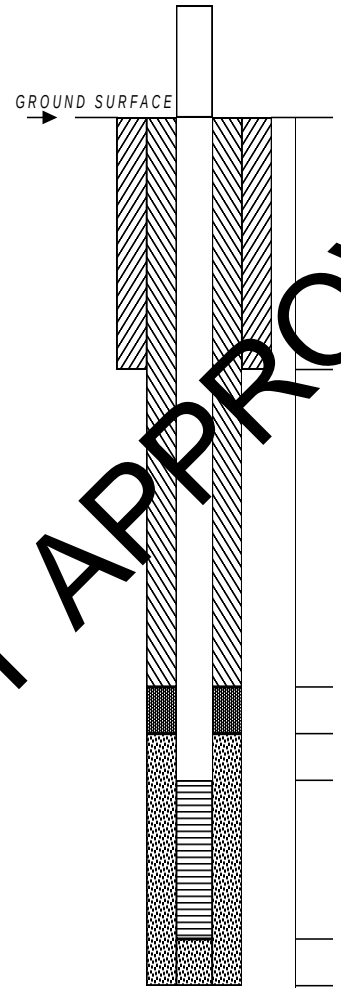
DETAILS OF CONSTRUCTION

Date Completed:	6/13/19
Borehole Diameter (in.)	8”
Type and Size of Casing (in.)	2” sch 40
Type and Size of Screen (in.)	2” sch 40
Screen Perforation Diameter (in.)	.020
Screen Length (ft.)	15’
Centralizer Depths (ft.)	NA

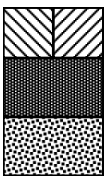
Completion Technique

1. Type of Filter Pack and Placement Method
   Monterey #3 HSA
2. Type of Bentonite and Placement Method
   3/8” HSA
3. Type of Grout Mixture and Placement Method
   Cement

Description of Potential Problems With Well:



NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE



GROUT

BENTONITE

FILTER PACK

Well Head Elevation	XXX 13.33 ft Local Tidal
	ABOVE GROUND
Ground Surface Elev.	XXX 10.52 ft Local Tidal
Well Head Completion Method	MONUMENT
Drilling Method/Rig Type	HSA Hollow Stem Auger

Surface Completion:

Type:	ABOVE
Diameter:	12”
Length:	5.5’

MATERIALS

Cement (bags)	2
Sand (ft)	17’
Casing Material (ft)	5’
Bentonite (ft)	2’

Top of Bentonite	1.5	ft
Top of Filter Pack	2.5	ft
Top of Screen	4.5	ft
Bottom of Screen	19.5	ft
Bottom of Hole	20	ft

Field Log of Boring

BORING NUMBER: MWI-3A

SHEET 1 OF 1

PROJECT NAME: KEKAHA LANDFILL	PROJECT NUMBER:	ELEVATION AND DATUM: Ground Surface 11.03 ft Local Tidal	LOCATION: KEKAHA LANDFILL
DRILLING COMPANY: VALLEY WELL DRILLING	DRILLER: BYRON MEACHAM	DATE AND TIME STARTED: 5/28/19 1000	DATE AND TIME COMPLETED: 5/28/19 1130
DRILLING EQUIPMENT: AMS POWER PROBE	DRILLING METHOD: HOLLOW STEM AUGER	COMPLETION DEPTH: 20	TOTAL NO. OF SAMPLES: NONE
SIZE AND TYPE OF BIT: 8"	HOLE DIAMETER: 8"	NO. OF SAMPLES: BULK / SS	DRIVE: NA / PITCHER: NA
DRILLING FLUID: NA	DRILLING ANGLE: NA	WATER LEVEL: FIRST 8' BGS	AFTER 1 HOURS: 8' BGS
SAMPLE HAMMER TYPE: NA AUTOMATIC	DRIVING WT.	DROP	HYDROGEOLOGIST/DATE	CHECKED BY/DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOWCOUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
Medium Sand 0-20'	0				Medium Sand, SM	SAND	0	100	0	
					Silty sand pale brown					
					5YR6/6 loose					PID@2.5' 0 PPM
	5			13-26-27						PID@5' 0 PPM
										PID@7.5' 0 PPM
					DRY WATER AT 8'BGS					
	10				WET					PID@10' 0 PPM
										PID@12.5' 0 PPM
	15			12-22-20	Pale Grey					PID@15' 0 PPM
										PID@17.5' 0 PPM
	20			6-8-12	Pale Grey					PID@20' 0 PPM

NOT APPROVED

No rock encountered. No presence of fill material.

MONITORING WELL CONSTRUCTION DIAGRAM

WELL #: **MWI-3A** CONSULTANT: GOODFELLOW BROTHERS

CLIENT: COUNTY OF KAUAI SOLID WASTE BRANCH DRILLER: BYRON MEACHAM

WELL LOCATION: KEKAHA LANDFILL, KAUAI DATE/TIME: Monument Set 6/13/19

NOT APPROVED

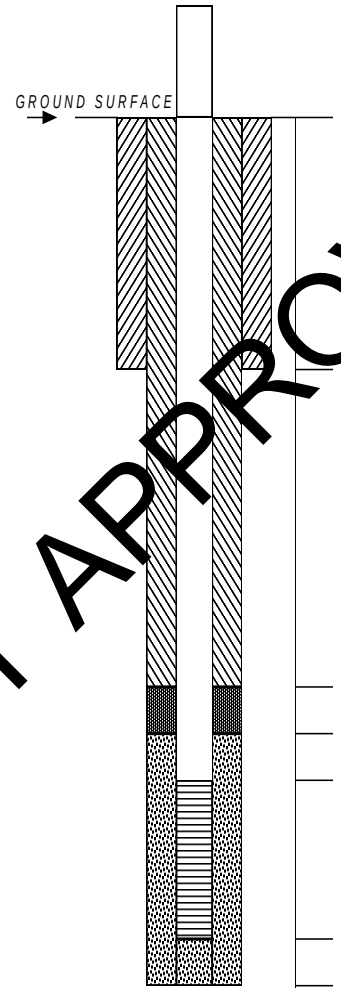
DETAILS OF CONSTRUCTION

Date Completed:	6/13/19
Borehole Diameter (in.)	8”
Type and Size of Casing (in.)	2” sch 40
Type and Size of Screen (in.)	2” sch 40
Screen Perforation Diameter (in.)	.020
Screen Length (ft.)	15’
Centralizer Depths (ft.)	NA

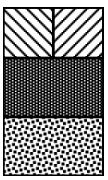
Completion Technique

1. Type of Filter Pack and Placement Method
   Monterey #3 HSA
2. Type of Bentonite and Placement Method
   3/8” HSA
3. Type of Grout Mixture and Placement Method
   Cement

Description of Potential Problems With Well:



NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE



GROUT

BENTONITE

FILTER PACK

Well Head Elevation	XXX 14.03 ft Local Tidal 3.5 ABOVE GROUND
Ground Surface Elev.	XXX 11.03 ft Local Tidal
Well Head Completion Method	MONUMENT
Drilling Method/Rig Type	HSA Hollow Stem Auger

Surface Completion:

Type:	ABOVE
Diameter:	12”
Length:	5.5’

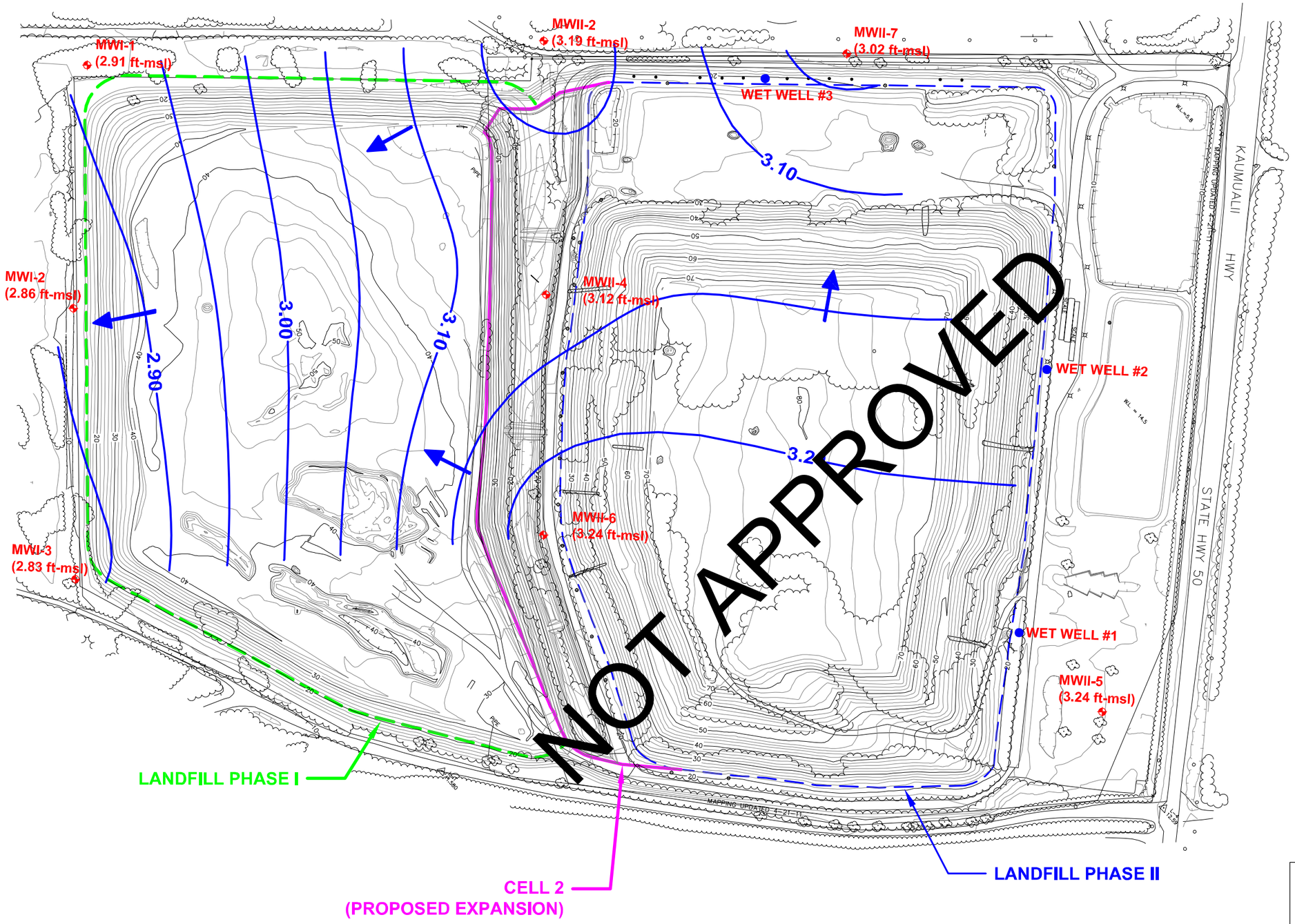
MATERIALS

Cement (bags)	2
Sand (ft)	17’
Casing Material (ft)	5’
Bentonite (ft)	2’

Top of Bentonite	1.5	ft
Top of Filter Pack	2.5	ft
Top of Screen	4.5	ft
Bottom of Screen	19.5	ft
Bottom of Hole	20	ft

APPENDIX C
Field Forms

NOT APPROVED



LEGEND

MWII-4 ELEV. ft-msl — PHASE II GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION

3.00 — GROUNDWATER POTENTIOMETRIC SURFACE

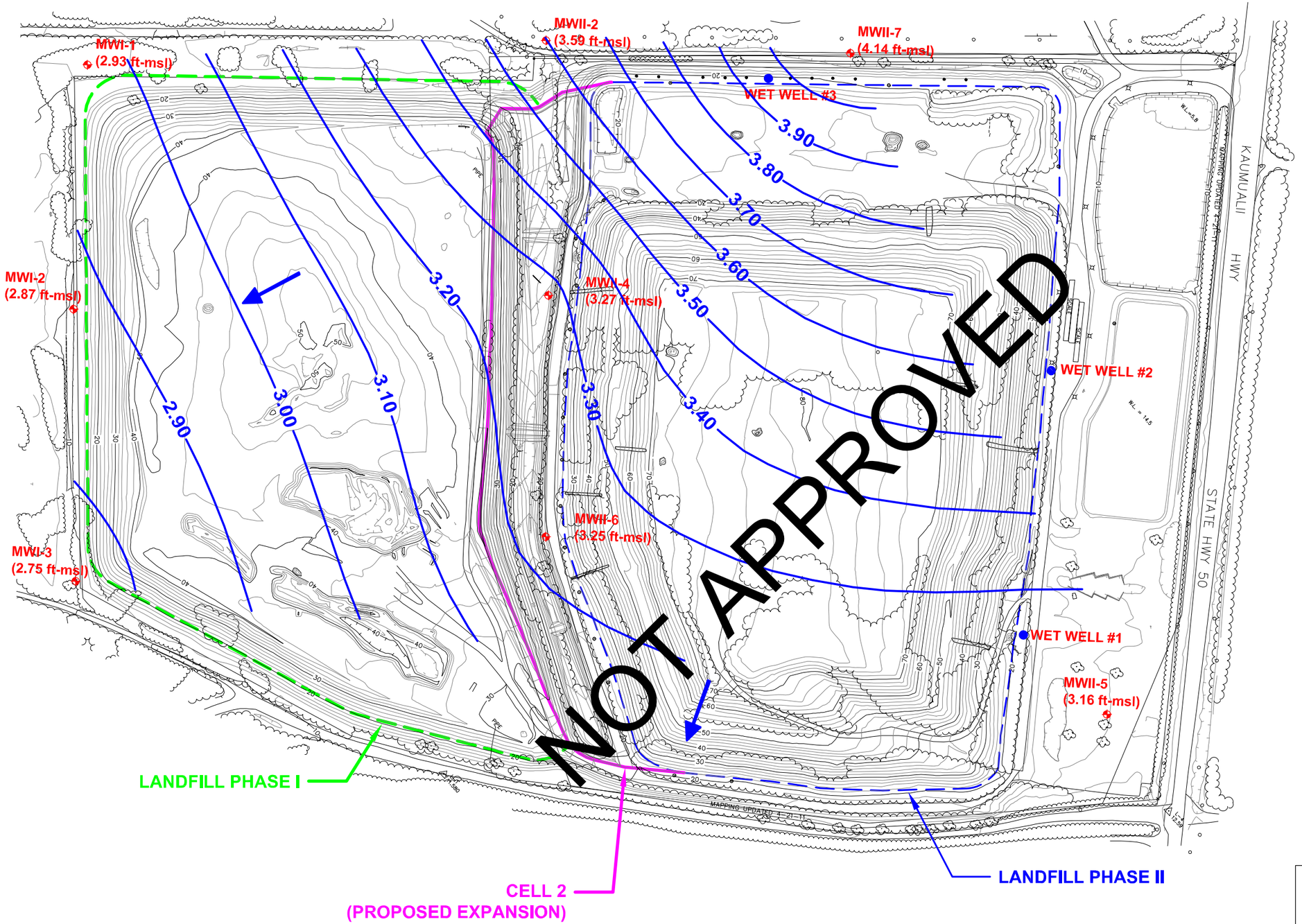
TRUE NORTH
SCALE: 1 INCH = 240 FEET

0 120 240 480
SCALE: 1" = 240'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(June 5, 2012)
Kauai, Hawaii

AECOM

P:\DHY\GIW\Waste Management of Hawaii\KLF\Kekaha Landfill Phase II\Groundwater\2012\3.0 Deliverables\3rd Qtr. 2012\Apr--June\Figure_GIW_SiteLayoutMap_rev.dwg 08/22/12 4:52 PM Hamad



LEGEND

MWII-4 ELEV. ft-msl — PHASE II GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION

3.90 — GROUNDWATER POTENTIOMETRIC SURFACE

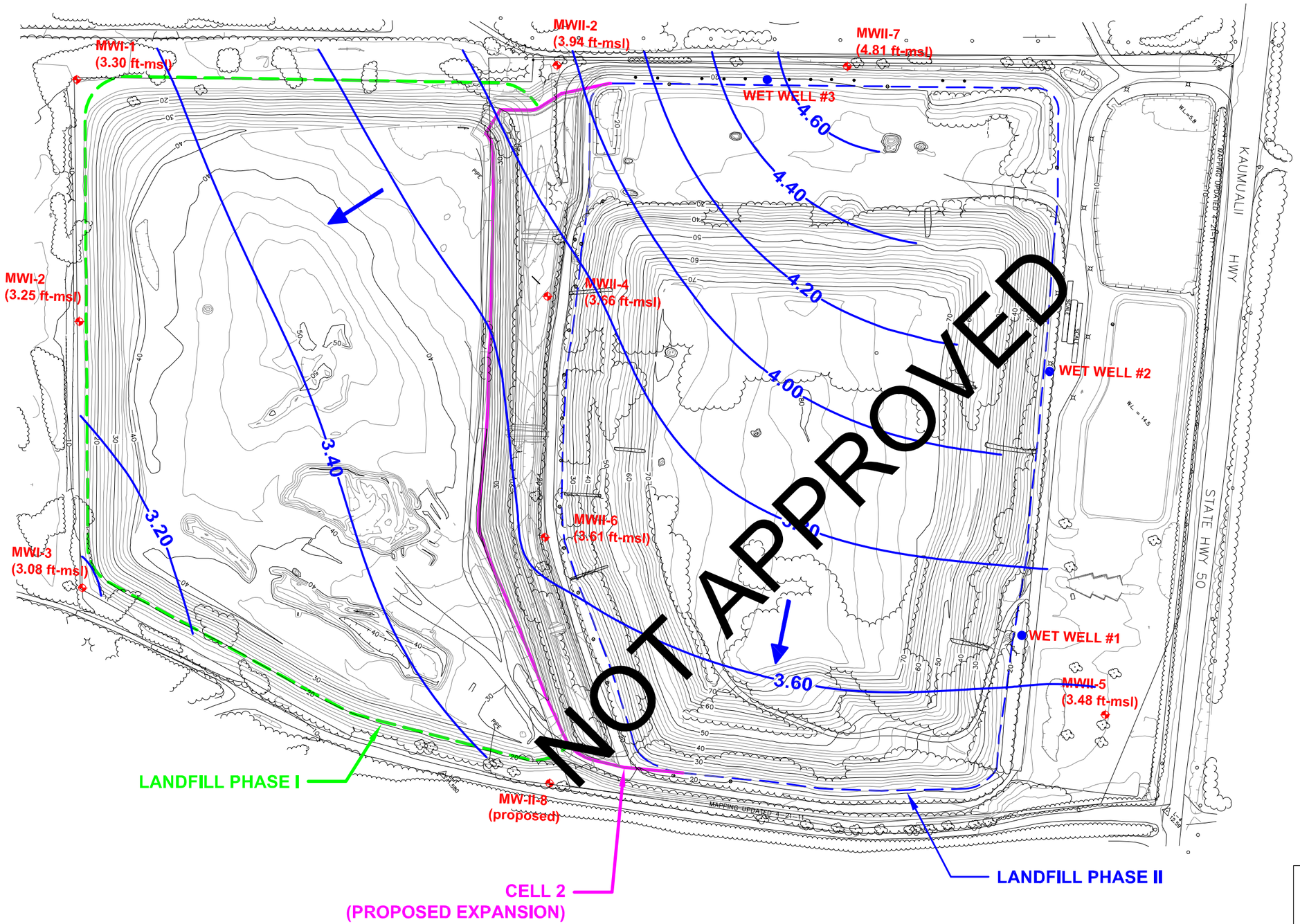
TRUE NORTH
SCALE: 1 INCH = 240 FEET

0 120 240 480
SCALE: 1" = 240'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(August 27, 2012)
Kauai, Hawaii

AECOM

P:\JOBS\Waste Management of Hawaii\KLF\Kekaha Landfill Phase II\Groundwater\2012\3rd Qtr. 2012(July-Sept)\Report\Fig2_GWM_SiteLayoutMap_27Aug2012.dwg 10/11/12 3:13 PM nomoud



LEGEND

MWII-4 ELEV. ft-msl — PHASE II GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION

3.80 — GROUNDWATER POTENTIOMETRIC SURFACE

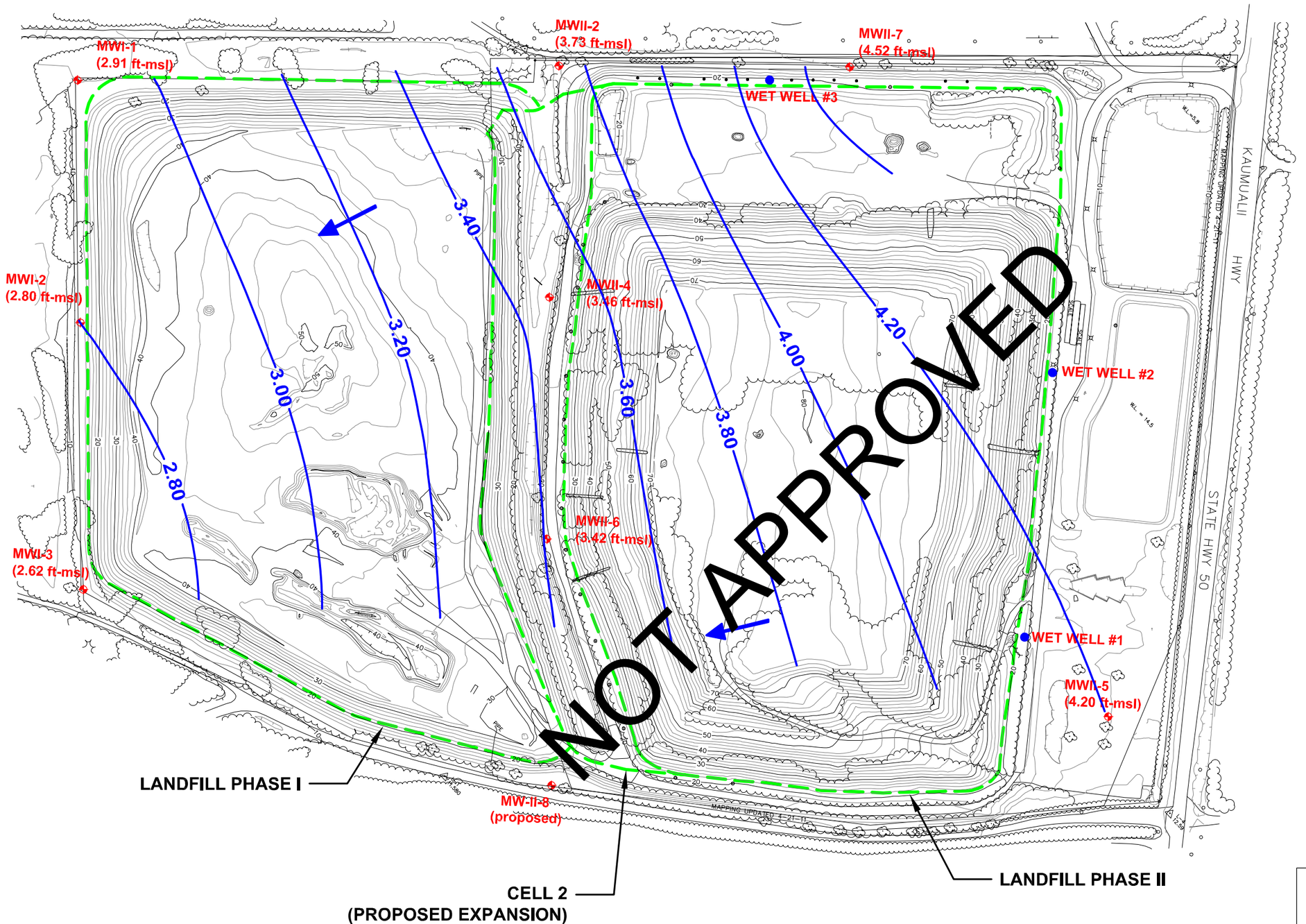
TRUE NORTH
SCALE: 1 INCH = 240 FEET

0 120 240 480
SCALE: 1" = 240'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(November 13, 2012)
Kauai, Hawaii

AECOM

\\ahnl1fp003\data\Projects\QKV\GDW\Waste Management of Hawaii\KLF\Kekaha Landfill Phase II\Groundwater\2012\7.0 Deliverables\Kh GPlg2_GWM_SiteLayoutMap_13Nov2012.dwg 12/26/12 5:51 PM nsmod



LEGEND

MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.80	GROUNDWATER POTENTIOMETRIC SURFACE

TRUE NORTH
SCALE: 1 INCH = 240 FEET

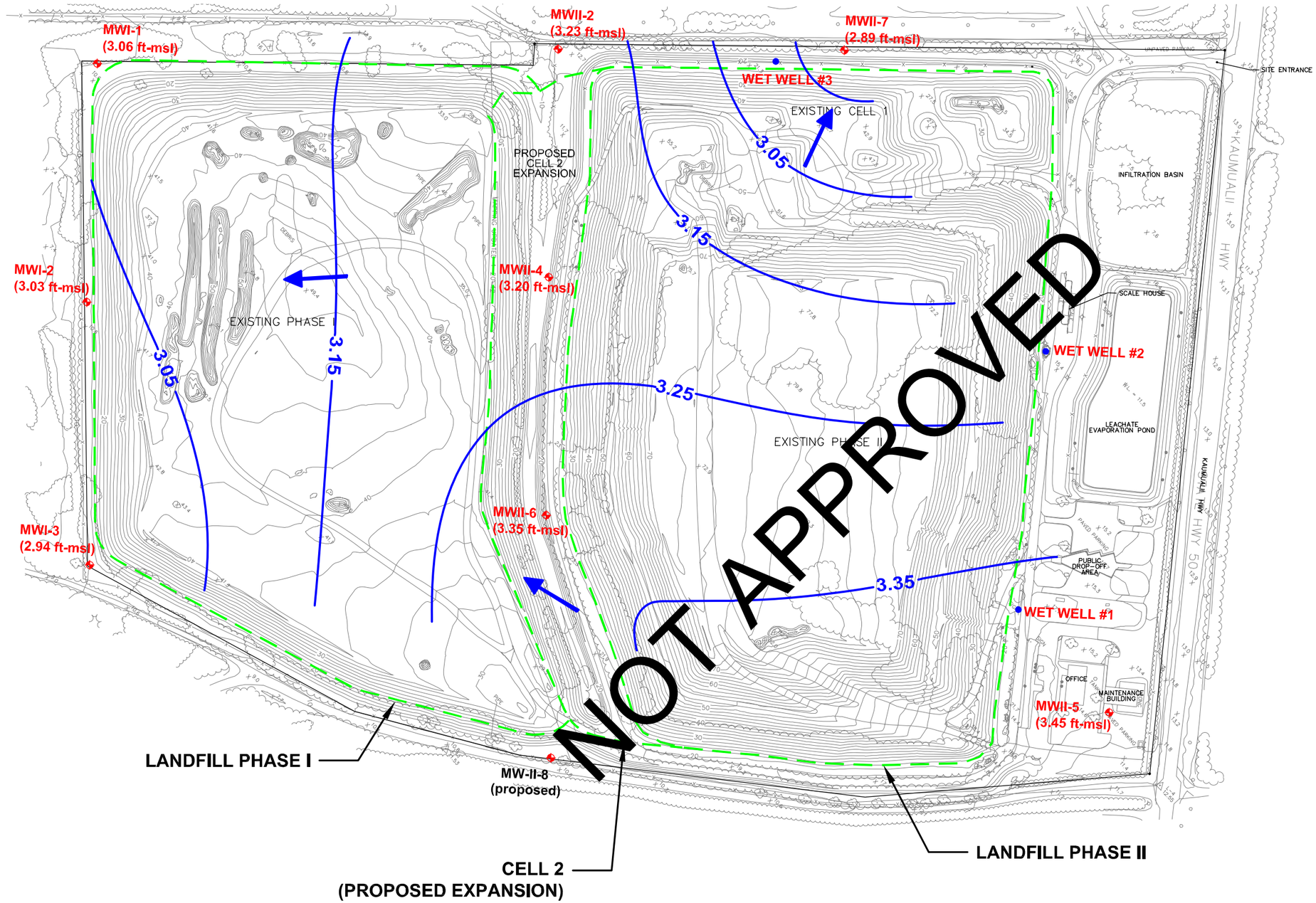
0 120 240 480

SCALE: 1" = 240'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(February 24, 2013)
Kauai, Hawaii

AECOM

P:\DNV\GRW\Waste Management of Hawaii\KLF\Kekaha Landfill Phase II\Groundwater\2013\7.0 Deliverables\1st Qtr. 2013 (Jan—Mar)\Report\Fig2_GWM_SiteLayoutMap_24Feb2013.dwg 04/05/13 8:52 AM nsmcd



LEGEND

MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.05	GROUNDWATER POTENTIOMETRIC SURFACE
●	LEACHATE WET WELL

TRUE NORTH

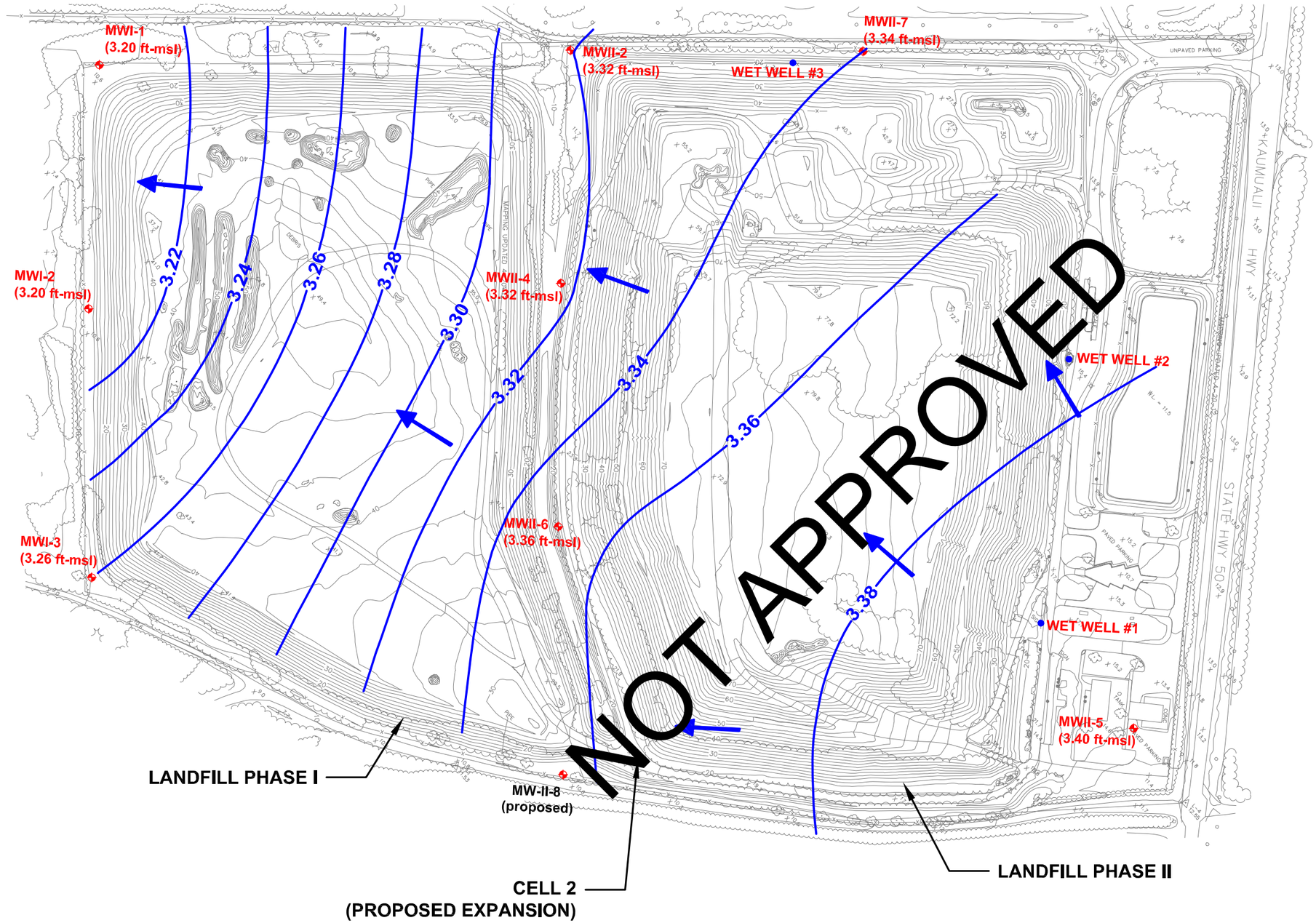
0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(June 4, 2013)
Kauai, Hawaii

AECOM

P:\GNV\Weste Management of Hawaii\KLF\Kekaha Landfill Phase II\Groundwater\2013\7.0 Deliverables\2nd Quarter 2013\Report\Figures\Fig2_GWM_SiteLayoutMap_04Jun2013.dwg 06/15/13 1:52 PM nsmod



LEGEND	
MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.34	GROUNDWATER POTENTIOMETRIC SURFACE
●	LEACHATE WET WELL

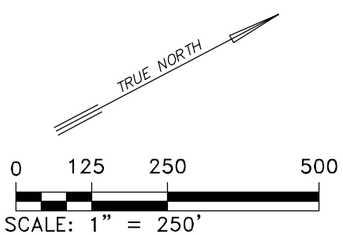


Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(August 26, 2013)
Kauai, Hawaii

AECOM

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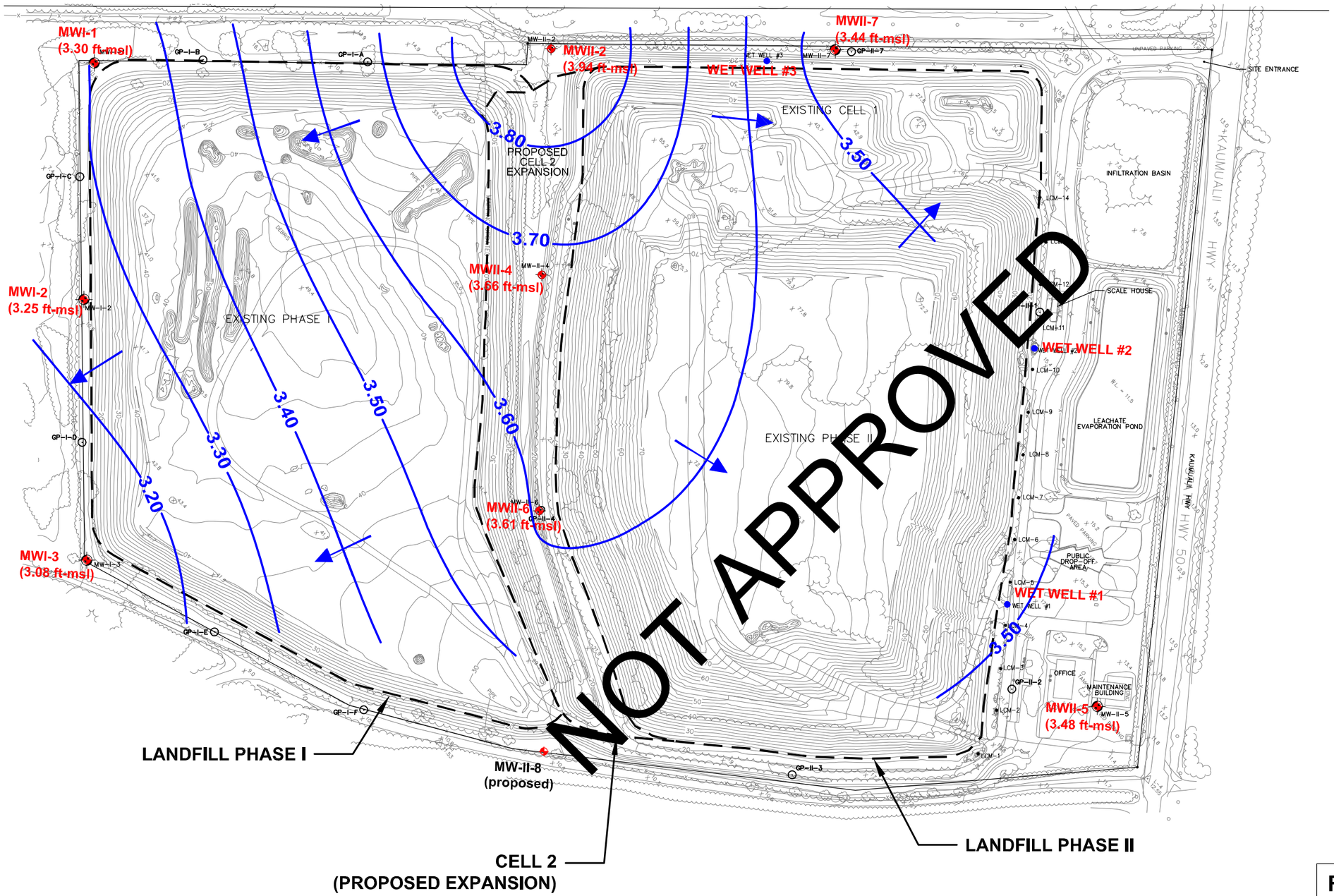


LEGEND

MWII-4 ELEV. ft-msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.94	GROUNDWATER POTENTIOMETRIC SURFACE
●	LEACHATE WET WELL

TRUE NORTH

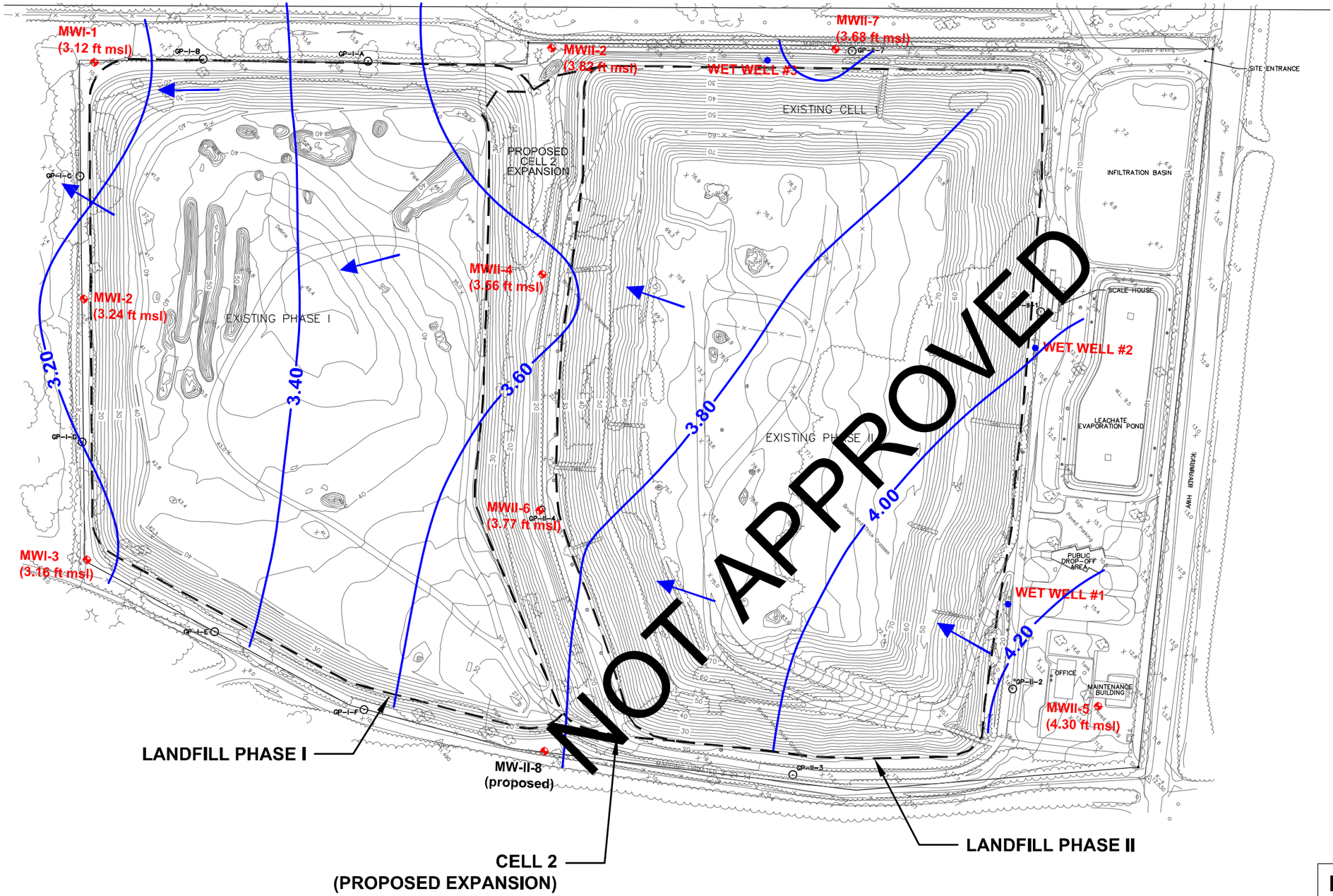
0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring
Site Layout Map
Kekaha Landfill Phase II
(February 24, 2014)
Kauai, Hawaii

AECOM

P:\GNV\Non-Federal\WMI\60315847 WMI-KLF Env. Services 2014\Task 2 Groundwater\Report\1st Qtr 2014\Figures\Active Files\Fig2_GWM_SiteLayoutMap_24Feb2014.dwg 04/21/14 5:03 PM nomool



LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.60	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A MARCH 2014 AERIAL SURVEY.

TRUE NORTH

0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring
Site Layout Map
Kekaha Landfill Phase II
(May 27, 2014)
Kauai, Hawaii

AECOM

P:\DNV\Non-Federal\WMH\60315847 WMH-KLF Env Services 2014\Task 2 Groundwater\2nd Qtr\Report\01 Working\Figures\Fig2_GWM_SiteLayoutMap_27May2014.dwg 07/22/14 4:00 PM NamedL

MWI-1
(3.13 ft msl)

MWI-2
(3.13 ft msl)

MWI-3
(3.15 ft msl)

MWII-2
(3.49 ft msl)

MWII-4
(3.53 ft msl)

MWII-6
(3.58 ft msl)

MWII-7
(3.51 ft msl)

MWII-5
(4.38 ft msl)

WET WELL #3

WET WELL #2

WET WELL #1

MW-II-8
(proposed)

3.20

3.40

3.60

3.80

4.00

4.20

EXISTING PHASE I

EXISTING CELL I

EXISTING PHASE II

PROPOSED
CELL 2
EXPANSION

INFILTRATION BASIN

LEACHATE
EVAPORATION POND

SCALE HOUSE

SITE ENTRANCE

PUBLIC
DROP-OFF
AREA

OFFICE

MAINTENANCE
BUILDING

Kaumualii Hwy

LANDFILL PHASE I

CELL 2
(PROPOSED EXPANSION)

LANDFILL PHASE II

NOT APPROVED

LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.60	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A MARCH 2014 AERIAL SURVEY.

TRUE NORTH

0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring
Site Layout Map
Kekaha Landfill Phase II
(August 26, 2014)
Kauai, Hawaii

AECOM

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MWI-1
(4.84 ft msl)

MWI-2
(3.71 ft msl)

MWI-3
(3.59 ft msl)

MWII-2
(4.21 ft msl)

MWII-4
(3.98 ft msl)

MWII-6
(3.91 ft msl)

MWII-7
(5.95 ft msl)

MWII-5
(4.07 ft msl)

MW-II-8
(proposed)

WET WELL #3

WET WELL #2

WET WELL #1

EXISTING PHASE I

EXISTING PHASE II

EXISTING CELL 1

PROPOSED
CELL 2
EXPANSION

INFILTRATION BASIN

SCALE HOUSE

LEACHATE
EVAPORATION POND

PUBLIC
DROP-OFF
AREA

OFFICE

MAINTENANCE
BUILDING

SITE ENTRANCE

Unpaved Parking

Paved Parking

Kaumualii Hwy

KAUMUALII HWY

3.80
4.00
4.20
4.40
4.60
4.80
5.00
5.20
5.40
5.60

LANDFILL PHASE I

LANDFILL PHASE II

CELL 2
(PROPOSED EXPANSION)

NOT APPROVED

LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
4.60	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A MARCH 2014 AERIAL SURVEY.

TRUE NORTH

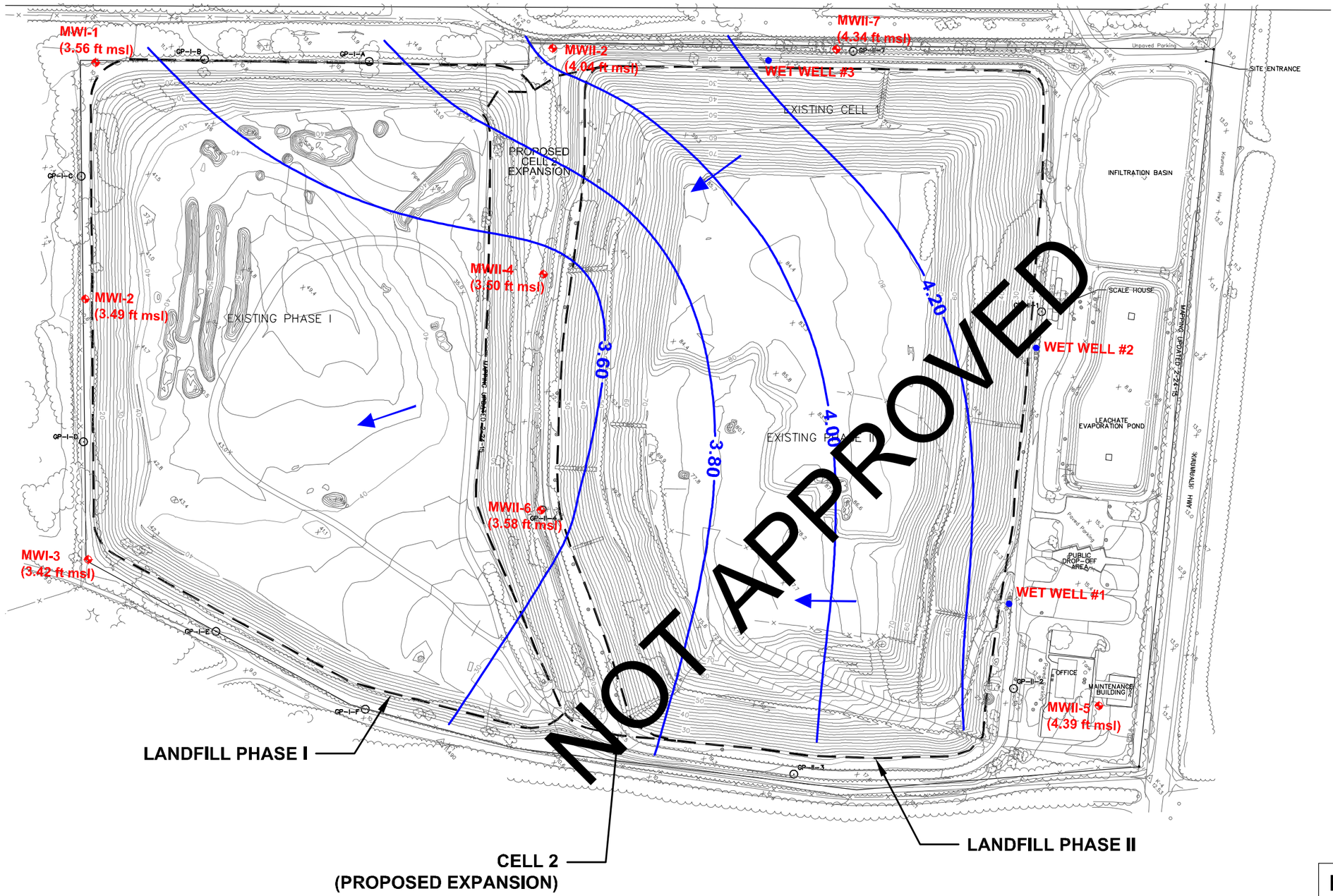
0 125 250 500

SCALE: 1" = 250'

AECOM

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(November 10, 2014)
Kauai, Hawaii

P:\DNV\Non-Federal\WMH\60315847 WMH-KLF Env Services 2014\Task 2 Groundwater\Feb Qtr\Report\01_Working Final\Figures\Figures\Fig2_GWM_Site Layout Map_10Nov2014.dwg 12/18/14 4:44 PM nsmcol



LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
4.20	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.

TRUE NORTH

0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring Site Layout Map
Kekaha Landfill Phase II
(February 23, 2015)
Kauai, Hawaii

AECOM

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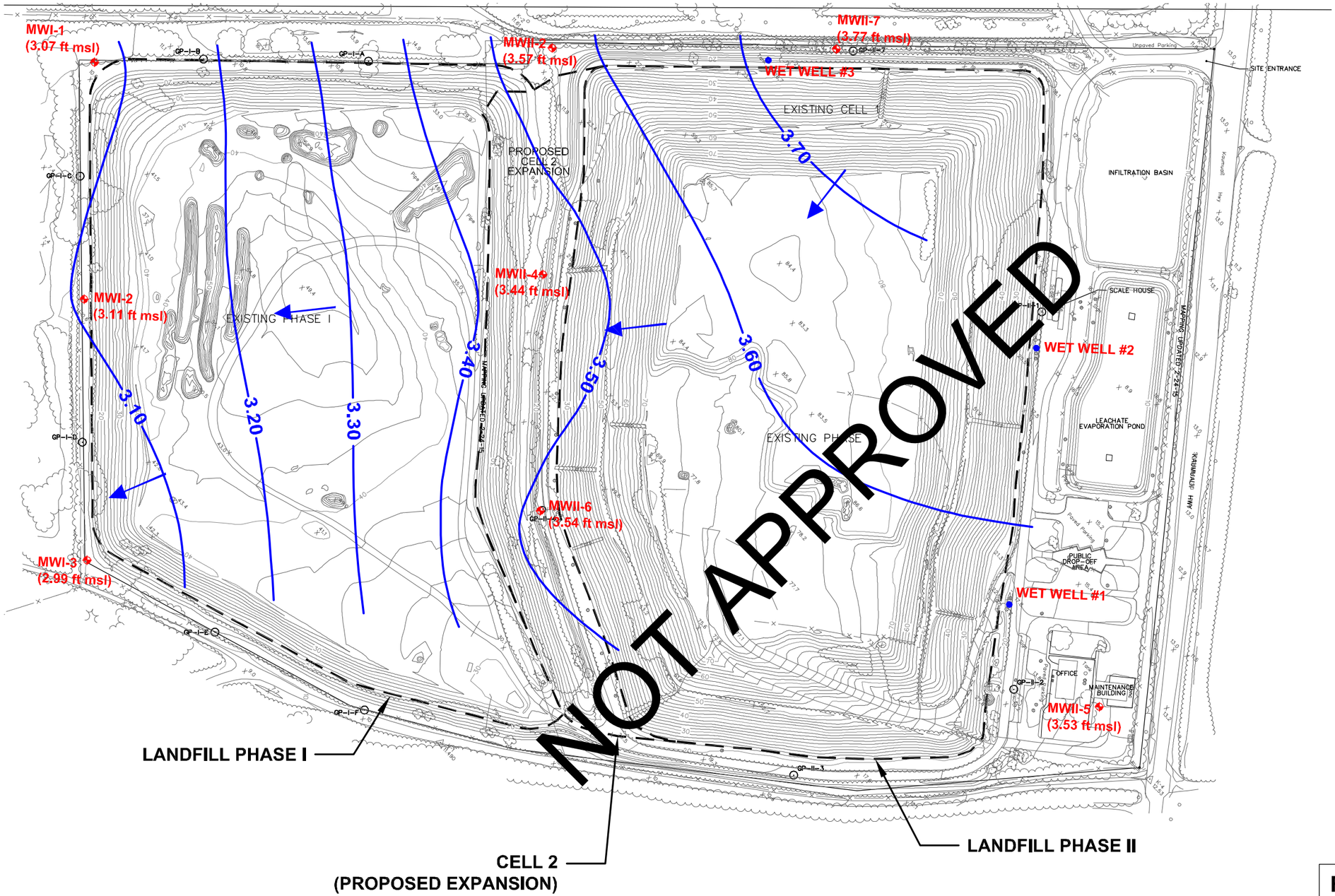

LEGEND

MWII-4 ELEV. ft msl	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
3.10	GROUNDWATER POTENTIOMETRIC SURFACE
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTE

GROUND SURFACE CONTOURS ARE PROVIDED BY WMH BASED ON A FEBRUARY 2015 AERIAL SURVEY.

TRUE NORTH

0 125 250 500

SCALE: 1" = 250'

Figure 2
Groundwater Monitoring
Site Layout Map
Kekaha Landfill Phase II
(May 31, 2015)
Kauai, Hawaii

AECOM

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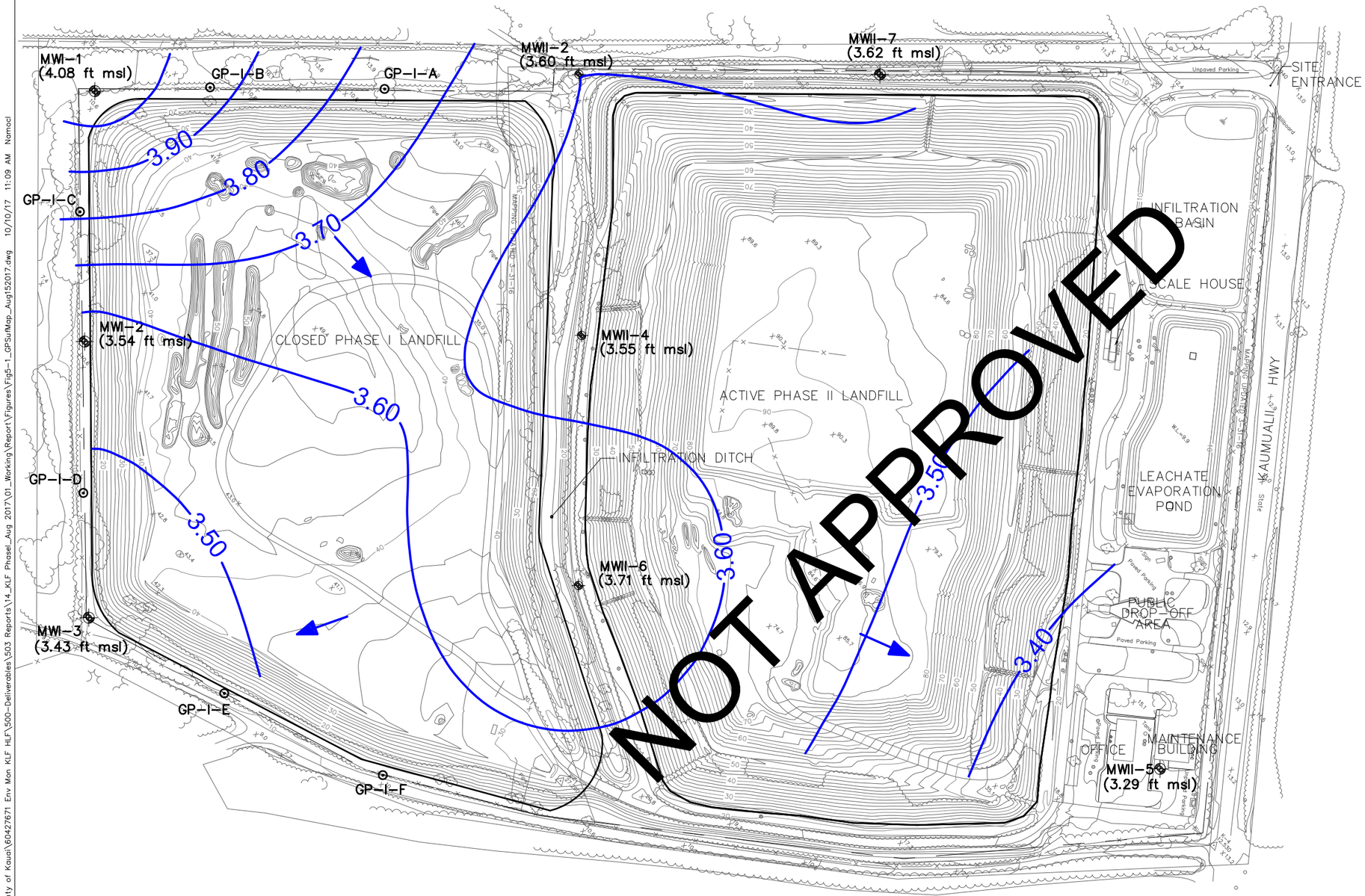

Legend

- EXISTING TOPOGRAPHY (680)
- GROUNDWATER CONTOUR (FT MSL) (3.50)
- PROPERTY LINE
- EXISTING LIMITS OF WASTE
- GROUNDWATER FLOW DIRECTION
- MWI-3 (3.43 ft msl) — GROUNDWATER MONITORING WELL AND GROUNDWATER DEPTH
- GPI-E — GAS MONITORING PROBE

Notes

1. EXISTING GRADE IS BASED ON TOPOGRAPHIC MAP PREPARED BY AEROMETRIC, INC., SEATTLE, WASHINGTON. DATE OF FLIGHT: MARCH 31, 2016.
2. HORIZONTAL DATUM IS BASED ON NAD83 (1986), HAWAII ZONE 4. VERTICAL DATUM BASED ON LOCAL TIDAL.
3. WELLS MWI-1, MWI-2 AND MWI-3 ARE POINT OF COMPLIANCE WELLS FOR PHASE I.

TRUE NORTH
SCALE: 1 INCH = 250 FEET

0 125 250 500

SCALE: 1" = 250'

Figure 5-1
Groundwater Potentiometric Surface Map
August 15, 2017
County of Kauai
Kekaha Sanitary Landfill Phase I

S:\Projects_Legacy\ENV\Non-Federal\County of Kauai\60427671 Env Mon KLF HLF\500-Deliverables\503 Reports\14_KLF Phase1_Aug 2017\01_Working\Report\Figures\Fig5-1_GPSurfMap_Aug152017.dwg 10/10/17 11:09 AM Namocl

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Legend

680	EXISTING TOPOGRAPHY
3.50	GROUNDWATER CONTOUR (FT MSL)
	PROPERTY LINE
	EXISTING LIMITS OF WASTE
	GROUNDWATER FLOW DIRECTION
MWI-3 (3.14 ft msl)	GROUNDWATER MONITORING WELL AND GROUNDWATER DEPTH
GPI-E	GAS MONITORING PROBE

Notes

1. EXISTING GRADE IS BASED ON TOPOGRAPHIC MAP PREPARED BY AEROMETRIC, INC., SEATTLE, WASHINGTON.
   DATE OF FLIGHT: MARCH 31, 2016.
2. HORIZONTAL DATUM IS BASED ON NAD83 (1986), HAWAII ZONE 4.
   VERTICAL DATUM BASED ON LOCAL TIDAL.
3. WELLS MWI-1, MWI-2 AND MWI-3 ARE POINT OF COMPLIANCE WELLS FOR PHASE I.

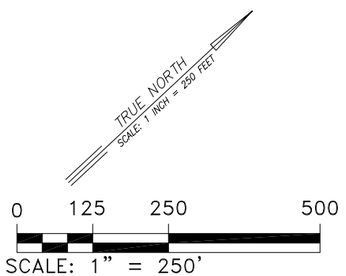

Figure 5-1
Groundwater Potentiometric Surface Map
November 14, 2017
County of Kauai
Kekaha Sanitary Landfill Phase I

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Legend

680	EXISTING TOPOGRAPHY
3.30	GROUNDWATER CONTOUR (FT MSL)
	PROPERTY LINE
	EXISTING LIMITS OF WASTE
	GROUNDWATER FLOW DIRECTION
MWI-3 (3.20 ft msl)	GROUNDWATER MONITORING WELL AND GROUNDWATER DEPTH
GPI-E	GAS MONITORING PROBE

Notes

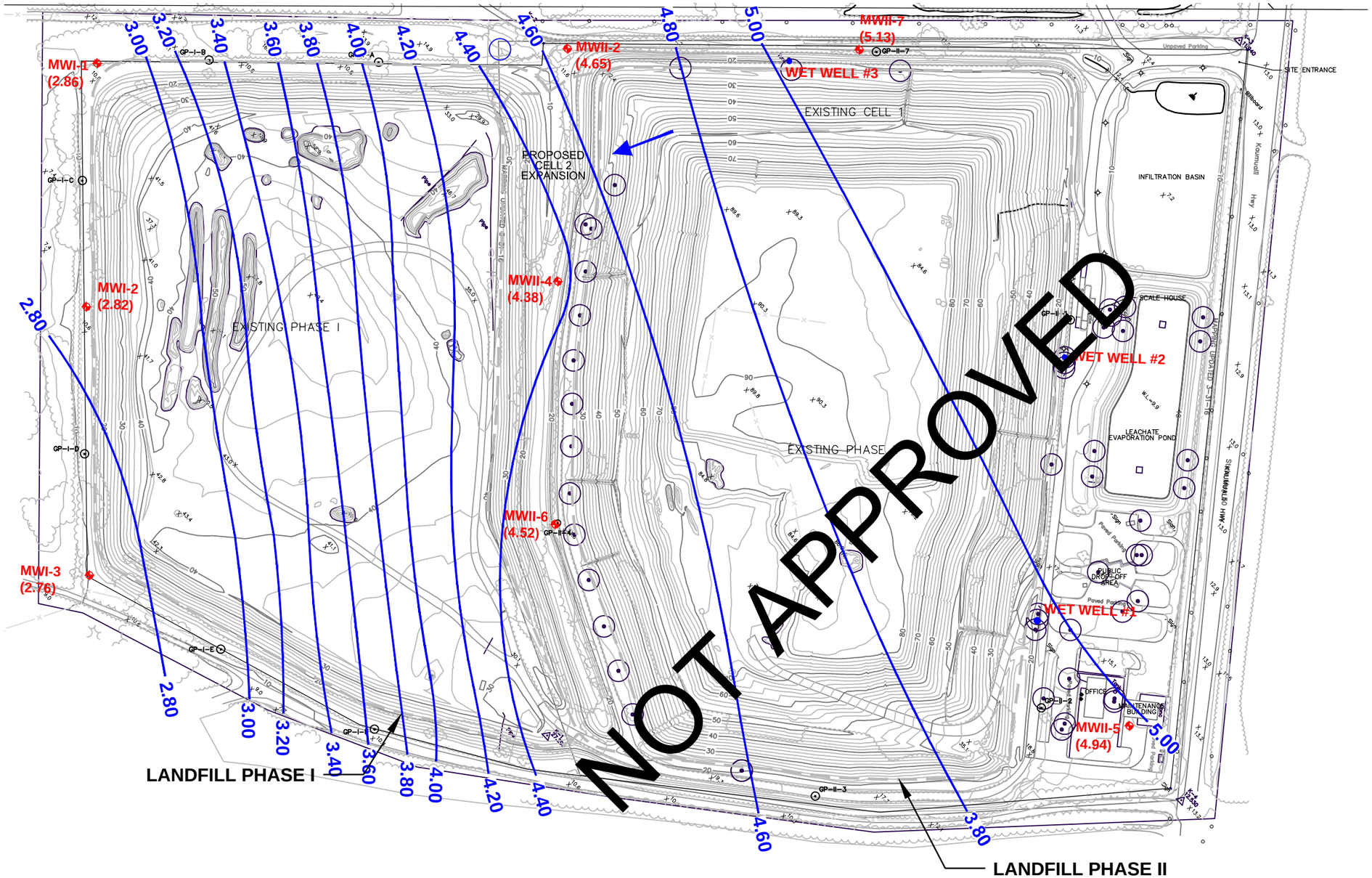
1. EXISTING GRADE IS BASED ON TOPOGRAPHIC MAP PREPARED BY AIRFRAME MAY 20, 2017.
2. BASIS FOR HORIZONTAL AND VERTICAL CONTROL. HORIZONTAL DATUM IS BASED ON NAD83 (1986), HAWAII ZONE 4. VERTICAL DATUM BASED ON LOCAL TIDAL.
3. WELLS MWI-1, MWI-2 AND MWI-3 ARE POINT OF COMPLIANCE WELLS FOR PHASE I.
4. GROUNDWATER ELEVATION FROM MWII-7 COULD NOT BE MEASURED.

TRUE NORTH
SCALE: 1 INCH = 250 FEET

0 125 250 500

SCALE: 1" = 250'

Figure 5-1
Groundwater Potentiometric Surface Map
February 13, 2018
County of Kauai
Kekaha Sanitary Landfill Phase I



0 250'

GRAPHIC SCALE

LEGEND

- MWII-4 (4.38) — GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
- 3.30 — GROUNDWATER SURFACE CONTOURS
- GROUNDWATER FLOW DIRECTION
- LEACHATE WET WELL

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY WMH ON MARCH 2016.
2. GROUNDWATER ELEVATIONS ARE LISTED AS FEET ABOVE MEAN SEA LEVEL.

REV. NO.	DATE	DESCRIPTION

APTIM

WASTE MANAGEMENT OF HAWAII
KEKAHA LANDFILL PHASE II

FIGURE 2
GROUNDWATER CONTOUR MAP
2Q2018

DRAWN BY:	TRS	APPROVED BY:	CT	PROJ. NO.:	631213741	DATE:	JUNE 2018

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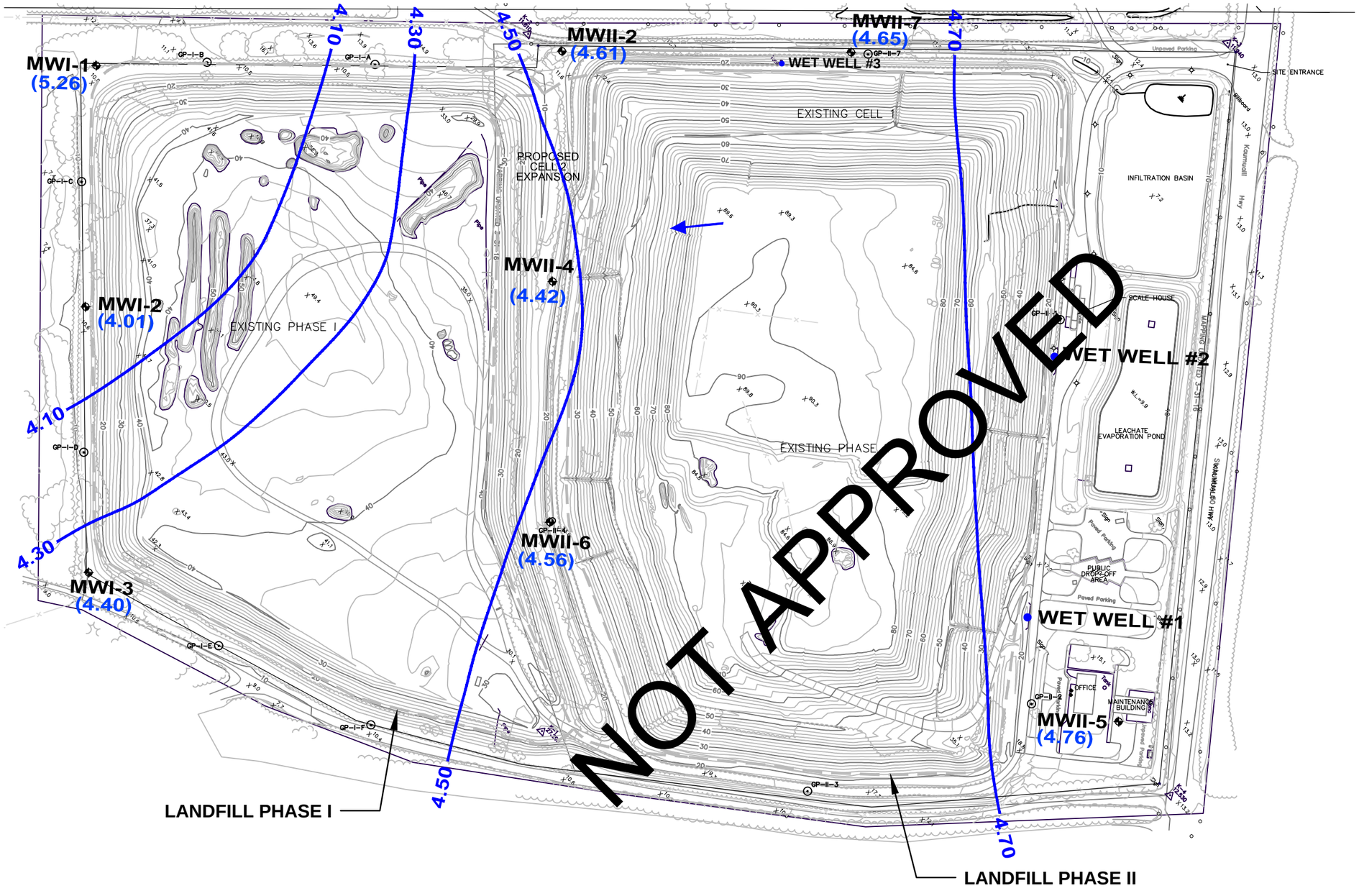

LEGEND

- MWII-4 (4.42) — GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
- 4.50 — GROUNDWATER SURFACE CONTOURS
- GROUNDWATER FLOW DIRECTION
- LEACHATE WET WELL

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY WMH ON MARCH 2016.
2. GROUNDWATER ELEVATIONS ARE LISTED AS FEET ABOVE MEAN SEA LEVEL.
3. MEASURED GROUNDWATER ELEVATION AT WELL MWI-1 WAS NOT USED FOR CONTOURING PURPOSES.

REV. NO.	DATE	DESCRIPTION

APTIM

WASTE MANAGEMENT OF HAWAII
KEKAHA LANDFILL PHASE II

FIGURE 2
GROUNDWATER CONTOUR MAP
4Q2018

DRAWN BY:	TRS	APPROVED BY:	CT	PROJ. NO.:	631213741	DATE:	JANUARY 2019

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XREF Files: 01Exist_Site
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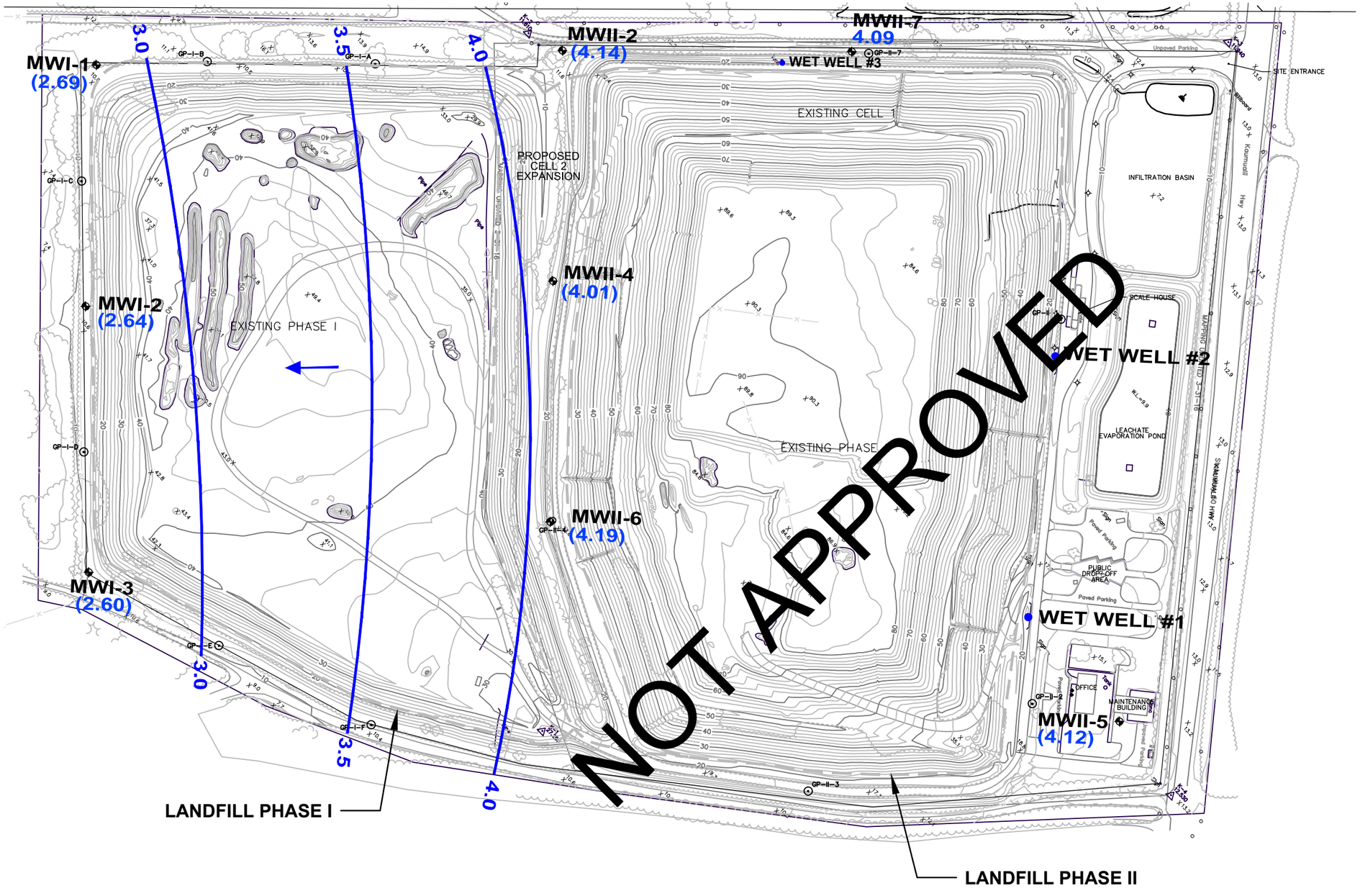

N

0 250'

GRAPHIC SCALE

LEGEND

MWII-4 (4.42)	GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
4.50	GROUNDWATER SURFACE CONTOURS
	GROUNDWATER FLOW DIRECTION
	LEACHATE WET WELL

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY WMH ON MARCH 2016.
2. GROUNDWATER ELEVATIONS ARE LISTED AS FEET ABOVE MEAN SEA LEVEL.

REV. NO.	DATE	DESCRIPTION

APTIM

WASTE MANAGEMENT OF HAWAII
KEKAHA LANDFILL PHASE II

FIGURE 2
GROUNDWATER CONTOUR MAP
1Q2019

DRAWN BY:	TRS	APPROVED BY:	CT	PROJ. NO.:	631213741	DATE:	MAY 2019

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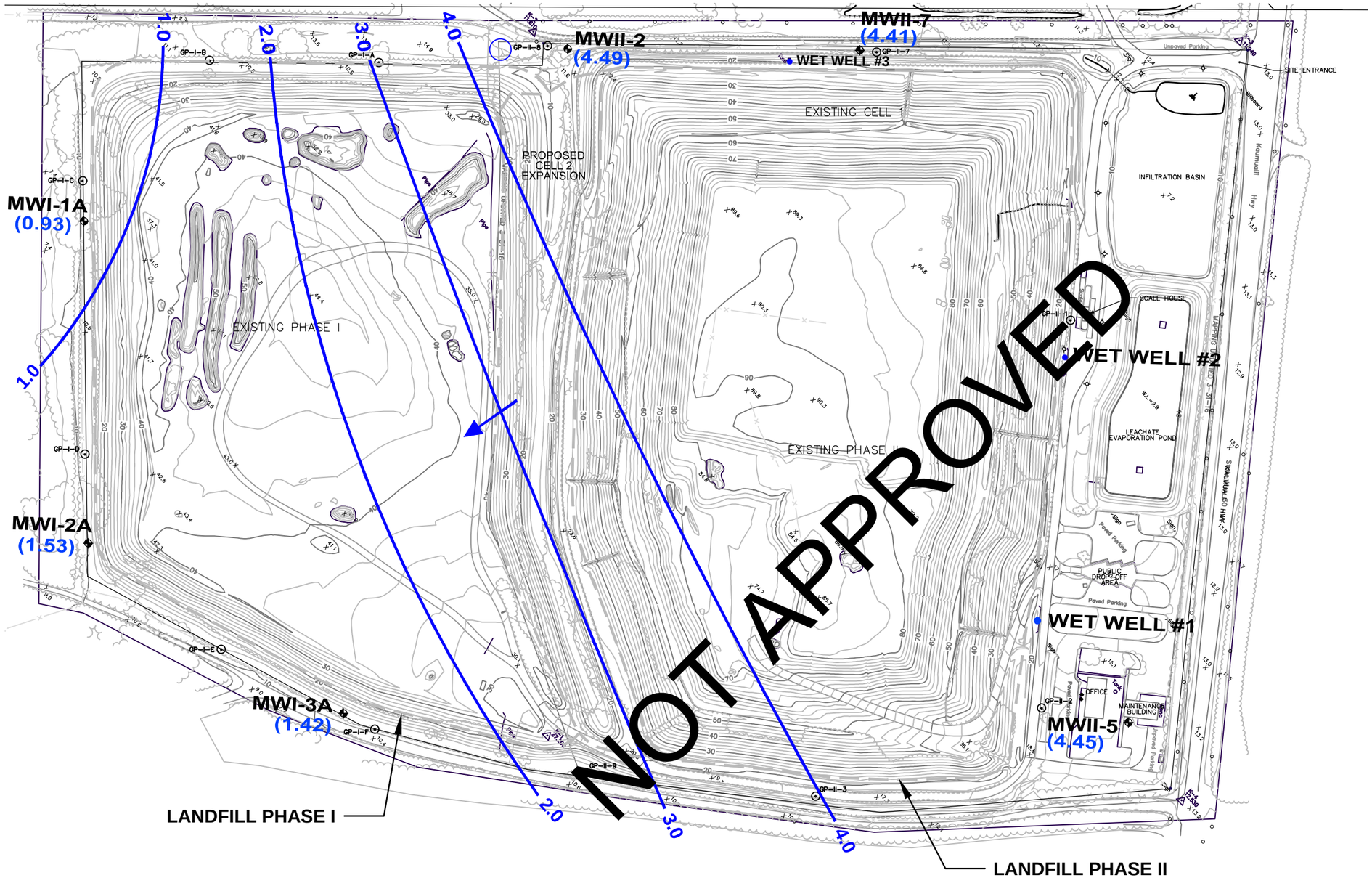


0 250'

GRAPHIC SCALE

LEGEND

- MWII-5 (4.45) — GROUNDWATER MONITORING WELL AND GROUNDWATER ELEVATION
- 4.0 — GROUNDWATER SURFACE CONTOURS
- GROUNDWATER FLOW DIRECTION
- LEACHATE WET WELL

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY WMH ON MARCH 2016.
2. GROUNDWATER ELEVATIONS ARE LISTED AS FEET ABOVE MEAN SEA LEVEL.

REV. NO.	DATE	DESCRIPTION

APTIM

WASTE MANAGEMENT OF HAWAII
KEKAHA LANDFILL

FIGURE 2
GROUNDWATER CONTOUR MAP
3Q2019

DRAWN BY:	TRS	APPROVED BY:	CT	PROJ. NO.:	631213741	DATE:	AUGUST 2019

File: M:\Kekaha\631213741-B4.dwg User: terrance.schaeffer Oct 10, 2019 - 9:16am
XREF Files: 01Exist_Site
HIO1115_2_11_15
HIO1116_3_31_16 IMAGE Files:

Top of Casing 12.98 ft (MSL)

LOCKED PROTECTIVE CASING EXTENDS 2' ABOVE GRADE

CONCRETE

BENTONITE SEAL

2-INCH DIA. SCH. 40 PVC SOLID CASING

2-INCH DIA. SCH. 40 PVC SLOTTED CASING (0.02-inch slots)

MONTEREY SILICA SAND

8-INCH DIA. BORING

END CAP

COLLAPSED

Equipment Mobile B-34

Elevation ~11 feet *Date* 05/26/95

Depth (ft)	Sample	
0		LIGHT BROWN SAND (SP), loose, dry, coralline, with shell fragments.
		Becomes medium dense.
5		Becomes moist.
		Small pieces of coralline sandstone.
		Water level at 8.6 feet, 15:21, 6/2/95.
10		Color change to light gray, wet, with abundant shell fragments.
		Color change to very light gray.
15		
20		
		End of boring at 24 feet.
25		

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-I-1 *(Sheet 1 of 1)*
Kekaha Landfill Phase I
Kekaha, Kauai, Hawaii

FIGURE 2

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
kar	22924.804		KLFWI	6/95	

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWI-1

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

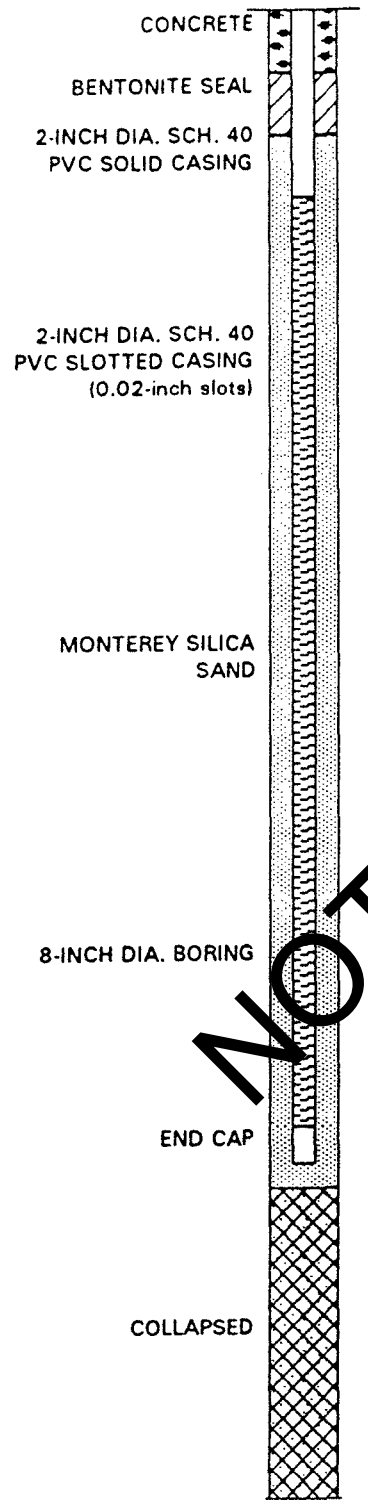
Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting: Coordinates are in	Phone Number: 241-4839 Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person: Mailing Address: P.O. BOX 621 HONOLULU, HI 96809 Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: 5/26/95	Casing Material: SCH 40 PVC Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 7.5'
Total Depth: 17.5'	Screen Material: SCH 40 PVC Slot Size: 020
Depth to Water: 7.72'	Screen Length: 10' Screen Depth: 7.5-17.5'
Was well set in an aquifer that is current or potential drinking water source? NO Boring Log/Well Construction diagram attached? YES	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT Depth: (See well diagram)
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767 Fax Number: 682-1768	Phone Number: 868-6536 Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/14/19	Sealing Material: CEMENT BENTONITE Depth: 20'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 3 BAGS Mixing Ratio: 5%
Casing/Screen Removed: YES If Yes, was annular material removed? YES If No, was casing cut off below surface?	Method of Sealing Material Placement: TREMMIE
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

Top of Casing **11.67 ft (MSL)**

Equipment **Mobile B-34**

Elevation **~9.5 feet** *Date* **05/24/95**



Depth (ft)	Sample	
0		LIGHT BROWN SAND (SP-SM), loose, dry, coralline, with shell fragments.
		LIGHT BROWN SAND (SP), medium dense, moist, coralline, with shell fragments and pieces of coralline sandstone.
5		
		Water level at 7.2 feet, 16:07, 6/2/95. Color change to brown.
		Color change to grayish brown with some refuse. Becomes moist to wet.
10		
		Color change to light gray with abundant shell fragments.
15		
20		
		End of boring at 24 feet.
25		

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-I-2 *(Sheet 1 of 1)*
Kekaha Landfill Phase I
Kekaha, Kauai, Hawaii

FIGURE **3**

DRAWN	*JOB NUMBER*	*APPROVED*	*FILE*	*DATE*	*REVISED DATE*
kar	22924.804		KLFWI	6/95	

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWI-2

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting: Coordinates are in	Phone Number: 241-4839 Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person: Mailing Address: P.O. BOX 621 HONOLULU, HI 96809 Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: 5/24/95	Casing Material: SCH 40 PVC Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 7.0'
Total Depth: 17.0'	Screen Material: SCH 40 PVC Slot Size: 020
Depth to Water: 8.26'	Screen Length: 10' Screen Depth: 7.0-17.0'
Was well set in an aquifer that is current or potential drinking water source? NO Boring Log/Well Construction diagram attached? YES	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT Depth: (See well diagram)
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767 Fax Number: 682-1768	Phone Number: 868-6536 Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/16/19	Sealing Material: CEMENT BENTONITE Depth: 20'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 3 BAGS Mixing Ratio: 5%
Casing/Screen Removed: YES If Yes, was annular material removed? YES If No, was casing cut off below surface?	Method of Sealing Material Placement: TREMMIE
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

Top of Casing **12.08 ft (MSL)**

LOCKED PROTECTIVE CASING EXTENDS 2' ABOVE GRADE

CONCRETE

BENTONITE SEAL

2-INCH DIA. SCH. 40 PVC SOLID CASING

2-INCH DIA. SCH. 40 PVC SLOTTED CASING (0.02-inch slots)

MONTEREY SILICA SAND

8-INCH DIA. BORING

END CAP

COLLAPSED

Equipment Mobile B-34

Elevation ~10 feet *Date* 05/25/95

Depth (ft)	Sample	
0		LIGHT BROWN SAND (SM-SP), loose, dry, coralline.
		BROWN SAND (SP), medium dense, moist, coralline, with shell fragments.
5		Color change to light brown, with abundant shell fragments.
		Water level at 7.6 feet, 16:46, 6/2/95. Color change to very light brown.
10		Becomes moist to wet.
		Color change to light gray.
15		
20		
		End of boring at 24 feet.
25		

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-I-3 *(Sheet 1 of 1)*
Kekaha Landfill Phase I
Kekaha, Kauai, Hawaii

FIGURE 4

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
kas	23924.004				

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWI-3

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA
	Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting:	Phone Number: 241-4839
Coordinates are in	Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person:
	Mailing Address: P.O. BOX 621 HONOLULU, HI 96809
	Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: 5/25/19	Casing Material: SCH 40 PVC Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 8.0'
Total Depth: 18.0'	Screen Material: SCH 40 PVC Slot Size: 020
Depth to Water: 8.18'	Screen Length: 10' Screen Depth: 8.0-18.0'
Was well set in an aquifer that is current or potential drinking water source? NO	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT Depth: (See well diagram)
Boring Log/Well Construction diagram attached? YES	
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767	Phone Number: 868-6536
Fax Number: 682-1768	Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/16/19	Sealing Material: CEMENT BENTONITE Depth: 20'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 3 BAGS Mixing Ratio: 5%
Casing/Screen Removed: YES	Method of Sealing Material Placement: TREMMIE
If Yes, was annular material removed? YES	
If No, was casing cut off below surface?	
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWII-6

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting: Coordinates are in	Phone Number: 241-4839 Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person: Mailing Address: P.O. BOX 621 HONOLULU, HI 96809 Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: UNKNOWN	Casing Material: SCH 40 PVC Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 15.0'
Total Depth: 35.0'	Screen Material: SCH 40 PVC Slot Size: 020
Depth to Water: 18.78'	Screen Length: 20' Screen Depth: 15.0-35.0'
Was well set in an aquifer that is current or potential drinking water source? NO Boring Log/Well Construction diagram attached? NO	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT Depth: (See well diagram)
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767 Fax Number: 682-1768	Phone Number: 868-6536 Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/9/19	Sealing Material: CEMENT BENTONITE Depth: 35.0'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 5 BAGS Mixing Ratio: 5%
Casing/Screen Removed: YES If Yes, was annular material removed? YES If No, was casing cut off below surface?	Method of Sealing Material Placement: TREMMIE
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

MWII-2

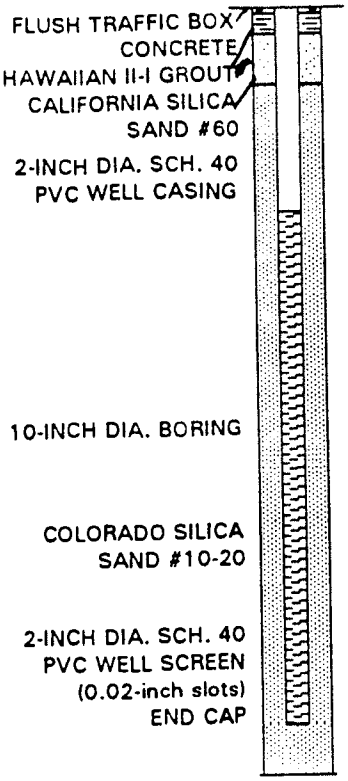
Harding Lawson Associates. 1993. Engineering Report, Kekaha Landfill Phase II, Kekaha, Kaua'i, Hawai'i. August.

Top of Casing **feet**

Equipment **Mobile B-61**

Elevation **feet** *Date* **01/22/93**

Laboratory Tests	*Moisture Content (%)*	*Blows/foot*	*Depth (ft)*	*Sample*
			0	
		22	5	
		38	10	
			15	
			20	
			25	
			30	



LIGHT BROWN CALCAREOUS SAND (SP), medium dense to dense, fine to medium, moist.

Becomes saturated.
Water level at 6.5 feet, 9:55, 1/22/93

Becomes white, light brown, medium to coarse.

End of boring at 15 feet.

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-II-2
Kekaha Phase II Design
Kekaha, Kauai, Hawaii

PLATE A-2

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
kar	22897.204	PBC	KEKII	2/93	

MWII-4

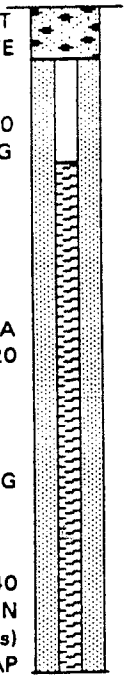
Harding Lawson Associates. 1993. Engineering Report, Kekaha Landfill Phase II, Kekaha, Kaua'i, Hawai'i. August.

Top of Casing **feet**

Equipment **Mobile B-61**

Elevation **feet** *Date* **01/22/93**

Laboratory Tests	*Moisture Content (%)*	*Blows/foot*	*Depth (ft)*	*Sample*
			0	
		36		
			5	
		50		
			10	
			15	
			20	
			25	
			30	



3' STICKUP MONUMENT CONCRETE

2-INCH DIA. SCH. 40 PVC WELL CASING

COLORADO SILICA SAND #10-20

10-INCH DIA. BORING

2-INCH DIA. SCH. 40 PVC WELL SCREEN (0.02-inch slots) END CAP

LIGHT BROWN CALCAREOUS SAND (SP), dense, fine to medium, moist.

Water level at 6.0 feet, 16:20, 1/22/93

End of boring at 13 feet.

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-II-4
Kekaha Phase II Design
Kekaha, Kauai, Hawaii

PLATE A-4

DRAWN	*JOB NUMBER*	*APPROVED*	*FILE*	*DATE*	*REVISED DATE*
kar	22897.204	PBC	KEKII	2/93	

Abandonment of Monitoring Well
Summary Report
Monitoring Well MWII-4

Submit form in 30 days of well abandonment or within 90 days if included in a site closure, monitoring, or investigation report. In addition, submit copies of the original boring log and well construction diagram for the monitoring well, and the disposal documentation for wastes generated during the abandonment process. Submit all documentation to: Hawai'i Department of Health, Hazard Evaluation and Emergency Response Office, Attention: SDAR, 919 Ala Moana Blvd, Rm 206, Honolulu Hawai'i 96814.

Location Information	Owner Information
Facility Name: KEKAHA LANDFILL	Well Owner: COUNTY OF KAUAI SOILD WASTE BRANCH
Facility Address: 6900 KAUMUALII HWY #A KEKAHA, HI 96752	Contact Person: LYLE TABATA
	Mailing Address: 4444 RICE ST. #295 LIHUE, HI 96766
Northing:	
Easting:	Phone Number: 241-4839
Coordinates are in	Fax Number: 241-6204
TMK: 1-2-002:001 & 1-2-002:009	Land Owner: STATE OF HAWAII DLNR
Location Description: ALONG ACCESS ROAD OF EXISTING PHASE 1 SEE ATTACHED MAP	Contact Person:
	Mailing Address: P.O. BOX 621 HONOLULU, HI 96809
	Phone Number: 587-0419
Monitoring Well Location Map Attached: YES	Fax Number: 312-6357
Well Construction Information	
Date of Installation: UNKNOWN	Casing Material: SCH 40 PVC
	Casing Diameter: 2"
Drilling Company: UNKNOWN	Casing Length: 15.0'
Total Depth: 18.1'	Screen Material: SCH 40 PVC
	Slot Size: 020
Depth to Water: 17.10'	Screen Length: 10.0'
	Screen Depth: 8.1'-18.1'
Was well set in an aquifer that is current or potential drinking water source? NO	Annular Material: FILTER PACK MONTEREY SAND #3, BENTONITE, GROUT
	Depth: (See well diagram)
Boring Log/Well Construction diagram attached? NO	
General Abandonment Information	
Drilling Firm: VALLEY WELL DRILLING, LLC	Consulting Firm: GOODFELLOW BROTHERS
Contact Person: TRACIE SOBER	Contact Person: AUSTIN FRICKE
Mailing Address: 91-255 KAUHI ST. KAPOLEI, HI 96707	Mailing Address: P.O. BOX 3690 LIHUE, HI 96766
Phone Number: 682-1767	Phone Number: 868-6536
Fax Number: 682-1768	Fax Number:
Well Abandonment Information	
Date of Abandonment: 5/14/19	Sealing Material: CEMENT BENTONITE
	Depth: 20'
Reason for Abandonment: LANDFILL EXPANSION	Volume/Weight/Bags: 4 BAGS
	Mixing Ratio: 5%
Casing/Screen Removed: YES	Method of Sealing Material Placement: TREMMIE
If Yes, was annular material removed? YES	
If No, was casing cut off below surface?	
Comments:	
Driller's Signature:	Date:
Consultant's Signature:	Date:

NOT APPROVED

MWII-5

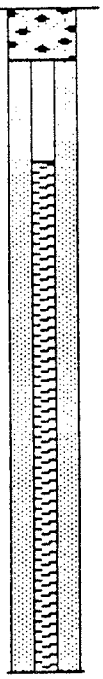
Harding Lawson Associates. 1993. Engineering Report, Kekaha Landfill Phase II, Kekaha, Kaua'i, Hawai'i. August.

Top of Casing **feet**

Equipment **Mobile B-61**

Elevation **feet** *Date* **01/23/93**

Laboratory Tests	*Moisture Content (%)*	*Blows/foot*	*Depth (ft)*	*Sample*
			0	
		47		
			5	
		30		
			10	
		25		
			15	
			20	
			25	
			30	



3' STICKUP MONUMENT CONCRETE

2-INCH DIA. SCH. 40 PVC WELL CASING

COLORADO SILICA SAND #10-20

10-INCH DIA. BORING

2-INCH DIA. SCH. 40 PVC WELL SCREEN (0.02-inch slots) END CAP

LIGHT BROWN CALCAREOUS SAND (SP), fine, moist.

Becomes saturated.

End of boring at 13 feet.

NOT APPROVED

Harding Lawson Associates
Engineering and Environmental Services

Log of Monitoring Well MW-II-5
Kekaha Phase II Design
Kekaha, Kauai, Hawaii

PLATE A-5

DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DA
kar	22897.204	PBC	KEKII	2/93	

MWII-7

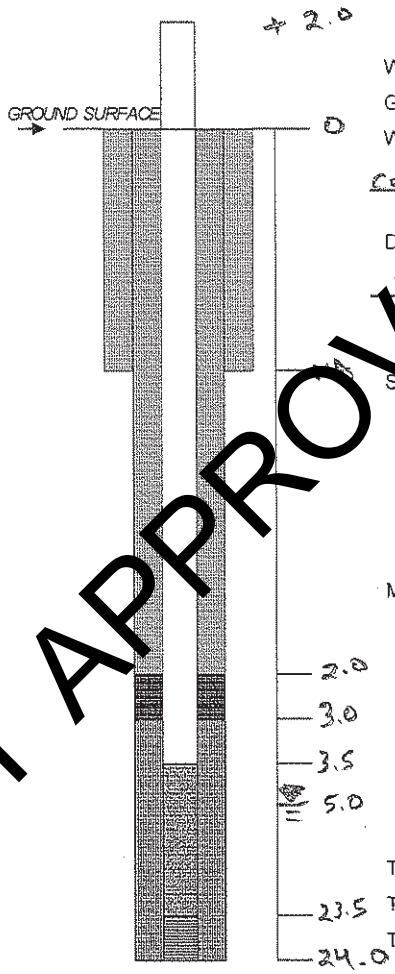
AMEC. 2008. Kekaha Phase II Landfill Well Construction (letter) Report. December.

WELL COMPLETION RECORD

JOB NO.: _____ WELL NO. MW-II-07 HYDROGEOLOGIST: Jeremy Haney

CLIENT: City and County of Kauai DRILLER: Tim Robertson

WELL LOCATION: Kekaha landfill DATE/TIME: Nov 19, 2008



Well Head Elevation +2ft

Ground Surface Elev. ?

Well Head Completion Method

concrete monument + bollards

Drilling Method/Rig Type

Hollow stem auger

Surface ~~Casing~~ monument

Type Steel

Diameter 8in

Length 5ft

DETAILS OF CONSTRUCTION

Date Completed 11/19/08

Borehole Diameter (in.) 8in

Type and Size of Casing (in.) Sch 40 PVC 2in

Type and Size of Screen (in.) 11 ~~2ft~~ 20ft

Screen Perforation Diameter (in.) 0.010

Screen Length (ft.) 20ft

Centralizer Depths (ft.) NA

Completion Technique

1. Type of Filter Pack and Placement Method
   Sand Monterey #2
2. Type of Bentonite and Placement Method
   pellets
3. Type of Grout Mixture and Placement Method
   cement

Description of Potential Problems With Well:
None

Development Technique
Surge + pump

MATERIALS

Cement (bags)	4
Sand (ft.^{3})	7 bags
Casing Material (ft.)	5 ft
Bentonite (ft.^{3})	1 Bag

Top of Bentonite	2.0	ft.
Top of Filter Pack	3.0	ft.
Top of Screen	3.5	ft.
Bottom of Screen	23.5	ft.
Bottom of Hole	24.0	ft.

NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE

GROUT
BENTONITE
FILTER PACK

NOT APPROVED

Field Log of Boring

BORING NUMBER: MW-I-1A

SHEET 1 OF 1

PROJECT NAME: KEKAHA LANDFILL	PROJECT NUMBER:	ELEVATION AND DATUM: Ground Surface 11.14 ft Local Tidal	LOCATION: KEKAHA LANDFILL
DRILLING COMPANY: VALLEY WELL DRILLING	DRILLER: BYRON MEACHAM	DATE AND TIME STARTED: 5/28/19 1230	DATE AND TIME COMPLETED: 5/29/19 0830
DRILLING EQUIPMENT: AMS POWER PROBE	DRILLING METHOD: HOLLOW STEM AUGER	COMPLETION DEPTH: 20	TOTAL NO. OF SAMPLES: NONE
SIZE AND TYPE OF BIT: 8"	HOLE DIAMETER: 8"	NO. OF SAMPLES: BULK / SS	DRIVE: NA / PITCHER: NA
DRILLING FLUID: NA	DRILLING ANGLE: NA	WATER LEVEL: FIRST 8' BGS	AFTER 1 HOURS: 8' BGS
SAMPLE HAMMER TYPE: NA AUTOMATIC; DRIVING WT.; DROP		HYDROGEOLOGIST/DATE	CHECKED BY/DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOWCOUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
Medium Sand 0-20'	0				Medium Sand, SM	SAND	0	100	0	
					Silty sand pale brown					
					5YR6/6 loose					PID@2.5' 0 PPM
	5			3-2-15						PID@5' 0 PPM
										PID@7.5' 0 PPM
					DRY WATER AT 8'BGS					
	10			5-8-12	WET					PID@10' 0 PPM
										PID@12.5' 0 PPM
	15				32-46-50 for 6 Pale Grey					PID@15' 0 PPM
										PID@17.5' 0 PPM
	20			5-3-4	Pale Grey					PID@20' 0 PPM

NOT APPROVED

No rock encountered. No presence of fill materials.

MONITORING WELL CONSTRUCTION DIAGRAM

WELL #: **MWI-1A** CONSULTANT: GOODFELLOW BROTHERS

CLIENT: COUNTY OF KAUAI SOLID WASTE BRANCH DRILLER: BYRON MEACHAM

WELL LOCATION: KEKAHA LANDFILL, KAUAI DATE/TIME: Monument Set 6/13/19

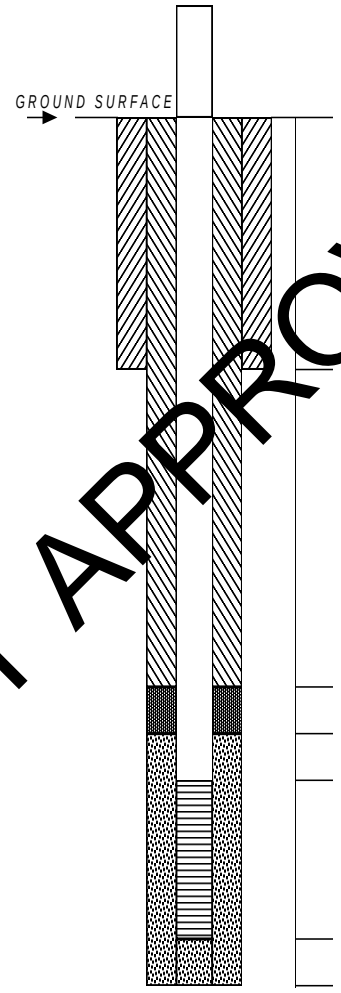
DETAILS OF CONSTRUCTION

Date Completed:	6/13/19
Borehole Diameter (in.)	8”
Type and Size of Casing (in.)	2” sch 40
Type and Size of Screen (in.)	2” sch 40
Screen Perforation Diameter (in.)	.020
Screen Length (ft.)	15’
Centralizer Depths (ft.)	NA

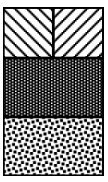
Completion Technique

1. Type of Filter Pack and Placement Method
   Monterey #3 HSA
2. Type of Bentonite and Placement Method
   3/8” HSA
3. Type of Grout Mixture and Placement Method
   Cement

Description of Potential Problems With Well:



NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE



GROUT

BENTONITE

FILTER PACK

Well Head Elevation	XXX 14.53 ft Local Tidal
	ABOVE GROUND
Ground Surface Elev.	XXX 11.14 ft Local Tidal
Well Head Completion Method	MONUMENT
Drilling Method/Rig Type	HSA Hollow Stem Auger

Surface Completion:

Type:	ABOVE
Diameter:	12”
Length:	5.5’

MATERIALS

Cement (bags)	2
Sand (ft)	17’
Casing Material (ft)	5’
Bentonite (ft)	2’

Top of Bentonite	1.5	ft
Top of Filter Pack	2.5	ft
Top of Screen	4.5	ft
Bottom of Screen	19.5	ft
Bottom of Hole	20	ft

NOT APPROVED

Field Log of Boring

BORING NUMBER: MW-I-2A

SHEET 1 OF 1

PROJECT NAME: KEKAHA LANDFILL	PROJECT NUMBER:	ELEVATION AND DATUM: Ground Surface 10.52 ft Local Tidal	LOCATION: KEKAHA LANDFILL
DRILLING COMPANY: VALLEY WELL DRILLING	DRILLER: MICHAEL SURIGAO	DATE AND TIME STARTED: 5/17/19 900AM	DATE AND TIME COMPLETED: 5/17/19 1200PM
DRILLING EQUIPMENT: AMS POWER PROBE	DRILLING METHOD: HOLLOW STEM AUGER	COMPLETION DEPTH: 20	TOTAL NO. OF SAMPLES: NONE
SIZE AND TYPE OF BIT: 8"	HOLE DIAMETER: 8"	NO. OF SAMPLES: BULK: SS:	DRIVE: NA PITCHER: NA
DRILLING FLUID: NA	DRILLING ANGLE: NA	WATER LEVEL: FIRST 8' BGS	AFTER 1 HOURS 8 BGS
SAMPLE HAMMER TYPE: NA AUTOMATIC	DRIVING WT.	DROP	HYDROGEOLOGIST/DATE: CHECKED BY/DATE

NOT APPROVED

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOWCOUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
Medium Sandy 0-20'	0				Medium Sand, SM	SAND	0	100	0	
					Silty sand pale brown					
					5YR6/6 loose					PID@2.5' 0 PPM
	5			7-11-29						PID@5' 0 PPM
										PID@7.5' 0 PPM
					DRY WATER AT 8'BGS					
	10			6-9-10	WET					PID@10' 0 PPM
										PID@12.5' 0 PPM
	15			4-11-8						PID@15' 0 PPM
										PID@17.5' 0 PPM
	20			3-11-11						PID@20' 0 PPM

No rock encountered. No presence of fill material.

MONITORING WELL CONSTRUCTION DIAGRAM

WELL #: **MWI-2A** CONSULTANT: GOODFELLOW BROTHERS

CLIENT: COUNTY OF KAUAI SOLID WASTE BRANCH DRILLER: MICHAEL SURIGAO

WELL LOCATION: KEKAHA LANDFILL, KAUAI DATE/TIME: Monument Set 6/13/19

NOT APPROVED

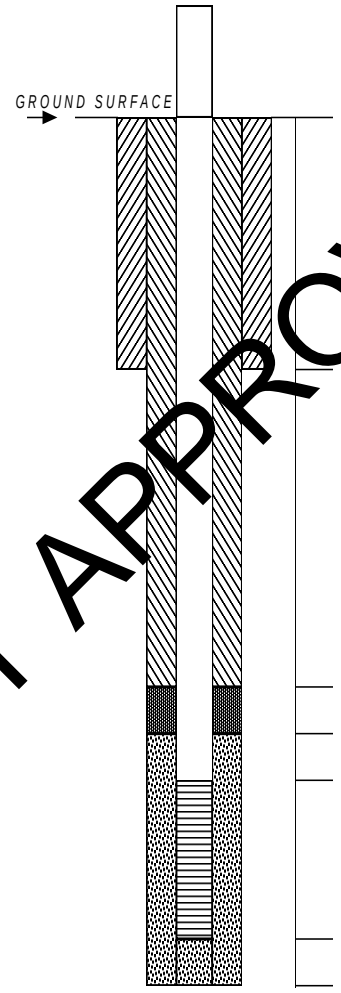
DETAILS OF CONSTRUCTION

Date Completed:	6/13/19
Borehole Diameter (in.)	8”
Type and Size of Casing (in.)	2” sch 40
Type and Size of Screen (in.)	2” sch 40
Screen Perforation Diameter (in.)	.020
Screen Length (ft.)	15’
Centralizer Depths (ft.)	NA

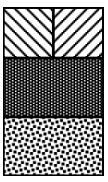
Completion Technique

1. Type of Filter Pack and Placement Method
   Monterey #3 HSA
2. Type of Bentonite and Placement Method
   3/8” HSA
3. Type of Grout Mixture and Placement Method
   Cement

Description of Potential Problems With Well:



NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE



GROUT

BENTONITE

FILTER PACK

Well Head Elevation	XXX 13.33 ft Local Tidal
	ABOVE GROUND
Ground Surface Elev.	XXX 10.52 ft Local Tidal
Well Head Completion Method	MONUMENT
Drilling Method/Rig Type	HSA Hollow Stem Auger

Surface Completion:

Type:	ABOVE
Diameter:	12”
Length:	5.5’

MATERIALS

Cement (bags)	2
Sand (ft)	17’
Casing Material (ft)	5’
Bentonite (ft)	2’

Top of Bentonite	1.5	ft
Top of Filter Pack	2.5	ft
Top of Screen	4.5	ft
Bottom of Screen	19.5	ft
Bottom of Hole	20	ft

Field Log of Boring

BORING NUMBER: MWI-3A

SHEET 1 OF 1

PROJECT NAME: KEKAHA LANDFILL	PROJECT NUMBER:	ELEVATION AND DATUM: Ground Surface 11.03 ft Local Tidal	LOCATION: KEKAHA LANDFILL
DRILLING COMPANY: VALLEY WELL DRILLING	DRILLER: BYRON MEACHAM	DATE AND TIME STARTED: 5/28/19 1000	DATE AND TIME COMPLETED: 5/28/19 1130
DRILLING EQUIPMENT: AMS POWER PROBE	DRILLING METHOD: HOLLOW STEM AUGER	COMPLETION DEPTH: 20	TOTAL NO. OF SAMPLES: NONE
SIZE AND TYPE OF BIT: 8"	HOLE DIAMETER: 8"	NO. OF SAMPLES: BULK / SS	DRIVE: NA / PITCHER: NA
DRILLING FLUID: NA	DRILLING ANGLE: NA	WATER LEVEL: FIRST 8' BGS	AFTER 1 HOURS: 8' BGS
SAMPLE HAMMER TYPE: NA AUTOMATIC	DRIVING WT.	DROP	HYDROGEOLOGIST/DATE	CHECKED BY/DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOWCOUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
Medium Sand 0-20'	0				Medium Sand, SM	SAND	0	100	0	
					Silty sand pale brown					
					5YR6/6 loose					PID@2.5' 0 PPM
	5			13-26-27						PID@5' 0 PPM
										PID@7.5' 0 PPM
					DRY WATER AT 8'BGS					
	10				WET					PID@10' 0 PPM
										PID@12.5' 0 PPM
	15			12-22-20	Pale Grey					PID@15' 0 PPM
										PID@17.5' 0 PPM
	20			6-8-12	Pale Grey					PID@20' 0 PPM

NOT APPROVED

No rock encountered. No presence of fill material.

MONITORING WELL CONSTRUCTION DIAGRAM

WELL #: **MWI-3A** CONSULTANT: GOODFELLOW BROTHERS

CLIENT: COUNTY OF KAUAI SOLID WASTE BRANCH DRILLER: BYRON MEACHAM

WELL LOCATION: KEKAHA LANDFILL, KAUAI DATE/TIME: Monument Set 6/13/19

NOT APPROVED

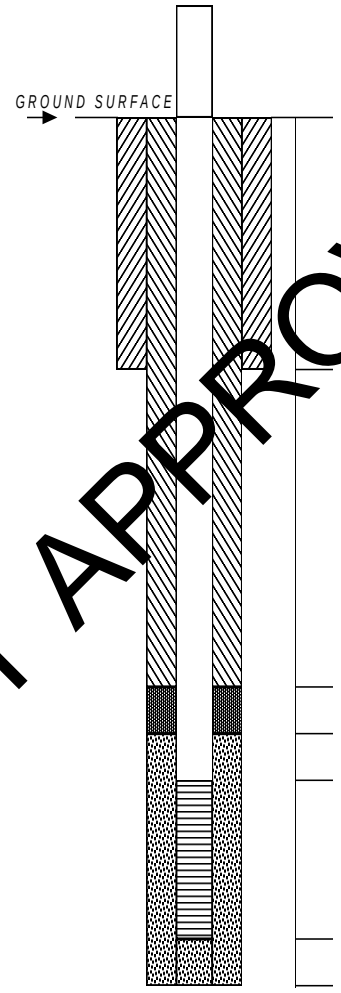
DETAILS OF CONSTRUCTION

Date Completed:	6/13/19
Borehole Diameter (in.)	8”
Type and Size of Casing (in.)	2” sch 40
Type and Size of Screen (in.)	2” sch 40
Screen Perforation Diameter (in.)	.020
Screen Length (ft.)	15’
Centralizer Depths (ft.)	NA

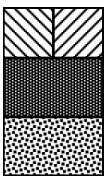
Completion Technique

1. Type of Filter Pack and Placement Method
   Monterey #3 HSA
2. Type of Bentonite and Placement Method
   3/8” HSA
3. Type of Grout Mixture and Placement Method
   Cement

Description of Potential Problems With Well:



NOTE: ALL DEPTHS ARE REFERENCED TO GROUND SURFACE



GROUT

BENTONITE

FILTER PACK

Well Head Elevation	XXX 14.03 ft Local Tidal 3.5 ABOVE GROUND
Ground Surface Elev.	XXX 11.03 ft Local Tidal
Well Head Completion Method	MONUMENT
Drilling Method/Rig Type	HSA Hollow Stem Auger

Surface Completion:

Type:	ABOVE
Diameter:	12”
Length:	5.5’

MATERIALS

Cement (bags)	2
Sand (ft)	17’
Casing Material (ft)	5’
Bentonite (ft)	2’

Top of Bentonite	1.5	ft
Top of Filter Pack	2.5	ft
Top of Screen	4.5	ft
Bottom of Screen	19.5	ft
Bottom of Hole	20	ft

WELL CONDITION INSPECTION FORM

Site: _____ Personnel: _____

Date: _____ Page _____ of _____

Well ID	Protective Casing	Well Casing	Label	Lock	Sample Equipment Type	General Turbidity	Well Yield	Comments/Observations *
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	
	☐ OK ☐ Damaged	☐ OK ☐ Damaged	☐ OK ☐ Inadequate	☐ Yes ☐ No		☐ Clear ☐ Turbid	☐ OK ☐ Inadequate	

NOT APPROVED

* Note ponding water, weep holes, or any other information pertaining to well condition. Provide additional details on listed items.

Return this form to Site Manager and Groundwater Program Manager

Well Condition Summary Form

Facility: _____ Well/Piezometer Name: _____

Evaluator: _____ Evaluation Date: _____

	Y	N	N/A
Is the well's location appropriately shown on a facility map?			
Is the well adequately flagged if hard to find?			
Is the well elevation information inscribed at or on the well correct?			
Is the well: ❑ flush with surface? ❑ above ground?			
Is the well free of physical damage?			
Is the well labeled on the inside?			
Is the well labeled on the outside?			
Does the well have protective posts, if necessary?			
Do above ground wells have weep holes at the base of the protective casing?			
Does the area around the well appear clean?			
Is the casing secure (attempt to move along two perpendicular axes)?			
Is the surface seal void of differential erosion around and under the base?			
Is the surface seal free of cracks that may affect the integrity of the seal?			
Is the surface seal sloped to prevent ponding around the well?			
Is the well free from standing or ponded water?			
Is the well locked to prevent unauthorized access?			
Is the protective casing cap void of large gaps which would breach security?			
Is the locking cap free of rust?			
Is there a survey mark on the riser/wellhead assembly cap?			
Is the riser cap vented?			
Is the annular space free of animal/insect nests?			
Is the annular space appropriately filled with filtering material?			
If a pump, can it be lifted a few inches? (do not test prior to sampling)			
Is the well free of kinks or bends?			

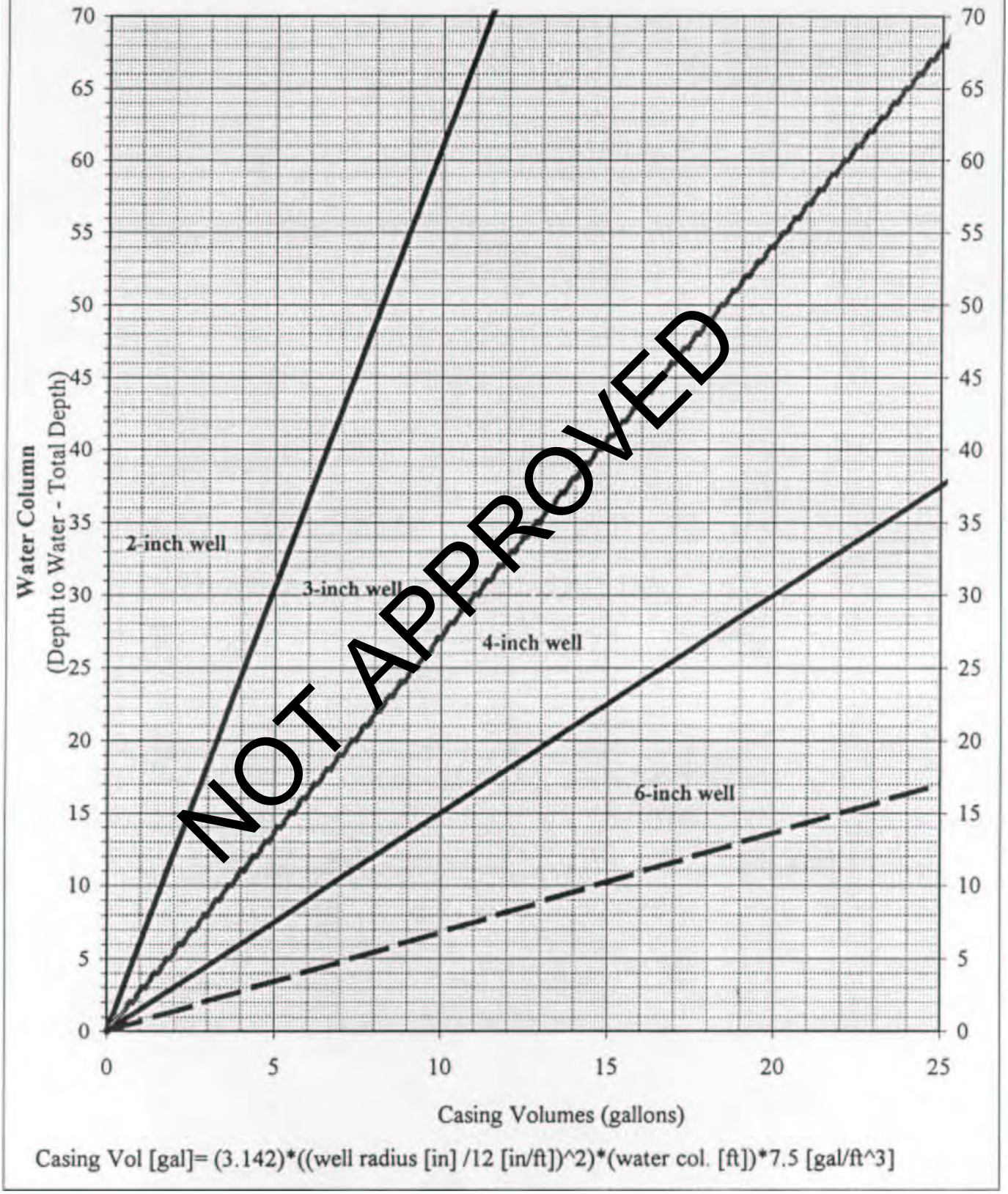
NOT APPROVED

COMMENTS: _____

_____

_____

Purge Table



Casing Vol [gal]= (3.142)*((well radius [in] /12 [in/ft])^2)*(water col. [ft])*7.5 [gal/ft^3]

METER CALIBRATION LOG

PROJECT NAME:_____ DATE:_____

PROJECT NUMBER:_____ SAMPLER:_____

MODEL:_____ SERIAL NO.:_____

pH METER

Time	pH 10 Buffer Check	pH 7 Buffer Check	pH 4 Buffer Check	Temp of Calibration Soln (°C)

Buffer Lot Numbers: pH 4:_____ pH 7:_____ pH 10:_____

CONDUCTIVITY METER

Temp. of Calibration Soln	Corrected Cond. @ 25°C	*Time*

REDOX METER

Temp (°C)	E_H Reading (mV)	Time

Calibration Solution Lot Number:_____ **Calibration Solution Lot Number:**_____

Calibration Range for Solution _____ Calibration Range for Solution _____

MODEL:_____ **SERIAL NO.**:_____

NOT APPROVED

Turbidity Meter

Gel Value (NTU)	Reading (NTU)	Time
0 – 10 range		
0 – 100 range		
0 – 1,000 range		
0 – 10 range		
0 – 100 range		
0 – 1,000 range		

Problems/Corrective Actions:_____

Signature:_____ Date:_____

QC'd By:_____ Date:_____

Geosyntec consultants

engineers | scientists | innovators

SECTION VI - PERIMETER GAS MONITORING PLAN

Kekaha Landfill Phase II
Kekaha, Kaua‘i, Hawai‘i

Prepared for

County of Kaua‘i
Department of Public Works
4444 Rice Street
Lihu‘e, Kaua‘i 96766

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project number: WG3074

February 20, 2023

Revised November 22, 2023

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Figure 2: Groundwater Monitoring Site Layout Map

Figure 3: Gas Monitoring Probe Locations

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Appendix A: Landfill Gas Meter Calibration Certificate

Appendix B: Perimeter Gas Monitoring Field Report Form

ACRONYMS AND ABBREVIATIONS

§	Section
bgs	below ground surface
btoc	below top of casing
CFR	Code of Federal Regulations
DOH	Department of Health, State of Hawai‘i
EPA	Environmental Protection Agency, United States
ft	foot or feet
GCCS	gas collection and control system
gpm	gallons per minute
HAR	Hawai‘i Administrative Rules
ID	identification
KLF	Kekaha Landfill
LEL	lower explosive limit
LFG	landfill gas
msl	mean sea level
MSW	municipal solid waste
NSPS	New Source Performance Standards
PGMP	perimeter gas monitoring plan
SCADA	supervisory control and data acquisition
RCRA	Resource Conservation and Recovery Act
SCFM	standard cubic feet per minute
SWS	Solid Waste Section
TDS	total dissolved solids
USGS	U.S. Geological Survey
WBZ	water bearing zone

1. INTRODUCTION

Geosyntec Consultants, Inc. has prepared this Perimeter Gas Monitoring Plan (PGMP) for the Kekaha Municipal Solid Waste Landfill (KLF), located in Kekaha, Kauaʻi, Hawaiʻi. Solid Waste Management Permit LF-0042-16 (Permit) was issued on September 13, 2019, and provides guidance for both Phase I and Phase II of the landfill while permitting active disposal in Phase II.

This PGMP summarizes the existing perimeter gas monitoring network and gas monitoring program for the monitoring of methane at the KLF while combining the monitoring programs of both Phase I and Phase II. This PGMP complies with the landfill gas (LFG) monitoring requirements of the Federal Resource Conservation and Recovery Act (RCRA) Subtitle D regulations, Hawaiʻi Administrative Rules (HAR), and the KLF Phase II Solid Waste Permit (No.LF-0042-16) that was issued by the State of Hawaiʻi Department of Health (DOH) Solid Waste Section (SWS).

1.1 Objectives

The objectives of this PGMP are to:

- Summarize applicable LFG migration monitoring and regulatory requirements
- Outline the existing perimeter gas monitoring network and current site conditions at the KLF
- Provide guidance on properly monitoring the perimeter gas monitoring network

1.2 Regulatory Requirements

Pursuant to RCRA Subtitle D regulations 40 Code of Federal Regulations (CFR) Section (§)258.23, and HAR Title 11, Chapter 58.1-15(d), municipal solid waste (MSW) landfills must monitor methane gas in facility structures and around the landfill perimeter (DOH 1994). Owners or operators of all MSW landfills must ensure that:

- §258.23 (a)(1) & §11-58.1-15(d)(1)(A) “The concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit (LEL) for methane in facility structures (excluding gas control or recovery system components)”
- §258.23 (a)(2) & §11-58.1-15(d)(1)(B) “The concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary,” the LEL for methane gas is 5 percent by volume
- §258.23 (b)(1) & §11-58.1-15 (d)(2)(A) “The type and frequency of monitoring must be determined based on the following factors:

  (i) Soil conditions
  (ii) The hydrogeologic conditions surrounding the facility

(iii) The hydraulic conditions surrounding the facility
(iv) The location of facility structures and property boundaries

These criteria were considered in developing the PGMP for the KLF.

2. SITE INFORMATION

This section consists of five subsections presenting site information pertinent to the KLF PGMP:

- Site Description
- Landfill Structures and Surroundings
- Site Geology
- Site Hydrogeology
- LFG Collection and Control System (GCCS)

2.1 Site Description

The KLF is located near the southwest coast of the Island of Kaua‘i, about 2 miles west of the town of Kekaha, at mile marker 28 of Kaumuali‘i Highway (Highway 50). As shown on Figure 1-1, the seaward boundary of the landfill site is located approximately 4,000 feet (ft) northeast of the ocean shoreline. The KLF facility, as permitted, consists of two landfill phases, the Phase I landfill and the Phase II landfill.

The KLF Phase I landfill occupies approximately 33 acres and varies in elevation from approximately 10 to 49 ft above mean sea level (msl). The County opened the Phase I landfill in 1953 and accepted solid wastes at the facility until operations ceased on October 8, 1993. The Phase I landfill has no liner system beneath the refuse; however, the final cover of the Phase I Landfill was designed and constructed in accordance with the following environmental rules and regulations in effect at the time of construction:

- United States (U.S.) Environmental Protection Agency (EPA) Solid Waste Disposal Facility Criteria, under RCRA Subtitle D, published as 40 CFR Part 258
- DOH Solid Waste Management Control and Interim Guidelines for Landfill Closure, Draft, HAR Title 11, Chapter 58

The KLF Phase II landfill was constructed in 1993 and is bounded by Kaumuali‘i Highway to the northeast, an unpaved access road and agricultural area to the southeast, an aquaculture facility to the northwest, and the Phase I Landfill to the southwest. The Phase II Landfill was constructed to meet RCRA Subtitle D criteria and is currently an active MSW landfill.

Since it opened in 1993, the Phase II landfill has been expanded five times: three vertical expansions (1998, 2005, and 2014); and two lateral expansions (2010 and 2019-2020).

The first lateral expansion of the Phase II landfill was designated as Cell 1, which was constructed in 2010 and added approximately 6.4 acres to the west end of the Phase II landfill, increasing the total permitted footprint of the Phase II landfill to 38.5 acres.

In 2019 and 2020, the Cell 2 lateral expansion was constructed. The Cell 2 lateral expansion fills the area between the southwest bank of the Phase II landfill and the northeast bank of the unlined Phase I landfill (Figure 1-2). Construction of the Cell 2 expansion created a continuous Subtitle D base liner system that underlies all the Phase II landfill, including Cell 2. Cell 2 extends the permitted footprint of the lined Phase II landfill by approximately 6.6 acres and provides an estimated 947,500 cubic yards of airspace based on a final cover elevation of 120 feet above msl. A vertical expansion to a final elevation of 171.5 feet above msl is proposed and is undergoing permit review. If current landfill waste density and daily disposal rates remain consistent, the Cell 2 expansion is expected to extend the operating life of the Phase II landfill by approximately 3.2 years. Unless otherwise noted, the term "Phase II landfill" includes all the original Phase II landfill area, the Cell 1 and Cell 2 lateral expansions, and the three vertical expansions.

2.2 Climate and Topography

The Kekaha-Mana coastal plain is relatively arid compared to the rest of Kaua'i due to the "rain shadow" effect of the mountains to the north. Annual rainfall in the area averages between 10 to 40 inches per year, while areas near the center of the island average more than 280 inches of rain per year (Oregon Climate Services, 1998).

2.3 Regional Geology

The geologic formations of the Kekaha-Mana coastal plain consist primarily of older alluvium and contemporary coralline and marl sedimentary rocks of marine, littoral, and terrestrial origin (Sanifill and Baquerizo 1996). These sedimentary rocks were deposited in lagoon and estuarine environments and in a flanking terrestrial environment. The thickness of the coastal plain sedimentary deposit ranges from zero on the inland edge to more than 400 ft along the seaward edge of the plain. The surface deposits extend to depths of approximately 50 ft below ground surface (bgs), and consist predominantly of loose sand, coral fragments, and shell debris. The sedimentary deposits beneath the KLF are estimated to be over 400 ft thick and are underlain by basalt; the top of the basalt is a drowned, wave-cut bench sloping gently seaward (Sanifill and Baquerizo, 1996).

2.4 Regional Hydrogeology

Two aquifers with distinctly different hydrogeologic properties underlie the Kekaha-Mana coastal plain: a coastal plain aquifer within the near-surface sedimentary (caprock) deposits; and a deep aquifer within the underlying sequence of basalt flows of the Nāpali Formation. This aquifer typically yields large quantities of water from wells and shafts with little drawdown, reflecting generally high hydraulic conductivity, estimated by the U.S. Geological Survey (USGS) as approximately 400 ft/day. Saturated sediments of the caprock formation (the caprock aquifer) overlie the basaltic aquifer and limit the seaward discharge of groundwater from the deeper aquifer. According to the USGS, the regional average hydraulic conductivity of the coastal plain aquifer is approximately 0.12 feet/day (Burt, 1976).

Recharge to the uppermost water bearing zone (WBZ) of the coastal plain aquifer underlying the KLF occurs in the upland area northeast of the facility. Groundwater flows from the higher elevations to the northeast, through the Nāpali basalts and into the sedimentary coastal plain aquifer. The groundwater enters the coastal sedimentary units at their contact with the upland basalts, flows seaward, and discharges into the Pacific Ocean. Total dissolved solids (TDS) concentrations increase significantly from inland (Mauka) areas to seaward (Makai) areas as the groundwater flows through the coastal sediments and mixes with sea water. However, the results of an April 1994 tidal study indicate that tidal effects do not significantly influence the prevailing groundwater flow direction within the coastal plain aquifer at the site (Sanifill and Baquerizo, 1996).

The water table level in the site area is controlled by pumping stations in the area operated and maintained by the State of Hawai‘i Agribusiness Development Corporation and the Kekaha Agricultural Association, in coordination with the U.S. Navy. This is the primary pumping station in the Kekaha area (Kawaiele). The groundwater management system controls flooding and facilitates cultivation of the lower elevations on the Mana Plain (Sanifill and Baquerizo, 1996).

2.5 Site Geology

Borings near the KLF have been advanced to depths of more than 50 ft without reaching the bottom of the coastal plain aquifer, and it is estimated that the thickness of the coastal plain aquifer may exceed 400 ft beneath the landfill area (Sanifill and Baquerizo, 1996). The upper 50 ft of this deposit consists of surficial alluvial sediments composed of loose, sand-size coral and shell debris. Below a depth of 50 ft, these deposits become increasingly consolidated and indurated that comprise the coralline and marl sedimentary rocks typical of the cap rock reported in regional investigations.

2.6 Site Hydrogeology

The uppermost groundwater at the KLF occurs within the surficial sedimentary deposits of the coastal plain aquifer at approximately 5 to 7 ft bgs, which is about 3 to 5 feet above msl. The historical water level monitoring data indicate that groundwater typically flows toward the ocean in a west-southwest direction, with a hydraulic gradient of approximately 0.0005 feet per foot (Table 1).

Table 1. Recent Groundwater Level Summary

Well ID	Date	Time	Depth to Groundwater (ft btoc)
MWI-1A	22-Aug-22	8:00	10.42
MWI-2A	22-Aug-22	8:05	9.15
MWI-3A	22-Aug-22	8:25	9.48
MWII-2	22-Aug-22	7:40	11.51
MWII-5	22-Aug-22	8:15	9.38
MWII-7	22-Aug-22	7:35	11.62

The vertical component of groundwater flow at the site is minor and groundwater ultimately discharges to the ocean southwest of the site. The KLF monitoring wells are completed in the surficial coastal plain sediments.

The unconsolidated surficial alluvial sediments that underlie the coastal plain in the vicinity of the KLF are more permeable than the deeper caprock. The results of an aquifer test performed during the week of 16 October 1995 indicate that the hydraulic conductivity of the caprock aquifer underlying the KLF site is approximately 162 feet/day (6×10^{-2} centimeters per second). The aquifer test was implemented by pumping MWI-1 (Figure 1-2) at a rate of 4.2 gallons per minute (gpm) for approximately 36 hours while measuring the corresponding drawdown at MWII-5.

2.7 Landfill Gas Collection and Control System

In 2016, the KLF installed a GCCS consisting of 57 vertical extraction wells, header and lateral piping, three condensate collection sumps, and a skid-mounted control system comprising an enclosed flare, dual blower system, knock-out pot, and a programmable logic controller with a supervisory control and data acquisition (SCADA) system. The flare operation started on May 22, 2017.

The flare system was designed in accordance with 40 CFR Part 60 Subpart WWW, New Source Performance Standards (NSPS), Standards of Performance for Municipal Solid Waste Landfills, including provisions for flow measurement, a minimum operating temperature of 1,400^{o}F and with a minimum residence time of 0.3 seconds with a minimum 98% overall destruction efficiency. The flare has a capacity to handle LFG flow ranging from 50 to 750 standard cubic feet per minute (SCFM).

3. PERIMETER GAS MONITORING NETWORK

3.1 Current Perimeter Gas Monitoring Network

The perimeter gas monitoring network at the KLF consists of 12 permanent gas probes to detect any LFG migration from the KLF (Table 1 and Figure 3). The design of the gas monitoring probes is in accordance with the *Kekaha Landfill Phase II Landfill Gas Migration Plan* (HLA 1993) and EPA requirements for a perimeter gas monitoring network. This information is detailed in the *Solid Waste Disposal Facility Criteria, Technical Manual*, which was prepared by EPA to assist in the implementation of Subtitle D requirements.

3.2 Facility Structures

The Landfill property has three structures that require quarterly monitoring: the Main Office; the County Office; and the Scale House (Figure 3). Monitoring of these facilities is in accordance with RCRA Subtitle D regulations 40 CFR Section (§)258.23, and HAR Title 11, Chapter 58.1-15(d) MSW landfills must monitor methane gas in facility structures and around the landfill perimeter (DOH 1994).

4. GAS MONITORING PROGRAM

This section consists of eight subsections summarizing the gas monitoring program at the KLF Phase II:

- Perimeter Gas Probe Monitoring
- Monitoring Equipment
- Monitoring Procedures
- Perimeter Probe Methane Compliance Monitoring
- Structure Compliance Monitoring System
- Documentation and Reporting
- Responses for Exceedances
- Inspection and Maintenance

4.1 Perimeter Gas Probe Monitoring

The perimeter gas network is monitored quarterly, as required by RCRA Subtitle D regulations, HAR Chapter 11-58.1-15(d) (DOH 1994), and the KLF Phase II Solid Waste Permit. The following subsections describe the monitoring equipment and procedures, the compliance threshold level for methane, documentation and recording procedures, the response to be conducted in an event of an exceedance of compliance threshold level, and inspection and maintenance procedures to be followed by KLF Phase II.

4.2 Monitoring Equipment

A portable gas-monitoring instrument (*Land Tec GEM 5000* or equivalent) calibrated to detect methane at concentrations of 5 percent or less is used to monitor the perimeter gas probes. The gas-monitoring instrument is field calibrated before and after each monitoring day, using an appropriate standard calibration gas, and is also calibrated by a certified vendor prior to the monitoring events. Calibration information for the meter is entered into the *Perimeter Gas Monitoring Field Report Form* (**Appendix A**). Maintenance and calibration of all monitoring instruments are in accordance with manufacturer instructions.

4.3 Monitoring Procedures

On a quarterly basis, trained personnel will monitor the perimeter gas probes using a calibrated portable gas-monitoring instrument (as described above in Section 4.2).

The permanent gas probes are equipped with a 1/4-inch monitoring port installed at the top of the probe casing. Tygon tubing is attached to the portable gas-monitoring instrument and is then connected to the monitoring port. Once the connection between the instrument and the casing space has been established, the gas probe pressure will be recorded. The technician will then turn on the instrument pump and allow gas through the instrument for a period of at least

two minutes, until readings have stabilized. Following stabilization, the technician will record the methane concentration in percent LEL and percent by volume, the carbon dioxide in percent by volume, oxygen in percent by volume, and barometric pressure. These results will be recorded electronically directly into the memory of the portable gas-monitoring instrument or transcribed onto a *Perimeter Gas Monitoring Field Report Form* (**Appendix** B), which will be retained on site in the KLF Phase II Operating Files, as reported in the Quarterly Perimeter Gas Monitoring Probe Reports.

4.4 Perimeter Probe Methane Compliance Monitoring

If methane levels within any probe are detected at or above 5 percent by volume, a response action will be conducted in accordance with Subtitle D regulations, HAR standards, and the Permit. These actions are outlined in the procedures listed in Section 4.5 below.

4.5 Structure Compliance Monitoring System

Building structures at KLF Phase II are monitored quarterly. Combustible gas is most likely to accumulate within corners, baseboards, crawlspaces, or any location where air movement is restricted and in areas of potential leaks.

If methane levels are detected at or above 1.25 percent by volume (25% LEL), methane levels will be verified using an infrared gas detector, flame ionization detector, or equivalent instrument, with a minimum detection level of 0.1 percent methane by volume or less. If methane levels are verified to be 1.25 percent by volume or greater, KLF Phase II will take steps to ensure worker safety, as discussed in Section 4.7 below. In addition, KLF Phase II will institute controls to bring the level of methane within buildings below 1.25 percent in the structure.

4.6 Documentation and Reporting

In accordance with Subtitle D regulations, HAR standards, and the Permit, perimeter gas probe monitoring results are recorded electronically within the memory of the portable gas-monitoring instrument and/or transcribed on to the *Perimeter Gas Monitoring Field Report Form* (**Appendix B)** and retained on site in the KLF Operating Record. The monitoring reports include:

- Methane, oxygen, and carbon dioxide concentrations, and pressure at each probe
- Documentation of site conditions at the time of monitoring, including date, time, barometric pressure, atmospheric temperatures, and general weather conditions
- Personnel names, instrumentation, and a brief description of methods used in the monitoring

All monitoring data will be maintained through the closure and post-closure periods. A monitoring report with the above-mentioned information will be submitted to the DOH SWS within 60 days of each monitoring event.

4.7 Responses for Exceedances

If methane is detected at levels exceeding 1.25 percent by volume in facility structures or 5 percent by volume in perimeter gas-monitoring probes, then the owner or operator may conduct a verification monitoring event, provided that the event be conducted within one hour of measuring the initial exceedance. The exceedance limits specified above correspond to explosive gas (methane) control limits specified in RCRA Subtitle D regulations 40 CFR §258.23, HAR Title 11, Chapter 58.1-15(d) (DOH 1994), or the KLF Phase II Solid Waste Permit (No. LF-0104-04).

If verification monitoring indicates that gas concentrations are below the regulatory limits, the owner or operator shall place the results in the operating record and send written notification of the exceedance and verification monitoring event to the DOH within seven days.

If verification sampling is not performed within one hour of measuring the initial exceedance, and/or the verification sampling confirms an exceedance, the owner or operator shall perform the following:

- Immediately take all necessary steps to ensure protection of human health.
- Immediately notify the DOH of the exceedance.
- Within seven (7) days of detection, place in the operating record and submit to the DOH, the type of gas detected, gas levels detected, and a description of the steps taken to protect human health.
- Within 60 days of detection, implement a remediation plan for the combustible gas releases, place a copy of the plan in the operating record, provide a copy of the plan to the DOH, and notify the DOH that the plan has been implemented. The plan shall describe the nature and extent of the problem and the proposed remedy.
- Within 30 days after the remediation plan has been completed, submit a report to the DOH documenting the actions taken, additional monitoring results, and plans to prevent future recurrences.

The DOH may modify the reporting and implementation schedule, as necessary, to protect human health and the environment.

4.8 Inspection and Maintenance

The owner or operator shall inspect and maintain the gas-monitoring probes. If a probe is unusable, KLF Phase II shall repair the probe or install a new probe prior to the next monitoring event.

If a probe is repaired, the owner or operator will submit documentation to the DOH SWS indicating the reason for the repair, type of repairs completed, and evaluations performed to ensure that the probe is acceptable for use.

If a probe is replaced, then the owner or operator will comply with the following requirements:

1. The owner or operator will update the PGMP within 30 days to show the new probe location and identification number. The update shall also document the reason for replacing the probe.
2. The owner or operator will submit an installation report for the new probe within 60 days to the DOH SWS. The documentation shall include, but is not limited to, geologic logs of each probe location, surveyed locations and elevations of probes, and as-built drawings of each monitoring probe.
3. The owner or operator will properly abandon the unusable probe and submit associated documentation to the DOH SWS. Probe abandonment shall be performed in a manner which minimizes oxygen infiltration into waste mass.

5. REFERENCES

40 Code of Federal Regulations (CFR) 51. *Requirements for Preparation, Adoption, and Submittal of Implementation Plans.*

40 Code of Federal Regulations (CFR) 52. *Approval and Promulgation of Implementation Plans.*

40 Code of Federal Regulations (CFR) 60. *Standards of Performance for New Stationary Sources.*

40 Code of Federal Regulations (CFR) 258. 2006. *Criteria for Municipal Solid Waste Landfills*.

Department of Health, State of Hawai‘i (DOH). 1994. *Hawai‘i Administrative Rules, Title 11, Chapter 58.1: Solid Waste Management Control.* January.

Harding Lawson Associates (HLA). 1993. *Landfill Gas Migration Monitoring Plan.*

Oregon Climate Service. 1998. *Average Annual Precipitation, Kaua‘i, Hawai‘i.* August.

R. M. Towill Corp. 1993. *Revised Environmental Impact Statement, Kekaha Sanitary Landfill Expansion Project.* Report prepared for the County of Kauai, Department of Public Works, December.

Sanifill, Inc. and Baquerizo, Ed. A. 1996. *Monitoring and Reporting Program, Kekaha Landfill Phase II Facility, Kauai, Hawai‘i.* March.

FIGURES

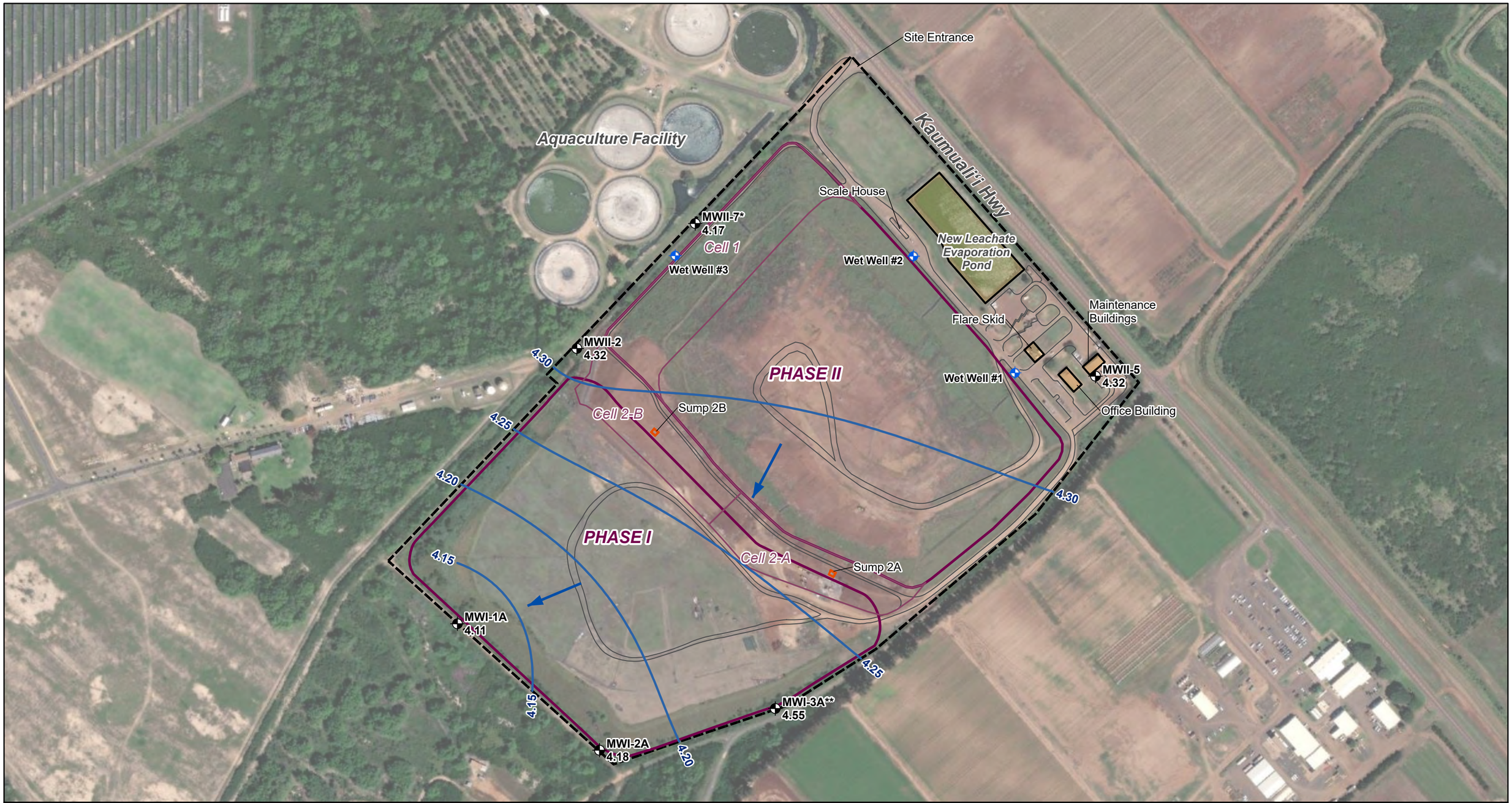
Site Location Map

Kekaha Municipal Solid Waste Landfill
Kaua'i, Hawai'i

Geosyntec consultants

WG3074	July 2022	Figure 1

P:\GIS\WM\KekahaLF\Project\2022Q1_GWMR\2022Q1.aprx\Fig01_SiteLocationMap 6/13/2022 4:43 PM (KWalton)



Legend

MWI-1A 4.11 — Groundwater Monitoring Well

* = MWII-7 groundwater level is anomalously low and is not used for contouring.

** = MWI-3A groundwater level is anomalously high and is not used for contouring.

Wet Well (Leachate Sump)

4.30 — Groundwater Elevation Contour (ft msl)

Inferred Groundwater Flow Direction

Sump Location

Phase Boundary

Cell Boundary

Property Boundary

Roads

Notes:
ft msl = feet above mean sea level
- Monitoring wells were gauged on August 22, 2022.
- TOC elevation data provided by Waste Management from May 11, 2018 and July 29, 2019 well survey elevations and use the USGS brass monument G1000 plus 1.21 feet.

N

0 350 Feet

Groundwater Contour Map
August 2022

Kekaha Municipal Solid Waste Landfill
Kauaʻi, Hawaiʻi

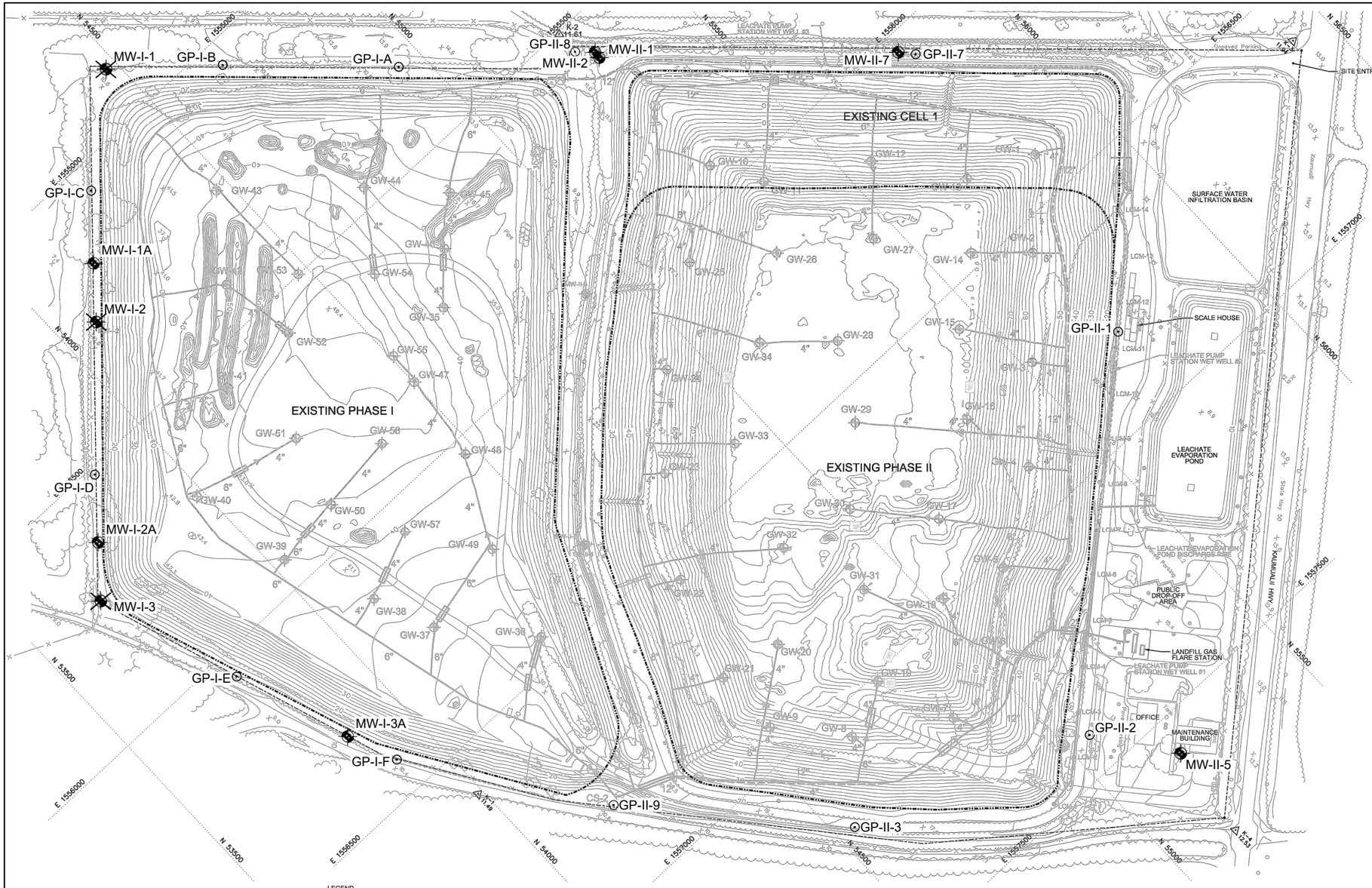
Geosyntec consultants

WG3074 | October 2022

Figure 2

P:\GIS\WM\KekahaLF\Project\2022Q3_GWMR\2022Q3.aprx\Fig03_GroundwaterElevation 10/14/2022 1:30 PM (KWalton)

\\OAKLAND-01\DATA\CADD\CIVIL 3D\COUNTY OF KAUAI\WG2644 - CELL 2 CQA\FIGURE 1-PERIMETER GAS - Last Saved by: SBerdy on 4/15/20



LEGEND

- EXISTING SITE SURVEY BENCHMARK
- EXISTING TOPOGRAPHY
- PROPERTY LINE
- EXISTING LIMITS OF WASTE
- EXISTING GROUNDWATER MONITORING WELL
- EXISTING LEACHATE RISER PIPE PHASE II
- EXISTING GAS PROBE
- EXISTING LEACHATE MANAGEMENT PIPING
- ABANDONED GROUNDWATER MONITORING WELL
- ABANDONED GAS PROBE
- EXISTING GAS WELL
- EXISTING VALVE
- EXISTING REDUCER
- EXISTING FLANGE
- EXISTING GAS HEADER
- EXISTING CONDENSATE DRAIN LINE
- CONDENSATE FORCEMAIN

NOTES:

1. EXISTING GRADE IS BASED ON TOPOGRAPHIC MAP PREPARED BY MILLER CREEK AERIAL MAPPING, LLC, BURIEN, WASHINGTON. DATE OF FLIGHT: FEBRUARY 24, 2015. (CONTOURS ON TOP OF PHASE II ARE BASED ON AIR FRAME TOPOGRAPHIC MAP. DATE OF FLIGHT MAY 20 2017)
2. HORIZONTAL DATUM IS BASED ON NAD83 (1986), HAWAII ZONE 4. VERTICAL DATUM BASED ON LOCAL TIDAL AND SITE SURVEY BENCHMARKS (MSL)
3. LEACHATE FORCEMAIN, MANHOLES AND WET WELL LOCATIONS ARE APPROXIMATE.
4. LANDFILL GAS SYSTEM LOCATIONS ARE APPROXIMATE.

SCALE: 0' 50' 100' 200'

SOURCE:
DRAWING C-1 OF CELL 2 BASE LINER CONSTRUCTION DRAWINGS, PHASE II LATERAL EXPANSION, KEKAHA SANITARY LANDFILL, 4 SEPTEMBER 2018 BY AECOM

PERIMETER GAS MONITORING PROBES KEKAHA MUNICIPAL SOLID WASTE LANDFILL KEKAHA, KAUAI, HAWAII

Geosyntec consultants

PROJECT NO: WG2644 | APRIL 2020

FIGURE 3

APPENDIX A

Landfill Gas Meter Calibration Certificate

PJLA Calibration

No. 66916

Date Of Calibration: 07-Mar-2022

Certificate Number: G504508_9/43671

Non Accredited results:

Pressure Transducers (inches of water column)					
Transducer	**Certified (Low)**	**Reading (Low)**	**Certified (High)**	**Reading (High)**	**Accuracy**
Static	0"	0"	40"	40.20"	2.0"
Differential	0"	0"	4"	4.00"	0.7"

Barometer (mbar)	
Reference	**Instrument Reading**
0980 mbar / 28.93 "Hg	0981 mbar / 28.97 "Hg

As received gas check readings:

Methane (CH4)	
Certified Gas (%)	**Instrument Reading (%)**
5.0	5.6
15.0	16.2
50.0	50.9

Carbon Dioxide (CO2)	
Certified Gas (%)	**Instrument Reading (%)**
5.0	5.4
15.1	15.5
50.0	49.1

Oxygen (O2)	
Certified Gas (%)	**Instrument Reading (%)**
20.8	21.8

As received Gas readings recorded at: 31.0 °C/87.8 °F

As received Barometric Pressure recorded at: 21.9 °C/71.4 °F

As received gas check readings are only recorded if the instrument is received in a working condition. Where the instrument is received damaged no reading can be taken.

Date of Issue : 08 Mar 2022

Approved By Signatory

Kyle Racine

Laboratory Inspection

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

PJLA Calibration

No. 66916

Date Of Calibration: 07-Mar-2022

Certificate Number: G504508_9/43671

Customer: **Geosyntac - San Diego, CA**

16644 W Bernardo Dr Suite 301 San DIego, CA 92127
USA

Description: Landtec Gas Analyzer

Model: GEM5000

Serial Number: G504508

Accredited Results:

Methane (CH4)

Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
5.0	5.0	0.42
15.0	14.9	0.66
50.0	49.0	1.03

Carbon Dioxide (CO2)

Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
5.0	4.9	0.43
15.1	14.9	0.71
50.0	50.0	1.19

Oxygen (O2)

Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
20.8	20.9	0.25

Gas cylinders are traceable and details can be provided if requested.

CH4, CO2 readings recorded at: 31.0 °C/87.8 °F

Barometric Pressure: 0980 mbar/28.93 "Hg

O2 readings recorded at: 21.9 °C/71.4 °F

Method of Test : The analyzer is calibrated in a temperature controlled chamber using a series of reference gases, in compliance with procedure ISP17.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with NIST requirements.

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Inc.

Calibration certificate number **22RA-50742 H-04932**

Instrument **SEM5000** **Serial Number** **40479**

Description of the calibration procedure:

The calibration is verified with certified gas bottle. The maximum error of the instrument as specified in the datasheet.

Gas verification from **0-1000ppm CH4**

Full scale (ppm)	Gas concentration (ppm)	Response 1 (ppm)	Response 2 (ppm)	Response 3 (ppm)	Average response (ppm)	Maximum error (ppm)	Maximum error (% F.s.)	Maximum error %
1000	0.0	0	0	0	0.00	0.00	0.00	0.00
1000	3	3.1	3.1	3.1	3.10	0.10	0.01	0.01
1000	9.9	10.2	10.2	10.2	10.20	0.30	0.03	0.03
1000	102.0	106.0	106.0	106.0	106.00	4.00	0.40	0.40
1000	1000.0	979.0	979.0	979.0	979.00	21.00	2.10	2.10

Uncertainty	2.10	%
Max % error	2.10	% FS

Gas verification from ***0-100% vol CH4***

Full scale (%vol)	Gas concentration (%vol)	Response 1 (%vol)	Response 2 (%vol)	Response 3 (%vol)	Average response (%vol)	Maximum error (%vol)	Maximum error (% F.s.)	Maximum error %
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	2.20	2.10	2.10	2.10	2.10	0.10	0.10	0.10
100.00	4.99	4.80	4.80	4.80	4.80	0.19	0.19	0.19
100.00	15.01	14.8	14.8	14.8	14.80	0.21	0.21	0.21
100.00	50.00	49.9	49.9	49.9	49.90	0.10	0.10	0.10
100.00	100.00	100.0	100.0	100.0	100.00	0.00	0.00	0.00

Uncertainty	0.21	%
Max % error	0.21	% FS

CERTIFICATION OF CALIBRATION

Issued by: QED Environmental Systems Inc.

Environmental conditions during calibration

Temp.	70.0	F
Pressure	988	mBar

Gas bottles used for calibration

Gas	Cylinder number	Expiry date	Gas
Synthetic Air	4012763	5/1/2023	Synthetic Air
3 ppm	4115410	6/1/2024	CH4
10 ppm	4115404	6/1/2024	CH4
100 ppm	4115411	6/1/2024	CH4
1000 ppm	4115412	6/1/2024	CH4
2.2% vol	4115413	6/1/2024	CH4
5.0% vol	3995519Y	2/24/2026	CH4
15% vol	3796437Y	11/21/2027	CH4
50% vol	4703614Y	4/30/2026	CH4
100% vol	94419	11/13/2025	CH4

Calibration results Pass

Next scheduled calibration 4/26/2024

Calibration date 4/26/2022

Calibration done by Craig McPherson

APPENDIX A

Perimeter Gas Monitoring Field Report Form

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PERIMETER GAS MONITORING
FIELD REPORT FORM
KEKAHA MUNICIPAL SOLID WASTE LANDFILL

Monitoring Technician: _____ Date: _____

Sampling Time Start: _____ Finish: _____

Sampling Event: _____

Instrument Type: _____ Instrument Calibrated:

Make: _____ Pass _____ Fail _____

Model: _____ Battery Condition:

Serial #: _____ OK _____ Low _____

GEM 5000 METER CALIBRATION

Calibration	CH_4 (% Vol.)	CO_2 (% Vol.)	O_2 (% Vol.)	Date	Time	Pass/Fail
CALKKHAM (Span)						
CALKKHAM (Span)						
CALKKHPM (Span)						
CALKKHPM (Span)						

GEM5000 Calibrated according to manufacturer specifications using a span gas of 15% CH_4,15%CO_2, 0%O_2, and a span gas of 11% O_2.

CH_4 = Methane; CO_2 = Carbon Dioxide; O_2 = Oxygen

Geosyntec consultants

Monitoring Technician: _____ Date: _____

Sampling Time Start: _____ Finish: _____

Sampling Event: _____

Instrument Type: _____ Instrument Calibrated:

Make: _____ Pass _____ Fail _____

Model: _____ Battery Condition:

Serial #: _____ OK _____ Low _____

SEM 500 METER CALIBRATION

Calibration	CH_4 (ppm)	Date	Time	Pass/Fail
Zero Meas. 1				
Span Meas. 1				
Zero Meas. 2				
Span Meas. 2				
Zero Meas.3				
Span Meas. 3				
Upwind of Landfill				
Downwind of Landfill				

SEM 5000 Calibrated according to manufacturer specifications using span gas of 500 ppm CH_4, and zero air
Meter response time of 4 seconds to 90 percent of stabilized reading after starting from zero to span calibration gas

Geosyntec consultants

GAS PROBE READINGS

Gas Probe	CH_4 (% LEL)	CH_4 (% Vol. in Air)	CH_4 (PPM)	CO_2 (% Vol. in Air)	O_2 (% Vol. in Air)	Static Pressure (in. H_2O)	Date	Time
GP-I-A								
GP-I-B								
GP-I-C								
GP-I-D								
GP-I-E								
GP-I-F								
GP-II-1								
GP-II-2								
GP-II-3								
GP-II-7								
GP-II-8								
GP-II-9								

BUILDING SURVEY READINGS

Building	CH_4 (% LEL)	CH_4 (PPM)	Date	Time
Main Office				
County Office				
Scale House				

Comments: Barometric Pressure:

Printed Name

Signature

cc:

Geosyntec consultants

engineers | scientists | innovators

SECTION VII - SUBSURFACE LANDFILL GAS TEMPERATURE MONITORING AND CONTINGENCY PLAN

Kekaha Municipal Solid Waste Landfill – Phase I Landfill Disposal Area Kekaha, Kaua‘i

Prepared for

County of Kaua‘i
Department of Public Works
4444 Rice Street
Lihu‘e, Hawai‘i 96766

Prepared by
Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project number: WG3074

March 3, 2023

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   2.3 Determination of Landfill Gas Temperature 2
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   3.1 Plan Basis 2
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Figure 1: Site Plan and Landfill Gas Management System

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
CO	carbon monoxide
County	County of Kaua‘i
DOH	Department of Health, State of Hawai‘i
EALs	environmental action levels
GCCS	Gas Collection and Control System
GEM 5000 Plus	Landtec GEM5000 Plus Landfill Gas Monitor
KSL	Kekaha Sanitary Landfill
ppmv	parts per million –volume
SOE	subsurface oxidation event

1. INTRODUCTION

The Cell 2 horizontal expansion consists of a modern, lined waste cell above the mauka sideslope of the existing Kekaha Sanitary Landfill Phase I (KSL). To reduce differential settlement of the Cell 2 liner system, the Phase I waste mass, which has undergone more than 20 years of consolidation, must remain intact. The subsurface landfill gas temperature monitoring and contingency plan, as described herein, is among the several systems and management plans developed to ensure the integrity of the Cell 2 liner and Phase I cover system. This plan presents modifications and updates to the temperature and monitoring plan prepared by County of Kauaʻi (County) from September 2018 (County 2018).

While the presence of the Cell 2 liner above the Phase I waste mass in this area will inhibit the intrusion of oxygen, and thus decrease the likelihood of subsurface oxidation events, this plan updates the implementation of a landfill gas temperature monitoring system (Figure 1) to identify potential future subsurface landfill oxidation events under the Cell 2 liner system in a timely fashion to allow for appropriate response actions. The County uses the existing Gas Control and Collection System (GCCS) to monitor for fire conditions, including subsurface temperature, carbon monoxide, and subsurface oxidation indicators such as oxygen and balance gas levels.

In landfills, minimizing the potential sources of oxygen intrusion into the waste mass reduces the prevalence of landfill fire generation and propagation. The use of an impermeable geosynthetic liner in the construction of Cell 2 and the existing geosynthetic capping material on Phase 1 both act as a barrier to oxygen intrusion.

2. DATA COLLECTION & ANALYSIS

As part of the air regulation requirements and in compliance with the covered source permit (No. 0802-01-C)[1] as well as for operational needs, the County monitors and collects monthly data at each GCCS extraction well monthly, including methane, oxygen, balance gas, and temperature using a Landtec GEM5000 Plus Landfill Gas Monitor (GEM5000 Plus) or equivalent. Additionally, the County monitors carbon monoxide monthly using the GEM5000 Plus at each extraction well. Carbon monoxide monitoring is routinely used to complement temperature and oxygen monitoring to evaluate potential subsurface oxidation conditions.

Temperature is monitored monthly in all landfill gas extraction wells. A temperature of 131 degrees F (°F) will be used as the threshold for establishing whether additional investigation is warranted. Note that use of this threshold, within the context of this plan, does not purport to establish a correlation between 131°F and oxidation. It is only used as a criterion for conducting additional investigations.

[1] The County is currently in the process and renewing the covered source permit so the permit number may become outdated after this plan is released.

2.1 Determination of Carbon Monoxide Concentration

The GEM5000 Plus or equivalent will be used to monitor carbon monoxide (CO) monthly. Prior to monitoring, the GEM5000 Plus will be calibrated to measure CO.

2.2 Determination of Oxygen Concentration

Similar to the CO concentration determination, the GEM5000 Plus or equivalent will be used to monitor landfill gas composition, including concentrations of oxygen, methane, carbon dioxide, and balance gas. The oxygen data will provide information about the potential for an oxidation event to propagate.

2.3 Determination of Landfill Gas Temperature

The GEM5000 Plus or equivalent will be used to monitor landfill gas temperature monthly. The GEM5000 Plus temperature probe will be factory calibrated annually for conformance.

3. CONTINGENCY PLAN

This section outlines the steps to be taken if monitored conditions indicate the presence of a subsurface oxidation event (SOE).

3.1 Plan Basis

Typically, SOEs are relatively small and involve only 100 to 500 square feet of landfill surface area. Often only a single gas extraction well is involved. The most common method of controlling an SOE is to reduce or cutoff the oxygen supply either by shutting off gas extraction wells in the affected area or by increasing cover thickness or a combination of both. Applying water to the cover, which fills the soil pores, can also be effective in restricting further air intrusion.

This Plan has been developed based on this control philosophy. For purposes of this plan, the following definitions apply:

- **Operator** – means the gas collection and control system operator or other designated landfill personnel.
- **CO concentration** – means the concentration of CO measured by field instruments including GEM5000 Plus.

3.2 Action Level Triggers

When any of the following conditions are observed, it will be presumed that an SOE has occurred, and the procedures in this section will be implemented:

- CO concentration exceeds **1,000 parts per million –volume (ppmv)** in one or more gas extraction wells near the Cell 2 and Phase I interface,

- Temperature exceeds **131º F** and CO concentration exceeds **400 ppmv** in one or more gas extraction wells, or
- Actual observation of evidence of an SOE (e.g., smoke, smoldering ash, or burnt materials).

3.3 Actions for SOE

If high levels of CO and temperature are detected, but the levels do not exceed the action level triggers, the County should take steps to cover and compact suspected areas where an SOE is developing with soil and/or water. If, as the result of monitoring under the previous section or from other indicators (e.g., smoke), the action levels set forth in Section 3.2 are triggered, the following procedures will be implemented to mitigate the SOE. In addition to the procedures outlined below, if significant and persistent smoke is observed, the local fire department may be called for additional support:

1. Hawai'i Department of Health – Solid Waste Division (DOH) will be notified of the SOE. within **24 hours** of the start of the implementation of the Contingency Plan as described in this section **via email**. A follow-up letter within 7 business days will be prepared and placed in the facility operating record.
2. The nearest GCCS extraction well(s) and any adjacent GCCS extraction well(s) with a CO concentration over 400 ppmv will be closed within **24 hours** of detecting an SOE. Specifically, the Operator will shut off any GCCS extraction well(s) within 200 feet of the affected area and will shut off any adjacent GCCS extraction well(s) with a CO concentration over 400 ppmv. The affected well will not be operated under vacuum until the SOE has been corrected or an engineering evaluation dictates a different course of action. The DOH will be notified of alternative actions within 7 days of their implementation.
3. Within **72 hours**, the Operator will reduce, by a minimum of 50%, the vacuum applied to adjacent GCCS extraction wells with a CO concentration between 200 ppmv and 400 ppmv and gas temperatures over 131º F. The vacuum on these adjacent wells will not be increased until the SOE has been corrected or an engineering evaluation dictates a different course of action. The Operator may reduce the applied vacuum further depending on conditions and the severity of the SOE.
4. Within **96 hours**, the Operator will check the flare flame arrestor and condensate knockout pot for ash to establish if the SOE has impacted flare operation and performance. Any ash found during this investigation will be removed and future inspections conducted. This assessment will require shutdown of the flare, but no longer than necessary.
5. The Operator will inspect all GCCS extraction well seals and any nearby landfill cap penetrations for cracks or obvious indications that air can enter the Phase I landfill.
6. The Operator will inspect the landfill cover in close proximity to the SOE area to confirm that the cover is not extensively cracked (indicating subsidence), has not been washed

away exposing the geomembrane, or the geomembrane has not been visibly damaged (tears or punctures). For purposes of this plan, the impacted area includes all adjacent wells with CO concentrations over 200 ppmv and the area between these wells and adjacent wells with CO concentrations below 200 ppmv.

7. In addition to inspecting and confirming the integrity of the cap near the SOE, the Operator will place and compact additional cover soil if it shows signs of cracking or has been washed away. The additional cover soils will be spread to extend at least 50 feet beyond the identifiable perimeter of the SOE, but not beyond the lateral limits of the landfill. A 6-millimeter or thicker geomembrane covered with a minimum of 6 inches of earthen material cover will be installed as a temporary barrier to air intrusion in areas where the geomembrane cap has been damaged. After the SOE has been extinguished, the damaged geomembrane will be repaired to a minimal standard of the originally designed Phase I cap specifications.
8. The Operator will monitor for subsidence. If subsidence other than normal landfill settlement is detected, the Operator may apply additional cover to the affected area to provide a safe work zone.
9. To ensure safety, all KSL personnel and the public, except those authorized to be in the SOE area, should be restricted to a minimum of 150 feet from the affected area and, if subsidence is detected, all personnel are to be barred access until an engineering review can establish suitable protocols for safe management of the SOE.
10. The Operator will measure gas composition including CO, oxygen, and balance gases in gas extraction well(s) in the affected area after first purging the well(s). Temperature measurements will also be taken. These measurements will be reviewed regularly by designated personnel to assess the progress of mitigation efforts.
11. All actions will be summarized in a memo at least monthly and placed in the facility operating records.
12. After implementing the above actions, the Operator will monitor the affected extraction wells in the area of the SOE weekly. If the CO concentration trend downward for a minimum consecutive 3-week period[2] and landfill gas temperatures decrease or remain constant, the County will assume that the SOE has been controlled.
13. The DOH will be notified within 30 days of successfully extinguishing the SOE in writing advising that the gas extraction well(s) have been returned to normal operation.

Other Potential Options – SOEs are not the same in every instance. If continued monitoring does not show decreases in CO levels or if temperatures continue to increase, the County will prepare a

[2] As an SOE is brought under control, carbon monoxide levels may spike as the SOE's oxygen supply decreases. This is the result of an uptick of incomplete combustion. Consequently, this spike in CO is an indication that the SOE is being controlled provided that it is not accompanied by a similar temperature spike. This scenario would not require additional action, but would prolong weekly monitoring to confirm that the SOE is extinguished.

detailed plan for submittal to the DOH for review and approval. The plan will include alternatives for controlling the SOE, including the feasibility of and procedures for injecting biodegradable foam and/or carbon dioxide or others as listed below. Upon approval from the DOH, the County will implement the approved plan. In exigent or emergency circumstances, the County reserves the right to take any actions necessary for safe operation of the KSL in advance of consultation with the DOH and that may differ from the tasks outlined in this section.

- ***Vent Gas Wellheads.*** This option assumes that gas temperatures will naturally decline by conduction to levels consistent with other portions of the KSL. This approach will take a long time and may allow for a subsequent event if cover materials allow air to enter the facility.
- Vent extraction wells to allow temperature to dissipate (static pressure created within the waste would prevent air from entering the KSL while allowing heat to escape to the atmosphere).
- Continue to take follow-up gas quality and temperature measurements to ascertain whether venting measures are adequate for temperature dissipation.
- Maintain adequate cover. Fill and compact any low areas that may have been a result of settlement due to the oxidation below.

If KSL personnel determine or develop a better option(s), plan, or program, the DOH will be notified.

3.4 Waste Acceptance

While addressing potential subsurface oxidation conditions, unless KSL personnel determine otherwise, waste will continue to be accepted and placed at the KSL. Landfilling placement procedures and conditions will continue to be monitored and adjusted as necessary per the direction of site personnel and the DOH.

4. SETTLEMENT MONITORING

4.1 Action Plan

To monitor settlement along the interface of the lateral expansion and the existing closed Phase I landfill, three survey benchmarks will be installed. The benchmarks would be approximately 6 inches in diameter and approximately 14 inches tall. The bottom 8 inches of the benchmark is below the surface. One bollard will be built next to each benchmark to provide visibility and protection.

The three benchmarks will be placed at the two ends of the interface of the Cell 2 expansion and one benchmark in the middle. The precise locations of these benchmarks are still to be determined.

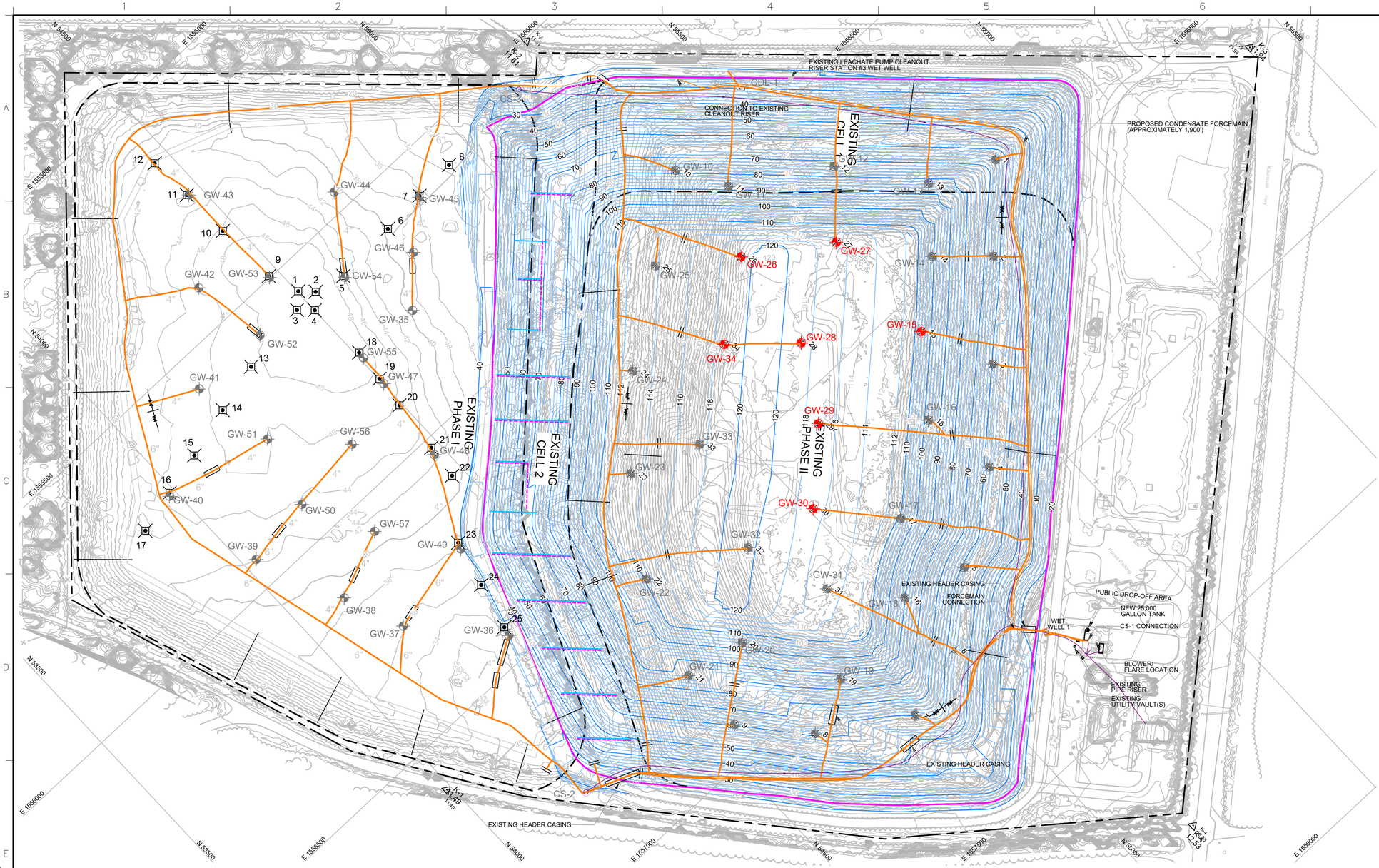
Based on engineering estimates, the hypothetical worst-case settlement is expected to be about 2 feet at the middle of the slope with the liner experiencing little to no strain (approximately 10%

of the allowable). To be conservative, if the measured cumulative settlement at the top of the slope exceeds 2 feet, an assessment of the slope liner will be performed. The assessment would initially be an engineering evaluation of the data to determine if the settlement is uniform or if areas are experiencing excessive differential settlement. Based on the investigation, additional measures such as additional monitoring, excavation of areas to evaluate the liner, or other testing may be performed.

5. REFERENCES

County of Kauaʻi. 2018. Kekaha Sanitary Landfill – Subsurface Landfill Gas Temperature Monitoring and Contingency Plan – Phase 1 Landfill Disposal Area. September 2018.

FIGURES



0 120 240
SCALE IN FEET

LEGEND

- EXISTING GROUND ELEVATION (10-FT AND 2-FOOT CONTOUR) (NOTES 1, 2, AND 3)
- APPROXIMATE PROPERTY LINE (NOTE 5)
- APPROXIMATE PHASES I AND II WASTE LIMIT (NOTE 5)
- APPROXIMATE CELL 2 LIMIT
- EXISTING SITE SURVEY BENCHMARK
- LIMIT OF REMAINING AIRSPACE ESTIMATE
- TOP OF FINAL COVER GRADE (10-FT AND 2-FOOT CONTOUR) (NOTE 6)
- GW-9 LANDFILL GAS EXTRACTION WELL (NOTE 7)
- GW-15 HIGH TEMPERATURE LANDFILL GAS EXTRACTION WELL (NOTE 7)
- LANDFILL GAS COLLECTION HEADER/LATERAL (NOTE 7)

NOTES:

1. EXISTING GROUND CONTOURS WITHIN PHASE II AND CELL 2 PREPARED BY R.M. TOWILL CORPORATION (RMTC) AND BASED ON DRONE SURVEY DATED 05-05-2021. EXISTING GROUND CONTOURS WITHIN PHASE I PREPARED BY AIR FRAME, LLC. AND BASED ON AERIAL SURVEY DATED 03-28.19. EXISTING SITE FEATURES ARE FROM TOPOGRAPHIC MAP PREPARED BY MILLER CREEK AERIAL MAPPING, LLC, DATED 02-24-2015.
2. DRONE SURVEY DATED 05-05-2021 NOT CORRECTED IN AREAS OF VEGETATION.
3. HORIZONTAL DATUM AND COORDINATES ARE BASED ON LOCAL COORDINATE SYSTEM. VERTICAL DATUM AND ELEVATIONS ARE BASED ON LOCAL TIDAL AND SITE SURVEY BENCHMARKS (MSL).
4. EXISTING INFRASTRUCTURE LOCATIONS ARE APPROXIMATE AND DO NOT INCLUDE ALL UNDERGROUND STRUCTURES OR UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR (I) VERIFICATION OF EXISTING CONDITIONS, (II) COORDINATION AND MARKING OF EXISTING UTILITIES PRIOR TO CONSTRUCTION, AND (III) CONTACTING THE HAWAII ONE CALL CENTER (866-423-7287 OR 811) 48 HOURS PRIOR TO EXCAVATION TO MARK OUT UTILITIES.
5. APPROXIMATE PROPERTY LINE AND PHASES I AND II WASTE LIMITS ARE FROM CONSTRUCTION DRAWING C-1 "EXISTING SITE CONDITIONS", PROJECT 6558519 "CELL 2 BASE LINER - PHASE II LATERAL EXPANSION", PREPARED BY AECOM, DATED 09-04-2018.
6. TOP OF FINAL COVER GRADES SHOWN REPRESENT FINAL COVER GRADING PLAN PREPARED BY AECOM, DATED 04-30-18.
7. EXISTING LANDFILL GAS SYSTEM SHOWN TAKEN FROM FIGURE NO. 1 "EXISTING LGCC PLAN" (FILE 001 KEK GCCS PLAN WLC 062817.DWG), DATED JUNE 28, 2017. PREPARED BY ENVIRONMENTAL INFORMATION LOGISTICS, LLC (EIL).
8. EXISTING LANDFILL GAS VENTS SHOWN TAKEN FROM DRAWING C-3 "LANDFILL GAS SYSTEM AND GEOTEXTILE 1 PLAN", DATED JANUARY 31, 1996. PREPARED BY HARDING LAWSON ASSOCIATES (HLA).

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

DESIGN BY:	AT
DRAWN BY:	ABK
CHECKED BY:	AT
REVIEWED BY:	MJM
APPROVED BY:	MJM

TITLE: SITE PLAN AND LANDFILL GAS MANAGEMENT SYSTEM

PROJECT: LANDFILL GAS MANAGEMENT SYSTEM

SITE: KEKAHA MUNICIPAL SOLID WASTE LANDFILL
KEKAHA, COUNTY OF KAUAI, HAWAII

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION
4444 RICE STREET, SUITE 295
LIHUE, HAWAII 96766
PHONE: 808.241.4841

Geosyntec consultants
1111 BROADWAY, 6TH FLOOR
OAKLAND, CALIFORNIA 94607 USA
PHONE: 510.836.3034

DATE:	SEPTEMBER 2021
PROJECT NO.:	WG2790
FILE:	WG2790-LFG WELLS 3
DRAWING NO.:	2 OF 2

P:\CADD\CIVIL 3D\COUNTY OF KAUAI\WG2790 (HORIZONTAL GAS COLLECTORS)\SHEETS\WG2790-LFG WELLS 3

Geosyntec consultants

engineers | scientists | innovators

SECTION VIII – CLOSURE/POST-CLOSURE PLAN

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua‘i

Prepared for

County of Kaua‘i
Department of Public Works
4444 Rice Street
Lihu‘e, Hawai‘i 96766

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project Number: WG3074

February 20, 2023

An update will not be provided at this time

Geosyntec consultants

engineers | scientists | innovators

SECTION IX – PERMITS

Kekaha Municipal Solid Waste Landfill – Phase II
Kekaha, Kaua‘i

Prepared for

County of Kaua‘i
Department of Public Works
4444 Rice Street
Lihu‘e, Hawai‘i 96766

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

Project number: WG3074

February 20, 2023

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LIST OF PERMITS

1. Solid Waste Permit – LF-0042-16
2. Title V Permit – 0802-01-C
3. Title V Permit Renewal
4. Email correspondence – NPDES Exemption

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

September 13, 2019 S0902KK

CERTIFIED MAIL NO. 7019 0700 0002 2274 8674
RETURN RECEIPT REQUESTED

RECEIVED
SEP 20 2019
DEPARTMENT OF PUBLIC WORKS
ADMINISTRATION

Mr. Lyle Tabata
Acting County Engineer
County of Kauai
4444 Rice Street, Suite 295
Lihue, Hawaii 96766

CERTIFIED MAIL NO. 7019 0700 0002 2274 8681
RETURN RECEIPT REQUESTED

Ms. Tina Adler
Waste Management of Hawaii
6900-D Kaumualii Highway
Kekaha, Hawaii 96752

Dear Mr. Tabata and Ms. Adler:

SUBJECT: Solid Waste Management Permit No. LF-0042-16
Kekaha Municipal Solid Waste Landfill
6900-D Kaumualii Highway, Kekaha, Hawaii
TMKs: (4) 1-2-002:001 and 009

The Department of Health (DOH), Solid Waste Section (SWS) received your solid waste permit renewal and modification application dated September 2016 and revised October 2017, and additional submissions through October 2018.

The Notice of Draft Renewal and Modification Permit for the Kekaha Municipal Solid Waste Landfill was published in *The Garden Island* newspaper on June 28, 2019. The public comment period ran from June 28, 2019 to July 29, 2019. Comments were received from Waste Management of Hawaii. The comments received and the responses from the DOH are enclosed. Revisions to the draft permit were made based on responses to comments. Other non-substantive changes were also made.

The enclosed Solid Waste Management Permit No. LF-0042-16 is issued under the provisions of Hawaii Revised Statutes (HRS), Chapter 342H, "Solid Waste Pollution" and Hawaii Administrative Rules, Title 11, Chapter 58.1, "Solid Waste Management Control." The permittee may appeal to the Director of Health any of the conditions to the subject permit. The appeal must be in writing and submitted to the Director of Health within twenty (20) days after the receipt of this notice.

In accordance with the issued permit, please address the following items:

1. Groundwater Monitoring Plan. Please submit a revised groundwater monitoring plan within six (6) months of permit issuance.
2. Provide a current construction schedule to allow for coordination of site visits during construction.

It should be noted that surveys performed throughout the years have utilized multiple vertical datums. Note that elevation references made in the permit are based on the documents from which the information was received. Because of the variances, the permittee shall identify the datum used when providing any elevation data and provide an updated elevation conversion table that will relate all elevation datums used at the facility. In the future, all elevations shall be based on one single datum, which is clearly identified. We understand that as of May 11, 2018, the permittees have selected use of the USGS brass monument G1000 plus 1.21 feet.

In addition, as the county works from conceptual design to final design of the final cover system, we recommend that the soils that come into contact with the geosynthetic clay liner (GCL) have low calcium and magnesium ions, and that there is sufficient effective overburden stress over the GCL to achieve design permeability.

It is also our understanding that the County of Kauai is planning to purchase soil for intermediate and final cover. We also understand that the county plans to test and compare the results with the DOH unrestricted use Environmental Action Levels to verify it's use as an intermediate cover soil. Please ensure that sampling and analysis complies with the DOH Hazard Evaluation and Emergency Response Office *Technical Guidance Manual* and the *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material (*also known the *Clean Fill Guidance)*. These documents may be found at:
http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/technical-guidance-and-fact-sheets.

HRS 342H-14 states that unless the submitted documents and other information secured by the DOH from the permittees contain confidential information, such as secret processes or methods of manufacture, they shall be made available for inspection by the public. Please notify the DOH-SWS within twenty (20) days of the receipt of this letter if you would like to make a claim of confidentiality. Otherwise, your entire application will be available for public inspection

If you have any questions regarding this letter, please contact Mr. Kevin Kihara of the Solid and Hazardous Waste Branch at (808) 586-4226.

Sincerely,

MARIANNE ROSSIO, P.E., ACTING CHIEF
Environmental Management Division

Enclosures: Solid Waste Management Permit No. LF-0042-16
Response to comments

PERMITTEES:	**PERMIT NUMBER:**	LF- 0042-16
OWNER:	**DATE OF ISSUE:**	September 13, 2019
County of Kauai	**EXPIRATION DATE:**	September 12, 2024
OPERATOR:	**LATITUDE/LONGITUDE:**	21° 59'N/159°45'W
Waste Management of Hawaii, Inc.	**PROJECT:**	Kekaha MSW Landfill
6900-D Kaumualii Highway	**Page:**	1 of 46
Kekaha, Hawaii 96752		

SOLID WASTE MANAGEMENT PERMIT

This solid waste management permit renewal with modification is issued under the provisions of Chapters 342H, *Solid Waste Pollution,* Hawaii Revised Statutes (HRS), and Title 11, Chapter 58.1, *Solid Waste Management Control,* Hawaii Administrative Rules (HAR). The above-named permittees are hereby authorized to construct and to operate the facility shown on the application and additional submittals, and other documents on file with the Department of Health (DOH) as follows:

To Construct: Phase II, Cell 2. The proposed Cell 2 is a 6.6-acre lateral expansion of the existing Phase II at the Kekaha Municipal Solid Waste Landfill (KLF). Cell 2 will be created by removing the infiltration ditch between Phase I and Phase II and overlaying onto the sideslopes of both landfill phases (I and II). The liner for Cell 2 is identical to the existing Phase II, Cell 1 liner and will overlay the Phase I sideslope and connect to the existing Phase II liner. Construction of Cell 2 will increase the volume of the landfill by about 972,500 cubic yards.

The KLF is situated on approximately 98 acres of land and is comprised of two distinct refuse fill areas identified as Phase I, approximately 33 acres, and Phase II, approximately 38.5 acres. Phase I ceased operations on October 8, 1993 and final cover was subsequently constructed. Phase I has no liner system beneath the refuse as there was no requirement for one at that time. Phase II began operations on October 9, 1993 with the closure of Phase I. Phase II was constructed to meet the Resource Conservation and Recovery Act (RCRA) Subtitle D criteria and is currently the only active municipal solid waste (MSW) landfill on Kauai.

Phase II was initially permitted for a maximum elevation of 37 feet above mean sea level (msl). However, due to waste generated by Hurricane Iniki in 1992, a vertical expansion was approved in 1998 raising the maximum fill elevation to 60 feet msl. An additional vertical expansion was approved in 2005 to raise the maximum fill level to 85 feet msl. A lateral expansion into Cell 1 was approved in November 2009, with another vertical expansion to 120 feet above msl for Phase II approved in 2014. The Phase II maximum permitted elevation of 120 feet above msl remains unchanged for this permit.

To Operate: (1) A MSW landfill consisting of the existing Phase II (inclusive of Cell 1), approximately 38.5 acres, and the proposed Cell 2 expansion, approximately 6.6 acres. The average daily acceptance rate of the landfill is 200 tons per day. The peak daily disposal rate is limited to 600 tons. The MSW landfill shall be operated with the approved environmental controls and monitoring systems, which includes a stormwater management system with an infiltration basin, a leachate collection system and evaporation pond, a perimeter gas monitoring system, a subsurface gas and temperature and settlement monitoring systems, and leachate and groundwater monitoring systems. (2) A materials drop-off facility (MDOF) to allow the public to drop-off green waste, recyclables, residential municipal solid waste, tires, and white goods for subsequent recycling or disposal. There is also a used oil drop-off area located in the adjacent maintenance shop. Accepted recyclable materials include cardboard, newspaper,

glass, aluminum cans, plastic bottles (#1 and #2), and mixed paper. The landfill operator is Waste Management of Hawaii, Inc., and the landfill work force is County of Kauai employees.

IN ACCORDANCE WITH:

(1) A permit renewal and modification application dated September 2016 and revised October 2017. The document includes, *Engineering Report for Kekaha Sanitary Landfill Phase II, Cell 2 Lateral Expansion,* prepared by AECOM Technical Services, Inc., (AECOM), and dated October 2017.
(2) *Draft Cell 2 Base Liner Construction Drawings,* prepared by AECOM and dated October 2018.
(3) *Site Operations Manual, Kekaha MSWLF - Phase II,* October 2017. The document includes multiple plans including, but not limited to: (a) *Existing Materials Drop-off Facility Operations Plan,* prepared by AECOM and dated October 2015. (b) *Perimeter Gas Monitoring Plan*, prepared by AECOM and dated January 2016. (c) *Groundwater and Leachate Monitoring Plan*, (d) *Closure/Post Closure Plan*, prepared by AECOM and dated May 2016.
(4) *Subsurface Landfill Gas Temperature Monitoring and Contingency Plan, Phase 1 Landfill Disposal Area,* dated September 2018.
(5) *Revised Leachate Management Plan*, dated August 2018.

All other plans and information referenced by and submitted as required by this permit, and approved by the DOH are also part of the permit documents. Should there be any discrepancies among the submitted documents, HRS 342H and I, HAR 11-58.1, and the conditions of this permit, then solid waste laws, rules, and permit conditions shall take precedence.

LOCATED AT: Mile marker 28
Kaumuali'i Highway (Highway 50)
About 2 miles west of Kekaha, Kauai
TMK: (4) 1-2-002:001, 009

SUBJECT TO: HRS 342H and 342I; HAR 11-58.1; and Part I: Standard Conditions, Part II: Special Conditions, MSW Landfill, Sections A through J, and Part III: Special Conditions, Materials Drop-Off Facility, of this permit.

Acceptance of this permit constitutes an acknowledgement and agreement that the holder will comply with all rules, regulations, and orders of the DOH and the conditions precedent to the granting of this permit.

This permit supersedes Solid Waste Management Permit Number LF-0052-13, issued on March 5, 2014, in its entirety.

(For) Director of Health
State of Hawaii

PERMITTEES:		**PERMIT NUMBER:**	LF- 0042-16
OWNER:		**DATE OF ISSUE:**	September 13, 2019
County of Kauai		**EXPIRATION DATE:**	September 12, 2024
OPERATOR:		**LATITUDE/LONGITUDE:**	21° 59'N/159°45'W
Waste Management of Hawaii, Inc.		**PROJECT:**	Kekaha MSW Landfill
6900-D Kaumualii Highway		**Page:**	4 of 46
Kekaha, Hawaii 96752			

The solid waste management facility is subject to HRS Chapter 342H, *Solid Waste Pollution,* HRS Chapter 342I, *Special Wastes Recycling,* HAR Chapter 11-58.1, *Solid Waste Management Control*, and the following conditions:

PART I: STANDARD CONDITIONS

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittees and enforceable, pursuant to the authority of HRS §342H. The DOH will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittees, its agents, employees, servants, representatives, contractors, or subcontractors. If any term or condition of this permit becomes invalid as a result of a challenge to a portion of this permit, the other terms and conditions of this permit shall not be affected and shall remain valid.

2. This permit:

   a. shall not in any manner affect the title of the premises upon which the facility is or will be located;
   b. does not release the permittees from any liability for any loss due to personal injury or property damage caused by, resulting from, or arising out of the design, installation, construction, operation, maintenance, closure, or post-closure of the facility;
   c. does not release the permittees from compliance with other applicable statutes and regulations of the State of Hawaii or with applicable federal or local laws, regulations, or ordinances;
   d. in no way implies or suggests that the State of Hawaii, or its officers, agents, or employees assumes any liability, directly or indirectly, for any losses due to personal injury or property damage caused by, resulting from, or arising out of the design, construction, operation or maintenance of the facility; and
   e. shall not constitute nor be construed to be an approval of the design, construction, operation, maintenance, closure and post-closure of the facility beyond the regulatory requirements mandated by HRS §342H and HAR §11-58.1.

3. Issuance of this permit does not preclude the responsibility of the permittees to obtain any and all necessary approvals and permits from the appropriate federal, state, and local agencies, including zoning clearances, prior to the start of operations.

4. Unless the submitted documents and other information secured by the DOH from the permittees contain confidential information, such as secret processes or methods of manufacture, they shall be made available for inspection by the public (HRS §342H-14). The permittees shall be responsible for identifying, in writing, the

specific information asserted to be confidential. The DOH shall review the assertion made by the permittees and determine if confidentiality is indeed warranted.

5. This permit is valid only for the specific processes and operations applied for and indicated in the submitted application and additional submissions approved by the DOH. Any unauthorized deviation that affects the facility's design, operations or procedures, or which could threaten human health and the environment, from the submitted application, approved drawings, operations manual, and additional submissions or conditions of this permit may constitute grounds for revocation of this permit, and/or enforcement action by the DOH. Should there be any discrepancies between the submitted documents and the permit conditions, the permit conditions shall take precedence. A copy of the submitted application and additional submissions shall be maintained at the facility.

6. This permit is non-transferable whether by operation of law or otherwise, either from one location to another, from one solid waste disposal operation to another, or from one person to another without the written approval of the director [HAR §11-58.1-04(e)(2)].

7. This permit shall be kept at or near the construction and operation site for which the permit is issued and shall be available upon request [HAR §11-58.1-04(f)]. A request for a duplicate permit shall be made in writing to the director within ten (10) days after the destruction, loss, or defacement of this permit. A fee of $50.00 shall be charged and submitted with the request [HAR §11-58.1-04(h)(3)].

8. The permittees shall at all times properly operate and maintain the facility and systems of treatment, process, and control (and related appurtenances), as applicable to the facility, that are installed or used by the permittees to achieve compliance with the conditions of this permit, as required by the DOH rules. The facility shall be designed, constructed, and equipped in accordance with best practicable technology so as to operate without causing a violation of applicable rules and regulations.

9. Incident Notification Requirements. The permittees shall notify the DOH, in writing, by use of a fax machine (fax), or electronic mail (email) whenever there are incidents such as fire, explosion, or release of regulated material/waste, which could threaten human health or the environment (i.e., air, soil, or surface and subsurface waters). Initial notification may be by phone, fax, or email and reported within eight (8) hours, whenever possible, and no more than twenty-four (24) hours. The notification report shall be completed and submitted by an Environmental Professional/District Manager or other responsible official within three (3) calendar days for waste disposal facilities, such as landfills and incinerators and shall include:

   a. name, address, and telephone number of the owner and operator;
   b. name, address, and telephone number of the facility at which the incident occurred;

c. date, time, and type of incident (i.e., fire, explosion, release, etc.);
d. name and quantity of material(s) involved;
e. the extent of injuries, if any;
f. an assessment of actual or potential hazards to human health or the environment, where this is applicable;
g. estimated quantity and disposition of recovered and unrecovered material that resulted from the incident;
h. evaluation of the circumstances that led to the incident;
i. steps being taken to reduce, eliminate, and prevent recurrence, including an implementation schedule; and
j. other information or monitoring as required by the DOH.

Notification requirements for releases only apply to releases of a quantity equal or exceeding the reportable quantity listed in HAR §11-451.

10. Noncompliance Notification Requirements. If, for any reason, the permittees do not comply with, or will be unable to comply with, any condition or limitation specified in the permit, the permittees shall notify the DOH verbally within twenty-four (24) hours followed by a written report within three (3) calendar days of the verbal notification. The written report shall be completed and submitted by an Environmental Professional/District Manager or other responsible official and contain the following information:

a. description and cause of noncompliance;
b. period of noncompliance, including exact dates and times; and, if not corrected, the anticipated duration that the noncompliance is expected to continue;
c. steps that will be taken to correct the area of noncompliance;
d. steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance, including an implementation schedule; and
e. other information or monitoring as required by the DOH.

The permittees may be subject to enforcement action by the DOH, penalties, or revocation of this permit. Notification via fax or email is acceptable. Any data transmission or detailed explanations transmitted shall be accompanied by regular mail submittals. Failure to notify in accordance with this requirement may initiate enforcement action.

11. Monitoring and Recordkeeping Requirements. The permittees shall comply with the following monitoring and recordkeeping requirements:

a. Upon request, the permittees shall furnish all records (e.g., transaction reports, disposal receipts, sampling, and testing results) and plans required by the DOH. The retention period for all records shall be a minimum of five (5) years unless

otherwise specified in Standard Condition 11.b; however, there shall be an indefinite retention period for all records associated with any unresolved enforcement action as determined by the DOH.

b. The permittees shall retain at the facility or other location designated by this permit, records of all monitoring information (including all calibration and maintenance records and all original recordings of monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The retention period shall be for the life of the facility, through closure and post-closure periods, for waste disposal facilities (such as landfills and incinerators).

c. Records of monitoring information, if applicable, shall include:
- the date, exact location, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- analytical techniques or methods used; and
- results of such analyses.

12. The permittees shall submit complete and detailed plans and reports on existing solid waste management systems and of any proposed addition to, modification of, or alteration of any such systems that affects the facility's operations or procedures, or which could threaten human health and the environment and contain the information requested by the DOH in the form prescribed by the DOH. Any submission for permit modification shall be submitted in accordance with Standard Condition 13. The plans and reports shall be prepared by a competent person acceptable to the DOH, and at the expense of the permittees.

13. Should the permittees decide to modify the permit or continue operation of the solid waste facility beyond the expiration date of the permit, the permittees shall submit a complete permit modification or renewal application at least one (1) year prior to the modification or the date of permit expiration. Any submission for permit modification does not affect these permit conditions until such modification becomes final in accordance with HAR §11-58.1-04, or as approved by the DOH.

14. The director may, in accordance with HRS §342H-6, enter and inspect the facility for the purpose of:

a. investigating an actual or suspected source of solid waste or other pollution;
b. ascertaining compliance or noncompliance with any rule, regulation, permit condition, or standard promulgated by the DOH; and
c. conducting tests in connection therewith (including collecting soil, water, air, ash, and any other material or samples).

The permittees, by accepting this permit, specifically agree to allow authorized DOH personnel, upon presentation of credentials or other documents as may be required by law, access to the premises. The permittees may conduct testing (including collecting soil, water, air, ash, and any other material or samples) simultaneously.

15. The DOH may require the permittees to conduct sampling and testing to determine the degree of pollution, if any, from the solid waste facility (including soil, water, air, ash, and any other materials or samples). If contamination is found, the permittees shall appropriately address the situation to protect human health and the environment.

16. When requested by the DOH, the permittees shall within a reasonable time, as specified by the DOH, furnish any information required by law, which is needed to determine compliance with the permit. If the permittees become aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the DOH, such facts or information shall be submitted or corrected promptly. Upon the written request of the permittees, the deadline for submission of information may be extended, if the DOH determines that reasonable justification exists for the extension.

17. If the DOH determines that the permittees have violated or are violating any provision of HRS §342H, HAR §11-58.1, or these permit conditions, the DOH may pursue enforcement action in accordance with HRS §342H-7, *Enforcement*; §342H-9, *Penalties*; §342H-10, *Administrative Penalties*; §342H-11, *Injunctive and other relief;* or any other pertinent rules.

18. The DOH may, on its own motion, modify, suspend, or revoke a permit if, after affording the applicant a hearing in accordance with HRS 91, the DOH determines that any permit condition, rule, or provision of HRS §342H has been violated or that such is in the public interest [HAR §11-58.1-04(d)].

19. If the governor or the director determines that an imminent peril to the public health and safety is, or will be, caused by the disposal of solid waste or any combination of discharges of other waste that requires immediate action, the governor or the director, without a public hearing, may order the permittees to immediately reduce or stop the disposal, discharge, or process, and may take any and all other actions as may be necessary (HRS §342H-8).

PART II: SPECIAL CONDITIONS - MSW LANDFILL

Section A General Facility Conditions

1. The permittees shall construct and operate the facility in accordance with HRS 342H and 342I, HAR §11-58.1, the permit renewal and modification application dated September 2016, revised application dated October 2017, draft construction drawings dated October 2018, approved subsequent submissions, and the conditions of this permit. If there are any discrepancies among the aforementioned documents, HRS, HAR and permit conditions, then solid waste laws, rules and these permit conditions shall take precedence.

2. The permittees shall maintain a Master Plan that provides information on future landfill capacity requirements in both numerical and graphical presentations with a minimum projection of 20 years and shall include the waste footprints and service lives of Phase II and future lateral expansion phases and/or future landfills. The Master Plan shall include the proposed Basis of Design, buffer areas, appurtenant and support facilities. Updates and revisions to the plan shall be submitted annually in conjunction with the Annual Operating Reports.

3. The height of the MSW landfill, including final cover, shall not exceed 120 feet above msl at its highest point. The final grades of the MSW landfill shall be in accordance with Drawing No. 4, *Engineering Report Kekaha Landfill Phase II – Cell 2 Lateral Expansion Kekaha Sanitary Landfill,* dated December 2015. This drawing is imbedded in the *Engineering Report for Kekaha Sanitary Landfill Phase II, Cell 2 Lateral Expansion* dated October 2017. Note that the vertical datum in the drawing correlates to designated USGS Brass Monument G1000 plus 1.21 feet.

4. No construction of additional disposal cells or modification of the lateral or vertical extent of disposal cells shall occur without written approval by the DOH. Any modification requests shall be submitted in accordance with Standard Condition 13, at least one (1) year prior to commencement of the proposed construction or modification. The construction and design plans shall be prepared and certified by a professional engineer, with at least five (5) years' experience in designing landfills and registered in the State of Hawaii.

5. A permanent sign shall be posted at the facility entrance identifying the facility, the hours and days of operation, and the name and address of the operator, a telephone number and other pertinent information.

6. The permittees may only operate the facility during the normal operating hours of 8:00 a.m. to 4:00 p.m., seven (7) days per week, for acceptance and disposal of waste at the MSW landfill; and collection of waste and recyclables at the MDOF. In the

event that the facility proposes any waste acceptance and disposal outside normal operating hours, the permittees shall notify the DOH, in writing, of this event. The notification shall be provided at least twenty-four (24) hours in advance of the event. If the event is unanticipated, the permittees shall provide verbal notice of the event within four (4) hours and written notification within eight (8) hours of commencement of the event. A fax or email submission of the notification is acceptable. The written notification shall specify the affected dates and times, the nature and reason for the extended operations, identification of any considerations associated with the extended operations, and controls/procedures that will be implemented to mitigate any adverse impacts of the extended operations.

7. An all-weather access road shall be maintained into and out of the facility site, through the entrance facility and to and from the working area of the landfill.

8. The permittees are responsible for providing measures to control public access in accordance with HAR 11-58.1-15(f). The permittees shall provide and maintain controlled access to the facility in the form of fences and gates along the site perimeter. All gates shall be kept locked when an attendant is not on duty. Scavenging at the facility is prohibited.

9. The facility shall have a Site Manager and an Environmental Professional who shall be knowledgeable of state solid waste laws, regulations, these permit conditions, and the permit application components including, but not limited to, the October 2017 Site Operations Manual and approved subsequent submissions. The Environmental Professional may be an employee based outside of the County. The permittees shall submit written updates in the event that there are any changes in the responsibilities or identification of the Site Manager or the Environmental Professional.

10. Landfill operations shall be supervised by an individual who has successfully completed a Manager of Landfill Operations (MOLO) training course conducted by the Solid Waste Association of North America, or a DOH-approved alternative. MOLO training certifications or equivalent shall be current. Records of such training shall be placed in the operating record.

11. The permittees shall comply with the financial assurance requirements in HAR 11-58.1-18 for closure of the landfill, post-closure care, and corrective action, if required. The permittees shall include documentation of financial assurance and a copy of the detailed written estimates, including annual adjustments for inflation, in the Annual Operating Report, as required in Part II: Special Conditions – MSW Landfill, Section J of this permit. At a minimum, the Closure and Post Closure Plan shall be revised every five (5) years, or whenever facility plans are updated or changed.

12. Emergency Action Plan. The permittees shall implement the Emergency Action Plan, provided as Section I, Part E of the October 2017 Site Operations Manual, and approved subsequent submissions.

    a. The permittees shall provide verbal and written notification of incidents to the DOH, in accordance with Part I: Standard Condition 9. Incidents also include suspected subsurface fires and shall be reported based on any of the notification criteria listed in the Site Operations Manual.
    b. The permittees shall implement the Emergency Action Plan for the following situations:

        i. Fires (including surface, nearby, incoming waste loads, vehicle/equipment, subsurface, etc.);
        ii. Severe storm (2-year, 24-hour storm or greater, or continued rainy conditions over duration of 14 days), including hurricanes;
        iii. Earthquakes and tsunamis;
        iv. Hazardous material spills at or above the Reportable Quantity; and
        v. Other emergency procedures, and trigger levels, as provided in the Emergency Action Plan.

    c. The permittees shall assess, monitor, and repair the landfill after emergencies that may affect the integrity of the landfill, including, but not limited to, the liner system, leachate collection and control system, surface water management system, and any other affected portions of the landfill. If the acceptance and disposal of waste ceases, the permittees shall submit a written evaluation of whether waste acceptance can resume. The evaluation shall be prepared by a professional engineer registered in the State of Hawaii and the District Manager, certifying that the landfill and its associated environmental controls are functional, equivalent or better than required, and that operation of the landfill will not cause a violation of environmental regulations. The evaluation shall also include a description of any findings and corrective actions. The facility may resume acceptance and disposal of waste upon submission of this evaluation to the DOH. The DOH may require additional assessment, monitoring, and corrective actions, as necessary to address the event.

Section B Construction and Maintenance of Phase II

1. The permittees shall maintain the integrity of the liner system and leachate collection and control system as designed and constructed, or implement equivalent or better alternative environmental controls, as approved by the DOH and as generally described below:

a. Phase II was installed in accordance with Harding Lawson Associates drawings, *Kekaha Sanitary Landfill Phase 2,* dated March 1993. The original Phase II is divided into fourteen (14) cells, each of which is 100 feet wide and 800 to 1,110 feet long. Each cell is graded at a slope of 3% toward a central trench for leachate collection. The trenches contain drainage gravel and eight (8)-inch diameter perforated high-density polyethylene (HDPE) pipes. Each pipe drains to a leachate collection manhole located outside the liner cell perimeter. Leachate collected in the manholes flow by gravity to two pump stations (wet wells), from which it is pumped through HDPE force main pipes to the leachate evaporation pond. The base liner system consists of the following components (bottom to top):

   i. 6-inch thick granular foundation layer (sideslopes only).
   ii. Prepared granular subbase grade.
   iii. Geosynthetic Clay Liner (GCL) consisting of a smooth 20-mil HDPE geomembrane with an adhered bentonite powder layer on one side (Gundseal). The GCL was installed with the smooth side in direct contact with the granular subbase base grade and foundation layer on sideslope, and with the bentonite component side up.
   iv. Single-sided textured 60-mil HDPE geomembrane (textured side down) against the bentonite component of the GCL on the sideslope.
   v. Smooth 60-mil HDPE geomembrane against bentonite component of the GCL on the base.
   vi. 24-inch sand drainage layer (base and side slope).

b. Phase II, Cell 1 was constructed in accordance with the January 2009 Engineering Report, with an expansion of the existing leachate collection system and introduction with a third pump station (wet well). Phase II, Cell 2 shall be constructed in accordance with the October 2017 *Engineering Report, Kekaha Sanitary Landfill Phase II Cell 2 Lateral Expansion*. The base liner for Cell 1 and Cell 2 generally consists of the following layers (from bottom to top):

   i. Prepared subbase grade.
   ii. Secondary liner of 60-mil HDPE geomembrane, textured on both sides.
   iii. GCL composite product consisting of bentonite powder/granules encapsulated between a carrier non-woven geotextile and a cover of non-woven geotextile, needle punched for additional strength.
   iv. Primary 60-mil HDPE geomembrane, textured on both sides.
   v. 16 oz/yd^2 non-woven cushion geotextile.
   vi. 12-inch drainage layer consisting gravel, with a maximum rock size of 1.5 inches, with a permeability of $3x10^{-1}$ cm/sec or greater, and containing less than 12 percent calcium.
   vii. 6 oz/yd^2 separator geotextile.

viii. 24-inch operations layer.
ix. The side slope liner of Cell 1 consists of a layer of internally reinforced GCL sandwiched between two 60-mil HDPE geomembranes textured on both sides. The geotextiles, 12-inch drainage, and 24-inch operations layers on the base liner shall extend up the entire length of the side slopes.
x. The side slope liner of Cell 2 over Phase I also includes, in certain areas, a reinforcement grid and a non-woven geotextile between the prepared subbase grade and secondary HDPE geomembrane, which is smooth on the bottom side.

c. Phase II, Cell 2 leachate sumps 2A and 2B shall be constructed in accordance with the October 2018 Draft *Cell 2 Base Liner Construction Drawings Phase II Lateral Expansion Kekaha Sanitary Landfill*. Leachate collected in the sumps is pumped via a sideslope riser pipe into a double contained HDPE force main routed to the leachate evaporation pond. The liner beneath each sump is constructed with identical material used for construction of the base liner for Phase II, Cell 2 referenced in special condition B.1.b, with the addition of:

i. 60-mil HDPE geomembrane, and
ii. GCL composite layer.

d. The Leachate Evaporation Pond base liner system was constructed as documented in the *Report of Construction Quality Assurance for New Leachate Evaporation Pond*, dated May 25, 2010. The lowest base liner elevation is at least five (5) feet above the high ground water level. The base liner system for the Evaporation Pond was constructed as follows (from bottom to top).

i. Prepared subbase grade.
ii. 60-mil HDPE geomembrane, textured on both sides.
iii. GCL composite product consisting of bentonite powder/granules encapsulated between a carrier woven geotextile and a cover of woven geotextile, which are needle punched.
iv. 60-mil HDPE geomembrane, textured on both sides.
v. GCL composite, same as d.iii above.
vi. 60-mil HDPE geomembrane, textured on both sides.
vii. 16-oz/sq yd non-woven cushion geotextile layer.
viii. 12-inch granular operations layer with maximum rock size of 3/4 inch and less than 12 percent calcium.
ix. 6 oz/sq yd non-woven separator textile layer.
x. 2-inch thick granular protection layer.

e. Repairs to the Phase II liner damaged by termites, as evidenced in the March 20, 2015 *Summary of the Second Phase II Liner Investigation* shall be done in accordance with the October 2018 *Draft Cell 2 Base Liner Construction Drawings Phase II Lateral Expansion Kekaha Sanitary Landfill.*

2. **Buffer**. MSW disposal activities shall not occur within a buffer zone comprised of a minimum of:

   a. 52 feet from the edge of waste to the property line along the west/northwest edge of Cell 1. This would provide an approximate 82-foot distance from the closest edge of waste of Cell 1 to the nearest agricultural activity. This distance is comprised of about 52 feet from the edge of waste to the landfill property line, and 30 feet from the landfill property line to the far edge of a federal roadway right-of-way for the Lae-O-Kokole Lighthouse.
   b. 300 feet from edge of waste to the property line along Kaumuali'i Highway.
   c. 1,000 feet from the property line of any future urban area known at the time of permit issuance.

3. The permittees shall submit any significant proposed changes affecting the design or structural integrity of the installed liner system or leachate collection system, in writing, at least one hundred eighty (180) days prior to commencement of the proposed change. Regular maintenance procedures, such as replacing broken valves with a similar valve, do not require DOH approval. Any proposed changes shall be comparable or improved in its capability to protect human health and the environment. At a minimum, the written proposal shall include:

   a. Identification of affected cells or areas;
   b. Reason for the proposed change;
   c. Engineering design;
   d. Point of Compliance Evaluation;
   e. Implementation schedule; and
   f. Other pertinent information.

   The DOH may also require additional information to evaluate the request. If the proposed changes require a modification to this permit, a modification application shall be submitted in accordance with Standard Condition 13.

4. Installation of any geosynthetic liner shall be performed by an experienced installer who has installed a minimum of 500,000 square feet of similar type liners or shall be performed under the supervision of the manufacturer. An experienced quality assurance/quality control (QA/QC) landfill inspector with at least five (5) years of experience in landfill construction quality assurance (CQA) responsible to a professional engineer shall observe liner installation and grade elevations. The

permittees shall notify the DOH, in writing, five (5) days prior to any liner installation work.

5. The permittees are responsible for obtaining the services of a registered land surveyor who shall provide an as-built survey of any construction or repairs to the landfill or monitoring systems, which includes, but is not limited to, base grades, liner grades, leachate lines, sumps, stormwater and leachate management systems, gas and groundwater monitoring systems, and other features needed to assist in any future site repairs and development, and to demonstrate compliance with the approved drawings.

6. The permittees shall retain a professional engineer registered in the State of Hawaii for the supervision of the CQA requirements of this project, and upon the completion of all construction phases or elements (including repairs on liner and leachate systems) the engineer shall submit a CQA report to the DOH as to the complete conformity of construction to the plans and specifications as approved. The CQA report is described in Special Condition B.7.

7. The permittees shall prepare and submit a CQA report to the DOH.

    a. The CQA report shall be submitted to the DOH prior to placement of the initial select waste lift.
    b. A professional engineer, with at least five (5) years' experience in designing landfills and registered in the State of Hawaii shall review the inspections and test records for each sector as certified by the liner manufacturer or manufacturer's representative and the QA/QC engineer. The professional engineer shall also verify that the bottom liner and leachate collection system have been installed in accordance with the plans as approved by the DOH.
    c. The CQA report shall also include the following, as applicable:

        i. A map of each sector showing panel layouts as installed;
        ii. A letter of certification signed by the QA/QC engineer stating that all weld test results and vacuum or pressure testing of all welded seams were visually observed;
        iii. Liner inspection reports;
        iv. QA/QC testing procedures;
        v. Laboratory analyses;
        vi. As-built and survey drawings documenting the cell construction, including the bottom and top of sump elevations, location and elevation of base grades, liner system, and leachate collection system;
        vii. Written certification, by the liner contractor and installer, certifying the acceptability of the soil cushion layer prior to liner placement;
        viii. Documentation showing that panels were properly joined within the cell, as well as with liner systems in adjacent cells;

ix. Documentation and as-built drawings to show supporting berms constructed beneath areas where new liner systems are connected with previously installed liner systems;
x. Documentation and as-built drawings of anchor trenches and berms (temporary and permanent) located around each cell;
xi. Documentation and description of any temporary stormwater control measures implemented;
xii. Identification of any deviations from the construction plan, reason for the deviation, and effects on the stability and integrity of the design. Any deviations shall be reviewed and approved by the design engineer, who shall verify that the deviation is comparable or improved in its capability to protect human health and the environment; and
xiii. Written certification by a professional engineer that the liner system, leachate collection system, and any other associated items were installed in accordance with the approved documents and HAR 11-58.1.

8. No solid waste shall be disposed of into any new cell or sector until an experienced professional engineer certifies completion of construction in accordance with approved drawings and HAR 11-58.1, and the CQA report is submitted in accordance with Special Condition B.7.

9. The permittees shall afford the opportunity for an inspection of each new cell or sector by the DOH, with the presence of the CQA engineer and on-site facility operator.

10. The permittees shall install and maintain grade survey control markers to delineate the boundaries and elevations of the MSW landfill areas, in sufficient number to demonstrate compliance with permitted grades.

Section C Phase II Acceptance Criteria

1. The permittees are authorized to accept for disposal, solid wastes, as defined in HAR 11-58.1-03, except unacceptable waste listed under Special Condition C.2.h.

2. The permittees shall implement the October 2017 Site Operations Manual, the January 2016 Waste Acceptance/Hazardous Waste Exclusion Program, approved subsequent submissions, and the following conditions.

a. The permittees shall screen waste, prevent unacceptable waste from entering the facility, and remove unacceptable waste if it enters the facility.
b. The permittees shall post a sign on the property that lists unacceptable wastes.
c. The permittees shall conduct random visual surveillance of mixed commercial loads (not inclusive of loads known to only contain single source-separated

materials, such as sludge), at least once per day, to spot check for unacceptable wastes. Findings shall be documented on the Load Check Data Sheet.

d. The equipment operators and spotters at the active workface shall visually screen the contents of each load and remove unacceptable waste.

e. If unacceptable waste is observed, the permittees shall reject the load. If the waste has been unloaded, the permittees shall separate the unacceptable waste, move it away from the active workface, and manage it in accordance with Special Condition C.3.

f. Equipment operators and spotters shall receive training on visual surveillance and unacceptable waste handling procedures set forth in the Operations Plan. Training shall be attended at least once per year, or more frequently as needed to ensure compliance with the facility procedures.

g. The permittees shall maintain records of random inspections on the Load Check Data Sheets and personnel training.

h. Unacceptable waste is defined as:

   i. Regulated hazardous waste, as defined in state hazardous waste laws and regulations;
   ii. Polychlorinated biphenyl (PCB) waste, as defined in 40 CFR Part 761;
   iii. Untreated infectious waste, excluding infectious waste generated within the household, in accordance with HAR 11-58.1-63;
   iv. Bulk or noncontainerized liquid waste, except as provided in HAR 11-58.1-15(i);
   v. Containers holding liquid waste, except as provided in HAR 11-58.1-15(i)(2);
   vi. Commercial loads containing greater than 25% green waste and household loads containing greater than 50% green waste, in accordance with HAR 11-58.1-65(b);
   vii. Scrap automobiles, white goods, and whole motor vehicle tires, in accordance with HAR 11-58.1-65(c);
   viii. Lead acid batteries, in accordance with HRS 342I;
   ix. Compressed gas tanks; and
   x. Other unacceptable wastes listed in the Operations Plan and Waste Acceptance/Hazardous Waste Exclusion Program.

3. If unacceptable waste is identified at the facility, the permittees shall separate the waste, manage, transport, and recycle/dispose of it in accordance with the October 2017 Site Operations Manual and applicable laws and rules. Unacceptable waste shall not be disposed of at the facility.

   a. Unacceptable waste shall be transported from the facility prior to posing a nuisance, health, or safety concern.

b. Unacceptable waste shall be transported to a permitted solid waste management facility allowed to accept the waste, or to an out-of-state recycling/disposal facility.
c. The permittees shall maintain a daily log of unacceptable waste turned away from the facility or separated from disposal, including date, hauler, waste type, estimated quantity, and destination.
d. The permittees shall notify the DOH, in writing within the next working day of the identification of hazardous or PCB waste. The notification shall include the date and time of incident, origin of the waste, hauler/generator, description and quantity of waste, actions that will be taken to manage the waste at the site, and actions that will be taken to remove the waste from the premises. The permittees shall also provide written notification, including a copy of the associated manifests, within seven (7) days of removal of the waste from the facility.

4. The permittees shall manage and dispose of radioactive waste in accordance with HAR 11-58.1-64.

5. The permittees shall implement the Waste Acceptance/Hazardous Waste Exclusion Program, as provided in Section I, Part B of the Site Operations Manual, approved subsequent submissions, and these permit conditions. All documentation shall be maintained at the facility and made available to the DOH upon request.

a. The permittees shall pre-approve special wastes, prior to acceptance at the facility.
b. The permittees shall maintain written documentation and implement special handling procedures associated with each type of special waste. The procedures shall be based on the physical, chemical or pertinent characteristics of the special waste.
c. Special waste means any solid waste which, because of its source or physical, chemical, or biological characteristics, require special consideration for its proper processing or disposal, or both, and includes, but is not limited to:

i. Asbestos;
ii. Semi-solid wastes including:

(1) dewatered car and equipment wash wastes;
(2) sewage sludges; and
(3) underground storage tank and other sludges;

iii. Off-specification and outdated products;
iv. Baghouse dusts;
v. Inorganic filter cakes;

vi. Treated infectious waste;
vii. Dead animals and offal;
viii. Contaminated Materials including:

(1) Contaminated soils and debris, including: resins and chemical debris; petroleum and other contaminated soils; and petroleum fuels (i.e., used oil, diesel, jet fuel, gasoline) and debris,
(2) Sandblast grits,
(3) Waste that are toxic in nature, such as insecticides, poisons, or radioactive materials (provided that they are not regulated under another authority such as RCRA Subtitle C, TSCA that requires disposal other than at a permitted MSW landfill), and
(4) other solid waste, which may be accepted for disposal such as contaminated industrial/commercial waste and non-TSCA regulated PCB waste, provided such materials are not regulated hazardous waste;

ix. Other special waste listed in the Waste Acceptance/Hazardous Waste Exclusion Program; and
x. Fresh or frozen uncooked shrimp and other crustaceans.

d. The permittees shall approve Contaminated Materials (as defined in Special Condition C.5.c.viii), on a case-by-case basis, prior to acceptance at the facility.

i. The permittees shall implement procedures for the acceptance of contaminated material specified in Section 5.2.3 of the October 2017 Site Operations Manual, and approved subsequent submissions. These procedures shall be implemented for all contaminated materials defined in Special Condition C.5.c.viii. The DOH, Hazard Evaluation and Emergency Response Office Technical Guidance Manual for sampling and analysis shall be incorporated, where appropriate.
ii. A Notice of Contaminated Material Approval shall be prepared for contaminated material accepted at the facility. The notice shall include approval from both the owner and operator of the facility, acceptance date(s), quantity and description of waste, origin of waste, waste profile sheet/approval manifest; proposed management of contaminated material (use as daily cover or disposal as void space fill) and any special management and handling procedures. The permittees shall maintain a copy of the approval and provide a copy to DOH prior to acceptance.

Section D Phase II Landfill Operations

1. The permittees shall implement the October 2017 Site Operations Manual and approved subsequent revisions. The DOH may periodically require revisions to the Site Operations Manual. The contents of the Site Operations Manual shall address permit requirements and be implemented to ensure compliance. Any significant changes to the Site Operations Manual require approval from the DOH. Depending on the scope of the change, a permit modification may also be required. If there are discrepancies between the Site Operations Manual and these permit conditions, the permit conditions take precedence.

2. The average acceptance rate of the landfill is approximately 200 tons per day. The average peak daily disposal rate is approximately 600 tons per day.

3. **User Population**. The permittees shall maintain a list of the types of users for operator reference and regulatory review. In the event that a change is required for the user population or the screening and review process to identify legitimate users, the permittees shall submit a written update of such change. The written update shall propose adjustments to the screening and review process, as appropriate to respond to the changes in the user population.

4. **Air Criteria**. The permittees are responsible for obtaining permits and maintaining compliance with any state or federal clean air regulations. Open burning of solid waste, except for debris from emergency cleanup operations, is prohibited. Open burning of debris from emergency cleanup operations shall not commence without prior approval from the DOH.

5. **Climatic Information**. Climate information shall be collected on a daily basis and shall include information on rainfall, solar radiation, evaporation, wind speed and direction, humidity, temperature, and other meteorological data, as applicable, for use in modeling evapotranspiration and leachate generation with the HELP Model at the landfill and evaluating litter/odor control. The permittees shall minimize any weather equipment downtimes. In the event that the equipment is not operational, the permittees shall maintain a record of the affected date(s), reason, and actions taken. Data shall be provided to the DOH upon request.

6. **Program for Regular Training**. The permittees shall provide training to landfill operators annually, or more frequently, as needed, to ensure that the operators are familiar with the Site Operations Manual and these permit conditions. Training shall be conducted by a Site Manager or Environmental Professional. Records of training shall be maintained.

7. **Queuing**. The permittees shall provide adequate on-site queuing for waste delivery vehicles at the scalehouse area. The permittees shall also make reasonable best efforts to prevent waste vehicles from idling on the highway.

8. **Mud and Dust Prevention Program**. The permittees shall provide measures for minimizing the tracking of mud onto public roads, and the generation of dust on site. If the measures do not adequately minimize the tracking of mud on to public roads or generation of dust from vehicular traffic onsite, the permittees shall implement additional mud prevention and dust control measures.

    a. Mud prevention measures include the installation and maintenance of wet weather pads and access routes constructed of material (such as cold plane material or asphalt/concrete rubble) that will minimize the exposure of excessive muddy conditions. A wet weather deck shall be present to allow for safe disposal of MSW during wet weather or muddy conditions. If mud is tracked offsite, the permittees shall clean up the tracked mud off the property and implement additional mud prevention measures. Possible measures that may be implemented include: rumble strips, drive-through tire wash, and/or wash pad.
    b. The permittees shall provide adequate signage to inform drivers/operators of non-household vehicles that their loads should be covered prior to entering the facility.
    c. Dust prevention measures include, but are not limited to, applying water spray to roads and active workface throughout the day, as needed to control dust. The permittees shall also minimize dust generated from areas with intermediate cover. The DOH may require that intermediate slopes be vegetated, or measures be taken to control dust.

9. **Disease Vector Control**. The permittees shall prevent or control on-site populations of disease vectors, including rodents, insects, and birds. If vector control measures are not adequate, the permittees shall implement additional vector control measures.

    a. A monthly Vector Control Report shall be completed and placed in the operating record to document the following:

        i. Results of a monthly inspection of the landfill documenting the presence or absence of flies and other insects, rodents, and birds.
        ii. Summary of vector abatement activities.

    b. Special measures shall be taken to prevent birds from alighting at the workface during delivery and disposal of loads of fresh or frozen uncooked shrimp and other crustaceans. Such measures may include producing noise, deploying balloons and/or having active equipment guard the load.

10. **Litter Control**. The permittees shall confine litter to the working face area and prevent litter from leaving the facility. The permittees shall implement litter control measures as delineated in the Site Operations Manual and these conditions. During the course of the working day of operation, all windblown material shall be collected and be properly disposed. At a minimum, the collection measures shall include:

    a. The use of litter screens/fences within 100 yards downwind of the active workface (primary fencing).
    b. The use of additional temporary litter screens/fences in secondary control positions at the workface area in places where they will not hinder traffic control.
    c. The presence of a truck clean-out area near the active workface, with litter screens/fences and disposal receptacles for truck clean-out. If the truck clean-out area is within 100 feet of a downwind primary fencing area, additional screens/fences shall only be required if the primary and secondary fencing areas are inadequate.
    d. Cleaning of litter screens/fences (primary, secondary, and truck clean-out area screens/fences) throughout the day. At the end of the operating day, all litter shall be removed from all litter screen/fences.
    e. Additional litter cleanup of all impacted areas in the event of a major windstorm or other incident in which litter escapes the normal litter containment systems.
    f. Documentation of the number of personnel picking up litter, number of bags collected, and maximum wind speed for each day.
    g. If litter control measures are not adequate, the permittees shall implement additional litter control measures.

11. **Temporary Storage**. Stockpiled materials within the landfill waste boundary shall be limited to cover material, gravel for roads/wet weather areas, and landfill equipment, except as otherwise approved by the DOH. The volume of material storage stockpiles shall not exceed thirty (30) days capacity. If temporary storage exceeds or is anticipated to exceed thirty (30) days, the permittees shall construct temporary berms or implement other measures to prevent erosion of the stored material and allow for proper surface water flow.

12. The permittees shall provide adequate equipment and personnel to operate the MSW landfill facility, including provisions for back-up personnel and equipment. A minimum of one bulldozer, one compactor, one water truck, and one traffic controller shall be available to operate at the working face during operational hours, except that the water truck could be making rounds at other locations at the facility. Equipment and personnel changes could be made if approved by the DOH in writing. The traffic controller and bulldozer operator may be the same person.

13. Operators shall routinely clean the tracks/wheels at the working face using shovel/dry methodology. If water is needed, cleaning shall be at the workface and the amount of water used shall be limited to an amount that would otherwise be used for dust control and not cause infiltration into the waste layer.

14. The permittees shall implement the June 2016 Asbestos Management and Disposal Plan (Section I, Part B, Appendix A of the October 2017 Site Operations Manual) and approved subsequent submissions. Compliance with the plan does not preclude compliance with other applicable statutes, regulations, and rules. The permittees shall document the quantity, type, and location of asbestos disposed of in the MSW landfill. Disposal locations shall be recorded with GPS coordinates. The permittees shall maintain records on the amount and location of asbestos disposal.

15. Loads of treated medical waste shall be placed in a trench/pit excavated within waste that was placed on the same day. Loads of treated medical waste shall be immediately covered with a minimum of two (2) feet of MSW and compacted.

16. Loads of dead animals and offal (hides, intestines and other waste from slaughtered animals) and fresh or frozen uncooked shrimp and other crustaceans shall be placed in trench/pit areas, excavated within waste that was placed on the same day, and shall be immediately covered with a minimum of two (2) feet of MSW or soil and compacted. The thickness of MSW shall be increased or additional soil shall be used, as needed to minimize odors. Odor neutralizers and soil cover shall be used, as needed to minimize odors. Prior to acceptance, uncooked shrimp and other crustaceans shall also be containerized and double-bagged.

17. The Odor Control Program in the October 2017 Site Operations Manual shall be implemented. If odor control measures are not adequate, the permittees shall implement additional odor control measures and the DOH may require that additional measures be implemented.

    a. Odorous loads shall be placed in trench/pit areas, excavated within waste that was placed on the same day and known to contain no odorous special wastes. The pit will be large enough to contain approximately twice the volume of the anticipated odorous load.
    b. The odorous load shall be immediately covered with a minimum of two (2) feet of MSW or soils and compacted. The thickness of MSW shall be increased or additional soil shall be used, as needed to minimize the odor.
    c. Daily cover soil will be placed and compacted above the solid waste. Odor neutralizers and added soil cover shall be used, as needed to minimize odors.

18. The following controls shall apply to the operations with contaminated materials (as defined in Special Condition C.5.c.viii):

    a. The permittees shall ensure that contaminated materials are removed from the truck during disposal to the best practicable extent possible.
    b. The permittees shall implement appropriate dust control measures, such as water sprays and barriers, containerization, or restricting disposal to only non-windy conditions to adequately control dust and the scattering of contaminants during placement of contaminated material. The selection of dust/contaminant control measures shall be determined based on operations, the type of waste, and type and concentration of contaminants. The permittees shall also determine whether air monitoring is necessary for the specific disposal. The control measures and procedures for dust control and air monitoring, if applicable, shall be specified in the Contaminated Materials Notification.
    c. The permittees shall document the special disposal procedures implemented for the contaminated material. Special disposal procedures may include the isolation of the material by the use of synthetic or soil barriers or containers.

19. Contaminated soil with contaminant concentrations below current DOH Environmental Action Levels for Direct Exposure in Industrial Setting may be used as daily cover, provided the daily cover is not exposed for more than twenty-four (24) hours.

20. Contaminated soil with contaminant concentrations greater than DOH Environmental Action Levels for unrestricted use shall not be used as intermediate or final cover. The permittees shall implement DOH's *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material* in determining whether soil is appropriate for cover use.

21. The permittees shall place daily cover on the disposed solid waste at the end of each workday, or at more frequent intervals if necessary, to control disease vectors, fires, odors, blowing litter, and scavenging. The daily cover material shall be comprised of a minimum of six inches of earthen material or an alternative daily cover and shall leave no exposed waste. Of primary preference, earthen material shall be soil. The permittees shall maintain a daily log, including the date, volume of waste disposed, cell geometry, and volume and type of material used as daily cover.

22. The permittees may submit a written proposal to request the use of an alternative daily cover (ADC), comprised of alternative materials of an alternative thickness (other than at least six inches of earthen material).

a. The use of ADC is limited to daily cover use.
b. The use of ADC shall be evaluated in demonstration projects. The demonstration project shall be performed in 6-month increments to determine whether the ADC and its thickness can control disease vectors, fires, odors, nuisance, litter, and scavenging without presenting a threat to human health and the environment.
c. The request shall include ADC specifications, associated operational procedures, an assessment of whether the alternative material and thickness can control disease vectors, fires, odors, blowing litter, and scavenging without presenting a threat to human health and the environment, and any other pertinent information.
d. The permittees shall obtain DOH approval, in writing, prior to the commencement of the demonstration project.
e. The permittees shall report the performance of the ADC at the end of the demonstration period, including an evaluation of whether the ADC is appropriate for use at the facility, and successful operational procedures.
f. The permittees shall obtain DOH approval, in writing, prior to commencement of continued use of ADC beyond the demonstration period. The DOH may impose conditions on the use of ADC. Those conditions shall become part of this permit.
g. The demonstration period or the approved use of an ADC may be rescinded or cancelled by either the DOH or permittees at anytime without cause.

23. In accordance with the DOH's January 24, 1995 letter, the permittees may use tarps as ADC. The tarps shall be Griffolyn TX1200 (minimum 10 mil thickness with nylon scrim reinforcement) or equivalent. The tarps may only be used under the following conditions:

a. The area where ADC is used shall be covered with waste or soil daily cover within twenty-four (24) hours after initial ADC placement.
b. The ADC placement is limited to 100 feet x 100 feet (approximately 3 tarps). The areas that are not covered with ADC shall be covered with at least six (6) inches of compacted daily soil cover.
c. An intermediate cell construction method shall be used, with the intermediate cells being limited to 2,000 tons. The approximate dimensions of a 2,000-ton intermediate cell at the Kekaha Landfill are to be 100 feet by 100 feet by 10 feet high. Once the intermediate cell is completed, all faces of the cell shall receive a compacted six-inch layer of soil.
d. Additional soil to 12-inches thick shall be added to the six-inch cover material for all-weather haul roads, at the tipping pad, and areas needing intermediate cover.
e. Intermediate cell construction soil shall use a fine grain, clay type soil.

24. **Daily Cover Monitoring Verification Program**. The permittees shall take digital photos of the active workface at the middle and end of each day (Monday through Sunday), from the same perspective, to document the placement and thickness of daily cover. Digital photo records shall be maintained at the facility and submitted to the DOH via email by noon on the following business day, with cell location information provided in photographs and in emails.

25. The permittees shall cover all areas that do not receive waste (MSW) within a 30-day period with intermediate cover. The permittees shall also cover any area receiving vehicular traffic with intermediate cover, regardless of the time period since last receiving waste. The DOH may require that intermediate slopes be vegetated or measures be taken to control dust.

    a. Intermediate cover shall be a minimum of 12 inches of earthen material (may include six inches of soil daily cover). The particle size shall be adequate to minimize infiltration and direct stormwater to collection systems.
    b. Intermediate cover shall be inspected at least once per month, and issues shall be addressed as they are identified, such as repairs for erosion and cracking. The permittees shall maintain a log of inspections, findings, and corrective actions, if needed.

26. The permittees shall cease acceptance and disposal of waste in high wind conditions, as necessary for safety and environmental compliance and as determined by the foreman and Site Manager or Environmental Professional/District Manager. The permittees shall maintain a log of such events, including the date, time of shutdown, and associated estimated wind speed.

27. The permittees shall stop accepting waste when the landfill has reached its design capacity as defined in Drawing No. 4 of the December 2015 *Engineering Report Kekaha Landfill Phase II – Cell 2 Lateral Expansion Kekaha Sanitary Landfill*, or is terminated by any land use permits, whichever comes first, and begin closure actions as delineated in Part II, Special Conditions, Section I.

Section E Surface Water Management

1. The permittees shall design, construct, and maintain a surface water run-on and run-off control system throughout the life of the landfill and through post-closure in accordance with HAR 11-58.1-15(g).

2. The surface water system is generally depicted in Section V of the October 2017 Site Operations Manual and shall be as shown on Drawing No.5 of the December 2015 *Engineering Report Kekaha Landfill Phase II – Cell 2 Lateral Expansion Kekaha Sanitary Landfill* and approved subsequent submitted documents. The surface water management system consists of storm water conveyance that transfers surface water to infiltration ditches and to an infiltration basin on the northeast corner of the facility. Storm water shall not come into contact with the GCL of the landfill and evaporation pond containment system. If the design is insufficient to comply with the conditions of this permit, proposed modifications shall be submitted to the DOH and implemented.

3. Stormwater that comes in contact with solid waste shall be managed and disposed of as leachate.

4. The conditions of this permit do not preclude compliance with any other applicable federal, state, or local requirements including water quality and surface water discharge regulations.

5. The Surface Water Management Plan as delineated in Section V of the October 2017 Site Operations Manual shall be updated annually and filed with the DOH by September 1 of each year. It shall contain the following information:

    a. An annual inspection report of surface water management features and facilities, together with a description of required maintenance and changes;
    b. Updated drawings showing current topography of the landfill, surface water drainage paths and conveyances, and drainage system modifications planned for the next year in response to waste filling;
    c. A statement that all areas with intermediate cover were graded to direct storm water away from the workface and towards the storm water collection system;
    d. Engineering calculations documenting the capability of the surface water management system to comply with the run-on and run-off requirements listed under Special Condition E.1. Top deck areas shall have minimum slope of 3% to promote drainage. Side-slopes shall not exceed 3.5 horizontal to 1 vertical (final slope design); and
    e. Any updates to the Storm Water Pollution Control Plan or Spill Prevention, Control, and Countermeasures Plan prepared pursuant to federal requirements under the Clean Water Act.

Section F Explosive Gases Control

1. The permittees shall implement the January 2016 *Perimeter Gas Monitoring Plan, Kekaha Landfill Phase II,* prepared by AECOM Technical Services, Inc., or an DOH-approved updated plan. The plan shall be conducted in accordance with HAR 11-58.1-15(d), which requires the permittees to ensure that:

a. The concentration of methane gas generated by the facility does not exceed 25% of the lower explosive limit (LEL) for methane in facility structures (excluding gas control or recovery system components); and
b. The concentration of methane gas does not exceed the LEL for methane at the facility property boundary. The LEL for methane is five (5) percent by volume.

2. As specified in the January 2016 Perimeter Gas Monitoring Plan, at a minimum, the permittees shall monitor the concentration of gases, including oxygen, methane and carbon dioxide on a quarterly basis. The permittees shall monitor the concentration of the gases in facility structures, including temporary structures, and at the property boundary in accordance with the January 2016 Perimeter Gas Monitoring Plan, or as approved by the DOH. If an exceedance is identified, the permittees may conduct a verification monitoring event within one (1) hour of the initially detected exceedance. If exceedances or other anomalous condition is identified, the DOH may increase the frequency of monitoring events.

3. The permittees shall inspect and maintain the perimeter gas monitoring probes. In the event that a probe is unusable, the permittees shall repair the probe or install a new probe prior to the next monitoring event.

a. If a probe is repaired, submit documentation to the DOH indicating the reason for repair, type of repairs completed, and evaluations performed to ensure the probe is acceptable for use.
b. If a probe is replaced or added, the permittees shall:

i. Update the Perimeter Gas Monitoring Plan to show the new probe locations and identification numbers within thirty (30) days of probe installation. The update shall also document the reason for the replacement or addition of the probe.
ii. Submit an installation report for the new probe within sixty (60) days of completion. The report shall include geologic logs for each probe location, survey locations, elevations of probes, and as-built drawings of each monitoring probe.
iii. Abandon the unusable probe and submit associated documentation.

c. All probe locations to be abandoned shall be done in a manner that minimizes oxygen infiltration to the waste mass.

4. The permittees shall ensure that the field meters are factory calibrated in accordance with manufacturer's specifications. The permittees shall also field calibrate the meters prior to each monitoring event. The permittees shall conduct monitoring events only with equipment that has been properly calibrated and maintained.

5. The permittees shall submit a report with results within sixty (60) days of each monitoring event. The results shall include the date and time, gas concentrations by volume, barometric pressure, site conditions, name of personnel conducting the monitoring, description of equipment and calibration results, description of monitoring procedure, and identification of any procedures or observations outside of normal conditions.

6. If explosive gas concentrations exceed the limits in Special Condition F.1, and verification monitoring is not performed, or verification monitoring confirms the initial exceedance, the permittees shall perform the following:

    a. Immediately take all necessary steps to ensure protection of human health.
    b. Immediately notify the DOH of the exceedance.
    c. Within seven (7) days of detection, place in the operating record and submit to the DOH documentation that methane gas levels were detected, and a description of the steps taken to protect human health.
    d. Within sixty (60) days of detection, implement a remediation plan for the explosive gas releases, place a copy of the plan in the operating record, provide a copy of the plan to the DOH, and notify the DOH that the plan has been implemented.
    e. Within thirty (30) days after the remediation plan has been completed, submit a report to the DOH documenting the actions taken, additional monitoring results, and plans to prevent future recurrences.
    f. The DOH may modify the reporting and implementation schedule, as necessary to protect human health and the environment.

Section G Leachate Management/Groundwater and Leachate Monitoring

Leachate Management

1. The permittees shall implement the August 2018 Revised Leachate Management Plan and/or approved subsequent submissions, and the following conditions. If there are discrepancies between the plans and the permit conditions, the HRS, HAR, and permit conditions take precedence.

2. The permittees shall manage storm water that comes in contact with solid waste as leachate. Leachate shall be managed to prevent entry into the storm water collection system and contact with the public.

3. The permittees shall maintain an elevation control point at the top of casing of each groundwater monitoring well and leachate sump/manhole/wet well, for the measurement of groundwater/leachate level in each monitoring system. The elevation control point shall be surveyed at least once every five (5) years and clearly marked.

Reference elevations at the top of each wet well and sump shall be permanently marked on the surface of the access opening to allow the manual measurement of leachate surface elevation from the access hatch opening. The permittees shall also maintain a monument, showing benchmark elevation, located in a position off the landfill.

4. The permittees shall inspect, operate, and maintain the leachate management system and evaporation pond, as designed. The leachate management system includes the leachate collection and transmission piping, sumps, manholes, wet wells, and pumping stations that deliver leachate from the landfill to the evaporation pond.

   a. The leachate management system and evaporation pond shall be operated and maintained in accordance with HLA drawing titled *Kekaha Sanitary Landfill Phase 2* and dated March 1993 (original Phase II leachate collection system) and as modified by the following and approved subsequent drawings.

      i. Cell 1 Leachate Collection System: *Report of CQA Cell 1 (1A through 1D),* dated October 18, 2010, and prepared by Geosyntec Consultants, including red-lined construction drawings.
      ii. Evaporation Pond: *Report of Construction Quality Assurance for New Leachate Evaporation Pond*, prepared by Geosyntec Consultants, dated May 25, 2010, including red lined construction drawing numbers 3, 11, 12, 13, 14 and 22, as of May 24, 2010.
      iii. *Report of Construction Quality Assurance, Phase II Leachate Management System Modifications, Kekaha Sanitary Landfill*, prepared by Geosyntec Consultants, dated April 14, 2016.
      iv. Cell 2 Leachate Collection System: *Cell 2 Base Liner Construction Drawings Phase II Lateral Expansion, Kekaha Sanitary Landfill*, prepared by AECOM, dated October 2018.

   b. Permittees shall maintain in good working order an automated leachate pump system, with preset sump and wet well levels to minimize backup of leachate into the cells or leachate transmission lines. The pump settings shall be as specified in listed references and as listed below; or as approved by the DOH. The automated systems shall include an alarm system to alert the permittees to anomalous conditions with the pumps, or in wet wells or sumps.

	Wet Well 1[1,4]	Wet Well 2[1,4]	Wet Well 3[2,5]	Sump 2A[5,6]	Sump 2B[5,6]
High Alarm (inches from bottom of well)	34	34	60[7]	n/a	n/a
High Alarm (feet, elevation)	5.63	6.53	8.00[7]	12.1	12.1
Pump On (inches from bottom of well)	22	22	48	n/a	n/a
Pump On (feet, elevation)	4.63	5.53	7.00	11.6	11.6
Pump Off (inches from bottom of well)	13	13	14.25	n/a	n/a
Pump Off (feet, elevation)	3.88	4.78	4.19	11.1	11.1
Low Alarm (inches from bottom of well)	11	11	13.25	n/a	n/a
Low Alarm (feet, elevation)	3.71	4.61	4.11	n/a	n/a

[1] *Report of Construction Quality Assurance, Phase II Leachate Management System Modifications, Kekaha Sanitary Landfill, prepared by Geosyntec Consultants*, dated April 14, 2016.

[2] *Report of CQA Cell 1, prepared by Geosyntec Consultants*, dated October 18, 2010.

[3] *Draft Cell 2 Base Liner Construction Drawings Phase II Lateral Expansion, Kekaha Sanitary Landfill*, prepared by AECOM dated October 2018.

[4] Vertical datum correlates to designated USGS brass monument G1000 plus 1.21 feet.

[5] Vertical datum correlates to Local Tidal.

[6] Email from Donn Kakuda, County of Kauai to Kevin Kihara, dated June 15, 2018.

[7] Revised Leachate Management Plan, prepared by Waste Management of Hawaii, Inc., dated August 2018.

c. The permittees shall inspect the condition and integrity of the leachate collection system and evaporation pond at least once per month, and in accordance with the Leachate Management Plan.

d. The permittees shall perform a system check of the interstitial monitoring system of each of the wet wells at least once a month in accordance with the manufacturer's recommendation.

e. The permittees shall document the results of the inspections and implement corrective actions to address any findings that may compromise the integrity of the system and result in a release.

f. If the pump system or any portion of the leachate collection and removal system is inoperable, the permittees shall take immediate steps to rectify the problem and implement contingency measures to comply with remaining conditions of this permit.

5. The permittees shall maintain usable access to all groundwater monitoring wells and leachate sumps/manholes/wet wells. The permittees shall inspect and maintain the integrity of the monitoring wells and sumps/manholes/wet wells, and protect them from damage, destruction, or vandalism. If repair or replacement is necessary to ensure proper management and monitoring, then the permittees shall design and construct the necessary repairs and/or replacements.

    a. Should any of these sumps/wells/manholes become damaged, destroyed, or vandalized, the permittees shall notify the DOH immediately. The notification shall include pertinent information as to the cause of the destruction, description of measures to replace and/or repair the sumps/wells/manholes, and actions taken to prevent the recurrence of such problems in the future.
    b. If a well/manhole/sump will be constructed, modified or repaired, a construction plan shall be submitted to the DOH prior to commencement of construction. At a minimum, the plan shall include the proposed well/manhole/sump location; the rationale for the well/manhole/sump location; a description of the well/manhole/sump design, modification or repair; and installation procedures. The permittees shall implement the repair/construction upon DOH approval.
    c. The permittees shall ensure that the existing Phase II leachate collection pipe cleanouts are periodically extended in accordance with the *Draft Cell 2 Base Liner Construction Drawings Phase II Lateral Expansion, Kekaha Sanitary Landfill*, dated October 2018, or subsequent updates provided by the engineer of record.
    d. A Well/Manhole/Sump Completion Report shall be sent to the DOH within sixty (60) days of any new groundwater monitoring well and leachate manhole/wet well/sump (as appropriate) construction or repair. At a minimum, the report shall include geologic logs, well/manhole/wet well/sump design, installation activities, surveyed location, as-built drawings (with depths and elevations of all pertinent components, such as top of casing, total depth of well, screened interval, groundwater elevation, pipe inverts, and pump intake placement) and pump level information. Upon well/manhole/wet well/sump completion, the permittees shall incorporate wells/manholes/wet wells/sumps into the leachate/groundwater monitoring program.

6. The permittees shall remove leachate from the landfill via each of the leachate wet wells and sumps using the automated system that is described in Special Condition G.4.b. Based on design plans, the leachate levels in the wet wells shall not exceed the following compliance levels, or as approved by the DOH:

Location	Top of Well or Sump, Elevation (feet)	Lowest Pipe Invert Elevation (feet)	Lowest Sump Elevation (feet)	Lowest Liner Elevation (feet)	Compliance Elevation (feet)
Wet Well 1	18.00[1,4]	6.50[1,4]	n/a	6.6 msl[5,6]	7.50[1,4]
Wet Well 2	16.11[1,4]	7.03[1,4]	n/a	6.6 msl[5,6]	8.03[1,4]
Wet Well 3[2,5]	22.5 msl	8.11 msl	n/a	10.50 msl	9.11 msl
Sump 2A[3,5]	TBD	n/a	10.50 msl	11.56 msl	12.56 msl
Sump 2B[3,5]	TBD	n/a	10.50 msl	11.61 msl	12.61 msl

[1] *Report of Construction Quality Assurance, Phase II Leachate Management System Modifications, Kekaha Sanitary Landfill,* prepared by Geosyntec Consultants, dated April 14, 2016.

[2] *Report of CQA Cell 1,* prepared by Geosyntec Consultants, dated October 18, 2010.

[3] *Draft Cell 2 Base Liner Construction Drawings, Phase II Lateral Expansion*, dated October 2018.

[4] Vertical datum correlates to designated USGS brass monument G1000 plus 1.21 feet.

[5] Vertical datum correlates to Local Tidal.

[6] *Kekaha Sanitary Landfill Phase II, Design Drawings*, prepared by Harding Lawson and Associates, dated March 1993.

7. Leachate Level Monitoring and Recordkeeping

a. The permittees shall use automated monitoring and recordkeeping systems to monitor leachate levels in the sumps and wet wells.

i. The permittees shall maintain a daily log of the leachate levels in each sump and wet well, and an indication of whether moisture was detected in the interstitial space of Wet Wells 1, 2, and 3.

ii. The log shall include the date, level of leachate in each sump and wet well, results of interstitial monitoring, volume of leachate pumped into the Evaporation Pond as measured by the flowmeters, or other approved methods, and name of person conducting the inspection.

b. The permittees shall take and record manual measurements of leachate levels in each wet well and sump at least once per month. If manual measurements are inconsistent with automated readings or other problems are identified with the system that questions the accuracy of the automated readings, manual measurements shall be taken and recorded daily until accuracy is again verified for at least five (5) consecutive days. The DOH may increase the frequency of manual measurements. Records shall include the date, leachate level, and name of person conducting the inspection.

c. In the event that any portion of the automated monitoring or recordkeeping systems is under repair or inoperable, the permittees shall take and record manual measurements daily to monitor the leachate levels in the associated wet wells. The permittees shall also record the leachate levels before and after pumping when the system is in manual mode. Within seven (7) days of triggering the requirement for manual measurements, the permittees shall submit written notification to the DOH describing the situation, corrective

actions, and schedule. The DOH may increase the frequency of manual measurements. After the repair/maintenance is completed, the permittees shall continue recording daily measurements for a minimum of three (3) days, and weekly for three (3) weeks to verify that all automated readings are consistent with manual measurements. The permittees shall submit written notification, including documentation, of the three (3)-week verification test, prior to reducing the frequency of manual measurements.

d. The permittees shall notify the DOH of any exceedances of the leachate compliance levels, in accordance with Standard Conditions, Item 10.

8. Evaporation Pond

a. Leachate levels in the evaporation pond shall not exceed 6-foot depth, leaving about 2 feet of freeboard.
b. The permittees shall implement contingency plans as needed to address potential exceedances, in accordance with the Operations Plan. These contingency plans include providing storage tanks to temporarily store excess leachate from the evaporation pond and haul excess leachate to an authorized wastewater treatment plant as necessary. The transfer of leachate and temporary storage of leachate shall be conducted with secondary containment measures.
c. The permittees shall maintain records of leachate removal (by means other than evaporation), including date, volume, beginning and ending depths of leachate, and manner of disposal.
d. Leachate levels in the evaporation pond shall be recorded at least weekly, except during periods of heavy rainfall, when the level shall be recorded daily, in accordance with the Leachate Management Plan.
e. The record log shall include the date, leachate level, and name of person conducting the inspection.
f. The permittees shall notify the DOH of any exceedances of the leachate evaporation pond compliance levels in accordance with Standard Condition Item 10.

<u>Groundwater and Leachate Monitoring</u>

9. If not already submitted by the issuance date of this permit, the permittees shall submit for DOH review and approval, an updated Groundwater Monitoring and Leachate Monitoring Plan within six months from the issuance date of this permit that addresses DOH comments provided in a letter issued May 31, 2019. At a minimum, the plan shall describe the entire groundwater monitoring well system and monitoring program (including, but not limited to, detection monitoring, assessment monitoring, statistical analysis, and corrective action) that complies with HAR 11-58.1-16, and include the certification by a qualified groundwater scientist as specified in HAR 11-58.1-16. Upon

approval, the permittees shall implement the updated plan. Until the DOH approves the updated plan, the permittees shall implement the existing groundwater monitoring plans for the respective phases of the landfill, as follows: *Revised Groundwater Monitoring Plan, Kekaha Landfill Phase I, Kekaha, Kauai, Hawaii*, dated January 2004, and *Groundwater Monitoring Plan, Kekaha Sanitary Landfill Phase II, Kekaha, Kauai, Hawaii,* dated August 2013, and approved subsequent revisions. The permittees may request revisions to the plan and implement the plan with DOH approval; or the DOH may periodically require revisions to the existing or updated plan. Deadlines imposed by the DOH for plan submissions or revisions shall be complied with.

10. The permittees shall measure groundwater elevations from each monitoring well prior to groundwater sampling and within a reasonable time period in order to estimate groundwater flow direction. The elevation datum and source shall be noted in each groundwater report.

11. All sample collection, handling, management, and analysis shall be conducted in accordance with EPA SW-846, *Test Methods for Evaluating Solid Waste.*

12. Each sample shall be properly collected, identified, contained, and preserved. The name and signature of the person who collected the sample shall be included in the records. A chain of custody shall be maintained from the time of sample collection through the final analysis and disposition.

13. Sample analysis shall be conducted by an independent third party with appropriate credentials and performed at the expense of the permittees.

14. Groundwater samples shall be collected and analyzed in accordance with the Groundwater and Leachate Monitoring Plan and as follows, or as required or otherwise approved by the DOH.

    a. Groundwater samples shall be analyzed, on a quarterly basis, for constituents listed in 40 CFR 258 Appendix I, major cations and anions (Mg, Mn, Na, Ca, K, Cl, CO_3, SO_4, and HCO_3), major leachate indicators (TDS, TOC, total alkalinity, nitrogen-ammonia, Cl, and Fe), COD, nitrate-N, bromide, and field measurements (electrical conductance, pH, temperature, turbidity, and groundwater surface elevation), or as required or otherwise approved by the DOH.
    b. Groundwater samples from newly installed wells shall be analyzed on a quarterly basis for the following constituents: constituents listed in 40 CFR 258 Appendix I, major cations and anions (Mg, Mn, Na, Ca, K, Cl, CO_3, SO_4, and HCO_3), major leachate indicators (TDS, TOC, total alkalinity, nitrogen-ammonia, Cl, and Fe), COD, nitrate-nitrite as N, bromide, and field measurements

(electrical conductance, pH, temperature, turbidity, and groundwater surface elevation), or as required or otherwise approved by the DOH.

15. Leachate samples shall be collected and analyzed on an annual basis, except as noted in 15.a. below, or as required by the DOH. Leachate samples shall be analyzed for constituents listed in the Groundwater and Leachate Monitoring Plan and as follows: 40 CFR 258, Appendix II, major cations and anions (Mg, Na, Ca, K, Cl, CO_3, SO_4, and HCO_3), major leachate indicators (TDS, TOC, total alkalinity, nitrogen-ammonia, Cl, and Fe), COD, nitrate-nitrite as N, bromide, and field measurements (electrical conductance, pH, temperature, and turbidity), or as required or otherwise approved by the DOH. Individual samples shall be collected and analyzed from Wet Wells 1, 2, and 3, Sumps 2A and 2B.

    a. Leachate monitoring for Sumps 2A and 2B shall be semi-annually for at least the first two years following the initial placement of MSW in Cell 2.

16. The permittees shall prepare and submit a Groundwater/Leachate Monitoring Report within ninety (90) days of sampling, or other applicable reporting period. At a minimum, the monitoring reports shall include:

    a. Identification of groundwater or leachate wells/sumps sampled during the event.
    b. Sample collection dates and methodology.
    c. Identification of third party entity that performed the sample analysis.
    d. Analytical data, including copies of laboratory reports.
    e. Time-series plots for each detection monitoring parameter (except field measurements) and Piper/Stiff diagrams.
    f. Comparison of analytical data to drinking water standards and Environmental Action Levels.
    g. Identification of any deviations from the plan, reason for the deviation, and effect on the sampling results.

17. The permittees shall provide statistical analysis and documentation in each groundwater monitoring report that adequately supports each assumption, position, and/or conclusion. This shall include, but is not limited to:

    a. Step-by-step methodology for determining and/or updating baseline statistics.
    b. Methodology and statistical data for evaluating monitoring data.
    c. Methodology and historical analysis for determining trends or spikes.
    d. Methodology and statistical data for describing changes or additions to the parameter monitoring list.

18. In the event of a detection of VOCs above the practical quantitation limit, or a statistically significant increase, the permittees shall comply with the requirements of HAR 11-58.1-16 and the Landfill Groundwater Monitoring Guidance Document.

Section H Subsurface Landfill Gas Temperature Monitoring and Contingency Plan Phase I Landfill Disposal Area

1. At a minimum, the permittees shall implement the September 2018 *Subsurface Landfill Gas Temperature Monitoring and Contingency Plan for the Phase I Landfill Disposal Area*, or an approved alternative, and the following.

    a. A subsurface oxidation event (SOE) is presumed to have occurred if any of the following conditions are observed at a temperature probe:

        i. CO concentration exceeds 1,000 parts per million by volume (ppmv);
        ii. The temperature exceeds 131 degrees F and the CO concentration exceeds 400 ppmv; or
        iii. Actual observance of evidence of an SOE (e.g., smoke, smoldering ash, or burnt materials).

    In the event of a SOE, the contingency plan in the September 2018 *Subsurface Landfill Gas Temperature Monitoring and Contingency Plan for the Phase I Landfill Disposal Area* shall, at a minimum, be implemented. Permittees shall also evaluate whether temperatures or SOE may have impacted the integrity of the cover, liner, and leachate collection system, and take corrective measures as necessary.

2. The permittees shall implement the settlement monitoring plan proposed in the September 2018 *Subsurface Landfill Gas Temperature Monitoring and Contingency Plan for the Phase I Landfill Disposal Area*, or an approved alternative. Settlement measurements shall be taken at least monthly during the first year, which may be reduced if settlement is not identified. Measurements shall be recorded in the Annual Operating Record. If settlement measurements indicate potential damage to the Phase I or Phase II landfills, appropriate measures shall be taken to minimize impact to human health and the environment.

3. The permittees shall maintain usable access to all temperature monitoring probes and settlement markers. The permittees shall inspect and maintain the integrity of the monitoring probes and settlement markers and protect them from damage, destruction, or vandalism. If repair or replacement is necessary to ensure proper management and monitoring, then the permittees shall design and construct the necessary repairs and/or replacements. All repairs or replacements to the monitoring probes shall be performed in a manner that minimizes the infiltration of oxygen to the waste mass. All probe

locations to be abandoned shall be done in a manner that minimizes oxygen infiltration to the waste mass.

Section I Closure and Post-Closure Requirements

1. The permittees shall perform closure and post-closure activities in accordance with HAR §11-58.1-17, the May 2016 Closure/Post Closure Plan or a DOH-approved updated plan, and these permit conditions.

2. The permittees shall submit closure construction plans and specifications with the notice of intent to close as specified in Special Condition II.I.3. The construction plans and specifications shall be prepared and certified by a professional engineer, with at least five (5) years' experience in designing landfills, and registered in the State of Hawaii.

3. The permittees shall provide written notice of intent to close each landfill unit at least one hundred eighty (180) days prior to initiating closure activities. The notice of intent shall include a schedule and shall also be placed in the operating record.

4. The permittees shall begin closure activities of each landfill unit after receiving DOH approval on the closure construction plans and specifications and:

   a. Within thirty (30) days after the date on which the unit receives the known final receipt of wastes;
   b. Within one (1) year after the most recent receipt of wastes, if remaining capacity exists and there is a reasonable likelihood of additional waste acceptance; or
   c. Otherwise as approved by the DOH.

5. Soil with contaminant concentrations above DOH Environmental Action Levels for unrestricted use shall not be used in the final cover system. The permittees shall follow the DOH's *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material.*

6. The permittees shall complete closure activities of each unit within one hundred eighty (180) days following the beginning of closure in Special Condition II.I.4. The permittees shall retain a professional engineer registered in the State of Hawaii for the supervision of the closure CQA requirements, and upon the completion, the engineer shall submit a summary CQA report to the DOH to demonstrate as to the complete conformity to the plans and specifications as approved. The summary report shall be submitted within sixty (60) days after closure activities are completed. The summary report shall include a description of closure activities, as-built drawings, a survey prepared by a licensed land surveyor of the final cover system and horizontal and vertical extent of the landfill, a documented control program of the final cover system

construction, QA/QC testing procedures, laboratory analyses, and engineer's certification that the closure was completed in accordance with the closure plan and complies with the requirements of HAR 11-58.1-17.

7. Within one (1) year of completion of closure construction, the permittees shall submit a copy of the notation on the deed to the landfill property in accordance with HAR 11-58.1-17; and implement post-closure care in accordance with HAR 11-58.1-17 and these permit conditions. The notation shall at a minimum include a surveyed location of the landfill and reference to as-built drawings associated with the construction and closure of the landfill, and the post-closure monitoring plan and reports.

8. The permittees shall inspect and maintain the final cover system, including portions of the final cover system in the case of a phased closure, and other environmental controls associated with the facility on a quarterly basis, or more frequently if necessary or required by the DOH. If post closure plans are inadequate to maintain the integrity of the final cover system and associated environmental controls, additional measures may be required. The DOH may periodically require revisions to the plan.

    a. The inspections of the final cover system shall include, but are not limited to, an assessment of security control; erosion and erosion damage; cover deformation resulting from settlement, subsidence, or deformation; and run on and runoff control structures.
    b. The inspections of other environmental controls shall include, but is not limited to, an assessment of the surface water management system, groundwater monitoring system, perimeter gas monitoring system, leachate collection and control system, Phase I temperature monitoring system, and presence of odors, vectors, and litter.
    c. The permittees shall document findings and implement corrective actions or other procedures, as necessary to maintain the integrity and functionality of the final cover system and environmental controls. The permittees shall submit written notification of any areas requiring attention and any associated corrective actions or procedures performed, within thirty (30) days of the quarterly inspection.

9. The permittees shall operate the surface water management system, perimeter gas management system, Phase I temperature monitoring system, leachate collection and control system, and groundwater monitoring programs in accordance with this permit through closure and post-closure care. The DOH may periodically require revisions to the plans.

10. During closure and post-closure periods, the permittees shall continue to assess the landfill after emergency events such as earthquakes and fires, in accordance with Special Condition A.12.

11. If portions of the landfill are closed while the remainder of the facility is still operating, the permittees shall continue operating and monitoring the closed sections in accordance with this permit.

12. Should the landfill reach full design capacity based on the permitted final grades referenced in Special Condition A.3, the permittees shall cease acceptance of waste and begin closure of remaining active portions of the landfill.

Section J Recordkeeping and Reporting Requirements

1. The permittees shall maintain records in accordance with HAR 11-58.1-15(j), Standard Condition 11, and the conditions of this permit. Records shall include the following list and any other recordkeeping requirements set forth in this permit:

    a. Financial assurance requirements (Special Condition A.11).
    b. Training records (Special Conditions A.10, C.2, and D.6).
    c. Load Check Data Sheets (Special Condition C.2).
    d. Daily log of unacceptable waste (Special Condition C.3).
    e. Implementation of Waste Acceptance/Hazardous Waste Exclusion Program (Special Condition C.5).
    f. User population (Special Condition D.3).
    g. Climatic information (Special Condition D.5).
    h. Vector control (Special Condition D.9).
    i. Litter control (Special Condition D.10).
    j. Asbestos disposal locations (Special Condition D.14).
    k. Special disposal procedures for contaminated material (Special Condition D.18.c).
    l. Daily cover log (Special Condition D.21).
    m. Daily cover monitoring verification program (Special Condition D.24).
    n. Monthly monitoring of intermediate cover (Special Condition D.25).
    o. Ceasing operations due to wind (Special Condition D.26).
    p. Inspection of leachate collection and groundwater monitoring systems (Special Condition G.5).
    q. Leachate collection system logs (Special Conditions G.7 and G.8).
    r. Monthly gas monitoring probe and settlement marker measurements (Special Conditions H.1 and H.2).
    s. Inspections of the final cover system (Special Condition I.8).

2. The permittees shall comply with the reporting requirements of Standard Condition 11, the following list, and any other reporting requirements set forth in this permit:

   a. Operations outside normal operating hours (Special Condition A.6).
   b. Personnel updates (Special Condition A.9).
   c. Financial assurance requirements (Special Condition A.11).
   d. Incident reporting, including suspected subsurface fires (Special Condition A.12).
   e. Evaluation of landfill integrity after emergency events (Special Condition A.12.c).
   f. Proposed changes to liner or LCRS design (Special Condition B.3).
   g. Liner installation notification (Special Condition B.4).
   h. Identification of hazardous or PCB waste (Special Condition C.3.d).
   i. Contaminated materials acceptance (Special Condition C.5.d).
   j. Changes to user population (Special Condition D.3).
   k. Daily cover monitoring verification program (Special Condition D.24).
   l. Explosive gas exceedances (Special Condition F.6).
   m. Monitoring well/manhole/wet well/sump status (Special Condition G.5).
   n. Exceedance of leachate compliance levels (Special Conditions G.6, G.7, and G.8).
   o. Notification of intent to close landfill units (Special Condition I.3).
   p. Final cover system areas (Special Condition I.8).

3. The permittees shall submit the following documents, and any other document requirements specified in this permit, in hardcopy and electronic format:

   a. Surface Water Management Plan (Special Condition E.5).
   b. Gas monitoring probe construction/repair/abandonment (Special Condition F.3).
   c. Explosive gas monitoring reports (Special Condition F.5).
   d. Explosive gas exceedance plans/reports (Special Condition F.6).
   e. Monitoring well/manhole/wet well/sump construction and repair (Special Condition G.5).
   f. Groundwater/Leachate Monitoring Report (Special Condition G.15).
   g. Closure plans and specifications (Special Condition I.2).
   h. Summary report of closure construction (Special Condition I.6).
   i. Copy of notation to deed following closure (Special Condition I.7).

4. The permittees shall submit an Annual Operating Report (AOR), for reporting period July 1 - June 30. The AOR shall be submitted by July 31 of each year to:

Department of Health
Environmental Management Division
Solid and Hazardous Waste Branch
2827 Waimano Home Road, #100
Pearl City, Hawaii 96782

5. The AOR shall be submitted in hardcopy and electronic format, and shall include the following information:

   a. Quantities of solid waste received (MSW, industrial/commercial, green waste, tires, wood, metals, asbestos, and other special wastes) by type, using an appropriate unit of measure.
   b. Quantities of leachate (gallons) generated and how it was handled or disposed.
   c. Using site-specific data, provide results of the HELP model and demonstrate the validity of the alternative liner design with respect to point of compliance requirements. An alternative validation method may be utilized if agreed to by the DOH. This validation shall be included in the first AOR submitted after receipt of this permit, unless meteorological conditions require further evaluation.
   d. Quantities of filled airspace for the present year, past filled airspace and remaining airspace in both cubic yards and years shall be provided. The information shall be provided in both numerical and graphical presentations.
   e. An annual topographic survey of the site as prepared by a land surveyor registered in the State of Hawaii, aerial surveys, or an approved alternate method. The survey shall also compare topographic elevations to final grades (isopach) as approved in this permit
   f. A Sequencing Plan, including a drawing, identifying the cell areas to be filled in the coming year including identification of the wet weather areas. The cell areas and wet weather area capacity shall be provided using an appropriate unit of measure.
   g. Final fill areas, intermediate fill areas, and future unused fill areas shall be identified for the projected year.
   h. Daily (MSW) cell construction plan, including cell geometry, estimated daily cover volumes, and soil to waste ratios.
   i. A soil-balance report of the past year and coming projected year reported separately. The soil daily cover and intermediate cover, including erosion replacement soil, also shall be reported separately. The source and type of soil shall be recorded separately for daily cover and intermediate cover.
   The soil-balance report for the past year shall be based on records of actual use on a daily, weekly and monthly basis. Any exceedance of permit grades or incomplete/non-application of daily cover shall be identified. Current soil use records shall be maintained at the facility for review.

j. Date of final receipt of waste at each cell in the landfill. A schedule and description of anticipated closure and post-closure activities to be performed within the next five (5) years.
k. A summary of closure and post-closure activities performed during the reporting period.
l. A copy of the detailed written estimates and documentation of financial assurance.
m. Updates to the Master Plan pursuant to Special Condition A.2.

PART III: SPECIAL CONDITIONS - MDOF

1. The permittees shall comply with the facility's operations procedures as provided in the October 2015 *Existing Materials Drop-off Facility Operations Plan* prepared by AECOM Technical Services, Inc., and approved subsequent submissions. Should there be any discrepancies between the submitted materials and permit conditions, the permit conditions shall take precedence.

2. The MDOF may only accept and store the following source separated waste streams: On-site storage shall be limited to the following capacities, and shall be removed in accordance with the schedule in the MDOF Operations Plan:

Item	Limit
a. Green waste	Two (2) 30 cubic yard roll-off containers
b. Tires	70 tires in roll-off containers
c. White goods	35 units
d. Used oil	Six (6) 55-gallon drums (maintenance shop)
e. Clean recyclables (cardboard, newspaper, glass, aluminum cans, #1 and #2 bottles, mixed paper)	30-cubic yard container (4 ports), and 10-cubic yard container
f. Municipal solid waste	Two (2) 30-cubic yard roll-off containers

3. The MDOF shall not accept scrap vehicles, lead acid batteries, or recyclable materials from commercial customers, as specified in the permit application. No regulated hazardous waste, in accordance with state hazardous waste laws and regulations, radioactive waste, or PCB wastes, as defined in 40 CFR Part 761, shall be accepted at this facility.

4. Individual waste streams shall be stored separately. Waste streams shall not be commingled or mixed with other solid waste or other materials, such as dirt, rocks, and vegetation.

5. Should unacceptable material inadvertently enter the MDOF, the material shall be properly stored, managed, and disposed of at appropriate DOH-permitted solid waste facilities prior to causing or creating a nuisance condition, health, safety, or environmental hazard. If any of this waste or waste generated at the MDOF is determined to be hazardous, the waste shall be properly managed and disposed of in accordance with state hazardous waste rules.

6. Measures shall be taken to prevent fluids and spills from being discharged or allowed to enter into sewers, drainage systems, surface or groundwater, water courses, marine waters, or onto the ground. Measures include the use of structural catchment systems, or absorbent materials.

7. Discharges of wash water, storm water and wastewater from MDOF processes and cleaning operations shall be in accordance with all applicable federal, state, and local rules and ordinances.

8. Appropriate engineering controls shall be instituted and implemented to prevent the scattering of litter and other solid waste, and to provide adequate drainage of storm water for the site, including paved areas and other surrounding areas.

9. Suitable means shall be provided to prevent and control fires. Access lanes shall be provided and maintained to allow for fire response or vector control.

10. Suitable means shall be employed to control nuisances and minimize odors and vectors (such as rodents and insects). The facility shall maintain a neat and orderly appearance and must be screened and buffered to minimize nuisances to neighboring properties.

11. Scavenging at the facility is prohibited.

12. No processing of materials shall be performed at the MDOF.

13. Materials collected shall be transported to DOH-permitted recycling or disposal facilities allowed and willing to accept such waste, or out-of-state recycling facilities and end markets.

14. The permittees shall comply with the tire disposal requirements specified under HRS 342I for Used Motor Vehicle Tire Recovery. On-site storage shall be limited to 70 waste tires and shall meet all the relevant requirements of the local county fire code.

a. Tires must be free of all contaminants such as oil, grease, gasoline, diesel, etc. that could create fire hazards, and the accumulation of water in the tires shall be minimized.
b. Tires shall be disposed only at a DOH-permitted recycling facility allowed to accept waste tires or an out-of-state recycling facility.

15. Unprocessed white goods shall be stored in an upright position and shall not be stacked.

16. Containers used to store used oil must be labeled or marked clearly with the words, "Used Oil." The storage area shall also comply with other applicable requirements of HAR 11-279.1. Used oil containers shall be placed in secondary containment capable of holding more than the contents of the largest used oil container. Secondary containment may include dikes, berms, or retaining walls, and a liner or impervious floor, such as concrete. The secondary containment system shall not be used as fluid storage. If fluid is found in the secondary containment system, the fluid shall be removed and properly disposed of, and the source of the fluid or leak determined and corrected.

17. In addition to the requirements in Standard Condition 16, records of screening and all transactions shall be kept a minimum of five (5) years. Copies shall be made available to the DOH upon request. The record information shall include:

a. The weekly total quantity of greenwaste, tires, white goods, used oil, clean recyclables, and MSW on-site;
b. The weekly total quantity, type, and final destination of greenwaste, tires, white goods, used oil, clean recyclables, and MSW transported from the site; and
c. Copies of receipts of sale, recycling, or disposal of material.

18. The permittees shall comply with the recordkeeping requirements relating to used motor vehicle tires as provided under the HRS Chapter 342I. The statute requires facilities that accept used tires to submit a summary of the following information by July 31 of each year:

a. name, phone number, and address of the person, company, business, source, or entity from whom the used tires were received, if receiving used tires from entities other than the general public, such as tire retailers, wholesalers, transporters, collectors, and recyclers;

b. date of receipt of used tires;
c. quantity of used tires received; and
d. record of shipment indicating:

   i. ultimate destination of the used tires;
   ii. identification of the transporter;
   iii. date of shipment; and
   iv. quantity of tires shipped.

19. An annual report for the MDOF shall be prepared and submitted to the DOH, reviewing the past year's operations and detailing the total quantity of greenwaste, tires, white goods, used oil, clean recyclables, and MSW recycled or disposed for the previous fiscal year (July 1 to June 30) by July 31 of each year. The annual report shall be submitted to the address listed in Part II, Special Condition J.4.

LF-0042-16 Permit Comments

Waste Management of Hawaii, Inc.

	Permit Page/Condition	Issue	Comment	Suggested language	Notes/Questions	SHWB Response
1	Permittees: Owner and Operator	County of Kauai is also a listed Operator	Add County of Kauai as another "Operator" to the header of the permit	Add County of Kauai as another "Operator" to the header of the permit	County of Kauai is listed as an Operator on the permit application	County of Kauai added as operator
2	Page 9, Section A, No 9 and Page 19, Section D, Condition 6	Reference to "Environmental Operations Manager"	Change language to Site Manager and Environmental Professional	"Training shall be conducted by a Site Manager or Environmental Professional."	Environmental Professional is more in line with WMH's organization structure - Universal Change throughout document for consistency	"Environmental Operations Manager" revised to "Environmental Professional"
3	Page 12, Section B.1.c (Universal Edit Throughout Permit)	References to Specifc Plans	Updated plans as reference to the permit	Phase II, Cell 2 leachate sumps 2A and 2B shall be constructed in accordance with the October 2018 Draft Cell 2 Base Liner Construction Drawings Phase II Lateral Expansion Kekaha Sanitary Landfill *or the most current approved plan* .	Plans are updated regularly and submitted to the DOH for approval. Dates of specific plans will be irrelevant when a plan is updated. This should apply to all plans that are noted with specific dates.	Condition B.3. already allows the permittee to submit changes to design for DOH approval. Similarly Conditions C.2., D.1, E.5, G.1, G.9, and H.1 allow for updated revisions for DOH approval. For clarity, we included similar language to Conditions D.12, F.1, and I.1. Note that the referenced example in your comment, October 2018 Draft Cell 2 Base Liner Construction Drawings is the current approved plan.
4	Page 20, Section D, Condition 9.b	Special measures listed regarding loads of fresh or frozed uncooked shrimp and other crustaceans. The facility does not accept these items.	Remove Condition 9.b. from permit	N/A	WMH will be reviewing its operating manual regarding acceptance of fresh or frozed uncooked shrimp and other crustaceans and will make changes if necessary. The facility does not currently accept these items.	It is the understanding of the SHWB that the operations plan will be revised, however, the operations plan will be not revised prior to permit issuance. Thus, the condition will remain. The permittee may choose to be more stringent than the permit conditions.
5	Page 21, Section D, Condition 12	Equipment required to be present on the Landfill - Unrealistic to sustain all equipment on the working face at all times, especially if repairs are needed.	More specific language that is tailored to actual operations.	The permittees shall provide adequate equipment and personnel to operate the MSW landfill facility, including provisions for back-up personnel and equipment. A minimum of one bulldozer, one compactor, one water truck, and one traffic controller shall be *available to* operate at the working face during operational hours, *unless equipment requires maintenance and/or re pair or* otherwise approved by the DOH. The traffic controller and bulldozer operator may be the same person.	Language provide just a suggestion - WMH is open to other permit language as the DOH sees fit.	Condition D.12 has been revised to read as follows: "The permittees shall provide adequate equipment and personnel to operate the MSW landfill facility, including provisions for back-up personnel and equipment. A minimum of one bulldozer, one compactor, one water truck, and one traffic controller shall be available to operate at the working face during operational hours, except that the water truck could be making rounds at other locations at the facility. Equipment and personnel changes could be made if approved by the DOH in writing. The traffic controller and bulldozer operator may be the same person."
6	Page 23, Section D, Condition 23	Slight language modification to clarify Tarp requirements.	Describe Tarping systems to be Griffolyn TX1200 or equivalent.	In accordance with the DOH's January 24, 1995 letter, the permittees may use tarps as ADC. The tarps shall be Griffolyn TX1200 (minimum 10 mil thickness with nylon scrim reinforcement) *or equivalent* . The tarps may only be used under the following conditions:	An equivalent make and model is sufficient if that specific item isnt available.	The condition has been modified to read: "The tarps shall be Griffolyn TX1200 (minimum 10 mil thickness with nylon scrim reinforcement) or **equivalent** "
7	Page 35, Section H, Condition 1.a	Monthly monitoring for Temperature in 5 foot intervals beginning at a depth of 10 feet does not have value in the data. Within current Operations Plan, this requirement is not listed.	Remove requirements describing monthly monitoring for tempertature at 5 feet intervals.	N/A	Requirement needs to be removed as the monitoring plan was revised and is no longer part of the monitoring requirements.	Requirement will be removed.

DATE SEP 2 0 2019

PW 09.19.071

TO	INITIAL	DATE		TO	INITIAL	DATE	
✓			COUNTY ENGINEER	–			HR
–		9/20/19	DEPUTY COUNTY ENGINEER	–			ROADS
–			SECRETARY	✓			SHOP
–			BUILDING	–			SOLID WASTE
–			ENGINEERING	–			WASTEWATER
–			FISCAL	–			

NOTE:

FOR

INFORMATION	CIRCULATE	POST
COMMENTS/RECOMMENDATION	DRAFT REPLY	FINAL TYPE
APPROPRIATE ATTN/ACTION	REVIEW / SIGNATURE	SEE ME

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LINDA ROSEN, M.D., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

September 10, 2014

14-725E CAB
File No. 0802

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
(7010 3090 0002 5271 6926)

Mr. Larry Dill
County Engineer
County of Kauai
Department of Public Works
Moikena Building
4444 Rice Street, Suite 275
Lihue, Hawaii 96766

Dear Mr. Dill:

Subject: **Covered Source Permit (CSP) No. 0802-01-C**
Initial Application No. 0802-01
Kekaha Landfill
Landfill Gas Collection and Control System
Located At: 6900D Kaumualii Highway, Kekaha, Kauai
Date of Expiration: September 9, 2019

The subject Covered Source Permit is issued in accordance with Hawaii Administrative Rules, Title 11, Chapter 60.1. The issuance of this permit is based on the plans, specifications and information submitted on January 14, 2014. This Covered Source Permit is issued subject to the conditions/requirements set forth in the following Attachments:

Attachment I:	Standard Conditions
Attachment II:	Special Conditions
Attachment II-INSIG:	Special Conditions - Insignificant Activities
Attachment III:	Annual Fee Requirements
Attachment IV:	Annual Emissions Reporting Requirements

The following forms are enclosed for your use and submittal as required:

Compliance Certification Form	
Monitoring Report Form:	Collection and Control System
Monitoring Report Form:	Opacity Exceedances
Annual Emissions Report Form:	Municipal Solid Waste Landfills

Supplemental Report Form:	Modification/Reconstruction of MSW Landfill
Supplemental Report Form:	Notification of Landfill Closure
Supplemental Report Form:	Annual Report
Supplemental Report Form:	Notification of Collection and Control Equipment Removal

The following are enclosed for your use in monitoring visible emissions:

Visible Emissions Form Requirements, State of Hawaii
Visible Emissions Form

This permit, (a) shall not in any manner affect the title of the premises upon which the equipment is to be located, (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment, and (c) in no manner implies or suggests that the Hawaii Department of Health (herein after referred to as Department), or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment.

If you have any questions regarding this matter, please call Mr. Kevin Kihara of the Clean Air Branch at (808) 586-4200.

Sincerely,

STUART YAMADA, P.E., CHIEF
Environmental Management Division

KK:nn
Enclosures

c: Solid and Hazardous Waste Branch
Logan Kastner, EHS – Kauai
CAB Monitoring Section

ATTACHMENT I: STANDARD CONDITIONS
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

This permit is granted in accordance with the Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1, Air Pollution Control, and is subject to the following standard conditions:

1. Unless specifically identified, the terms and conditions contained in this permit are consistent with the applicable requirement, including form, on which each term or condition is based.

   (Auth.: HAR §11-60.1-90)

2. This permit, or a copy thereof, shall be maintained at or near the source and shall be made available for inspection upon request. The permit shall not be willfully defaced, altered, forged, counterfeited, or falsified.

   (Auth.: HAR §11-60.1-6; SIP §11-60-11)[2]

3. This permit is not transferable whether by operation of law or otherwise, from person to person, from place to place, or from one piece of equipment to another without the approval of the Department, except as provided in HAR, Section 11-60.1-91.

   (Auth.: HAR §11-60.1-7; SIP §11-60-9)[2]

4. A request for transfer from person to person shall be made on forms furnished by the Department.

   (Auth.: HAR §11-60.1-7)

5. In the event of any changes in control or ownership of the facilities to be constructed or modified, this permit shall be binding on all subsequent owners and operators. The permittee shall notify the succeeding owner and operator of the existence of this permit and its conditions by letter, copies of which will be forwarded to the Department and the U.S. Environmental Protection Agency (EPA), Region 9.

   (Auth.: HAR §11-60.1-5, §11-60.1-7, §11-60.1-94)

6. The facility covered by this permit shall be constructed and operated in accordance with the application, and any information submitted as part of the application, for the Covered Source Permit. There shall be no deviation unless additional or revised plans are submitted to and approved by the Department, and the permit is amended to allow such deviation.

   (Auth.: HAR §11-60.1-2, §11-60.1-4, §11-60.1-82, §11-60.1-84, §11-60.1-90)

7. This permit (a) does not release the permittee from compliance with other applicable statutes of the State of Hawaii, or with applicable local laws, regulations, or ordinances, and

(b) shall not constitute, nor be construed to be an approval of the design of the covered source.

(Auth.: HAR §11-60.1-5, §11-60.1-82)

8. The permittee shall comply with all the terms and conditions of this permit. Any permit noncompliance constitutes a violation of HAR, Chapter 11-60.1 and the Clean Air Act and is grounds for enforcement action; for permit termination, suspension, reopening, or amendment; or for denial of a permit renewal application.

   (Auth.: HAR §11-60.1-3, §11-60.1-10, §11-60.1-19, §11-60.1-90)

9. If any term or condition of this permit becomes invalid as a result of a challenge to a portion of this permit, the other terms and conditions of this permit shall not be affected and shall remain valid.

   (Auth.: HAR §11-60.1-90)

10. The permittee shall not use as a defense in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the terms and conditions of this permit.

    (Auth.: HAR §11-60.1-90)

11. This permit may be terminated, suspended, reopened, or amended for cause pursuant to HAR, Sections, 11-60.1-10 and 11-60.1-98, and Hawaii Revised Statutes (HRS), Chapter 342B-27, after affording the permittee an opportunity for a hearing in accordance with HRS, Chapter 91.

    (Auth.: HAR §11-60.1-3, §11-60.1-10, §11-60.1-90, §11-60.1-98)

12. The filing of a request by the permittee for the termination, suspension, reopening, or amendment of this permit, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

    (Auth.: HAR §11-60.1-90)

13. This permit does not convey any property rights of any sort, or any exclusive privilege.

    (Auth.: HAR §11-60.1-90)

14. The permittee shall notify the Department and U.S. EPA, Region 9, in writing of the following dates:

a. The **anticipated date of initial start-up** for each emission unit of a new source or significant modification not more than sixty (60) days or less than thirty (30) days prior to such date;
b. The **actual date of construction commencement** within fifteen (15) days after such date; and
c. The **actual date of start-up** within fifteen (15) days after such date.

(Auth.: HAR §11-60.1-90)

15. The permittee shall furnish, in a timely manner, any information or records requested in writing by the Department to determine whether cause exists for terminating, suspending, reopening, or amending this permit, or to determine compliance with this permit. Upon request, the permittee shall also furnish to the Department copies of records required to be kept by the permittee. For information claimed to be confidential, the Director of Health may require the permittee to furnish such records not only to the Department but also directly to the U.S. EPA, Region 9, along with a claim of confidentiality.

(Auth.: HAR §11-60.1-14, §11-60.1-90)

16. The permittee shall notify the Department in writing, of the **intent to shut down air pollution control equipment for necessary scheduled maintenance** at least twenty-four (24) hours prior to the planned shutdown. The submittal of this notice shall not be a defense to an enforcement action. The notice shall include the following:

a. Identification of the specific equipment to be taken out of service, as well as its location and permit number;
b. The expected length of time that the air pollution control equipment will be out of service;
c. The nature and quantity of emissions of air pollutants likely to be emitted during the shutdown period;
d. Measures such as the use of off-shift labor and equipment that will be taken to minimize the length of the shutdown period; and
e. The reasons why it would be impossible or impractical to shut down the source operation during the maintenance period.

(Auth.: HAR §11-60.1-15; SIP §11-60-16)[2]

17. **Except for emergencies which result in noncompliance with any technology-based emission limitation in accordance with HAR, Section 11-60.1-16.5, in the event any emission unit, air pollution control equipment, or related equipment malfunctions or breaks down in such a manner as to cause the emission of air pollutants in violation of HAR, Chapter 11-60.1 or this permit,** the permittee shall immediately notify the Department of the malfunction or breakdown, unless the protection of personnel or public health or safety demands immediate attention to the malfunction or breakdown and makes such notification infeasible. In the latter case, the notice shall be provided as soon as

practicable. Within five (5) working days of this initial notification, the permittee shall also submit, in writing, the following information:

a. Identification of each affected emission point and each emission limit exceeded;
b. Magnitude of each excess emission;
c. Time and duration of each excess emission;
d. Identity of the process or control equipment causing the excess emission;
e. Cause and nature of each excess emission;
f. Description of the steps taken to remedy the situation, prevent a recurrence, limit the excessive emissions, and assure that the malfunction or breakdown does not interfere with the attainment and maintenance of the National Ambient Air Quality Standards and state ambient air quality standards;
g. Documentation that the equipment or process was at all times maintained and operated in a manner consistent with good practice for minimizing emissions; and
h. A statement that the excess emissions are not part of a recurring pattern indicative of inadequate design, operation, or maintenance.

The submittal of these notices shall not be a defense to an enforcement action.

(Auth.: HAR §11-60.1-16; SIP §11-60-16)[2]

18. The permittee may request confidential treatment of any records in accordance with HAR, Section 11-60.1-14.

(Auth.: HAR §11-60.1-14, §11-60.1-90)

19. This permit shall become invalid with respect to the authorized construction if construction is not commenced as follows:

a. Within eighteen (18) months after the permit takes effect, is discontinued for a period of eighteen (18) months or more, or is not completed within a reasonable time.
b. For phased construction projects, each phase shall commence construction within eighteen (18) months of the projected and approved commencement dates in the permit. This provision shall be applicable only if the projected and approved commencement dates of each construction phase are defined in Attachment II, Special Conditions, of this permit.

(Auth.: HAR §11-60.1-9, §11-60.1-90)

20. The Department may extend the time periods specified in Standard Condition No. 19 upon a satisfactory showing that an extension is justified. Requests for an extension shall be submitted in writing to the Department.

(Auth.: HAR §11-60.1-9, §11-60.1-90)

21. The permittee shall submit fees in accordance with HAR, Chapter 11-60.1, Subchapter 6.

    (Auth.: HAR §11-60.1-90)

22. All certifications shall be in accordance with HAR, Section 11-60.1-4.

    (Auth.: HAR §11-60.1-4, HAR §11-60.1-90)

23. The permittee shall allow the Director of Health, the Regional Administrator for the U.S. EPA and/or an authorized representative, upon presentation of credentials or other documents required by law:

    a. To enter the premises where a source is located or emission-related activity is conducted, or where records must be kept under the conditions of this permit and inspect at reasonable times all facilities, equipment, including monitoring and air pollution control equipment, practices, operations, or records covered under the terms and conditions of this permit and request copies of records or copy records required by this permit; and
    b. To sample or monitor at reasonable times substances or parameters to ensure compliance with this permit or applicable requirements of HAR, Chapter 11-60.1.

    (Auth.: HAR §11-60.1-11, §11-60.1-90)

24. Within thirty (30) days of **permanent discontinuance of the construction, modification, relocation, or operation of the facility covered by this permit**, the discontinuance shall be reported in writing to the Department by a responsible official of the source.

    (Auth.: HAR §11-60.1-8; SIP §11-60-10)[2]

25. Each permit renewal application shall be submitted to the Department and the U.S. EPA, Region 9, no less than twelve (12) months and no more than eighteen (18) months prior to the permit expiration date. The director may allow a permit renewal application to be submitted no less than six months prior to the permit expiration date if the director determines that there is reasonable justification.

    start permit renewal application between April 9 and Sept 9 2018

    (Auth.: HAR §11-60.1-101, 40 CFR §70.5(a)(1)(iii))[1]

26. The terms and conditions included in this permit, including any provision designed to limit a source's potential to emit, are federally enforceable unless such terms, conditions, or requirements are specifically designated as not federally enforceable.

    (Auth.: HAR §11-60.1-93)

27. The compliance plan and compliance certification submittal requirements shall be in accordance with HAR, Sections 11-60.1-85 and 11-60.1-86. As specified in HAR,

Section 11-60.1-86, the compliance certification shall be submitted to the Department and the U.S. EPA, Region 9, once per year, or more frequently as set by any applicable requirement.

(Auth.: HAR §11-60.1-90)

28. **Any document (including reports) required to be submitted by this permit shall be certified as being true, accurate, and complete by a responsible official in accordance with HAR, Sections 11-60.1-1 and 11-60.1-4, and shall be mailed to the following address:**

Clean Air Branch
Environmental Management Division
Hawaii Department of Health
P.O. Box 3378
Honolulu, HI 96801-3378

Upon request and as required by this permit, all correspondence to the State of Hawaii Department associated with this Covered Source Permit shall have duplicate copies forwarded to:

Chief
Permits Office, (Attention: Air-3)
Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

(Auth.: HAR §11-60.1-4, §11-60.1-90)

29. To determine compliance with submittal deadlines for time-sensitive documents, the postmark date of the document shall be used. If the document was hand-delivered, the date received ("stamped") at the Clean Air Branch shall be used to determine the submittal date.

(Auth.: HAR §11-60.1-5, §11-60.1-90)

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[1] The citations to the Code of Federal Regulations (CFR) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the CFR. Due to the integration of the preconstruction and operating permit requirements, permit conditions may incorporate more stringent requirements than those set forth in the CFR.

[2] The citations to the State Implementation Plan (SIP) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the SIP.

ATTACHMENT II: SPECIAL CONDITIONS
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In addition to the standard conditions of the Covered Source Permit, the following special conditions shall apply to the permitted facility:

Section A. Equipment Description

1. This permit encompasses the following equipment and associated appurtenances:

   a. Kekaha Sanitary Landfill; and
   b. Active Landfill Gas Collection and Control system for landfill consisting of enclosed flare, extraction wells, landfill gas piping, and associated equipment.

   (Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.1, §60.752)[1]

Section B. Definitions

For the purposes of this permit, the following definitions shall be used:

1. *Active Collection System* means a gas collection system that uses gas mover equipment.

2. *Active Landfill* means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

3. *Bioreactor* means a Municipal Solid Waste (MSW) landfill or portion of a MSW landfill where any liquid other than leachate (leachate includes landfill gas condensate) is added in a controlled fashion into the waste mass (often in combination with recirculating leachate) to reach a minimum average moisture content of at least 40 percent by weight to accelerate or enhance the anaerobic (without oxygen) biodegradation of the waste.

4. *Closed Landfill* means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under 40 Code of Federal Regulations (CFR) §60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed.

5. *Closure* means that point in time when a landfill becomes a closed landfill.

6. *Commercial Solid Waste* means all types of solid waste generated by stores, offices, restaurants, warehouses, and other non-manufacturing activities, excluding residential and industrial wastes.

7. *Controlled Landfill* means any landfill at which collection and control systems are required under 40 CFR Part 60, Subpart WWW, as a result of the non-methane organic compounds emission rate. The landfill is considered controlled at the time a collection and control system design plan is submitted in compliance with 40 CFR §60.752(b)(2)(I).

8. *Design Capacity* means the maximum amount of solid waste a landfill can accept, as indicated in terms of volume or mass in the most recent permit issued by the State, local, or Tribal agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site specific density, which must be recalculated annually.

9. *Deviation* means any instance in which an affected source subject to 40 CFR Part 60, Subpart WWW, or an owner or operator of such a source:

   a. Fails to meet any requirement or obligation established by this subpart, including, but not limited to, any emissions limitation (including any operating limit) or work practice standard;
   b. Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or
   c. Fails to meet any emission limitation (including any operating limit) or work practice standard in this subpart during Startup, Shutdown, or Malfunction, regardless of whether or not such failure is permitted by this subpart.

10. *Disposal Facility* means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

11. *Emission Rate Cutoff* means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

12. *Emissions Limitation* means any emission limit, opacity limit, operating limit, or visible emissions limit.

13. *Enclosed Combustor* means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

14. *EPA Approved State Plan* means a State plan that EPA has approved based on the requirements in 40 CFR Part 60, Subpart B to implement and enforce 40 CFR Part 60, Subpart Cc. An approved State plan becomes effective on the date specified in the notice published in the Federal Register announcing EPA's approval.

15. *Federal Plan* means the EPA plan to implement 40 CFR Part 60, Subpart Cc for existing MSW landfills located in States and Indian country where State plans or tribal plans are not currently in effect. On the effective date of an EPA approved State or tribal plan, the Federal plan no longer applies. The Federal plan is found at 40 CFR Part 62, Subpart GGG.

16. *Flare* means an open combustor without enclosure or shroud.

17. *Gas Mover Equipment* means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.

18. *Household Waste* means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).

19. *Industrial Solid Waste* means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, Parts 264 and 265 of the CFR, Title 40. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste, or oil, and gas waste.

20. *Interior Well* means any well or similar collection component located inside the perimeter of the landfill waste. A perimeter well located outside the landfilled waste is not an interior well.

21. *Landfill* means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under 40 CFR §257.2.

22. *Lateral Expansion* means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

23. *Modification* means an increase in the permitted volume design capacity of the landfill by either horizontal or vertical expansion based on its permitted design capacity as of May 30, 1991. Modification does not occur until the owner or operator commences construction on the horizontal or vertical expansion.

24. *Municipal Solid Waste Landfill* or *MSW Landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. A MSW landfill may also receive other types of Resource Conservation and Recovery Act, Subtitle D wastes (40 CFR §257.2) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of a MSW landfill may be separated by access roads. A MSW landfill may be publicly or privately owned. A MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

25. *Municipal solid waste landfill emissions* or *MSW landfill emissions* means gas generated by the decomposition of organic waste deposited in a MSW landfill or derived from the evolution of organic compounds in the waste.

26. *NMOC* means non-methane organic compounds, as measured according to the provisions of 40 CFR §60.754.

27. *Nondegradable waste* means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

28. *Passive collection system* means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

29. *Sludge* means any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

30. *Solid waste* means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under 33 U.S.C. 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (42 U.S.C 2011 et seq.).

31. *Sufficient density* means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in 40 CFR 60, Subpart WWW.

32. *Sufficient extraction rate* means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

33. *Tribal plan* means a plan submitted by a tribal authority pursuant to 40 CFR Parts 9, 35, 49, 50, and 81 to implement and enforce 40 CFR Part 60, Subpart Cc.

34. *Work practice standard* means any design, equipment, work practice, or operational standard, or combination thereof that is promulgated pursuant to Section 112(h) of the Clean Air Act.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §60.751, 40 CFR §63.1990)[1]

Section C. Applicable Federal Regulations

1. The Kekaha Landfill is subject to the provisions of the following federal regulations:

   a. 40 CFR Part 60, Standards of Performance for New Stationary Sources, Subpart A - General Provisions;
   b. 40 CFR Part 60, Standards of Performance for New Stationary Sources, Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills;
   c. 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories, Subpart A - General Provisions; and
   d. 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories, Subpart AAAA - Municipal Solid Waste Landfills.

   (Auth: HAR §11-60.1-3, §60.1-90, §60.1-174; 40 CFR §60.1, §60.750, 40 CFR §63.1930)[1]

2. The permittee shall comply with all applicable provisions of these standards including all emission limits, notification, testing, monitoring, and reporting requirements.

   In addition to the requirements of Hawaii Revised Statues, Chapter 342B and Hawaii Administrative Rules, Chapters 11-59 and 60.1, the conditions specified in this Attachment are incorporated pursuant to Federal regulations 40 CFR Part 60, Subparts A and WWW and 40 CFR Part 63, Subparts A and AAAA. Except as may be required by the aforementioned state law and rules, should there be a conflict between the conditions of this attachment and the aforementioned Federal regulations, the Federal regulations shall take precedence.

   (Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.1, §60.750, 40 CFR §63.1930)[1]

Section D. Operational Standards for the Collection and Control System

1. Landfill Air Emission Standards

   a. The landfill shall comply with the following:

      i. Submit a collection and control system design plan prepared by a professional engineer to the Department and U.S. EPA, Region 9, by June 2, 2015, unless Tier 2 or Tier 3 sampling demonstrates that the emission rate is less than fifty (50) megagrams per year, as specified in 40 CFR §60.757(c)(1) or (2).

         1) The collection and control system as described in the plan shall meet the design requirements of this attachment, Special Condition D.1.a.ii.
         2) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of 40 CFR §§60.753 through 60.758 proposed by the owner or operator.

3) The collection and control system design plan shall either conform with specifications for active collection systems in 40 CFR §60.759 or include a demonstration which satisfies to the Department and/or U.S. EPA, Region 9, as applicable, the sufficiency of the alternative provisions to 40 CFR §60.759.
4) The Department and/or U.S. EPA, Region 9, as applicable, shall review the information submitted under this attachment, Special Conditions D.1.a.i.1 thru D.1.a.i.3, and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.

ii. Install a collection and control system that captures the gas generated within the landfill as required by this attachment, Special Conditions D.1.a.ii and D.1.a.iii by December 1, 2016, unless Tier 2 or Tier 3 sampling, demonstrates that the emission rate is less than fifty (50) megagrams per year, as specified in 40 CFR §60.757(c)(1) or (2).

1) The Active collection system shall:

a) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;
b) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:

i) Five (5) years or more if active; or
ii) Two (2) years or more if closed or at final grade.

c) Collect gas at a sufficient extraction rate; and
d) Be designed to minimize off-site migration of subsurface gas.

iii. Route all the collected gas to a control system that complies with the requirements in either paragraph 1), 2), or 3) of this section.

1) An open flare designed and operated in accordance with 40 CFR §60.18 except as noted in 40 CFR §60.754(e);
2) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than twenty (20) parts per million (ppm) by volume, dry basis as hexane at three (3) percent oxygen. The reduction efficiency or ppm by volume shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in 40 CFR §60.754(d).

a) If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.
b) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in 40 CFR §60.756;

3) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of this attachment, Special Conditions D.1.a.iii.1) or D.1.a.iii.2).

iv. Operate the collection and control device installed to comply with this subpart in accordance with the provisions of 40 CFR §§60.753, 60.755, and 60.756.

v. The collection and control system may be capped or removed provided that all the conditions of paragraphs 1), 2), and 3) of this section are met:

1) The landfill shall be a closed landfill as defined in this attachment, Special Condition B.4. A closure report shall be submitted to the Department and U.S. EPA, Region 9, as provided in this attachment, Special Condition G.8;
2) The collection and control system shall have been in operation a minimum of fifteen (15) years; and
3) Following the procedures specified in 40 CFR §60.754(b), the calculated NMOC gas produced by the landfill shall be less than fifty (50) megagrams per year on three (3) successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.752)[1]

2. Gas Collection System Standards

Each owner or operator of a MSW landfill gas collection and control system used to comply with the provisions of 40 CFR §60.752(b)(2)(ii) shall:

a. Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

i. Five (5) years or more if active; or
ii. Two (2) years or more if closed or at final grade.

b. Operate the collection system with negative pressure at each wellhead except under the following conditions:

i. A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the monitoring reports as provided in this attachment, Special Condition G.2;

ii. Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan; and
iii. A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Department and/or U.S. EPA, Region 9, as applicable.

c. Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C and with either a nitrogen level less than twenty (20) percent or an oxygen level less than five (5) percent. The permittee may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

i. The nitrogen level shall be determined using 40 CFR Part 60, Appendix A, Method 3C, unless an alternative test method is established as allowed by 40 CFR §60.752(b)(2)(i).
ii. Unless an alternate test method is established as allowed by 40 CFR §60.752(b)(2)(i), the oxygen shall be determined by an oxygen meter using 40 CFR Part 60, Appendix A, Method 3A or 3C except that:

1) The span shall be set so that the regulatory limit is between twenty (20) and fifty (50) percent of the span;
2) A data recorder is not required;
3) Only two (2) calibration gases are required, a zero and span, and ambient air may be used as the span;
4) A calibration error check is not required; and
5) The allowable sample bias, zero drift, and calibration drift are ±10 percent.

d. Operate the collection system so that the methane concentration is less than 500 ppm above background at the surface of the landfill. To determine if this level is exceeded, the permittee shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at thirty (30) meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The permittee may establish an alternate traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the thirty (30) meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing;
e. Operate the system such that all collected gases are vented to the gas collection and control system designed and operated in compliance with 40 CFR §60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one (1) hour;
f. Operate the control or treatment system at all times when the collected gas is routed to the system; and

g. If monitoring demonstrates that the operational requirements of this attachment, Special Conditions D.2.b, D.2.c, or D.2.d are not met, the permittee shall take corrective action as specified in Section E of this attachment. If corrective actions are taken as specified, the monitored exceedance is not a violation of the operational requirements in this section.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.753)[1]

3. Visible Emissions

a. The permittee shall take measures to control fugitive dust at all material transfer points and throughout the workyard. The Department may at any time require the permittee to further abate fugitive dust emissions if an inspection indicates poor or insufficient control.
b. The permittee shall not cause or permit fugitive dust to become airborne without taking reasonable precautions and shall not cause or permit the discharge of visible emissions of fugitive dust beyond the lot line of the property on which the emissions originate.
c. For any six (6) minute averaging period, the enclosed flare shall not exhibit visible emissions of twenty (20) percent or greater, except as follows: during start-up, shutdown, or equipment breakdown, the enclosed flare may exhibit visible emissions not greater than twenty (20), but not exceeding sixty (60) percent opacity for a period aggregating not more than six (6) minutes in any sixty (60) minute period.

(Auth: HAR §11-60.1-3, §11-60.1-33, §11-60.1-90)

Section E. Compliance Provisions

1. Except as provided in the collection and control system design plan submitted pursuant to this attachment, Special Condition D.1.a.i, the permittee shall use the following methods to determine whether the gas collection system is in compliance with this attachment, Special Conditions D.1.a.ii.1 and D.1.a.iii.

a. Calculation of Maximum Expected Gas Generation Flow Rate

For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with 40 CFR §60.752(b)(2)(ii)(A)(1), one of the following equations shall be used. The k and L_o kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42) or other site specific values demonstrated to be appropriate and approved by the Department. If k has been determined as specified in this attachment, Section H, the value of k determined from the test shall be used. A value of no more than fifteen (15) years shall be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

i. For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_oR\ (e^{-kc} - e^{-kt}) \text{ where,}$$

Q_m = maximum expected gas generation flow rate (m^3/yr)
L_o = methane generation potential, (m^3/Mg solid waste)
R = average annual acceptance rate (Mg/yr)
k = methane generation rate constant ($year^{-1}$)
t = age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation (years)
c = time since closure (years) (for an active landfill c = 0 and $e^{-kc} = 1$)

ii. For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^{n} 2kL_oM_i\left(e^{-kt_i}\right)$$

Q_M = maximum expected gas generation flow rate (m^3/year)
k = methane generation rate constant ($year^{-1}$)
L_o = methane generation potential, (m^3/Mg solid waste)
M_i = mass of solid waste in the i^{th} section (Mg)
t_i = age of the i^{th} section (years)

iii. If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations in this attachment, Special Conditions E.1.a.i and E.1.a.ii. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in this attachment, Special Conditions E.1.a.i and E.1.a.ii, or other methods shall be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

b. Gas Collector Density

For the purposes of determining sufficient density of gas collectors for compliance with 40 CFR §60.752(b)(2)(ii)(A)(2), the permittee shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Department and/or U.S. EPA, Region 9, as applicable, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

c. Gas Collection System Flow Rate

For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with 40 CFR §60.752(b)(2)(ii)(A)(*3*), the owner or

operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within five (5) calendar days, except for the three (3) conditions allowed under this attachment, Special Condition D.2.b. If negative pressure cannot be achieved without excess air infiltration within fifteen (15) calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Department and/or U.S. EPA, Region 9, as applicable, for approval.

d. Owners or operators are not required to install additional wells as required in this attachment, Special Condition E.1.c during the first 180 days after gas collection system startup.

e. Identification of Excess Air Infiltration

For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in 40 CFR §60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within five (5) calendar days. If correction of the exceedance cannot be achieved within fifteen (15) calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Department and/or U.S. EPA, Region 9, as applicable.

f. An owner or operator seeking to demonstrate compliance with §60.752(b)(2)(ii)(A)(*4*) through the use of a collection system not conforming to the specifications provided in 40 CFR §60.759, shall provide information as specified in §60.752(b)(2)(i)(C) satisfactory to the Department and/or U.S. EPA, Region 9, as applicable, demonstrating that off-site migration is being controlled.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

2. For purposes of compliance with 40 CFR §60.753(a), the permittee of a controlled landfill shall place each well or design component as specified in the approved design plan. Each well shall be installed no later than sixty (60) days after the date on which the initial solid waste has been in place for a period of:

a. Five (5) years or more if active; or
b. Two (2) years or more if closed or at final grade.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

3. The following procedures shall be used for compliance with the surface methane operational standard as provided in this attachment, Special Condition D.2.d.

   a. After installation of the collection system, the permittee shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at thirty (30) meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in this attachment, Special Condition E.4.
   b. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least thirty (30) meters from the perimeter wells.
   c. Surface emission monitoring shall be performed in accordance with §4.3.1 of Method 21 of 40 CFR Part 60, Appendix A, except that the probe inlet shall be placed within five (5) to ten (10) centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.
   d. Any reading of 500 ppm or more above background at any location shall be recorded as a monitored exceedance and the following actions shall be taken. As long as the specified actions are taken, the exceedance is not a violation of this attachment, Special Condition D.2.d.

      i. The location of each monitored exceedance shall be marked and the location recorded.
      ii. Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within ten (10) calendar days of detecting the exceedance.
      iii. If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within ten (10) days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in this attachment, Special Condition E.3.d.v shall be taken, and no further monitoring of that location is required until the action specified in this attachment, Special Condition E.3.d.v has been taken.
      iv. Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the ten-day (10-day) re-monitoring specified in this attachment, Special Conditions E.3.d.ii or E.3.d.iii shall be re-monitored one-month (1-month) from the initial exceedance. If the one-month (1-month) re-monitoring shows a concentration less than 500 ppm above background, no further monitoring of that location is required until the next quarterly monitoring period. If the one-month (1-month) re-monitoring shows an exceedance, the actions specified in this attachment, Special Conditions E.3.d.ii or E.3.d.iii shall be taken.
      v. For any location where monitored methane concentration equals or exceeds 500 ppm above background three (3) times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation

may be submitted to the Department and/or U.S. EPA, Region 9, as applicable, for approval.

e. The permittee shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

4. The permittee shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

   a. The portable analyzer shall meet the instrument specifications provided in Section 3 of Method 21 of 40 CFR 60, Appendix A, except that "methane" shall replace all references to VOC;
   b. The calibration gas shall be methane, diluted to a nominal concentration of 500 ppm in air;
   c. To meet the performance evaluation requirements in Section 3.1.3 of Method 21 of 40 CFR Part 60, Appendix A, the instrument evaluation procedures of Section 4.4 of Method 21 of 40 CFR Part 60, Appendix A shall be used; and
   d. The calibration procedures provided in Section 4.2 of Method 21 of 40 CFR Part 60, Appendix A shall be followed immediately before commencing a surface monitoring survey.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

5. The provisions of this attachment, Section E apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction, shall not exceed five (5) days for collection systems and shall not exceed one (1) hour for treatment or control devices.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

6. If you are required by 40 CFR §60.752(b)(2) of Subpart WWW, the Federal plan, or an EPA approved and effective State or tribal plan to install a collection and control system, you must comply with the requirements in 40 CFR §§63.1960 through 63.1985 and with the general provisions of this part specified in Table 1 of 40 CFR Part 63, Subpart AAAA.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174, 40 CFR §63.1955)[1]

7. All affected sources must comply with the Startup, Shutdown, and Malfunction (SSM) requirements, in Subpart A of 40 CFR Part 63, Subpart AAAA, as specified in Table 1 of this subpart and all affected sources must submit compliance reports every six (6) months as specified in §63.1980(a) and (b), including information on all deviations that occurred during the six-month (6-month) reporting period. Deviations for continuous emission

monitors or numerical continuous parameter monitors must be determined using a three-hour (3 hour) monitoring block average.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174, 40 CFR §63.1955)[1]

8. Compliance with 40 CFR Part 63, Subpart AAAA, is determined in the same way it is determined for 40 CFR Part 60, Subpart WWW, including performance testing, monitoring of the collection system, continuous parameter monitoring, and other credible evidence. In addition, continuous parameter monitoring data, collected under 40 CFR §60.756(b)(1), (c)(1), and (d) of Subpart WWW, are used to demonstrate compliance with the operating conditions for control systems. If a deviation occurs, you have failed to meet the control device operating conditions described in 40 CFR Part 63, Subpart AAAA, and have deviated from the requirements of 40 CFR Part 63, Subpart AAAA. Finally, you must develop a written SSM plan according to the provisions in 40 CFR §63.6(e)(3). A copy of the SSM plan must be maintained on site. Failure to write or maintain a copy of the SSM plan is a deviation from the requirements of 40 CFR Part 63, Subpart AAAA.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174, 40 CFR §63.1960)[1]

9. A deviation is defined in 40 CFR §63.1990. For the purposes of the landfill monitoring and SSM plan requirements, deviations include the following:

   a. A deviation occurs when the control device operating parameter boundaries described in 40 CFR §60.758(c)(1) of Subpart WWW are exceeded;
   b. A deviation occurs when one-hour (1-hour) or more of the hours during the three-hour (3-hour) block averaging period does not constitute a valid hour of data. A valid hour of data must have measured values for at least three (3) fifteen-minute (15-minute) monitoring periods within the hour; and
   c. A deviation occurs when a SSM plan is not developed or maintained on site.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174, 40 CFR §63.1960, 63.1965)[1]

Section F. Monitoring and Recordkeeping Requirements

Monitoring Requirements

1. Active Gas Collection System

Except as provided in the collection and control system design plan submitted pursuant to this attachment, Special Condition D.1.a.i, the permittee with an active gas collection system shall install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:

   a. Measure the gauge pressure in the gas collection header on a monthly basis as provided for in this attachment, Special Condition E.1.c;

b. Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis; as provided for in this attachment, Special Condition E.1.e; and
c. Monitor temperature of the landfill gas on a monthly basis as provided in this attachment, Special Condition E.1.e.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

2. Enclosed Flare

The permittee shall calibrate, maintain, and operate the following equipment according to the manufacturer's specifications:

a. A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ±1percent of the temperature being measured expressed in degrees Celsius or ±0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than forty-four (44) megawatts.
b. A device that records flow to or bypass of the control device. The permittee shall either:

   i. Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every fifteen (15) minutes; or
   ii. Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

3. Surface Concentrations of Methane

The permittee shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in this attachment, Special Condition No. E.4. Any closed landfill that has no monitored exceedances of the operational standard in three (3) consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

4. Alternatives

All of the specified alternatives in the collection and control design plan shall comply with any additional monitoring requirements set forth in the plan as approved by the Department and/or U.S. EPA, Region 9, as applicable.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

5. Performance Tests

   Initial and annual source performance tests shall be conducted on the collection and control system pursuant to this attachment, Section H. Test summaries and results shall be maintained in accordance with the requirements of this section.

   (Auth: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90)[1]

6. In the event that the collection and control system is not in operation and in compliance with this attachment, Sections D and E:

   a. Annual NMOC emission rates shall be calculated in accordance with this attachment, Section G; and
   b. NMOC emission rate reports shall be submitted in accordance with this attachment, Special Condition G.4.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.757)[1]

7. Visible Emissions (VE)

   The permittee shall conduct **monthly** (*calendar month*) VE observations for the enclosed flare in accordance with 40 CFR Part 60, Appendix A, Method 9, or U.S. EPA approved equivalent methods, or alternate methods with prior written approval from the Department. For each month, two (2) consecutive six (6) minute observations shall be taken at fifteen (15) second intervals for each equipment. Records shall be completed and maintained in accordance with the *Visible Emissions Form Requirements.*

   (Auth: HAR §11-60.1-8, §11-60.1-15, §11-60.1-16, §11-60.1-90)

Recordkeeping Requirements

8. All records, including support information, shall be maintained for at least five (5) years from the date of the monitoring sample, measurement, test, report, or application. Support information includes all maintenance, inspection, and repair records, and copies of all reports required by this permit. These records shall be true, accurate, and maintained in a permanent form suitable for inspection, and made available to the Department or its representative upon request.

   (Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.758)[1]

9. Each permittee that specified alternatives in the collection and control design plan shall comply with any additional recordkeeping requirements set forth in the plan as approved by the Department.

   (Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.758)[1]

10. Except as provided in the collection and control system design plan approved by the Department, the permittee shall maintain the following records:

    a. Equipment operating parameters specified to be monitored in this attachment, Special Conditions F.1 thru F.4, including:

        i. Gauge pressure in each extraction well;
        ii. Nitrogen or oxygen concentration in extracted landfill gas;
        iii. Temperature of extracted landfill gas;
        iv. Methane concentrations along landfill surface;
        v. Gas flow from collection system to the control device; and
        vi. Combustion temperature of an enclosed combustion device or the continuous presence of a pilot flame for an open flare.

    b. The following data, as measured during the initial performance test or compliance determination shall be maintained for the life of the control equipment. Records of subsequent tests or monitoring shall be maintained for a minimum of five (5) years.

        i. The maximum expected gas generation flow rate as calculated in this attachment, Special Condition E.1.a. The owner or operator may use another method to determine the maximum gas generation flow rate, if the method is included in the collection and control system design plan approved by the Department and/or U.S. EPA, Region 9, as applicable.
        ii. The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in this attachment, Special Condition E.1.

    c. Instances in which positive pressure occurs in efforts to avoid a fire, including the date, time, and duration of positive pressure.
    d. Periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.
    e. Continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines.
    f. Plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector for the life of the collection system, including:

        i. Installation date and location of all newly installed collectors; and
        ii. Documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as well as any nonproductive areas excluded from collection.

    g. All collection and control system exceedances of the operational standards in this attachment, Section D, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance. Records

shall also include the dates, times, duration, reasons, sampler's name, and any corrective actions, as applicable.

h. Source performance test plans, summaries, and results for the collection and control system.

i. Equipment inspection, maintenance, and repair work. A log shall be maintained for the equipment covered under this permit. Replacement of parts and repairs to the facility shall be well documented. As a minimum, the log shall include:

   i. Date of the inspection/maintenance/repair;
   ii. Description of the findings and any maintenance/repair work performed; and
   iii. The name and title of the personnel performing the inspection/work.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.753, §60.758)[1]

8. Records of the control device vendor specifications shall be maintained until removal.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.753, §60.758)[1]

Section G. Notification and Reporting Requirements

1. Notification and reporting pertaining to the following events for each landfill shall be done in accordance with Attachment I, Standard Conditions 14, 16, 17, and 25, respectively.

   a. *Anticipated date of initial start-up, actual date of construction commencement, and actual date of start-up;*
   b. *Intent to shut down air pollution control equipment for necessary scheduled maintenance;*
   c. *Emissions of air pollutants in violation of HAR, Chapter 11-60.1 or this permit (excluding technology-based emission exceedances due to emergencies); and*
   d. *Permanent discontinuance of construction, modification, relocation, or operation of the facility covered by this permit.*

   (Auth: HAR §11-60.1-8, §11-60.1-15, §11-60.1-16, §11-60.1-90; SIP §11-60-10, §11-60-16)[2]

2. Monitoring Reports

   The permittee shall submit **semi-annually** the following written report to the Department. The report shall be submitted **within sixty (60) days after** *the end of each semi-annual calendar period (January 1 - June 30 and July 1 - December 31),* and shall include:

   a. Information as required by the Annual Report in this attachment, Special Condition G.3; and
   b. Additional information, including:

i. Average and maximum gauge pressure within each gas extraction well measured over six-month (6-month) period;
ii. Average and maximum nitrogen concentration or average and maximum oxygen concentration measured over six-month (6-month) period;
iii. Average and maximum landfill gas temperature in extraction well measured over six-month (6-month) period;
iv. Average and maximum methane concentration at landfill surface measured over quarterly period. If annual monitoring is allowed, the average and maximum methane concentration at landfill surface during the most recent monitoring event;
v. Identification of any instances when the gas flow has been diverted from the control device, enclosed combustor, or open flare;
vi. Average, maximum, and minimum combustion temperature of an enclosed combustion device, as applicable;
vii. Identification of any instances in which the pilot flame or flare flame for an open flare was not present;
viii. For all maximum values, include the date and time that the value was identified;
ix. For all instances of non-compliance, indicate the dates, times, duration, and reason;
x. Any opacity exceedances as determined by the required monthly visible emissions monitoring. Each exceedance reported shall include the date, six (6) minute average opacity reading, possible reasons for exceedance, duration of exceedance, and corrective actions taken. If there were no exceedances, the permittee shall submit in writing a statement indicating that for each equipment there were no exceedances for that semi-annual period; and
xi. All deviations from the requirements of 40 CFR Part 63, Subpart AAAA, including the actions taken during a startup, shutdown, or malfunction, were consistent with the procedures in the SSM plan, that occurred during the six-month (6-month) reporting period

The Monitoring Report Form(s): **Collection and Control System**, and **Visible Emissions** shall be used.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

3. Annual Reports

The permittee with an active collection system shall submit to the Department and U.S. EPA, Region 9, annual reports of the recorded information in Conditions G.3.a through G.3.f of this paragraph. The initial report shall be submitted **within 180 days** *of installation and start-up of the collection and control system*, and shall include the initial performance test report required under 40 CFR §60.8. For enclosed combustion devices and flares, reportable exceedances are defined under 40 CFR §60.758(c).

a. Value, date, time, and duration of each exceedance of applicable parameters for:

i. Gauge pressure in the gas collection header;
ii. Nitrogen or oxygen concentration in the landfill gas;

iii. Temperature of landfill gas; and
iv. Surface concentrations of methane.

b. Description, reason, dates, start and end times, and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified in Attachment II, Section E.
c. Description, reason, dates, start and end times, and duration of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating.
d. All periods when the collection system was not operating in excess of five (5) days, including dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation.
e. The location of each exceedance of the 500 ppm surface methane concentration as provided in 40 CFR §60.753(d), concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance.
f. The date of installation and the location of each well or collection system expansion added.

The Supplemental Report Form: ***Annual Report*** shall be used.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.758)[1]

4. Annual Report Submission

Pursuant to 40 CFR §63.1980, the annual report described in this attachment, Special Condition G.3, shall be updated and submitted every six (6) months.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.758, 40 CFR §63.1980)[1]

5. Annual Emissions Reporting

As required by Attachment IV, the permittee shall report annually the NMOC emission rate and total tons per year emitted of each regulated air pollutant from the municipal solid waste landfill facility, including hazardous air pollutants. The reporting of annual emissions is due **within sixty (60) days following** *the end of each calendar year.*

The enclosed Annual Emissions Report Form: ***Municipal Solid Waste Landfills*** shall be used for reporting.

Upon written request of the facility, the deadline for reporting of annual emissions may be extended, if the Department determines that reasonable justification exists for the extension.

(Auth: HAR §11-60.1-3, §11-60.1-90)

6. Performance Test Reports

   a. At least **thirty (30) days prior** *to conducting a source performance test*, the permittee shall submit to the Department a test plan in accordance with this attachment, Special Condition H.4.
   b. Written reports of the results of all source performance tests conducted pursuant to this permit shall be submitted to the Department **within sixty (60) days** *after the completion of the performance test* in accordance with this attachment, Special Condition H.6.

   (Auth: HAR §11-60.1-3, §11-60.1-90)

7. Design Capacity Increase

   The permittee shall submit information regarding landfill modifications (as defined in Special Condition B.23) to the Department at least **thirty (30) days prior** to commencement of construction. The information submitted shall include the following:

   a. Name, address, and phone number of the facility, and the plant site manager or other contact;
   b. Current design capacity of the landfill (m^3 and Mg);
   c. Current site-specific density (Mg/m^3);
   d. Description of the reconstruction or modification;
   e. Site map of the landfill containing the following information:

      i. Location of the landfill and area of proposed modification or reconstruction;
      ii. Current lateral boundaries of the existing landfill;
      iii. Proposed lateral boundaries of the expansion;
      iv. Current and proposed vertical dimensions of the landfill;
      v. Projected date of construction commencement;
      vi. Projected waste acceptance rate for the proposed modification;
      vii. Certification that no air pollution equipment will be added to the facility and operational methods will remain similar as permitted under this Covered Source Permit;
      viii. Certification that the permittee shall comply with each applicable requirement of this Covered Source Permit;
      ix. Other information as may be required by the Department; and
      x. A ***certified statement by a responsible official*** that all information contained in the notification is accurate and true.

   The enclosed Supplemental Report Form: ***Modification/Reconstruction of MSW Landfill*** shall be used.

   (Auth: HAR §11-60.1-3, §11-60.1-90)

8. Landfill Closure

The permittee shall submit a **closure report** to the Department **within 30 days** of waste acceptance cessation. If a closure report is submitted, no additional wastes may be placed into the landfill without filing a notification of modification as in 40 CFR §60.7(a)(4). The closure report shall contain the following information:

a. Last day of waste acceptance (month, day, year);
b. Date of closure (month, day, year);
c. Design capacity (Mg and m^3);
d. Quantity of refuse-in-place (Mg and m^3);
e. Identification and quantity of additional capacity, if any;
f. Certification that no additional waste will be placed in the landfill; and
g. Name, address, and phone number of the facility, and the plant site manager or other contact.

The enclosed Supplemental Report Form: ***Notification of Landfill Closure*** shall be used.

The Department may request additional information as may be necessary to verify that permanent closure has taken place in accordance with 40 CFR §258.60.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.757)[1]

9. Equipment Removal Notification

The permittee shall submit an equipment removal report to the Department **thirty (30) days prior** to removal or cessation of operation of the control equipment.

a. The equipment removal report shall contain the following items:

i. A copy of the closure report submitted in accordance with Special Condition G.7;
ii. A copy of the initial performance test report demonstrating that the fifteen (15) year minimum control period has expired; and

iii. Dated copies of three (3) successive NMOC emission rate reports demonstrating that the landfill is no longer producing fifty (50) megagrams or greater of NMOC per year.

b. The Department may request such additional information as may be necessary to verify that all of the conditions for removal in Special Condition G.11 have been met.

The enclosed Supplemental Report Form: ***Notification of Collection and Control Equipment Removal*** shall be used.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.757)[1]

10. Compliance Certification

During the permit term, the permittee shall submit at least **annually** to the Department and U.S. EPA, Region 9, a compliance certification pursuant to HAR, Subsection 11-60.1-86. The permittee shall indicate whether or not compliance is being met with each term or condition of this permit. The compliance certification shall include at a minimum the following information:

a. The identification of each term or condition of the permit that is the basis of the certification;
b. The compliance status;
c. Whether compliance was continuous or intermittent;
d. The methods used for determining the compliance status of the source currently and over the reporting period;
e. Any additional information indicating the source's compliance status with any applicable enhanced monitoring and compliance certification including the requirements of Section 114(a)(3) of the Clean Air Act or any applicable monitoring and analysis provisions of Section 504(b) of the Clean Air Act;
f. A brief description of any deviations including identifying as possible exceptions to compliance any periods during which compliance is required and in which the excursion or exceedances as defined in 40 CFR Part 64 occurred; and
g. Any additional information as required by the Department including information to determine compliance.

*The compliance certification shall be submitted within **sixty (60) days after** the end of each calendar year, and shall be signed and dated by a responsible official.*

Upon written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department determines that reasonable justification exists for the extension.

(Auth.: HAR §11-60.1-4, §11-60.1-86, §11-60.1-90)

11. Discontinuance of the Collection and Control System

The permittee shall calculate the NMOC emission rate for purposes of determining when a collection and control system can be removed, using the following equation:

$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC}$, where
M_{NMOC} = mass emission rate of NMOC (Mg/yr)
Q_{LFG} = flow rate of landfill gas (m^3/min)
C_{NMOC} = NMOC concentration (ppm by volume as hexane)

a. The flow rate of landfill gas, Q_{LFG}, shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of Section 4 of Method 2E of 40 CFR Part 60, Appendix A.

b. The average NMOC concentration, C_{NMOC}, shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25C or Method 18 of 40 CFR Part 60, Appendix A. If using Method 18 of Appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The permittee shall divide the NMOC concentration from Method 25C of 40 CFR Part 60, Appendix A, by six (6) to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

c. The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Department and/or U.S. EPA, Region 9, as applicable.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754)[1]

Section H. Testing Requirements

1. **Within sixty (60) days after** *achieving the maximum production rate* of the collection and control system but not later than one hundred eighty (180) days after initial start-up, and annually thereafter, the permittee shall conduct or cause to be conducted performance tests on the collection and control system for the following purposes:

   a. To establish the reduction efficiency or parts per million volume (ppmv) of a control system designed and operated to reduce NMOC by ninety-eight (98) weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by ninety-eight (98) weight percent or reduce the outlet NMOC concentration to less than twenty (20) ppm by volume, dry basis as hexane at three (3) percent oxygen.

   The Department may require testing at other points in the facility or more frequent testing if an inspection indicates poor or insufficient controls.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.754)[1]

2. The performance tests for the emissions of NMOC shall be conducted and results reported in accordance with the test methods set forth in 40 CFR Part 60, Appendix A, and 40 CFR Part 60.8. The following test methods or U.S. EPA approved equivalent methods with written consent from the Department shall be used:

   a. The permittee shall use Method 25, 25C, or Method 18 of 40 CFR Part 60, Appendix A, to determine compliance with the ninety-eight (98) weight-percent efficiency or the twenty (20) ppmv outlet concentration level, unless another method to demonstrate compliance is included in the collection and control system design plan approved by the Department;
   b. The permittee shall use Method 3 or 3A, to determine the oxygen for correcting the NMOC concentration as hexane to three (3) percent;

c. The permittee shall use Method 25A in place of Method 25 in cases where the outlet concentration is less than fifty (50) ppm NMOC as carbon (eight (8) ppm NMOC as hexane);
d. If using Method 18 of Appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42); and
e. The permittee shall use the following equation to calculate efficiency:

Control Efficiency = $(NMOC_{in} - NMOC_{out})/NMOC_{in}$

Where, $NMOC_{in}$ = mass of NMOC entering control device and
$NMOC_{out}$ = mass of NMOC exiting control device.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754)[1]

3. The initial performance test report shall include the following information:

a. A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;
b. The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;
c. The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;
d. The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area;
e. The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and
f. The provisions for the control of off-site migration.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754, 60.757)[1]

4. The performance tests shall be made at the expense of the permittee and shall be conducted at the maximum expected operating capacity of the collection and control system. All performance tests may be monitored by the Department.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90, SIP §11-60-15)[2]

5. Unless otherwise specified in the applicable subpart, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of

determining compliance with an applicable standard, the arithmetic means of results of the three (3) runs shall apply.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90 40 CFR §60.8)[2]

6. At least **thirty (30) calendar days prior** *to conducting a performance test*, the owner or operator shall submit a written performance test plan to the Department that includes date(s) of the test, test duration, test locations, test methods, source operation, location of visible emissions, and other parameters that may affect performance test results. Such a plan shall conform to U.S. EPA guidelines including quality assurance procedures. A test plan or quality assurance plan that does not have the approval of the Department may be grounds to invalidate any test and require a retest.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90, 40 CFR §60.8, SIP §11-60-15)[1,2]

7. Any deviations from these conditions, test methods, or procedures may be cause for rejection of the test results unless such deviations are approved by the Department before the tests.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

8. **Within sixty (60) days after** *completion of the performance test*, the permittee shall submit to the Department the test report which shall include the operating conditions of the landfill gas collection and control system, the summarized test results, comparative results with the permit emissions limits, and other pertinent field data, laboratory data, and support calculations.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

9. Upon written request and justification, the Department may waive the requirement for, or a portion of, a specific performance test. The waiver request is to be submitted prior to the required test and must include documentation justifying such action. Documentation should include, but is not limited to, the results of the prior performance test indicating compliance by a wide margin, documentation of continuing compliance, and further that operations of the source have not changed since the previous test.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

Section I. Agency Notification

Any document, including reports, required to be submitted by this Covered Source Permit shall be done in accordance with Attachment I, Standard Condition No. 28.

(Auth: HAR §11-60.1-4, §11-60.1-90)

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[1]The citations to the Code of Federal Regulations (CFR) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the CFR. Due to the integration of the preconstruction and operating permit requirements, permit conditions may incorporate more stringent requirements than those set forth in the CFR.

[2]The citations to the State Implementation Plan (SIP) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the SIP.

ATTACHMENT II - INSIG
SPECIAL CONDITIONS – INSIGNIFICANT ACTIVITIES
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In addition to the Standard Conditions of the Covered Source Permit, the following Special Conditions shall apply to the permitted facility:

Section A. Equipment Description

This attachment encompasses insignificant activities listed in HAR, §11-60.1-82(f) and (g) for which provisions of this permit and HAR, Subchapter 2, General Prohibitions apply.

(Auth: HAR §11-60.1-3)

Section B. Operational Limitations

1. The permittee shall take measures to operate applicable insignificant activities in accordance with the provisions of HAR, Subchapter 2 for visible emissions, fugitive dust, incineration, process industries, sulfur oxides from fuel combustion, storage of volatile organic compounds, volatile organic compound water separation, pump and compressor requirements, and waste gas disposal.

   (Auth: HAR §11-60.1-3, §11-60.1-82, §11-60.1-90)

2. The Department may at any time require the permittee to further abate emissions if an inspection indicates poor or insufficient controls.

   (Auth: HAR §11-60.1-3, §11-60.1-5, §11-60.1-82, §11-60.1-90)

Section C. Monitoring and Recordkeeping Requirements

1. The Department reserves the right to require monitoring, recordkeeping, or testing of any insignificant activity to determine compliance with the applicable requirements.

   (Auth: HAR §11-60.1-3, §11-60.1-90)

2. All records shall be maintained for at least five (5) years from the date of any required monitoring, recordkeeping, testing, or reporting. These records shall be in a permanent form suitable for inspection and made available to the Department or their authorized representative upon request.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

Section D. Notification and Reporting

Compliance Certification

During the permit term, the permittee shall submit at least **annually** to the Department and U.S. EPA, Region 9, the attached *Compliance Certification Form* pursuant to HAR,

Subsection 11-60.1-86. The permittee shall indicate whether or not compliance is being met with each term or condition of this permit. The compliance certification shall include at a minimum the following information:

1. The identification of each term or condition of the permit that is the basis of the certification;
2. The compliance status;
3. Whether compliance was continuous or intermittent;
4. The methods used for determining the compliance status of the source currently and over the reporting period;
5. Any additional information indicating the source's compliance status with any applicable enhanced monitoring and compliance certification, including the requirements of Section 114(a)(3) of the Clean Air Act or any applicable monitoring and analysis provisions of Section 504(b) of the Clean Air Act; and
6. A brief description of any deviations including identifying as possible exceptions to compliance any periods during which compliance is required and in which the excursion or exceedances as defined in 40 CFR Part 64 occurred; and
7. Any additional information as required by the Department including information to determine compliance.

The compliance certification shall be submitted **within sixty (60) days after** the end of each calendar year, and shall be signed and dated by a responsible official or authorized representative.

Upon written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department determines that reasonable justification exists for the extension.

In lieu of addressing each emission unit as specified in Attachment V, the permittee may address insignificant activities as a single unit provided compliance is met with all applicable requirements. If compliance is not totally attained, the permittee shall identify the specific insignificant activity and provide the details associated with the noncompliance.

(Auth: HAR §11-60.1-4, §11-60.1-86, §11-60.1-90

Section E. Agency Notification

Any document (including reports) required to be submitted by this Covered Source Permit shall be done in accordance with Attachment 1, Standard Condition No. 28.

(Auth: HAR §11-60.1-4, §11-60.1-90)

ATTACHMENT III: ANNUAL FEE REQUIREMENTS
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

The following requirements for the submittal of annual fees are established pursuant to HAR, Title 11, Chapter 60.1, Air Pollution Control. Should HAR, Chapter 60.1 be revised such that the following requirements are in conflict with the provisions of HAR, Chapter 60.1, the permittee shall comply with the provisions of HAR, Chapter 60.1.

1. Annual fees shall be paid in full:

   a. **Within sixty (60) days after** the end of each calendar year; and
   b. **Within thirty (30) days after** the permanent discontinuance of the covered source.

2. The annual fees shall be determined and submitted in accordance with HAR, Chapter 11-60.1, Subchapter 6.

3. The annual emissions data for which the annual fees are based shall accompany the submittal of any annual fees and be submitted on forms furnished by the Department.

4. The annual fees and the emission data shall be mailed to:

Clean Air Branch
Environmental Management Division
Hawaii Department of Health
P.O. Box 3378
Honolulu, HI 96801-3378

ATTACHMENT IV: ANNUAL EMISSIONS REPORTING REQUIREMENTS
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the HAR, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the nature and amounts of emissions.

1. Complete the attached Annual Emissions Report Form: **Municipal Solid Waste Landfills.**

2. The reporting period shall be from January 1 to December 31 of each year. All reports shall be submitted to the Department of Health **within sixty (60) days after** *the end of each calendar year* and shall be mailed to the following address:

Clean Air Branch
Environmental Management Division
Hawaii Department of Health
P.O. Box 3378
Honolulu, HI 96801-3378

3. The permittee shall retain the information submitted, including all emission calculations. These records shall be in a permanent form suitable for inspection, retained for a minimum of five (5) years, and made available to the Department of Health upon request.

4. Any information submitted to the Department of Health without a request for confidentiality shall be considered public record.

5. In accordance with HAR, Section 11-60.1-14, the permittee may request confidential treatment of specific information, including information concerning secret processes or methods of manufacture, by submitting a written request to the Department of Health and clearly identifying the specific information that is to be accorded confidential treatment.

COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0802-01-C
PAGE 1 OF ___

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following certification at least annually, or more frequently as requested by the Department.

(Make Copies of the Compliance Certification Form for Future Use)

For Period: _____ Date: _____

Company/Facility Name: _____

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by Department of Health as public record. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, and any permit issued thereof.

COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0802-01-C
(CONTINUED, PAGE 2 OF ___)

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

The purpose of this form is to evaluate whether or not the facility was in compliance with the permit terms and conditions during the covered period. If there were any deviations to the permit terms and conditions during the covered period, the deviation(s) shall be certified as *intermittent compliance* for the particular permit term(s) or condition(s). Deviations include failure to monitor, record, report, or collect the minimum data required by the permit to show compliance. In the absence of any deviation, the particular permit term(s) or condition(s) may be certified as *continuous compliance*.

Instructions:
Please certify Sections A, B, and C below for continuous or intermittent compliance. Sections A and B are to be certified as a group of permit conditions. Section C shall be certified individually for each operational and emissions limit condition as listed in the Special Conditions section of the permit (list all applicable equipment for each condition). Any deviations shall also be listed individually and described in Section D. The facility may substitute its own generated form in verbatim for Sections C and D.

A. Attachment I, Standard Conditions

Permit term/condition	Equipment(s)	Compliance
All standard conditions	All Equipment(s) listed in the permit	☐ Continuous ☐ Intermittent

B. Special Conditions - Monitoring, Recordkeeping, Reporting, Testing, and INSIG

Permit term/condition	Equipment(s)	Compliance
All monitoring conditions	All Equipment(s) listed in the permit	☐ Continuous ☐ Intermittent
Permit term/condition All recordkeeping conditions	Equipment(s) All Equipment(s) listed in the permit	Compliance ☐ Continuous ☐ Intermittent
Permit term/condition All reporting conditions	Equipment(s) All Equipment(s) listed in the permit	Compliance ☐ Continuous ☐ Intermittent
Permit term/condition All testing conditions	Equipment(s) All Equipment(s) listed in the permit	Compliance ☐ Continuous ☐ Intermittent
Permit term/condition All INSIG conditions	Equipment(s) All Equipment(s) listed in the permit	Compliance ☐ Continuous ☐ Intermittent

COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0802-01-C
(CONTINUED, PAGE ____ OF ___)

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

C. Special Conditions - Operational and Emissions Limitations

Each permit term/condition shall be identified in chronological order using attachment and section numbers (e.g., Attachment II, B.1, Attachment IIA, Special Condition No. B.1.f, etc.). Each equipment shall be identified using the description stated in Section A of the Special Conditions (e.g., unit no., model no., serial no., etc.). Check all methods (as required by permit) used to determine the compliance status of the respective permit term/condition.

Permit term/condition	Equipment(s)	Method	Compliance
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent

(Make Additional Copies if Needed)

COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0802-01-C
(CONTINUED, PAGE ___ OF ___)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

D. Deviations

Permit Term/ Condition	Equipment(s) / Brief Summary of Deviation	Deviation Period time (am/pm) & date (mo/day/yr)	Date of Written Deviation Report to DOH (mo/day/yr)
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	

*Identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance as defined under 40 CFR 64 occurred.

(Make Additional Copies if Needed)

MONITORING REPORT FORM
COLLECTION AND CONTROL SYSTEM
COVERED SOURCE PERMIT 0802-01-C
(PAGE 1 OF 3)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following information **semi-annually**:

(Make copies for Future Use)

For Period:_____ Date:_____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (Print):_____

Title:_____

Responsible Official (Signature):_____ Date: _____

1. Value and length of time for exceedance of applicable parameters. If there were no exceedances identified, then write "no exceedances" in the comment column.

Parameter	Value	Date	Start Time	End Time	Duration	Comments
Gauge pressure in gas collection header						
Nitrogen Conc.(%), or						
Oxygen Conc. (%)						
Temp. (EC) of landfill gas						
Surface Conc. of Methane (ppmv as hexane)						

2. Average and maximum values for the following:

Parameter	Average Value	Maximum Value	Date of Max. Value	Comments
Gauge pressure in gas collection header				
Nitrogen Conc. (%)				
Oxygen Conc. (%)				
Temp. (°C) of landfill gas				
Surface Concentrations of Methane*				

* If annual monitoring is allowed, the average and maximum methane concentration at landfill surface during the most recent monitoring event;

MONITORING REPORT FORM
COLLECTION AND CONTROL SYSTEM
COVERED SOURCE PERMIT 0802-01-C
(PAGE 2 of 3)

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

3. Identify the dates, times, duration, reason, and description of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Date	Start - End Time	Duration	Comments

4. Identify the dates, times, duration, reason, and description of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Dates	Start/End Times	Duration	Comments

5. Identify all periods when the collection system was not operating in excess of five (5) days, including the dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation. If there were no occurrences, then write "no occurrences" in the comment column.

Reason, Actions Taken	Start/End Dates	Start/End Times	Duration	Future Protocol, Comments

6. Identify the location of each exceedance of the 500 ppm surface methane concentration and the concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance. If there were no exceedances, then write "no occurrences" in the table.

Sampling Date	Location	Conc. (ppm)	Previous Conc. (ppm)	Actions Taken	Sampler's Name

MONITORING REPORT FORM
COLLECTION AND CONTROL SYSTEM
COVERED SOURCE PERMIT 0802-01-C
(PAGE 3 OF 3)

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

7. Identify the date of installation and the location of each well or collection system expansion added. If no additions were made, then write "no additions" in the table.

Installation Date	Description of Addition	Location

8. Identify any instances when the gas flow has been diverted from the control device, enclosed combustor, or open flare. If there were no occurrences, then write "no occurrences" in the table.

Description and Reason	Dates	Start/End Times	Duration	Comments

9. Identify the date of any deviations from the requirements of 40 CFR Part 63, Subpart AAAA , including the actions taken during a startup, shutdown or malfunction were consistent with the procedures in the startup, shutdown and malfunction plan. If there were no deviations, then write "no deviations" in the table.

Date	Description of Action	Consistent with plan (yes or no)

ANNUAL EMISSIONS REPORT FORM
MUNICIPAL SOLID WASTE LANDFILLS
COVERED SOURCE PERMIT 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the nature and amounts of emissions, annually.

(Make copies for Future Use)

For Period: _____ Date: _____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature) _____ Date: _____

1. Landfill Emissions

Landfill type (circle one): Area Trench Ramp

Average annual refuse acceptance rate during active life (Mg/yr): _____

Parameter	Site-Specific Value, if available	Calculation Method
Methane generation potential, L_o (m^3 CH_4/Mg refuse)		
Methane generation rate constant, k (yr^{-1})		
Concentration of CH_4 in landfill gas (ppmv)		
Concentration of CO_2 in landfill gas (ppmv)		
Concentration of N_2 in landfill gas (ppmv)		
Concentration of O_2 in landfill gas (ppmv)		
Temperature of landfill gas (°C)		

Note:
If the permittee intends to use the site-specific values to compute annual emissions from the municipal solid waste landfill, all data, background information, and calculations shall be provided with the submittal of this form. If the requested information is not provided, default values will be assumed.

2. For MSW Landfills with a Collection and Control System:

Indicate the control efficiency of the collection and control system: _____

Control Efficiency = $(NMOC_{in} - NMOC_{out})/NMOC_{in}$

Where, $NMOC_{in}$ = mass of NMOC entering control device and

$NMOC_{out}$ = mass of NMOC exiting control device.

SUPPLEMENTAL REPORT FORM
MODIFICATION/RECONSTRUCTION OF MSW LANDFILL
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

This form fulfills the requirements of the Amended Design Capacity Report.

(Make copies for Future Use)

For Period:_____ Date: _____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

I certify that no air pollution equipment will be added to the facility and operational methods will remain similar as permitted under this Covered Source Permit.

I certify to comply with each applicable requirement of this Covered Source Permit.

Responsible Official (Print):_____

Title:_____

Responsible Official (Signature):_____Date: _____

1. Current design capacity of the landfill (m^3 and Mg) _____
2. Current site-specific density (Mg/m^3): _____
3. Description of the reconstruction or modification: _____

   _____

   _____

   _____
4. Current lateral dimensions of the landfill (meters): _____

   Proposed lateral dimensions of the landfill (meters):_____

   Current vertical limit of the landfill (meters): _____

   Proposed vertical limit of the landfill (meters):_____
5. Projected date of construction commencement: _____
6. Projected waste acceptance rate (Mg/yr):_____
7. Include a site map of the landfill containing the following information:
   a) Location of the landfill and area of proposed modification or reconstruction;
   b) Current lateral boundaries of the existing landfill;
   c) Proposed lateral boundaries of the expansion; and
   d) Current and proposed vertical dimensions of the landfill.

SUPPLEMENTAL REPORT FORM
NOTIFICATION OF LANDFILL CLOSURE
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

For Period: _____ Date: _____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

I certify that the landfill closure is intended to be permanent.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____ Date: _____

Last day of waste acceptance (month, day, year): _____

Date of landfill closure (month, day, year): _____

Final design capacity of landfill (Mg or m^3): _____

Final quantity of refuse-in-place (Mg **and** m^3): _____

Anticipated additional capacity, if any (Mg or m^3): _____

SUPPLEMENTAL REPORT FORM
ANNUAL REPORT
COVERED SOURCE PERMIT NO. 0802-01-C
(PAGE 1 OF 2)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report the following to the Department of Health.

This report shall be submitted to the Department of Health *within 180 days of installation and start-up* of the collection and control system. Attach additional sheets if necessary. The initial performance test report shall also be included with this submittal.

Facility Name: _____ Date: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____ Date: _____

Start-up date of collection and control system: _____

1. Value and length of time for exceedance of applicable parameters. If there were no exceedances identified, then write "no exceedances" in the comment column.

Parameter	Value	Date	Start Time	End Time	Duration	Comments
Gauge pressure in gas collection header						
Nitrogen Concentration or						
Oxygen Concentration						
Temperature of landfill gas						
Surface Concentrations of Methane						

2. Identify the dates, times, duration, reason, and description of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Date	Start - End Time	Duration	Comments

SUPPLEMENTAL REPORT FORM
ANNUAL REPORT
COVERED SOURCE PERMIT NO. 0802-01-C
(PAGE 2 OF 2)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report the following to the Department of Health.

3. Identify the dates, times, duration, reason, and description of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Dates	Start/End Times	Duration	Comments

4. Identify all periods when the collection system was not operating in excess of five (5) days, including the dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation. If there were no occurrences, then write "no occurrences" in the comment column.

Reason, Actions Taken	Start/End Dates	Start/End Times	Duration	Future Protocol, Comments

5. Identify the location of each exceedance of the 500 ppm surface methane concentration and the concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance. If there were no exceedances, then write "no occurrences" in the table.

Sampling Date	Location	Conc. (ppm)	Previous Conc. (ppm)	Actions Taken	Sampler=s Name

6. Identify the date of installation and the location of each well or collection system expansion added. If no additions were made, then write "no additions" in the table.

Installation Date	Description of Addition	Location

SUPPLEMENTAL REPORT FORM
NOTIFICATION OF COLLECTION AND CONTROL EQUIPMENT REMOVAL
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

For Period: _____ Date: _____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

I certify that the landfill closure is intended to be permanent.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____ Date: _____

Last day of waste acceptance (month, day, year): _____

Date of landfill closure (month, day, year): _____

Final design capacity of landfill (Mg or m^3): _____

Date of closure report (month, day, year), including a copy of the closure report: _____

Has the collection and control system been in operation for a minimum of fifteen (15) years (based on the date of the most recent addition to the system?) Yes No

Include dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing fifty (50) megagrams or greater of NMOC per year. (Use equations for landfills without a collection and control system to make this determination.)

MONITORING REPORT FORM
OPACITY EXCEEDANCES
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following information semi-annually:

(Make copies for Future Use)

For Period:_____ Date: _____

Facility Name: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (PRINT): _____

TITLE: _____

Responsible Official (Signature): _____

Visible Emissions:

Report the following on the lines provided below: all date(s) and six (6) minute average opacity reading(s) which the opacity limit was exceeded during the monthly observations; if there were no exceedances during the monthly observations, then write Ano exceedances@ in the comment column.

EQUIPMENT	SERIAL/ID NO.	DATE	6 MIN. AVG. (%)	COMMENTS

VISIBLE EMISSIONS FORM REQUIREMENTS
STATE OF HAWAII
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

The following Visible Emissions (VE) Form shall be completed **monthly** (*each calendar month*) for each equipment subject to opacity limits in accordance with Method 9. At least **annually** (*calendar year*), VE observations shall be conducted for each equipment subject to opacity limits by a certified reader in accordance with Method 9. The VE Form shall be completed as follows:

1. Visible emissions observations shall take place during the day only. The opacity shall be noted in five (5) percent increments (i.e., 25%).

2. Orient the sun within a 140 degree sector to your back. Provide a source layout sketch on the VE Form using the symbols as shown.

3. Stand at least three (3) stack heights, but not more than a quarter mile from the stack.

4. Two (2) observations shall be taken at fifteen (15) second intervals for six (6) consecutive minutes for each equipment.

5. The six (6) minute average opacity reading shall be calculated for each observation.

6. If possible, the observations shall be performed as follows:

    a. Read from where the line of sight is at right angles to the wind direction.
    b. The line of sight shall not include more than one (1) plume at a time.
    c. Read at the point in the plume with the greatest opacity (without condensed water vapor), ideally while the plume is no wider than the stack diameter.
    d. Read the plume at fifteen (15) second intervals only. Do not read continuously.
    e. The equipment shall be operating at maximum permitted capacity.

7. If the equipment was shut-down for that period, briefly explain the reason for shut-down in the comment column.

The permittee shall retain the completed VE Forms for recordkeeping. These records shall be in a permanent form suitable for inspection, retained for a minimum of five (5) years, and made available to the Department of Health, or their representative upon request.

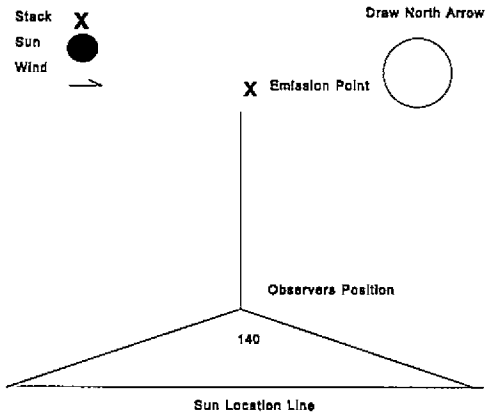
VISIBLE EMISSIONS FORM
STATE OF HAWAII
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

(Make Copies for Future Use For Each Equipment)

Permit No.: 0802-01-C
Company Name:_____
Equipment and Fuel:_____
Site Conditions:

Stack height above ground (ft):_____
Stack distance from observer (ft):_____
Emission color (black or white):_____
Sky conditions (% cloud cover):_____
Wind speed (mph):_____
Temperature (EF):_____
Observer Name:_____
Certified? (Yes/No):_____



Observation Date and Start Time:_____

SECONDS / MINUTES	0	15	30	45	COMMENTS
1					
2					
3					
4					
5					
6					
Six (6) Minute Average Opacity Reading (%):					

Observation Date and Start Time:_____

SECONDS / MINUTES	0	15	30	45	COMMENTS
1					
2					
3					
4					
5					
6					
Six (6) Minute Average Opacity Reading (%):					

Geosyntec consultants

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www.geosyntec.com

March 24, 2022

Ms. Allison Fraley
Solid Waste Management Division
Department of Public Works
The County of Kaua‘i
4444 Rice Street, Suite 295
Lihue, Kaua‘i, HI 96766

Subject: Covered Source Permit (CSP) Renewal Application (No. 0802-01-C)
Kekaha Sanitary Landfill, Kekaha, Kauai, Hawaii

Dear Ms. Fraley:

Geosyntec Consultants, Inc. (Geosyntec) is pleased to re-submit the Covered Source Permit Renewal application for the Kekaha Sanitary Landfill (KSL), Kauai, Hawaii, located at 6900D Kaumualii Highway, Kekaha, Hawaii 96752. The initial Covered Source Permit Renewal was issued on September 10, 2014 with CSP No. 0802-01-C. The CSP Permit Renewal Application Package includes i) Compliance Plan ii) Compliance Certification iii) Standard Air Pollution Control Permit Application Form iv) Application for a Covered Source Permit Renewal; and v) Application for a Minor Modification to a Covered Source.

If you have any questions, please contact Jane Besch at (626)-788-4637 or Aklilu Tesfamichael at (510) 285-2683 of Geosyntec.

Kind Regards,

Tingting Jiang
Project Engineer

Jane Besch, CSP, CPP
Principal

Aklilu Tesfamichael, Ph.D.
Senior Engineer
Geosyntec Consultants

cc. Troy Tanigawa, Department of Public Works

Prepared for

County of Kauai – Department of Public Works
4444 Rice Street, Suite 275
Lihue, HI 96766

CSP Permit Renewal

Kekaha Sanitary Landfill
6900D Kaumualii Highway
Kekaha, Hawaii 96752

Submitted by

Geosyntec consultants
engineers | scientists | innovators

1111 Broadway Sixth Floor
Oakland CA 94607

Project Number: WG3068

March 2022

Revised March 2022

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LIST OF ACRONYMS

bbl	Barrel
CFR	Code of Federal Regulations
CSP	Covered Source Permit
EPA	United States Environmental Protection Agency
^{o}F	Fahrenheit
GCCS	Gas Collection and Control System
GHG	Greenhouse Gases
gpm	Gallons per minute
HAP	Hazardous Air Pollutants
HAR	Hawaii Administrative Rules
KSL	Kekaha Sanitary Landfill
LFG	Landfill Gas
MACT	Maximum Achievable Control Technology
Mg	Million megagrams
MSW	Municipal Solid Waste
NESHAP	National Emission Standards for Hazardous Air Pollutants
NMOC	Non-Methane Organic Compound
NOx	Nitrogen Oxides
NSPS	New Source Performance Standards
NSR	New Source Review
PM	Particulate Matter
PM10	PM with an aerodynamic diameter less than 10 microns
PM2.5	PM with an aerodynamic diameter less than 2.5 microns
ppm	Parts per million
PSD	Prevention of Significant Deterioration
psia	Pounds per square inch absolute
RICE	Reciprocating Internal Combustion Engine
RMP	Risk Management Plan
SCFM	Standard Cubic Feet Per Minute
tpy	Tons per year
VOC	Volatile Organic Compounds

1. EXECUTIVE SUMMARY

County of Kauai, Department of Public Works owns and operates Kekaha Sanitary Landfill (KSL). The site is approximately 98 acres and located at 6900D Kaumualii Highway, Kekaha, Kauai, Hawaii. The site consists of Phase I and Phase II fill areas. Phase I received municipal solid waste (MSW) circa 1960 to 1993 and Phase II began operations in 1993 and has since been actively receiving waste. The Phase II landfill containment system consists of a landfill liner and a leachate collection system, which routes leachate to the leachate evaporation lagoon. As of 2021, the site has received approximately 3 million tons of waste. In 2020, construction of Cell 2 of Phase II was completed as authorized by Solid Waste Permit # LF-0042-16. Cell 2 is a 6.6 acre lateral expansion of the existing Phase II at KSL. The addition of Cell 2 increased the volume of the landfill by approximately 972,500 cubic yards.

KSL currently operates under Covered Source Permit (CSP) No.0802-01-C, which was issued on September 10, 2014. The Covered Source Permit authorization expires on September 9, 2019, unless a timely and complete renewal application has been submitted no fewer than twelve months and no more than eighteen months prior to expiration. This CSP Renewal Application is being submitted to comply with the deadline to renew this permit.

As part of the CSP No.0802-01-C renewal, KSL is requesting modifications to the permit which qualify as minor modifications per HAR §11-60.1-81. KSL is submitting this renewal and minor modification application in accordance with the procedures detailed in HAR §11-60.1-101. As the modifications requested in this application qualify as minor modifications and do not affect the federal conditions of the permit, per HAR §11-60.1-95, EPA review of this application is not required. The requested minor modifications are described in Section 5 of this application.

2. FACILITY DESCRIPTION

The Facility is located at 6900D Kaumualii Highway, Kekaha, Kauai, Hawaii. The facility is currently operating under CSP No.0802-01-C issued on September 10, 2014. This application is being submitted to renew the CSP and includes minor modifications requested by the facility. The facility is an active, MSW landfill, which consists of Phase I and Phase II fill areas. Phase I received MSW from 1960 to 1993 and Phase II began operations in 1993 and has since been actively receiving waste. As of 2021, the site has received 3.03 million tons of waste.

The Phase II landfill containment system consists of a landfill liner and a leachate collection system, which routes leachate to the leachate evaporation lagoon. Since its original construction, Phase II has been expanded both vertically and laterally (Cell 1 and Cell 2) to meet increased MSW disposal demands. In 2020, construction of Cell 2 of Phase II was completed as authorized by Solid Waste Permit # LF-0042-16. Cell 2 is a 6.6 acre lateral expansion of the existing Phase II at KSL. Cell 2 was created by removing infiltration ditch between Phase I and Phase II and overlaying onto the side slopes of both landfill phases. The liner for Cell 2 is identical to the existing Phase II, Cell 1 liner and it overlays the Phase I side slope and connects to the existing Phase II liner. The addition of Cell 2 increased the volume of the landfill by approximately 972,500 cubic yards. Six perimeter landfill gas (LFG) probes have been installed around Phase I and six around Phase II to monitor subsurface methane migration.

In 2006, the site installed a landfill gas collection and control system (GCCS) consisting of 57 vertical extraction wells (23 in Phase I and 34 Phase II) fitted with orifice plate-style wellheads, high density polyethylene (HDPE) collection header and lateral piping, three condensate collection sumps, and a skid mounted control system comprising enclosed flare, dual blower system, knock-out pot (KOP), and a programmable logic controller (PLC) with a supervisory control and data acquisition (SCADA) system for remote system monitoring and paperless electronic recording of operational parameters. The condensate sumps and the KOP use electric pumps to move LFG condensate into the leachate collection system and eventually into the leachate evaporation lagoon. Two multistage centrifugal blowers (duty and standby) are used to extract and send LFG to the flare for destruction. The blowers range can accommodate full rated flare capacity (50-750 SCFM) with 40 inches water column capacity at the skid inlet to the knock-out vessel.

In accordance with 40 Code of Federal Regulations (CFR) Part 60, Subpart WWW – Standards of Performance for Municipal Solid Waste Landfills, the collection and control system is required to be designed and operated to reduce NMOC by ninety-eight (98)

weight-percent ((§60.752(b)(2)(iii)(B)), or to reduce the outlet NMOC concentration to less than twenty (20) ppm by volume, dry basis as hexane at three (3) percent oxygen.

The facility map and process flow program can be found in Appendix A.

3. EQUIPMENT SPECIFICATIONS

The stack for the flare is 40.7 feet tall, 6.02 feet in diameter, and is equipped with three sample ports, three thermocouple temperature monitoring devices, ultraviolet flame detector assemblies, flame arrestor and pneumatic shutdown assembly at the flare inlet. The flare system was designed in accordance with 40 CFR Part 60 Subpart WWW, NSPS, Standards of Performance for Municipal Solid Waste Landfills, including provisions for continuous flow and temperature measurement, a minimum operating temperature of 1,400 deg. Fahrenheit (^{o}F) and with a minimum residence time of 0.3 seconds with a minimum 98% overall destruction efficiency. The flare has a capacity to handle LFG flow ranging from 50 to 750 standard cubic feet per minute (SCFM).

The extraction wells are operated with a working vacuum that produces the highest sustainable flow of LFG without drawing in excessive air. Maximum well temperatures are maintained below 131 °F (55 °C), with an oxygen concentration of less than 5%, with the exception of wells exempted by DOH in a letter dated November 20, 2020, to operate at temperatures to 136°F (58 °C), The wells that have this exemption are: GW-15, GW26, GW27, GW29, GW30 and GW34. To demonstrate compliance with the operating parameter limits, the wells are monitored monthly for vacuum and temperature, along with methane, carbon dioxide, and oxygen concentrations. Wells determined to be operating outside of compliance limits are adjusted by changing the amount of vacuum in the well.

In addition to well monitoring, the landfill surface emission is required to be monitored on a quarterly basis. If the surface methane emission readings exceed 500 parts per million (ppm) of methane, corrective action is required per 40 CFR §60.755. The landfill is also required to perform a monthly cover inspection. Monitoring devices on the LFG collection and control system include a continuous temperature monitor for the flare and a continuous recording flow meter for recording LFG flow to the flare.

4. INSIGNIFICANT ACTIVITIES

As required by HAR §11-60.1-82(e), a list of insignificant activities that are found in subsection (f) are required to be identified in the CSP. The insignificant activities listed by the applicant are:

Table 4-1 List of Insignificant Activities

ID	Description	Capacity	Exemption
EGEN1	Emergency Backup Diesel Engine Generator (diesel fuel oil No 1D)	125 kW	HAR §11-60.1-82(f)(5)
Tank 1	Diesel fuel tank	2,000 gal	HAR §11-60.1-82(f)(1)
Tank 2	Condensate Storage Tank	2,500 gal	HAR §11-60.1-82(f)(1)

A 2,500-gallon condensate storage tank (Tank 2) was added in late 2017, which is considered an insignificant activity per HAR §11-60.1-82(f)(1).

5. PROPOSED PERMIT MODIFICATIONS:

Table 5-1 Proposed Permit Modifications

Emission Source Description	Proposed Changes
A gas collection and control system (GCCS)	• Remove statements for a collection and control system design plan submission in Section B.7. • Remove the collection and control system design plan submission requirements in Section D.1.a.i. and installation required date in D.1.a.ii. • Remove "Section D.1.a.i." and "Section D.1.a.ii" in Section E.1.a.i and E.1.a.ii. • Remove statements for special condition D.1.a.i. in Section F.1. • Remove statements for the initial report submission requirements of collection and control system installation in Section G.3.
Condensate Storage Tank	• Add 2,500-gallon capacity condensate storage tank to the Insignificant Activities List
Visible Emissions (VE) Form	• For consistency with Permit Condition Attachment II, Section F, No. 7 – Visible Emissions, add the following language to the VE Form: besides Method 9 stated in the opening paragraph of the VE Form Requirements, add "or U.S. EPA approved equivalent methods or alternate methods with prior written approval from the Department."

5.1 Removal of Permit Conditions on Installation of GCCS

A GCCS was installed in 2016 and start-up commenced in December 2016.

The requested modification is to remove the statements of the date of GCCS installation and GCCS design plan in Special Conditions Section B, D, F, G listed in Table 5-1 above. The modifications of the Permit Conditions is defined as a minor modification under HAR §11-60.1-81.

5.2 Add Condensate Storage Tank to the List of Insignificant Activities

A 2,500-condensate storage tank (Tank 2) was installed in late 2017. Under HAR §11-60.1-82, the condensate storage tank is considered an insignificant activity.

5.3 Visible Emissions Form Update

The CSP Permit for KSL (No. 0802-01-C) uses the following permit language: The permittee shall conduct monthly (calendar month) VE observations for the enclosed flare in accordance with 40 CFR Part 60, Appendix A, Method 9, *or U.S. EPA approved equivalent methods or alternate methods with prior written approval from the Department*." The VE Form, found as an attachment at the end of the CSP, states the following: "The following Visible Emissions (VE) Form shall be completed monthly (each calendar month) for each equipment subject to opacity limits in accordance with Method 9. At least annually (calendar year), VE observations shall be conducted for each equipment subject to opacity limits by a certified reader in accordance with Method 9." To provide consistency, KSL requests that the form language be updated to include the entire permit language by adding, "*or U.S. EPA approved equivalent methods or alternate methods with prior written approval from the Department."*

6. PROJECT EMISSIONS

Landfill releases to the atmosphere include emissions from the GCCS after flaring as well as fugitive emissions from uncollected LFG.

Potential NMOC and HAP emissions from the landfill were based on LFG generation rates obtained from USEPA's LandGEM model (LandGEM Version 3.03, released in May 2005). With anticipated Landfill year of closure in 2027, the LandGEM model indicated that maximum LFG generation rate would occur in the year 2028. This LFG generation rate was used as the basis of potential emission calculations for NMOC and HAPs.

The LFG was assumed to be 43% methane by volume based on wellfield monitoring. A collection efficiency of 80% (consistent with 2021 GHG report for the landfill, attached in Appendix D) was used to estimate the LFG directed to the flare. Potential emissions from the flare were based on a destruction efficiency of 91.5% based on the flare annual performance test report for the year 2021. The emissions for criteria air pollutants from flare and fugitive are shown in Appendix C.

HAP emission rates for KSL for the flare and from fugitive sources were calculated using the individual HAP concentrations referenced in AP-42, Section 2.4, Municipal Solid Waste Landfills and the flow rate of the LFG predicted by LandGEM. LandGEM input are based on AP-42 recommendations and default parameters. HAP emission calculations for both the flare and fugitive sources are presented in Appendix C.

The total emissions from the flare and fugitive emissions from the landfill surface are summarized in Table 6-1 below:

Table 6-1 Project Emission Summary

Flare No.	Emissions (tpy)						
	NO_x	**CO**	**SO_x**	**PM_{25}**	**HAP**	**NMOC**	**VOC**
Flare Emissions	2.35	44.01	1.07	1.00	0.79	1.53	0.76
Landfill Fugitive Emissions	--	--	--	--	2.38	4.61	1.83
Total Emissions	2.35	44.01	1.07	1.00	3.17	6.13	2.59

7. MAXIMUM OPERATING SCHEDULE

The maximum operating schedule for the facility is 8,760 hours per year (24 hours per day, 7 days per week, and 52 weeks per year).

8. REGULATORY APPLICABILITY ANALYSIS REQUIREMENTS

This Section discusses the applicability of federal and state air quality regulations associated with KSL.

8.1 Federal Air Pollution Control Regulations – New Source Performance Standards (NSPS)

Federal NSPS, codified in 40 CFR Part 60, establish pollutant emission limits as well as monitoring, reporting, and recordkeeping requirements for various emission sources based on source type and size. The NSPS apply to new, modified, or reconstructed sources. The potentially applicable NSPS are described below.

8.1.1 40 CFR Part 60, Subpart A – NSPS General Provisions

Due to the operation of equipment subject to individual NSPS, the facility is subject to the applicable requirements of 40 CFR Part 60, Subpart A, *General Provisions* (NSPS General Provisions). KSL is in compliance with the applicable requirements in this subpart.

8.1.2 40 CFR 60, Subpart K, Ka, and Kb – NSPS for Volatile Organic Liquid Storage Vessels

NSPS Subparts K, Ka and Kb apply to volatile organic liquids (VOL) storage vessels of certain sizes that have been constructed, reconstructed, or modified during various time periods. Subpart K applies to storage vessels constructed, reconstructed, or modified prior to 1978 and Subpart Ka applies to storage vessels constructed, reconstructed, or modified prior to 1984. Both Subpart K and Ka apply to storage vessels with a capacity greater than 40,000 gallons. Subpart Kb applies to storage vessels with a capacity greater than or equal to 75 cubic meters, or approximately 19,813 gallons, that are used to store VOL for which construction, reconstruction or modification commenced after July 23, 1984. The storage vessels at the facility are Tanks 1 and 2 with capacities of 2,000 gallons and 2,500 gallons, respectively. Because the tanks do not meet the applicable capacity thresholds, Subparts K, Ka and Kb are not applicable.

8.1.3 40 CFR 60, Subpart WWW – NSPS for Municipal Solid Waste Landfills

NSPS Subpart WWW is applicable to KSL. The provisions of this subpart apply to each MSW landfill that commenced construction, reconstruction or modification on or after May 30, 1991. KSL was issued a permit for the vertical expansion, and the landfill was modified after May 30, 1991. This subpart requires new and existing landfills emitting 34 MG/yr or more of NMOC reduce emissions by 98% or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen using a gas collection and control system. KSL emits NMOC above this threshold and has installed the GCCS to comply with this subpart. KSL is in compliance with the applicable requirements in this subpart.

8.1.4 40 CFR 60, Subpart XXX – NSPS for Municipal Solid Waste Landfills that Commenced Construction, Reconstruction or Modification After July 17, 2014

NSPS Subpart XXX is applicable to landfills if construction, reconstruction, or modification occurred on or after July 17, 2014. The term “modification” is defined in the subpart as an increase in the permitted volume design capacity of the landfill by either lateral or vertical expansion based on its permitted design capacity as of July 17, 2014. Modification does not occur until the owner or operator commences construction on the lateral or vertical expansion. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill. Construction of Cell 2 of Phase II is not considered a modification because it did not increase the design capacity of the Kekaha Landfill. Also, physical or operational changes made to a MSW landfill solely to comply with Subpart WWW of this part are not considered construction, reconstruction or modifications for the purposes of this Subpart. Because the most recent design capacity increase occurred prior to July 17, 2014 (on March 5, 2014), Subpart XXX does not apply.

8.1.5 40 CFR Part 60, Subpart IIII-NSPS for Stationary Compression Ignition Internal Combustion Engines

NSPS Subpart IIII applies to compression ignition (CI) reciprocating internal combustions engines (RICE) constructed, modified, or reconstructed after various applicability dates, the earliest of which is July 11, 2005. Any stationary CI RICE for which construction, modification, or reconstruction commences after July 11, 2005 is potentially subject to this regulation. The 125-kW emergency diesel engine was manufactured in May 1994, which was before April 1, 2006 and has not been modified or reconstructed. Therefore, Subpart IIII does not apply.

8.1.6 Non-Applicability of Other NSPS

NSPS are developed for specific industrial source categories. The applicability of a NSPS to a facility can be readily ascertained based on the industrial source category covered. Other than the above-listed Subparts, other NSPS are categorically not applicable to the facility.

8.1.7 Federal Air Pollution Control Regulations – National Emission Standards for Hazardous Air Pollutants (NESHAP)

8.1.8 40 CFR 63, Subpart A – NESHAP General Provisions

Due to its operation of equipment subject to individual NESHAP, the facility is subject to the applicable requirements of 40 CFR Part 63 Subpart A General Provisions. KSL is in compliance with the applicable requirements in this subpart.

8.1.9 40 CFR 63, Subpart AAAA – NESHAP for Municipal Solid Waste Landfills

This subpart, also referred to as the Landfill Maximum Achievable Control Technology (MACT), is applicable to any open landfill that accepted waste after November 8, 1987, that has estimated uncontrolled NMOC emissions exceeding 34 megagrams per year (Mg/yr), and which meets one of the following criteria: (1) is a major source, (2) is collocated with a major source, or (3) is an area source with capacity greater than 2.5 million cubic meters (3.2 million cubic yards). KSL is subject NESHAP Subpart AAAA because waste was accepted after November 8, 1987, the design capacity is greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters, and the estimated uncontrolled NMOC emissions is equal to or greater than fifty (34) Mg/yr.

NESHAP, Subpart AAAA contains "startup, shutdown, and malfunction (SSM) requirements" that apply to affected landfills. The rule requires that the Permittee develop and implement a written SSM plan that describes in detail the procedures for operating and maintaining the collection and control system and the continuous monitoring system (CMS) during periods of SSM [40 CFR 63.6(e)(3)]. There are also recordkeeping and reporting requirements for SSM incidents. The site is currently in compliance with the SSM requirements and therefore is expected to comply in the future.

8.1.10 40 CFR 63, Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines

NESHAP Subpart ZZZZ, also referred to as the RICE MACT, establishes emission and operating limitations for HAP emitted from stationary RICE located at major and area

sources of HAP. An affected source is any existing, new or reconstructed stationary RICE. For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if one commenced construction or reconstruction of the stationary RICE before June 12, 2006. The 125kW generator was installed in Phase II in 1993 and therefore is considered an existing source and must follow the requirements established in 40 CFR §63.6603. Accordingly, Table 2d to Subpart ZZZZ, indicates that existing stationary RICE located at an area source of HAP emissions must comply with the following operational requirements:

a. Change oil and filter every 500 hours of operation or annually, whichever comes first;

b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; and

c. Inspect all hoses and belts every 500 hours of operation annually, whichever comes first, and replace as necessary.

Under 40 CFR §63.6655, records must be kept to demonstrate compliance with these maintenance activities. Subpart ZZZZ was not presented in the initial CSP Permit. KSL has implemented measures, prior to the submittal of this application, to conduct the required maintenance activities in compliance with Subpart ZZZZ and going forward, is expected to comply.

8.2 Non-Applicability of other NESHAPS

As with NSPS standards, NESHAP are developed for specific industrial source categories. Therefore, the applicability of a specific NESHAP can be readily ascertained based on the industrial source category covered. All NESHAP regulations in 40 CFR Part 61 and 40 CFR Part 63, excluding those identified as applicable above, are not applicable to KSL.

8.3 Federal Air Pollution Control Regulations- Other

8.3.1 New Source Review (NSR) – Prevention of Significant Deterioration- 40 CFR Part 51 Subpart I

KSL is a minor source with respect to prevention of significant deterioration (PSD) regulations because potential emissions of criteria pollutants are less than 250 tons per year (tpy). Landfills are not one of the twenty-eight sources designated by EPA with a major source threshold of 100 tpy. KSL is located in an area designated as either

attainment or non-designated for all pollutants. KSL will remain classified as a minor source with respect to PSD regulation upon renewal of the current Title V Permit.

8.3.2 Compliance Assurance Monitoring – 40 CFR Part 64

Under the Compliance Assurance Monitoring (CAM) regulations (40 CFR Part 64) facilities are required to prepare and submit monitoring plans for certain emissions units with the initial or renewal Title V application. The CAM plans are intended to provide an on-going and reasonable assurance of compliance with emission limits. Under the general applicability criteria, this regulation only applies to emission units that use a control device to achieve compliance with an emission limit and whose pre-controlled emission levels exceed the major source thresholds under the Title V Operation Permit program.

Compliance Assurance Monitoring (CAM) applies to facilities that fulfill all of the following criteria:

1. Facility is a major source that is required to obtain a Part 70 (Title V) or 71 (Federal Plan) permit.
2. Facility is subject to emission limitation or standard for the applicable pollutant.
3. Facility uses a control device to achieve compliance.
4. Potential pre-control emissions of applicable pollutant are at least 100 percent of major source amount
5. Facility is not subject to a federal standard (NSPS or NESHAPS) promulgated after November 15, 1990.

The landfill NSPS (40 CFR Part 60, Subpart WWW) was promulgated on March 12, 1996, and the landfill NESHAP was promulgated on January 16, 2003. Therefore, the landfill gas collection and control equipment are not subject to CAM provisions.

8.3.3 Chemical Accident Prevention Provision – 40 CFR Part 68

Subpart B of 40 CFR Part 68, Chemical Accident Prevention Provisions, outlines requirements for a risk management plan (RMP) pursuant to Section 112R of the Clean Air Act. Applicability of the subpart is determined based on the type and quantity of certain potential hazardous and/or flammable chemicals stored at a facility. The RMP requirements do not apply to this facility, because it does not have more than the threshold quantity of a regulated substance in a process.

8.3.4 State Operating Permit Programs (Title V) – 40 CFR Part 70

KSL is classified stationary source as defined in the 40 CFR Part 70 (Title V) Regulations. The KSL is major source because potential emissions of one or more criteria pollutants exceed the applicable major source threshold. However, this facility is not a major source of HAPS under Title V because it does not have the potential to emit greater than 10 tpy of an individual HAP nor does it have the potential to emit 25 tpy of the total aggregated HAPS. KSL will remain a major source with regard Title V regulations after renewal of the existing CSP.

8.3.5 Protection of Stratospheric Ozone – 40 CFR Part 82

The requirements originating from Title VI of the Clean Air Act, entitled Protection of Stratospheric Ozone, are contained in 40 CFR Part 82. These regulations apply to "any person that produces, transforms, destroys, Imports or exports a controlled substance or imports or exports a controlled product." KSL does not conduct any of the activities associated with the controlled substance regulated in 40 CFR Part 82 and therefore, these regulations do not apply.

8.3.6 Mandatory Reporting of Greenhouse Gases – 40 CFR Part 98

40 CFR Part 98 establishes reporting requirements for owners and operators of certain facilities that directly emit greenhouse gas (GHG). For the purposes of Title V, GHG reporting requirements established under 40 CFR Part 98 are not included in the definition of "applicable requirements" in 40 CFR 70.1 and 71.2. EPA's published guidance on permitting requirements for GHG states:

It is the responsibility of each source to determine the applicability of the GHG reporting rule and to comply with it, as necessary. However, since the requirements of the [40 CFR Part 98] GHG reporting rule are not considered applicable requirements under Title V, they do not need to be included in the Title V permit.

In consideration of the definition of "applicable requirements" under the Title V permitting program and the published EPA guidance, it is not appropriate to include 40 CFR Part 98 requirements in Title V permits. Additionally, §98.2(a)(1)-(3) identifies facilities subject to GHG reporting and related activities. KSL does not meet the requirements for facilities obligated under 40 CFR Part 98, therefore, this Rule does not apply.

8.4 Applicable State Requirements – State of Hawaii – Title 11

The following State Requires are applicable to KSL:

8.4.1 HAR Title 11, Chapter 59 – Ambient Air Quality Standards

This regulation sets numerical ambient air quality standards which limit the time-averaged concentration of specific pollutants dispersed or suspended in the ambient air of the State. HAR §11-59-5 prohibits any person to cause or allow or contribute to a violation of any of the ambient air quality standards Based on previous compliance with the ambient air quality standards, it is expected that the facility will comply.

8.4.2 HAR Title 11, Chapter 60.1, Subchapter 1 – General Requirements

HAR §11-60.1-2 – Prohibition of Air Pollution

> This Section prohibits any activity which causes air pollution or causes or allows the emission of any regulated or hazardous air pollutant without first securing approval in wiring from the Director.

HAR §11-60.1-3 – General Conditions for Considering Applications

> This Section states that the Director shall approve an application for a noncovered or covered source permit if the applicant can show to the satisfaction of the Director that all applicable provisions of this chapter will be complied with.

HAR §11-60.1-4 – Certification

> This Section states that every application form, report, compliance plan, or compliance certification submitted pursuant to this chapter shall contain certification by a responsible official of truth, accuracy, and completeness. This certification and any other certification required pursuant to this chapter shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

HAR §11-60.1-5 – Permit Conditions

> This Section provides the Director with the authorization to impose more restrictive conditions in a noncovered or covered source permit to further limit the air pollutants and operation of the source.

HAR §11-60.1-6 – Holding of Permit

This Section states that each noncovered or covered source permit, or a copy thereof, shall be maintained at or near the stationary source for which the noncovered or covered source permit was issued and shall be made available for inspection upon the Director's request. It also prohibits defacing, altering, forging, counterfeiting or falsifying a noncovered or covered source permit.

HAR §11-60.1-7 – Transfer of Permit

This Section states that noncovered and covered source permits shall not be transferable, whether by operation of law or otherwise. A request for transfer must be made to the Director.

HAR §11-60.1-8 – Reporting Discontinuance

This Section states that within thirty days of permanent discontinuance of the construction, modification, relocation or operation of any noncovered or covered source, the discontinuance shall be reporting in writing to the Director by a responsible official of the source.

§11-60.1-9 – Cancellation of a Noncovered or Covered Source Permit

This Section states that if construction authorized by a covered source permit is not commenced within eighteen months after the covered source permit takes effect, is discontinued for a period of eighteen months or more, or is not completed within a reasonable time, the covered source permit shall become invalid with respect to the authorized construction.

§11-60.1-10 – Permit termination, suspension, reopening and amendment

This Section authorizes the Director, at the Director's sold discretion or on the petition of any permit, to terminate, suspend, reopen or amend any permit if, after affording the permittee an opportunity for a hearing under certain conditions.

§11-60.1-11 – Sampling, testing and reporting

This Section outlines the requirements for sampling and testing and reporting, which must be done in accordance with EPA referenced methods, test procedures approved by the Director.

§11-60.1-14 – Public Access to Information

This Section outlines the information that is considered government records and as such shall be made available for public inspection.

§11-60.1-15 – Reporting of Equipment Shutdown

> This Section outlines, in the case of shutdown of air pollution control equipment for necessary scheduled maintenance, the notification requirements and the conditions of the notification.

§11-60.1-16 – Prompt reporting of deviations

> This Section states that in the event any emission unit, air pollution control equipment, or related equipment malfunctions or breaks down in such a manner as to cause the emission of air pollutants in violation of this chapter or a permit, the owner or operator shall immediately notify the department of the malfunction or breakdown, unless the protection of personnel or public health or safety demands immediate attention to the malfunction or breakdown and makes such notification infeasible.

§11-60.1-19 – Penalties and Remedies

> This Section outlines the penalties and remedies for any person who violates any provision of this chapter, any term or condition of a permit, etc.

Each of the items listed above are potentially applicable to KSL. KSL is currently in compliance with each of the sections of HAR Title 11, Chapter 60.1, Subchapter 1 and is expected to remain compliant upon renewal of its existing CSP. .

8.4.3 HAR Title 11, Chapter 60.1, Subchapter 2 – General Prohibitions

§11-60.1-32 – Visible Emissions

This Section, subsection (b) states that visible emission restrictions for stationary sources which commenced construction, modification, or relocation after March 20, 1972, shall be as follows:

- No person shall cause or permit the emission of visible air pollutants of a density equal to or darker than 20% opacity;
- During start-up, shutdown, or when breakdown of equipment occurs, a person may discharge into the atmosphere from any single source of emission, for a period aggregating not more than six minutes in any sixty minutes, air pollutants of a density not darker than 60% opacity.
- Opacity shall be determined by evaluating opacity of emissions pursuant to 40 CFR Part 60, Appendix A, Method 9 and other EPA approved methods.

§11-60.1-33 – Fugitive Dust

This Section states that no person shall cause or permit visible fugitive dust to become airborne without taking reasonable precautions.

Each of the items listed above are potentially applicable to KSL. KSL is currently in compliance with each of the sections outlined above of HAR Title 11, Chapter 60.1, Subchapter 2 and is expected to remain compliant upon renewal of its existing CSP.

8.4.4 HAR Title 11, Chapter 60.1, Subchapter 5 – Covered Sources

§11-60.1-81 – Definition of Applicable Requirements

Subsection (14) defines the application of BACT, which is required for all pollutants that have the potential to emit or increase emissions above significant amounts considering any limitations, enforceable by the Director, on the covered source to emit a pollutant. To determine what constitutes a significant amount, refer to the definition of "significant" listed in HAR §11-60.1-1. Pursuant to the definition, a "significant: amount is a rate of emissions that would equal or exceed an of the following pollutant and emission rates:

Table 8-1 Emission Summary for BACT

Pollutant	Significant Level (tpy)	Calculated Emissions (tpy)
Carbon Monoxide	100	44.01
Nitrogen Oxides	40	2.35
Sulfur dioxide	40	1.07
PM	25	1.00
PM_{10}	15	1.00
Ozone	40 of VOC or NOx	2.59 (Controlled VOC); 2.35 (NOx)
Lead	0.6	0
Asbestos	0.007	0
Beryllium	0.0004	0
Mercury	0.1	0.00003
Vinyl Chloride	1	0.055
Fluorides	3	0
Sulfuric acid mist	7	0
Total reduced sulfur	10	0.36
Reduced sulfur compounds	10	0

Since the significant level was not exceeded for any of the listed pollutants, a BACT analysis is not required.

§11-60.1-82 – Applicability (Covered Sources)

§11-60.1-84 – Duty to supplement or correct permit applications

This Section requires that an applicant for a covered source permit who fails to submit any relevant facts or who has submitted incorrect information in any permit application shall promptly submit such supplementary facts or corrected information.

§11-60.1-85 – Compliance Plan

This Section requires that a compliance plan be submitted with every initial application for a covered source…application of a covered source permit renewal and application for significant modification to a covered source.

§11`-60.1-86 – Compliance certification of covered sources

This Section requires a compliance certification to be submitted with every initial application for a covered source…application for any covered source permit renewal, and application for a significant modification to a covered source.

§11-60.1-90 – Permit Content

This Section outlines the elements that are to be placed in all covered source permits.

§11-60.1-93 – Federally enforceable permit terms and conditions

Terms and conditions included in a covered source permit, including any provision designed to limit a source's potential to emit, are federally enforceable unless specifically designated as not federally enforceable.

§11-60.1-94 – Transmission of Information to the Administrator

This Section outlines the information to be submitted to the Administrator.

§11-60.1-98 – Permit reopening

This Section describes the conditions allowable for reopening a covered source permit.

§11-60.1-101 – Covered Source Permit Renewal Applications

This Section outlines the information that is required for a covered source permit renewal application. The permit renewal application shall be submitted

to the Director no fewer than twelve months and no more than eighteen months prior to the permit expiration date.

This Subchapter applies to emission unit or control equipment permitting requirements for major sources subject to Title V. The Subchapter outlines the requirements for obtaining a CSP and various requirements. Because the Site has an existing CSP, and has complied with permit conditions, and because the site is renewing the permit through this application, it is expected that the facility will continue to comply with the applicable sections of this Subchapter.

8.4.5 HAR Title 11, Chapter 60.1, Subchapter 6- Fees for Covered Sources, Noncovered Sources and Agricultural Burning

Fees are required for all Covered Source Permits, as well as other types of permits, along with annual fees. KSL is subject to the regulations in this Subchapter and is in compliance with the applicable requirements.

8.4.6 HAR Title 11, Chapter 60.1, Subchapter 7 – Prevention of Significant Deterioration Review

This Subchapter incorporates by reference, provisions of 40 CFR Part 52.21 and applies to owners or operators planning to construct a major stationary source or to make a major modification to such a stationary source. Because the Site complies with the federal regulations, the site is expected to comply with Subchapter 7.

8.4.7 HAR Title 11, Chapter 60.1, Subchapter 8 and Subchapter 9 – NSPS and NESHAPs

§11-60.1-174 – Maximum achievable control technology (MACT emission standards)

§11-60.1-161 – New Source Performance Standards

These two Subchapters incorporate by reference the federal standards for NSPS and NESHAPS. Because the site complies with NSPS and NESHAPS Subpart, including the Subpart ZZZZ as identified in this CSP renewal (as outlined above in the federal rule applicability section) the facility is expected to comply.

8.4.8 HAR Title 11, Chapter 60.1, Subchapter 11 – Greenhouse Gasses

The purpose of this rule is to implement the goals of Act 234, 2007 Hawaii Session Law, which sets a statewide greenhouse gas (GHG) limit to be achieved by 2020. It requires

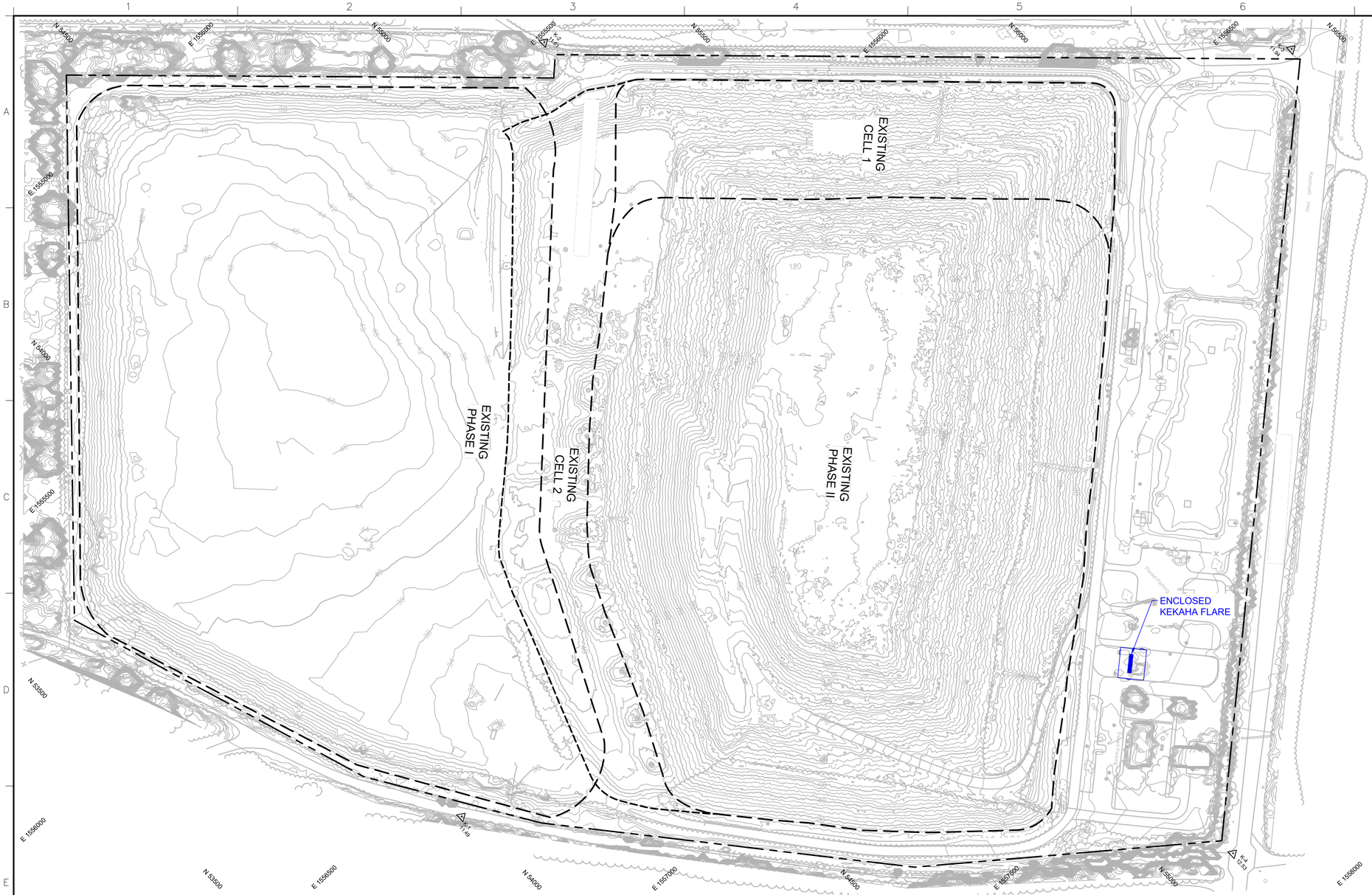
the submission of a GHG emission reduction plan, except for municipal waste combustion operations, for facilities with the potential to emit GHG emissions (biogenic and non-biogenic) equal to or above 100,000 tons per year CO2e. Because GHG emissions for the site are less than 100,000 tons per year CO2e, the preparation of a GHG emission reduction plan is not required.

9. SUMMARY

KSL is requesting the proposed modifications detailed in Section 5, which fit the definition of a minor modification per HAR §11-60.1-81. The criteria used to evaluate if permitting is applicable to the modifications requested in this application are listed below:

- Does not require public participation. (HAR §11-60.1-99).
- Does not result in or increase the emissions of all air pollutant above the permitted emission limits. (HAR §11-60.1-81. (1))
- Does not result in or increase the emissions of any air pollutant for HAP over 500 pounds per year, 5 tons per year of CO, 2 tons per year of other pollutants or 25% of significant amounts of emission as defined in Section 11-60.1-1 (1). (HAR §11-60.1-81(2))
- Does not violate any applicable requirement. (HAR §11-60.1-81. (3))
- Does not involve significant changes to existing monitoring requirements. (HAR §11-60.1-81. (4))
- Does not require or change a case-by-case determination of an emission limitation or other standard, a source-specific determination for temporary sources of ambient impacts, or a visibility or increment analysis. (HAR §11-60.1-81. (5))
- Does not seek to establish or change a permit term or condition for which there is no corresponding underlying applicable requirement. (HAR §11-60.1-81. (6))
- No modification pursuant to any provision of Title I of the Act. (HAR §11-60.1-81. (7))

APPENDIX A
Facility Map and Process Flow Diagram



0 120 240

SCALE IN FEET

LEGEND

- EXISTING GROUND ELEVATION (10-FT AND 2-FOOT CONTOUR) (NOTES 1, 2, AND 3)
- APPROXIMATE PROPERTY LINE (NOTE 5)
- APPROXIMATE PHASES I AND II WASTE LIMIT (NOTE 5)
- APPROXIMATE CELL 2 LIMIT
- △ EXISTING SITE SURVEY BENCHMARK

NOTES:

1. EXISTING GROUND CONTOURS WITHIN PHASE II AND CELL2 PREPARED BY R.M. TOWILL CORPORATION (RMTC) AND BASED ON DRONE SURVEY DATED 05-05-2021. 1.EXISTING GROUND CONTOURS WITHIN PHASE I PREPARED BY AIR FRAME, LLC. AND BASED ON AERIAL SURVEY DATED 03-28.19. EXISTING SITE FEATURES ARE FROM TOPOGRAPHIC MAP PREPARED BY MILLER CREEK AERIAL MAPPING, LLC, DATED 02-24-2015.
2. DRONE SURVEY DATED 05-05-2021 NOT CORRECTED IN AREAS OF VEGETATION.
3. HORIZONTAL DATUM AND COORDINATES ARE BASED ON LOCAL COORDINATE SYSTEM. VERTICAL DATUM AND ELEVATIONS ARE BASED ON LOCAL TIDAL AND SITE SURVEY BENCHMARKS (MSL).
4. EXISTING INFRASTRUCTURE LOCATIONS ARE APPROXIMATE AND DO NOT INCLUDE ALL UNDERGROUND STRUCTURES OR UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR (I) VERIFICATION OF EXISTING CONDITIONS, (II) COORDINATION AND MARKING OF EXISTING UTILITIES PRIOR TO CONSTRUCTION, AND (III) CONTACTING THE HAWAII ONE CALL CENTER (866-423-7287 OR 811) 48 HOURS PRIOR TO EXCAVATION TO MARK OUT UTILITIES.
5. APPROXIMATE PROPERTY LINE AND PHASES I AND II WASTE LIMITS ARE FROM CONSTRUCTION DRAWING C-1 "EXISTING SITE CONDITIONS", PROJECT 6558519 "CELL 2 BASE LINER - PHASE II LATERAL EXPANSION", PREPARED BY AECOM, DATED 09-04-2018.

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

DESIGN BY:	AT
DRAWN BY:	ABK
CHECKED BY:	AT
REVIEWED BY:	MJM
APPROVED BY:	MJM

TITLE: SITE PLAN AND EXISTING TOPOGRAPHY

PROJECT: LANDFILL GAS MANAGEMENT SYSTEM

SITE: KEKAHA MUNICIPAL SOLID WASTE LANDFILL
KEKAHA, COUNTY OF KAUAI, HAWAII

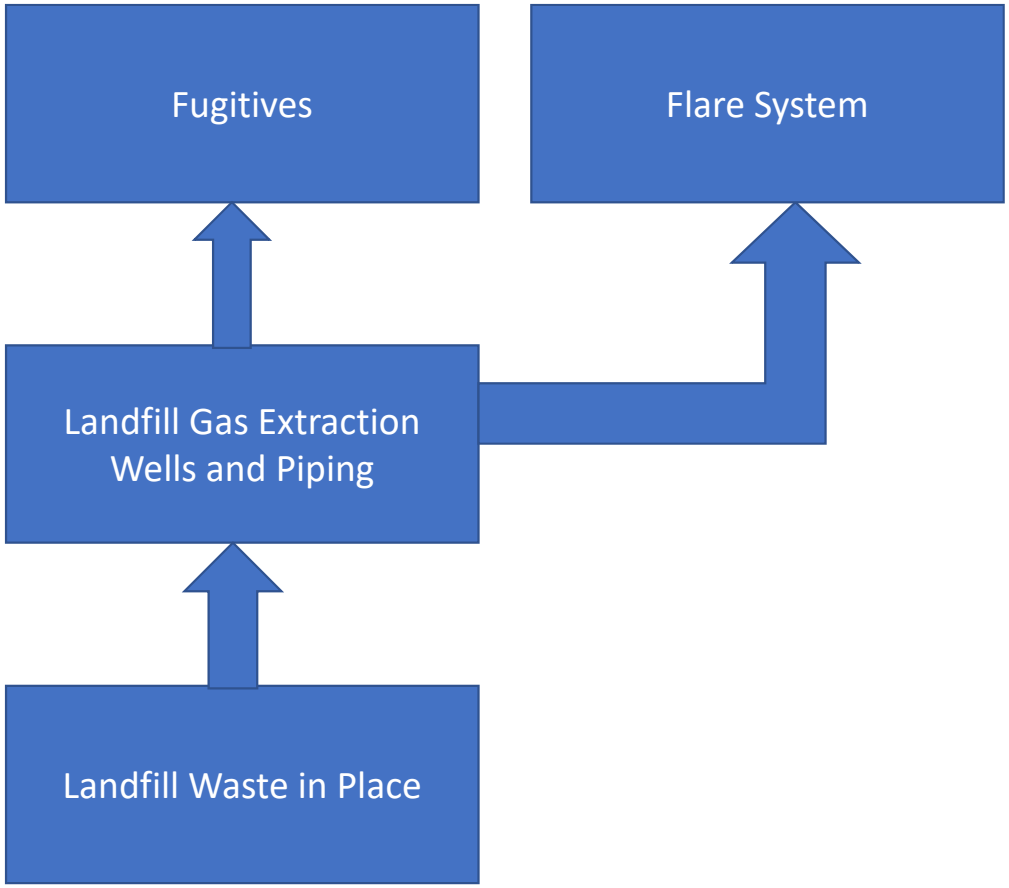
COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION
4444 RICE STREET, SUITE 295
LIHUE, HAWAII 96766
PHONE: 808.241.4841

Geosyntec consultants
1111 BROADWAY, 6TH FLOOR
OAKLAND, CALIFORNIA 94607 USA
PHONE: 510.836.3034

DATE:	SEPTEMBER 2021
PROJECT NO.:	WG2790
FILE:	WG2790-LFG WELLS 4
DRAWING NO.:	1 OF 1

P:\CADD\CIVIL 3D\COUNTY OF KAUAI\WG2790 (HORIZONTAL GAS COLLECTORS)\SHEETS\WG2790-LFG WELLS 4

Process Flow Diagram



APPENDIX B
CSP Application Forms

File No.: _____

C-1: Compliance Plan

The Responsible Official shall submit a Compliance Plan as indicated in the Instructions for Applying for an Air Pollution Control Permit and at such other times as requested by the Director of Health (hereafter, Director).

Use separate sheets of paper if necessary.

---

1. Compliance status with respect to all Applicable Requirements:

   Will your facility be in compliance, or is your facility in compliance, with all applicable requirements in effect at the time of your permit application submittal?

   [x] YES {If YES, complete items a and c below}

   [ ] NO {If NO, complete items a, b, and c below}

   a. Identify all applicable requirement(s) for which compliance is achieved.
   All applicable requirements for the compliance is subject to current CSP Permit Conditions.

   Provide a statement that the source is in compliance and will continue to comply with all such requirements.
   The emission source is in compliance and will continue to comply with all such requirements listed in current CSP Permit and with the requirements outlined in this CSP renewal application at the time of application submittal .

   b. Identify all applicable requirement(s) for which compliance is NOT achieved.
   None.

   Provide a detailed Schedule of Compliance Schedule and a description of how the source will achieve compliance with all such applicable requirements.

Description of Remedial Action	Expected Date of Completion
NA	

c. Identify any other applicable requirement(s) with a future compliance date that your source is subject to. These applicable requirements may take effect AFTER permit issuance:

Applicable Requirement	Effective Date	Currently in Compliance?
NA		
40 CFR 60.752(b)(2)(ii)(A)(2) - connect Cell 2 to gas collection system.	2025	YES

If the source is not currently in compliance, provide a Schedule of Compliance and a description of how the source will achieve compliance with all such applicable requirements:

Description of Proposed Action/Steps to Achieve Compliance	Expected Date of Achieving Compliance
NA	

Provide a statement that the source on a timely basis will meet all these applicable requirements:

NA

If the expected date of achieving compliance will NOT meet the applicable requirement's effective date, provide a more detailed description of each remedial action and the expected date of completion:

Description of Remedial Action and Explanation	Expected Date of Completion
NA	

2. Compliance Progress Reports:

a. If a compliance plan is being submitted to remedy a violation, complete the following information:

Frequency of Submittal: _____ (less than or equal to 6 months) Beginning Date: _____

b. Date(s) that the Action described in (1)(b) was achieved:

Remedial Action	Date Achieved
NA	

c. Narrative description of why any date(s) in (1)(b) was not met, and any preventive or corrective measures taken in the interim:

NA

RESPONSIBLE OFFICIAL (as defined in HAR §11-60.1-1)

Name (Last): **Tanigawa** (First): **Troy** (MI): _____

Title: **Acting County Engineer** Phone: **808-241-4993**

Mailing Address: **4444 Rice Street, Suite 275** City: **Lihue**

State: **Hawaii** Zip Code: **96766**

Certification by Responsible Official (pursuant to HAR §11-60.1-4)

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, and any permit issued thereof.

Name (Print/Type): **Troy Tanigawa**

(Signature): _____ Date: _____

Facility Name: **Kekaha Sanitary Landfill**

Location: **6900D Kaumualii Highway**

Permit Number: **0802-01-C**

FOR AGENCY USE ONLY

File/Application No.: _____

Island: _____

Date Received: _____

File No.: _____

C-2: Compliance Certification

The Responsible Official shall submit a Compliance Certification as indicated in the Instructions for Applying for an Air Pollution Control Permit and at such other times as requested by the Director of Health (hereafter, Director).

Complete as many copies of this form as needed. Use separate sheets of paper if necessary.

RESPONSIBLE OFFICIAL (as defined in HAR §11-60.1-1)

Name (Last): **Tanigawa** (First): **Troy** (MI): _____

Title: **Acting County Engineer** Phone: **808-241-4993**

Mailing Address: **4444 Rice Street, Suite 275**

City: **Lihue** State: **HI** Zip Code: **96766**

Certification by Responsible Official (pursuant to HAR §11-60.1-4)

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, and any permit issued thereof.

Name (Print/Type): **Troy Tanigawa**

(Signature): _____ Date: _____

Facility Name: **Kekaha Sanitary Landfill**
Location: **6900D Kaumualii Highway, Kekaha, HI, 96752**
Permit Number: **0802-01-C**

FOR AGENCY USE ONLY

File/Application No.: _____

Island: _____

Date Received: _____

Complete the following information for ***each*** applicable requirement that applies to ***each*** emissions unit at the source. Also include any additional information as required by the Director. The compliance certification may reference information contained in a previous compliance certification submittal to the Director, provided such referenced information is certified as being current and still applicable.

1. Schedule for submission of Compliance Certifications during the term of the permit:

   Frequency of Submittal: _____Every 1 years_____Beginning Date: _09/10/2019___

2. Emissions Unit No./Description: _____1, Flare_____

3. Identify the applicable requirement(s) that is/are the basis of this certification: s

   The applicable requirements that compliances with are listed below:

   1. 40 CFR Part 60, Subpart A
   2. 40 CFR Part 60, Subpart WWW
   3. 40 CFR Part 63, Subpart A
   4. 40 CFR Part 63, Subpart AAAA

4. Compliance status:

   a. Will the emissions unit be in compliance with the identified applicable requirement(s)?

      [X] YES [ ] NO

   b. If YES, will compliance be continuous or intermittent?

      [X] Continuous [ ] Intermittent

   c. If NO, explain:

      _____

      _____

      _____

      _____

      _____

5. Describe the methods to be used in determining compliance of the emissions unit with the applicable requirement(s), including any monitoring, recordkeeping, reporting requirements, and/or test methods:

Compliance with the Initial Permit Conditions, Section F-Recordkeeping and Reporting Requirements.

Monthly wellhead monitoring, quarterly surface emission monitoring, continuous flare temperature and flow monitoring, monthly visible emission evaluation, annual flare performance test, recordkeeping and semi-annual and annual reporting.

Provide a detailed description of the methods used to determine compliance (e.g. monitoring device type and location, test method description, or parameter being recorded, frequency of recordkeeping, etc.):

Compliance with the Initial Permit Condition, Section F-H.

6. Statement of Compliance with Enhanced Monitoring and Compliance Certification Requirements.

a. Will the emissions unit identified in this application be in compliance with applicable enhanced monitoring and compliance certification requirements?

☐ YES ☒ NO

b. If YES, identify the requirements and the provisions being taken to achieve compliance:

c. If NO, describe below which requirements will not be met:

Site not subject to enhance monitoring requirement

File/Application No.: _____

S-1: Standard Air Pollution Control Permit Application Form

(Covered Source Permit and Noncovered Source Permit)

State of Hawaii
Department of Health
Environmental Management Division
Clean Air Branch
P.O. Box 3378 • Honolulu, HI 96801-3378 • Phone: (808) 586-4200

1. Company Name: County of Kauai, Department of Public Works

2. Facility Name (if different from the Company): Kekaha Sanitary Landfill

3. Mailing Address: 4444 Rice Street, Suite 275

   City: Lihue State: HI Zip Code: 96766

   Phone Number: 808-241-4992

4. Name of Owner/Owner's Agent: Troy Tanigawa

   Title: Acting County Engineer Phone: 808-241-4993

   Mailing Address: 4444 Rice Street, Suite 275

   City: Lihue State: HI Zip Code: 96766

5. Plant Site Manager/Other Contact: Allison Fraley

   Title: Solid Waste Programs Coordinator Phone: 808-241-4837

   Mailing Address: 4444 Rice Street, Suite 275

   City: Lihue State: HI Zip Code: 96766

6. Permit Application Basis: (Check all applicable categories.)

   ☐ Initial Permit for a New Source ☐ Initial Permit for an Existing Source

   ☒ Renewal of Existing Permit ☐ General Permit

   ☐ Temporary Source ☐ Transfer of Permit

   ☒ Modification to a Covered Source: ➔ Is Modification? ☐ Significant ☒ Minor ☐ Uncertain

   ☐ Modification to a Noncovered Source

7. If renewal or modification, include existing permit number: 0802-01-C

8. Does the Proposed Source require a County Special Management Area Permit? ☐ Yes ☒ No

9. Type of Source (Check One): ☒ Covered Source ☐ Covered and PSD Source

   ☐ Noncovered Source ☐ Uncertain

10. Standard Industrial Classification Code (SICC), if known: 4953

11. Proposed Equipment/Plant Location (e.g. street address): 6900D Kaumualii Highway

City: Kekaha State: HI Zip Code: 96752

UTM Coordinates (meters): East: 422543.91 North: 2431070.02

UTM Zone: 4Q UTM Horizontal Datum: ☐ Old Hawaiian ☐ NAD-27 ☒ NAD-83

12. General Nature of Business: Municipal Solid Waste Landfill

13. Date of Planned Commencement of Construction or Modification: NA

14. Is ***any*** of the equipment to be leased to another individual or entity? ☐ Yes ☒ No

15. Type of Organization: ☐ Corporation ☐ Individual Owner ☐ Partnership

☒ Government Agency (Government Facility Code: _____)

☐ Other: _____

Any applicant for a permit who fails to submit any relevant facts or who has submitted incorrect information in any permit application shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. In addition, an applicant shall provide additional information as necessary to address any requirements that become applicable to the source after the date it filed a complete application, but prior to the issuance of the noncovered source permit or release of a draft covered source permit. (HAR §11-60.1-64 & 11-60.1-84)

RESPONSIBLE OFFICIAL (as defined in HAR §11-60.1-1)

Name (Last): Tanigawa (First): Troy (MI): _____

Title: Acting County Engineer Phone: 808-241-4993

Mailing Address: 4444 Rice Street, Suite 295

City: Lihue State: Hawaii Zip Code: 96766

Certification by Responsible Official (pursuant to HAR §11-60.1-4)

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1, Air Pollution Control, and any permit issued thereof.

NAME (Print/Type): Troy Tanigawa

(Signature): _____ Date: _____

FOR AGENCY USE ONLY:

File/Application No.: _____

Island: _____

Date Received: _____

Submit the following documents as part of your application:

A. The ***Emissions Units Table***, filled in as completely as possible. Use separate sheets of paper as needed. General instructions include the following:

1. Identify each **emission point** with a unique number for this plant site, consistent with emission point identification used on the location drawing and previous permits; if known, provide the SICC number. Emission points shall be identified and described in sufficient detail to establish the basis for **fees** and applicability of requirement of HAR, Chapter 11-60.1. Examples of emission point names are: heater, vent, boiler, tank, baghouse, fugitive, etc. Abbreviations may be used.
   a. For each emission point use as many lines as necessary to list regulated and hazardous air pollutant data. For hazardous air pollutants, also list the Chemical Abstracts Service number (CAS#).
   b. Indicate the emission points that discharge together for any length of time.
   c. The **Equipment Date** is the date of equipment construction, reconstruction, or modification. Provide supporting documentation.

2. State the **maximum emission rates** in terms sufficient to establish compliance with the applicable requirements and standard reference test methods. Provide all supporting emission calculations and assumptions:
   a. Include all regulated and hazardous air pollutants and air pollutants for which the source is major, as defined in HAR §11-60.1-1. Examples of regulated pollutant names are: Carbon Monoxide (CO), Nitrogen Oxides (NO_X), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOC), particulate matter (PM), and particulate less than 10 microns (PM_{10}). Abbreviations may be used.
   b. Include fugitive emissions.
   c. **Pounds per hour (#/HR**) is the maximum potential emission rate expected by applicant.
   d. **Tons per year** is the annual maximum potential emissions expected by the applicant, taking into account the typical operating schedule.

3. Describe ***Stack Source Parameters***:
   a. **Stack Height** is the height above the ground.
   b. **Direction** refers to the exit direction of stack emissions: up, down or horizontal.
   c. **Flow Rate** is the actual, not the calculated, flow rate.

4. Provide any additional information, if applicable, as follows:
   a. If combinations of different fuels are used that cause any of the stack source parameters to differ, complete one row for each possible set of stack parameters and identify each fuel in the **Equipment Description**.
   b. For a rectangular stack, indicate the length and width.
   c. Provide any information on stack parameters or any stack height limitations developed pursuant to Section 123 of the Clean Air Act.

B. A **process flow diagram** identifying all equipment used in the process, including the following:
1. Identify and describe each emission point.
2. Identify the locations of safety valves, bypasses, and other such devices which when activated may release air pollutants to the atmosphere.

C. A **facility location map**, drawn to a reasonable scale and showing the following:
1. The property involved and all structures on it. Identify property/fence lines plainly.
2. Layout of the facility.
3. Location and identification of the proposed emissions unit on the property.
4. Location of the property and equipment with respect to streets and all adjacent property. Show the location of all structures within 100 meters of the applicant's emissions unit. Provide the building dimensions (height, length, and width) of all structures that have heights greater than 40% of the stack height of the emissions unit.

D. Provide a description of any proposed modifications or permit revisions. Include any justification or supporting information for the proposed modifications or permit revisions.

Company Name: County of Kauai, Department of Public Works

File No.: _____

Location: 6900D Kaumualii Highway, Kekaha, Hawaii.

(Make as many copies of this page as necessary)

EMISSIONS UNITS TABLE

Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

AIR POLLUTANT DATA: EMISSION POINTS				AIR POLLUTANT	AIR POLLUTANT EMISSION RATE		UTM Zone: ____ Horizontal Datum [a]: ____		STACK SOURCE PARAMETERS						
Stack No.	Unit No.	Equipment Name/ Description & SICC number	Equipment Date	Regulated/ Hazardous Air Pollutant Name & CAS#	#/ HR	Tons/ YR	Coordinates (mtrs)		Stack Height (mtrs)	Direction (u/d/h) [b]	Inside Diameter (mtrs)	Velocity (m/s)	Flow Rate (m^3/s)	Temp. (^{o} K)	Capped (Y/N)
1	1	Flare	December 6, 2016	1. NO2, CAS: 10102-44-0 2. CO, CAS: 7440-48-4 3. PM25., CAS: NA 4. SO2, CAS: 7446-09-5 5. VOC, CAS: NA	1. 0.54 2. 10.05 3. 0.23 4. 0.24 5. 0.17	1. 2.35 2. 44.01 3. 1.00 4. 1.07 5. 0.76	East	1557330.3061	12.4	upward	1.835	0.93	2.45	1114.82	Y
							North	55271.7638							
2	2	Fugtive Emissions	NA	1. VOC, CAS: NA	1. 0.42	1. 1.83	East	NA	NA	NA	NA	NA	NA	NA	NA
							North	NA							
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								
							East								
							North								

[a] **Specify UTM Horizontal Datum as Old Hawaiian, NAD-83, or NAD-27**

[b] **Specify the direction of the stack exhaust as u = upward, d = downward, or h = horizontal**

File No.: _____

S-3: Application for a Covered Source Permit Renewal

Each application for permit renewal shall be submitted to the Director of Health, (hereafter, Director) a minimum of **twelve months** prior to the date of permit expiration. In providing the required information, please reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-101, the following information is required:

A. Statement certifying that no changes have been made in the design or operation of the source as proposed in the initial and any subsequent Covered Source Permit applications. If changes have occurred or are being proposed, the applicant shall provide a description of those changes such as work practices, operations, equipment design, and monitoring procedures, including the affected applicable requirements associated with the changes and the corresponding information to determine the applicability of all applicable requirements.

B. Equipment Specifications:
1. Maximum design capacity.
2. Fuel type.
3. Fuel use.
4. Production capacity.
5. Production rates.
6. Raw materials.
7. Provide any manufacturer's literature.

C. Provide detailed descriptions of all processes and products defined by Standard Industrial Classification Code (SICC). Also, provide any reasonably anticipated alternative operating scenarios, associated processes, and products, by SICC.
1. Identify and describe in detail all air pollution control equipment and compliance monitoring devices or activities, and to the extent of available information, an estimate of emissions before and after controls. Provide all calculations and assumptions.
2. List all ***insignificant*** activities in accordance with HAR §11-60.1-82.

D. Maximum Operating Schedule (to the extent needed to determine or regulate emissions):
1. Total hours per day, per week, and/or per month.
2. Total hours per year.
3. If operation is seasonal or irregular, describe.

E. Cite and describe all applicable requirements as defined in HAR §11-60.1-81, including the following:
   1. Description of or reference to any applicable test methods for determining compliance with each applicable requirement.
   2. Explanation of all proposed exemptions from any applicable requirements.

F. Identify and describe current operational limitations or work practices that affect emissions of any regulated or hazardous air pollutant. Provide all calculations and assumptions.

G. For ***new*** covered sources and ***significant*** modifications which increase the emissions of any air pollutant or result in the emission of any air pollutant not previously emitted, an assessment of the ambient air quality impact of the covered source or significant modification, with the inclusion of any available background air quality data. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the NAAQS and SAAQS.

H. For ***new*** covered sources and ***significant*** modifications subject to the requirements of subchapter 7 of HAR Chapter 11-60.1, all analyses, assessments, monitoring, and other application requirements of subchapter 7.

I. Provide detailed information to define permit terms and conditions for any proposed ***emissions trading*** within the facility in accordance with HAR §11-60.1-96.

J. Provide the following for Compliance purposes:
   1. A Compliance Plan, Form C-1.
   2. A Compliance Certification, Form C-2.

II. Submit an application fee according to the Application Fee Schedule in the Instructions for Applying for an Air Pollution Control Permit.

III. Provide other information as follows:

A. As required by any applicable requirement or as requested and deemed necessary by the Director to make a decision on the application.

B. As may be necessary to implement and enforce other applicable requirements of the Clean Air Act or of HAR Chapter 11-60.1 or to determine the applicability of such requirements.

IV. The Director reserves the right to request the following information:

A. An assessment of the ambient air quality impact of the source or modification. The assessment shall include all supporting data, calculations and assumptions, and a comparison with the National Ambient Air Quality Standards and State Ambient Air Quality Standards.

B. A risk assessment of the air quality related impacts caused by the covered source or significant modification to the surrounding environment.

C. Results of source emissions testing, ambient air quality monitoring, or both.

D. Information on other available control technologies.

V. An application shall be determined to be complete only when all of the following have been complied with:

A. All information required or requested in numbers **I, III, and IV** has been submitted.

B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.

C. All applicable fees have been submitted.

D. The Director has certified that the application is complete.

VI. The Director shall not continue to act upon or consider an incomplete application.

A. The applicant shall be notified in writing whether the application is complete. Unless the Director requests additional information or notifies the applicant of incompleteness within sixty days of receipt of an application, the application shall be deemed complete.

B. During the processing of an application that has been determined or deemed complete, if the Director determines that additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response. As set forth in HAR §11-60.1-82, the covered source's ability to operate and the validity of the Covered Source Permit shall continue beyond the permit expiration date until the final permit is issued or denied, provided the applicant submits all additional information within the reasonable deadline specified by the Director.

VII. After receipt of a complete application, the Director, in writing, shall approve, conditionally approve, or deny an application:

A. Within twelve months, ***except*** for applications for renewal for coverage under a covered source general permit. If the application for renewal has not been approved or denied within twelve months, the Covered Source Permit and all its terms and conditions shall remain in effect and not expire until the application for renewal has been approved or denied and provided the applicant has submitted any additional information within the reasonable deadline specified by the Director.

B. Within six months for applications for renewal requesting coverage under a covered source general permit. If the application for renewal has not been approved or denied within six months, the coverage under the covered source general permit and all its terms and conditions shall remain

in effect and not expire until the application for renewal has been approved or denied and provided the applicant has submitted any additional information within the reasonable deadline specified by the Director.

VIII. A Covered Source Permit renewal application shall be approved only if the Director determines that the operation of the covered source will be in compliance with all applicable requirements.

IX. The Director shall provide for public notice, including the method by which a public hearing can be requested, and an opportunity for public comment on the draft Covered Source Permit renewal in accordance with HAR §11-60.1-99.

X. The Director shall provide a statement that sets forth the legal and factual bases for the draft permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.

XI. Each application for renewal and proposed Covered Source Permit shall be subject to EPA oversight in accordance with HAR §11-60.1-95.

File No.: _____

S-7: Application for a Minor Modification to a Covered Source

In providing the required information, reference the corresponding letters and numbers listed below.

Provide a minimum of **two (2)** sets (1 original and 1 copy) of all application materials to the Hawaii Department of Health. Also, mail **one (1)** set directly to EPA at the following address:

Chief (Attention: AIR-3)
Permits Office, Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

I. In accordance with Hawaii Administrative Rules (HAR) §11-60.1-103, the following information is required:

A. A clear description of all changes.

B. A statement of why the modification is determined to be minor, and a request that minor modification procedures be used.

C. Cite and describe any new applicable requirements as defined in HAR §11-60.1-81 that will apply if the minor modification occurs.

D. The suggested changes to permit terms or conditions.

E. Certification by a responsible official that the proposed modification meets the criteria for minor modification.

F. All information submitted with the application for the Initial Covered Source Permit or any subsequent application for a Covered Source Permit. The owner or operator may reference information contained in a previous application submittal, provided such referenced information has been certified as being current and still applicable.

G. Other information, as required by any applicable requirement or as requested and deemed necessary by the Director of Health (hereafter, Director) to make a decision on the application.

II. Submit an application fee according to the Application Fee Schedule in the Instructions for Applying for an Air Pollution Control Permit.

III. An application shall be determined to be complete only when all of the following have been complied with:

A. All information required or requested in number **I** have been submitted.

B. All documents requiring certification have been certified pursuant to HAR §11-60.1-4.

C. All applicable fees have been submitted.

D. The Director has certified that the application is complete.

IV. The Director shall not continue to act upon or consider an incomplete application.

A. The applicant shall be notified in writing whether the application is complete. Unless the Director requests additional information or notifies the applicant of incompleteness within thirty days of receipt of an application, the application shall be deemed complete.

B. During the processing of an application that has been determined or deemed complete, if the Director determines that additional information is necessary to evaluate or take final action on the application, the Director may request such information in writing and set a reasonable deadline for a response.

V. Within ninety days of receipt of a complete application for a minor modification, or upon program approval, within fifteen days after the end of the Administrator's forty-five-day review period, whichever is later, the Director in writing shall:

A. Amend the permit to reflect the minor modification as proposed.

B. Deny the minor modification.

C. Determine that the requested modification does not meet the minor modification criteria, and should be reviewed under the significant modification procedures; or

D. Upon program approval, amend the proposed permit and resubmit the amendment to EPA for reevaluation.

VI. An application for a minor modification to a covered source shall be approved only if the Director determines that the minor modification will be in compliance with all applicable requirements.

VII. The Director shall provide a statement that sets forth the legal and factual bases for the proposed permit conditions (including references to the applicable statutory or regulatory provisions) to EPA and any other person requesting it.

VIII. Each application and proposed permit reflecting the minor modification to a covered source shall be subject to EPA oversight in accordance with HAR §11-60.1-95.

APPENDIX C
Potential to Emit Emission Calculations

Flare Emissions

1. Criteria Pollutant Emissions

Maximum LFG Flow Rate, scfm	656	*From LandGEM Model; The closure year is 2027, but the maximum LFG gas flow rate occurs in 2028.*
Methane Fraction, %	42.80	*2021 GHG Report*
Methane to Flare, scfm	223	*Calculated: Maximum LFG Gas Flow Rate * Methane Fraction% * GCCS Collection Efficiency*
Flare Destruction Efficiency	0.92	*From Annual Flare Test Report 2021*
Collection Efficiency of GCCS	0.80	*2021 GHG Report*
Volume of Collected Landfill Gas, scfm	521.75	*Calculated: Maximum LFG Gas Flow Rate * GCCS Collection Efficiency*

Pollutant	Emission Factor	Units	lbs/hr	(ton/yr)
NO2	40.00	lb/10^6 dscf Methane	0.54	2.35
CO	750.00	lb/10^6 dscf Methane	10.05	44.01
PM2.5 [b]	17.00	lb/10^6 dscf Methane	0.23	1.00
SO2	7.79	lb/10^6 scf landfill gas	0.24	1.07
VOC	51.90	lb/10^6 scf landfill gas	0.17	0.76

Notes:

Emission Factors

a. NO2, PM and CO emission factors obtained from AP-42, Table 2.4.5 (11/98)

b. Pursuant to Table 2.4.5, footnote b; PM=PM10=PM25.

c. VOC was calculated based on the 98% of flare destruction efficiency.

d. NMOC EF	133.08	lb/10^b scf LFG	NMOC ppmv * 86.18 lb/lb-mol /385.3 scf/lb-mol
e. VOC EF	51.90	lb/10^6 scf LFG	VOC = 39% NMOC, AP-42, Table 2.4-2
f. SO2 EF	7.79	lb/10^6 scf LFG	Sulfur ppmv * 64.06 lb/lb-mol /385.3 scf/lb-mol

g. Collection Efficiency is 80% obtained from 2021 GHG report, covers all the areas of the LFG.

Emission Calculations

h. VOC emission is from flare emission

i. NOx, CO, SO2, and PM are flare emissions and do not include fugitive emissions

j. NOx (ton/yr) = EF (lb/106 scf CH4) * (CH4 to flare (scfm)*525,600 minutes/yr) * (1 ton/2000 lb)

k. CO (ton/yr) = EF (lb/106 scf CH4) * (CH4 to flare(scfm)*525,600 minutes/yr)* (1 ton/2000 lb)

l. PM2.5 (ton/yr) = EF (lb/106 scf CH4) * (CH4 to flare(scfm)*525,600 minutes/yr) * (1 ton/2000 lb)

m. SO2 (ton/yr) = EF (lb/106 scf LFG) * (LFG to flare (scfm)*525,600 minutes/yr) * (1 ton/2000 lb)

n. Flare VOC (ton/yr) = EF (lb/106 scf LFG) * (LFG to flare (scfm)*525,600 minutes/yr) * (1 ton/2000 lb)*(1-Flare Destruction)

2. HAP Emissions							
Pollutant	**Concentration (ppmv)**	**Molecular Weight**	**Total Landfill Gas Flow Rate (m^3/yr)**	**Volume of the Gas (m^3/yr)**	**Mass of Gas (tpy)**	**Emissions Rates**	
						Hourly (lb/hr)	**Annual (tpy)**
1,1,1-Trichloroethane (methyl chloroform) - HAP	4.80E-01	1.33E+02	9.76E+06	4.68E+00	2.82E-02	4.35E-04	1.91E-03
1,1,2,2-Tetrachloroethane - HAP/VOC	1.10E+00	1.68E+02	9.76E+06	1.07E+01	8.12E-02	1.25E-03	5.49E-03
1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.40E+00	9.90E+01	9.76E+06	2.34E+01	1.04E-01	1.61E-03	7.07E-03
1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	2.00E-01	9.69E+01	9.76E+06	1.95E+00	8.53E-03	1.32E-04	5.77E-04
1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	4.10E-01	9.90E+01	9.76E+06	4.00E+00	1.78E-02	2.76E-04	1.21E-03
1,2-Dichloropropane (propylene dichloride) - HAP/VOC	1.80E-01	1.13E+02	9.76E+06	1.76E+00	8.95E-03	1.38E-04	6.05E-04
Acrylonitrile - HAP/VOC	6.30E+00	5.31E+01	9.76E+06	6.15E+01	1.47E-01	2.27E-03	9.95E-03
Benzene - No or Unknown Co-disposal - HAP/VOC	1.90E+00	7.81E+01	9.76E+06	1.85E+01	6.53E-02	1.01E-03	4.42E-03
Benzene - Co-disposal - HAP/VOC	1.10E+01	7.81E+01	9.76E+06	1.07E+02	3.78E-01	5.84E-03	2.56E-02
Carbon disulfide - HAP/VOC	5.80E-01	7.61E+01	9.76E+06	5.66E+00	1.94E-02	3.00E-04	1.31E-03
Carbon tetrachloride - HAP/VOC	4.00E-03	1.54E+02	9.76E+06	3.90E-02	2.71E-04	4.18E-06	1.83E-05
Carbonyl sulfide - HAP/VOC	4.90E-01	6.01E+01	9.76E+06	4.78E+00	1.29E-02	2.00E-04	8.76E-04
Chlorobenzene - HAP/VOC	2.50E-01	1.13E+02	9.76E+06	2.44E+00	1.24E-02	1.91E-04	8.37E-04
Chloroethane (ethyl chloride) - HAP/VOC	1.30E+00	6.45E+01	9.76E+06	1.27E+01	3.69E-02	5.70E-04	2.50E-03
Chloroform - HAP/VOC	3.00E-02	1.19E+02	9.76E+06	2.93E-01	1.58E-03	2.43E-05	1.07E-04
Dichlorobenzene - (HAP for para isomer/VOC)	2.10E-01	1.47E+02	9.76E+06	2.05E+00	1.36E-02	2.10E-04	9.19E-04
Dichloromethane (methylene chloride) - HAP	1.40E+01	8.49E+01	9.76E+06	1.37E+02	5.23E-01	8.08E-03	3.54E-02
Ethylbenzene - HAP/VOC	4.60E+00	1.06E+02	9.76E+06	4.49E+01	2.15E-01	3.32E-03	1.45E-02
Ethylene dibromide - HAP/VOC	1.00E-03	1.88E+02	9.76E+06	9.76E-03	8.26E-05	1.28E-06	5.59E-06
Hexane - HAP/VOC	6.60E+00	8.62E+01	9.76E+06	6.44E+01	2.50E-01	3.86E-03	1.69E-02
Mercury (total) - HAP	2.90E-04	2.01E+02	9.76E+06	2.83E-03	2.56E-05	4.65E-06	2.04E-05
Methyl isobutyl ketone - HAP/VOC	1.90E+00	1.00E+02	9.76E+06	1.85E+01	8.37E-02	1.29E-03	5.66E-03
Perchloroethylene (tetrachloroethylene) - HAP	3.70E+00	1.66E+02	9.76E+06	3.61E+01	2.70E-01	4.17E-03	1.83E-02
Toluene - No or Unknown Co-disposal - HAP/VOC	3.90E+01	9.21E+01	9.76E+06	3.81E+02	1.58E+00	2.44E-02	1.07E-01
Toluene - Co-disposal - HAP/VOC	1.70E+02	9.21E+01	9.76E+06	1.66E+03	6.89E+00	1.06E-01	4.66E-01
Trichloroethylene (trichloroethene) - HAP/VOC	2.80E+00	1.31E+02	9.76E+06	2.73E+01	1.62E-01	2.50E-03	1.09E-02
Vinyl chloride - HAP/VOC	7.30E+00	6.25E+01	9.76E+06	7.12E+01	2.01E-01	3.10E-03	1.36E-02
Xylenes - HAP/VOC	1.20E+01	1.06E+02	9.76E+06	1.17E+02	5.60E-01	8.65E-03	3.79E-02
					Total	**1.80E-01**	**7.90E-01**

NMOC	595.00	8.62E+01	9.76E+06	5.81E+03	2.26E+01	3.05E+03	1.53E+00
Reduced Sulfur (SO2)	4.69E+01	6.40E+01	9.76E+06	4.58E+02	1.32E+00	1.79E+02	8.93E-02

Notes:

1. Concentration and Molecular weight are obtained from LandGEM model.

Fugitive Emissions

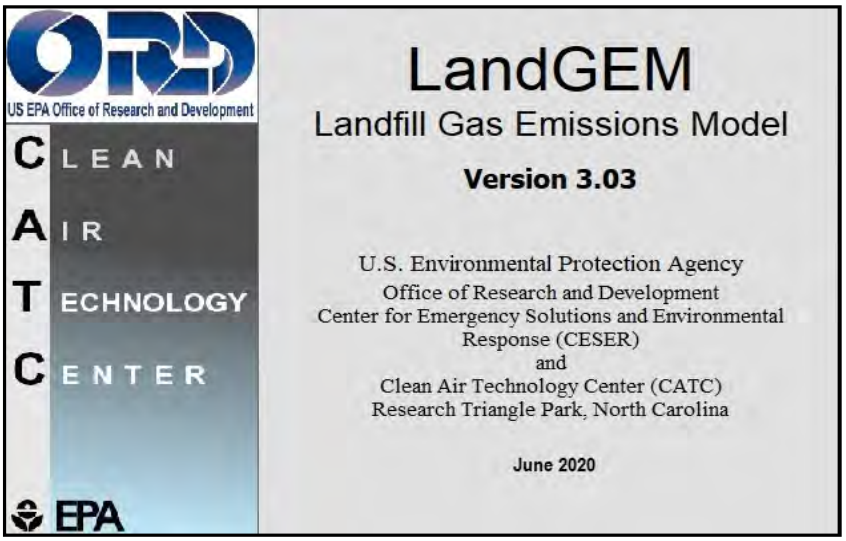
1. Criteria Pollutant Emissions

Maximum LFG Flow Rate, scfm	656	*From LandGEM Model; The closure year is 2027, but the maximum LFG gas flow rate occurs in 2028*
Collection Efficiency of GCCS	0.80	*2021 GHG Report*
Emissions of Uncollected Landfill Gas, scfm	134	*Calculated: Total emissions of Landfill gas * (1-GCCS Collection Efficiency)*

Pollutant	Emission Factor	Units	lbs/hr	(ton/yr)
VOC	51.90	lb/10^6 scf landfill gas	4.17E-01	1.83

2. HAP Emissions

Pollutant	Concentration (ppmv)	Molecular Weight	Total Landfill Gas Flow Rate (m^3/yr)	Volume of the Gas (m^3/yr)	Mass of Gas (tpy)	Emissions Rates	
						Hourly (lb/hr)	Annual (tpy)
1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41	9.76E+06	4.68	2.82E-02	1.31E-03	5.75E-03
1,1,2,2-Tetrachloroethane - HAP/VOC	1.10	167.85	9.76E+06	10.73	8.12E-02	3.79E-03	1.66E-02
1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.40	98.97	9.76E+06	23.42	1.04E-01	4.87E-03	2.13E-02
1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94	9.76E+06	1.95	8.53E-03	3.98E-04	1.74E-03
1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96	9.76E+06	4.00	1.78E-02	8.32E-04	3.64E-03
1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99	9.76E+06	1.76	8.95E-03	4.17E-04	1.83E-03
Acrylonitrile - HAP/VOC	6.30	53.06	9.76E+06	61.47	1.47E-01	6.85E-03	3.00E-02
Benzene - No or Unknown Co-disposal - HAP/VOC	1.90	78.11	9.76E+06	18.54	6.53E-02	3.04E-03	1.33E-02
Benzene - Co-disposal - HAP/VOC	11.00	78.11	9.76E+06	107.33	3.78E-01	1.76E-02	7.72E-02
Carbon disulfide - HAP/VOC	0.58	76.13	9.76E+06	5.66	1.94E-02	9.05E-04	3.97E-03
Carbon tetrachloride - HAP/VOC	0.00	153.84	9.76E+06	0.04	2.71E-04	1.26E-05	5.53E-05
Carbonyl sulfide - HAP/VOC	0.49	60.07	9.76E+06	4.78	1.29E-02	6.04E-04	2.64E-03
Chlorobenzene - HAP/VOC	0.25	112.56	9.76E+06	2.44	1.24E-02	5.77E-04	2.53E-03
Chloroethane (ethyl chloride) - HAP/VOC	1.30	64.52	9.76E+06	12.68	3.69E-02	1.72E-03	7.53E-03
Chloroform - HAP/VOC	0.03	119.39	9.76E+06	0.29	1.58E-03	7.34E-05	3.22E-04
Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147.00	9.76E+06	2.05	1.36E-02	6.33E-04	2.77E-03
Dichloromethane (methylene chloride) - HAP	14.00	84.94	9.76E+06	136.60	5.23E-01	2.44E-02	1.07E-01
Ethylbenzene - HAP/VOC	4.60	106.16	9.76E+06	44.88	2.15E-01	1.00E-02	4.39E-02
Ethylene dibromide - HAP/VOC	0.00	187.88	9.76E+06	0.01	8.26E-05	3.85E-06	1.69E-05
Hexane - HAP/VOC	6.60	86.18	9.76E+06	64.40	2.50E-01	1.17E-02	5.11E-02
Mercury (total) - HAP	0.00	200.61	9.76E+06	0.00	2.56E-05	1.19E-06	5.22E-06
Methyl isobutyl ketone - HAP/VOC	1.90	100.16	9.76E+06	18.54	8.37E-02	3.90E-03	1.71E-02
Perchloroethylene (tetrachloroethylene) - HAP	3.70	165.83	9.76E+06	36.10	2.70E-01	1.26E-02	5.51E-02
Toluene - No or Unknown Co-disposal - HAP/VOC	39.00	92.13	9.76E+06	380.54	1.58E+00	7.37E-02	3.23E-01
Toluene - Co-disposal - HAP/VOC	170.00	92.13	9.76E+06	1658.77	6.89E+00	3.21E-01	1.41E+00
Trichloroethylene (trichloroethene) - HAP/VOC	2.80	131.40	9.76E+06	27.32	1.62E-01	7.54E-03	3.30E-02
Vinyl chloride - HAP/VOC	7.30	62.50	9.76E+06	71.23	2.01E-01	9.35E-03	4.10E-02
Xylenes - HAP/VOC	12.00	106.16	9.76E+06	117.09	5.60E-01	2.61E-02	1.14E-01
					Total	**5.44E-01**	**2.38E+00**
NMOC	595.00	86.18	9.76E+06	5805.69	2.26E+01	1.05E+00	4.61E+00
Reduced Sulfur (SO2)	46.90	64.00	9.76E+06	457.63	1.32E+00	6.15E-02	2.70E-01



Summary Report

Landfill Name or Identifier: Kekaha Sanitary Landfill

Date: Wednesday, March 16, 2022

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate ($year^{-1}$)
L_0 = potential methane generation capacity (m^3/Mg)
M_i = mass of waste accepted in the i^{th} year (Mg)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1960**	
Landfill Closure Year (with 80-year limit)	**2027**	
Actual Closure Year (without limit)	***2027***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity		*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.020**	$year^{-1}$
Potential Methane Generation Capacity, L_0	**100**	m^3/Mg
NMOC Concentration	**595**	*ppmv as hexane*
Methane Content	**43**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1960	20,708	22,779	0	0
1961	20,708	22,779	20,708	22,779
1962	20,708	22,779	41,417	45,559
1963	20,708	22,779	62,125	68,338
1964	20,708	22,779	82,834	91,117
1965	20,708	22,779	103,542	113,896
1966	20,708	22,779	124,251	136,676
1967	20,708	22,779	144,959	159,455
1968	20,708	22,779	165,668	182,234
1969	20,708	22,779	186,376	205,014
1970	20,708	22,779	207,084	227,793
1971	20,708	22,779	227,793	250,572
1972	20,708	22,779	248,501	273,351
1973	20,708	22,779	269,210	296,131
1974	20,708	22,779	289,918	318,910
1975	20,708	22,779	310,627	341,689
1976	20,708	22,779	331,335	364,469
1977	20,708	22,779	352,043	387,248
1978	20,708	22,779	372,752	410,027
1979	20,708	22,779	393,460	432,806
1980	20,708	22,779	414,169	455,586
1981	20,708	22,779	434,877	478,365
1982	20,708	22,779	455,586	501,144
1983	20,708	22,779	476,294	523,924
1984	20,708	22,779	497,003	546,703
1985	20,708	22,779	517,711	569,482
1986	20,708	22,779	538,419	592,261
1987	20,708	22,779	559,128	615,041
1988	20,708	22,779	579,836	637,820
1989	20,708	22,779	600,545	660,599
1990	20,708	22,779	621,253	683,379
1991	20,708	22,779	641,962	706,158
1992	20,708	22,779	662,670	728,937
1993	60,436	66,480	683,379	751,716
1994	60,436	66,480	743,815	818,196
1995	60,436	66,480	804,251	884,676
1996	60,436	66,480	864,688	951,156
1997	60,436	66,480	925,124	1,017,636
1998	60,436	66,480	985,560	1,084,116
1999	60,436	66,480	1,045,997	1,150,596

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2000	69,580	76,538	1,106,433	1,217,076
2001	69,975	76,972	1,176,013	1,293,614
2002	70,170	77,187	1,245,988	1,370,586
2003	76,772	84,449	1,316,158	1,447,773
2004	80,684	88,752	1,392,929	1,532,222
2005	79,235	87,158	1,473,613	1,620,974
2006	83,614	91,975	1,552,848	1,708,132
2007	81,383	89,521	1,636,461	1,800,107
2008	75,002	82,502	1,717,844	1,889,628
2009	65,428	71,971	1,792,846	1,972,130
2010	66,199	72,819	1,858,274	2,044,101
2011	63,848	70,233	1,924,473	2,116,920
2012	66,279	72,907	1,988,321	2,187,153
2013	67,765	74,541	2,054,600	2,260,060
2014	72,510	79,761	2,122,365	2,334,601
2015	73,795	81,174	2,194,875	2,414,362
2016	77,412	85,154	2,268,669	2,495,536
2017	77,295	85,024	2,346,082	2,580,690
2018	84,582	93,040	2,423,376	2,665,714
2019	82,395	90,634	2,507,958	2,758,754
2020	79,593	87,553	2,590,353	2,849,388
2021	80,429	88,472	2,669,946	2,936,941
2022	80,429	88,472	2,750,375	3,025,413
2023	80,429	88,472	2,830,804	3,113,885
2024	80,429	88,472	2,911,233	3,202,357
2025	80,429	88,472	2,991,662	3,290,828
2026	80,429	88,472	3,072,091	3,379,300
2027	54,204	59,624	3,152,520	3,467,772
2028	0	0	3,206,724	3,527,396
2029	0	0	3,206,724	3,527,396
2030	0	0	3,206,724	3,527,396
2031	0	0	3,206,724	3,527,396
2032	0	0	3,206,724	3,527,396
2033	0	0	3,206,724	3,527,396
2034	0	0	3,206,724	3,527,396
2035	0	0	3,206,724	3,527,396
2036	0	0	3,206,724	3,527,396
2037	0	0	3,206,724	3,527,396
2038	0	0	3,206,724	3,527,396
2039	0	0	3,206,724	3,527,396

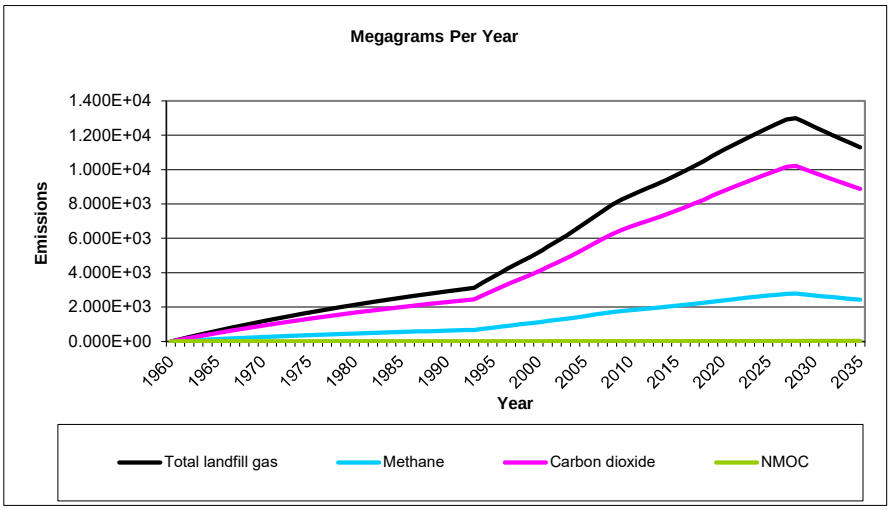
Pollutant Parameters

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
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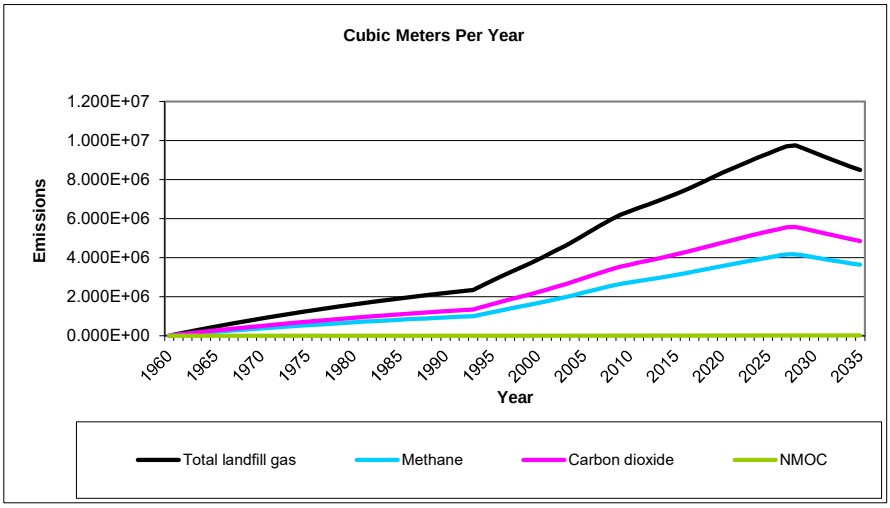
8.000E+03
6.000E+03
4.000E+03
2.000E+03
0.000E+00
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


Cubic Meters Per Year
Emissions
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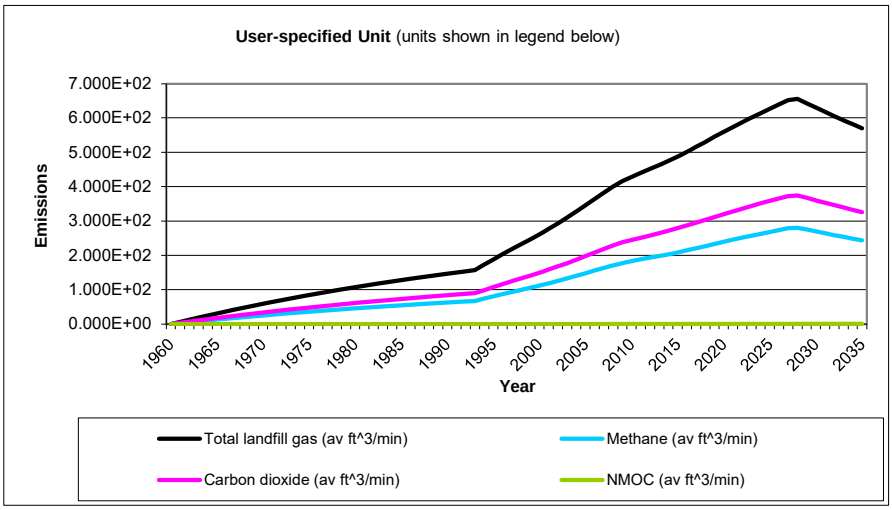
1.000E+07
8.000E+06
6.000E+06
4.000E+06
2.000E+06
0.000E+00
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


User-specified Unit (units shown in legend below)
Emissions
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4.000E+02
3.000E+02
2.000E+02
1.000E+02
0.000E+00
1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
NMOC (av ft^3/min)

Results

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1960	0	0	0	0	0	0
1961	1.278E+02	9.590E+04	6.444E+00	2.738E+01	4.105E+04	2.758E+00
1962	2.531E+02	1.899E+05	1.276E+01	5.423E+01	8.128E+04	5.461E+00
1963	3.759E+02	2.820E+05	1.895E+01	8.054E+01	1.207E+05	8.111E+00
1964	4.962E+02	3.724E+05	2.502E+01	1.063E+02	1.594E+05	1.071E+01
1965	6.142E+02	4.609E+05	3.097E+01	1.316E+02	1.973E+05	1.325E+01
1966	7.298E+02	5.477E+05	3.680E+01	1.564E+02	2.344E+05	1.575E+01
1967	8.432E+02	6.327E+05	4.251E+01	1.807E+02	2.708E+05	1.820E+01
1968	9.543E+02	7.161E+05	4.812E+01	2.045E+02	3.065E+05	2.059E+01
1969	1.063E+03	7.978E+05	5.361E+01	2.278E+02	3.415E+05	2.294E+01
1970	1.170E+03	8.779E+05	5.899E+01	2.507E+02	3.758E+05	2.525E+01
1971	1.275E+03	9.565E+05	6.426E+01	2.731E+02	4.094E+05	2.750E+01
1972	1.377E+03	1.033E+06	6.944E+01	2.951E+02	4.423E+05	2.972E+01
1973	1.478E+03	1.109E+06	7.450E+01	3.166E+02	4.746E+05	3.189E+01
1974	1.576E+03	1.183E+06	7.947E+01	3.377E+02	5.062E+05	3.401E+01
1975	1.673E+03	1.255E+06	8.434E+01	3.584E+02	5.373E+05	3.610E+01
1976	1.767E+03	1.326E+06	8.912E+01	3.787E+02	5.677E+05	3.814E+01
1977	1.860E+03	1.396E+06	9.380E+01	3.986E+02	5.975E+05	4.014E+01
1978	1.951E+03	1.464E+06	9.838E+01	4.181E+02	6.267E+05	4.211E+01
1979	2.040E+03	1.531E+06	1.029E+02	4.372E+02	6.553E+05	4.403E+01
1980	2.128E+03	1.597E+06	1.073E+02	4.559E+02	6.834E+05	4.592E+01
1981	2.213E+03	1.661E+06	1.116E+02	4.743E+02	7.109E+05	4.777E+01
1982	2.297E+03	1.724E+06	1.158E+02	4.923E+02	7.379E+05	4.958E+01
1983	2.380E+03	1.786E+06	1.200E+02	5.099E+02	7.643E+05	5.135E+01
1984	2.460E+03	1.846E+06	1.241E+02	5.272E+02	7.902E+05	5.310E+01
1985	2.539E+03	1.906E+06	1.280E+02	5.441E+02	8.156E+05	5.480E+01
1986	2.617E+03	1.964E+06	1.320E+02	5.608E+02	8.405E+05	5.647E+01
1987	2.693E+03	2.021E+06	1.358E+02	5.770E+02	8.649E+05	5.811E+01
1988	2.767E+03	2.077E+06	1.395E+02	5.930E+02	8.888E+05	5.972E+01
1989	2.840E+03	2.132E+06	1.432E+02	6.086E+02	9.123E+05	6.130E+01
1990	2.912E+03	2.185E+06	1.468E+02	6.240E+02	9.353E+05	6.284E+01
1991	2.982E+03	2.238E+06	1.504E+02	6.390E+02	9.578E+05	6.435E+01
1992	3.051E+03	2.289E+06	1.538E+02	6.537E+02	9.799E+05	6.584E+01
1993	3.118E+03	2.340E+06	1.572E+02	6.682E+02	1.002E+06	6.729E+01
1994	3.429E+03	2.574E+06	1.729E+02	7.349E+02	1.101E+06	7.401E+01
1995	3.735E+03	2.802E+06	1.883E+02	8.002E+02	1.199E+06	8.059E+01
1996	4.034E+03	3.027E+06	2.034E+02	8.643E+02	1.296E+06	8.705E+01
1997	4.327E+03	3.247E+06	2.182E+02	9.271E+02	1.390E+06	9.337E+01
1998	4.614E+03	3.462E+06	2.326E+02	9.887E+02	1.482E+06	9.957E+01
1999	4.896E+03	3.674E+06	2.468E+02	1.049E+03	1.572E+06	1.056E+02
2000	5.172E+03	3.881E+06	2.608E+02	1.108E+03	1.661E+06	1.116E+02
2001	5.499E+03	4.126E+06	2.772E+02	1.178E+03	1.766E+06	1.187E+02
2002	5.822E+03	4.369E+06	2.935E+02	1.247E+03	1.870E+06	1.256E+02
2003	6.139E+03	4.607E+06	3.096E+02	1.316E+03	1.972E+06	1.325E+02
2004	6.492E+03	4.871E+06	3.273E+02	1.391E+03	2.085E+06	1.401E+02
2005	6.861E+03	5.149E+06	3.459E+02	1.470E+03	2.204E+06	1.481E+02
2006	7.214E+03	5.414E+06	3.637E+02	1.546E+03	2.317E+06	1.557E+02
2007	7.587E+03	5.694E+06	3.826E+02	1.626E+03	2.437E+06	1.637E+02
2008	7.939E+03	5.958E+06	4.003E+02	1.701E+03	2.550E+06	1.713E+02
2009	8.245E+03	6.187E+06	4.157E+02	1.767E+03	2.648E+06	1.779E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2010	8.485E+03	6.368E+06	4.278E+02	1.818E+03	2.725E+06	1.831E+02
2011	8.726E+03	6.548E+06	4.400E+02	1.870E+03	2.803E+06	1.883E+02
2012	8.947E+03	6.714E+06	4.511E+02	1.917E+03	2.874E+06	1.931E+02
2013	9.179E+03	6.888E+06	4.628E+02	1.967E+03	2.948E+06	1.981E+02
2014	9.415E+03	7.066E+06	4.747E+02	2.018E+03	3.024E+06	2.032E+02
2015	9.677E+03	7.261E+06	4.879E+02	2.073E+03	3.108E+06	2.088E+02
2016	9.940E+03	7.459E+06	5.012E+02	2.130E+03	3.193E+06	2.145E+02
2017	1.022E+04	7.670E+06	5.154E+02	2.190E+03	3.283E+06	2.206E+02
2018	1.050E+04	7.876E+06	5.292E+02	2.249E+03	3.371E+06	2.265E+02
2019	1.081E+04	8.112E+06	5.450E+02	2.316E+03	3.472E+06	2.333E+02
2020	1.110E+04	8.333E+06	5.599E+02	2.379E+03	3.567E+06	2.396E+02
2021	1.138E+04	8.537E+06	5.736E+02	2.438E+03	3.654E+06	2.455E+02
2022	1.165E+04	8.740E+06	5.872E+02	2.496E+03	3.741E+06	2.513E+02
2023	1.191E+04	8.939E+06	6.006E+02	2.553E+03	3.826E+06	2.571E+02
2024	1.217E+04	9.135E+06	6.138E+02	2.608E+03	3.910E+06	2.627E+02
2025	1.243E+04	9.327E+06	6.266E+02	2.663E+03	3.992E+06	2.682E+02
2026	1.268E+04	9.514E+06	6.393E+02	2.717E+03	4.072E+06	2.736E+02
2027	1.292E+04	9.698E+06	6.516E+02	2.769E+03	4.151E+06	2.789E+02
2028	1.300E+04	9.757E+06	6.556E+02	2.786E+03	4.176E+06	2.806E+02
2029	1.275E+04	9.564E+06	6.426E+02	2.731E+03	4.093E+06	2.750E+02
2030	1.249E+04	9.375E+06	6.299E+02	2.677E+03	4.012E+06	2.696E+02
2031	1.225E+04	9.189E+06	6.174E+02	2.624E+03	3.933E+06	2.643E+02
2032	1.200E+04	9.007E+06	6.052E+02	2.572E+03	3.855E+06	2.590E+02
2033	1.177E+04	8.829E+06	5.932E+02	2.521E+03	3.779E+06	2.539E+02
2034	1.153E+04	8.654E+06	5.815E+02	2.471E+03	3.704E+06	2.489E+02
2035	1.130E+04	8.483E+06	5.699E+02	2.422E+03	3.631E+06	2.439E+02
2036	1.108E+04	8.315E+06	5.587E+02	2.374E+03	3.559E+06	2.391E+02
2037	1.086E+04	8.150E+06	5.476E+02	2.327E+03	3.488E+06	2.344E+02
2038	1.065E+04	7.989E+06	5.368E+02	2.281E+03	3.419E+06	2.297E+02
2039	1.043E+04	7.830E+06	5.261E+02	2.236E+03	3.351E+06	2.252E+02
2040	1.023E+04	7.675E+06	5.157E+02	2.192E+03	3.285E+06	2.207E+02
2041	1.003E+04	7.523E+06	5.055E+02	2.148E+03	3.220E+06	2.164E+02
2042	9.827E+03	7.374E+06	4.955E+02	2.106E+03	3.156E+06	2.121E+02
2043	9.633E+03	7.228E+06	4.857E+02	2.064E+03	3.094E+06	2.079E+02
2044	9.442E+03	7.085E+06	4.761E+02	2.023E+03	3.033E+06	2.038E+02
2045	9.255E+03	6.945E+06	4.666E+02	1.983E+03	2.972E+06	1.997E+02
2046	9.072E+03	6.807E+06	4.574E+02	1.944E+03	2.914E+06	1.958E+02
2047	8.892E+03	6.673E+06	4.483E+02	1.905E+03	2.856E+06	1.919E+02
2048	8.716E+03	6.541E+06	4.395E+02	1.868E+03	2.799E+06	1.881E+02
2049	8.543E+03	6.411E+06	4.308E+02	1.831E+03	2.744E+06	1.844E+02
2050	8.374E+03	6.284E+06	4.222E+02	1.794E+03	2.690E+06	1.807E+02
2051	8.208E+03	6.160E+06	4.139E+02	1.759E+03	2.636E+06	1.771E+02
2052	8.046E+03	6.038E+06	4.057E+02	1.724E+03	2.584E+06	1.736E+02
2053	7.886E+03	5.918E+06	3.976E+02	1.690E+03	2.533E+06	1.702E+02
2054	7.730E+03	5.801E+06	3.898E+02	1.656E+03	2.483E+06	1.668E+02
2055	7.577E+03	5.686E+06	3.820E+02	1.624E+03	2.434E+06	1.635E+02
2056	7.427E+03	5.573E+06	3.745E+02	1.591E+03	2.385E+06	1.603E+02
2057	7.280E+03	5.463E+06	3.671E+02	1.560E+03	2.338E+06	1.571E+02
2058	7.136E+03	5.355E+06	3.598E+02	1.529E+03	2.292E+06	1.540E+02
2059	6.995E+03	5.249E+06	3.527E+02	1.499E+03	2.247E+06	1.509E+02
2060	6.856E+03	5.145E+06	3.457E+02	1.469E+03	2.202E+06	1.480E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2061	6.720E+03	5.043E+06	3.388E+02	1.440E+03	2.158E+06	1.450E+02
2062	6.587E+03	4.943E+06	3.321E+02	1.411E+03	2.116E+06	1.422E+02
2063	6.457E+03	4.845E+06	3.256E+02	1.384E+03	2.074E+06	1.393E+02
2064	6.329E+03	4.749E+06	3.191E+02	1.356E+03	2.033E+06	1.366E+02
2065	6.204E+03	4.655E+06	3.128E+02	1.329E+03	1.993E+06	1.339E+02
2066	6.081E+03	4.563E+06	3.066E+02	1.303E+03	1.953E+06	1.312E+02
2067	5.960E+03	4.473E+06	3.005E+02	1.277E+03	1.914E+06	1.286E+02
2068	5.842E+03	4.384E+06	2.946E+02	1.252E+03	1.876E+06	1.261E+02
2069	5.727E+03	4.297E+06	2.887E+02	1.227E+03	1.839E+06	1.236E+02
2070	5.613E+03	4.212E+06	2.830E+02	1.203E+03	1.803E+06	1.211E+02
2071	5.502E+03	4.129E+06	2.774E+02	1.179E+03	1.767E+06	1.187E+02
2072	5.393E+03	4.047E+06	2.719E+02	1.156E+03	1.732E+06	1.164E+02
2073	5.286E+03	3.967E+06	2.665E+02	1.133E+03	1.698E+06	1.141E+02
2074	5.182E+03	3.888E+06	2.613E+02	1.110E+03	1.664E+06	1.118E+02
2075	5.079E+03	3.812E+06	2.561E+02	1.088E+03	1.631E+06	1.096E+02
2076	4.979E+03	3.736E+06	2.510E+02	1.067E+03	1.599E+06	1.074E+02
2077	4.880E+03	3.662E+06	2.461E+02	1.046E+03	1.567E+06	1.053E+02
2078	4.783E+03	3.590E+06	2.412E+02	1.025E+03	1.536E+06	1.032E+02
2079	4.689E+03	3.518E+06	2.364E+02	1.005E+03	1.506E+06	1.012E+02
2080	4.596E+03	3.449E+06	2.317E+02	9.848E+02	1.476E+06	9.918E+01
2081	4.505E+03	3.380E+06	2.271E+02	9.653E+02	1.447E+06	9.721E+01
2082	4.416E+03	3.314E+06	2.226E+02	9.462E+02	1.418E+06	9.529E+01
2083	4.328E+03	3.248E+06	2.182E+02	9.274E+02	1.390E+06	9.340E+01
2084	4.242E+03	3.184E+06	2.139E+02	9.091E+02	1.363E+06	9.155E+01
2085	4.158E+03	3.121E+06	2.097E+02	8.911E+02	1.336E+06	8.974E+01
2086	4.076E+03	3.059E+06	2.055E+02	8.734E+02	1.309E+06	8.796E+01
2087	3.995E+03	2.998E+06	2.015E+02	8.561E+02	1.283E+06	8.622E+01
2088	3.916E+03	2.939E+06	1.975E+02	8.392E+02	1.258E+06	8.451E+01
2089	3.839E+03	2.881E+06	1.936E+02	8.225E+02	1.233E+06	8.284E+01
2090	3.763E+03	2.824E+06	1.897E+02	8.063E+02	1.209E+06	8.120E+01
2091	3.688E+03	2.768E+06	1.860E+02	7.903E+02	1.185E+06	7.959E+01
2092	3.615E+03	2.713E+06	1.823E+02	7.746E+02	1.161E+06	7.802E+01
2093	3.544E+03	2.659E+06	1.787E+02	7.593E+02	1.138E+06	7.647E+01
2094	3.473E+03	2.607E+06	1.751E+02	7.443E+02	1.116E+06	7.496E+01
2095	3.405E+03	2.555E+06	1.717E+02	7.295E+02	1.094E+06	7.347E+01
2096	3.337E+03	2.504E+06	1.683E+02	7.151E+02	1.072E+06	7.202E+01
2097	3.271E+03	2.455E+06	1.649E+02	7.009E+02	1.051E+06	7.059E+01
2098	3.206E+03	2.406E+06	1.617E+02	6.870E+02	1.030E+06	6.919E+01
2099	3.143E+03	2.358E+06	1.585E+02	6.734E+02	1.009E+06	6.782E+01
2100	3.081E+03	2.312E+06	1.553E+02	6.601E+02	9.894E+05	6.648E+01

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1960	0	0	0	0	0	0
1961	1.004E+02	5.486E+04	3.686E+00	2.045E-01	5.706E+01	3.834E-03
1962	1.988E+02	1.086E+05	7.299E+00	4.050E-01	1.130E+02	7.592E-03
1963	2.953E+02	1.613E+05	1.084E+01	6.015E-01	1.678E+02	1.128E-02
1964	3.899E+02	2.130E+05	1.431E+01	7.942E-01	2.216E+02	1.489E-02
1965	4.826E+02	2.636E+05	1.771E+01	9.830E-01	2.742E+02	1.843E-02
1966	5.734E+02	3.133E+05	2.105E+01	1.168E+00	3.259E+02	2.189E-02
1967	6.625E+02	3.619E+05	2.432E+01	1.349E+00	3.765E+02	2.530E-02
1968	7.498E+02	4.096E+05	2.752E+01	1.527E+00	4.261E+02	2.863E-02
1969	8.354E+02	4.564E+05	3.066E+01	1.702E+00	4.747E+02	3.190E-02
1970	9.192E+02	5.022E+05	3.374E+01	1.872E+00	5.224E+02	3.510E-02
1971	1.001E+03	5.471E+05	3.676E+01	2.040E+00	5.691E+02	3.824E-02
1972	1.082E+03	5.911E+05	3.972E+01	2.204E+00	6.149E+02	4.131E-02
1973	1.161E+03	6.343E+05	4.262E+01	2.365E+00	6.598E+02	4.433E-02
1974	1.238E+03	6.766E+05	4.546E+01	2.523E+00	7.038E+02	4.729E-02
1975	1.314E+03	7.180E+05	4.824E+01	2.677E+00	7.469E+02	5.018E-02
1976	1.389E+03	7.587E+05	5.097E+01	2.829E+00	7.892E+02	5.302E-02
1977	1.462E+03	7.985E+05	5.365E+01	2.977E+00	8.306E+02	5.581E-02
1978	1.533E+03	8.375E+05	5.627E+01	3.123E+00	8.712E+02	5.854E-02
1979	1.603E+03	8.758E+05	5.885E+01	3.266E+00	9.110E+02	6.121E-02
1980	1.672E+03	9.133E+05	6.137E+01	3.405E+00	9.501E+02	6.383E-02
1981	1.739E+03	9.501E+05	6.384E+01	3.543E+00	9.883E+02	6.640E-02
1982	1.805E+03	9.861E+05	6.626E+01	3.677E+00	1.026E+03	6.892E-02
1983	1.870E+03	1.021E+06	6.863E+01	3.809E+00	1.063E+03	7.139E-02
1984	1.933E+03	1.056E+06	7.096E+01	3.938E+00	1.099E+03	7.381E-02
1985	1.995E+03	1.090E+06	7.324E+01	4.064E+00	1.134E+03	7.619E-02
1986	2.056E+03	1.123E+06	7.548E+01	4.188E+00	1.168E+03	7.851E-02
1987	2.116E+03	1.156E+06	7.767E+01	4.310E+00	1.202E+03	8.079E-02
1988	2.174E+03	1.188E+06	7.981E+01	4.429E+00	1.236E+03	8.302E-02
1989	2.232E+03	1.219E+06	8.192E+01	4.546E+00	1.268E+03	8.521E-02
1990	2.288E+03	1.250E+06	8.398E+01	4.661E+00	1.300E+03	8.736E-02
1991	2.343E+03	1.280E+06	8.601E+01	4.773E+00	1.332E+03	8.946E-02
1992	2.397E+03	1.310E+06	8.799E+01	4.883E+00	1.362E+03	9.153E-02
1993	2.450E+03	1.338E+06	8.993E+01	4.991E+00	1.392E+03	9.355E-02
1994	2.695E+03	1.472E+06	9.891E+01	5.489E+00	1.531E+03	1.029E-01
1995	2.934E+03	1.603E+06	1.077E+02	5.977E+00	1.667E+03	1.120E-01
1996	3.169E+03	1.731E+06	1.163E+02	6.456E+00	1.801E+03	1.210E-01
1997	3.400E+03	1.857E+06	1.248E+02	6.925E+00	1.932E+03	1.298E-01
1998	3.625E+03	1.981E+06	1.331E+02	7.385E+00	2.060E+03	1.384E-01
1999	3.847E+03	2.101E+06	1.412E+02	7.835E+00	2.186E+03	1.469E-01
2000	4.063E+03	2.220E+06	1.492E+02	8.277E+00	2.309E+03	1.552E-01
2001	4.320E+03	2.360E+06	1.586E+02	8.800E+00	2.455E+03	1.650E-01
2002	4.574E+03	2.499E+06	1.679E+02	9.317E+00	2.599E+03	1.746E-01
2003	4.824E+03	2.635E+06	1.771E+02	9.826E+00	2.741E+03	1.842E-01
2004	5.101E+03	2.786E+06	1.872E+02	1.039E+01	2.898E+03	1.947E-01
2005	5.391E+03	2.945E+06	1.979E+02	1.098E+01	3.063E+03	2.058E-01
2006	5.668E+03	3.097E+06	2.081E+02	1.155E+01	3.221E+03	2.164E-01
2007	5.961E+03	3.257E+06	2.188E+02	1.214E+01	3.388E+03	2.276E-01
2008	6.238E+03	3.408E+06	2.290E+02	1.271E+01	3.545E+03	2.382E-01
2009	6.478E+03	3.539E+06	2.378E+02	1.320E+01	3.681E+03	2.473E-01

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2010	6.667E+03	3.642E+06	2.447E+02	1.358E+01	3.789E+03	2.546E-01
2011	6.856E+03	3.746E+06	2.517E+02	1.397E+01	3.896E+03	2.618E-01
2012	7.030E+03	3.840E+06	2.580E+02	1.432E+01	3.995E+03	2.684E-01
2013	7.212E+03	3.940E+06	2.647E+02	1.469E+01	4.098E+03	2.754E-01
2014	7.398E+03	4.042E+06	2.715E+02	1.507E+01	4.204E+03	2.825E-01
2015	7.603E+03	4.154E+06	2.791E+02	1.549E+01	4.321E+03	2.903E-01
2016	7.810E+03	4.267E+06	2.867E+02	1.591E+01	4.438E+03	2.982E-01
2017	8.031E+03	4.387E+06	2.948E+02	1.636E+01	4.564E+03	3.066E-01
2018	8.247E+03	4.505E+06	3.027E+02	1.680E+01	4.686E+03	3.149E-01
2019	8.494E+03	4.640E+06	3.118E+02	1.730E+01	4.827E+03	3.243E-01
2020	8.725E+03	4.766E+06	3.203E+02	1.777E+01	4.958E+03	3.331E-01
2021	8.938E+03	4.883E+06	3.281E+02	1.821E+01	5.079E+03	3.413E-01
2022	9.151E+03	4.999E+06	3.359E+02	1.864E+01	5.200E+03	3.494E-01
2023	9.360E+03	5.113E+06	3.436E+02	1.907E+01	5.319E+03	3.574E-01
2024	9.565E+03	5.225E+06	3.511E+02	1.948E+01	5.435E+03	3.652E-01
2025	9.765E+03	5.335E+06	3.584E+02	1.989E+01	5.549E+03	3.729E-01
2026	9.962E+03	5.442E+06	3.657E+02	2.029E+01	5.661E+03	3.804E-01
2027	1.015E+04	5.547E+06	3.727E+02	2.068E+01	5.771E+03	3.877E-01
2028	1.022E+04	5.581E+06	3.750E+02	2.081E+01	5.806E+03	3.901E-01
2029	1.001E+04	5.471E+06	3.676E+02	2.040E+01	5.691E+03	3.824E-01
2030	9.816E+03	5.362E+06	3.603E+02	1.999E+01	5.578E+03	3.748E-01
2031	9.621E+03	5.256E+06	3.532E+02	1.960E+01	5.468E+03	3.674E-01
2032	9.431E+03	5.152E+06	3.462E+02	1.921E+01	5.359E+03	3.601E-01
2033	9.244E+03	5.050E+06	3.393E+02	1.883E+01	5.253E+03	3.530E-01
2034	9.061E+03	4.950E+06	3.326E+02	1.846E+01	5.149E+03	3.460E-01
2035	8.882E+03	4.852E+06	3.260E+02	1.809E+01	5.047E+03	3.391E-01
2036	8.706E+03	4.756E+06	3.196E+02	1.773E+01	4.947E+03	3.324E-01
2037	8.533E+03	4.662E+06	3.132E+02	1.738E+01	4.849E+03	3.258E-01
2038	8.364E+03	4.570E+06	3.070E+02	1.704E+01	4.753E+03	3.194E-01
2039	8.199E+03	4.479E+06	3.009E+02	1.670E+01	4.659E+03	3.130E-01
2040	8.037E+03	4.390E+06	2.950E+02	1.637E+01	4.567E+03	3.068E-01
2041	7.877E+03	4.303E+06	2.891E+02	1.605E+01	4.476E+03	3.008E-01
2042	7.721E+03	4.218E+06	2.834E+02	1.573E+01	4.388E+03	2.948E-01
2043	7.569E+03	4.135E+06	2.778E+02	1.542E+01	4.301E+03	2.890E-01
2044	7.419E+03	4.053E+06	2.723E+02	1.511E+01	4.216E+03	2.833E-01
2045	7.272E+03	3.973E+06	2.669E+02	1.481E+01	4.132E+03	2.776E-01
2046	7.128E+03	3.894E+06	2.616E+02	1.452E+01	4.050E+03	2.721E-01
2047	6.987E+03	3.817E+06	2.564E+02	1.423E+01	3.970E+03	2.668E-01
2048	6.848E+03	3.741E+06	2.514E+02	1.395E+01	3.892E+03	2.615E-01
2049	6.713E+03	3.667E+06	2.464E+02	1.367E+01	3.815E+03	2.563E-01
2050	6.580E+03	3.595E+06	2.415E+02	1.340E+01	3.739E+03	2.512E-01
2051	6.449E+03	3.523E+06	2.367E+02	1.314E+01	3.665E+03	2.463E-01
2052	6.322E+03	3.454E+06	2.320E+02	1.288E+01	3.592E+03	2.414E-01
2053	6.197E+03	3.385E+06	2.274E+02	1.262E+01	3.521E+03	2.366E-01
2054	6.074E+03	3.318E+06	2.229E+02	1.237E+01	3.452E+03	2.319E-01
2055	5.954E+03	3.252E+06	2.185E+02	1.213E+01	3.383E+03	2.273E-01
2056	5.836E+03	3.188E+06	2.142E+02	1.189E+01	3.316E+03	2.228E-01
2057	5.720E+03	3.125E+06	2.100E+02	1.165E+01	3.251E+03	2.184E-01
2058	5.607E+03	3.063E+06	2.058E+02	1.142E+01	3.186E+03	2.141E-01
2059	5.496E+03	3.002E+06	2.017E+02	1.119E+01	3.123E+03	2.098E-01
2060	5.387E+03	2.943E+06	1.977E+02	1.097E+01	3.061E+03	2.057E-01

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2061	5.280E+03	2.885E+06	1.938E+02	1.076E+01	3.001E+03	2.016E-01
2062	5.176E+03	2.828E+06	1.900E+02	1.054E+01	2.941E+03	1.976E-01
2063	5.073E+03	2.772E+06	1.862E+02	1.033E+01	2.883E+03	1.937E-01
2064	4.973E+03	2.717E+06	1.825E+02	1.013E+01	2.826E+03	1.899E-01
2065	4.874E+03	2.663E+06	1.789E+02	9.929E+00	2.770E+03	1.861E-01
2066	4.778E+03	2.610E+06	1.754E+02	9.732E+00	2.715E+03	1.824E-01
2067	4.683E+03	2.558E+06	1.719E+02	9.539E+00	2.661E+03	1.788E-01
2068	4.591E+03	2.508E+06	1.685E+02	9.351E+00	2.609E+03	1.753E-01
2069	4.500E+03	2.458E+06	1.652E+02	9.165E+00	2.557E+03	1.718E-01
2070	4.411E+03	2.409E+06	1.619E+02	8.984E+00	2.506E+03	1.684E-01
2071	4.323E+03	2.362E+06	1.587E+02	8.806E+00	2.457E+03	1.651E-01
2072	4.238E+03	2.315E+06	1.555E+02	8.632E+00	2.408E+03	1.618E-01
2073	4.154E+03	2.269E+06	1.525E+02	8.461E+00	2.360E+03	1.586E-01
2074	4.071E+03	2.224E+06	1.494E+02	8.293E+00	2.314E+03	1.555E-01
2075	3.991E+03	2.180E+06	1.465E+02	8.129E+00	2.268E+03	1.524E-01
2076	3.912E+03	2.137E+06	1.436E+02	7.968E+00	2.223E+03	1.494E-01
2077	3.834E+03	2.095E+06	1.407E+02	7.810E+00	2.179E+03	1.464E-01
2078	3.758E+03	2.053E+06	1.380E+02	7.656E+00	2.136E+03	1.435E-01
2079	3.684E+03	2.013E+06	1.352E+02	7.504E+00	2.093E+03	1.407E-01
2080	3.611E+03	1.973E+06	1.325E+02	7.355E+00	2.052E+03	1.379E-01
2081	3.540E+03	1.934E+06	1.299E+02	7.210E+00	2.011E+03	1.351E-01
2082	3.469E+03	1.895E+06	1.273E+02	7.067E+00	1.972E+03	1.325E-01
2083	3.401E+03	1.858E+06	1.248E+02	6.927E+00	1.933E+03	1.298E-01
2084	3.333E+03	1.821E+06	1.224E+02	6.790E+00	1.894E+03	1.273E-01
2085	3.267E+03	1.785E+06	1.199E+02	6.655E+00	1.857E+03	1.248E-01
2086	3.203E+03	1.750E+06	1.176E+02	6.524E+00	1.820E+03	1.223E-01
2087	3.139E+03	1.715E+06	1.152E+02	6.395E+00	1.784E+03	1.199E-01
2088	3.077E+03	1.681E+06	1.129E+02	6.268E+00	1.749E+03	1.175E-01
2089	3.016E+03	1.648E+06	1.107E+02	6.144E+00	1.714E+03	1.152E-01
2090	2.956E+03	1.615E+06	1.085E+02	6.022E+00	1.680E+03	1.129E-01
2091	2.898E+03	1.583E+06	1.064E+02	5.903E+00	1.647E+03	1.106E-01
2092	2.841E+03	1.552E+06	1.043E+02	5.786E+00	1.614E+03	1.085E-01
2093	2.784E+03	1.521E+06	1.022E+02	5.671E+00	1.582E+03	1.063E-01
2094	2.729E+03	1.491E+06	1.002E+02	5.559E+00	1.551E+03	1.042E-01
2095	2.675E+03	1.461E+06	9.819E+01	5.449E+00	1.520E+03	1.021E-01
2096	2.622E+03	1.432E+06	9.625E+01	5.341E+00	1.490E+03	1.001E-01
2097	2.570E+03	1.404E+06	9.434E+01	5.235E+00	1.461E+03	9.814E-02
2098	2.519E+03	1.376E+06	9.247E+01	5.132E+00	1.432E+03	9.619E-02
2099	2.469E+03	1.349E+06	9.064E+01	5.030E+00	1.403E+03	9.429E-02
2100	2.421E+03	1.322E+06	8.885E+01	4.930E+00	1.376E+03	9.242E-02

APPENDIX D
Supporting Documentation

This section includes the following items:

1. CSP No. 0802-01-C with revised statements (in red) for renewal
2. Permit to Operate at Higher Operating Temperature for Select Wells
3. Permit for Gas Collection and Control System Construction
4. 2021 GHG Report
5. 2021 GHG Report
6. Power Generation Operator's Manual
7. Technical Specifications for Landfill Gas Collection and Control System Construction
8. Compliance Emissions Test Report 2021

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This section includes the following items:

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7. Flare Compliance Emissions Test Report 2021

APPENDIX D1

CSP No. 0802-01-C with revised statements (in red) for renewal

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LINDA ROSEN, M.D., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:

September 10, 2014

14-725E CAB
File No. 0802

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
(7010 3090 0002 5271 6926)

Mr. Larry Dill
County Engineer
County of Kauai
Department of Public Works
Moikena Building
4444 Rice Street, Suite 275
Lihue, Hawaii 96766

Dear Mr. Dill:

Subject: **Covered Source Permit (CSP) No. 0802-01-C**
Initial Application No. 0802-01
Kekaha Landfill
Landfill Gas Collection and Control System
Located At: 6900D Kaumualii Highway, Kekaha, Kauai
Date of Expiration: September 9, 2019

The subject Covered Source Permit is issued in accordance with Hawaii Administrative Rules, Title 11, Chapter 60.1. The issuance of this permit is based on the plans, specifications and information submitted on January 14, 2014. This Covered Source Permit is issued subject to the conditions/requirements set forth in the following Attachments:

Attachment I:	Standard Conditions
Attachment II:	Special Conditions
Attachment II-INSIG:	Special Conditions - Insignificant Activities
Attachment III:	Annual Fee Requirements
Attachment IV:	Annual Emissions Reporting Requirements

The following forms are enclosed for your use and submittal as required:

Compliance Certification Form	
Monitoring Report Form:	Collection and Control System
Monitoring Report Form:	Opacity Exceedances
Annual Emissions Report Form:	Municipal Solid Waste Landfills

Supplemental Report Form:	Modification/Reconstruction of MSW Landfill
Supplemental Report Form:	Notification of Landfill Closure
Supplemental Report Form:	Annual Report
Supplemental Report Form:	Notification of Collection and Control Equipment Removal

The following are enclosed for your use in monitoring visible emissions:

Visible Emissions Form Requirements, State of Hawaii
Visible Emissions Form

This permit, (a) shall not in any manner affect the title of the premises upon which the equipment is to be located, (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment, and (c) in no manner implies or suggests that the Hawaii Department of Health (herein after referred to as Department), or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment.

If you have any questions regarding this matter, please call Mr. Kevin Kihara of the Clean Air Branch at (808) 586-4200.

Sincerely,

STUART YAMADA, P.E., CHIEF
Environmental Management Division

KK:nn
Enclosures

c: Solid and Hazardous Waste Branch
Logan Kastner, EHS – Kauai
CAB Monitoring Section

ATTACHMENT I: STANDARD CONDITIONS
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

This permit is granted in accordance with the Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1, Air Pollution Control, and is subject to the following standard conditions:

1. Unless specifically identified, the terms and conditions contained in this permit are consistent with the applicable requirement, including form, on which each term or condition is based.

   (Auth.: HAR §11-60.1-90)

2. This permit, or a copy thereof, shall be maintained at or near the source and shall be made available for inspection upon request. The permit shall not be willfully defaced, altered, forged, counterfeited, or falsified.

   (Auth.: HAR §11-60.1-6; SIP §11-60-11)[2]

3. This permit is not transferable whether by operation of law or otherwise, from person to person, from place to place, or from one piece of equipment to another without the approval of the Department, except as provided in HAR, Section 11-60.1-91.

   (Auth.: HAR §11-60.1-7; SIP §11-60-9)[2]

4. A request for transfer from person to person shall be made on forms furnished by the Department.

   (Auth.: HAR §11-60.1-7)

5. In the event of any changes in control or ownership of the facilities to be constructed or modified, this permit shall be binding on all subsequent owners and operators. The permittee shall notify the succeeding owner and operator of the existence of this permit and its conditions by letter, copies of which will be forwarded to the Department and the U.S. Environmental Protection Agency (EPA), Region 9.

   (Auth.: HAR §11-60.1-5, §11-60.1-7, §11-60.1-94)

6. The facility covered by this permit shall be constructed and operated in accordance with the application, and any information submitted as part of the application, for the Covered Source Permit. There shall be no deviation unless additional or revised plans are submitted to and approved by the Department, and the permit is amended to allow such deviation.

   (Auth.: HAR §11-60.1-2, §11-60.1-4, §11-60.1-82, §11-60.1-84, §11-60.1-90)

7. This permit (a) does not release the permittee from compliance with other applicable statutes of the State of Hawaii, or with applicable local laws, regulations, or ordinances, and

(b) shall not constitute, nor be construed to be an approval of the design of the covered source.

(Auth.: HAR §11-60.1-5, §11-60.1-82)

8. The permittee shall comply with all the terms and conditions of this permit. Any permit noncompliance constitutes a violation of HAR, Chapter 11-60.1 and the Clean Air Act and is grounds for enforcement action; for permit termination, suspension, reopening, or amendment; or for denial of a permit renewal application.

   (Auth.: HAR §11-60.1-3, §11-60.1-10, §11-60.1-19, §11-60.1-90)

9. If any term or condition of this permit becomes invalid as a result of a challenge to a portion of this permit, the other terms and conditions of this permit shall not be affected and shall remain valid.

   (Auth.: HAR §11-60.1-90)

10. The permittee shall not use as a defense in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the terms and conditions of this permit.

    (Auth.: HAR §11-60.1-90)

11. This permit may be terminated, suspended, reopened, or amended for cause pursuant to HAR, Sections, 11-60.1-10 and 11-60.1-98, and Hawaii Revised Statutes (HRS), Chapter 342B-27, after affording the permittee an opportunity for a hearing in accordance with HRS, Chapter 91.

    (Auth.: HAR §11-60.1-3, §11-60.1-10, §11-60.1-90, §11-60.1-98)

12. The filing of a request by the permittee for the termination, suspension, reopening, or amendment of this permit, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

    (Auth.: HAR §11-60.1-90)

13. This permit does not convey any property rights of any sort, or any exclusive privilege.

    (Auth.: HAR §11-60.1-90)

14. The permittee shall notify the Department and U.S. EPA, Region 9, in writing of the following dates:

a. The **anticipated date of initial start-up** for each emission unit of a new source or significant modification not more than sixty (60) days or less than thirty (30) days prior to such date;
b. The **actual date of construction commencement** within fifteen (15) days after such date; and
c. The **actual date of start-up** within fifteen (15) days after such date.

(Auth.: HAR §11-60.1-90)

15. The permittee shall furnish, in a timely manner, any information or records requested in writing by the Department to determine whether cause exists for terminating, suspending, reopening, or amending this permit, or to determine compliance with this permit. Upon request, the permittee shall also furnish to the Department copies of records required to be kept by the permittee. For information claimed to be confidential, the Director of Health may require the permittee to furnish such records not only to the Department but also directly to the U.S. EPA, Region 9, along with a claim of confidentiality.

(Auth.: HAR §11-60.1-14, §11-60.1-90)

16. The permittee shall notify the Department in writing, of the **intent to shut down air pollution control equipment for necessary scheduled maintenance** at least twenty-four (24) hours prior to the planned shutdown. The submittal of this notice shall not be a defense to an enforcement action. The notice shall include the following:

a. Identification of the specific equipment to be taken out of service, as well as its location and permit number;
b. The expected length of time that the air pollution control equipment will be out of service;
c. The nature and quantity of emissions of air pollutants likely to be emitted during the shutdown period;
d. Measures such as the use of off-shift labor and equipment that will be taken to minimize the length of the shutdown period; and
e. The reasons why it would be impossible or impractical to shut down the source operation during the maintenance period.

(Auth.: HAR §11-60.1-15; SIP §11-60-16)[2]

17. **Except for emergencies which result in noncompliance with any technology-based emission limitation in accordance with HAR, Section 11-60.1-16.5, in the event any emission unit, air pollution control equipment, or related equipment malfunctions or breaks down in such a manner as to cause the emission of air pollutants in violation of HAR, Chapter 11-60.1 or this permit,** the permittee shall immediately notify the Department of the malfunction or breakdown, unless the protection of personnel or public health or safety demands immediate attention to the malfunction or breakdown and makes such notification infeasible. In the latter case, the notice shall be provided as soon as

practicable. Within five (5) working days of this initial notification, the permittee shall also submit, in writing, the following information:

a. Identification of each affected emission point and each emission limit exceeded;
b. Magnitude of each excess emission;
c. Time and duration of each excess emission;
d. Identity of the process or control equipment causing the excess emission;
e. Cause and nature of each excess emission;
f. Description of the steps taken to remedy the situation, prevent a recurrence, limit the excessive emissions, and assure that the malfunction or breakdown does not interfere with the attainment and maintenance of the National Ambient Air Quality Standards and state ambient air quality standards;
g. Documentation that the equipment or process was at all times maintained and operated in a manner consistent with good practice for minimizing emissions; and
h. A statement that the excess emissions are not part of a recurring pattern indicative of inadequate design, operation, or maintenance.

The submittal of these notices shall not be a defense to an enforcement action.

(Auth.: HAR §11-60.1-16; SIP §11-60-16)[2]

18. The permittee may request confidential treatment of any records in accordance with HAR, Section 11-60.1-14.

(Auth.: HAR §11-60.1-14, §11-60.1-90)

19. This permit shall become invalid with respect to the authorized construction if construction is not commenced as follows:

a. Within eighteen (18) months after the permit takes effect, is discontinued for a period of eighteen (18) months or more, or is not completed within a reasonable time.
b. For phased construction projects, each phase shall commence construction within eighteen (18) months of the projected and approved commencement dates in the permit. This provision shall be applicable only if the projected and approved commencement dates of each construction phase are defined in Attachment II, Special Conditions, of this permit.

(Auth.: HAR §11-60.1-9, §11-60.1-90)

20. The Department may extend the time periods specified in Standard Condition No. 19 upon a satisfactory showing that an extension is justified. Requests for an extension shall be submitted in writing to the Department.

(Auth.: HAR §11-60.1-9, §11-60.1-90)

21. The permittee shall submit fees in accordance with HAR, Chapter 11-60.1, Subchapter 6.

    (Auth.: HAR §11-60.1-90)

22. All certifications shall be in accordance with HAR, Section 11-60.1-4.

    (Auth.: HAR §11-60.1-4, HAR §11-60.1-90)

23. The permittee shall allow the Director of Health, the Regional Administrator for the U.S. EPA and/or an authorized representative, upon presentation of credentials or other documents required by law:

    a. To enter the premises where a source is located or emission-related activity is conducted, or where records must be kept under the conditions of this permit and inspect at reasonable times all facilities, equipment, including monitoring and air pollution control equipment, practices, operations, or records covered under the terms and conditions of this permit and request copies of records or copy records required by this permit; and
    b. To sample or monitor at reasonable times substances or parameters to ensure compliance with this permit or applicable requirements of HAR, Chapter 11-60.1.

    (Auth.: HAR §11-60.1-11, §11-60.1-90)

24. Within thirty (30) days of **permanent discontinuance of the construction, modification, relocation, or operation of the facility covered by this permit**, the discontinuance shall be reported in writing to the Department by a responsible official of the source.

    (Auth.: HAR §11-60.1-8; SIP §11-60-10)[2]

25. Each permit renewal application shall be submitted to the Department and the U.S. EPA, Region 9, no less than twelve (12) months and no more than eighteen (18) months prior to the permit expiration date. The director may allow a permit renewal application to be submitted no less than six months prior to the permit expiration date, if the director determines that there is reasonable justification.

    (Auth.: HAR §11-60.1-101, 40 CFR §70.5(a)(1)(iii))[1]

26. The terms and conditions included in this permit, including any provision designed to limit a source's potential to emit, are federally enforceable unless such terms, conditions, or requirements are specifically designated as not federally enforceable.

    (Auth.: HAR §11-60.1-93)

27. The compliance plan and compliance certification submittal requirements shall be in accordance with HAR, Sections 11-60.1-85 and 11-60.1-86. As specified in HAR,

Section 11-60.1-86, the compliance certification shall be submitted to the Department and the U.S. EPA, Region 9, once per year, or more frequently as set by any applicable requirement.

(Auth.: HAR §11-60.1-90)

28. **Any document (including reports) required to be submitted by this permit shall be certified as being true, accurate, and complete by a responsible official in accordance with HAR, Sections 11-60.1-1 and 11-60.1-4, and shall be mailed to the following address:**

Clean Air Branch
Environmental Management Division
Hawaii Department of Health
P.O. Box 3378
Honolulu, HI 96801-3378

Upon request and as required by this permit, all correspondence to the State of Hawaii Department associated with this Covered Source Permit shall have duplicate copies forwarded to:

Chief
Permits Office, (Attention: Air-3)
Air Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

(Auth.: HAR §11-60.1-4, §11-60.1-90)

29. To determine compliance with submittal deadlines for time-sensitive documents, the postmark date of the document shall be used. If the document was hand-delivered, the date received ("stamped") at the Clean Air Branch shall be used to determine the submittal date.

(Auth.: HAR §11-60.1-5, §11-60.1-90)

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[1]The citations to the Code of Federal Regulations (CFR) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the CFR. Due to the integration of the preconstruction and operating permit requirements, permit conditions may incorporate more stringent requirements than those set forth in the CFR.

[2]The citations to the State Implementation Plan (SIP) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the SIP.

ATTACHMENT II: SPECIAL CONDITIONS
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In addition to the standard conditions of the Covered Source Permit, the following special conditions shall apply to the permitted facility:

Section A. Equipment Description

1. This permit encompasses the following equipment and associated appurtenances:

   a. Kekaha Sanitary Landfill; and
   b. Active Landfill Gas Collection and Control system for landfill consisting of enclosed flare, extraction wells, landfill gas piping, and associated equipment.

   (Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.1, §60.752)[1]

Section B. Definitions

For the purposes of this permit, the following definitions shall be used:

1. *Active Collection System* means a gas collection system that uses gas mover equipment.

2. *Active Landfill* means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

3. *Bioreactor* means a Municipal Solid Waste (MSW) landfill or portion of a MSW landfill where any liquid other than leachate (leachate includes landfill gas condensate) is added in a controlled fashion into the waste mass (often in combination with recirculating leachate) to reach a minimum average moisture content of at least 40 percent by weight to accelerate or enhance the anaerobic (without oxygen) biodegradation of the waste.

4. *Closed Landfill* means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under 40 Code of Federal Regulations (CFR) §60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed.

5. *Closure* means that point in time when a landfill becomes a closed landfill.

6. *Commercial Solid Waste* means all types of solid waste generated by stores, offices, restaurants, warehouses, and other non-manufacturing activities, excluding residential and industrial wastes.

7. *Controlled Landfill* means any landfill at which collection and control systems are required under 40 CFR Part 60, Subpart WWW, as a result of the non-methane organic compounds emission rate. ~~The landfill is considered controlled at the time a collection and control system design plan is submitted in compliance with 40 CFR §60.752(b)(2)(i).~~

8. *Design Capacity* means the maximum amount of solid waste a landfill can accept, as indicated in terms of volume or mass in the most recent permit issued by the State, local, or Tribal agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site specific density, which must be recalculated annually.

9. *Deviation* means any instance in which an affected source subject to 40 CFR Part 60, Subpart WWW, or an owner or operator of such a source:

    a. Fails to meet any requirement or obligation established by this subpart, including, but not limited to, any emissions limitation (including any operating limit) or work practice standard;
    b. Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or
    c. Fails to meet any emission limitation (including any operating limit) or work practice standard in this subpart during Startup, Shutdown, or Malfunction, regardless of whether or not such failure is permitted by this subpart.

10. *Disposal Facility* means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

11. *Emission Rate Cutoff* means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

12. *Emissions Limitation* means any emission limit, opacity limit, operating limit, or visible emissions limit.

13. *Enclosed Combustor* means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

14. *EPA Approved State Plan* means a State plan that EPA has approved based on the requirements in 40 CFR Part 60, Subpart B to implement and enforce 40 CFR Part 60, Subpart Cc. An approved State plan becomes effective on the date specified in the notice published in the Federal Register announcing EPA's approval.

15. *Federal Plan* means the EPA plan to implement 40 CFR Part 60, Subpart Cc for existing MSW landfills located in States and Indian country where State plans or tribal plans are not currently in effect. On the effective date of an EPA approved State or tribal plan, the Federal plan no longer applies. The Federal plan is found at 40 CFR Part 62, Subpart GGG.

16. *Flare* means an open combustor without enclosure or shroud.

17. *Gas Mover Equipment* means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.

18. *Household Waste* means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).

19. *Industrial Solid Waste* means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, Parts 264 and 265 of the CFR, Title 40. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste, or oil, and gas waste.

20. *Interior Well* means any well or similar collection component located inside the perimeter of the landfill waste. A perimeter well located outside the landfilled waste is not an interior well.

21. *Landfill* means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under 40 CFR §257.2.

22. *Lateral Expansion* means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

23. *Modification* means an increase in the permitted volume design capacity of the landfill by either horizontal or vertical expansion based on its permitted design capacity as of May 30, 1991. Modification does not occur until the owner or operator commences construction on the horizontal or vertical expansion.

24. *Municipal Solid Waste Landfill* or *MSW Landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. A MSW landfill may also receive other types of Resource Conservation and Recovery Act, Subtitle D wastes (40 CFR §257.2) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of a MSW landfill may be separated by access roads. A MSW landfill may be publicly or privately owned. A MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

25. *Municipal solid waste landfill emissions* or *MSW landfill emissions* means gas generated by the decomposition of organic waste deposited in a MSW landfill or derived from the evolution of organic compounds in the waste.

26. *NMOC* means non-methane organic compounds, as measured according to the provisions of 40 CFR §60.754.

27. *Nondegradable waste* means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

28. *Passive collection system* means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

29. *Sludge* means any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

30. *Solid waste* means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under 33 U.S.C. 1342, or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (42 U.S.C 2011 et seq.).

31. *Sufficient density* means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in 40 CFR 60, Subpart WWW.

32. *Sufficient extraction rate* means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

33. *Tribal plan* means a plan submitted by a tribal authority pursuant to 40 CFR Parts 9, 35, 49, 50, and 81 to implement and enforce 40 CFR Part 60, Subpart Cc.

34. *Work practice standard* means any design, equipment, work practice, or operational standard, or combination thereof that is promulgated pursuant to Section 112(h) of the Clean Air Act.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §60.751, 40 CFR §63.1990)[1]

Section C. Applicable Federal Regulations

1. The Kekaha Landfill is subject to the provisions of the following federal regulations:

   a. 40 CFR Part 60, Standards of Performance for New Stationary Sources, Subpart A - General Provisions;
   b. 40 CFR Part 60, Standards of Performance for New Stationary Sources, Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills;
   c. 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories, Subpart A - General Provisions; and
   d. 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories, Subpart AAAA - Municipal Solid Waste Landfills.

   (Auth: HAR §11-60.1-3, §60.1-90, §60.1-174; 40 CFR §60.1, §60.750, 40 CFR §63.1930)[1]

2. The permittee shall comply with all applicable provisions of these standards including all emission limits, notification, testing, monitoring, and reporting requirements.

   In addition to the requirements of Hawaii Revised Statues, Chapter 342B and Hawaii Administrative Rules, Chapters 11-59 and 60.1, the conditions specified in this Attachment are incorporated pursuant to Federal regulations 40 CFR Part 60, Subparts A and WWW and 40 CFR Part 63, Subparts A and AAAA. Except as may be required by the aforementioned state law and rules, should there be a conflict between the conditions of this attachment and the aforementioned Federal regulations, the Federal regulations shall take precedence.

   (Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.1, §60.750, 40 CFR §63.1930)[1]

Section D. Operational Standards for the Collection and Control System

1. Landfill Air Emission Standards

   a. The landfill shall comply with the following:

      i. ~~Submit a collection and control system design plan prepared by a professional engineer to the Department and U.S. EPA, Region 9, by June 2, 2015, unless Tier 2 or Tier 3 sampling demonstrates that the emission rate is less than fifty (50) megagrams per year, as specified in 40 CFR §60.757(c)(1) or (2).~~

         1) ~~The collection and control system as described in the plan shall meet the design requirements of this attachment, Special Condition D.1.a.ii.~~
         2) ~~The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of 40 CFR §§60.753 through 60.758 proposed by the owner or operator.~~

3) ~~The collection and control system design plan shall either conform with specifications for active collection systems in 40 CFR §60.759 or include a demonstration which satisfies to the Department and/or U.S. EPA, Region 9, as applicable, the sufficiency of the alternative provisions to 40 CFR §60.759.~~
4) ~~The Department and/or U.S. EPA, Region 9, as applicable, shall review the information submitted under this attachment, Special Conditions D.1.a.i.1 thru D.1.a.i.3, and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.~~

ii. Install a collection and control system that captures the gas generated within the landfill as required by this attachment, ~~Special Conditions D.1.a.ii and D.1.a.iii by December 1, 2016,~~ unless Tier 2 or Tier 3 sampling, demonstrates that the emission rate is less than fifty (50) megagrams per year, as specified in 40 CFR §60.757(c)(1) or (2).

1) The Active collection system shall:

a) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;
b) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:

i) Five (5) years or more if active; or
ii) Two (2) years or more if closed or at final grade.

c) Collect gas at a sufficient extraction rate; and
d) Be designed to minimize off-site migration of subsurface gas.

iii. Route all the collected gas to a control system that complies with the requirements in either paragraph 1), 2), or 3) of this section.

1) An open flare designed and operated in accordance with 40 CFR §60.18 except as noted in 40 CFR §60.754(e);
2) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than twenty (20) parts per million (ppm) by volume, dry basis as hexane at three (3) percent oxygen. The reduction efficiency or ppm by volume shall be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in 40 CFR §60.754(d).

a) If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.
b) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in 40 CFR §60.756;

3) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of this attachment, Special Conditions D.1.a.iii.1) or D.1.a.iii.2).

iv. Operate the collection and control device installed to comply with this subpart in accordance with the provisions of 40 CFR §§60.753, 60.755, and 60.756.

v. The collection and control system may be capped or removed provided that all the conditions of paragraphs 1), 2), and 3) of this section are met:

1) The landfill shall be a closed landfill as defined in this attachment, Special Condition B.4. A closure report shall be submitted to the Department and U.S. EPA, Region 9, as provided in this attachment, Special Condition G.8;
2) The collection and control system shall have been in operation a minimum of fifteen (15) years; and
3) Following the procedures specified in 40 CFR §60.754(b), the calculated NMOC gas produced by the landfill shall be less than fifty (50) megagrams per year on three (3) successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.752)[1]

2. Gas Collection System Standards

Each owner or operator of a MSW landfill gas collection and control system used to comply with the provisions of 40 CFR §60.752(b)(2)(ii) shall:

a. Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

i. Five (5) years or more if active; or
ii. Two (2) years or more if closed or at final grade.

b. Operate the collection system with negative pressure at each wellhead except under the following conditions:

i. A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the monitoring reports as provided in this attachment, Special Condition G.2;

ii. Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan; and
iii. A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Department and/or U.S. EPA, Region 9, as applicable.

c. Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C and with either a nitrogen level less than twenty (20) percent or an oxygen level less than five (5) percent. The permittee may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

i. The nitrogen level shall be determined using 40 CFR Part 60, Appendix A, Method 3C, unless an alternative test method is established as allowed by 40 CFR §60.752(b)(2)(i).
ii. Unless an alternate test method is established as allowed by 40 CFR §60.752(b)(2)(i), the oxygen shall be determined by an oxygen meter using 40 CFR Part 60, Appendix A, Method 3A or 3C except that:

1) The span shall be set so that the regulatory limit is between twenty (20) and fifty (50) percent of the span;
2) A data recorder is not required;
3) Only two (2) calibration gases are required, a zero and span, and ambient air may be used as the span;
4) A calibration error check is not required; and
5) The allowable sample bias, zero drift, and calibration drift are ±10 percent.

d. Operate the collection system so that the methane concentration is less than 500 ppm above background at the surface of the landfill. To determine if this level is exceeded, the permittee shall conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at thirty (30) meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The permittee may establish an alternate traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the thirty (30) meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing;
e. Operate the system such that all collected gases are vented to the gas collection and control system designed and operated in compliance with 40 CFR §60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one (1) hour;
f. Operate the control or treatment system at all times when the collected gas is routed to the system; and

g. If monitoring demonstrates that the operational requirements of this attachment, Special Conditions D.2.b, D.2.c, or D.2.d are not met, the permittee shall take corrective action as specified in Section E of this attachment. If corrective actions are taken as specified, the monitored exceedance is not a violation of the operational requirements in this section.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.753)[1]

3. Visible Emissions

a. The permittee shall take measures to control fugitive dust at all material transfer points and throughout the workyard. The Department may at any time require the permittee to further abate fugitive dust emissions if an inspection indicates poor or insufficient control.
b. The permittee shall not cause or permit fugitive dust to become airborne without taking reasonable precautions and shall not cause or permit the discharge of visible emissions of fugitive dust beyond the lot line of the property on which the emissions originate.
c. For any six (6) minute averaging period, the enclosed flare shall not exhibit visible emissions of twenty (20) percent or greater, except as follows: during start-up, shutdown, or equipment breakdown, the enclosed flare may exhibit visible emissions not greater than twenty (20), but not exceeding sixty (60) percent opacity for a period aggregating not more than six (6) minutes in any sixty (60) minute period.

(Auth: HAR §11-60.1-3, §11-60.1-33, §11-60.1-90)

Section E. Compliance Provisions

1. ~~Except as provided in the collection and control system design plan submitted pursuant to this attachment, Special Condition D.1.a.i,~~ the permittee shall use the following methods to determine whether the gas collection system is in compliance with this attachment, ~~Special Conditions D.1.a.ii.1~~ and D.1.a.iii.

a. Calculation of Maximum Expected Gas Generation Flow Rate

For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with 40 CFR §60.752(b)(2)(ii)(A)(1), one of the following equations shall be used. The k and L_o kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42) or other site specific values demonstrated to be appropriate and approved by the Department. If k has been determined as specified in this attachment, Section H, the value of k determined from the test shall be used. A value of no more than fifteen (15) years shall be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

i. For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_oR\ (e^{-kc} - e^{-kt}) \text{ where,}$$

Q_m = maximum expected gas generation flow rate (m^3/yr)
L_o = methane generation potential, (m^3/Mg solid waste)
R = average annual acceptance rate (Mg/yr)
k = methane generation rate constant ($year^{-1}$)
t = age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation (years)
c = time since closure (years) (for an active landfill c = 0 and e^{-kc} = 1)

ii. For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^{n} 2kL_oM_i\left(e^{-kt_i}\right)$$

Q_M = maximum expected gas generation flow rate (m^3/year)
k = methane generation rate constant ($year^{-1}$)
L_o = methane generation potential, (m^3/Mg solid waste)
M_i = mass of solid waste in the i^{th} section (Mg)
t_i = age of the i^{th} section (years)

iii. If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate ~~instead of, or in conjunction with, the equations in this attachment, Special Conditions E.1.a.i and E.1.a.ii.~~ If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in this attachment, Special Conditions E.1.a.i and E.1.a.ii, or other methods shall be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

b. Gas Collector Density

For the purposes of determining sufficient density of gas collectors for compliance with 40 CFR §60.752(b)(2)(ii)(A)(2), the permittee shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Department and/or U.S. EPA, Region 9, as applicable, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

c. Gas Collection System Flow Rate

For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with 40 CFR §60.752(b)(2)(ii)(A)(*3*), the owner or

operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within five (5) calendar days, except for the three (3) conditions allowed under this attachment, Special Condition D.2.b. If negative pressure cannot be achieved without excess air infiltration within fifteen (15) calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Department and/or U.S. EPA, Region 9, as applicable, for approval.

d. Owners or operators are not required to install additional wells as required in this attachment, Special Condition E.1.c during the first 180 days after gas collection system startup.

e. Identification of Excess Air Infiltration

For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in 40 CFR §60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within five (5) calendar days. If correction of the exceedance cannot be achieved within fifteen (15) calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Department and/or U.S. EPA, Region 9, as applicable.

f. An owner or operator seeking to demonstrate compliance with §60.752(b)(2)(ii)(A)(*4*) through the use of a collection system not conforming to the specifications provided in 40 CFR §60.759, shall provide information as specified in §60.752(b)(2)(i)(C) satisfactory to the Department and/or U.S. EPA, Region 9, as applicable, demonstrating that off-site migration is being controlled.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

2. For purposes of compliance with 40 CFR §60.753(a), the permittee of a controlled landfill shall place each well or design component as specified in the approved design plan. Each well shall be installed no later than sixty (60) days after the date on which the initial solid waste has been in place for a period of:

a. Five (5) years or more if active; or
b. Two (2) years or more if closed or at final grade.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

3. The following procedures shall be used for compliance with the surface methane operational standard as provided in this attachment, Special Condition D.2.d.

   a. After installation of the collection system, the permittee shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at thirty (30) meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in this attachment, Special Condition E.4.
   b. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least thirty (30) meters from the perimeter wells.
   c. Surface emission monitoring shall be performed in accordance with §4.3.1 of Method 21 of 40 CFR Part 60, Appendix A, except that the probe inlet shall be placed within five (5) to ten (10) centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.
   d. Any reading of 500 ppm or more above background at any location shall be recorded as a monitored exceedance and the following actions shall be taken. As long as the specified actions are taken, the exceedance is not a violation of this attachment, Special Condition D.2.d.

      i. The location of each monitored exceedance shall be marked and the location recorded.
      ii. Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within ten (10) calendar days of detecting the exceedance.
      iii. If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within ten (10) days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in this attachment, Special Condition E.3.d.v shall be taken, and no further monitoring of that location is required until the action specified in this attachment, Special Condition E.3.d.v has been taken.
      iv. Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the ten-day (10-day) re-monitoring specified in this attachment, Special Conditions E.3.d.ii or E.3.d.iii shall be re-monitored one-month (1-month) from the initial exceedance. If the one-month (1-month) re-monitoring shows a concentration less than 500 ppm above background, no further monitoring of that location is required until the next quarterly monitoring period. If the one-month (1-month) re-monitoring shows an exceedance, the actions specified in this attachment, Special Conditions E.3.d.ii or E.3.d.iii shall be taken.
      v. For any location where monitored methane concentration equals or exceeds 500 ppm above background three (3) times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation

may be submitted to the Department and/or U.S. EPA, Region 9, as applicable, for approval.

e. The permittee shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

4. The permittee shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

   a. The portable analyzer shall meet the instrument specifications provided in Section 3 of Method 21 of 40 CFR 60, Appendix A, except that "methane" shall replace all references to VOC;
   b. The calibration gas shall be methane, diluted to a nominal concentration of 500 ppm in air;
   c. To meet the performance evaluation requirements in Section 3.1.3 of Method 21 of 40 CFR Part 60, Appendix A, the instrument evaluation procedures of Section 4.4 of Method 21 of 40 CFR Part 60, Appendix A shall be used; and
   d. The calibration procedures provided in Section 4.2 of Method 21 of 40 CFR Part 60, Appendix A shall be followed immediately before commencing a surface monitoring survey.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

5. The provisions of this attachment, Section E apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction, shall not exceed five (5) days for collection systems and shall not exceed one (1) hour for treatment or control devices.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.755)[1]

6. If you are required by 40 CFR §60.752(b)(2) of Subpart WWW, the Federal plan, or an EPA approved and effective State or tribal plan to install a collection and control system, you must comply with the requirements in 40 CFR §§63.1960 through 63.1985 and with the general provisions of this part specified in Table 1 of 40 CFR Part 63, Subpart AAAA.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174, 40 CFR §63.1955)[1]

7. All affected sources must comply with the Startup, Shutdown, and Malfunction (SSM) requirements, in Subpart A of 40 CFR Part 63, Subpart AAAA, as specified in Table 1 of this subpart and all affected sources must submit compliance reports every six (6) months as specified in §63.1980(a) and (b), including information on all deviations that occurred during the six-month (6-month) reporting period. Deviations for continuous emission

monitors or numerical continuous parameter monitors must be determined using a three-hour (3 hour) monitoring block average.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174, 40 CFR §63.1955)[1]

8. Compliance with 40 CFR Part 63, Subpart AAAA, is determined in the same way it is determined for 40 CFR Part 60, Subpart WWW, including performance testing, monitoring of the collection system, continuous parameter monitoring, and other credible evidence. In addition, continuous parameter monitoring data, collected under 40 CFR §60.756(b)(1), (c)(1), and (d) of Subpart WWW, are used to demonstrate compliance with the operating conditions for control systems. If a deviation occurs, you have failed to meet the control device operating conditions described in 40 CFR Part 63, Subpart AAAA, and have deviated from the requirements of 40 CFR Part 63, Subpart AAAA. Finally, you must develop a written SSM plan according to the provisions in 40 CFR §63.6(e)(3). A copy of the SSM plan must be maintained on site. Failure to write or maintain a copy of the SSM plan is a deviation from the requirements of 40 CFR Part 63, Subpart AAAA.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174, 40 CFR §63.1960)[1]

9. A deviation is defined in 40 CFR §63.1990. For the purposes of the landfill monitoring and SSM plan requirements, deviations include the following:

   a. A deviation occurs when the control device operating parameter boundaries described in 40 CFR §60.758(c)(1) of Subpart WWW are exceeded;
   b. A deviation occurs when one-hour (1-hour) or more of the hours during the three-hour (3-hour) block averaging period does not constitute a valid hour of data. A valid hour of data must have measured values for at least three (3) fifteen-minute (15-minute) monitoring periods within the hour; and
   c. A deviation occurs when a SSM plan is not developed or maintained on site.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174, 40 CFR §63.1960, 63.1965)[1]

Section F. Monitoring and Recordkeeping Requirements

Monitoring Requirements

1. Active Gas Collection System

~~Except as provided in the collection and control system design plan submitted pursuant to this attachment, Special Condition D.1.a.i,~~ the permittee with an active gas collection system shall install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:

   a. Measure the gauge pressure in the gas collection header on a monthly basis as provided for in this attachment, Special Condition E.1.c;

b. Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis; as provided for in this attachment, Special Condition E.1.e; and
c. Monitor temperature of the landfill gas on a monthly basis as provided in this attachment, Special Condition E.1.e.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

2. Enclosed Flare

The permittee shall calibrate, maintain, and operate the following equipment according to the manufacturer's specifications:

a. A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ±1percent of the temperature being measured expressed in degrees Celsius or ±0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than forty-four (44) megawatts.
b. A device that records flow to or bypass of the control device. The permittee shall either:

   i. Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every fifteen (15) minutes; or
   ii. Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

3. Surface Concentrations of Methane

The permittee shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in this attachment, Special Condition No. E.4. Any closed landfill that has no monitored exceedances of the operational standard in three (3) consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

4. Alternatives

All of the specified alternatives in the collection and control design plan shall comply with any additional monitoring requirements set forth in the plan as approved by the Department and/or U.S. EPA, Region 9, as applicable.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

5. Performance Tests

   Initial and annual source performance tests shall be conducted on the collection and control system pursuant to this attachment, Section H. Test summaries and results shall be maintained in accordance with the requirements of this section.

   (Auth: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90)[1]

6. In the event that the collection and control system is not in operation and in compliance with this attachment, Sections D and E:

   a. Annual NMOC emission rates shall be calculated in accordance with this attachment, Section G; and
   b. NMOC emission rate reports shall be submitted in accordance with this attachment, Special Condition G.4.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.757)[1]

7. Visible Emissions (VE)

   The permittee shall conduct **monthly** (*calendar month*) VE observations for the enclosed flare in accordance with 40 CFR Part 60, Appendix A, Method 9, or U.S. EPA approved equivalent methods, or alternate methods with prior written approval from the Department. For each month, two (2) consecutive six (6) minute observations shall be taken at fifteen (15) second intervals for each equipment. Records shall be completed and maintained in accordance with the *Visible Emissions Form Requirements.*

   (Auth: HAR §11-60.1-8, §11-60.1-15, §11-60.1-16, §11-60.1-90)

Recordkeeping Requirements

8. All records, including support information, shall be maintained for at least five (5) years from the date of the monitoring sample, measurement, test, report, or application. Support information includes all maintenance, inspection, and repair records, and copies of all reports required by this permit. These records shall be true, accurate, and maintained in a permanent form suitable for inspection, and made available to the Department or its representative upon request.

   (Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.758)[1]

9. Each permittee that specified alternatives in the collection and control design plan shall comply with any additional recordkeeping requirements set forth in the plan as approved by the Department.

   (Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.758)[1]

10. Except as provided in the collection and control system design plan approved by the Department, the permittee shall maintain the following records:

    a. Equipment operating parameters specified to be monitored in this attachment, Special Conditions F.1 thru F.4, including:

        i. Gauge pressure in each extraction well;
        ii. Nitrogen or oxygen concentration in extracted landfill gas;
        iii. Temperature of extracted landfill gas;
        iv. Methane concentrations along landfill surface;
        v. Gas flow from collection system to the control device; and
        vi. Combustion temperature of an enclosed combustion device or the continuous presence of a pilot flame for an open flare.

    b. The following data, as measured during the initial performance test or compliance determination shall be maintained for the life of the control equipment. Records of subsequent tests or monitoring shall be maintained for a minimum of five (5) years.

        i. The maximum expected gas generation flow rate as calculated in this attachment, Special Condition E.1.a. The owner or operator may use another method to determine the maximum gas generation flow rate, if the method is included in the collection and control system design plan approved by the Department and/or U.S. EPA, Region 9, as applicable.
        ii. The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in this attachment, Special Condition E.1.

    c. Instances in which positive pressure occurs in efforts to avoid a fire, including the date, time, and duration of positive pressure.
    d. Periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.
    e. Continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines.
    f. Plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector for the life of the collection system, including:

        i. Installation date and location of all newly installed collectors; and
        ii. Documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as well as any nonproductive areas excluded from collection.

    g. All collection and control system exceedances of the operational standards in this attachment, Section D, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance. Records

shall also include the dates, times, duration, reasons, sampler's name, and any corrective actions, as applicable.

h. Source performance test plans, summaries, and results for the collection and control system.

i. Equipment inspection, maintenance, and repair work. A log shall be maintained for the equipment covered under this permit. Replacement of parts and repairs to the facility shall be well documented. As a minimum, the log shall include:

   i. Date of the inspection/maintenance/repair;
   ii. Description of the findings and any maintenance/repair work performed; and
   iii. The name and title of the personnel performing the inspection/work.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.753, §60.758)[1]

8. Records of the control device vendor specifications shall be maintained until removal.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.753, §60.758)[1]

Section G. Notification and Reporting Requirements

1. Notification and reporting pertaining to the following events for each landfill shall be done in accordance with Attachment I, Standard Conditions 14, 16, 17, and 25, respectively.

   a. *Anticipated date of initial start-up, actual date of construction commencement, and actual date of start-up;*
   b. *Intent to shut down air pollution control equipment for necessary scheduled maintenance;*
   c. *Emissions of air pollutants in violation of HAR, Chapter 11-60.1 or this permit (excluding technology-based emission exceedances due to emergencies); and*
   d. *Permanent discontinuance of construction, modification, relocation, or operation of the facility covered by this permit.*

   (Auth: HAR §11-60.1-8, §11-60.1-15, §11-60.1-16, §11-60.1-90; SIP §11-60-10, §11-60-16)[2]

2. Monitoring Reports

   The permittee shall submit **semi-annually** the following written report to the Department. The report shall be submitted **within sixty (60) days after** *the end of each semi-annual calendar period (January 1 - June 30 and July 1 - December 31),* and shall include:

   a. Information as required by the Annual Report in this attachment, Special Condition G.3; and
   b. Additional information, including:

i. Average and maximum gauge pressure within each gas extraction well measured over six-month (6-month) period;
ii. Average and maximum nitrogen concentration or average and maximum oxygen concentration measured over six-month (6-month) period;
iii. Average and maximum landfill gas temperature in extraction well measured over six-month (6-month) period;
iv. Average and maximum methane concentration at landfill surface measured over quarterly period. If annual monitoring is allowed, the average and maximum methane concentration at landfill surface during the most recent monitoring event;
v. Identification of any instances when the gas flow has been diverted from the control device, enclosed combustor, or open flare;
vi. Average, maximum, and minimum combustion temperature of an enclosed combustion device, as applicable;
vii. Identification of any instances in which the pilot flame or flare flame for an open flare was not present;
viii. For all maximum values, include the date and time that the value was identified;
ix. For all instances of non-compliance, indicate the dates, times, duration, and reason;
x. Any opacity exceedances as determined by the required monthly visible emissions monitoring. Each exceedance reported shall include the date, six (6) minute average opacity reading, possible reasons for exceedance, duration of exceedance, and corrective actions taken. If there were no exceedances, the permittee shall submit in writing a statement indicating that for each equipment there were no exceedances for that semi-annual period; and
xi. All deviations from the requirements of 40 CFR Part 63, Subpart AAAA, including the actions taken during a startup, shutdown, or malfunction, were consistent with the procedures in the SSM plan, that occurred during the six-month (6-month) reporting period

The Monitoring Report Form(s): **Collection and Control System**, and **Visible Emissions** shall be used.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.756)[1]

3. Annual Reports

The permittee with an active collection system shall submit to the Department and U.S. EPA, Region 9, annual reports of the recorded information in Conditions G.3.a through G.3.f of this paragraph. ~~The initial report shall be submitted~~ **within 180 days** ~~*of installation and start-up of the collection and control system,* and shall include the initial performance test report required under 40 CFR §60.8.~~ For enclosed combustion devices and flares, reportable exceedances are defined under 40 CFR §60.758(c).

a. Value, date, time, and duration of each exceedance of applicable parameters for:

i. Gauge pressure in the gas collection header;
ii. Nitrogen or oxygen concentration in the landfill gas;

iii. Temperature of landfill gas; and
iv. Surface concentrations of methane.

b. Description, reason, dates, start and end times, and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified in Attachment II, Section E.
c. Description, reason, dates, start and end times, and duration of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating.
d. All periods when the collection system was not operating in excess of five (5) days, including dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation.
e. The location of each exceedance of the 500 ppm surface methane concentration as provided in 40 CFR §60.753(d), concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance.
f. The date of installation and the location of each well or collection system expansion added.

The Supplemental Report Form: ***Annual Report*** shall be used.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.758)[1]

4. Annual Report Submission

Pursuant to 40 CFR §63.1980, the annual report described in this attachment, Special Condition G.3, shall be updated and submitted every six (6) months.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.758, 40 CFR §63.1980)[1]

5. Annual Emissions Reporting

As required by Attachment IV, the permittee shall report annually the NMOC emission rate and total tons per year emitted of each regulated air pollutant from the municipal solid waste landfill facility, including hazardous air pollutants. The reporting of annual emissions is due **within sixty (60) days following** *the end of each calendar year.*

The enclosed Annual Emissions Report Form: ***Municipal Solid Waste Landfills*** shall be used for reporting.

Upon written request of the facility, the deadline for reporting of annual emissions may be extended, if the Department determines that reasonable justification exists for the extension.

(Auth: HAR §11-60.1-3, §11-60.1-90)

6. Performance Test Reports

   a. At least **thirty (30) days prior** *to conducting a source performance test*, the permittee shall submit to the Department a test plan in accordance with this attachment, Special Condition H.4.
   b. Written reports of the results of all source performance tests conducted pursuant to this permit shall be submitted to the Department **within sixty (60) days** *after the completion of the performance test* in accordance with this attachment, Special Condition H.6.

   (Auth: HAR §11-60.1-3, §11-60.1-90)

7. Design Capacity Increase

   The permittee shall submit information regarding landfill modifications (as defined in Special Condition B.23) to the Department at least **thirty (30) days prior** to commencement of construction. The information submitted shall include the following:

   a. Name, address, and phone number of the facility, and the plant site manager or other contact;
   b. Current design capacity of the landfill (m^3 and Mg);
   c. Current site-specific density (Mg/m^3);
   d. Description of the reconstruction or modification;
   e. Site map of the landfill containing the following information:

      i. Location of the landfill and area of proposed modification or reconstruction;
      ii. Current lateral boundaries of the existing landfill;
      iii. Proposed lateral boundaries of the expansion;
      iv. Current and proposed vertical dimensions of the landfill;
      v. Projected date of construction commencement;
      vi. Projected waste acceptance rate for the proposed modification;
      vii. Certification that no air pollution equipment will be added to the facility and operational methods will remain similar as permitted under this Covered Source Permit;
      viii. Certification that the permittee shall comply with each applicable requirement of this Covered Source Permit;
      ix. Other information as may be required by the Department; and
      x. A ***certified statement by a responsible official*** that all information contained in the notification is accurate and true.

   The enclosed Supplemental Report Form: ***Modification/Reconstruction of MSW Landfill*** shall be used.

   (Auth: HAR §11-60.1-3, §11-60.1-90)

8. Landfill Closure

The permittee shall submit a **closure report** to the Department **within 30 days** of waste acceptance cessation. If a closure report is submitted, no additional wastes may be placed into the landfill without filing a notification of modification as in 40 CFR §60.7(a)(4). The closure report shall contain the following information:

a. Last day of waste acceptance (month, day, year);
b. Date of closure (month, day, year);
c. Design capacity (Mg and m^3);
d. Quantity of refuse-in-place (Mg and m^3);
e. Identification and quantity of additional capacity, if any;
f. Certification that no additional waste will be placed in the landfill; and
g. Name, address, and phone number of the facility, and the plant site manager or other contact.

The enclosed Supplemental Report Form: ***Notification of Landfill Closure*** shall be used.

The Department may request additional information as may be necessary to verify that permanent closure has taken place in accordance with 40 CFR §258.60.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.757)[1]

9. Equipment Removal Notification

The permittee shall submit an equipment removal report to the Department **thirty (30) days prior** to removal or cessation of operation of the control equipment.

a. The equipment removal report shall contain the following items:

i. A copy of the closure report submitted in accordance with Special Condition G.7;
ii. A copy of the initial performance test report demonstrating that the fifteen (15) year minimum control period has expired; and

iii. Dated copies of three (3) successive NMOC emission rate reports demonstrating that the landfill is no longer producing fifty (50) megagrams or greater of NMOC per year.

b. The Department may request such additional information as may be necessary to verify that all of the conditions for removal in Special Condition G.11 have been met.

The enclosed Supplemental Report Form: ***Notification of Collection and Control Equipment Removal*** shall be used.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.757)[1]

10. Compliance Certification

During the permit term, the permittee shall submit at least **annually** to the Department and U.S. EPA, Region 9, a compliance certification pursuant to HAR, Subsection 11-60.1-86. The permittee shall indicate whether or not compliance is being met with each term or condition of this permit. The compliance certification shall include at a minimum the following information:

a. The identification of each term or condition of the permit that is the basis of the certification;
b. The compliance status;
c. Whether compliance was continuous or intermittent;
d. The methods used for determining the compliance status of the source currently and over the reporting period;
e. Any additional information indicating the source's compliance status with any applicable enhanced monitoring and compliance certification including the requirements of Section 114(a)(3) of the Clean Air Act or any applicable monitoring and analysis provisions of Section 504(b) of the Clean Air Act;
f. A brief description of any deviations including identifying as possible exceptions to compliance any periods during which compliance is required and in which the excursion or exceedances as defined in 40 CFR Part 64 occurred; and
g. Any additional information as required by the Department including information to determine compliance.

*The compliance certification shall be submitted within **sixty (60) days after** the end of each calendar year, and shall be signed and dated by a responsible official.*

Upon written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department determines that reasonable justification exists for the extension.

(Auth.: HAR §11-60.1-4, §11-60.1-86, §11-60.1-90)

11. Discontinuance of the Collection and Control System

The permittee shall calculate the NMOC emission rate for purposes of determining when a collection and control system can be removed, using the following equation:

$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC}$, where
M_{NMOC} = mass emission rate of NMOC (Mg/yr)
Q_{LFG} = flow rate of landfill gas (m^3/min)
C_{NMOC} = NMOC concentration (ppm by volume as hexane)

a. The flow rate of landfill gas, Q_{LFG}, shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of Section 4 of Method 2E of 40 CFR Part 60, Appendix A.

b. The average NMOC concentration, C_{NMOC}, shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25C or Method 18 of 40 CFR Part 60, Appendix A. If using Method 18 of Appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The permittee shall divide the NMOC concentration from Method 25C of 40 CFR Part 60, Appendix A, by six (6) to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.
c. The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Department and/or U.S. EPA, Region 9, as applicable.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754)[1]

Section H. Testing Requirements

1. **Within sixty (60) days after** *achieving the maximum production rate* of the collection and control system but not later than one hundred eighty (180) days after initial start-up, and annually thereafter, the permittee shall conduct or cause to be conducted performance tests on the collection and control system for the following purposes:

   a. To establish the reduction efficiency or parts per million volume (ppmv) of a control system designed and operated to reduce NMOC by ninety-eight (98) weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by ninety-eight (98) weight percent or reduce the outlet NMOC concentration to less than twenty (20) ppm by volume, dry basis as hexane at three (3) percent oxygen.

   The Department may require testing at other points in the facility or more frequent testing if an inspection indicates poor or insufficient controls.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.754)[1]

2. The performance tests for the emissions of NMOC shall be conducted and results reported in accordance with the test methods set forth in 40 CFR Part 60, Appendix A, and 40 CFR Part 60.8. The following test methods or U.S. EPA approved equivalent methods with written consent from the Department shall be used:

   a. The permittee shall use Method 25, 25C, or Method 18 of 40 CFR Part 60, Appendix A, to determine compliance with the ninety-eight (98) weight-percent efficiency or the twenty (20) ppmv outlet concentration level, unless another method to demonstrate compliance is included in the collection and control system design plan approved by the Department;
   b. The permittee shall use Method 3 or 3A, to determine the oxygen for correcting the NMOC concentration as hexane to three (3) percent;

c. The permittee shall use Method 25A in place of Method 25 in cases where the outlet concentration is less than fifty (50) ppm NMOC as carbon (eight (8) ppm NMOC as hexane);
d. If using Method 18 of Appendix A, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42); and
e. The permittee shall use the following equation to calculate efficiency:

Control Efficiency = $(NMOC_{in} - NMOC_{out})/NMOC_{in}$

Where, $NMOC_{in}$ = mass of NMOC entering control device and
$NMOC_{out}$ = mass of NMOC exiting control device.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754)[1]

3. The initial performance test report shall include the following information:

a. A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;
b. The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;
c. The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;
d. The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area;
e. The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and
f. The provisions for the control of off-site migration.

(Auth: HAR §11-60.1-3, §11-60.1-90, §11-60.1-174; 40 CFR §60.754, 60.757)[1]

4. The performance tests shall be made at the expense of the permittee and shall be conducted at the maximum expected operating capacity of the collection and control system. All performance tests may be monitored by the Department.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90, SIP §11-60-15)[2]

5. Unless otherwise specified in the applicable subpart, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of

determining compliance with an applicable standard, the arithmetic means of results of the three (3) runs shall apply.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90 40 CFR §60.8)[2]

6. At least **thirty (30) calendar days prior** *to conducting a performance test*, the owner or operator shall submit a written performance test plan to the Department that includes date(s) of the test, test duration, test locations, test methods, source operation, location of visible emissions, and other parameters that may affect performance test results. Such a plan shall conform to U.S. EPA guidelines including quality assurance procedures. A test plan or quality assurance plan that does not have the approval of the Department may be grounds to invalidate any test and require a retest.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90, 40 CFR §60.8, SIP §11-60-15)[1,2]

7. Any deviations from these conditions, test methods, or procedures may be cause for rejection of the test results unless such deviations are approved by the Department before the tests.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

8. **Within sixty (60) days after** *completion of the performance test*, the permittee shall submit to the Department the test report which shall include the operating conditions of the landfill gas collection and control system, the summarized test results, comparative results with the permit emissions limits, and other pertinent field data, laboratory data, and support calculations.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

9. Upon written request and justification, the Department may waive the requirement for, or a portion of, a specific performance test. The waiver request is to be submitted prior to the required test and must include documentation justifying such action. Documentation should include, but is not limited to, the results of the prior performance test indicating compliance by a wide margin, documentation of continuing compliance, and further that operations of the source have not changed since the previous test.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

Section I. Agency Notification

Any document, including reports, required to be submitted by this Covered Source Permit shall be done in accordance with Attachment I, Standard Condition No. 28.

(Auth: HAR §11-60.1-4, §11-60.1-90)

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[1]The citations to the Code of Federal Regulations (CFR) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the CFR. Due to the integration of the preconstruction and operating permit requirements, permit conditions may incorporate more stringent requirements than those set forth in the CFR.

[2]The citations to the State Implementation Plan (SIP) identified under a particular condition, indicate that the permit condition complies with the specified provision(s) of the SIP.

ATTACHMENT II - INSIG
SPECIAL CONDITIONS – INSIGNIFICANT ACTIVITIES
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In addition to the Standard Conditions of the Covered Source Permit, the following Special Conditions shall apply to the permitted facility:

Section A. Equipment Description

This attachment encompasses insignificant activities listed in HAR, §11-60.1-82(f) and (g) for which provisions of this permit and HAR, Subchapter 2, General Prohibitions apply.

(Auth: HAR §11-60.1-3)

Section B. Operational Limitations

1. The permittee shall take measures to operate applicable insignificant activities in accordance with the provisions of HAR, Subchapter 2 for visible emissions, fugitive dust, incineration, process industries, sulfur oxides from fuel combustion, storage of volatile organic compounds, volatile organic compound water separation, pump and compressor requirements, and waste gas disposal.

   (Auth: HAR §11-60.1-3, §11-60.1-82, §11-60.1-90)

2. The Department may at any time require the permittee to further abate emissions if an inspection indicates poor or insufficient controls.

   (Auth: HAR §11-60.1-3, §11-60.1-5, §11-60.1-82, §11-60.1-90)

Section C. Monitoring and Recordkeeping Requirements

1. The Department reserves the right to require monitoring, recordkeeping, or testing of any insignificant activity to determine compliance with the applicable requirements.

   (Auth: HAR §11-60.1-3, §11-60.1-90)

2. All records shall be maintained for at least five (5) years from the date of any required monitoring, recordkeeping, testing, or reporting. These records shall be in a permanent form suitable for inspection and made available to the Department or their authorized representative upon request.

   (Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

Section D. Notification and Reporting

Compliance Certification

During the permit term, the permittee shall submit at least **annually** to the Department and U.S. EPA, Region 9, the attached *Compliance Certification Form* pursuant to HAR,

Subsection 11-60.1-86. The permittee shall indicate whether or not compliance is being met with each term or condition of this permit. The compliance certification shall include at a minimum the following information:

1. The identification of each term or condition of the permit that is the basis of the certification;
2. The compliance status;
3. Whether compliance was continuous or intermittent;
4. The methods used for determining the compliance status of the source currently and over the reporting period;
5. Any additional information indicating the source's compliance status with any applicable enhanced monitoring and compliance certification, including the requirements of Section 114(a)(3) of the Clean Air Act or any applicable monitoring and analysis provisions of Section 504(b) of the Clean Air Act; and
6. A brief description of any deviations including identifying as possible exceptions to compliance any periods during which compliance is required and in which the excursion or exceedances as defined in 40 CFR Part 64 occurred; and
7. Any additional information as required by the Department including information to determine compliance.

The compliance certification shall be submitted **within sixty (60) days after** the end of each calendar year, and shall be signed and dated by a responsible official or authorized representative.

Upon written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department determines that reasonable justification exists for the extension.

In lieu of addressing each emission unit as specified in Attachment V, the permittee may address insignificant activities as a single unit provided compliance is met with all applicable requirements. If compliance is not totally attained, the permittee shall identify the specific insignificant activity and provide the details associated with the noncompliance.

(Auth: HAR §11-60.1-4, §11-60.1-86, §11-60.1-90

Section E. Agency Notification

Any document (including reports) required to be submitted by this Covered Source Permit shall be done in accordance with Attachment 1, Standard Condition No. 28.

(Auth: HAR §11-60.1-4, §11-60.1-90)

ATTACHMENT III: ANNUAL FEE REQUIREMENTS
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

The following requirements for the submittal of annual fees are established pursuant to HAR, Title 11, Chapter 60.1, Air Pollution Control. Should HAR, Chapter 60.1 be revised such that the following requirements are in conflict with the provisions of HAR, Chapter 60.1, the permittee shall comply with the provisions of HAR, Chapter 60.1.

1. Annual fees shall be paid in full:

   a. **Within sixty (60) days after** the end of each calendar year; and
   b. **Within thirty (30) days after** the permanent discontinuance of the covered source.

2. The annual fees shall be determined and submitted in accordance with HAR, Chapter 11-60.1, Subchapter 6.

3. The annual emissions data for which the annual fees are based shall accompany the submittal of any annual fees and be submitted on forms furnished by the Department.

4. The annual fees and the emission data shall be mailed to:

Clean Air Branch
Environmental Management Division
Hawaii Department of Health
P.O. Box 3378
Honolulu, HI 96801-3378

ATTACHMENT IV: ANNUAL EMISSIONS REPORTING REQUIREMENTS
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the HAR, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the nature and amounts of emissions.

1. Complete the attached Annual Emissions Report Form: **Municipal Solid Waste Landfills.**

2. The reporting period shall be from January 1 to December 31 of each year. All reports shall be submitted to the Department of Health **within sixty (60) days after** *the end of each calendar year* and shall be mailed to the following address:

Clean Air Branch
Environmental Management Division
Hawaii Department of Health
P.O. Box 3378
Honolulu, HI 96801-3378

3. The permittee shall retain the information submitted, including all emission calculations. These records shall be in a permanent form suitable for inspection, retained for a minimum of five (5) years, and made available to the Department of Health upon request.

4. Any information submitted to the Department of Health without a request for confidentiality shall be considered public record.

5. In accordance with HAR, Section 11-60.1-14, the permittee may request confidential treatment of specific information, including information concerning secret processes or methods of manufacture, by submitting a written request to the Department of Health and clearly identifying the specific information that is to be accorded confidential treatment.

COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0802-01-C
PAGE 1 OF ___

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following certification at least annually, or more frequently as requested by the Department.

(Make Copies of the Compliance Certification Form for Future Use)

For Period: _____ Date: _____

Company/Facility Name: _____

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by Department of Health as public record. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, and any permit issued thereof.

COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0802-01-C
(CONTINUED, PAGE 2 OF ___)

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

The purpose of this form is to evaluate whether or not the facility was in compliance with the permit terms and conditions during the covered period. If there were any deviations to the permit terms and conditions during the covered period, the deviation(s) shall be certified as *intermittent compliance* for the particular permit term(s) or condition(s). Deviations include failure to monitor, record, report, or collect the minimum data required by the permit to show compliance. In the absence of any deviation, the particular permit term(s) or condition(s) may be certified as *continuous compliance*.

Instructions:
Please certify Sections A, B, and C below for continuous or intermittent compliance. Sections A and B are to be certified as a group of permit conditions. Section C shall be certified individually for each operational and emissions limit condition as listed in the Special Conditions section of the permit (list all applicable equipment for each condition). Any deviations shall also be listed individually and described in Section D. The facility may substitute its own generated form in verbatim for Sections C and D.

A. Attachment I, Standard Conditions

Permit term/condition	Equipment(s)	Compliance
All standard conditions	All Equipment(s) listed in the permit	☐ Continuous ☐ Intermittent

B. Special Conditions - Monitoring, Recordkeeping, Reporting, Testing, and INSIG

Permit term/condition	Equipment(s)	Compliance
All monitoring conditions	All Equipment(s) listed in the permit	☐ Continuous ☐ Intermittent
Permit term/condition	Equipment(s)	Compliance
All recordkeeping conditions	All Equipment(s) listed in the permit	☐ Continuous ☐ Intermittent
Permit term/condition	Equipment(s)	Compliance
All reporting conditions	All Equipment(s) listed in the permit	☐ Continuous ☐ Intermittent
Permit term/condition	Equipment(s)	Compliance
All testing conditions	All Equipment(s) listed in the permit	☐ Continuous ☐ Intermittent
Permit term/condition	Equipment(s)	Compliance
All INSIG conditions	All Equipment(s) listed in the permit	☐ Continuous ☐ Intermittent

COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0802-01-C
(CONTINUED, PAGE ____ OF ___)

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

C. Special Conditions - Operational and Emissions Limitations

Each permit term/condition shall be identified in chronological order using attachment and section numbers (e.g., Attachment II, B.1, Attachment IIA, Special Condition No. B.1.f, etc.). Each equipment shall be identified using the description stated in Section A of the Special Conditions (e.g., unit no., model no., serial no., etc.). Check all methods (as required by permit) used to determine the compliance status of the respective permit term/condition.

Permit term/condition	Equipment(s)	Method	Compliance
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent
		☐ monitoring ☐ recordkeeping ☐ reporting ☐ testing ☐ none of the above	☐ Continuous ☐ Intermittent

(Make Additional Copies if Needed)

COMPLIANCE CERTIFICATION FORM
COVERED SOURCE PERMIT NO. 0802-01-C
(CONTINUED, PAGE ___ OF ___)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

D. Deviations

Permit Term/ Condition	Equipment(s) / Brief Summary of Deviation	Deviation Period time (am/pm) & date (mo/day/yr)	Date of Written Deviation Report to DOH (mo/day/yr)
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	
		Beginning: Ending:	

*Identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance as defined under 40 CFR 64 occurred.

(Make Additional Copies if Needed)

MONITORING REPORT FORM
COLLECTION AND CONTROL SYSTEM
COVERED SOURCE PERMIT 0802-01-C
(PAGE 1 OF 3)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following information **semi-annually**:

(Make copies for Future Use)

For Period:_____ Date:_____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (Print):_____

Title:_____

Responsible Official (Signature):_____ Date: _____

1. Value and length of time for exceedance of applicable parameters. If there were no exceedances identified, then write "no exceedances" in the comment column.

Parameter	Value	Date	Start Time	End Time	Duration	Comments
Gauge pressure in gas collection header						
Nitrogen Conc.(%), or						
Oxygen Conc. (%)						
Temp. (EC) of landfill gas						
Surface Conc. of Methane (ppmv as hexane)						

2. Average and maximum values for the following:

Parameter	Average Value	Maximum Value	Date of Max. Value	Comments
Gauge pressure in gas collection header				
Nitrogen Conc. (%)				
Oxygen Conc. (%)				
Temp. (°C) of landfill gas				
Surface Concentrations of Methane*				

* If annual monitoring is allowed, the average and maximum methane concentration at landfill surface during the most recent monitoring event;

MONITORING REPORT FORM
COLLECTION AND CONTROL SYSTEM
COVERED SOURCE PERMIT 0802-01-C
(PAGE 2 of 3)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

3. Identify the dates, times, duration, reason, and description of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Date	Start - End Time	Duration	Comments

4. Identify the dates, times, duration, reason, and description of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Dates	Start/End Times	Duration	Comments

5. Identify all periods when the collection system was not operating in excess of five (5) days, including the dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation. If there were no occurrences, then write "no occurrences" in the comment column.

Reason, Actions Taken	Start/End Dates	Start/End Times	Duration	Future Protocol, Comments

6. Identify the location of each exceedance of the 500 ppm surface methane concentration and the concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance. If there were no exceedances, then write "no occurrences" in the table.

Sampling Date	Location	Conc. (ppm)	Previous Conc. (ppm)	Actions Taken	Sampler's Name

MONITORING REPORT FORM
COLLECTION AND CONTROL SYSTEM
COVERED SOURCE PERMIT 0802-01-C
(PAGE 3 OF 3)

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

7. Identify the date of installation and the location of each well or collection system expansion added. If no additions were made, then write "no additions" in the table.

Installation Date	Description of Addition	Location

8. Identify any instances when the gas flow has been diverted from the control device, enclosed combustor, or open flare. If there were no occurrences, then write "no occurrences" in the table.

Description and Reason	Dates	Start/End Times	Duration	Comments

9. Identify the date of any deviations from the requirements of 40 CFR Part 63, Subpart AAAA , including the actions taken during a startup, shutdown or malfunction were consistent with the procedures in the startup, shutdown and malfunction plan. If there were no deviations, then write "no deviations" in the table.

Date	Description of Action	Consistent with plan (yes or no)

ANNUAL EMISSIONS REPORT FORM
MUNICIPAL SOLID WASTE LANDFILLS
COVERED SOURCE PERMIT 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the nature and amounts of emissions, annually.

(Make copies for Future Use)

For Period: _____ Date: _____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature) _____ Date: _____

1. Landfill Emissions

Landfill type (circle one): Area Trench Ramp

Average annual refuse acceptance rate during active life (Mg/yr): _____

Parameter	Site-Specific Value, if available	Calculation Method
Methane generation potential, L_o (m^3 CH_4/Mg refuse)		
Methane generation rate constant, k (yr^{-1})		
Concentration of CH_4 in landfill gas (ppmv)		
Concentration of CO_2 in landfill gas (ppmv)		
Concentration of N_2 in landfill gas (ppmv)		
Concentration of O_2 in landfill gas (ppmv)		
Temperature of landfill gas (°C)		

Note:
If the permittee intends to use the site-specific values to compute annual emissions from the municipal solid waste landfill, all data, background information, and calculations shall be provided with the submittal of this form. If the requested information is not provided, default values will be assumed.

2. For MSW Landfills with a Collection and Control System:

Indicate the control efficiency of the collection and control system: _____

Control Efficiency = $(NMOC_{in} - NMOC_{out})/NMOC_{in}$

Where, $NMOC_{in}$ = mass of NMOC entering control device and

$NMOC_{out}$ = mass of NMOC exiting control device.

SUPPLEMENTAL REPORT FORM
MODIFICATION/RECONSTRUCTION OF MSW LANDFILL
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

This form fulfills the requirements of the Amended Design Capacity Report.

(Make copies for Future Use)

For Period:_____ Date: _____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

I certify that no air pollution equipment will be added to the facility and operational methods will remain similar as permitted under this Covered Source Permit.

I certify to comply with each applicable requirement of this Covered Source Permit.

Responsible Official (Print):_____

Title:_____

Responsible Official (Signature):_____Date: _____

1. Current design capacity of the landfill (m^3 and Mg) _____
2. Current site-specific density (Mg/m^3): _____
3. Description of the reconstruction or modification: _____

   _____

   _____

   _____
4. Current lateral dimensions of the landfill (meters): _____

   Proposed lateral dimensions of the landfill (meters):_____

   Current vertical limit of the landfill (meters): _____

   Proposed vertical limit of the landfill (meters):_____
5. Projected date of construction commencement: _____
6. Projected waste acceptance rate (Mg/yr):_____
7. Include a site map of the landfill containing the following information:
   a) Location of the landfill and area of proposed modification or reconstruction;
   b) Current lateral boundaries of the existing landfill;
   c) Proposed lateral boundaries of the expansion; and
   d) Current and proposed vertical dimensions of the landfill.

SUPPLEMENTAL REPORT FORM
NOTIFICATION OF LANDFILL CLOSURE
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

For Period: _____ Date: _____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

I certify that the landfill closure is intended to be permanent.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____ Date: _____

Last day of waste acceptance (month, day, year): _____

Date of landfill closure (month, day, year): _____

Final design capacity of landfill (Mg or m^3): _____

Final quantity of refuse-in-place (Mg **and** m^3): _____

Anticipated additional capacity, if any (Mg or m^3): _____

SUPPLEMENTAL REPORT FORM
ANNUAL REPORT
COVERED SOURCE PERMIT NO. 0802-01-C
(PAGE 1 OF 2)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report the following to the Department of Health.

This report shall be submitted to the Department of Health *within 180 days of installation and start-up* of the collection and control system. Attach additional sheets if necessary. The initial performance test report shall also be included with this submittal.

Facility Name: _____ Date: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____ Date: _____

Start-up date of collection and control system: _____

1. Value and length of time for exceedance of applicable parameters. If there were no exceedances identified, then write "no exceedances" in the comment column.

Parameter	Value	Date	Start Time	End Time	Duration	Comments
Gauge pressure in gas collection header						
Nitrogen Concentration or						
Oxygen Concentration						
Temperature of landfill gas						
Surface Concentrations of Methane						

2. Identify the dates, times, duration, reason, and description of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Date	Start - End Time	Duration	Comments

SUPPLEMENTAL REPORT FORM
ANNUAL REPORT
COVERED SOURCE PERMIT NO. 0802-01-C
(PAGE 2 OF 2)

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report the following to the Department of Health.

3. Identify the dates, times, duration, reason, and description of all periods when the control device was not operating for a period exceeding one (1) hour and length of time the control device was not operating. If there were no occurrences, then write "no occurrences" in the comment column.

Description and Reason	Dates	Start/End Times	Duration	Comments

4. Identify all periods when the collection system was not operating in excess of five (5) days, including the dates and times that operation ceased, reason for not operating, actions taken, dates and times that operation resumed, and future operational protocol that will prevent a reoccurrence of the situation. If there were no occurrences, then write "no occurrences" in the comment column.

Reason, Actions Taken	Start/End Dates	Start/End Times	Duration	Future Protocol, Comments

5. Identify the location of each exceedance of the 500 ppm surface methane concentration and the concentration at each location for which an exceedance was recorded in the previous month. Also identify the dates of sampling, sampler's name, and actions taken to address the exceedance. If there were no exceedances, then write "no occurrences" in the table.

Sampling Date	Location	Conc. (ppm)	Previous Conc. (ppm)	Actions Taken	Sampler=s Name

6. Identify the date of installation and the location of each well or collection system expansion added. If no additions were made, then write "no additions" in the table.

Installation Date	Description of Addition	Location

SUPPLEMENTAL REPORT FORM
NOTIFICATION OF COLLECTION AND CONTROL EQUIPMENT REMOVAL
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

For Period: _____ Date: _____

Facility Name: _____

Facility Location: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

I certify that the landfill closure is intended to be permanent.

Responsible Official (Print): _____

Title: _____

Responsible Official (Signature): _____ Date: _____

Last day of waste acceptance (month, day, year): _____

Date of landfill closure (month, day, year): _____

Final design capacity of landfill (Mg or m^3): _____

Date of closure report (month, day, year), including a copy of the closure report: _____

Has the collection and control system been in operation for a minimum of fifteen (15) years (based on the date of the most recent addition to the system?) Yes No

Include dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing fifty (50) megagrams or greater of NMOC per year. (Use equations for landfills without a collection and control system to make this determination.)

MONITORING REPORT FORM
OPACITY EXCEEDANCES
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following information semi-annually:

(Make copies for Future Use)

For Period:_____ Date: _____

Facility Name: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (PRINT): _____

TITLE: _____

Responsible Official (Signature): _____

Visible Emissions:

Report the following on the lines provided below: all date(s) and six (6) minute average opacity reading(s) which the opacity limit was exceeded during the monthly observations; if there were no exceedances during the monthly observations, then write Ano exceedances@ in the comment column.

EQUIPMENT	SERIAL/ID NO.	DATE	6 MIN. AVG. (%)	COMMENTS

VISIBLE EMISSIONS FORM REQUIREMENTS
STATE OF HAWAII
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date:** September 9, 2019

or other EPA approved methods.

The following Visible Emissions (VE) Form shall be completed **monthly** (*each calendar month*) for each equipment subject to opacity limits in accordance with Method 9. At least **annually** (*calendar year*), VE observations shall be conducted for each equipment subject to opacity limits by a certified reader in accordance with Method 9. The VE Form shall be completed as follows:

or other EPA approved methods.

1. Visible emissions observations shall take place during the day only. The opacity shall be noted in five (5) percent increments (i.e., 25%).

2. Orient the sun within a 140 degree sector to your back. Provide a source layout sketch on the VE Form using the symbols as shown.

3. Stand at least three (3) stack heights, but not more than a quarter mile from the stack.

4. Two (2) observations shall be taken at fifteen (15) second intervals for six (6) consecutive minutes for each equipment.

5. The six (6) minute average opacity reading shall be calculated for each observation.

6. If possible, the observations shall be performed as follows:

   a. Read from where the line of sight is at right angles to the wind direction.
   b. The line of sight shall not include more than one (1) plume at a time.
   c. Read at the point in the plume with the greatest opacity (without condensed water vapor), ideally while the plume is no wider than the stack diameter.
   d. Read the plume at fifteen (15) second intervals only. Do not read continuously.
   e. The equipment shall be operating at maximum permitted capacity.

7. If the equipment was shut-down for that period, briefly explain the reason for shut-down in the comment column.

The permittee shall retain the completed VE Forms for recordkeeping. These records shall be in a permanent form suitable for inspection, retained for a minimum of five (5) years, and made available to the Department of Health, or their representative upon request.

VISIBLE EMISSIONS FORM
STATE OF HAWAII
COVERED SOURCE PERMIT NO. 0802-01-C

Issuance Date: September 10, 2014 **Expiration Date: September 9, 2019**

(Make Copies for Future Use For Each Equipment)

Permit No.: 0802-01-C
Company Name:_____
Equipment and Fuel:_____
Site Conditions:

Stack height above ground (ft):_____

Stack distance from observer (ft):_____

Emission color (black or white):_____

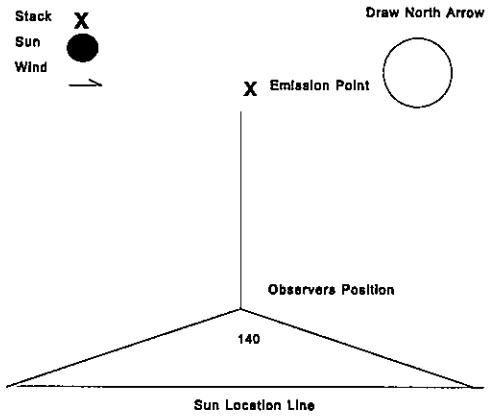
Sky conditions (% cloud cover):_____

Wind speed (mph):_____

Temperature (EF):_____

Observer Name:_____

Certified? (Yes/No):_____



Observation Date and Start Time:_____

SECONDS / MINUTES	0	15	30	45	COMMENTS
1					
2					
3					
4					
5					
6					
Six (6) Minute Average Opacity Reading (%):					

Observation Date and Start Time:_____

SECONDS / MINUTES	0	15	30	45	COMMENTS
1					
2					
3					
4					
5					
6					
Six (6) Minute Average Opacity Reading (%):					

APPENDIX D2

Permit to operate at Higher Operating Temperature for Select Wells

DAVID Y. IGE
GOVERNOR OF HAWAII

ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:
20-539E CAB
File No. 0802

November 20, 2020

Mr. Troy Tanigawa
Acting County Engineer
Department of Public Works
County of Kauai
Moikena Building
4444 Rice Street, Suite 275
Lihue, Hawaii 96766

Dear Mr. Tanigawa:

SUBJECT: Request for Higher Operating Temperature
Covered Source Permit (CSP) No. 0802-01-C
County of Kauai
Kekaha Landfill
Gas Collection and Control System
Located At: 6900D Kaumualii Highway, Kekaha, Kauai

The Department of Health, Clean Air Branch (CAB), acknowledges receipt of the letter from the County of Kauai on September 22, 2020, requesting higher operating temperature values for landfill Gas Extraction Wells GW-15, GW-26, GW-27, GW-28, GW-29, GW-30, and GW-34 installed at the subject landfill.

Kekaha Landfill is subject to the New Source Performance Standards ("NSPS") for Municipal Solid Waste Landfills ("40 Code of Federal Regulations (CFR) Part 60, Subpart WWW"). Pursuant to 40 CFR Section 60.753(c), Kekaha Landfill must operate each interior wellhead in the collection system with a landfill gas temperature less than 55 degrees Celsius (131 degrees Fahrenheit) and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent. The facility may request a higher operating temperature at a particular well, provided that supporting data is submitted that demonstrates that the elevated temperature does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

The County of Kauai included with the request supporting data collected from July 2017 through August 2020 at Gas Extraction Wells GW-15, GW-26, GW-27, GW-28, GW-29, GW-30, and GW-34. The parameters measured included Methane (CH_4), Carbon dioxide (CO_2), Oxygen (O_2), Temperature, Carbon monoxide (CO), and CH_4 to CO_2 ratio.

The CAB has reviewed the data provided with the September 22, 2020 letter and based on the information provided, there is no physical evidence of fire or subsurface oxidation or inhibition of anaerobic decomposition. Kekaha Landfill has also demonstrated that the higher operating temperature would not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

Therefore, CAB is approving the higher operating temperatures to 136 ºF for Gas Extraction Wells GW-15, GW-26, GW-27, GW-28, GW-29, GW-30, and GW-34. Any further increases in the temperature at these wells or any increases in operating temperature at any other wells would require additional approval by CAB.

If there are any questions regarding this matter, please contact Ms. Chenyan Song of my staff at (808) 586-4200.

Sincerely,

MARIANNE ROSSIO, P.E.
Manager, Clean Air Branch

CS:mah

DAVID Y. IGE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

FILE COPY
ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

Initials CS CL
Mailed Out NOV 20 2020

In reply, please refer to:
File:
20-539E CAB
File No. 0802

November 20, 2020

Mr. Troy Tanigawa
Acting County Engineer
Department of Public Works
County of Kauai
Moikena Building
4444 Rice Street, Suite 275
Lihue, Hawaii 96766

Dear Mr. Tanigawa:

SUBJECT: Request for Higher Operating Temperature
Covered Source Permit (CSP) No. 0802-01-C
County of Kauai
Kekaha Landfill
Gas Collection and Control System
Located At: 6900D Kaumualii Highway, Kekaha, Kauai

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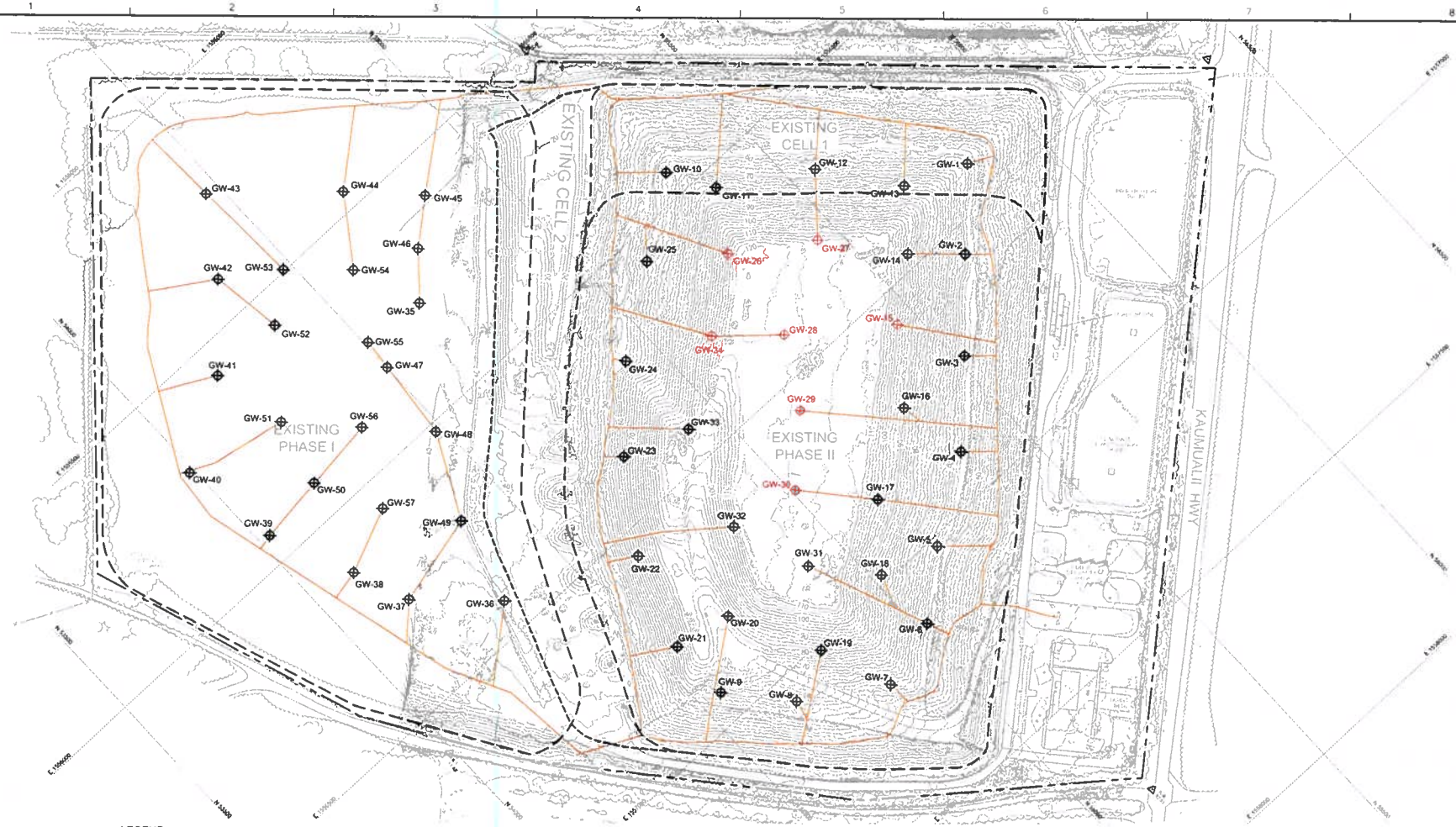
If there are any questions regarding this matter, please contact Ms. Chenyan Song of my staff at (808) 586-4200.

Sincerely,

MARIANNE ROSSIO, P.E.
Manager, Clean Air Branch

CS:mah



LEGEND

- EXISTING GROUND ELEVATION (10-FT AND 2-FOOT CONTOUR) (NOTES 1 AND 2)
- APPROXIMATE PROPERTY LINE (NOTE 4)
- APPROXIMATE PHASES I AND II WASTE LIMIT (NOTE 4)
- APPROXIMATE CELL 2 LIMIT
- EXISTING SITE SURVEY BENCHMARK
- LANDFILL GAS COLLECTION HEADER / LATERAL
- GW-9 LANDFILL GAS EXTRACTION WELL
- GW-15 HIGH TEMPERATURE LANDFILL GAS EXTRACTION WELL

NOTES:

1. EXISTING GROUND CONTOURS PREPARED BY R.M. TOWILL CORPORATION (RMTC) AND BASED ON DRONE SURVEY DATED 06-27-2020. EXISTING SITE FEATURES ARE FROM TOPOGRAPHIC MAP PREPARED BY MILLER CREEK AERIAL MAPPING, LLC, DATED 02-24-2015.
2. HORIZONTAL DATUM AND COORDINATES ARE BASED ON HAWAII STATE PLANE COORDINATE SYSTEM, ZONE 4, NAD83 (1986), US SURVEY FOOT. VERTICAL DATUM AND ELEVATIONS ARE BASED ON LOCAL TIDAL AND SITE SURVEY BENCHMARKS (MSL).
3. LOCATIONS OF EXISTING INFRASTRUCTURE ARE APPROXIMATE AND DO NOT INCLUDE ALL UNDERGROUND STRUCTURES OR UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR (I) VERIFICATION OF EXISTING CONDITIONS, (II) COORDINATION AND MARKING OF EXISTING UTILITIES PRIOR TO CONSTRUCTION, AND (III) CONTACTING THE HAWAII ONE CALL CENTER (866-423-7287 OR 811) 48 HOURS PRIOR TO EXCAVATION TO MARK OUT UTILITIES.
4. APPROXIMATE PROPERTY LINE AND PHASES I AND II WASTE LIMITS ARE FROM CONSTRUCTION DRAWING C-1 "EXISTING SITE CONDITIONS", PROJECT 6558519 "CELL 2 BASE LINER - PHASE II LATERAL EXPANSION", PREPARED BY AECOM, DATED 09-04-2018.

SCALE IN FEET: 0, 120, 240

DRAFT - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRN	APP

DESIGN BY	AT
DRAWN BY	ABK
CHECKED BY	AT
REVIEWED BY	MJM
APPROVED BY	MJM

TITLE: SITE PLAN AND LANDFILL GAS WELLS

PROJECT: LANDFILL GAS MANAGEMENT SYSTEM

SITE: KEKAHA MUNICIPAL SOLID WASTE LANDFILL
KEKAHA, COUNTY OF KAUAI, HAWAII

COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION
4444 RICE STREET, SUITE 295
LIHUE, HAWAII 96766
PHONE 808 241-4841

Geosyntec consultants
1111 BROADWAY, 6TH FLOOR
OAKLAND, CALIFORNIA 94607 USA
PHONE 510 836 3034

DATE	SEPTEMBER 2020
PROJECT NO	WG2790
FILE	WG2790-LFG WELLS
DRAWING NO	1 OF 1

APPENDIX D3

Permit for Gas Collection and Control System Construction

Bernard P. Carvalho, Jr.
Mayor

Wallace G. Rezentes Jr.
Managing Director

Lyle Tabata
Acting County Engineer

DEPARTMENT OF PUBLIC WORKS
County of Kaua'i, State of Hawai'i
4444 Rice Street, Suite 275, Līhu'e, Hawai'i 96766
TEL (808) 241-4992 FAX (808) 241-6604

December 19, 2016

Goodfellow Bros. Inc
91-476 Komohana Street
Kapolei, HI 96707

Attention: Mike Minkemann

Subject: Contract No. 9357 – Gas Collection and Control System Construction for the Kekaha Landfill, Kauai, Hawaii

Dear Mr. Minkemann:

The construction work for Gas Collection and Control System has been reviewed by authorized representatives of the Owner, Contractor, and Engineer. The project has been approved as substantially complete as of December 8, 2016.

If you should have any questions or require additional information, please contact me at (808) 241-4838.

Very truly yours,

TROY TANIGAWA
Environmental Services
Management Engineer

Concur,

LYLE TABATA
Acting County Engineer

APPENDIX D4

2021 Greenhouse Gas (GHG) Report

Certification Statement:

The designated representative or alternate designated representative must sign (i.e., agree to) this certification statement. If you are an agent and you click on "SUBMIT", you are not agreeing to the certification statement, but are submitting the certification statement on behalf of the designated representative or alternate designated representative who is agreeing to the certification statement. An agent is only authorized to make the electronic submission on behalf of the designated representative, not to sign (i.e., agree to) the certification statement.

Facility Name: Kekaha Landfill
Facility Identifier: 525460
Facility Reporting Year: 2017
Facility Location:
Address: 6900D Kaumualii Highway
City: Kekaha
State: HI
Postal Code: 96752

Facility Site Details:

CO2 equivalent emissions from facility subparts C-II, SS, and TT (metric tons): 34,204.8
CO2 equivalent emissions from supplier subparts LL-QQ (metric tons): 0
Biogenic CO2 emissions from facility subparts C-II, SS, and TT (metric tons): 0
Cogeneration Unit Emissions Indicator: N
GHG Report Start Date: 2017-01-01
GHG Report End Date: 2017-12-31
Description of Changes to Calculation Methodology:
Part 75 Biogenic Emissions Indication:
Plant Code Indicator: N
Primary NAICS Code: 562212
Second Primary NAICS Code:

Parent Company Details:

Parent Company Name: COUNTY OF KAUAI
Address: 4444 Rice Street, Room 295, Lihue, HI 96766
Percent Ownership Interest: 100

Subpart HH: Municipal Solid Waste Landfills

Gas Information Details

Gas Name	Methane
Gas Quantity	1,368.19 (Metric Tons)
Own Result?	

Landfill Details

Is the landfill open?	Y	
Estimated Year LandFill Closure	2021	
Starting Year for Accepting Waste	1960	
First year of emissions reporting	2010	
Leachate recirculation was used during the reporting year	N	
Typical frequency of use for leachate recirculation system	Not used for the past 10 years	
Scales are present at the landfill in the reporting year	Y	
Does the landfill have a landfill gas collection system?	Y	
Passive vents and/or flares are present	Y	
Landfill Capacity	2601869 (Metric Tons)	
Total surface area of the landfill containing waste	284500.2 (Square Meters)	
Covertype Details	Other soil mixture	( )

Aeration Details

Aeration Blower Capacity	( )
Landfill Fraction Affected by Aeration	( )
Aeration Blower Operations Hours	( )
Other MCF Factors	
Additional Description	

Current Waste Disposal Quantity Determination Details

First Year to Current Year Annual Waste Quantity Method

Reporting Year	**2017**
Total Annual Waste Disposal Quantity	77132.553579423 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	77132.553579423 (Metric Tons)
Reporting Year	**2016**
Total Annual Waste Disposal Quantity	77250.033998073 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	77250.033998073 (Metric Tons)
Reporting Year	**2015**
Total Annual Waste Disposal Quantity	73639.8 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	73639.81481 (Metric Tons)
Reporting Year	**2014**
Total Annual Waste Disposal Quantity	72358 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	72357.96276 (Metric Tons)
Reporting Year	**2013**
Total Annual Waste Disposal Quantity	67622.5 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	67622.45837 (Metric Tons)
Reporting Year	**2012**
Total Annual Waste Disposal Quantity	66140.1 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	66140.11849 (Metric Tons)
Reporting Year	**2011**
Total Annual Waste Disposal Quantity	63714.3 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	63714.30648 (Metric Tons)

Reporting Year	**2010**
Total Annual Waste Disposal Quantity	66060.3 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	66060.28624 (Metric Tons)

Waste Type Details

Year Waste Disposed	**2017**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0
Year Waste Disposed	**2016**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0.0
Year Waste Disposed	**2015**									
Missing										

data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Waste composition	bulk waste					1	0.2	0.5	0.038
Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**2014**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Waste composition	bulk waste					1	0.2	0.5	0.038
Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**2013**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate

Details					was used					
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0
Year Waste Disposed	**2012**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0
Year Waste Disposed	**2011**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0
Year Waste Disposed	**2010**									
Missing data procedure used?	N									

Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Waste composition	bulk waste					1	0.2	0.5	0.038
Waste composition	inerts					0	0	0.5	0

Historical Waste Disposal Quantity Estimation Details

Method used to determine the annual waste quantity for any prior years

Were scales used to determine the annual waste quantity	Y
Start Year	1993
End Year	2009

Prior Year Annual Waste Quantity Method

Reporting Year	**2009**
Total Annual Waste Disposal Quantity	65290.9900437 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	65290.9900437 (Metric Tons)
Reporting Year	**2008**
Total Annual Waste Disposal Quantity	74844.5521194 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	74844.5521194 (Metric Tons)
Reporting Year	**2007**
Total Annual Waste Disposal Quantity	81212.0815287 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	81212.0815287 (Metric Tons)
Reporting Year	**2006**
Total Annual Waste Disposal Quantity	83438.3127825 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	83438.3127825 (Metric Tons)
Reporting Year	**2005**
Total Annual Waste Disposal Quantity	79068.4040826 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste	

Disposal Quantity	79068.4040826 (Metric Tons)
Reporting Year	**2004**
Total Annual Waste Disposal Quantity	80514.4564944 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	80514.4564944 (Metric Tons)
Reporting Year	**2003**
Total Annual Waste Disposal Quantity	76610.8407303 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	76610.8407303 (Metric Tons)
Reporting Year	**2002**
Total Annual Waste Disposal Quantity	70022.8654389 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	70022.8654389 (Metric Tons)
Reporting Year	**2001**
Total Annual Waste Disposal Quantity	69827.8207284 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	69827.8207284 (Metric Tons)
Reporting Year	**2000**
Total Annual Waste Disposal Quantity	69434.1025686 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	69434.1025686 (Metric Tons)
Reporting Year	**1999**
Total Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Reporting Year	**1998**
Total Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Reporting Year	**1997**
Total Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Reporting Year	**1996**

Total Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Reporting Year	**1995**
Total Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Reporting Year	**1994**
Total Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Reporting Year	**1993**
Total Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Method Used to Determine Quantity	Used scales to weigh loads before off-loading and either used scales to weigh individual loads after off-loading or used representative tare vehicle/container weights
Annual Waste Disposal Quantity	60309.638856 (Metric Tons)
Reporting Year	**1992**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1991**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1990**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1989**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1988**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to	

Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1987**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1986**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1985**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1984**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1983**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1982**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1981**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1980**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste	20665.02008 (Metric Tons)

Disposal Quantity	
Reporting Year	**1979**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1978**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1977**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1976**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1975**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1974**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1973**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1972**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1971**
Total Annual Waste	

Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1970**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1969**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1968**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1967**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1966**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1965**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1964**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1963**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to	other

Determine Quantity	
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1962**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1961**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Reporting Year	**1960**
Total Annual Waste Disposal Quantity	20665.02008 (Metric Tons)
Method Used to Determine Quantity	other
Annual Waste Disposal Quantity	20665.02008 (Metric Tons)

Waste Type Details

Year Waste Disposed	**2009**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Waste composition	bulk waste					1	0.2	0.5	0.038
Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**2008**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**2007**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**2006**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**2005**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Waste composition	bulk waste					1	0.2	0.5	0.038
Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**2004**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Waste composition	bulk waste					1	0.2	0.5	0.038
Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**2003**
Missing data procedure used?	N
Number of Times Substituted	

					An MCF value				

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0
Year Waste Disposed	**2002**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0
Year Waste Disposed	**2001**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Waste composition	bulk waste					1	0.2	0.5	0.038
	Waste composition	inerts					0	0	0.5	0
Year Waste	**2000**									

Disposed	
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Waste composition	bulk waste					1	0.2	0.5	0.038
Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**1999**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Waste composition	bulk waste					1	0.2	0.5	0.038
Waste composition	inerts					0	0	0.5	0

Year Waste Disposed	**1998**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate

	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1997**									
Missing data procedure used?	N									
Number of Times Substituted										

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1996**									
Missing data procedure used?	N									
Number of Times Substituted										

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1995**									
Missing data procedure used?	N									
Number of Times Substituted										

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1994**									
Missing data procedure used?	N									
Number of										

Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1993**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1992**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1991**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year										

Waste Disposed	**1990**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1989**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1988**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1987**
Missing data procedure used?	N
Number of Times Substituted	

					An MCF					

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1986**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1985**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1984**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1983**

Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1982**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1981**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1980**
Missing data procedure used?	N
Number of Times Substituted	

Waste

Option	Waste	Methane Fraction	Methane Fraction	An MCF value other than the	Annual MCF	Percent by	Degradable Organic	Fraction Of DOC	Decay

Type Details		Type	Determination Method	Determination Value	default of 1 was used	Value	Weight	Carbon Value	Dissimilated	Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1979**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1978**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1977**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1976**									
Missing data	N									

procedure used?	
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1975**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1974**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1973**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate

	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1972**									
Missing data procedure used?	N									
Number of Times Substituted										

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1971**									
Missing data procedure used?	N									
Number of Times Substituted										

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1970**									
Missing data procedure used?	N									
Number of Times Substituted										

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1969**									
Missing data procedure used?	N									
Number of										

Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1968**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1967**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year Waste Disposed	**1966**									
Missing data procedure used?	N									
Number of Times Substituted										
Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038
Year										

Waste Disposed	**1965**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1964**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1963**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details

Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1962**
Missing data procedure used?	N
Number of Times Substituted	

					An MCF					

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1961**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Year Waste Disposed	**1960**
Missing data procedure used?	N
Number of Times Substituted	

Waste Type Details	Option	Waste Type	Methane Fraction Determination Method	Methane Fraction Determination Value	An MCF value other than the default of 1 was used	Annual MCF Value	Percent by Weight	Degradable Organic Carbon Value	Fraction Of DOC Dissimilated	Decay Rate
	Bulk Waste	Bulk waste					1	0.2	0.5	0.038

Working Capacity Details

Were working capacities used to determine waste disposal quantities	N

Tipping Receipt Details

Were tipping receipts or company records used to determine waste disposal quantities	N

Method used for estimating all annual waste quantities that are not determined with the methods above

Method	Method #3: Use the landfill capacity or, for operating landfills, the amount of waste-in-place to estimate a constant average waste disposal quantity (Equation HH-3).

Method Start Year	1960
Method End Year	1992

Historical Estimation Population Details

Historical landfill Capacity	681946Metric Tons
Reason	Gross capacity of the landfill used available

Methane Generation and Emissions for Landfills with LFG Collection Systems

Gas Collection System Information

System Manufacturer	GBI
System Capacity	750 (acfm)
Number of Wells	57
Annual Operating Hours Gas Efficiency	( )

Methane Oxidation Fractions

Methane Oxidation Fraction HH-5	0.25
Methane Oxidation Fraction HH-6	0.25
Methane Oxidation Fraction HH-7	0.25
Methane Oxidation Fraction HH-8	0.25

Measurement Locations

Name	**ST51 - 619057**		
Description	Thermal Mass Flowmeter		
Annual Operating Hours	5278 (Hours)		
Quantity of Recovered Methane	1199.5983066 (Metric Tons)		
Destruction Devices	Name	Annual Operating Hours	Destruction Efficiency
	EBF-72-40 Enclosed Flare	5278 (Hours)	0.928 (fraction (number between 0 and 1))

Methane Generation and Emissions values

Estimated Gas Collection Efficiency HH3	0.84 (decimal fraction)
Is Override Indicator?	N
Methane Generation Equation HH5	2181.51 (Metric Tons)
Is Override Indicator?	N
Methane Emissions Equation HH6	1368.19 (Metric Tons)
Is Override Indicator?	N
Methane Generation Equation HH7	1780.90 (Metric Tons)
Is Override Indicator?	N
Basis for Input Methane Generation Value	Equation HH-1
Methane Emission from Equation HH8	967.58 (Metric Tons)
Is Override Indicator?	N

Gas Collection Systems details

Annual Volume FGCollected Gas Volumetric Flow	Measured Value	136773735.8491 (scf)
	Is Substituted Indicator?	N
	Number of Times Substituted	
Annual Average Methane Concentration	Measured Value	45.6 (Number (between 0 and 100))
	Is Substituted Indicator?	N
	Number of Days Substituted	
	Number of Weeks Substituted	
	Number of Months Substituted	
	Number of Times Substituted	
Temperature Incorporated Indicator	Y	
Pressure Incorporated Indicator	Y	
LFG Flow Wet Basis Indicator	N	
Methane Concentration Wet Basis Indicator	N	
Site Destruction Location	On-site	
On Site Destruction Details	Backup Device Present Indicator	
	Destructive Efficiency Used	(decimal fraction)
	Primary Device Annual Operating Hours	( )

	Backup Device Annual Operating Hours	( )
Annual Quantity Of Recovered MethaneHH4	1199.60 (Metric Tons)	

Waste Depth Details

Area Type	Waste Depth	Surface Area
A1	0 (Meters)	0 (Square Meters)
A2	0 (Meters)	0 (Square Meters)
A3	21.34 (Meters)	8093.89 (Square Meters)
A4	12.8 (Meters)	144475.92 (Square Meters)
A5	14.02 (Meters)	131930.39 (Square Meters)

Equation HH-1 Details:

The fraction of CH4 in landfill gas (F), is it based on a measured value or default value	measured
Fraction by volume of CH4 in landfill gas	0.456
An MCF value other than the default of 1 was used	N
Annual MCF Value	1.0

Annual Modeled Methane Generation	2908.68 (Metric Tons)
Annual Modeled Methane Generation User Overrided value?	N

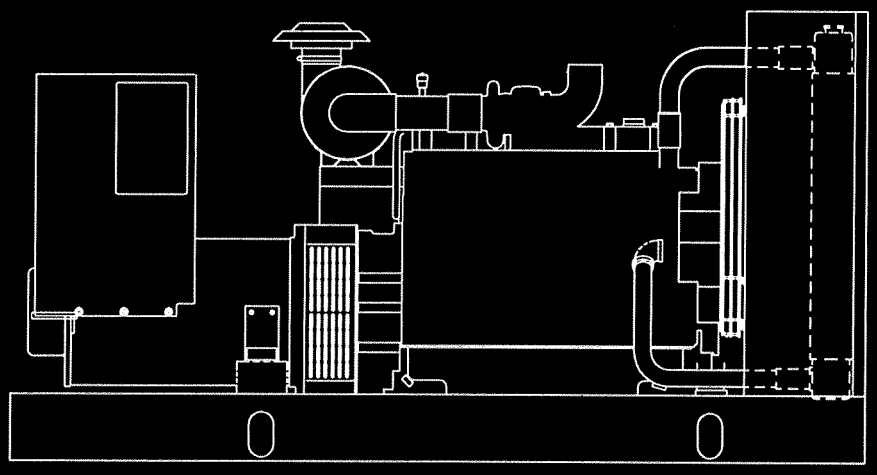
APPENDIX D5

Power Generation Operator's Manual

Power Generation

Operator's Manual

PowerCommand® Control
3100 Series
Detector™ Control
Sentinel Control
Generator Sets



Models
DGBB, DGBC, DGCA, DGCB, DGCC, DGDA
DGDB, DGDK, DGEA, DGFA, DGFB, DGFC

Printed in U.S.A.

960-0107D 10-2001

Power Generation

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California

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS – This manual contains important instructions that should be followed during installation and maintenance of the generator and batteries.

Before operating the generator set (genset), read the Operator's Manual and become familiar with it and the equipment. **Safe and efficient operation can be achieved only if the equipment is properly operated and maintained.** Many accidents are caused by failure to follow fundamental rules and precautions.

The following symbols, found throughout this manual, alert you to potentially dangerous conditions to the operator, service personnel, or the equipment.

⚠DANGER ***This symbol warns of immediate hazards which will result in severe personal injury or death.***

⚠WARNING ***This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.***

⚠CAUTION ***This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.***

FUEL AND FUMES ARE FLAMMABLE

Fire, explosion, and personal injury or death can result from improper practices.

- DO NOT fill fuel tanks while engine is running, unless tanks are outside the engine compartment. Fuel contact with hot engine or exhaust is a potential fire hazard.
- DO NOT permit any flame, cigarette, pilot light, spark, arcing equipment, or other ignition source near the generator set or fuel tank.
- Fuel lines must be adequately secured and free of leaks. Fuel connection at the engine should be made with an approved flexible line. Do not use zinc coated or copper fuel lines with diesel fuel.
- Be sure all fuel supplies have a positive shutoff valve.
- Be sure battery area has been well-ventilated prior to servicing near it. Lead-acid batteries emit a highly explosive hydrogen gas that can be ignited by arcing, sparking, smoking, etc.

EXHAUST GASES ARE DEADLY

- Provide an adequate exhaust system to properly expel discharged gases away from enclosed or sheltered areas and areas where individuals are likely to congregate. Visually and audibly inspect the exhaust daily for leaks per the maintenance schedule. Make sure that exhaust manifolds are secured and not warped. Do not use exhaust gases to heat a compartment.
- Be sure the unit is well ventilated.
- Engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Keep your hands, clothing, and jewelry away from moving parts.
- Before starting work on the generator set, disconnect battery charger from its AC source, then disconnect starting batteries, negative (–) cable first. This will prevent accidental starting.
- Make sure that fasteners on the generator set are secure. Tighten supports and clamps, keep guards in position over fans, drive belts, etc.
- Do not wear loose clothing or jewelry in the vicinity of moving parts, or while working on electrical equipment. Loose clothing and jewelry can become caught in moving parts.
- If adjustment must be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.

DO NOT OPERATE IN FLAMMABLE AND EXPLOSIVE ENVIRONMENTS

Flammable vapor can cause an engine to overspeed and become difficult to stop, resulting in possible fire, explosion, severe personal injury and death. Do not operate a genset where a flammable vapor environment can be created by fuel spill, leak, etc., unless the genset is equipped with an automatic safety device to block the air intake and stop the engine. The owners and operators of the genset are solely responsible for operating the genset safely. Contact your authorized Cummins Power Generation distributor for more information.

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ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Remove electric power before removing protective shields or touching electrical equipment. Use rubber insulative mats placed on dry wood platforms over floors that are metal or concrete when around electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin surface to be damp when handling electrical equipment. Do not wear jewelry. Jewelry can short out electrical contacts and cause shock or burning.
- Use extreme caution when working on electrical components. High voltages can cause injury or death. DO NOT tamper with interlocks.
- Follow all applicable state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician. Tag and lock open switches to avoid accidental closure.
- DO NOT CONNECT GENERATOR SET DIRECTLY TO ANY BUILDING ELECTRICAL SYSTEM. Hazardous voltages can flow from the generator set into the utility line. This creates a potential for electrocution or property damage. Connect only through an approved isolation switch or an approved paralleling device.

GENERAL SAFETY PRECAUTIONS

- Coolants under pressure have a higher boiling point than water. DO NOT open a radiator or heat exchanger pressure cap while the engine is running. Allow the generator set to cool and bleed the system pressure first.
- Used engine oils have been identified by some state or federal agencies as causing cancer or reproductive toxicity. When checking or changing engine oil, take care not to ingest, breathe the fumes, or contact used oil.
- Keep multi-class ABC fire extinguishers handy. Class A fires involve ordinary combustible materials such as wood and cloth; Class B fires, combustible and flammable liquid fuels and gaseous fuels; Class C fires, live electrical equipment. (ref. NFPA No. 10).
- Make sure that rags are not left on or near the engine.
- Make sure generator set is mounted in a manner to prevent combustible materials from accumulating under the unit.
- Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and engine damage which present a potential fire hazard.
- Keep the generator set and the surrounding area clean and free from obstructions. Remove any debris from the set and keep the floor clean and dry.
- Do not work on this equipment when mentally or physically fatigued, or after consuming any alcohol or drug that makes the operation of equipment unsafe.
- Substances in exhaust gases have been identified by some state or federal agencies as causing cancer or reproductive toxicity. Take care not to breath or ingest or come into contact with exhaust gases.
- Do not store any flammable liquids, such as fuel, cleaners, oil, etc., near the generator set. A fire or explosion could result.
- Wear hearing protection when going near an operating generator set.
- To prevent serious burns, avoid contact with hot metal parts such as radiator, turbo charger and exhaust system.

KEEP THIS MANUAL NEAR THE GENSET FOR EASY REFERENCE

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1. Introduction

GENERAL

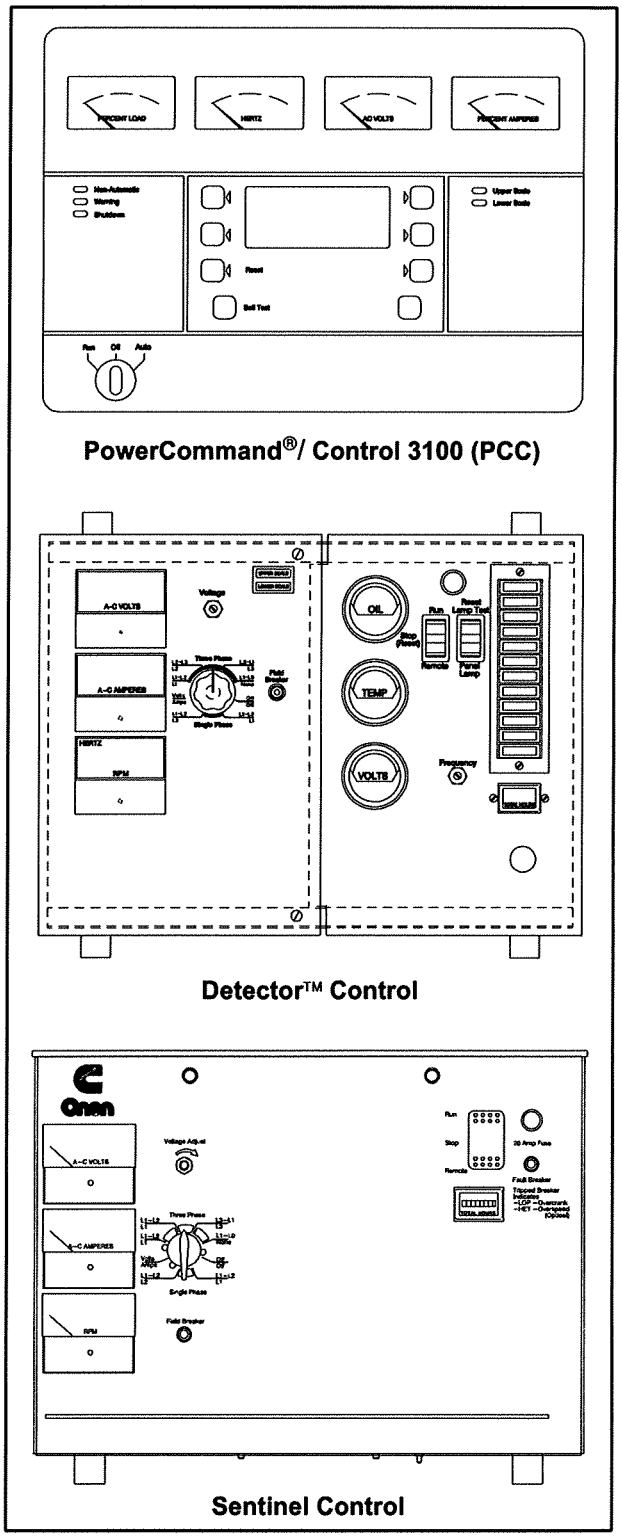
This manual covers models produced under the Cummins®/Onan® and Cummins Power Generation brand names.

Each operator should read this manual before operating the set for the first time. A generator set (genset) must be operated and maintained properly if you are to expect safe, reliable and quiet operation. The manual includes a troubleshooting guide and a maintenance schedule.

The engine manual is included with the genset. Where there is conflicting information, this manual takes precedence over the engine manual.

There are separate *Operation* and *Troubleshooting* sections for gensets using the PowerCommand® Control 3100 (PCC), the Sentinel control or the Detector™ control (Figure 1-1). Refer to the *Table of Contents* for specific information relating to your genset. The remaining sections apply to all versions.

⚠WARNING ***Improper operation and maintenance can lead to severe personal injury or loss of life and property by fire, electrocution, mechanical breakdown or exhaust gas asphyxiation. Read and follow the safety precautions on page iii and carefully observe all instructions and precautions in this manual.***



PowerCommand®/ Control 3100 (PCC)

Detector™ Control

Sentinel Control

FIGURE 1-1. CONTROL PANEL CONFIGURATIONS

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HOW TO OBTAIN SERVICE

When the generator set requires servicing, contact your nearest Cummins Power Generation distributor. Factory-trained Parts and Service representatives are ready to handle all your service needs.

To contact your local Cummins Power Generation distributor in the United States or Canada, call 1-800-888-6626 (this automated service utilizes touch-tone phones only). By selecting Option 1 (press 1), you will be automatically connected to the distributor nearest you.

If you are unable to contact a distributor using the automated service, consult the Yellow Pages. Typically, our distributors are listed under:

GENERATORS-ELECTRIC or
ELECTRICAL PRODUCTS

For outside North America, call Cummins Power Generation, 1-763-574-5000, 7:30 AM to 4:00 PM, Central Standard Time, Monday through Friday. Or, send a fax to Cummins Power Generation using the fax number 1-763-574-8087.

When contacting your distributor, always supply the complete Model, Specification, and Serial Number as shown on the generator set nameplate.

⚠ WARNING

INCORRECT SERVICE OR PARTS REPLACEMENT CAN RESULT IN SEVERE PERSONAL INJURY, DEATH, AND/OR EQUIPMENT DAMAGE. SERVICE PERSONNEL MUST BE TRAINED AND EXPERIENCED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE.

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Detector is a trademark of Cummins Inc.

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2. Specifications

MODEL	DGBB, DGBC, DGCA, DGCB	DGCC	DGDA, DGDB	DGDK
Engine Cummins Diesel Series	4B3.9	4BTA3.9	6BT5.9	6BTA5.9
Generator kW Rating	See Genset Name;late for rating information			
Electrical System Starting Voltage Battery Group Number CCA (minimum) Cold Soak @ 0° F (-18° C)	12 Volts DC One, 12 Volt 4D 1080			
Cooling System Capacity with Standard Radiator	5.5 Gal (21 L)	5.7 Gal (22 L)	6.5 Gal (25 L)	8.3 Gal (31.5 L)
Lubricating System Oil Capacity with Filters Oil Type*	12 Qts (11 L)	12 Qts (11 L)	17 Qts (16 L)	17 Qts (16 L)
* Refer to Cummins engine *Operation and Maintenance Manual* for lubricating oil recommendations/specifications.				

FUEL CONSUMPTION (STANDBY/FULL LOAD/60HZ)

MODEL	DGBB	DGBC	DGCA	DGCB	DGCC	DGDA	DGDB	DGDK
US gph (L/hr)	2.9 (11)	3.4 (12.9)	4.2 (15.9)	4.7 (17.8)	4.6 (17.4)	6.1 (23.1)	7.5 (28.5)	8.5 (35.6)

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MODEL	DGEA	DGFA	DGFB	DGFC
Engine Cummins Diesel Series	6CT8.3	6CTA8.3	6CTA8.3	6CTAA8.3
Generator kW Rating	See Genset Nameplate for rating information			
Electrical System Starting Voltage Battery Group Number CCA (minimum) Cold Soak @ 0° F (-18° C)	12 Volts DC One, 12 Volt 4D 1080			
Cooling System Capacity with Standard Radiator	6.8 Gal (26 L)	7.5 Gal (28 L)	7.5 Gal (28 L)	6.8 Gal (26 L)
Lubricating System Oil Capacity with Filters Oil Type*	20 Qts (19 L)	20 Qts (19 L)	20 Qts (19 L)	20 Qts (19 L)
* Refer to Cummins engine *Operation and Maintenance Manual* for lubricating oil recommendations/specifications.				

FUEL CONSUMPTION (STANDBY/FULL LOAD/60HZ)

MODEL	DGEA	DGFA	DGFB	DGFC
US gph (L/hr)	9.9 (37.5)	11.3 (42.8)	13.2 (50)	14.4 (54.6)

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3. Operation (PCC)

GENERAL

The following describes the function and operation of the PowerCommand® Control 3100 (PCC). All indicators, displays, meters and control switches are located on the face of the control panel as illustrated in Figure 3-1.

This section covers prestart checks, starting and stopping and operating the generator set. Each operator should read through this entire section before attempting to start the set. It is essential that the operator be completely familiar with the set and the PCC control. Refer to *Section 8* for operating recommendations.

PRESTART CHECKS

Before starting, be sure the following checks have been made and the unit is ready for operation.

Lubrication

Check the engine oil level. Keep the oil level near as possible to the dipstick high mark without overfilling.

Coolant

Check the engine coolant level. Refer to "Cooling Systems" in the Maintenance section of this manuals for proper procedure.

Fuel

Make sure the fuel tanks have sufficient fuel and that fuel system is primed. Check to make sure there are no leaks and that all fittings are tight.

Exhaust

Check to make sure entire exhaust system is tight, that no combustible materials are near system, and gases are discharged away from building openings.

EXHAUST GAS IS DEADLY!

Exhaust gases contain carbon monoxide, an odorless and colorless gas. Carbon monoxide is poisonous and can cause unconsciousness and death. Symptoms of carbon monoxide poisoning can include:

- ***Dizziness***
- ***Nausea***
- ***Headache***
- ***Weakness and Sleepiness***
- ***Throbbing in Temples***
- ***Muscular Twitching***
- ***Vomiting***
- ***Inability to Think Coherently***

IF YOU OR ANYONE ELSE EXPERIENCE ANY OF THESE SYMPTOMS, GET OUT INTO THE FRESH AIR IMMEDIATELY. If symptoms persist, seek medical attention. Shut down the unit and do not operate until it has been inspected and repaired.

Protection against carbon monoxide inhalation includes proper installation and regular, frequent visual and audible inspections of the complete exhaust system.

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Power command control

PCC POWER ON / STANDBY MODE

The control panel can be set to function in one of the following modes; Power On or Standby.

To select the alternate mode, refer to the Installation manual.

Power On Mode: In this mode, power is continuously supplied to the control panel. The control's operating software and control panel LED's/display will remain active.

Standby Mode: In this mode, the control's operating software is inactive and the LED's and displays on the front panel are all off. The operating software is initialized and the front panel is turned on in response to one of the following:

- moving the Run/Off/Auto switch to the Run position,
- pressing the Self Test button,
- a remote start input signal (generator set in Auto mode), or
- any one of several "wake-up" signals from external switches.

The wake up signals are:

Low Engine Coolant Level
Low Engine Coolant Temperature
Low Fuel
Customer Fault Inputs 2 and 3
Run Selected on Run/Off Auto Switch
Remote Start Signal in Auto Mode
Emergency Stop

With the switch set to Standby mode, pressing the Self Test button will allow you to activate and view the menu displays without starting the generator set. If no menu selections are made, a software timer will shut down the power after 30 seconds.

When left in the Standby mode, and a "Warning" signal is sensed by the PCC (for example, low coolant temp), the control will wake up and display the warning message. The control will remain active until the warning condition is corrected and the Reset button is pressed to clear the warning message.

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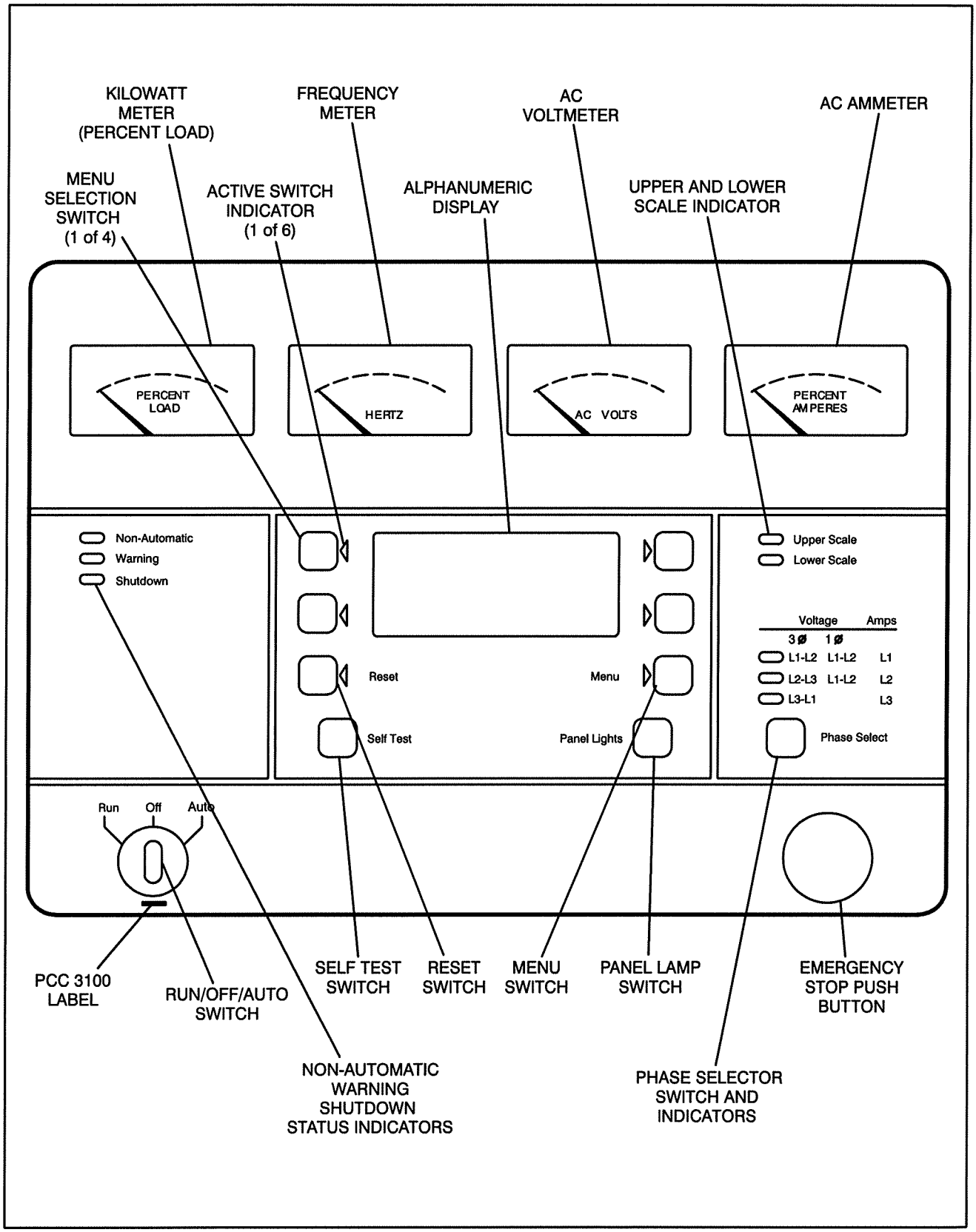

FIGURE 3-1. FRONT PANEL (PCC 3100)

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FRONT PANEL

Figure 3-1 shows the features of the front panel.

AC Voltmeter: Dual scale instrument indicates AC voltage. Measurement scale in use is shown on scale indicator lamp.

AC Ammeter: Indicates current output in percent of maximum rated current.

Kilowatt Meter: Indicates 3-phase AC power output as percent of rated load.

Frequency Meter: Indicates generator output frequency in hertz.

Upper and Lower Scale Indicator Lamps: Indicate AC voltmeter scale.

Digital Display: This two-line, 16-character per line alphanumeric display is used in the menu-driven operating system, in conjunction with the display menu selection switches and the Menu switch. Refer to the menu trees later in this section. The display is also used to show warning and shutdown messages.

* ***Display Menu Selection Switches:*** Four momentary switches—two on each side of the digital display window—are used to step through the various menu options and to adjust generator set parameters. The green arrow adjacent to the switch is lit when the switch can be used (switch is "active").

Menu Switch: Press this switch to return the digital display to the MAIN MENU. Refer to the menu trees later in this section.

* ***Reset Switch:*** Press this switch to reset warning and shutdown messages after the condition has been corrected. To reset a shutdown message with the Reset switch, the Run/Off/Auto switch must be in the Off position.

In Auto mode, shutdown faults can be reset by removing the remote start input and then cycling the remote reset input.

* ***Self Test Switch:*** Press and hold this switch to light all front panel LEDs and cycle through all shutdown and warning messages.

Panel Lights Switch: Press this switch to turn control panel illumination on and off. The illumination will shut off after about eight minutes.

Phase Selector Switch and Indicators: Press this momentary switch to select phases of generator output to be measured by AC voltmeter and ammeter. LEDs indicate the selected phase.

* ***Run/Off/Auto Switch:*** This switch starts and stops the set locally, or enables start/stop control of the engine from a remote location. (Ground to start.)

Emergency Stop Button: Push the switch in for emergency shutdown of the engine.

To reset:

Pull the button out or turn the button clockwise (button with arrow) and allow it to pop out. Move the Run/Off/Auto switch to Off.

Press the front panel Reset switch.

Select Run or Auto, as required.

Non-Automatic Status Indicator: This red lamp flashes continuously when the Run/Off/Auto switch is not in the Auto position.

Warning Status Indicator: This yellow lamp is lit whenever the control detects a warning condition. After the condition is corrected, warning indicators can be reset by pressing the Reset switch. (It is **not** necessary to stop the generator set.) In auto mode, warning indicators can also be reset by cycling the remote reset input after the condition is corrected.

Shutdown Status Indicator: This red lamp is lit whenever the control detects a shutdown condition. After the condition is corrected, shutdown indicators can be reset by turning the Run/Off/Auto switch to the Off position, and pressing the Reset switch. In auto mode, shutdown faults can be reset by removing the remote start input and then cycling the remote reset input.

Emergency Stop shutdown status (Code 102) can be reset only at the PCC front panel.

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STARTING

The following sections cover the three systems used to start the generator set.

Before starting the generator set, make sure that exhaust and fuel fittings are tight and properly positioned and that proper maintenance has been performed. See *Prestart Checks* in this section.

Starting at Control Panel

Move the Run/Off/Auto switch to the Run position. This will activate the engine control system and the starting system. The starter will begin cranking, and after a few seconds the engine will start and the starter will disconnect.

If the engine does not start, the starter will disengage after a specified period of time and the control will indicate an overcrank shutdown.

Generator sets with the cycle cranking option selected will alternately crank and rest for 3, 4, or 5 cycles. The crank times and rest times can be individually preset for 7 to 20 seconds.

To change the cycle number, and the crank and rest times, contact an authorized service center.

Generator sets with the cycle cranking option **not** selected will crank continuously for up to 75 seconds before disengaging the starter.

To clear an overcrank shutdown, place the Run/Off/Auto switch in the Off position and momentarily press the Reset switch. Wait two minutes for the starter motor to cool and then repeat the starting procedure. If the engine does not run after a second attempt, refer to the *Troubleshooting* section.

* Starting from Remote Location

Place the Run/Off/Auto switch in the Auto position. This allows the generator set to be started from a remote switch.

The operating software is initialized and the front panel is turned on in response to a remote run signal. Closing the remote switch initiates the starting sequence described in the previous section.

Starter cranking will begin after the start time delay timer (0–300 seconds) has timed out. Refer to Time Delay Start in the Adjust menu.

* Automatic Starting from ATS

Place the Run/Off/Auto switch in the Auto position if an automatic transfer switch (ATS) is used. The operating software is initialized in response to a remote run signal from the transfer switch. This allows the transfer switch to start the generator set if a power outage occurs and stop it when the power returns.

Starter cranking will begin after the start time delay timer (0–300 seconds) has timed out. Refer to Time Delay Start in the Adjust menu.

Cold Starting with Loads

In accordance with NFPA 110, Cummins Power Generation recommends installing diesel standby generator sets (life safety systems) equipped with coolant heaters in locations where the minimum ambient temperature is above 40°F (4°C). NFPA also requires that the engine coolant be maintained at a minimum of 90°F (32°C) and for most applications, accept the emergency load in 10 seconds or less. Although most generator sets will start in temperatures down to –25°F (–32°C) when equipped with coolant heaters, it might take more than 10 seconds to warm the engine up before a load can be applied when ambient temperatures are below 40°F (4°C).

The **Low Coolant Temp (Code 210)** message, in conjunction with illumination of the Warning LED, is provided to meet the requirements of NFPA 110. The low coolant temperature sensing logic initiates a warning when the engine coolant temperature falls below 70°F (21°C). In applications where the ambient temperature falls below 40°F (4°C), Low Coolant Temp may be indicated even though the coolant heaters are connected and functioning properly. Under these conditions, although the generator set may start, it may not be able to accept load within 10 seconds. When this condition occurs, check the coolant heaters for proper operation. If the coolant heaters are operating properly, other precautions may be necessary to warm the engine before applying a load.

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STOPPING

Before Stopping

Run the generator set at no load for three to five minutes before stopping. This allows the lubricating oil and engine coolant to carry heat away from the combustion chamber and bearings.

Stopping at Control Panel

If the set was started at the set control panel, move the Run/Off/Auto switch to the Off position. The set will stop immediately. The control will respond to "wake up" signals from the external sensing switches when the Run/Off/Auto switch is in the Off position.

Stopping from Remote Location

Move the remote starting switch to the Off position.

The set will stop after the stop time delay timer (0–600 seconds) has timed out. Refer to Time Delay Stop in the Adjust menu.

Automatic Stopping from ATS

If the set was started by an automatic transfer switch, the transfer switch control will send a remote stop signal after the normal power source returns.

The set will stop after the stop time delay timer (0–600 seconds) has timed out. Refer to Time Delay Stop in the Adjust menu.

Emergency Stop (Code 102)

The emergency stop button is located on the lower right side of control panel (Figure 3-1). Push the button in for emergency stop. The red Shutdown status LED will light, and the digital display message will be: "EMERGENCY STOP
102 – SHUTDOWN"

To reset, pull the button out or turn the button clockwise (button with arrow) and allow it to pop out. Move the Run/Off/Auto switch to the Off position. Then momentarily push the Reset switch.

Emergency Stop shutdown status can be reset only at the PCC front panel.

CUSTOMER INPUTS

Remote Start Input: When the Run/Off/Auto switch is in the Auto position, selecting this input initiates the engine cranking and start sequence.

Remote Reset Input: When the Run/Off/Auto switch is in the Auto position and the remote start switch is open, selecting this input resets any latched shutdown fault (except Emergency Stop, which must be reset at the front panel.)

Engine Idle Input: When the set is operating in the RUN mode, selecting this input causes generator build up to be inhibited and the engine to be governed at 800 RPM. When ground is removed from this input, the set returns to normal speed and voltage.

Engine idle operation is applicable only in the RUN mode. The PCC operating program does not permit engine idle operation when the set is operating in AUTO mode.

When the engine idle function is enabled, the control automatically sets lower oil pressure warning and shutdown trip points to reflect the lower operating speed. When the engine idle function is removed and the set reverts to normal operating speed, the control automatically resets oil pressure warning and shutdown trip points to the normal settings.

Remote Emergency Stop Input: Grounding this input causes an immediate shutdown. Emergency stop must be reset at the front panel.

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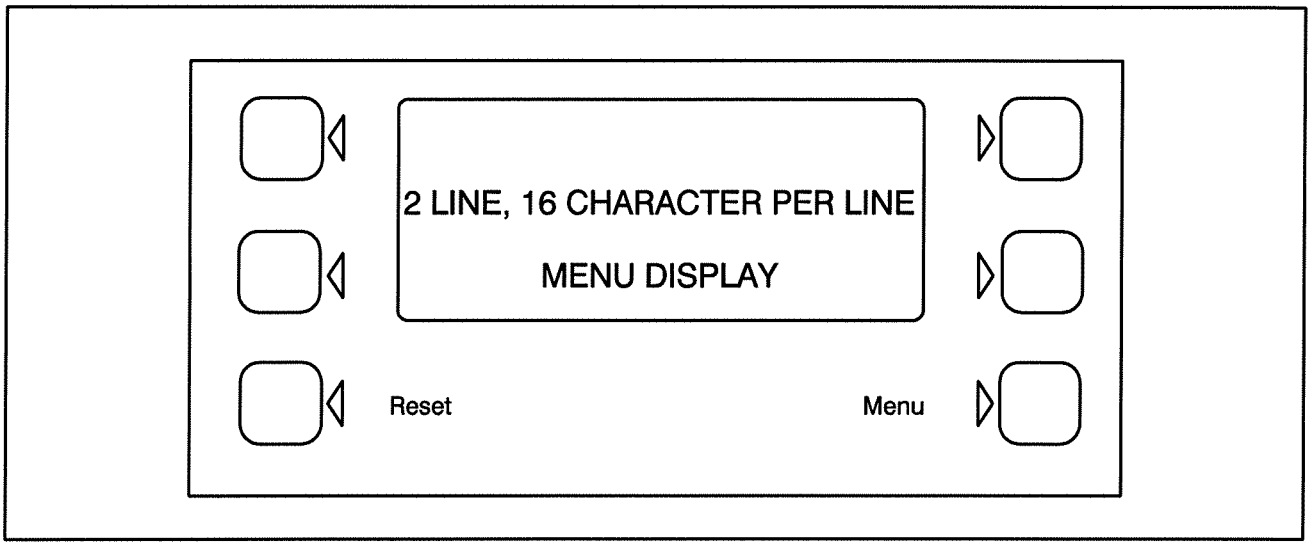

FIGURE 3-2. DIGITAL DISPLAY AND MENU SELECTION SWITCHES

MENU DISPLAY AND SWITCHES

Figure 3-2 shows the digital display and the menu selection switches.

In Standby Mode, to activate and view the menu displays without starting the generator set, press and release the Self Test switch. This will initialize the PCC operating software and permit operation of the menu display panel. If no menu selections are made, a software timer will shut down the display power after 30 seconds. In Power On Mode, power is continuously supplied to the control panel. Display will always remain active.

Digital Display: This two-line, 16-character per line alphanumeric display is used in the menu-driven operating system, in conjunction with the display menu selection switches and the Menu switch.

Display Menu Selection Switches: Four momentary switches—two on each side of the digital display window—are used to step through the various menu options and to adjust generator set parameters. **The green arrow adjacent to the switch is lit when the switch is available for use (is active).**

Menu Switch: Press this momentary switch to return the digital display to the main menu. (Refer to the main menu diagram on the next page.

Reset Switch: Press this momentary switch to reset warning and shutdown messages after the condition has been corrected.

In the digital display, the ">>" symbol indicates that selecting the adjacent button causes the operating program to branch to the next menu display—as shown in the menu diagrams.

In the digital display, the "<<" symbol indicates that selecting the adjacent button causes the operating program to go back to the previous menu display.

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MAIN MENU

The facing page shows the main menu and a block representation of the available submenus.

As shown in the diagram, the main menu can branch into one of four directions.

To display engine parameters, such as oil pressure and temperature, water temperature, engine speed (RPM), and exhaust temperature, press the button next to the word "ENGINE" in the display. Turn to the ENGINE menu diagram on page 3-11.

To display generator parameters, such as volts, amps, power (kW), and frequency, press the button next to the word "GEN" in the display. Turn to the GEN menu diagram on page 3-13.

To adjust output voltage and frequency, or start and stop delays, press the button next to the word "ADJUST" in the display. Turn to the ADJUST menu diagram on page 3-15.

To display the selected generator set model and the resident version software, press the button next to the ">>" in the display. From this selection, you can also review a History file that can record and save up to 20 error messages. Turn to the VERSION menu diagram on page 3-17.

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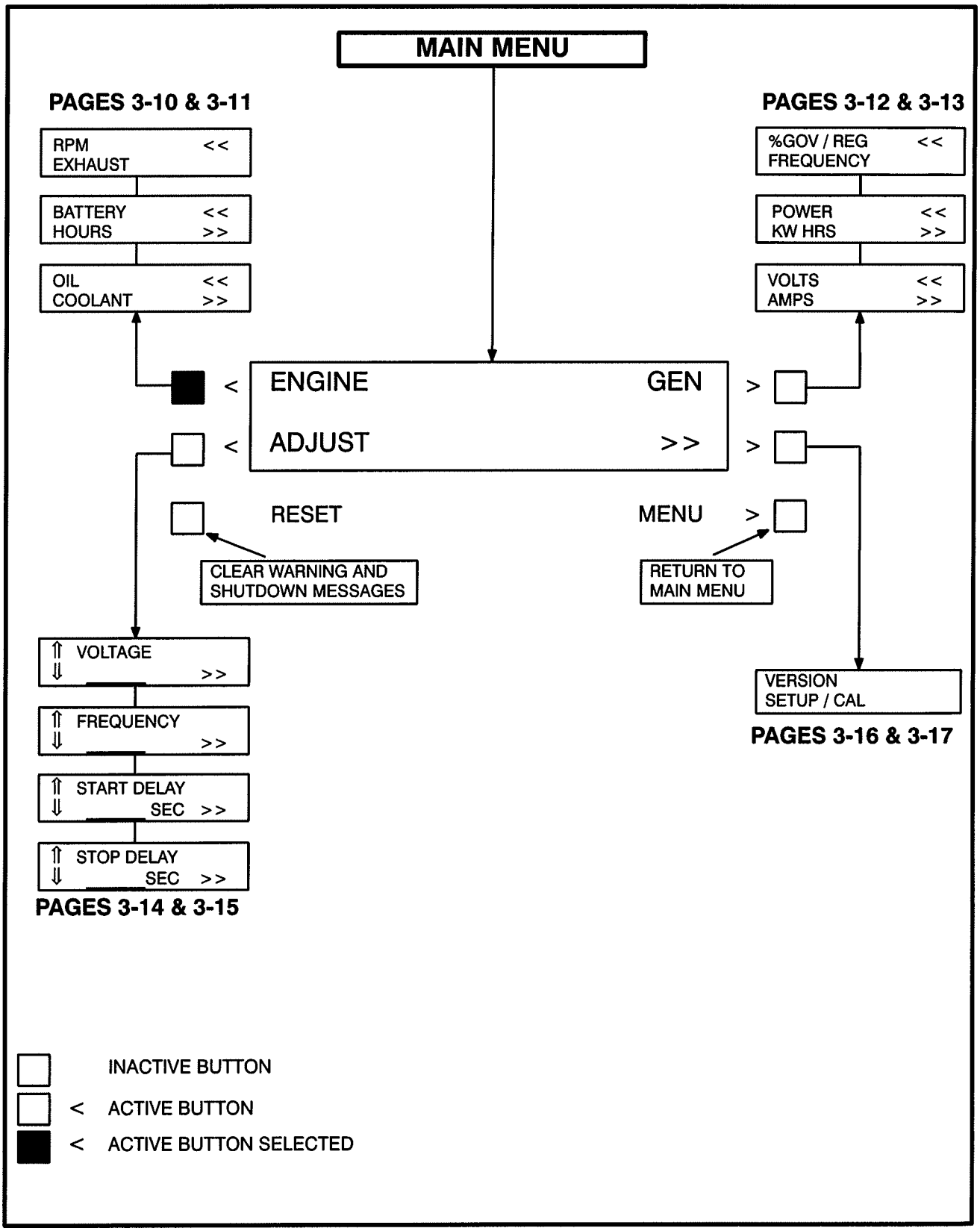

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ENGINE MENU

The facing page shows a block representation of the ENGINE menu. If you press the button next to the word "ENGINE" in the display, the first ENGINE submenu will appear.

As shown in the diagram, the ENGINE menu has three submenus.

OIL/COOLANT submenu: This is the first submenu. Select OIL for a display of oil pressure and oil temperature. Select COOLANT for a display of coolant temperature. When oil or coolant parameters are displayed, pressing the button next to the "<<" will return the display ("BACK") to the OIL/COOLANT submenu.

To check oil pressure or coolant temperature during a warning, access the oil pressure or coolant temperature menu prior to clearing the fault.

BATTERY/HOURS submenu: From the OIL/COOLANT submenu, press the button next to the ">>" in the display to move to the BATTERY/HOURS submenu. Select BATTERY for a display of battery voltage. Select HOURS for a display of the number of starts and the running hours. When battery or hours parameters are displayed, pressing the button next to the "<<" will return the display ("BACK") to the BATTERY/HOURS submenu.

RPM/EXHAUST submenu: From the BATTERY/HOURS submenu, press the button next to the ">>" in the display to move to the RPM/EXHAUST submenu. Select RPM for a display of engine RPM. Select EXHAUST for a display of the (optional) exhaust temperature. When RPM or exhaust parameters are displayed, pressing the button next to the "<<" will return the display ("BACK") to the RPM/EXHAUST submenu.

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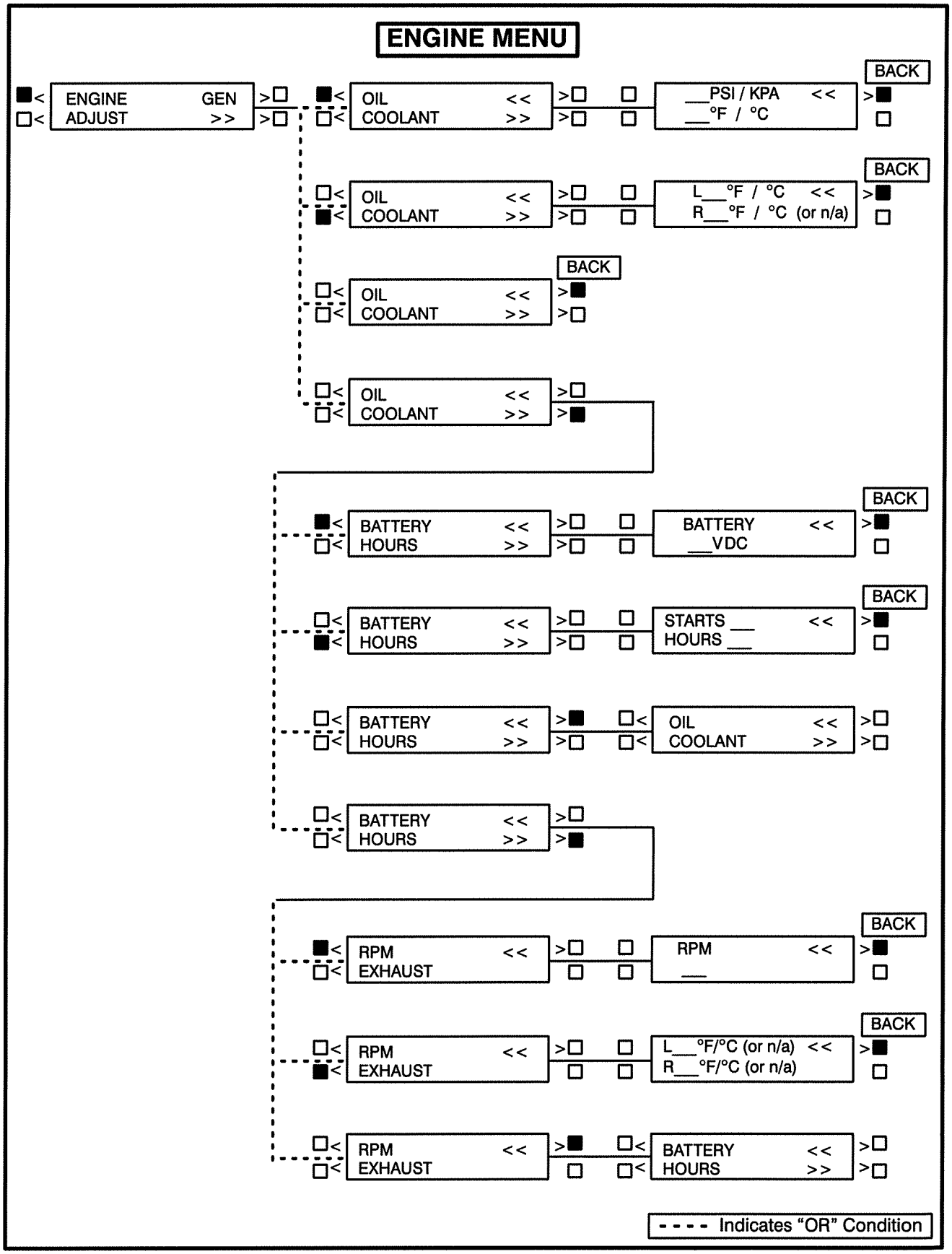

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GEN MENU

The facing page shows a block representation of the GEN menu. If you press the button next to the word "GEN" in the display, the first GEN submenu will appear.

As shown in the diagram, the GEN menu has three submenus.

VOLTS/AMPS submenu: This is the first submenu. Select VOLTS for a display of a line-line or line-neutral selection. Select line-line or line-neutral for the desired voltage display. Select AMPS for a display of L1, L2, and L3 current in amps. When voltage or current parameters are displayed, pressing the button next to the "<<" will return the display ("BACK") to the L-L/L-N submenu.

If DELTA is selected in the Initial Start Setup submenu, when selecting VOLTS, the "line-line" or "line-neutral" submenus will not be displayed, only the L12, L23, L31 submenu will be displayed.

POWER/KW HOURS submenu: From the VOLTS/AMPS submenu, press the button next to the ">>" in the display to move to the POWER/KW HOURS submenu. Select POWER for a display of power output in kilowatts and a power factor value. Select KW HOURS for a display of kilowatt hours. When power or kW hours parameters are displayed, pressing the button next to the "<<" will return the display ("BACK") to the POWER/KW HOURS submenu.

The PF reading will contain an asterisk if the power factor is leading (for example, *.3PF).

Beginning Version 1.06, N/A is displayed in the PF field when the generator set is not running.

%GOV/REG/FREQUENCY submenu: From the POWER/KW HOURS submenu, press the button next to the ">>" in the display to move to the %GOV/REG/FREQUENCY submenu. Select %GOV/REG for a display of voltage regulator and governor duty cycle (drive) levels in percentage of maximum. Select FREQUENCY for a display of the generator output frequency. When voltage regulator and governor or frequency parameters are displayed, pressing the button next to the "<<" will return the display ("BACK") to the %GOV/REG/FREQUENCY submenu.

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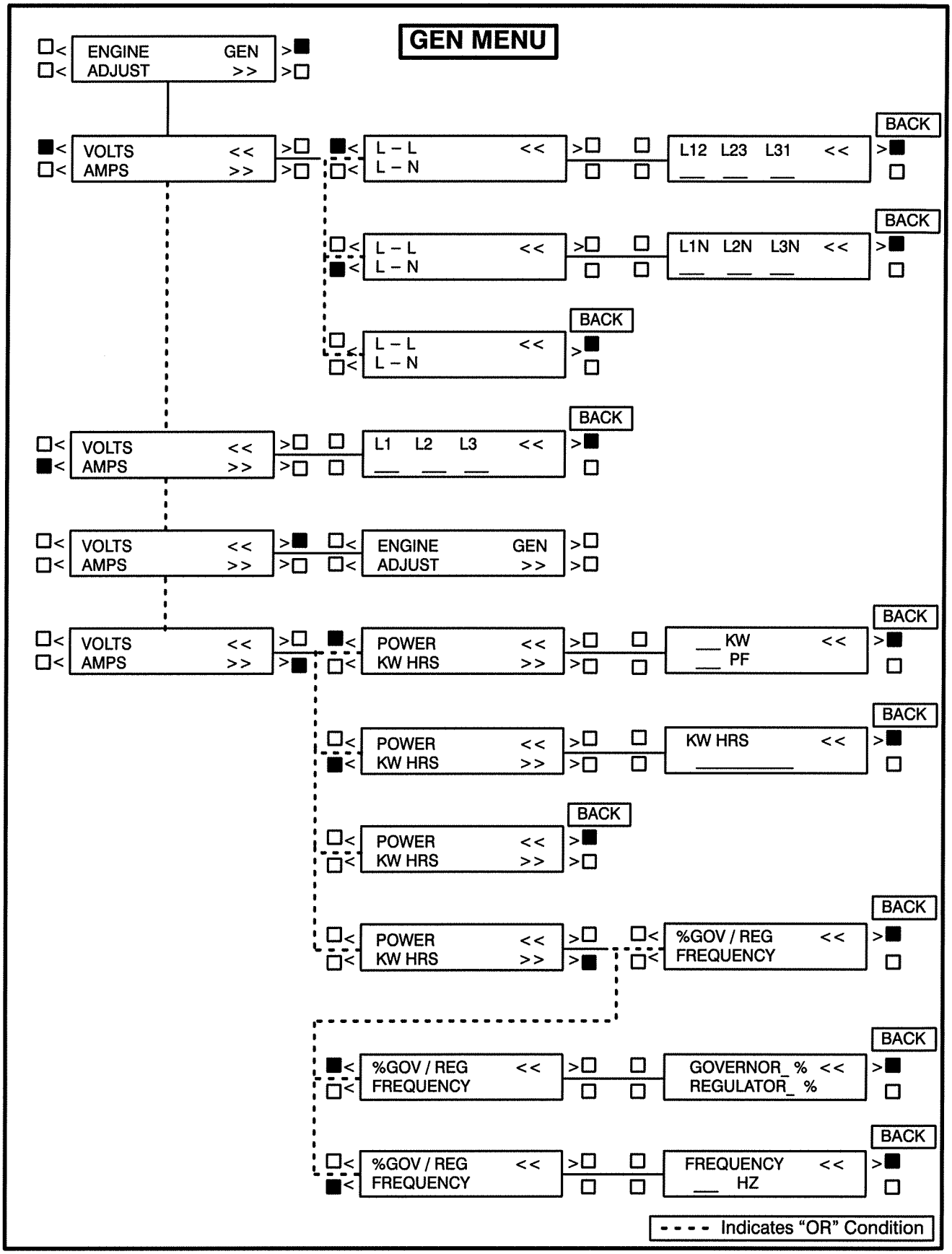

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ADJUST MENU

The facing page shows a block representation of the ADJUST menu. If you press the button next to the word "ADJUST" in the display, the VOLTAGE ADJUST submenu will appear.

As shown in the diagram, the ADJUST menu has five submenus, including a save/exit procedure.

Voltage and frequency can be adjusted only when the generator set is running under normal operating parameters (not in idle mode). For example, if voltage adjustment is selected when the set is in Idle mode or not running, the digital display will be:

VOLTAGE submenu: This is the first submenu. Use the buttons next to the "⇑" and "⇓" symbols to adjust output voltage ± 5%.

FREQUENCY submenu: From the VOLTAGE submenu, press the button next to the ">>" in the display to move to the FREQUENCY submenu. Use the buttons next to the "⇑" and "⇓" symbols to adjust output frequency ± 5%.

START DELAY submenu: This delay applies only to remote starting in the Auto mode. From the FREQUENCY submenu, press the button next to the ">>" in the display to move to the START DELAY submenu. Use the buttons next to the "⇑" and "⇓" symbols to set the start delay. The start delay adjustment range is 0 to 300 seconds.

STOP DELAY submenu: This delay applies only to remote stopping in the Auto mode. From the START DELAY submenu, press the button next to the ">>" in the display to move to the STOP DELAY submenu. Use the buttons next to the "⇑" and "⇓" symbols to set the stop delay. The stop delay adjustment range is 0 to 600 seconds.

IDLE SPEED submenu: From the STOP DELAY submenu, press the button next to the ">>" in the display to move to the IDLE SPEED submenu. Use the buttons next to the "⇑" and "⇓" symbols to set the idle speed. The idle speed adjustment range is 800 RPM ±100 RPM. (Default value is 800 RPM.)

The idle speed can be adjusted only when the generator set is running in the idle mode. When not in idle mode, N/A is displayed in RPM field.

SAVE/EXIT submenu: From the STOP DELAY submenu, press the button next to the ">>" in the display to move to the SAVE/EXIT submenu. Select SAVE to save your changes. At the CHANGES SAVED submenu, select EXIT to return to the main menu.

If you select SAVE, the adjustments will be retained after shutdown, and will be in effect when the set is restarted. If you select EXIT without saving first, the adjustments will remain in effect until the genset is shut down, but will be reset (and will not be in effect) when the set is restarted.

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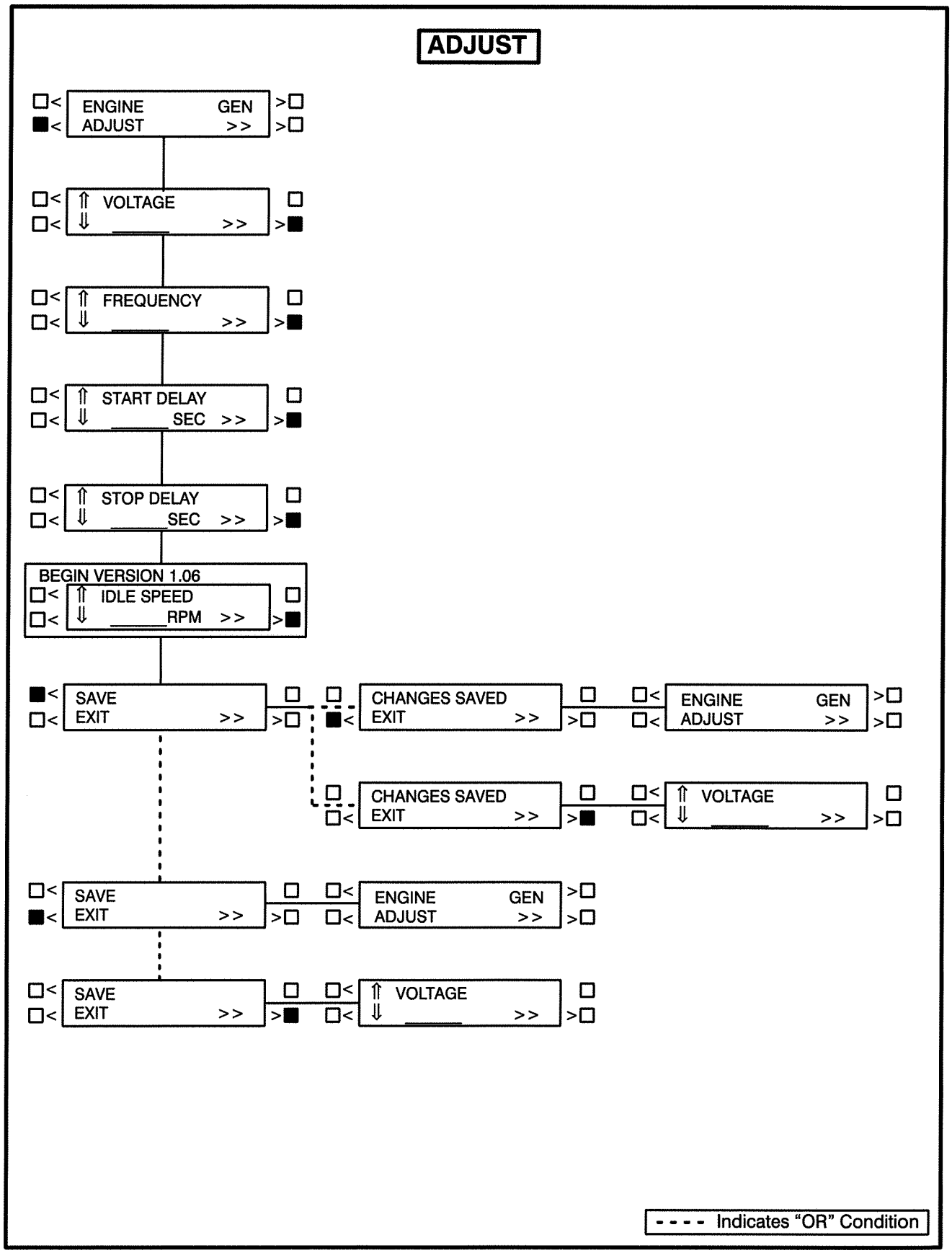

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VERSION MENU

The facing page shows a block representation of the VERSION submenus. If you press the button next to the ">>" in the Main menu display, the VERSION/SETUP/CAL menu will appear.

VERSION submenu: If you select VERSION, the display will show the generator set model number, frequency, and kW rating, and the date and version of the operating software.

To display the generator set configuration options, press the button next to the ">>" in the submenu that displays the model number, frequency and etc. This menu provides the following information:

- Generator set voltage
- WYE or DELTA
- Standby or Prime
- Parallel or Single

HISTORY: (Beginning Version 1.06) From the VERSION menu, press the button next to the ">>" in the display to move to the HISTORY submenu. Press the button next to "HISTORY" to display the last (latest) recorded error message.

The software will record (save) up to 20 error messages. The last error detected will always be displayed first. As each new error is detected, the oldest error recorded after 20 will be deleted.

To view the generator set runtime at which the error occurred and to scroll through the remaining recorded errors, press the button next to the ">>" in the error message menu to display the RUNTIME, NEWER/OLDER menu.

The buttons next to NEWER and OLDER are used to scroll up and down through the error messages. For example, pressing OLDER will display the next oldest recorded error message.

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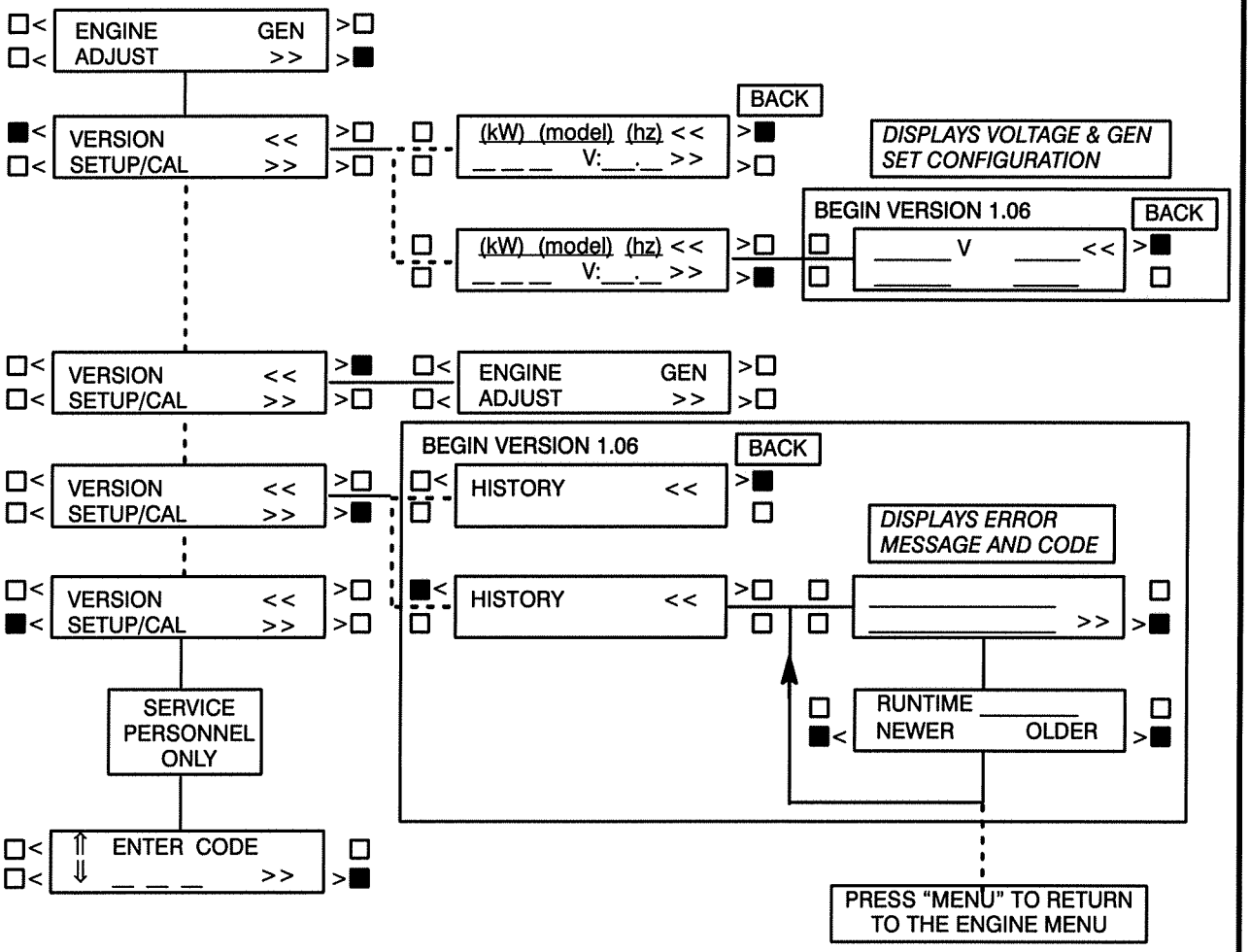
VERSION MENU



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4. Troubleshooting (PCC)

The PowerCommand® Control 3100 (PCC) continuously monitors engine sensors for abnormal conditions, such as low oil pressure and high coolant temperature. If any of these conditions occur, the PCC will light a yellow Warning lamp or a red Shutdown lamp and display a message on the digital display panel.

In the event of a shutdown fault (red Shutdown lamp), the PCC will stop the engine and close a set of contacts that can be wired to trip a circuit breaker. If the generator set is stopped for this reason, the operator can restart the set after making adjustments or corrections. This section lists the warning and shutdown messages (Table 4-1), and suggests troubleshooting procedures (Table 4-2).

Specifications section lists the PCC oil pressure warning and shutdown limits.

SAFETY CONSIDERATIONS

⚠WARNING ***Contacting high voltage components can cause electrocution, resulting in severe personal injury or death. Keep the output box covers in place during troubleshooting.***

High voltages are present when the set is running. Do not open the generator output box while the set is running.

⚠WARNING ***Ignition of explosive battery gases can cause severe personal injury or death. Arcing at battery terminals, light switch or other equipment, flame, pilot lights and sparks can ignite battery gas. Do not smoke, or switch trouble light ON or OFF near battery. Discharge static electricity from body before touching batteries by first touching a grounded metal surface. Ventilate battery area before working on or near battery—Wear goggles—Stop genset and disconnect charger before disconnecting battery cables—Disconnect negative (–) cable first and reconnect last.***

⚠CAUTION ***Disconnect battery charger from AC source before disconnecting battery cables. Otherwise, disconnecting cables can result in voltage spikes damaging to DC control circuits of the set.***

⚠WARNING ***Accidental starting of the generator set can cause severe personal injury or death. Prevent accidental starting by disconnecting the negative (–) cable from the battery terminal.***

When troubleshooting a set that is shut down, make certain the generator set cannot be accidentally restarted as follows:

1. Move the Run/Off/Auto switch on the control panel to the OFF position.
2. Turn off or remove AC power from the battery charger.
3. Remove the negative (–) battery cable from the generator set starting battery.

When a fault condition occurs during operation, follow the procedures listed below to locate and correct the problem. For any symptom not listed, contact an authorized service center for assistance.

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STATUS INDICATORS

Non-Automatic Status Indicator: This red lamp flashes continuously when the Run/Off/Auto switch is not in the Auto position.

Warning Status Indicator: This yellow lamp is lit whenever the control detects a warning condition. After the condition is corrected, warning indicators can be reset by pressing the Reset switch. (It is **not** necessary to stop the generator set.) In auto mode, warning indicators can also be reset by cycling the remote reset input after the condition is corrected.

Shutdown Status Indicator: This red lamp is lit whenever the control detects a shutdown condition. After the condition is corrected, shutdown indicators can be reset by turning the Run/Off/Auto switch to the Off position, and pressing the Reset switch. In auto mode, shutdown faults can be reset by removing the remote start input and then cycling the remote reset input.

Emergency Stop shutdown status (Code 102) can be reset only at the PCC front panel.

Digital Display: This two-line, 16-character per line alphanumeric display is used in the menu-driven operating system and to show shutdown and warning messages. Refer to Tables 4-1 and 4-2.

RESETTING THE CONTROL

Press the momentary ***Reset Switch*** to reset warning and shutdown messages after the condition has been corrected. To reset a shutdown message with the Reset switch, the Run/Off/Auto switch must be in the Off Position. **(The control cannot go into standby [sleep] mode until all faults have been reset.)**

In Auto mode, warning indicators can also be reset by cycling the remote reset input after the condition is corrected. Shutdown faults can be reset by removing the remote start input and then cycling the remote reset input.

Line Circuit Breaker (Optional)

The optional line circuit breaker mounts on the generator output box. If the load exceeds the generator current rating, the line circuit breaker will open, preventing the generator from being overloaded. If the circuit breaker trips, locate the source of the overload and correct as necessary. Manually reset the breaker to reconnect the load to the generator.

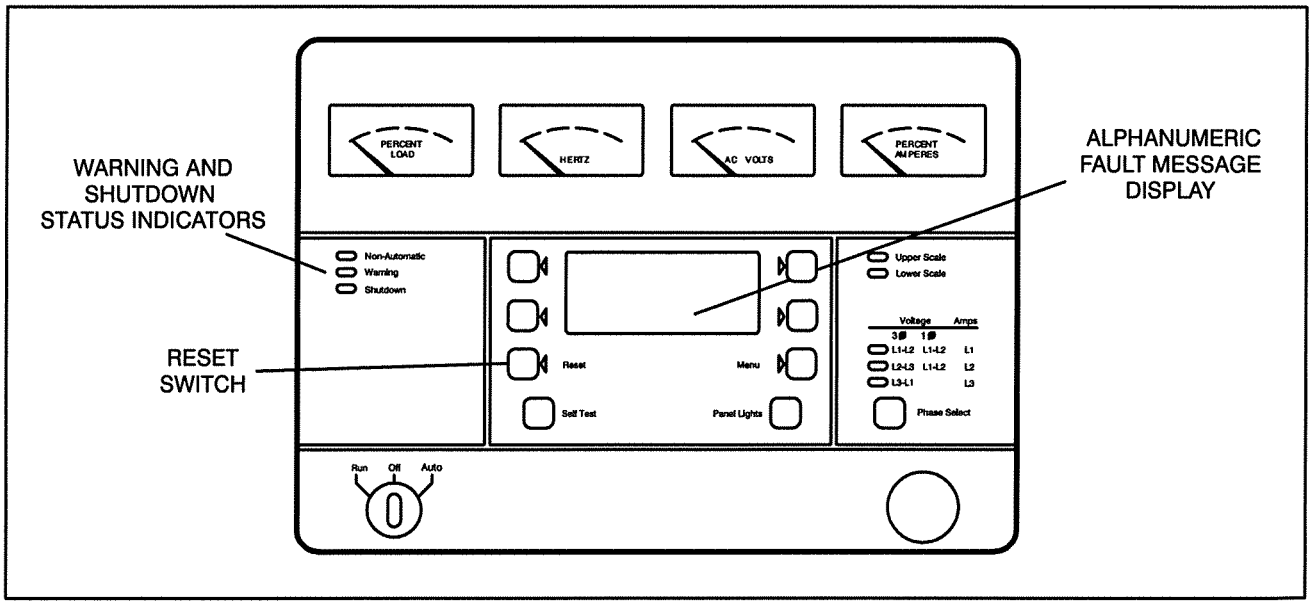

FIGURE 4-1. CONTROL PANEL (PCC 3100)

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TABLE 4-1. WARNING AND SHUTDOWN CODES

CODE	MESSAGE	STATUS LED	PAGE
101	IDLE MODE	none	4-4
102	EMERGENCY STOP	Shutdown	4-4
200	LOW OIL PRESSURE	Warning	4-4
201	LOW OIL PRESSURE	Shutdown	4-4
204	OIL PRES SENDER	Warning	4-5
210	LOW COOLANT TEMP	Warning	4-5
211	HIGH COOLANT TEMP	Warning	4-5
212	HIGH COOLANT TEMP	Shutdown	4-5
213	COOLANT SENDER	Warning	4-6
214	LOW COOLANT LVL	Warning	4-6
215	LOW COOLANT LVL	Shutdown	4-6
220	MAG PICKUP	Shutdown	4-6
221	FAIL TO CRANK	Shutdown	4-6
222	OVERCRANK	Shutdown	4-6
223	OVERSPEED	Shutdown	4-7
230	LOW DC VOLTAGE	Warning	4-7
231	HIGH DC VOLTAGE	Warning	4-7
232	WEAK BATTERY	Warning	4-7
240	LOW FUEL – DAY	Warning	4-7
241	LOW FUEL	Warning	4-7
250	EEPROM ERROR	Shutdown	4-7
251	EEPROM ERROR	Warning	4-8
252	EEPROM ERROR	Warning	4-8
260	CUSTOMER FAULT 1*	Warning/Shutdown	4-8
261	GROUND FAULT*	Warning/Shutdown	4-8
262	RUPTURE BASIN*	Warning/Shutdown	4-8
263	HIGH GEN TEMP*	Warning/Shutdown	4-8
301	HIGH AC VOLTAGE	Shutdown	4-9
303	LOW AC VOLTAGE	Shutdown	4-9
313	UNDER FREQUENCY	Shutdown	4-9
320	OVERCURRENT	Warning	4-9
321	OVERCURRENT	Shutdown	4-9
322	SHORT CIRCUIT	Shutdown	4-10
330	OVERLOAD	Warning	4-10
335	REVERSE POWER	Shutdown	4-10

* Default message. Editable for customer site requirements.

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TABLE 4-2. TROUBLESHOOTING

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
Control does not power up when the Run/Off/Auto switch is set to Run or the Self Test switch is pressed.	There is no DC power to the control. a. Check for battery disconnected, discharged, or improperly connected. b. Fuse F1 (20A/32V, Type 3AG) my be open. Replace with the same type. (Fuse is mounted near engine starter/solenoid, see Figure 4-2). Contact an authorized service center.
Warning, **Shutdown**, and **Non-Automatic** lamps are not lit. Digital display shows main menu or selected menu.	Indicates all engine systems are normal. No corrective action require
Non-Automatic lamp flashes.	Indicates Run/Off/Auto switch is not in the Auto position. This will prevent automatic starting if an automatic transfer switch is used. Move the Run/Off/Auto switch to the Auto position for automatic operation.
MESSAGE: **IDLE MODE** **101 – WARNING** Engine continues to operate at reduced RPM.	Indicates that the engine is operating in idle mode. When the set is operating in the RUN mode, grounding the engine idle input causes generator build-up to be inhibited and the engine to be governed at 800 RPM. When ground is removed from this input, the set returns to normal speed and voltage.When the engine idle function is enabled, the control automatically sets lower oil pressure warning and shutdown trip points to reflect the lower operating speed. When the engine idle function is removed and the set reverts to normal operating speed, the control automatically resets oil pressure warning and shutdown trip points to the normal settings.
Shutdown lamp lights. MESSAGE: **EMERGENCY STOP** **102 – SHUTDOWN** Engine shuts down and will not crank.	Indicates local or remote Emergency Stop. To reset the local Emergency Stop button : Pull the button out or turn the switch clockwise (button with arrow) and allow it to pop out. Move the Run/Off/Auto switch to Off. Press the Reset switch. Select Run or Auto, as required.
Warning lamp lights. MESSAGE: **LOW OIL PRESSURE** **200 – WARNING**	Indicates engine oil pressure has dropped to an unacceptable level. If generator is powering critical loads and cannot be shut down, wait until next shutdown period then follow, **201 Low Oil Pressure** procedure. If engine can be stopped, follow **201** procedure. **To check oil pressure, access Oil Pressure menu prior to clearing the fault.**

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TABLE 4-2. TROUBLESHOOTING (CONT.)

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
Shutdown lamp lights. MESSAGE: **LOW OIL PRESSURE** **201 – SHUTDOWN**	Indicates engine oil pressure has dropped below the shutdown trip point. Check oil level, lines and filters. If oil system is OK but oil level is low, replenish. Reset control and restart. Oil pressure limits are listed in *Specifications*. Contact an authorized service center.
Warning lamp lights. MESSAGE: **OIL PRES SENDER** **204 – WARNING**	Indicates that the engine oil pressure sender is not functioning correctly. Check that the engine oil pressure sender is properly connected. Contact an authorized service center.
Warning lamp lights. MESSAGE: **LOW COOLANT TEMP** **210 – WARNING** Set is in standby mode but is not operating. Warning occurs when engine coolant temperature is 70° F (21° C) or lower. **NOTE: In applications where the ambient temperature falls below 40°F (4°C), Low Engine Temp may be indicated even though the coolant heaters are operating.**	Indicates engine coolant heater is not operating or is not circulating coolant. Check for the following conditions: a. Coolant heater not connected to power supply. Check for blown fuse or disconnected heater cord and correct as required. b. Check for low coolant level and replenish if required. Look for possible coolant leakage points and repair as required. c. Contact an authorized service center if none of the above.
Warning lamp lights. MESSAGE: **HIGH COOLANT TEMP** **211 – WARNING**	Indicates engine has begun to overheat and coolant temperature has risen to an unacceptable level: **(215° F – standby / 207° F – primary).** If generator is powering non-critical and critical loads and cannot be shut down, use the following: a. Reduce load if possible by turning off non-critical loads. b. Check air inlets and outlets and remove any obstructions to airflow. If engine can be stopped, follow the next procedure. **To check coolant temperature, access Coolant Temp menu prior to clearing the fault.**

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TABLE 4-2. TROUBLESHOOTING (CONT.)

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
Shutdown lamp lights. MESSAGE: **HIGH COOLANT TEMP** **212 – SHUTDOWN**	Indicates engine has overheated (coolant temperature has risen above the shutdown trip point: **223° F – standby / 215° F – primary**) or the coolant level is low. Allow engine to cool down completely before proceeding with the following checks: a. Check coolant level and replenish if low. Look for coolant leakage and repair if necessary. b. Check for obstructions to cooling airflow and correct as necessary. c. Check fan belt and repair or tighten if necessary. d. Reset control and restart after locating and correcting problem. Contact an authorized service center if none of the above.
Warning lamp lights. MESSAGE: **ENG COOLANT SENDER** **213 – WARNING**	Indicates that the resistance of the coolant temperature sender is out of range. Contact an authorized service center.
Shutdown lamp lights. MESSAGE: **LOW COOLANT LVL** **214 – WARNINGor** **LOW COOLANT LVL** **215 – SHUTDOWN**	Indicates engine coolant level has fallen below the trip point. Allow engine to cool down completely before proceeding. a. Check coolant level and replenish if low. Look for possible coolant leakage points and repair if necessary. b. Reset control and restart after locating and correcting problem. Contact an authorized service center. **LOW COOLANT LVL Shutdown will not occur if generator set is in Idle mode (low coolant warning only).**
Shutdown lamp lights. MESSAGE: **MAG PICKUP** **220 – SHUTDOWN**	Indicates mag pickup speed indication is not being sensed or does not match generator set output frequency. a. Restart and check RPM on the digital display. b. Contact an authorized service center.

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TABLE 4-2. TROUBLESHOOTING (CONT.)

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
Shutdown lamp lights. Engine will not crank. MESSAGE: **FAIL TO CRANK** **221 – SHUTDOWN**	Indicates possible fault with control or starting system. Check for the following conditions: a. Poor battery cable connections. Clean the battery cable terminals and tighten all connections. b. Discharged or defective battery. Recharge or replace the battery. c. Contact an authorized service center for service of starter and starting system.
Shutdown lamp lights. Engine stops cranking. MESSAGE: **OVERCRANK** **222 – SHUTDOWN**	Indicates possible fuel system problem. a. Check for empty fuel tank, fuel leaks, or plugged fuel lines and correct as required. b. Check for dirty fuel filter and replace if necessary. c. Check for dirty or plugged air filter and replace if necessary. d. Reset the control and restart after correcting the problem. Contact an authorized service center if none of the above.
Shutdown lamp lights. Engine runs and then shuts down. MESSAGE: **OVERSPEED** **223 – SHUTDOWN**	Indicates engine has exceeded normal operating speed. (2070 rpm @ 60 hz; 1800 rpm @ 50 hz) Contact an authorized service center.
Warning lamp lights. MESSAGE: **LOW DC VOLTAGE** **230 – WARNING**	Indicates battery voltage is below 24 VDC. a. Discharged or defective battery. Check the battery charger fuse. Recharge or replace the battery. b. Poor battery cable connections. Clean the battery cable terminals and tighten all connections. c. Contact an authorized service center if none of the above.
Warning lamp lights. MESSAGE: **HIGH DC VOLTAGE** **231 – WARNING**	Indicates battery voltage exceeds 32 VDC. Contact an authorized service center.

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TABLE 4-2. TROUBLESHOOTING (CONT.)

⚠ WARNING ***Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.***

SYMPTOM	CORRECTIVE ACTION
Warning lamp lights. MESSAGE: **WEAK BATTERY** **232 – WARNING**	Indicates battery voltage drops below 60% of nominal for two seconds, during starting. Discharged or defective battery. See Warning message **230, LOW DC VOLTAGE**.
Warning lamp lights. MESSAGE: **LOW FUEL DAY** **240 – WARNING**	Indicates day tank fuel supply is running low. Check fuel supply and replenish as required.
Warning lamp lights. MESSAGE: **LOW FUEL** **241 – WARNING**	Indicates fuel supply is running low. Check fuel supply and replenish as required.
Shutdown lamp lights. MESSAGE: **EEPROM ERROR** **250 – SHUTDOWN**	Indicates PCC memory error. Data corruption of critical operating parameters. Contact an authorized service center.
Warning lamp lights. MESSAGE: **EEPROM ERROR** **251 – WARNING** or **252 – WARNING**	Indicates PCC memory error. Data corruption of noncritical operating parameters. Contact an authorized service center.
Shutdown lamp lights. MESSAGE: **CUSTOMER FAULT 1** **260 – SHUTDOWN** or **GROUND FAULT** **261 – SHUTDOWN** or **DAY TANK** **262 – SHUTDOWN** or **HIGH GEN TEMP** **263 – SHUTDOWN**	When any one of these customer defined inputs is closed to ground, the corresponding fault message is displayed. The nature of the fault is an optional customer selection. These fault functions can be programmed to initiate a shutdown or a warning. As indicated by the Shutdown lamp, a shutdown response has been preselected.Contact an authorized service center. **Note:** Customer fault messages are editable. The message displayed for the code shown (260 thru 263) may have been edited and may not appear as shown in this table.

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TABLE 4-2. TROUBLESHOOTING (CONT.)

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
Warning lamp lights. MESSAGE: **CUSTOMER FAULT 1** **260 – WARNING** or **GROUND FAULT** **261 – WARNING** or **RUPTURE BASIN** **262 – WARNING** or **HIGH GEN TEMP** **263 – WARNING**	When any one of these customer defined inputs is closed to ground, the corresponding fault message is displayed. The nature of the fault is an optional customer selection. These fault functions can be programmed to initiate a shutdown or a warning. As indicated by the Warning lamp, a warning response has been preselected. **Note:** Customer fault messages are editable. The message displayed for the code shown (260 thru 263) may have been edited and may not appear as shown in this table.
Shutdown lamp lights. MESSAGE: **HIGH AC VOLTAGE** **301 – SHUTDOWN**	Indicates that one or more of the phase voltages has exceeded 130% of nominal, or has exceeded 110% of nominal for 10 seconds. Contact an authorized service center.
Shutdown lamp lights. MESSAGE: **LOW AC VOLTAGE** **303 – SHUTDOWN**	Indicates that one or more of the phase voltages has dropped below 85% of nominal for 10 seconds. Contact an authorized service center.
Shutdown lamp lights. MESSAGE: **UNDER FREQUENCY** **313 – SHUTDOWN**	Indicates that engine speed has dropped below 90% of nominal for 10 seconds. **NOTE:** Five seconds before shutdown, a Load Dump signal is initiated. Contact an authorized service center.
Warning lamp lights. MESSAGE: **OVERCURRENT** **320 – WARNING**	Indicates that generator output current has exceeded 110% of rated for 60 seconds. Contact an authorized service center.
Shutdown lamp lights. MESSAGE: **OVERCURRENT** **321 – SHUTDOWN**	Indicates that generator output current has exceeded 110% of rated, and that a PCC time/current calculation has initiated an overcurrent shutdown. Contact an authorized service center.

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TABLE 4-2. TROUBLESHOOTING (CONT.)

⚠ WARNING ***Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.***

SYMPTOM	CORRECTIVE ACTION
Shutdown lamp lights. MESSAGE: **SHORT CIRCUIT** **322 – SHUTDOWN**	Indicates that generator output current has exceeded 175% of rated. Contact an authorized service center.
Warning lamp lights. MESSAGE: **OVERLOAD** **330 – WARNING**	Indicates that three-phase power output exceeds 105% of standby (or 115% of prime) rating. After five seconds, the Load Dump output is activated. After 60 seconds, the OVERLOAD warning is activated. Contact an authorized service center.
Shutdown lamp lights. MESSAGE: **REVERSE POWER** **335 – SHUTDOWN**	Indicates improper CT or PT phasing. (Non-parallel units only.) Contact an authorized service center.
Engine starts from generator control panel but will not start automatically or from a remote panel. (Note: The Run/Off/Auto switch must be in the Auto position for automatic or remote starting).	Check the control wiring between the remote switch and the PCC. Contact an authorized service center.
No AC output voltage.	Contact an authorized service center.

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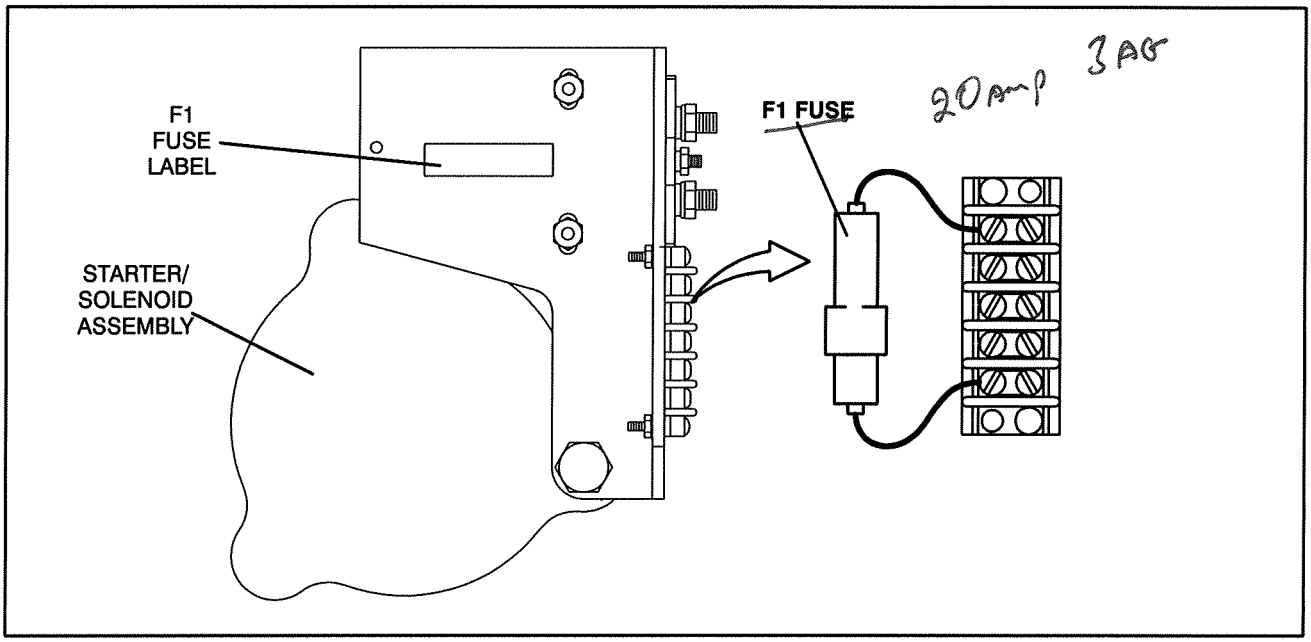

FIGURE 4-2. FUSE F1 (B+) LOCATION

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5. Operation (Detector Control)

GENERAL

This section covers prestart checks, starting and stopping and operating the generator set. Each operator should read through this entire section before attempting to start the set. It is essential that the operator be completely familiar with the set for safe operation. Refer to *Section 10* for operating recommendations.

PRESTART CHECKS

Before starting, be sure the following checks have been made and the unit is ready for operation. Refer to the *Maintenance* section for the recommended procedures.

Lubrication

Check the engine oil level. Keep the oil level near as possible to the dipstick high mark without overfilling.

Coolant

Check the engine coolant level. The cold coolant level should be about 3/4 inch (18 mm) below the radiator cap lower sealing surface. Do not check while the engine is hot.

⚠WARNING To prevent severe scalding, let engine cool down before removing coolant pressure cap. Turn cap slowly, and do not open it fully until the pressure has been relieved.

Fuel

Make sure the fuel tanks have sufficient fuel and that fuel system is primed. Check to make sure there are no leaks and that all fittings are tight.

Exhaust

Check to make sure entire exhaust system is tight, that no combustible materials are near system, and gases are discharged away from building openings.

CONTROL PANEL

The following describes the function and operation of the Detector Control panel. All instruments and control switches are located on the face of the control panel as illustrated in Figures 5-1 through 5-3. The control panel is separated into a DC panel for monitoring the engine and an AC panel for monitoring the generator.

EXHAUST GAS IS DEADLY!

Exhaust gases contain carbon monoxide, an odorless and colorless gas. Carbon monoxide is poisonous and can cause unconsciousness and death. Symptoms of carbon monoxide poisoning can include:

- ***Dizziness***
- ***Nausea***
- ***Headache***
- ***Weakness and Sleepiness***
- ***Throbbing in Temples***
- ***Muscular Twitching***
- ***Vomiting***
- ***Inability to Think Coherently***

IF YOU OR ANYONE ELSE EXPERIENCE ANY OF THESE SYMPTOMS, GET OUT INTO THE FRESH AIR IMMEDIATELY. If symptoms persist, seek medical attention. Shut down the unit and do not operate until it has been inspected and repaired.

Protection against carbon monoxide inhalation includes proper installation and regular, frequent visual and audible inspections of the complete exhaust system.

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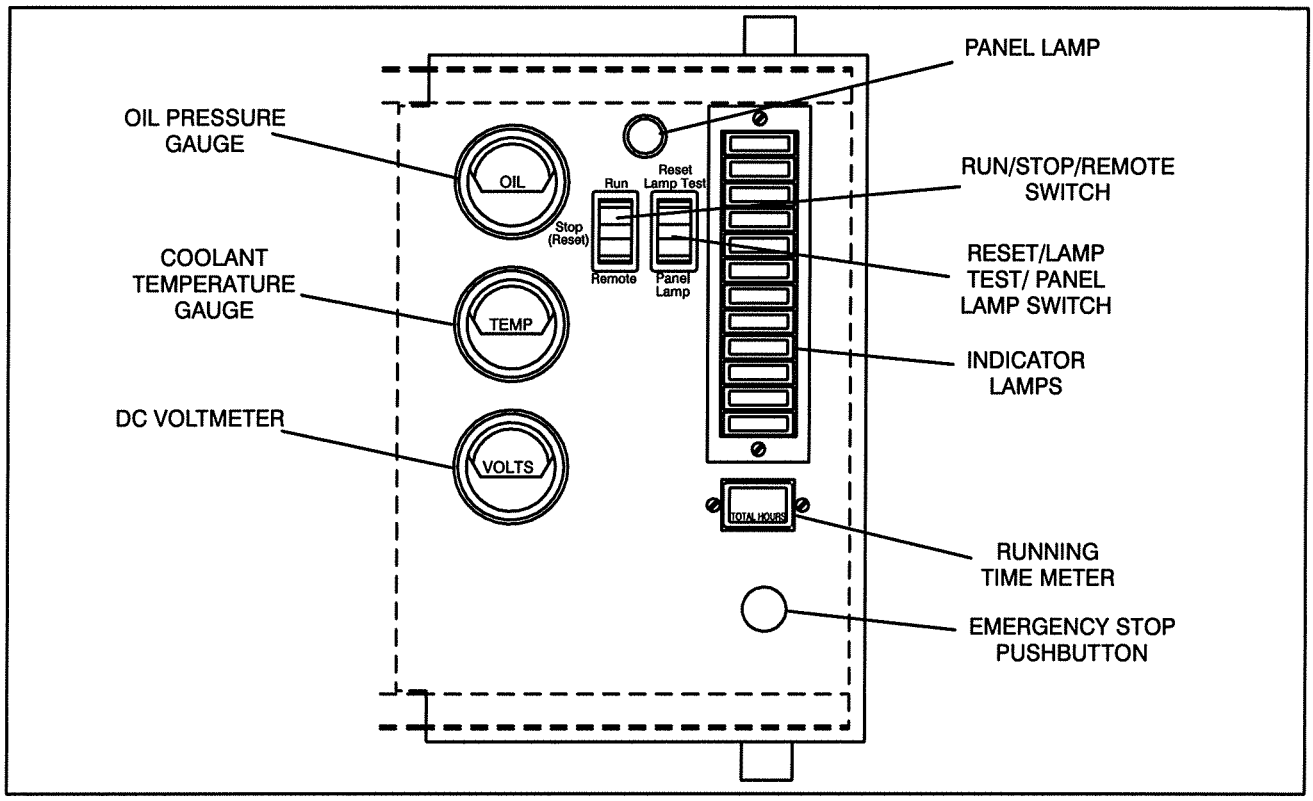

FIGURE 5-1. DC CONTROL PANEL

DC Panel

Panel Lamp: Illuminates control panel.

Oil Pressure Gauge: Indicates pressure of lubricating oil in engine (wired to a sensor located on the engine). Normal oil pressure is 30 to 65 psi (207 to 449 kPa) at normal operating temperature.

Coolant Temperature Gauge: Indicates temperature of circulating coolant in engine (wired to a sensor located on engine). Engine coolant temperature should be between 165° to 195° F(74° to 91° C).

DC Voltmeter: Indicates the battery charging system voltage.

Run/Stop/Remote Switch: Starts and stops the set locally, or from a remote location wired to the control engine monitor board.

Running Time Meter: Registers the total number of hours the unit has run. Use it to keep a record of periodic servicing. Time is cumulative; meter cannot be reset.

Reset/Lamp Test/Panel Lamp Switch: Resets the fault circuit only when the Run/Stop/Remote switch is in the Stop (Reset) position. Tests fault lamps and turns on the control panel lamp.

Emergency Stop Button (Optional): Push-in switch for emergency shutdown of the engine. To reset, pull switch out and move Run/Stop/Remote switch to Stop position. Then push test switch to Reset/Lamp Test position.

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Indicator Lamps: The control panel has twelve indicator lamps which are described as follows:

- RUN (green) lamp comes on when starter circuit opens after set starting.
- PRE LO OIL PRES (yellow) indicates engine oil pressure is marginally low.
- PRE HI ENG TEMP (yellow) indicates engine temperature is marginally high.
- LO OIL PRES (red) indicates engine has shut down because of critically low oil pressure.
- HI ENG TEMP (red) indicates engine has shut down because of critically high engine temperature.
- OVERSPEED (red) indicates engine has shut down because of excessive speed.
- OVERCRANK (red) indicates engine has failed to start during the cranking period.
- FAULT 1 (red) lamp indicates an undedicated fault. May be field programmed as a shutdown or non-shutdown, and as a timed or non-timed fault. (Normally set for timed shutdown),

  OR

  BASIN (yellow) lamp (optional) indicates inner fuel tank leaking to outer basin. (Normally set for warning while running or during standby.)
- FAULT 2 (red) lamp indicates same features as Fault 1 (normally set for non-timed shutdown).
- LOW ENG TEMP (yellow) lamp lights if engine temperature is marginally low for starting. It may indicate an inoperative coolant heater.
- LO FUEL (yellow) indicates fuel is marginally low.
- SWITCH OFF (flashing red) indicates generator set is not in automatic start mode.

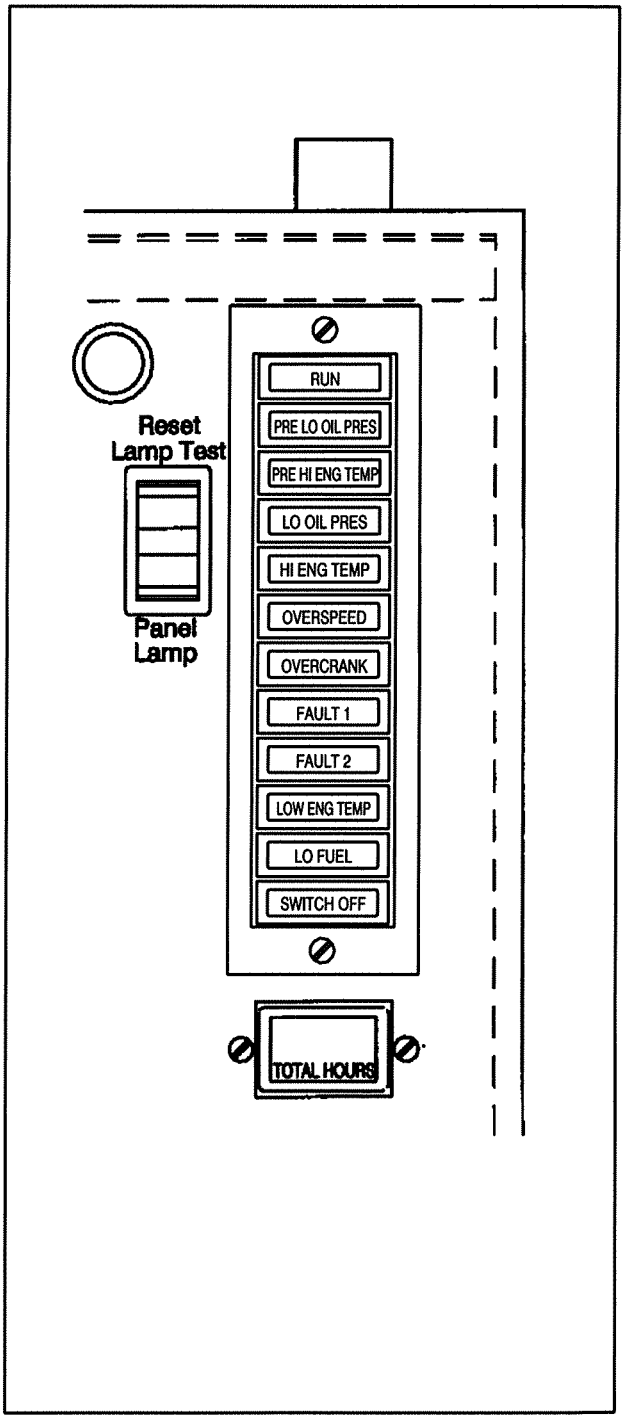

FIGURE 5-2. INDICATOR LAMPS

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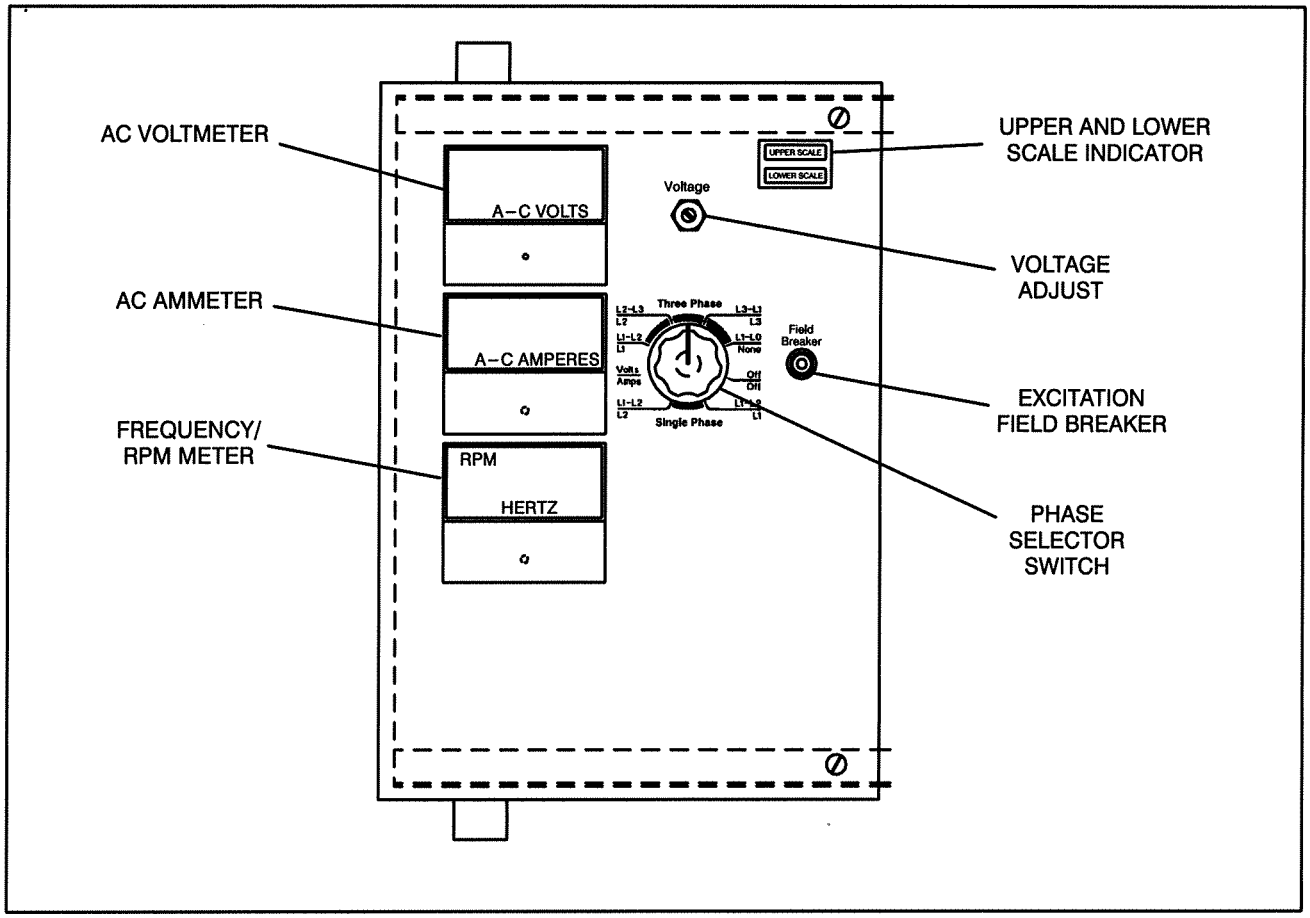

FIGURE 5-3. AC CONTROL PANEL

AC Panel

AC Voltmeter: Dual range instrument indicating AC voltage. Measurement range in use shown on indicator lamp.

AC Ammeter: Dual range instrument indicates AC generator line current.

Frequency/RPM Meter: Indicates generator output frequency in hertz and engine speed in revolutions-per-minute (RPM).

Voltage Adjusting Rheostat: Provides approximately plus or minus five percent adjustment of the rated output voltage.

Upper and Lower Scale Indicator Lamps: Indicates which scale to use on the AC voltmeter and ammeter.

Phase Selector Switch: Selects phases of generator output to be measured by AC voltmeter and ammeter.

Field Breaker: Provides generator exciter and regulator protection from overheating in the event of certain failure modes of generator, exciter and voltage regulator.

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GENERATOR AC VOLTAGE REGULATOR

The solid-state regulator controls AC output voltage from the generator at a predetermined level regardless of load. Refer to the genset Specification Sheet for the voltage regulation and random voltage variation specifications.

ENGINE CONTROL MODULE

Electronic and relay components of the engine monitoring circuit are on a circuit board assembly. Sensor inputs are connected by the wiring harness to plug connectors on the board. The control module provides the following functions of unit protection.

- Overcrank - The standard cycle cranking feature allows three 15-second cranking cycles with two 15-second rest periods. If engine fails to start, the module lights a fault lamp and opens the cranking circuit.

  The overcrank option limits engine cranking to 75 seconds. If engine fails to start, the module lights a fault lamp and opens the cranking circuit.

- Overspeed - Shuts down the engine immediately if overspeed occurs and lights a fault lamp. Overspeed shut down settings: 60 hertz units at 2100 ±90 r/min, 50 hertz units at 1850±50 r/min.

- Low Oil Pressure - Shuts down the engine immediately if oil pressure drops below 14 psi (97 kPA) and lights a fault lamp. The fault is time-delayed about 10 seconds following starter disconnect and inhibited during cranking. The delay allows oil pressure to rise to normal before the electronic control module monitors this system.

  A pre-low oil pressure sensor and lamp provides an alarm that oil pressure is marginally low, 20 psi (137 kPA) or less. The cause should be found and corrected as soon as possible.

- High Engine Temperature - shuts down the engine immediately if coolant temperature rises above 230° F (110° C) and lights a fault lamp. The fault is time-delayed about 10 seconds following starter disconnect and inhibited during cranking. This delay allows coolant in a hot engine time to circulate and return the water jacket to normal before the electronic control module monitors this system.

  A pre-high engine temperature sensor and lamp provides an alarm that engine temperature is marginally high, 220° F (104° C). The cause should be found and corrected as soon as possible.

  ⚠ CAUTION ***Loss of coolant can prevent sensor operation and allow the engine to overheat causing severe damage to the engine. Maintain coolant level for proper operation of the high engine temperature shutdown system.***

- Low Coolant Level Alarm/Shutdown (Optional) - An electronic switch that provides engine alarm or shutdown if coolant level falls too low. It also turns on the fault lamp.

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STARTING

The following sections cover the three systems used to start the generator set.

Before starting the generator set, make sure that exhaust and fuel fittings are tight and properly positioned and that proper maintenance has been performed. See *Prestart Checks* in this section.

Starting at Control Panel

Move the Run-Stop-Remote switch on the DC panel to the RUN position. This will activate the engine control system and the starting system. The starter will begin cranking and after a few seconds the engine should start. The starter will disconnect automatically.

If the engine does not start, the starter will disengage after a specified period of time and the control will indicate an overcrank fault. Generator sets with the optional overcrank control will crank continuously for up to 75 seconds before disengaging the starter. Generator sets with the standard cycle cranking feature will crank for 15 seconds in each cycle until 3 cycles have been completed. To clear an overcrank fault, place the Run-Stop-Remote switch in the STOP position and momentarily press the Reset switch. Wait two minutes for the starter motor to cool and then repeat the starting procedure. If the engine does not run after a second attempt at starting, refer to the *Troubleshooting* section.

Starting From Remote Location

Move the Run/Stop/Remote switch on the generator set DC panel to the REMOTE position. This allows the generator set to be started from a remote switch. Closing the remote switch initiates the starting sequence described in the previous section.

Automatic Starting

Place the Run/Stop/Remote switch on the generator set DC panel in the REMOTE position if an automatic transfer switch is used. This allows the transfer switch to start the generator set if a power outage occurs and stop it when the power returns.

Cold Starting With Loads

In accordance with NFPA 110, Cummins Power Generation recommends installing standby generator sets (life safety systems) equipped with coolant heaters in locations where the minimum ambient temperature is above 40°F (4°C). NFPA also requires that the engine coolant be maintained at a minimum of 90°F (32°C) and for most applications, accept the emergency load in 10 seconds or less. Although most generator sets will start in temperatures below 40°F (4°C) when equipped with coolant heaters, it might take some running time to warm the engine up before a load can be applied when ambient temperatures are below 40°F (4°C).

The Low Engine Temperature (LET) lamp on the Detector™ control is provided to meet the requirements of NFPA 110. The LET sensor signals an alarm when the engine coolant temperature falls below 70°F (21°C). In applications where the ambient temperature falls below 40°F (4°C), the LET may be lit even though the coolant heaters are connected and operable. Under these conditions, although the generator set may start, it may not be able to accept load within 10 seconds. When this condition occurs, check the coolant heaters for proper operation. If the coolant heaters are operating properly, other precautions might be necessary to warm the engine before applying a load.

STOPPING

Before Stopping

Run the generator set at no load for three to five minutes before stopping. This allows the lubricating oil and engine coolant to carry heat away from the combustion chamber and bearings.

To Stop

If the set was started at the set control panel or at a remote control panel, move the Run/Stop/Remote switch or remote starting switch to the STOP position. If the set was started by an automatic transfer switch, the transfer switch will send a remote (timed delay) stop signal after the normal power source returns.

Emergency Stop

An optional emergency stop button is located on the right side of control panel (Figure 5-1). Push button in for emergency stop. To reset, pull switch out and move Run/Stop/Remote switch to Stop position. Then push test switch to Reset/Lamp Test position.

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6. Troubleshooting (Detector Control)

The generator set has sensors that continuously monitor the engine for abnormal conditions, such as low oil pressure or high coolant temperature. If these conditions occur, the engine monitor activates a fault lamp, and may also stop the engine (depending on the condition). If the generator set is stopped for this reason, the operator may be able to restart the set after making adjustments or corrections. This section describes the fault condition system, and suggests troubleshooting procedures.

The control has a single green light to indicate RUN, four amber lights and seven red fault lights. The control also has a terminal connection for an audible alarm, which sounds when a fault occurs.

SAFETY CONSIDERATIONS

⚠WARNING ***Contacting high voltage components can cause electrocution, resulting in severe personal injury or death. Keep control and output box covers in place during troubleshooting.***

High voltages are present inside the control box and generator output box when the set is running. Do not open the control box or generator output box while the set is running.

⚠WARNING ***Ignition of explosive battery gases can cause severe personal injury or death. Arcing at battery terminals, light switch or other equipment, flame, pilot lights and sparks can ignite battery gas. Do not smoke, or switch trouble light ON or OFF near battery. Discharge static electricity from body before touching batteries by first touching a grounded metal surface.***

Ventilate battery area before working on or near battery—Wear goggles—Stop genset and disconnect charger before disconnecting battery cables—Disconnect negative (–) cable first and reconnect last.

⚠CAUTION ***Disconnect battery charger from AC source before disconnecting battery cables. Otherwise, disconnecting cables can result in voltage spikes damaging to DC control circuits of the set.***

⚠WARNING ***Accidental starting of the generator set can cause severe personal injury or death. Prevent accidental starting by disconnecting the negative (–) cable from the battery terminal.***

When troubleshooting a set that is shut down, make certain the generator set cannot be accidentally restarted as follows:

4. Move the Run/Stop/Remote switch on the control panel to the Stop position.
5. Turn off or remove AC power from the battery charger.
6. Remove the negative (–) battery cable from the generator set starting battery.

When a fault lamp turns on during operation, follow the procedures listed in Table 6-1 to locate and correct the problem. For any symptom not listed, contact an authorized service center for assistance.

RESETTING THE CONTROL

The external alarm and fault lamp may be deactivated by moving the Run/Stop/Remote switch to the Stop position and pressing the Reset/Lamp Test/Panel Lamp switch. Locate the problem and correct it before restarting the set. While pressing the Reset/Lamp Test/Panel Lamp switch, make certain that all lamps light.

LINE CIRCUIT BREAKER (OPTIONAL)

The optional line circuit breaker mounts on the generator output box. If the load exceeds the generator current rating, the line circuit breaker will open, preventing the generator from being overloaded. If the circuit breaker trips, locate the source of the overload and correct as necessary. Manually reset the breaker to reconnect the load to the generator.

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TABLE 6-1. TROUBLESHOOTING

⚠ WARNING ***Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.***

SYMPTOM	CORRECTIVE ACTION
1. Green RUN lamp lights following engine startup.	1. Indicates all engine systems are normal. No corrective action required.
2. PRE HI ENGINE TEMP lamp lights. Engine continues to operate. (Engine can be programmed to shut down.)	2. Indicates engine has begun to overheat and engine temperature has risen to approximately 215°F (102° C) or coolant level is low on optionally wired sets. If generator is powering non-critical and critical loads and cannot be shut down, use the following: a. Reduce load if possible by turning off non-critical loads. b. Check air inlets and outlets and remove any obstructions to airflow. **If engine can be stopped, follow procedure in step 3.**
3. HI ENG TEMP lamp lights. Engine shuts down.	3. Indicates engine has overheated (engine temperature has risen above 222°F/106°C) or coolant level is low. Allow engine to cool down completely before proceeding with the following checks: a. Check coolant level and replenish if low. Look for possible coolant leakage points and repair if necessary. b. Check for obstructions to cooling airflow and correct as necessary. c. Check for a slipping fan belt and tighten if loose. d. Reset control and restart after locating and correcting problem. Contact an authorized service center if none of the above.
4. PRE LO OIL PRES lamp lights. Engine continues to operate. (Engine can be programmed to shut down.)	4. Indicates engine oil pressure has dropped to 20 psi (138 kPa). If generator is powering critical loads and cannot be shut down, wait until next shutdown period and then follow step 5 procedure. If engine can be stopped, follow procedures in step 5.
5. LO OIL PRES lamp lights. Engine shuts down. NOTE: See also step 6.	5. Indicates engine oil pressure has dropped to 14 psi (97 kPa). Check oil level, lines and filters. If oil system is OK but oil level is low, replenish. Reset control and restart. Contact an authorized service center if oil pressure is not in the range of 25 to 40 psi (172 to 275 kPa).

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TABLE 6-1. TROUBLESHOOTING (CONT.)

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
6. OVERCRANK lamp lights and engine stops cranking. or Engine runs, shuts down, and LO OIL PRES lamp lights..	6. Indicates possible fuel system problem. a. Check for empty fuel tank, fuel leaks, or plugged fuel lines and correct as required. b. Check for dirty fuel filter and replace if necessary (see *Maintenance* section). c. Check for dirty or plugged air filter and replace if necessary (see *Maintenance* section). d. Reset the control and restart after correcting the problem. Contact an authorized service center for service if none of the above.
7. OVERSPEED lamp lights and the engine shuts down.	7. Indicates engine has exceeded normal operating speed. Contact an authorized service center for service.
8. SWITCH OFF lamp flashes.	8. Indicates Run/Stop/Remote switch is in the Stop position which will prevent automatic starting if an automatic transfer switch is used. Move the Run/Stop/Remote switch to the Remote position for automatic starting.
9. LO FUEL lamp lights. Engine continues to run.	9. Indicates diesel fuel supply is running low. Check fuel supply and replenish as required.
10. LO FUEL LAMP lights. Engine shuts down and LO OIL PRES lamp lights.	10. Indicates engine has run out of fuel. Check fuel level and replenish as required.
11. LO ENG TEMP lamp lights. Set is in standby mode but is not operating. (Lamp lights when engine coolant temperature is 70° F (21° C) or lower. Since the lamp goes out after the engine warms up, there should be no cause for alarm even during initial generator set operation.)	11. Indicates engine coolant heater is not operating, not not circulating coolant or ambient temperature too cold for heater to keep up with demand. Check for the following conditions: a. Coolant heater not connected to power supply. Check for blown fuse or disconnected heater cord and correct as required. b. Check for low coolant level and replenish if required. Look for possible coolant leakage points and repair as required. c. Contact an authorized service center if none of the above.

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TABLE 6-1. TROUBLESHOOTING (CONT.)

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
12. The FAULT 1 or FAULT 2 fault lamp lights. Engine shuts down immediately, engine runs for several seconds and then shuts down, or engine continues to run.	12. The standard undesignated fault functions are programmed to shut down the set when a fault is sensed. Fault 1 is time delayed while Fault 2 is immediate. The nature of the fault is an optional selection that is determined when the set installation is designed. The undesignated fault functions may also be programmed for non-shutdown or non-time delay.
13. Fault lamp lights but no fault exists. Engine gauges show oil pressure, engine temperature, and frequency (speed) are within normal limits.	13. The monitor board or a sensor may be at fault. Contact an authorized service center for service.
14. The BASIN (optional) fault lamp lights. Engine continues to run or is in standby mode. (Engine can be programmed to shut down.)	16. Indicates fuel is leaking from inner tank to outer basin or the sensor may be defective. Contact an authorized service center for service.
15. Engine starts from generator control panel but will not start automatically or from a remote panel. (Note: The Run/Stop/Remote switch must be in the Remote position for automatic or remote starting).	14. Remote circuit breaker is tripped. Reset breaker and restart. Contact an authorized service center if breaker trips after resetting.
16. Engine will not crank.	15. Indicates possible fault with control or starting system. Check for the following conditions: a. Fault lamp on. Correct fault and reset control. b. Poor battery cable connections. Clean the battery cable terminals and tighten all connections. c. Discharged or defective battery. Recharge or replace the battery. d. Emergency stop button (if equipped) pushed in. To reset, pull switch out and move Run/Stop/Remote switch to Stop position. Then push test switch to Reset/ Lamp position. e. Contact an authorized service center if none of the above.
17. No AC output voltage.	16. Field breaker is tripped. Reset breaker. Contact an authorized service center if voltage buildup causes breaker to trip.

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TABLE 6-1. TROUBLESHOOTING (CONT.)

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
18. RUN or fault lamp(s) does not light when Lamp Test switch is engaged.	16. Contact an authorized service center for assistance.
19. Green RUN lamp does not light following engine startup.	17. Indicates possible Start/Disconnect relay failure. Contact an authorized service center for assistance.

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7. Operation (Sentinel Control)

GENERAL

This section covers prestart checks, starting and stopping and operating the generator set. Each operator should read through this entire section before attempting to start the set. It is essential that the operator be completely familiar with the set for safe operation. Refer to *Section 10* for operating recommendations.

PRESTART CHECKS

Before starting, be sure the following checks have been made and the unit is ready for operation. Refer to the *Maintenance* section for the recommended procedures.

Lubrication

Check the engine oil level. Keep the oil level near as possible to the dipstick high mark without overfilling.

Coolant

Check the engine coolant level. Refer to "Cooling Systems" in the Maintenance section of this manuals for proper procedure.

Fuel

Make sure the fuel tanks have sufficient fuel and that fuel system is primed. Check to make sure there are no leaks and that all fittings are tight.

Exhaust

Check to make sure entire exhaust system is tight, that no combustible materials are near system, and gases are discharged away from building openings.

CONTROL PANEL

The following describes the function and operation of the Sentinel control. All instruments and control switches are located on the face of the control panel as illustrated in Figure 7-1.

EXHAUST GAS IS DEADLY!

Exhaust gases contain carbon monoxide, an odorless and colorless gas. Carbon monoxide is poisonous and can cause unconsciousness and death. Symptoms of carbon monoxide poisoning can include:

- ***Dizziness***
- ***Nausea***
- ***Headache***
- ***Weakness and Sleepiness***
- ***Throbbing in Temples***
- ***Muscular Twitching***
- ***Vomiting***
- ***Inability to Think Coherently***

IF YOU OR ANYONE ELSE EXPERIENCE ANY OF THESE SYMPTOMS, GET OUT INTO THE FRESH AIR IMMEDIATELY. If symptoms persist, seek medical attention. Shut down the unit and do not operate until it has been inspected and repaired.

Protection against carbon monoxide inhalation includes proper installation and regular, frequent visual and audible inspections of the complete exhaust system.

1-P/EM

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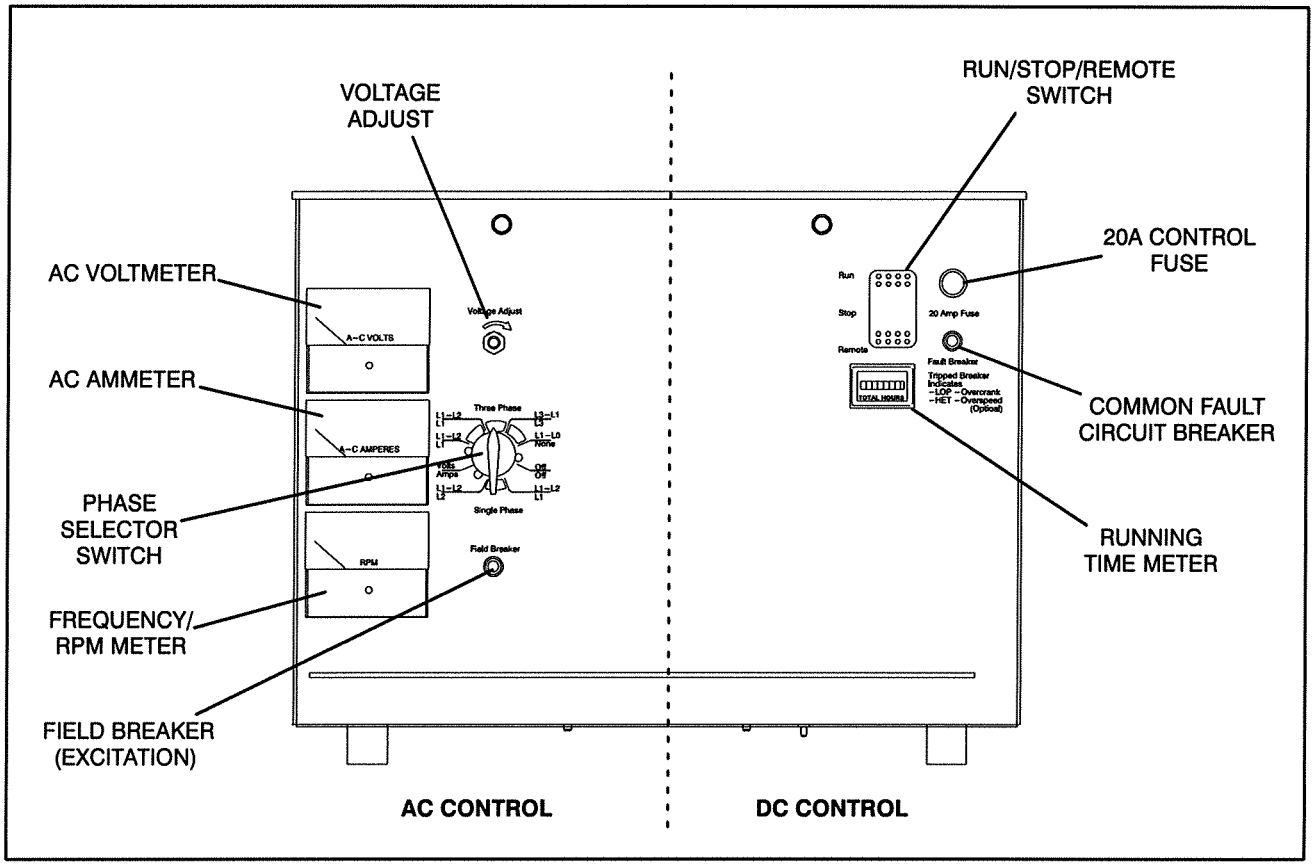

FIGURE 7-1. SENTINEL CONTROL PANEL

DC Control

Run/Stop/Remote Switch: Starts and stops the set locally, or from a remote location wired to the control.

Running Time Meter: Registers the total number of hours the unit has run. Use it to keep a record of periodic servicing. Time is cumulative; meter cannot be reset.

20A Control Fuse: Protects control components and wiring from current overload.

Common Fault Circuit Breaker: The common fault circuit breaker shuts down the engine when any fault shutdown sensor activates. Fault shutdown is indicated when the breaker reset button extends out past normal. Push the button to restore operation (after the engine has been properly serviced).

The standard fault shutdowns are low oil pressure, high engine temperature, overspeed, and overcrank. Optional fault shutdowns are low coolant level, low fuel level, and rupture basin.

AC Control

AC Voltmeter (Optional): Dual range instrument indicating AC voltage. Measurement range in use shown on indicator lamp.

AC Ammeter (Optional): Dual range instrument indicates AC generator line current.

Frequency/RPM Meter (Optional): Indicates generator output frequency in hertz and engine speed in revolutions-per-minute (RPM).

Voltage Adjusting Rheostat (Optional): Provides approximately plus or minus five percent adjustment of the rated output voltage.

Phase Selector Switch (Optional): Selects phases of generator output to be measured by AC voltmeter and ammeter.

Field Breaker (Excitation): Provides generator exciter and regulator protection from overheating in the event of certain failure modes of generator, exciter and voltage regulator.

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GENERATOR AC VOLTAGE REGULATOR

The solid-state regulator controls AC output voltage from the generator at a predetermined level regardless of load. Voltage regulation is plus or minus two percent from no load to full load. Random voltage variation is plus or minus one percent for constant loads.

ENGINE MONITORING

Electronic and relay components of the engine monitoring circuit are mounted inside the control box. An optional Dry Contact Module (DCM) can also be installed in the control box to enable remote monitoring of these components. The components provide the following functions of unit protection.

Note: Refer to the *Installation Manual* for a functional description of the Dry Contact Module option.

- Overcrank - Limits engine cranking to 60 seconds. If engine fails to start, the Fault Breaker trips and opens the cranking circuit.
- Overspeed - Shuts down the engine immediately and trips the common fault circuit breaker if overspeed occurs. The shut down limits are: 60 hertz units at 2100 ±90 r/min, 50 hertz units at 1850±50 r/min.
- Low Oil Pressure - Shuts down the engine immediately if oil pressure drops below 14 psi (97 kPA) and trips the common fault circuit breaker. The fault is time-delayed about 10 seconds following starter disconnect and inhibited during cranking. The delay allows oil pressure to rise to normal before the electronic control module monitors this system.
- High Engine Temperature - Shuts down the engine immediately if coolant temperature rises above 230° F (110° C) and trips the common fault circuit breaker. Fault condition cannot be cleared until sensor detects coolant temperature of lower than 222° F (106° C).
- Low Coolant Level (optional w/DCM) - Shuts down the engine immediately if coolant level falls too low. Fault condition cannot be cleared until sensor detects coolant in radiator.
- Low Fuel Level (optional w/DCM) - Shuts down the engine immediately if fuel level falls too low. Fault condition cannot be cleared until sensor detects fuel in fuel tank.
- Rupture Basin (optional w/DCM) - Indicates that the inner fuel tank is leaking to the outer basin. Engine continues to run. Fault condition cannot be cleared until fuel leak is corrected. (Remote panel must be attached to control to monitor this error.)

⚠ CAUTION ***Loss of coolant can prevent sensor operation and allow the engine to overheat causing severe damage to the engine. Maintain coolant level for proper operation of the high engine temperature shutdown system.***

STARTING

The following sections cover the three systems used to start the generator set.

Before starting the generator set, make sure that exhaust and fuel fittings are tight and properly positioned and that proper maintenance has been performed. See *Prestart Checks* in this section.

Starting at Control Panel

Move the Run-Stop-Remote switch on the DC panel to the RUN position. This will activate the engine control system and the starting system. The starter will begin cranking and after a few seconds the engine should start. The starter will disconnect when the engine reaches a speed of 450 to 570 RPM.

If the engine does not start, the starter will disengage after 60 seconds and the control will indicate an overcrank fault. To clear an overcrank fault, place the Run-Stop-Remote switch in the STOP position and reset the common fault circuit breaker. Wait two minutes for the starter motor to cool and then repeat the starting procedure. If the engine does not run after a second attempt at starting, refer to the *Troubleshooting (Sentinel Control)* section.

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Starting From Remote Location

Move the Run/Stop/Remote switch on the generator set DC panel to the REMOTE position. This allows the generator set to be started from a remote switch. Closing the remote switch initiates the starting sequence described in the previous section.

Automatic Starting

Place the Run/Stop/Remote switch on the generator set DC panel in the REMOTE position if an automatic transfer switch is used. This allows the transfer switch to start the generator set if a power outage occurs and stop it when the power returns.

Cold Starting With Loads

In accordance with NFPA 110, Cummins Power Generation recommends installing diesel standby generator sets (life safety systems) equipped with coolant heaters in locations where the minimum ambient temperature is above 40°F (4°C). NFPA also requires that the engine coolant be maintained at a minimum of 90°F (32°C) and for most applications, accept the emergency load in 10 seconds or less. Although most generator sets will start in temperatures below 40°F (4°C) when equipped with coolant heaters, it might take some running time to warm the engine up before a load can be applied when ambient temperatures are below 40°F (4°C).

STOPPING

Before Stopping

Run the generator set at no load for three to five minutes before stopping. This allows the lubricating oil and engine coolant to carry heat away from the combustion chamber and bearings.

To Stop

If the set was started at the set control panel or at a remote control panel, move the Run/Stop/Remote switch or remote starting switch to the STOP position. If the set was started by an automatic transfer switch, the transfer switch will send a remote (timed delay) stop signal after the normal power source returns.

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8. Troubleshooting (Sentinel Control)

The generator set has sensors that continuously monitor the engine for abnormal conditions, such as low oil pressure or high coolant temperature. If these conditions occur, the common fault circuit breaker trips, and the engine shuts down. After the problem is corrected, reset the common fault circuit breaker to restart the generator set. This section describes the fault condition system, and suggests troubleshooting procedures.

SAFETY CONSIDERATIONS

⚠WARNING ***Contacting high voltage components can cause electrocution, resulting in severe personal injury or death. Keep control and output box covers in place during troubleshooting.***

High voltages are present inside the control box and generator output box when the set is running. Do not open the control box or generator output box while the set is running.

⚠WARNING ***Ignition of explosive battery gases can cause severe personal injury or death. Arcing at battery terminals, light switch or other equipment, flame, pilot lights and sparks can ignite battery gas. Do not smoke, or switch trouble light ON or OFF near battery. Discharge static electricity from body before touching batteries by first touching a grounded metal surface. Ventilate battery area before working on or near battery—Wear goggles—Stop genset and disconnect charger before disconnecting battery cables—Disconnect negative (–) cable first and reconnect last.***

⚠CAUTION ***Disconnect battery charger from AC source before disconnecting battery cables. Otherwise, disconnecting cables can result in voltage spikes damaging to DC control circuits of the set.***

⚠WARNING ***Accidental starting of the generator set can cause severe personal injury or death. Prevent accidental starting by disconnecting the negative (–) cable from the battery terminal.***

When troubleshooting a set that is shut down, make certain the generator set cannot be accidentally restarted as follows:

7. Move the Run/Stop/Remote switch on the control panel to the Stop position.
8. Turn off or remove AC power from the battery charger.
9. Remove the negative (–) battery cable from the generator set starting battery.

When a fault condition occurs during operation, follow the procedures in Table 8-1 to locate and correct the problem. For any symptom not listed, contact an authorized service center for assistance.

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TABLE 8-1. TROUBLESHOOTING

⚠ WARNING ***Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.***

SYMPTOM	CORRECTIVE ACTION
1. Engine will not crank.	1. Indicates possible fault with control or starting system. Check for the following conditions. a. Correct fault and reset common fault circuit breaker. b. Poor battery cable connections. Clean the battery cable terminals and tighten all connections. c. Discharged or defective battery. Recharge or replace the battery. d. Replace the control circuit fuse (located inside the control panel) if it has blown.
2. The engine cranks, but does not start.	2. Indicates possible fuel system problem. a. Check for empty fuel tank, fuel leaks, or plugged fuel lines and correct as required. b. Check for dirty fuel filter and replace if necessary (see Maintenance section). c. Check for dirty or plugged air filter and replace if necessary (see Maintenance section). d. Reset the tripped common fault circuit breaker and restart after correcting the problem. Contact an authorized service center for service if none of the above.
3. The engine shuts down due to high engine temperature or low coolant level.	3. Indicates engine has overheated (engine temperature has risen above 230°F/110°C). Allow engine to cool down completely before proceeding with the following checks: a. Check coolant level and replenish if low. Look for possible coolant leakage points and repair if necessary. b. Check for obstructions to cooling airflow and correct as necessary. c. check for a slipping fan belt and tighten if loose. d. Reset the tripped common fault circuit breaker. Contact an authorized service center for service if none of the above.
4. Engine shuts down due to low oil pressure.	4. Indicates engine oil pressure has dropped to 14 psi (97 kPa). Check oil level, lines and filters. If oil system is OK but oil level is low, replenish. Reset the tripped common fault circuit breaker. Contact an authorized service center if oil pressure is not in the range of 25 to 65 psi (172 to 449 kPa).
5. The engine shuts down due to overspeed.	5. Indicates engine has exceeded normal operating speed. Contact an authorized service center for service.

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TABLE 8-1. TROUBLESHOOTING (CONT.)

⚠ WARNING *Hazards present in troubleshooting can cause equipment damage, severe personal injury or death. Only trained and experienced service personnel with knowledge of fuels, electricity, and machinery hazards should perform service procedures. Read Safety Precautions page and observe all instructions and precautions in this manual.*	
SYMPTOM	**CORRECTIVE ACTION**
6. The engine shuts down due to low coolant level.	6. Indicates low coolant level. Replenish coolant and look for possible coolant leakage points and repair as required.
7. The engine shuts down due to low fuel level. (Sets with optional low fuel level sensor.)	7. Indicates diesel fuel supply is running low. Check fuel supply and replenish as required.
8. The engine shuts down due to any of six faults but remote monitor device does not detect fault.	8. Indicates possible fault with controller external wiring.
9. Engine starts from generator control panel but will not start automatically or from a remote panel. (Note: The Run/Stop/Remote switch must be in the Remote position for automatic or remote starting).	9. Remote circuit breaker is tripped. Reset breaker and restart. Contact an authorized service center if breaker trips after resetting.

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9. Maintenance

GENERAL

Establish and adhere to a definite schedule for maintenance and service based on the application and severity of the environment. Table 9-1 covers the recommended service intervals for a generator set on STANDBY service. If the set will be subjected to extreme operating conditions, the service intervals should be reduced accordingly. Some of the factors that can affect the maintenance schedule are the following:

- Use for continuous duty (prime power)
- Extremes in ambient temperature
- Exposure to weather
- Exposure to salt water
- Exposure to dust, sand or other airborne contaminates

Consult with your local Cummins Power Generation distributor if the generator set will be subjected to any extreme operating conditions and determine a suitable schedule of maintenance. Use the running time meter (Figure 9-1) to keep an accurate log of all service performed for warranty support. Perform all service at the time period indicated or after the number of operating hours indicated, whichever comes first. Use Table 9-1 to determine the maintenance required and then refer to the sections that follow for the correct service procedures.

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TABLE 9-1. MAINTENANCE SCHEDULE

MAINTENANCE ITEMS	SERVICE TIME				
	Daily or after 8 Hours	Weekly or after 50 Hours	Monthly or after 100 Hours	3 Months or after 250 Hours	6 Months or after 500 Hours
Inspect Genset	X[1]				
Check Coolant Heater	X				
Check Oil Level	X				
Check Coolant Level	X				
Check Fuel Level	X				
Check Charge Air Piping	X				
Check Air Cleaner (Clean if required)		X[2]			
Check Battery Charging System		X			
Drain Fuel Filter(s)		X[4, 5]			
Drain Water and Sediment from Fuel Tanks		X[4]			
Check Anti-freeze and DCA Concentration			X[5]		
Check Drive Belt Tension			X[3, 5]		
Drain Exhaust Condensate Trap			X		
Check Starting Batteries			X		
Change Crankcase Oil and Filter				X[6]	
Change Coolant Filter				X[5]	
Clean Crankcase Breather				X[5]	
Change Air Cleaner Element				X[2]	
Check Radiator Hoses for Wear & Cracks				X	
Check Governor Adjustment				X	
Change Fuel Filters					X[5]
Clean Cooling System					X[5]
Adjust Valve Lash	After 1000 hours[7]				

X[1] Check for oil, fuel, cooling and exhaust system leaks. Check exhaust system audibly and visually with set running and repair any leaks immediately.

X[2] Perform more often in dusty conditions.

X[3] Visually check belt for evidence of wear or slippage. Replace if hard or brittle.

X[4] Drain 1 cup or more of fuel to remove water and sediment.

X[5] Refer to engine operation and maintenance manual for procedure.

X[6] If genset is used for prime power applications, change oil and filter every 3 months or 250 hours. If used for standby applications, change oil every 12 months or 250 hours, whichever comes first.

X[7] Contact an authorized service center for service.

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GENERATOR SET INSPECTION

During operation, be alert for mechanical problems that could create unsafe or hazardous conditions. The following sections cover several areas that should be frequently inspected for continued safe operation.

Exhaust System

With the generator set operating, inspect the entire exhaust system visually and audibly including the exhaust manifold, muffler and exhaust pipe. Check for leaks at all connections, welds, gaskets and joints and also make sure that exhaust pipes are not heating surrounding areas excessively. If any leaks are detected, shut down the genset and have leaks corrected immediately.

⚠WARNING ***Inhalation of exhaust gases can result in severe personal injury or death. Be sure deadly exhaust gas is piped outside and away from any windows, doors, vents or other inlets to building and not allowed to accumulate in inhabitable areas.***

Fuel System

With the generator set operating, inspect the fuel supply lines, return lines, filters and fittings for cracks and abrasions and make sure they are not rubbing against anything that could cause breakage. If any leaks are detected, have them corrected immediately.

⚠WARNING ***Ignition of fuel can cause severe personal injury or death by fire or explosion. Do not permit any flame, cigarette, arcing switch or equipment, pilot light, or other igniter near the fuel system or in areas sharing ventilation.***

AC Electric System

Check the following while the genset is operating; otherwise measure load lines L1, L2 and L3 using the appropriate AC meter.

Frequency/RPM Meter: The generator frequency should be stable and the reading should be the same as the genset nameplate rating (50 or 60 hz/1500 or 1800 RPM).

AC Voltmeter: Turn the phase selector switch to each line-to-line phase selection shown on the volts scale (L1-L2, L2-L3 and L3-L1). Read the AC voltmeter using the upper or lower scale as indicated by the scale indicator lamp. At no load, the line-to-line voltage(s) should be the same as the genset nameplate rating.

AC Ammeter: Turn the phase selector switch to each phase selection shown on the amps scale (L1, L2 and L3). Read the ammeter using the upper or lower scale as indicated by the scale indicator lamp. At no load the current ratings should be zero. With a load applied, each line current should be about the same.

Fault Lamps (Detector Only): Push the Reset/Lamp switch on the control panel. All indicator lamps should light. Verify that all the bulbs are on and then release the switch. Replace any bulbs that are burned out.

DC Electrical System

Check the terminals on the batteries for clean and tight connections. Loose or corroded connections create resistance which can hinder starting. Refer to *BATTERIES* later in this section for cleaning and safety precautions.

Engine

Monitor fluid levels and oil pressure and coolant temperatures frequently. Most engine problems give an early warning. Look and listen for changes in engine performance, sound, or appearance that can indicate service or repair is needed. Some engine changes to look for are as follows:

- Misfire
- Vibration
- Unusual noises
- Sudden changes in engine operating temperatures or pressures
- Excessive exhaust smoke
- Loss of power
- An increase in oil consumption
- An increase in fuel consumption
- Fuel, oil, or coolant leaks.

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GENERATOR SET MAINTENANCE (Battery Disconnected)

⚠WARNING ***Ignition of explosive battery gases can cause severe personal injury or death. Arcing at battery terminals, light switch or other equipment, flame, pilot lights and sparks can ignite battery gas. Do not smoke, or switch trouble light ON or OFF near battery. Discharge static electricity from body before touching batteries by first touching a grounded metal surface.***

Ventilate battery area before working on or near battery—Wear goggles—Stop genset and disconnect charger before disconnecting battery cables—Disconnect negative (–) cable first and reconnect last.

⚠CAUTION ***Disconnect battery charger from AC source before disconnecting battery cables. Otherwise, disconnecting cables can result in voltage spikes damaging to DC control circuits of the set.***

⚠WARNING ***Accidental starting of the generator set can cause severe personal injury or death. Prevent accidental starting by disconnecting the negative (–) cable from the battery terminal before beginning maintenance procedures.***

When performing the following maintenance procedures, make certain the generator set cannot be accidentally restarted as follows:

10. Place the run switch on the control panel to the OFF or STOP position.
11. Turn off or remove AC power from the battery charger.
12. Remove the negative (–) battery cable from the generator set starting battery.

Mechanical Inspection

With the generator set stopped, check for loose belts and fittings, leaking gaskets and hoses, or any signs of mechanical damage. If any problems are found, have them corrected immediately.

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LUBRICATION SYSTEM

Gensets are shipped with oil added. Be sure to check oil level before initial start.

Oil API Classification

Refer to the Cummins engine *Operation and Maintenance Manual* for lubricating oil classification.

Oil Viscosity

Refer to the Cummins engine *Operation and Maintenance Manual* for lubricating oil recommendations/specifications.

Engine Oil Level

Check the engine oil level during engine shutdown periods at the intervals specified in the Maintenance Table. The oil filter location is shown in Figure 9-2. The dipstick is stamped with high and low marks to indicate the level of oil in the crankcase.

For accurate readings, shut off the engine and wait approximately 15 minutes before checking the oil level. This allows oil in the upper portion of the engine to drain back into the crankcase. The dipstick and oil fill are located on the same side of the engine as shown in Figure 9-3.

⚠WARNING Crankcase pressure can blow out hot oil and cause severe burns. Do NOT check oil while the generator set is operating.

Keep the oil level as near as possible to the high mark on the dipstick. Remove the oil fill cap (see Figure 9-3) and add oil of the same quality and brand when necessary. Install the oil fill cap after adding oil.

⚠CAUTION Do not operate the engine with the oil level below the low mark or above the high mark. Overfilling can cause foaming or aeration of the oil while operation below the low mark may cause loss of oil pressure.

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OIL AND FILTER CHANGE

Change the oil and filter at the intervals recommended in the maintenance table. Use oil that meets Cummins recommendations/specifications.

Engine Oil Change

Refer to the Cummins engine *Operation and Maintenance Manual* for lubricating oil and filter changing procedure. Refer to *Specifications* in Section 2 of this manual for oil capacity. Use oil that meets Cummins recommendations/specifications.

⚠WARNING ***State or federal agencies have determined that contact with used engine oil can cause cancer or reproductive toxicity. Do not contact oil or breath vapors. Use rubber gloves and wash exposed skin.***

Used oil and filters must be disposed of properly to avoid environmental damage and clean-up liability. Check all federal, state and local regulations for disposal requirements.

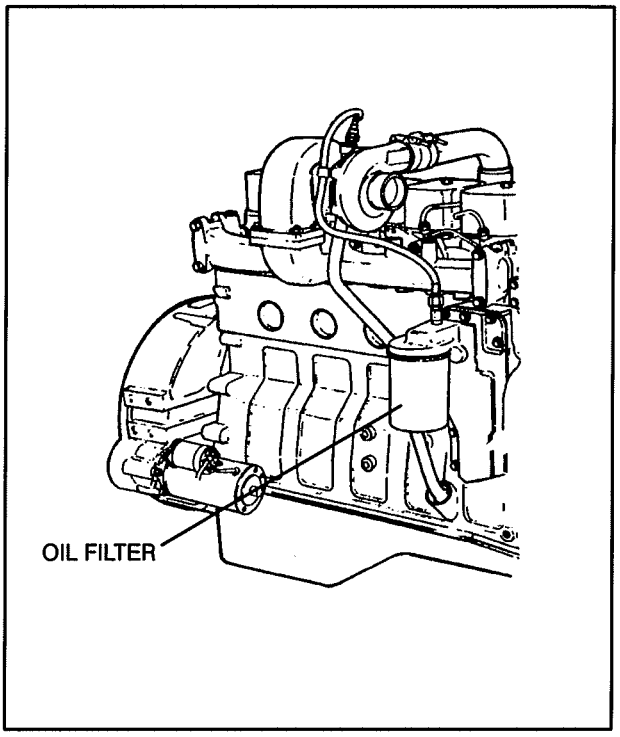

FIGURE 9-2. OIL FILTER

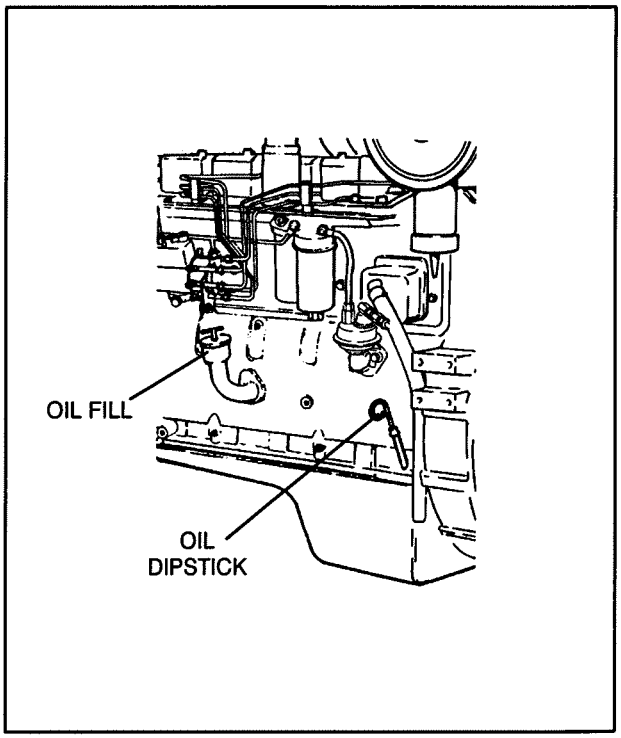

FIGURE 9-3. OIL FILL AND DIPSTICK LOCATIONS

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COOLING SYSTEM

Gensets are shipped with coolant added. Be sure to check coolant level before initial start.

⚠CAUTION ***The coolant heater must not be operated while the cooling system is empty or when the engine is running or damage to the heater will occur.***

⚠CAUTION ***Do not add cold coolant to a hot engine. Engine castings can be damaged. Allow the engine to cool to below 120 F (50 C)*** **before adding coolant.**

Coolant Level

With Coolant Recovery Tank: Check the coolant recovery tank level. Note the normal level when the engine is cool. Add coolant to the recovery tank to replace the normal loss of coolant.

Without coolant recovery tank: Check the coolant level during shutdown periods at the intervals specified in the Maintenance Table. Remove the radiator cap after allowing the engine to cool and if necessary, add coolant until the level is near the top of the radiator.

Refer to the Cummins engine *Operation and Maintenance Manual* for coolant recommendations/ specifications.

⚠WARNING ***To prevent severe scalding, let engine cool down before removing coolant pressure cap. Turn cap slowly, and do not open it fully until the pressure has been relieved.***

⚠CAUTION ***Loss of coolant can allow engine to overheat without protection of shutdown device and cause severe damage to the engine. Maintain coolant level for proper operation of the high engine temperature shutdown system.***

Coolant Requirements

Heavy duty diesel engines require a balanced coolant mixture of water, antifreeze and coolant additives. Drain and replace the mixture every 6 months or after 500 hours of operation (whichever occurs first) to eliminate buildup of harmful chemicals.

Refer to the Cummins engine *Operation and Maintenance Manual* for all cooling system maintenance, such as, coolant requirements, filling of cooling system, coolant filter replacement and flushing and cleaning.

Radiator

Inspect the exterior of the radiator for obstructions. Remove all dirt or foreign material with a soft brush or cloth. Use care to avoid damaging the fins. If available, use low pressure compressed air or stream of water (maximum of 35 psi/242 kPa), in opposite direction of normal air flow to clean radiator. If using water, protect the engine and the generator from over spray.

Coolant Heater

Check the operation of the coolant heater by verifying that hot coolant is being discharged from the outlet hose. ***Do not touch outlet hose*** – if heater is operational, radiant heat should be felt with hand held close to outlet hose.

⚠WARNING ***Contact with cooling system or engine can result in serious burns. Do not touch cooling system or engine during genset maintenance until they are cool.***

CHARGE AIR COOLER SYSTEM

Refer to the Cummins engine *Operation and Maintenance Manual* for the instructions to perform the charge air cooler system maintenance checks.

FUEL SYSTEM

Refer to the Cummins engine *Operation and Maintenance Manual* for fuel system maintenance.

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AIR CLEANER

The filter element should be replaced yearly or sooner if the service indicator button pops up indicating air restriction. Two types of air filter assemblies are used on the generator set. Refer to Figure 9-5 to determine which procedure to use to replace the air filter.

The vacuator valve dumps collected dust automatically.

Inspect all components of the air filtering system including all ducts and hoses. Verify that all connections and clamps are tight and inspect each component for cracks, dents, or other damage. Repair or service as required.

CAUTION ***Filters should be handled with care to prevent damage. If the filter does become damaged, install recommended replacement part.***

The following procedure should be followed when replacing the element.

Type A Filter Assembly

1. Release the three cover clips and remove the air cleaner cover.
2. Slowly remove the air filter to reduce the amount of dust dislodged. There may be some initial resistance when removing the filter. Gently move the end of the filter up and down and side to side or twist to break the seal.
3. Wipe out the interior of the air cleaner housing and cover with a clean, damp cloth. Make sure that **ALL** dust is removed from **ALL** interior surfaces of the air cleaner housing. Be careful not to damage the sealing area on the outlet tube.
4. Inspect new air filter for shipping damage. Pay attention to the inside of the open end (sealing area). Do not install a damaged filter.
5. Install new air filter. The seal area is on the inside of the open end of the filter. The sealing area will stretch slightly and adjust itself over the outlet tube. To complete the seal, apply pressure at the outer rim of the filter, not the flexible center. No cover pressure is required to hold the seal.
5. Put on the air cleaner cover and secure with the three cover clips.

Type B Filter Assembly

1. Remove the air cleaner cover.
2. Remove thumb screw and gasket washer, then remove the element from air cleaner.
3. Wipe out the interior of the air cleaner housing and cover with a clean, damp cloth.
4. Install new element and secure with gasket washer and thumb screw.
5. Put on the air cleaner cover and secure.

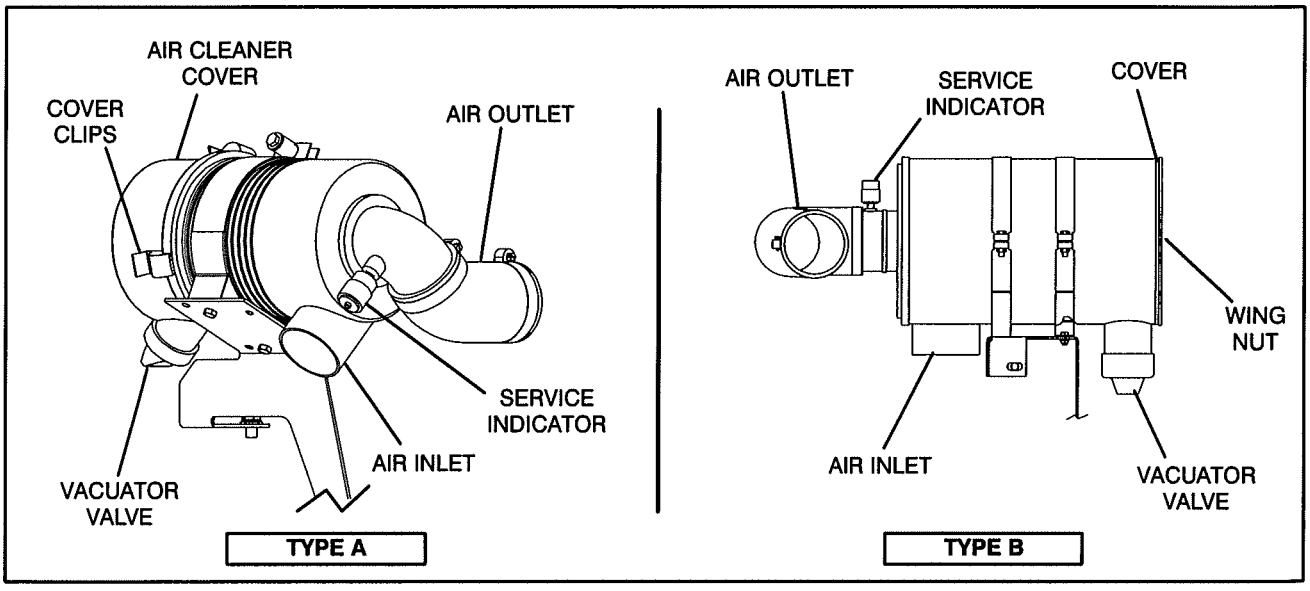

FIGURE 9-5. AIR CLEANER

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BATTERIES

⚠WARNING ***Ignition of explosive battery gases can cause severe personal injury or death. Arcing at battery terminals, light switch or other equipment, flame, pilot lights and sparks can ignite battery gas. Do not smoke, or switch trouble light ON or OFF near battery. Discharge static electricity from body before touching batteries by first touching a grounded metal surface.***

Ventilate battery area before working on or near battery—Wear goggles—Stop genset and disconnect charger before disconnecting battery cables—Disconnect negative (–) cable first and reconnect last.

⚠CAUTION ***Disconnect battery charger from AC source before disconnecting battery cables. Otherwise, disconnecting cables can result in voltage spikes damaging to DC control circuits of the set.***

Check the condition of the starting batteries at the interval specified in the Maintenance Table. To prevent dangerous arcing, always disconnect the negative ground cable from the battery before working on any part of the electrical system or the engine. Disregard the sections On Checking Specific Gravity and Checking Electrolyte Level if using a "maintenance-free" battery.

Cleaning Batteries

⚠WARNING ***Electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. Do not get the substance in your eyes or contact with skin. Wear goggles and protective, rubber gloves and apron when servicing batteries.***

In case of contact, immediately wash skin with soap and water. In case of contact, immediately flood eyes with large amounts of water for a minimum of 15 minutes. IMMEDIATELY CALL A PHYSICIAN.

Keep the batteries clean by wiping them with a damp cloth whenever dirt appears excessive.

If corrosion is present around the terminal connections, remove battery cables and wash the terminals with a solution consisting of 1/4 pound of baking soda added to 1 quart of water. (This solution is also used for washing down spilled electrolyte.)

Be sure the vent plugs are tight to prevent cleaning solution from entering the cells.

After cleaning, flush the outside of the battery and surrounding areas with clean water.

Keep the battery terminals clean and tight. After making connections, coat the terminals with a light application of petroleum jelly or non-conductive grease to retard corrosion.

Checking Specific Gravity

Use a battery hydrometer to check the specific gravity of the electrolyte in each battery cell.

Hold the hydrometer vertical and take the reading. Correct the reading by adding four gravity points (0.004) for every ten degrees the electrolyte temperature is above 80° F (27° C). A fully charged battery will have a corrected specific gravity of 1.260. Charge the battery if the reading is below 1.215.

Checking Electrolyte Level

⚠CAUTION ***Do not add water in freezing weather unless the engine will run long enough (two to three hours) to assure a thorough mixing of water and electrolyte.***

Check the level of the electrolyte (acid and water solution) in the batteries at least every 200 hours of operation.

Fill the battery cells to the bottom of the filler neck. If cells are low on water, add distilled water and recharge. If one cell is low, check case for leaks. Keep the battery case clean and dry. An accumulation of moisture will lead to a more rapid discharge and battery failure.

Battery Replacement

Always replace the starting battery with the same number and type (vented, lead acid). Properly dispose of battery in accordance with local environmental agency requirements.

⚠WARNING ***Electrolyte or explosion of battery can cause severe personal injury or death. Do not mutilate or burn the battery in a fire for disposal.***

Damage to case will release electrolyte which is harmful to the skin and eyes and is also toxic. Burning of battery may cause an explosion.

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10. Operating Recommendations

BREAK-IN

Drain and replace the crankcase oil after the first 50 hours of operation on new generator sets. Refer to the *Maintenance* section of this manual for the recommended procedures.

NO-LOAD OPERATION

Periods of no load operation should be held to a minimum. If it is necessary to keep the engine running for long periods of time when no electric output is required, best engine performance will be obtained by connecting a load bank of at least 30 percent of nameplate rating.

EXERCISE PERIOD

Generator sets on continuous standby must be able to go from a cold start to being fully operational in a matter of seconds. This can impose a severe burden on engine parts.

Regular exercising keeps engine parts lubricated, prevents oxidation of electrical contacts and in general helps provide reliable engine starting.

Exercise the generator set at least once a month for a minimum of 30 minutes, under not less than 30 percent of the nameplate rating.

LOW OPERATING TEMPERATURE

Use a coolant heater if a separate source of power is available. The optional heater will help provide reliable starting under adverse weather conditions. Be sure the voltage of the separate power source is correct for the heater element rating.

HIGH OPERATING TEMPERATURE

Refer to the genset nameplate for the maximum ambient operating temperature, if applicable.

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APPENDIX D6

Technical Specifications for Landfill Gas Collection and Control System Construction

TECHNICAL SPECIFICATIONS

For

LANDFILL GAS COLLECTION AND CONTROL SYSTEM CONSTRUCTION

Kekaha Landfill
County of Kauai
Kekaha, Kauai, Hawaii

Revision 1
August 2015

Prepared for:

County of Kauai
Department of Public Works
Lihue, Kauai, Hawaii

Prepared by:

Environmental Information Logistics, LLC
130 East Main Street

Caledonia, MI 49316

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Attachments:

A. Project Drawings

B. Minimum Health and Safety Requirements

SUMMARY OF REVISIONS

Revision 1 – August 2015

- Initial issue.

DIVISION 1 GENERAL REQUIREMENTS

SECTION 01 11 00.1
SUMMARY OF WORK

PART 1 GENERAL

1.01 DEFINITIONS OF PARTIES

A. OWNER: County of Kauai, Department of Public Works

B. VENDOR: Waste Management of Hawaii, Inc.

C. CONTRACTOR: Individual, firm or corporation who has entered into contract with OWNER.

D. SUBCONTRACTOR: Individual, firm or corporation supplying materials and/or performing work at the site pursuant to separate agreement with CONTRACTOR.

E. ENGINEER: Individual, firm or corporation responsible for preparing the construction drawings and technical specifications for the project. AECOM and Environmental Information Logistics, LLC.

F. CONSTRUCTION QUALITY ASSURANCE CONSULTANT (CQAC): Firm(s) independent from the OWNER and CONTRACTOR responsible for observing and documenting activities related to product manufacturing and product installation defined on the Drawings and in the Technical Specifications. CQAC firm will appoint a CQA Monitor who will act as authorized representative of CQAC.

G. WORK AREA: Area used by CONTRACTOR in completing the project including staging areas and access roads to construction locations.

1.02 COORDINATION OF PARTIES

A. OWNER may delegate all or some of the responsibilities listed in the specifications to VENDOR in accordance with mutually agreed terms and contracts

B. CONTRACTOR to contact OWNER or VENDOR is so delegated for approvals required under these specifications

C. Delegated responsibilities will be identified in the pre-construction meeting.

1.03 PROJECT DESCRIPTION FOR WORK

A. Specific listed sections are included to provide a reference to applicable requirements. However, CONTRACTOR is responsible for all work described in all applicable sections whether expressly listed or not in this part.

B. Mobilization and Staging (SECTION 01 70 00.2)

1. All labor and equipment to manage all materials used in the construction including offloading, loading and relocation to and from staging area during the entire duration of the project.

C. Gas Extraction Wells (SECTION 40 10 00.2)

1. Earthwork to construct drilling pads (if necessary) at gas well locations.

2. Relocate waste spoils from drilling activities onto facility active working face.

3. Drill vertical gas wells into waste.

4. Install CPVC well casing pipe.

5. Furnish and install, filter pack gravel, bentonite, geotextiles, centralizers and install soil as backfill for gas wells.

6. Furnish all necessary water to complete drilling operation and extraction well installation.

7. Provide all labor and equipment to manage materials used in the drilling and construction of the extraction wells including offloading, loading and relocation.

8. Abandon existing gas vents as described on drawings

9. Connect select gas vents via wellhead to collection header piping

D. Gas Collection Piping (SECTION 40 10 00.1)

1. Furnish and install HDPE piping and fittings for new landfill gas laterals and connecting new laterals and new wells to the gas collection system header.

2. Earthwork to ensure adequate gradient is maintained including cutting and filling as necessary to promote uniform pipe support along its entire length.

3. Placement of earthen material free of large rocks (>2 inches in diameter) at all piping intersections to maintain position of pipe during and after construction. This material shall cover pipe by a minimum of 18 inches of soil and be graded to ensure runoff from adjacent slopes.

4. Furnish and install orifice plate style gas extraction well heads from LFG&E, QED Environmental or other supplier providing similar materials.

5. Install sufficient road base material on and around pipe crossings to minimize disruption of and impact to vehicles.

6. Re-grade disturbed areas and repair interim cover.

E. Enclosed Flare (SECTION 11 90 00.1)

1. Install a skid mounted enclosed flare(s) in accordance with manufacturer specifications.

2. Connect new lateral piping and gas wells to the flare system.

3. Install concrete pad and anchor flare skid in accordance with manufacturer specifications.

4. Connect electrical panel (480 VAC, 3 phase) on flare skid to power distribution panel in maintenance shop.

F. Furnish and install condensate sumps including electric pumps (SECTION 40 10 00.4).

1. Provide liquid level measurement with data transmitted to flare for data logging.

G. Furnish and install fencing around the flare station area as described on drawings attached as reference for these specifications.

H. Furnish and install a storage container unit (8 feet x 20 feet – Matson type or equivalent) on a concrete pad.

1. Include 4 electrical outlets and 2 light fixtures; pre-run conduit and wiring to breaker in trailer

2. A/C – 12,000 btu installed

3. Include a breaker panel suitable for load in trailer

4. Provide load requirements to OWNER prior to purchase to allow for coordination with electrical engineer to ensure adequate power is available to storage unit.

5. Use Red Head Epcon C6+ epoxy anchoring system with Carbon Steel A36 anchors 1 inch dia. and 6-1/8 inch embedment. Anchor plate to be 6" x 10" x ½" carbon steel. Anchor plate to be "L" shaped to provide no more than 2" of stick-up for welding to trailer base frame. Bolt hole to be approximately 5" from edge and a minimum of 2" from angle along length. Bolt hole to be centered along 6 inch width.

I. CONTRACTOR is required to complete the work as indicated on the Drawings and defined in the Contract Documents within the time frame given in the Contract.

1.04 REFERENCE DOCUMENTS

A. The following reference documents apply to all specifications and work for this project. Conflicts between the drawings and specifications prepared for the project and the standards noted in C and D of this section shall be brought to the attention of the OWNER prior to purchasing or constructing. OWNER is not responsible for the cost of work not constructed in accordance with the standard specifications and details or as otherwise approved by OWNER.

B. "Gas System Construction Design", Kekaha Sanitary Landfill, June 2015

C. Standard Specifications for Public Works Construction, September 1986, Departments of Public Works, County of Kauai, City and County of Honolulu, County of Maui, County of Hawaii, of the State of Hawaii.

D. Standard Details for Public Works Construction, September 1984, Revised September 2000, Departments of Public Works, County of Kauai, City and County of Honolulu, County of Maui, County of Hawaii, of the State of Hawaii.

1.05 CODES AND REGULATIONS

A. If CONTRACTOR undertakes additional work due to the enactment of new, or the amendment of existing, statutes, ordinances, and regulations dealing with the performance of the successful bid, OWNER will issue a Work Directive Change or Change Order setting forth the additional work to be undertaken. The Work Change Directive and/or Change Order shall be prepared and executed as set forth in the General Conditions.

B. National Electric Code (NEC latest version)

C. Additional codes and regulations, as may be applicable, are included in specific specifications.

D. In accordance with Chapter 11-60.1, AIR POLLUTION CONTROL, TITLE 11, STATE ADMINISTRATIVE RULES, the CONTRACTOR shall be responsible for ensuring that effective control measures are provided to minimize or prevent any visible dust emission caused be the construction work from impacting the surrounding areas including the off-site roadways used to enter/exit the project. These measures include but are not limited to the use of water wagons, sprinkler systems, dust fences, etc.

E. D. In accordance with Chapter 11-55, WATER POLLUTION CONTROL AND CHAPTER 11-54, WATER QUALITY STANDARDS, TITLE 11, STATE ADMINISTRATIVE RULES, the

CONTRACTOR shall be responsible for ensuring that the BEST MANAGEMENT PRACTICE (BMP) to minimize or prevent the discharge of sediments, debris and other water pollutant into State waters is provided at all times.

1.06 QUALITY ASSURANCE INSPECTION AND TESTING

A. Tests called for in specifications or drawings, or as required by code or regulation, will be performed by CONTRACTOR or its authorized representative except when indicated otherwise in Specifications.

1.07 REFERENCE STANDARDS

A. Use the latest version of referenced standards, unless otherwise noted in Contract Document.

B. CONTRACTOR shall request clarification from ENGINEER before proceeding should specified reference standards conflict with Contract Documents.

C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.08 WORK RESTRICTIONS

A. Disposal of Waste Material:

1. Burning will not be permitted on site.

2. Remove material from site that cannot be placed legally in OWNER's landfill.

B. Fire Prevention and Protection: Extreme fire conditions may be present at project site. Perform all work in a fire-safe manner. Comply with applicable local and State fire prevention regulations.

C. Temporary Electric Power: No electric power is immediately available at CONTRACTOR'S staging area. Make arrangements for electric power for use during construction period until final acceptance by OWNER, and pay all costs for same.

D. Sanitary Facilities: CONTRACTOR to provide and maintain sanitary facilities for its employees and subcontractor's employees.

E. Temporary Telephone Service: No telephone service is immediately available at designated CONTRACTOR'S staging area.

F. Work Hours: Normal work hours at the facility are 6 am to 5 pm. Contractor cannot work hours other than the site's standard work hours without approval of OWNER. CONTRACTOR is responsible for supplying lights if needed at no additional cost to OWNER.

1.09 GENERAL CONSTRUCTION RESPONSIBILITIES AND PROCEDURES

A. CONTRACTOR shall be held responsible for correctness of work, and shall report errors or inconsistencies in the Drawings and Specifications to ENGINEER before executing work.

B. Responsibility for Damage to Existing Structures: Repair or replace structures or facilities damaged by CONTRACTOR at no additional cost to OWNER. Of particular importance are leachate handling systems, groundwater monitoring systems, haul roads and landfill gas monitoring systems.

1. The CONTRACTOR shall verify the locations and depths of utilities in the project area and exercise proper caution during excavation or trenching. CONTRATOR shall notify OWNER immediately if any existing utility is damaged during construction.

CONTRACTOR to repair existing utilities as expeditiously as possible at no cost to OWNER whether expressly identified on drawings or not.

C. CONTRACTOR shall obtain all necessary building permits including electrical if necessary based on the scope of the project.

D. CONTRACTOR is responsible for erosion control in all areas not within the solid waste disposal limits:

1. All control measures shall be inspected at least once each week and within 24 hours following any rainfall event of 0.5 inches or greater.

2. All measures shall be maintained in good working order. If repair is necessary, it shall be initiated within 24 hours after the inspection.

3. Built up sediment shall be removed from silt fence when it has reached on-third the height of the fence.

4. Silt screen or fence shall be inspected for depth of sediment, tears, to verify that the fabric is securely attached to the fence posts or concrete slab and to verify that the fence posts are firmly in the ground.

1.10 HAUL AND ACCESS ROAD MAINTENANCE

A. Construct and or maintain temporary access roads to WORK AREA to allow landfill operations to proceed normally. Notify OWNER of any change of conditions that will affect landfill operations at least 24 hours in advance of the change.

B. Construct temporary haul and access roads only at locations specifically approved by OWNER.

C. Perform necessary maintenance of temporary haul and access routes during construction to restore routes used by CONTRACTOR'S equipment to their original condition at conclusion of construction.

D. At conclusion of construction, re-grade temporary haul and access roads. Re-grade areas to original conditions.

E. Patch or overlay existing roadways impacted by construction as necessary to restore them to original condition at no cost to OWNER.

F. Remove temporary access roads used to install vertical landfill gas wells.

1.11 PROTECTION OF EXISTING MONITORING WELLS AND INFRASTRUCTURE

A. Prior to beginning site work, locate all monitoring wells, piezometers, utility boxes, valve boxes, or other utilities in Work area or adjacent to haul routes.

B. Install markers identifying the location of these objects.

C. Protect objects as necessary to prevent damage during Work, as approved by ENGINEER or OWNER.

D. Repair or replace objects damaged during construction by CONTRACTOR at no cost to OWNER.

1.12 DIMENSIONS AND MEASUREMENTS:

A. Figured dimensions marked with "ref." are for CONTRACTOR'S reference only and may vary.

B. Verify dimensions shown (especially for flare) and notify ENGINEER of discrepancies prior to proceeding with work.

C. Properties and dimensions on the Drawings and in these Specifications are expressed in U.S. units unless otherwise noted.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

* * * END OF SECTION * * *

SECTION 01 11 00.2
INTENT OF DRAWINGS AND TECHNICAL SPECIFICATIONS

PART 1 GENERAL

1.01 DRAWINGS AND TECHNICAL SPECIFICATIONS

A. The intent of the Drawings and Technical Specifications is to describe work that CONTRACTOR shall perform in a manner acceptable to OWNER and in full compliance with the terms of Contract.

B. Drawings show general arrangements for work that shall be used by CONTRACTOR in the preparation of shop and field drawings.

C. Provide OWNER with a complete and operable system, even though the Drawings and Specifications may not specifically call out all items of work required of CONTRACTOR to complete his tasks, install incidental appurtenances, materials, and the like.

D. CONTRACTOR is to perform work in accordance with lines, grades, cross sections, and dimensions shown on Drawings. Deviations shall be approved by OWNER or ENGINEER prior to making deviation.

E. Dimensions on Drawings are presumed to be correct, but CONTRACTOR shall check dimensions prior to beginning Work. If errors or omissions are discovered by CONTRACTOR, CONTRACTOR shall immediately notify ENGINEER in writing.

1.02 CHANGES TO DRAWINGS

A. It is inherent in the nature of construction that some changes in Drawings and Technical Specifications may be necessary during the course of construction to adjust them to field conditions, and it is the essence of the Contract to recognize a normal and expected margin of change. OWNER shall have the right to make such changes, from time to time, in the Drawings and Technical Specifications, in the character of the work as may be necessary or desirable to ensure the completion of the work in the most satisfactory manner without invalidating the Contract.

1.03 COORDINATION AND INTERPRETATION OF DRAWINGS AND TECHNICAL SPECIFICATIONS

A. Drawings, Technical Specifications, General Conditions, Supplementary Conditions, Contract Change Orders, and all supplementary documents are essential parts of Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be coordinated, complementary, and to describe and provide for a complete Work.

B. Should it appear that the Work or other matters relative thereto are not sufficiently detailed or explained in Contract Documents, CONTRACTOR shall apply to ENGINEER for such further explanations in the form of a Request for Information (RFI) as may be necessary and shall conform to OWNER's response as part of the Contract.

C. In the event of a doubt or question arising regarding the true meaning of the Contract Documents, reference shall be made to OWNER, whose decision thereon shall be final.

D. In the event of a discrepancy between a Drawing and the figures and or dimensions written thereon, the figures and or dimensions shall be taken as correct. Figured dimensions shall govern over scaled dimensions. Scaled dimensions shall not be used in the performance of the Work. Cross sections and details take precedent over general plan views.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

* * * END OF SECTION * * *

SECTION 01 20 00
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 MEASUREMENT

A. Performed according to United States Standard measure.

B. Based on actual units installed or neat line dimensions of work completed.

C. Compute all quantities of Work performed, or of materials and equipment delivered to the site for final payment purposes. Calculation of final quantities will be as described in the Bid Schedule provided with Bid Form. OWNER or OWNER's designated representative for this purpose or CQAC may verify all quantities.

1.02 PAYMENT

A. In accordance with unit prices and amounts shown on the Bid Schedule provided with Bid Form and attached to the Agreement.

B. Includes all costs for overhead and profit and for supplying materials, labor, equipment, and tools, necessary to complete the Work in accordance with the Technical Specifications, Drawings, and Contract Conditions.

1.03 VALUES OF UNIT PRICES

A. The number of units and quantities listed in the Bid Schedule are approximate only, and final payment will be made for the actual number of units and quantities incorporated in the work or made necessary to complete the project.

B. In the event that work and materials or equipment are required to be furnished to a greater or lesser extent than is indicated in the Bid Schedule, such work and materials or equipment will be furnished in greater or lesser quantities.

1.04 CHANGES AND EXTRA WORK

A. Changes and extra work will be measured and paid for in accordance with the requirements of written Change Orders.

1.05 REJECTED MATERIALS

A. Quantities of material wasted or disposed in a manner not called for in the Technical Specifications; rejected loads of material, including material rejected after it has been placed by reasons of the failure of the CONTRACTOR to conform to the provisions of the Technical Specifications; material not unloaded from the transporting vehicle; material placed outside the limits indicated by the Drawings or established by OWNER; or material remaining on hand after completion of the Work, will not be paid for, and such quantities will not be included in the final total unit price quantities. No compensation will be permitted for loading, hauling, and disposing of rejected material.

1.06 GENERAL PAYMENT INFORMATION

A. Payment for Lump Sum Bid Items

1. Total final payment for Lump Sum Bid Items and accepted Optional Lump Sum Bid Items shall be the value listed in "Lump Sum Bid Item Amounts" on the Bid Schedule provided with Bid Form and attached to Agreement.

B. Payment for Unit Price Bid Items

1. Total payment for unit price bid items shall be the unit price stated in Bid Schedule/Agreement multiplied by the final number of units installed or completed.

C. Progress payments shall be made in accordance with unit prices stated in the Bid Schedule/Agreement multiplied by the number of units completed during that pay period.

D. Payment includes cost for Division 1 Work with the exception of those Division 1 items listed in the Bid Schedule/Agreement.

E. Payment includes costs for overhead and profit, and for supplying materials, labor, equipment, tools and other incidentals necessary to complete Work in accordance with Contract Documents.

1.07 BID ITEM MEASUREMENT AND PAYMENT INFORMATION

A. See Bid Schedule provided with Bid Form and attached to Agreement for descriptions of work included in each pay item and for the method that various units of unit price work will be measured.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

* * * END OF SECTION * * *

SECTION 01 31 00
PROJECT MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Authority of Attendees.

B. Pre-Construction Meeting.

C. Progress Meetings and Agenda.

1.02 AUTHORITY OF ATTENDEES

A. Representatives of CONTRACTOR, VENDOR, ENGINEER (via conference call if appropriate), CQAC, OWNER, subcontractors, and suppliers attending meetings shall be authorized to act on behalf of entity each represents.

1.03 PRE-CONSTRUCTION MEETING

A. Meeting will be held at location and time selected by OWNER.

B. Attendance:

1. CONTRACTORS' Office Representative and Superintendent.

2. Subcontractors or supplier's representatives whom CONTRACTOR may invite or OWNER or VENDOR may request.

3. Construction Quality Assurance Consultant's Representative.

4. VENDOR.

C. The agenda will include, but not be limited to, the following subjects:

1. Proposed construction schedule.

2. Required bonds and insurance certifications prior to Notice to Proceed.

3. Explanation of liquidated damages (if applicable), other penalties, and required completion dates.

4. Procedures for handling submittals such as substitutions and shop drawings.

5. Arrangement for weekly progress meetings for involved parties.

6. Requirements for laboratory testing of materials.

7. Applications for payment, and progress payment procedures.

8. VENDOR and OWNER'S site regulations.

1.04 PROGRESS MEETINGS AND AGENDA

A. CONTRACTOR shall schedule and administer progress meetings.

B. Meetings to be held weekly, or more frequently, if requested by OWNER.

C. Attendance:

1. VENDOR
2. Construction Quality Assurance Consultant's Representative.
3. CONTRACTOR's Superintendent.
4. Subcontractors and suppliers as appropriate to agenda.

D. Meeting requirements:

1. Perform the following general requirements for progress meetings:
   a) Prepare agenda for meetings.
   b) Make physical arrangements for meetings.
   c) Preside at meetings.
   d) Record significant proceedings and decisions of meeting.
   e) Reproduce and distribute copies of meeting record within 3 days after each meeting to participants in meeting and to parties affected by decisions made at meeting.

E. Suggested Agenda:

1. Review and approve record of previous meeting.
2. Review progress of Work since previous meeting.
3. Field observations, problems, and conflicts.
4. Problems which impede construction schedule.
5. Review of off-site delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to construction schedule.
8. Planned progress during work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality and safety standards.
12. Pending changes and substitutions.
13. Review proposed changes for effect on construction schedule and completion date, and on other contractors.
14. Update of record (record) drawings and specifications.
15. Health and Safety.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

* * * END OF SECTION * * *

SECTION 01 40 00
QUALITY ASSURANCE AND QUALITY CONTROL

PART 1 GENERAL

1.01 QUALITY CONTROL OF INSTALLATION

A. Comply fully with manufacturers' instructions, including each step in sequence.

B. CONTRATOR shall request clarification from ENGINEER before proceeding should manufacturers' instructions conflict with contract documents.

C. Comply with specified testing standards as a minimum quality for work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.02 INSPECTION AND TESTING LABORATORY SERVICES

A. OWNER will appoint, employ, and pay for services of an independent Construction Quality Assurance firm (CQAC) to perform inspection and testing.

B. CQAC will perform inspections, tests, and other services specified in the Construction Quality Assurance Manual (CQAM), those indicated as the responsibility of the CQAC in individual specification sections, and those required by OWNER.

C. Reports will be submitted by CQAC to OWNER, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

D. Assist CQAC as requested in the performance of their CQA work.

E. Furnish samples of materials, equipment, and tools as requested.

F. Notify OWNER and CQAC 24 hours prior to expected time of completing work that requires CQA activities such as inspection and or testing.

G. Retesting required because of non-conforming materials or installations will be performed by CQAC.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

* * * END OF SECTION * * *

SECTION 01 60 00
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 MATERIALS

A. Term "Material" means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. May also include existing material or components required for reuse.

B. Two or more items of same kind shall be identical, by same manufacturer.

1.02 MANUFACTURER'S SPECIFICATIONS, RECOMMENDATIONS, INSTRUCTIONS

A. Follow manufacturers' specifications, recommendations or instructions for transporting, handling, storing, protecting, and installing materials, equipment or apparatus furnished as a part of this Contract. If in conflict with Specifications for project or if local conditions prevent execution in prescribed manner, obtain direction from ENGINEER regarding the correct specifications, recommendations and or instructions before proceeding with Work.

B. CONTRACTOR shall verify all dimensions of materials used, including the flare skid, and shall make all appropriate changes or adjustments to all other structures impacted by the dimension change.

1. Contractor shall obtain all authorizations required to make such changes (including building permit modifications if necessary)

2. Contractor shall prepare new engineering drawings to make such changes sealed by a professional engineer if the modifications are significant and require such drawings.

C. CONTRACTOR shall upon receiving final approved design drawings from the flare manufacturer, compare the structural/ geotechnical design assumptions used in the development of the foundation drawings to those used by the flare manufacturer. If these assumptions vary significantly, the foundation design shall be revised.

1.03 TRANSPORTATION AND HANDLING

A. Promptly inspect shipments to ensure that materials arriving at the site comply with specified requirements, quantities are correct, and materials are undamaged.

B. Handle and store materials by methods to prevent damage and contamination from dust, water or other elements.

1.04 STORAGE AND PROTECTION

A. OWNER and VENDOR assume no responsibility for materials and equipment stored on-site. CONTRACTOR assumes full responsibility for damage due to storage of materials and equipment.

B. Cover materials subject to dust contamination or UV degradation with impervious sheet covering. Provide ventilation to avoid condensation.

C. Arrange storage of materials to permit access for inspection. Periodically inspect to ensure materials are undamaged and are maintained under specified conditions.

1.05 ALLOWABLE MATERIALS

A. Materials specified by Reference Standards or by description only: Any material meeting those standards or description.

B. Materials specified by naming one or more manufacturers: Materials of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Materials Specified by naming one or more manufacturers with a provision for "or equal" substitutions: Submit request for substitution to ENGINEER for any manufacturer not named.

1.06 SUBSTITUTIONS

A. Substitutions will be considered when a CONTRACTOR believes a substitute material will perform better or cost less than the specified material, or when a material is unavailable through no fault of CONTRACTOR.

B. Document each request with complete data that demonstrates compliance of proposed substitution with Contract Documents.

C. A substitution request constitutes a representation that CONTRACTOR:

1. Has investigated proposed material and determined that it meets or exceeds quality level of specified material.

2. Shall provide same warranty for substitution as for specified material.

3. Shall coordinate installation and make changes to other Work which may be required for Work to be complete with no additional cost to OWNER.

4. Waives claims for additional costs or time extension which may subsequently become apparent.

D. Substitution Submittal Procedure:

1. Submit request for substitution to ENGINEER. Limit each request to one proposed substitution.

2. Submit shop drawings, material data, and certified test results attesting to proposed material equivalence.

3. OWNER will notify CONTRACTOR, in writing, of decision to accept or reject request.

E. Conditions Which Are Not Substitutions

1. Requirements for substitutions do not apply to CONTRACTOR options on materials and equipment provided for in specifications.

2. Revisions to Contract Documents, where requested by OWNER, are "changes" not "substitutions."

1.07 REPAIRS AND REPLACEMENTS

A. In event of damage that is CONTRACTOR'S responsibility, promptly make replacements and repairs to meet the Specifications at no additional cost to the OWNER.

B. Additional time required to secure replacements and to make repairs will not be considered by OWNER to justify extension in contract time.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

* * * END OF SECTION * * *

SECTION 01 70 00.1
CONTRACT CLOSEOUT

PART 1 GENERAL

Not used

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.01 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and Work is complete in accordance with Contract Documents and ready for OWNER's inspection.

B. Provide required submittals to OWNER.

3.02 PROJECT RECORD DOCUMENTS

A. Maintain on site or electronically, one set of the following record documents and record actual revisions to the work as they occur.

1. Contract Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed shop drawings, product data, samples and submittals.

B. Store Record Documents separate from documents used for construction.

C. Record survey information concurrent with construction progress, and in accordance with Section 01440.

D. Specifications: Legibly mark and record in each product section (PART 2) the description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and Modifications.

E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical location of underground utilities and appurtenances, referenced to permanent surface improvements.
2. Measured locations of items listed in Section 01440.

3. Internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

4. Field changes of dimension, detail, or materials.

5. Details not shown on original Contract Drawings.

3.03 RELEASE OF LIENS AND CONSENT OF SURETY

A. Submit documentation or lien releases from subcontractors and suppliers documenting payment to subcontractors and suppliers for all work performed under this Contract.

B. No application for final payment will be accepted until satisfactory evidence of Release of Liens and Consent of Surety to Final Payment has been submitted to the OWNER.

C. Retainage will not be paid by OWNER until CONTRACTOR has submitted evidence that all uncontested invoices from subcontractors and suppliers have been paid.

3.04 WARRANTIES

A. Submit manufacturer's warranties for products installed in the Work.

3.05 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance, and extra materials in quantities specified in individual specification sections.

3.06 DOCUMENT SUBMITTAL

A. Complete closeout procedures, final cleaning, and submit project record documents, warranties, and spare parts before applying for final payment.

B. Final payment will be withheld until work of this Section is complete and accepted by the OWNER.

3.07 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Remove waste and surplus materials, rubbish, and construction facilities from the construction sites.

C. Remove materials and equipment not required as a part of completed Work from OWNER’s property.

D. Finish grade designated areas to established grades or if no grade is established, to grades as designated by OWNER. Work shall include but is not limited to CONTRACTOR'S staging area, haul and access roads, and other areas disturbed by CONTRACTOR'S operation.

3.08 SUBSTANTIAL COMPLETION INSPECTION AND PUNCH LIST

A. When Work is substantially complete, contact OWNER to schedule inspection.

B. Inspection of Work areas will be conducted to verify Work was completed in compliance with project requirements.

C. Items not meeting project requirements and incomplete items will be summarized in a Punch List that will be provided to CONTRACTOR.

D. Complete Punch List work to meet project requirements.

3.09 FINAL COMPLETION INSPECTION

A. When Work, including punch list items, is complete, contact OWNER to schedule final inspection.

B. Inspection of Work areas will be conducted to verify Work was completed in compliance with project requirements and Work areas have been cleaned and restored to meet project requirements.

C. OWNER will provide written Completion Notice to CONTRACTOR that Work meets project requirements and is complete.

3.10 FINAL APPLICATION FOR PAYMENT

A. Submit final Application for Payment, including contract retainage (if applicable), after receiving Completion Notice.

* * * END OF SECTION * * *

SECTION 01 70 00.2
MOBILIZATION AND DEMOBILIZATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mobilization of equipment and personnel to project site.

B. Staging

C. Demobilization from project site.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.01 MOBILIZATION

A. Perform preparatory work and operations, including but not limited to, the following:

1. Move personnel, equipment, supplies, and incidentals to project site.
2. Establish offices, buildings and other facilities necessary to complete Work.
3. Procure bonds and insurance for Work.
4. Attend coordination, pre-construction, and other meetings as requested.
5. Coordinate subcontractors and suppliers.
6. Perform other activities that must begin before Work and which are not covered in other bid items.

3.02 STAGING

A. CONTRACTOR shall provide ALL labor and equipment to manage ALL materials used in the construction including offloading, loading and relocation to and from staging area during the entire duration of the project.

B. An area will be set aside on property for CONTRACTOR'S use as a staging area for personnel, equipment, and materials.

a) OWNER will define location of staging area on the project site.
b) CONTRACTOR shall maintain all materials and equipment within this defined staging area except as required to complete construction.
    1) CONTRACTOR may request from OWNER a larger area for staging if necessary, however, OWNER reserves the right to restrict expansion of the staging area if insufficient space is available.

3.03 DEMOBILIZATION

A. Perform demobilization work and operations, including but not limited to, the following:

1. Move personnel, equipment, excess materials, and incidentals off project site.

2. Re-grade, clean, and restore staging, storage, and access and haul roads, and other areas to pre-mobilization conditions.

3. Complete contract closeout activities in accordance with Section 01700 – Contract Closeout.

* * * END OF SECTION * * *

SECTION 01 70 00.3
ON-SITE HEALTH AND SAFETY

PART 1 GENERAL

1.01 SUMMARY

A. Construction activities at landfills may place CONTRACTOR'S personnel, personnel of other Contractors hired by OWNER to perform Work at site, and public in potentially hazardous situations due to exposure to landfill refuse, leachate, and gases.

B. CONTRACTOR is responsible for implementation and enforcement of safe Work practices including, but not limited to, personnel exposure to refuse, leachate, and gases; use of trenching, sheeting, and shoring; scaffolding; materials handling and drilling; operation of equipment; and safety of public during progress of Work.

1.02 PAYMENT

1. Include in Bid, cost for Work performed in Level D protection.

2. Work specified in this section is considered incidental and cost shall be included as part of appropriate lump sum or unit prices specified in Bid Form.

3. Include cost of Level "C" and "B" protection in appropriate unit price in Schedule of Supplemental Prices in Bid Form. If upgrade of protection is required, payment shall be made in accordance with Schedule of Supplemental Prices.

1.03 REGULATORY REQUIREMENTS

1. CONTRACTOR shall plan for and ensure personnel comply with basic provisions of OSHA Safety and Health Standards (29 CFR 1910) and General Construction Standards (29 CFR 1926) as appropriate.

2. Comply with applicable laws and regulations of any public body having jurisdiction for safety of persons or property.

1.04 OPERATIONS AND EQUIPMENT SAFETY

1. CONTRACTOR is responsible for initiating, maintaining, and supervising safety precautions and programs in connection with Work. CONTRACTOR shall take necessary precautions for safety of employees on Project site and other persons and organizations who may be affected by Project.

2. CONTRACTOR'S duties and responsibilities for safety in connection with Work shall continue until such time as Work is complete and OWNER has issued notice to CONTRACTOR that Work is complete.

1.05 HEALTH AND SAFETY

1. CONTRACTOR is responsible for implementation and enforcement of health and safety requirements and shall take necessary precautions and provide protection for the following.
   a) Personnel working on or visiting Project site, irrespective of employer.
   b) Work and materials or equipment to be incorporated in Work area on- or off site.
   c) Other property at or adjacent to Project site.
   d) Public exposed to job related operations or potential release of toxic or hazardous materials.

2. CONTRACTOR shall prepare site specific health and safety plan (HASP). If CONTRACTOR does not have capability to prepare HASP, CONTRACTOR shall employ consultants with appropriate capability. CONTRACTOR is solely responsible for adequacy of HASP's preparation, monitoring, management, and enforcement. At minimum, CONTRACTOR'S HASP shall address the following.

   a) Site description and history.

   b) Project activities and coordination with other Contractors.

   c) Hazard evaluation.

   d) On-site safety responsibilities.

   e) Work zones.

   f) Personnel training.

   g) Atmospheric monitoring.

   h) Personal protection, clothing, and equipment.

   i) Emergency procedures.

3. CONTRACTOR's HASP should be consistent with the OWNER's HASP. CONTRACTOR shall notify OWNER of differences that would impact safety at the project.

1.06 SUBMITTALS

A. Submit copies of HASP to OWNER within 10 days after Notice to Proceed. Work on site shall not proceed until HASP has been submitted to OWNER.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

* * * END OF SECTION * * *

DIVISION 2
SITE WORK

SECTION 02 21 00
CONSTRUCTION STAKING AND SURVEYING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General requirements for survey work to be performed by CONTRACTOR.

1. Perform construction layout work, such as staking well locations and elevations, and grade checking.

2. Perform surveys for measurement of pay quantities.

3. Perform surveys to document record conditions of the project.

1.02 EQUIPMENT AND PERSONNEL

A. Provide instruments and other survey equipment that is accurate, suitable for the surveys required in accordance with recognized professional standards, and in proper condition and adjustment at all times.

1.03 USE OF SURVEY DATA BY OWNER

A. CONTRACTOR's surveys are part of the Work and may be checked by OWNER or its representatives at any time. The CONTRACTOR is responsible for (1) any lines, grades, or measurements which do not comply with specified design criteria or proper tolerances, or which are otherwise defective, and (2) for any resultant defects in the Work. CONTRACTOR will be required to conduct re-surveys or check surveys to correct errors indicated by review of the field notebooks or otherwise detected.

1.04 VERIFICATON BY OWNER AND ALTERNATIVE PROCUREMENT OF SURVEYING SERVICES

A. OWNER reserves the right to perform checking and correction of CONTRACTOR's surveys but this does not relieve CONTRACTOR of the responsibility for adequate performance of the Work.

1.05 EXISTING CONDITIONS

A. OWNER will provide vertical and horizontal reference control stakes (benchmarks) within reasonable proximity of work. Notify OWNER if survey control points are damaged upon discovery. Also notify OWNER of any damage caused by CONTRACTOR, then repair or replace control points at no additional cost to OWNER.

1.06 SUBMITTALS

A. Delivery Schedule for Survey Information

1. Provide record and measurement and payment survey data to OWNER within one working day of completing the survey.

2. Submit required survey data (or portion thereof) to CQAC for approval before backfilling trenches.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.01 SURVEYS FOR LAYOUT AND PERFORMANCE OF WORK

A. Perform surveys for layout and performance of the Work, reduce the field notes, make necessary calculations, and prepare drawings necessary to carry out such work.

3.02 MONITORING DEVICE PROTECTION

A. Prior to beginning any site work, locate all monitoring wells, gas probes, piezometers, utility boxes, valve boxes, or other utilities in the area of the work.

B. Install markers identifying the location of these devices.

C. The purpose of the work is to protect these items during construction.

D. Any items damaged during construction by the CONTRACTOR will be replaced by the CONTRACTOR at no cost to the OWNER.

3.03 SURVEYS FOR RECORD DRAWINGS AND MEASUREMENT FOR PAYMENT

A. When the Specifications require items of work to be measured by surveying methods, perform surveys and perform necessary calculations to determine payment quantities. OWNER may perform independent checks.

B. Items requiring surveys for determining pay quantities are listed by bid item number in Bid Schedule.

C. Provide record data to OWNER for the following items:

1. Horizontal and vertical location of new gas wells, abandoned borings, and abandoned wells.

2. Horizontal and vertical location of the top of all lateral pipes at 50-foot intervals, at fittings, and changes in vertical or horizontal direction, and at connections to existing systems.

D. Provide record survey information and associated point data on the same datum and coordinate basis as the Construction Drawings. All point data must have clear, easy to understand descriptions. Provide all point data in Autocad (.dwg) format and ASCII format (point number, northing, easting, elevation, and description).

3.04 COORDINATION WITH OWNER

A. Keep OWNER informed on progress of survey work to allow OWNER sufficient time to verify survey work without inconvenience or delay to CONTRACTOR.

3.05 FINAL RECORD DRAWINGS

1. Include survey data (point number, northing, easting, elevation, description, etc.) in a table on the drawings.

2. Submit final record drawings, stamped by a Hawaii P.E. or P.L.S to OWNER within 3 weeks of completing work.

* * * END OF SECTION * * *

SECTION 11 90 00.1
ENCLOSED FLARE SYSTEM

PART 1 GENERAL

1.01 SYSTEM DESCRIPTION AND SUMMARY

A. Use this specification to provide proper blower/flare station.

B. Designed and constructed to operate as a complete pre-assembled unit (except as noted) to minimize installation and start-up time.

C. Completely fabricated, assembled, pre-wired, and tested (functional wiring check, simulated operation, proper operation of all safety systems, etc.) prior to shipment.

1.02 DESIGN REQUIREMENTS

A. Design system to dispose of landfill gas.

1. Typical Landfill Gas Composition:
   a) 40% to 60% methane.
   b) 30% to 50% carbon dioxide.
   c) <100 ppmv hydrogen sulfide.
   d) Less than 2000 ppm volatile organic compounds.

2. System shall use Best Available Control Technology (BACT).

3. Flare: Minimum operating temperature of 1,400^{0}F with a minimum residence time of 0.3 seconds.

4. Landfill Gas Flow Rate Range: 50-700 scfm

5. The flare system shall be designed as an independent unit but must be capable of working in parallel with a future renewable energy project. The unit shall combust all the collected gas in the range specified and be capable of combusting all gas in excess of that which is used for renewable energy project in accordance with the provisions of the NSPS.

B. Design for ambient air temperatures ranging from 40^{0}F to 110^{0}F.

C. Maximum anticipated wind velocities up to 110 mph.

D. Zone 1 seismic classification

E. Wind load and seismic classification requirements to be met without the use of guy-wires or similar devices.

F. Noise level in any direction within 3 ft from flare shall be less than 85 dBA.

G. Maximum head loss due to flare system: 10 inches water column (“w.c.)

H. Blower: Variable Frequency Drive (VFD) compatible unit designed to allow for the full range operation of the flare system

1. 100% redundant blower operation for the full range of operation of the flare

2. Must generate a minimum of 40 inches water column at skid inlet to knockout vessel (KOP).

I. Inlet Gas Valve: fail close operation

J. Flame Arrester: removable stainless steel internals

K. Pilot Gas: Propane at 15 psig

L. Ignition Gas (if necessary by design): Propane at 15 psig

M. Electricity: 480 VAC/3 phase/60 Hz

N. Area Classification: Electrical panel(s) to be located in non-hazardous area of skid. All other areas to be treated as class and division defined by NEC and NEMA.

O. The OSHA Lockout/tagout guidelines need to be included in all energy storage devices. The design shall include the ability to shut off, neutralize, or isolate any energy source.

P. Smokeless Requirement: 100%

Q. Flare capacity control via vacuum sensor, set point programmable in the field.

R. Designed in accordance with 40 CFR 60 Part WWW, New Source Performance Standards, including provisions for flow measurement.

S. Emissions

1. Overall Destruction Efficiency: 98% minimum

2. NOx, lb./MMBtu (HHV): 0.068 maximum

3. CO, lb./MMBtu (HHV): 0.37 maximum

4. All emission values guaranteed by manufacturer

T. Stable combustion with 30% - 55% methane concentration throughout the design capacity range while maintaining operating temperature without requiring any burner adjustment or flare modification.

U. Condensate Knockout vessel with no more than 2 inches water column pressure differential across internal demister pad.

1.03 REFERENCES

Latest editions of codes and guidelines published by National Fire Protection Association (NFPA), Occupational Safety and Health Administration (OSHA), National Electrical Manufacturers Association (NEMA), and National Electric Code (NEC)

1.04 SUBMITTALS

A. Shop Drawings:

1. Within two (2) weeks after system is ordered, submit Drawings of equipment offered with detailed description of operation including following:
   a) Outline dimensions.
   b) Electrical schematics.
   c) External and internal connection diagrams showing door-mounted items, incoming and outgoing contacts, and terminals as specified.
   d) Integrated terminal to terminal wiring, schematic and composite electrical diagrams including control interconnection diagrams of entire system assemblies, including:

1) Elementary schematic diagram.
2) Wiring and interconnecting diagram.
3) Bill of material listing components.

e) Identification of manufacturer's standard or optional equipment.

B. Product Data:

1. Submit Combustion Process Summary:
   a) After combustion emissions:
      1) Expected.
      2) Guaranteed.
   b) Operating temperature.
   c) Retention time.
   d) Waste heat release.
   e) Dimensions of system, weight of system (includes flare shell size, overall height, etc.).
   f) Expected noise levels.
   g) Expected head loss due to equipment at maximum design flow rate.
   h) Turndown Ratio.
   i) Destruction efficiency at maximum and minimum flows.
   j) Wind load data.
2. Provide manufacturer's specification sheets, product brochures.

C. Commercial Data:

1. Contractor to provide Scope of Work for flare system that is covered by warranty.
2. Contractor to ensure Equipment warranty is transferrable to OWNER.

D. Documentation:

1. Contractor shall supply the following documentation.
   a) A project schedule showing the major activities with their commencement dates and projected completion dates shall be issued to OWNER within two (2) weeks after flare system is ordered by CONTRACTOR.
   b) Weekly written progress reports shall be issued to OWNER starting from date of order by CONTRACTOR to include:
      1) Project schedule status
      2) Scheduling problems
      3) Possible delays
      4) Deviations from initial schedule
   c) Within four (4) weeks after order is placed by CONTRACTOR, three (3) sets of prints of the following should be submitted to OWNER and ENGINEER for review and comments:
      1) Equipment specification sheets
      2) Preliminary P&ID
      3) Control logic and start sequence
      4) Elevation and plan drawings with customer connections certified dimensionally correct (before issuance for shop fabrication).

5) Electrical wiring diagrams

6) Control panel layout with name plate wording

7) Foundation loadings necessary for design of foundation. CONTRACTOR shall provide this information to ENGINEER for review and confirmation of foundation structural details before CONTRACTOR begins foundation work.

d) Within three (3) weeks after the system fabrication is complete the CONTRACTOR shall submit to ENGINEER and OWNER three (3) sets of "as-built" drawings with all revisions noted, certified, and dated.

E. Operation and Maintenance (O&M) Data:

1. Five (5) Operation and Maintenance manuals per system shall be provided at the time the system is ready to ship and shall include the following information:

a) Catalog descriptions of all equipment utilized in the system as well as performance criteria for the operation conditions.

b) Recommended spare parts lists for all equipment, to include part name, manufacturer, part number, cost and supplier, etc.

c) Operating instructions for the entire unit under the conditions for which it was designed, including:

1) System start-up and shutdown procedures

2) Preventative maintenance schedule

3) Operating and safety procedures

4) Maintenance procedures

d) Certified copies of asbuilt drawings issued to OWNER and ENGINEER.

e) Troubleshooting instructions.

1.05 QUALITY ASSURANCE

A. System Responsibility:

1. To ensure proper operating systems, supplier of flare system shall also be responsible for supplying complete and operable system including associated control panel, installation of the flare package, interconnect with the existing gas system flanges, electrical interconnect and installation of foundation as necessary.

B. Regulatory Requirements:

1. Conform to all federal, state, and local requirements.

2. Compliance with relevant parts of 40 CFR 60, Subpart WWW.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Parnel Biogas, Inc.

B. John Zink Corporation, Inc.

C. LFG Specialties, LLC

D. ABUTEC, Inc.

E. LFG Technologies, Inc.

F. Or equal.

2.02 SKID

A. Unitized welded heavy-duty AISC designed structural steel skid.

B. Lifting lugs are to be installed, for ease of placement at the facility. Lug locations and general skid designed for safe deflections to prevent damage to piping and equipment during one-point lifting with spreader bar (i.e., when lifted from the four skid corners by a single crane using a spreader bar).

C. Designed to incorporate all horizontal electrical conduit "nested" or clustered and placed in non-trafficked areas along structural members or on decking oriented to eliminate tripping hazards. Fabricator shall eliminate all interference of high voltage with low voltage (4-20 ma) signals.

D. Completely galvanized or painted after fabrication

1. If painted, a minimum SP-6 surface preparation with primer and topcoat paint applied in accordance with paint manufacturers recommendations. Color to be silver, gray, sand, or customer approved alternative.

E. Any decking shall be made slip resistant. When painted, use grit (applied per paint manufacturer's recommendations). Alternatively, use diamond plate deck.

F. Anchor brackets are to be provided, suitable to secure the unit for wind loads specified (see Section 2.09 E) to appropriate foundation.

G. Flare stack(s) should be constructed as part of the skid and shipped separately for field installation. Flare shell(s), refractory and all ancillary components including piping and wiring should be completed prior to shipment to minimize field installation time and requirements.

2.03 BLOWERS

A. Duty/standby blower arrangement with second blower installed for switchover and alternating use. Blowers to be sized at full rated flare capacity for each blower (50 – 750 scfm).

B. Control panel to accommodate dual blowers. Additional blowers may be used to accommodate stated use in parallel with a renewable energy project.

C. VFD for each blower.

D. Multistage centrifugal blowers shall be of heavy-duty construction with direct drive, cast iron housing, steel shaft, aluminum-alloy impellers manufactured by Houston Service Industries (HSI) or equivalent.

E. Fans.

1. Fans may be used provided the units can attain the pressure and flow ranges specified. In addition, the fan motors must be capable of control via VFD. Fan internals must be aluminum or coated to prevent corrosion. Housing, seals and bearings must be designed to minimize leakage of landfill gas.

F. All wetted parts (excluding aluminum impellers) shall be phenolic coated for corrosion resistance.

G. Maximum blower and motor speed of 4,500 RPM or no higher than mfg. recommended maximum RPM (whichever is less).

H. Seals for blowers to be designed to resist corrosion and provide a leak tight operation. Seals for HSI blowers to be Opti-Seal® tungsten-carbide/polymer seal with open bearing housing and oil bath lubrication.

I. Blower motors to be TEFC NEMA MG-1 parts 30 & 31, Class F insulation, inverter duty (minimum 10:1 ratio under variable torque). All motors operated on variable frequency drives shall be equipped with a maintenance free, conductive micro fiber, shaft grounding ring (i.e., AEGIS™ SGR Bearing Protection Ring or equivalent) with a minimum of two rows of circumferential micro fibers to discharge electrical shaft currents within the motor and/or it bearings. Motors up to 100HP shall be provided with a minimum of one shaft grounding ring installed either on the drive end or non-drive end. Motors over 100HP shall be provided with an insulated bearing on the non-drive end and a shaft grounding ring on the drive end of the motor. Grounding rings shall be provided and installed by the motor or blower manufacturer or contractor and shall be installed in accordance with the manufacturer's recommendations.

J. Drains with valves to drain entire blower per manufacturer's recommendations, piped to edge of skid. Drain lines to be; of stainless steel material, sized, sloped and installed to promote free draining and accommodate "blow out" cleaning.

K. Provisions shall be made to prevent condensate from pooling in a manner that it could potentially enter the blower, or foul check valves associated with the blower, during periods with the unit in standby status.

L. Blowers to be mounted on individual structural steel skid by blower manufacturer (blower skid). Blower skid to be mounted on the flare skid with vibration pads in a manner that: adequately secures the unit during shipment; prevents lateral movement during operation; and allows the unit to "float" a small amount vertically on vibration pads such that the blower warranty is not impacted.

2.04 GAS CONVEYANCE PIPING

A. Stainless steel (type 304L) or HDPE

B. Corrosion resistant and fully assembled, mounted, and supported throughout the skid.

C. Flanged circular flexible bellows type couplings (rubber, metal, Buna-N or hypalon) rated for gas service at blower (or fan) inlet and outlet.

D. Flanged or wafer style check valve (Techno check or equivalent) with Viton seat and bushings, rated for gas service at blower (or fan) and located to minimize potential flow reversal "down flare".

E. Gear operated butterfly valve with Viton seats and bushings located at each blower inlet and outlet.

F. Gear operated butterfly valve with Viton seats and bushings located at moisture separator inlet.

G. Short flanged pipe segment upstream of moisture separator inlet isolation valve with pipe support.

H. Piping Sample Ports

1. Pipe sample ports are to be installed to allow for measurement of pressure and temperature at the inlet and outlet of the blower and to provide differential pressure measurement across the flame arrestor and mesh pad of the knockout vessel.

2. Two 1-inch minimum FNPT half coupling sample ports (one located in the vertical plane and one in the horizontal plane) located downstream of blower for optimal

flow measurements in the vicinity of the fixed flow meter. Ports to be plastic barbed ports (part numbers - Parker P4MCV4 hose barb with McMaster-Carr No. 9753K38 vinyl cap) or equivalent.

3. One each 1/2-inch minimum FNPT sample port (half couplings) located as close as possible to blower inlet and outlet flange. Ports to be plastic barbed ports (part numbers - Parker P4MCV4 hose barb with McMaster-Carr No. 9753K38 vinyl cap) or equivalent.

4. Two 1/2-inch minimum FNPT sample ports (half couplings) located upstream of moisture separator inlet isolation valve. Ports to be plastic barbed ports (part numbers - Parker P4MCV4 hose barb with McMaster-Carr No. 9753K38 vinyl cap) or equivalent.

2.05 MOISTURE SEPARATOR WITH DEMISTER PAD (KOP)

A. HDPE or 304L stainless steel construction to resist corrosive condensate. HDPE lids to be properly reinforced to prevent deflection/bowing under maximum vacuum conditions and operating temperatures to prevent leakage at the connection.

B. Flanged top for accessibility and maintenance. “Davit” crane required for ease of lid removal on all separators sized in excess of 36-inch diameter or taller than 6-feet, as measured above skid deck.

C. Unit shall be designed to accommodate pressures of –5 to +5 PSIG at a minimum.

D. Unit designed for removal of 99% of all liquid droplets > 10 microns in size. Demister pad to be properly supported and made of 316 type stainless steel or knitted polypropylene. Design maximum of 2-inch water column (w.c.) pressure drop across demister pad and 4-inch w.c. maximum pressure drop across entire separator at full design flow.

E. Install two ½-inch minimum FNPT sample ports for measuring differential pressure across the demister pad. Ports to be plastic barbed ports (part numbers - Parker P4MCV4 hose barb with McMaster-Carr No. 9753K38 vinyl cap) or equivalent.

F. Provide a single 2-inch HDPE or PVC ball type valve to drain.

G. Provide visual liquid level indication using sight glass with isolation valves and protection against breakage or other alternative visual liquid level indicator.

H. Drain liquids from KOP by pump. Provide sump of moisture separator with a high level shutdown switch with alarm in High-High position to prevent liquids carry through to the blower. Provide check valve on discharge of pump.

2.06 PNEUMATIC FAIL-CLOSED VALVE

A. Valve shall be a fail closed butterfly-type valve located between moisture separator and landfill gas blowers. It shall be supported adequately at its inlet and outlet to prevent any sagging of pipe segment(s) to which it is connected. The valve shall be bubble tight at 90" w.c, an electric valve can be used if it is fail close and attains similar closure speed.

B. Valve components shall be fabricated of the following materials:

1. Body shall be 150 lb. carbon steel wafer style type; ductile iron can also be used.

2. Disk and stem shall be 316 stainless steel or nickel- plated ductile iron;

3. Seat and bushings shall be Viton or PTFE (Xomox Pliaxseal or equivalent).

C. Valve shall also include the following components:

1. BETTIS, El-O-Matic or equivalent pneumatic rotary valve actuator.
2. ASCO or equivalent stainless steel three-way solenoid valve.
3. Speed control valve.
4. Limit switches for open and closed position.
5. ASCO or equivalent rotary valve position indicator capable of providing a continuous visual display of the valve's position.
6. Lockable storage rack for two standard nitrogen cylinders (one duty, one spare). Supply of nitrogen cylinders is not within scope of this specification.

D. Plumbing between pneumatic fail-closed valve and nitrogen cylinders shall include:

1. Flexible hose and regulator for each cylinder.
2. Check-valve between regulator and valve with Viton seat and bushings.
3. Fail close actuator with a three-way solenoid valve with manual override by GH-Bettis.
4. Actuator will automatically open and close upon a signal from the control panel.
5. The pneumatic or electric actuator shall have throttling capability.
6. An open speed control valve and a three-way solenoid valve (Asco) shall accompany the pneumatic actuator.

2.07 FLOW METER

A. Meter(s) to be Thermal Instrument Company, Model 9500, Fluid Controls Inc. Model ST98 with flow straightener, if required to achieve proper flow run, as noted below (Sections 2.07 I & J), or equivalent.

B. All flow meters shall be installed and used in accordance with manufacturer's published recommendations and meet a minimum accuracy of ±4% across the entire flare flow range as installed.

C. The following shall be the basis for installation and calibration:

1. LFG composition (50% methane, 40 % CO2, 0.5% oxygen, 9.5% nitrogen)
2. LFG temperature range (80 – 130 deg. F)
3. Flow range (50 – 750 scfm)
4. Pressure range (0 – 20 inches water column)
5. Turndown ratio (minimum 15 : 1)
6. Hydrogen Sulfide (H2S) levels anticipated for unit (<100 ppm).

D. All meters must report flow volumes corrected to 14.7 PSIA and 60^0F

E. Meters to be installed downstream of blowers.

F. Local display of instantaneous flow rate and totalized flow volume on meter head.

G. Signal to data recorder and PLC (with instantaneous flow rate display on recorder and PLC).

H. Sufficient flexible conduit to be provided to allow meter to be removed from pipe without disconnecting wiring.

I. If installed in a horizontal pipe run, installation point to be within 45^0 of the process pipe bottom so that any condensation drains away from the sensor location unless meter manufacturer requires otherwise.

J. To be located and installed in accordance with manufacturer's published recommendations including minimum lengths of straight pipe (upstream and downstream of meter).

K. Where required, flow straightening devices shall be used in accordance with manufacturer's recommendations.

2.08 FLAME ARRESTOR

A. Manufacturer to be Enardo, Protectoseal, Varec or equivalent.

B. Internals capable of being removed and cleaned without removing housing.

C. All aluminum housing with stainless steel element.

D. Piping and arrestor housing to be fully supported when arrestor element is removed.

E. Drain with manual ball valve designed to prevent bypass of the arrestor element. Pipe to edge of skid.

F. Two 1/2-inch minimum FNPT sample ports. Ports to be installed upstream and downstream of the element to allow for differential pressure measurements. Ports to be plastic barbed type (part numbers - Parker P4MCV4 hose barb with McMaster-Carr No. 9753K38 vinyl cap) or equivalent. **Warning: Ensure no permanent connections bypassing arrestor.**

G. Temperature switch or thermocouple to shut system down upon high flame arrestor temperature.

H. Provide exact gasket type and dimensions with a template suitable for local procurement during maintenance (a spare gasket set will meet the requirement as a template).

2.09 ENCLOSED FLARE MATERIALS

A. Enclosed Flare Stack Construction Section:

1. A-36 carbon steel shell (1/4" min. thickness)

2. Ceramic Fiber Refractory: A.P. Green (or equivalent) ceramic fiber refractory on Inconel pins and keepers. (1 ½ Inswool-HT 8# density, 2600^0F blanket backed with ½ Inswool-LT 4# density, 1800^0F blanket) or equivalent.

3. Stainless steel, multiple nozzle gas burners.

4. Purge air blower with pressure proved switch.

5. Flanged flare gas inlet (150# RF).

6. Pilot assembly with electric spark ignitor.

7. Bolted blade combustion air damper(s) for automatic control of combustion temperature.

8. Four blind flanged 3" NPT sample ports at 90^0 located ½ flare stack diameter from the top.

9. Carbon steel base plate.

10. All carbon steel surfaces shall receive a commercial sandblast to remove mill lacquer, corrosion products, mill scale and foreign material. Coat surfaces with heat resistant paint finish. Inorganic zinc primer (2-3 mils) is recommended.

11. Lifting lugs to assist in erection.

12. Access into burner system for maintenance.

2.10 PILOT GAS

A. Lockable storage rack sized and plumbed to accommodate 40 lb. propane cylinders (1 duty, 1 spare). Propane to be provided by owner.

B. Rack to be served by a single regulator and hose.

C. Rack to be located on opposite end of skid from flare stack.

D. Pilot control system including pressure regulator, fail-closed shutdown valve, manual block valve, strainer, and pressure indicator.

2.11 DATA RECORDER

A. Electronic paperless recorder

B. Yokogawa DAQSTATION Network Enhanced Model DX1012 or equivalent.

C. Mathematical function (with report function)

D. No loss of data in the event of power failure

E. Ability to view/chart all data on recorder screen in graphical and numerical format simultaneously.

F. Located within lockable access door on control panel

G. Viewable without opening control panel or control panel access door.

H. Recorded parameters

1. LFG flow to flare (SCFM)

2. Totalized flow to flare (MSCF)

3. Pilot flame temperature (^{0}F) as measured by thermocouple

4. Main flame temperature (^{0}F) as measured by the controlling thermocouple.

5. Fail-closed valve closed (Yes/No)

   a) Logic: fail-closed valve is open unless the valve closed limit switch indicates that it is fully closed

6. LFG blower on (Yes/No)

7. Flame proved (Yes/No)

   a) Logic: flame is not present unless the presence of a pilot or main flame is detected via thermocouple(s)

8. Flare system operating status (On/Off)

   a) Logic: flare system is on when the flame is proved and fail-closed valve is not closed (per valve closed limit switch)

9. Flare system venting of unburned LFG (Yes/No)

   a) Logic: flare system is venting unburned LFG when the flame is not proved and fail-closed valve is not closed (per valve closed limit switch)

10. Header pressure (In. WC)

11. Minimum of one spare input

I. Data recording interval of 2 minutes.

J. Flare system alarm upon data recorder system failure or when memory storage capacity falls below 15%.

K. Automatically produce daily and weekly reports including:

1. Average, maximum, and minimum LFG flow rate (SCFM);

2. Total LFG flow volume (MSCF);

3. Average, maximum, and minimum pilot flame temperature (^{0}F);

4. Average, maximum, and minimum main flame temperature (^{0}F);

5. Total time flame system on (hours);

6. Total time flame system off (hours);

7. Total time venting unburned LFG (hours);

8. Average, maximum, and minimum header pressure (In. WC).

L. Data storage/transfer

1. Capable of storing a minimum of 60 days of data

2. One (1) GB CF memory card

3. One (1) copy of DAQSTANDARD software or equivalent, fully licensed with all materials and original program “disks” or flash drives.

2.12 AUTODIALER:

A. Design Requirements:

a. Electronic monitoring system shall interface plant alarms to public telephone system or cellular phone network.

b. Upon receipt of one or more critical alarm trips, electronic system will automatically dial out onto phone system (up to 16 specified telephone numbers from one of 16 phone lists) with pre-programmed messages.

c. System shall continue calling until call completed and acknowledged.

B. Description & Phone Number Dialing:

a. The dialer shall be a solid-state component capable of dialing up to 16 phone numbers, each up to 50 digits in length. Phone numbers shall be user programmable via the system's keypad, locally or remotely connected PC/laptop or Touch Tone Phone.

C. Solid State Voice Message Recording and Playback:

a. The unit shall have two different categories of speech message capability, all implemented with permanent non-volatile solid-state circuitry with no mechanical tape mechanisms. The unit shall allow for message recording from a remote telephone as well as from the front panel.

b. User Field Recorded Messages: The user may record and re-record his own voice messages, for each input channel and for the Station ID.

c. Permanent built-in messages shall be included to support user programming operations, to provide supplemental warning messages such as advising that the alarms have been disabled, and to allow the unit to be fully functional even when the installer has not recorded any messages of his own.

D. Nonvolatile Program Memory Retention:

a. User-entered programming and voice message shall be kept intact even during power failures or when power is removed for up to 5 years.

E. Acknowledgment:

a. Acknowledgment of an alarm phone call is to be accomplished by pressing a key as the alarm call is being received, locally at the keypad, and/or by returning a phone call after receiving an alarm call.

F. Input Monitoring Function:

a. Each input channel shall also be independently programmable, without need to manipulate circuit board switches or jumpers, as Normally Open or Normally Closed, or for No Alarm (status only), or for Pulse Totalizing, or for Run Time Metering.

b. Physical Inputs: minimum of 12 dry contacts or analog inputs in any combination.

1. Any input in violation of a normal condition shall cause the unit to go into alarm status and begin the dial-out sequence.

2. Dry contact inputs shall also be independently programmable, without need to manipulate circuit board switches or jumpers, as Normally Open or Normally Closed, or for No Alarm (status only), or for Pulse Totalizing, or for Run Time Metering.

3. Analog inputs shall automatically detect and alarm on open current loop of any channel. All analog inputs shall be converted to engineering units as appropriate.

G. Alarm Message:

a. Upon initiating an alarm phone call; the system is to "speak" only those channels that are currently in "alarm status".

b. Any alarm message shall be capable of being delivered only once regardless of whether it is acknowledged or not.

c. Identify system malfunction

a. Flame failure

b. High flare temperature

c. Power failure

d. High flame arrestor temperature

e. High moisture separator level

f. Emergency Stop

g. Fail-closed valve not fully open or fully closed (as applicable)

h. Blower failure

i. Data recorder failure or memory approaching full

H. Diagnostics:

a. The unit shall provide a complete verbal report of all programmable functions and their programmed values on command from any remote Touch Tone phone.

I. Inquiry Message and Function:

a. Inquiry phone calls can be made directly to the unit at any time from any telephone, locally or long distance, for a complete status report of all variables being monitored, including power status.
b. Remote Reset: Alarm acknowledged by either depressing touch-tone key.

J. Status Notification:

a. The unit shall be capable of issuing a status report to any phone, modem and the Internet that contains the current value and alarm condition of all inputs and outputs.

b. The status notification report shall be issued on a periodic basis starting anytime during a day.

K. Internet Monitoring:

a. A user shall be able to view the current status of the remote unit through the Internet.

b. A user shall be able to view the event log of the remote unit via the Internet.

L. MANUFACTURER

A. Antx, inc. Austin, TX (877) 686-2689 Model: Antx DiaLog Elite
B. RACO, Model: Verbatum
C. Kaye, or equivalent

M. Enclosure: Sub-panel/Flush-door mount indoors or NEMA 4X outdoor surface mount.

N. The dialer is to use a standard rotary pulse or Touch Tone “dial-up” phone direct leased line not to be required) and is to be F.C.C. approved. Connection to the telephone is through a 4-pin modular jack (RJ-11).

O. The dialer shall be covered by a five (5) year warranty covering parts and labor performed at the Factory.

P. Operating Temperature: - 40 F to 185 F.

Q. Operating Humidity: 0% to 90%.

R. Power: 120 VAC, 60 Hz.

S. 24-hour battery backup.

T. Install in accordance with manufacturer’s written instructions and approved submittals.

U. Wire each device, program test and utility unit to be suitable for operation.

2.13 ELECTRICAL

A. Per National Electrical Manufacturer’s Association (NEMA) & National Electrical Code (NEC) codes and standards.

B. Per National Fire Protection Association (NFPA) 70E standards for construction.

C. Panel Classifications

1. Main power disconnect: NEMA 3R

2. Manual transfer switch: NEMA 3R

3. All other panels: NEMA 4X

D. All devices shall have finger-safe terminal connections and protective guards over live circuits. All terminal blocks to be clearly labeled to match drawings.

E. Area classification: Per NEC standards, minimum area classification to be Class I, Div. 2, Group D within 3-feet of any gas (LFG or propane) containing pipe or device.

F. Main power disconnect circuit breaker with manual transfer via circuit breaker 3P 480 volt, electronic sensing for tripping either source, NEMA 3R.

G. All flares will have provision for emergency generated power via manual 3-way power switch located on the primary side of the main flare breaker. Manual power transfer switch mounted on line side of main circuit breaker to accommodate alternate source of power is to be a manual 3P, double throw 600 V, non-fusible, NEMA 3R similar to Square D class 3140.

H. Conduit seals are to be used at transitions between classified and unclassified areas. Conduit seals to be packed and poured by flare supplier after installation of wiring and commissioning of system.

I. Control panel to be located a minimum of 3-feet from any gas (LFG or propane) source or pipe.

J. All wiring within threaded rigid galvanized steel conduit, except to accommodate removable devices, such as the flow meter. Always use a continuous length of wire. Do not splice wire to attain a needed length. Use the shortest possible wire length. Use wire trays for routing where possible. Avoid running control wire near high

energy wiring. Avoid running input wiring close to output wiring where possible. Avoid running DC wiring in close proximity to AC wiring where possible. Avoid creating sharp bends in the wires.

K. A reliable grounding system must be implemented. Grounding straps mounted on all panel doors and subpanels. Proper grounding and bonding is required for all control panels, power distribution panels and all other equipment.

L. Control panel shall have an Incoming Line Reactor: VFD may be susceptible to incoming voltage spikes because there is insufficient impedance. Line Reactor reduces the amount of harmonics, which are typically produced by VFD.

M. Control panel shall provide for the protection of the flow meter from lightning.

1. Provide an Isolated Transmitter:

2. Similar to Mighty Module MM4310 or equal.

3. This is an 8-pin Relay.

4. Mounting hardware may be required- associated part numbers include: DMP008, MP008, and HKB-HK2D-8.

N. Low Voltage Communication – Phone Lines: Total Protection Solutions Surge Suppression TK-CT-190TLPXXXXXX or equal (not required for Fiber Connections).

O. Primary Power at 480V: Total Protection Solutions Surge Track TK-ST240-40NN-L-DN or equal.

P. Underwriters Laboratories (UL508A) Certification or equivalent CSA rating required.

2.14 CONTROL PANELS

A. All control panels shall follow all applicable sections of the National Fire Protection Association (NFPA) fire code, and the codes of the National Electrical Manufacturer's Association (NEMA). All control voltage within the control cabinet shall be 120 volt AC or less. All high voltage cabling must be confined to motor control center (MCC) or VFD panel.

B. Starter panel with VFD, transformer, and surge protection.

C. Provide 480 volt control transformer for control voltage, as required.

D. VFDs (without bypass) with inlet vacuum control via the PLC, to be installed. Units to be Yaskawa (G7 Series), EATON/Cuttler-Hammer (SVX9000 Series AF), Square D (ATV61 Series), ABB (550 or 850 Series), Allen-Bradley (753 Series), or Fuji (Frenic 5000G11S Series) with phase unbalance, phase loss, and overload protection. VFD panel enclosure(s) to be equipped with "closed loop" air conditioners to properly cool and minimize the introduction of dust to the drive suitable for the climate where the equipment will be installed.

E. All VFD's shall have ample current capability for the motors so that the motor can produce the required torque for the load.

F. All VFDs shall include a secondary or load side contactor to isolate the load from the VFD when it is not in operation or under an emergency condition. (i.e., Emergency Stop). The VFD or PLC fault shall also be a condition for this contactor to open. This needs to be a fail safe circuit. It is required that an auxillary contact be provided on the secondary contactor for a PLC input (alarm status and event logger).

G. All VFDs shall have “line” reactors installed for the drive.

H. All VFDs shall have load reactors when the motor is installed more than 80 ft. from the VFD.

I. User set points such as vacuum PID or manual speed reference must be able to be accessed via an external keypad, controller or Human Machine Interface (HMI). Alarm status or VFD operation conditions feedback is also required back to a HMI, keypad or controller.

J. All VFD setpoints need to be listed in the manual and on file.

K. All primary power shall be monitored (using a device such as Symcom Part No. 460) for phase loss, phase unbalance, under/over volts with a shutdown to the PLC or a hardwired N.C. shutdown circuit. A phase monitoring light or alarm shall be installed and be a permissive type setting to prevent damage to any equipment. This feature could be built in to the VFD by the manufacturer.

L. All primary & secondary power sources and all analog input & outputs shall have surge protection installed (such as Dehn-usa surge protective terminal blocks).

1. Electrical surge protection on master control panel meeting Third Edition UL 1449 (Total Protection Solutions-TPS Model TK-ST160-480NN-L for 3 phase delta 480 volt or TK-ST160-3Y480 3 phase wye 480 volt or equal).

M. Electrical systems shall be isolated and controlled with circuit breakers without fuses for all AC voltages.

N. 24 volt DC power supply to loop power (analog signals) supply.

O. Light Emitting Diode (LED) bulbs to be used throughout function status indicators.

P. One industrial grade 20 Amp GFCI Type convenience outlet with weather proof cover (located outside of control panel).

Q. One 10-watt LED type all weather security light with On/Off/Photocell switch and photocell.

R. Weather Hood to be provided which extends a minimum of 3’ over front of panels.

S. Control Panel Security

1. All enclosures and cabinets that have energized circuits are to be lockable to prevent unauthorized personnel from gaining access.

2. All panels greater than 120 volts shall be outfitted with lockable features to prevent access inside the panel while the panel is energized.

3. Keyed switches and buttons (same key for all) are to be used for all controls (except Emergency-Stop) unless behind a lockable panel door.

T. All the appropriate items will be enclosed in a weatherproof (NEMA 4X) panel or equivalent panel capable of attaining performance of NEMA 4X and warranted to that performance by manufacturer.

U. All electrical valves and switches in the fuel gas or waste gas lines will be explosion proof or intrinsically safe.

V. Main power supply disconnect, purge air blower motor starter, waste gas blower motor starter and stepdown transformer mounted in a separate enclosure.

W. All the above items to be mounted on a carbon steel rack with support legs and shop piped and wired.

X. All carbon steel surfaces will receive a commercial sandblast and one coat (2-3 mils) of inorganic zinc primer.

Y. The control system will be given a functional test in supplier's shop simulating actual operation, to ensure that it is properly wired and will perform as designed.

2.15 CONTROL SYSTEM

A. PLC Based

1. PLC to be GE (Versamax Series), Automation Direct (A06 or DL205 Series), Allen Bradley (CompactLogix Series), Allen Bradley (SLC or MicroLogix 1200 Series), GE (9030 Series) or equivalent.

2. "Watchdog Timer" local to the CPU board is required to monitor CPU activity local to the microprocessor, such that the microprocessor is reset upon failure to detect CPU activity.

3. Touch screen (if used) to be suitable for intended exterior use and with proper resolution for bright daylight conditions and properly protected from potential damage by vandals or direct exposure to sunlight. Touch screen to be provided by GE (Quick Panel View Loaded Series), Automation Direct (C more EA7), Allen Bradley or equivalent.

4. Detailed "ladder logic" provided both in electronic (thumb drive) format and with hard copy printout of the "code" (non-disclosure agreements can be arranged if needed).

5. Backup of operating program provided in hard copy and electronic (thumb drive) format.

6. PLC to be equipped with data modem for voice alarm notification and remote service and support of the control system. Modem to be capable of connecting to the Sprint 3G network, AT&T 3G network, Verizon 3G network, POTS or equivalent.

B. Alarm conditions

1. Alarm on any system malfunction

C. Amp meter integrated to the PLC for each gas blower motor with local display.

D. Hour meter integrated to the PLC for each gas blower motor.

E. Panel power ON selector switch

F. Blower(s) On/Off/Auto switches

G. Blower operation limited to 2 minutes by timer within PLC logic when the switch is in the "On" (Manual) position, to allow for troubleshooting only.

H. Fail-closed valve Open/Closed/Auto switch

I. Valve is limited to 5 minutes in the open position by timer within PLC logic when the switch is in the "Open" (manual) position, to allow for troubleshooting only

2.16 CONTROL LOGIC

A. Presence of flame by thermocouple(s) or flame eye

B. Operating Permissives

1. Limit switch on fail-closed valve must indicate valve is in full-closed position prior to beginning system operation.

2. No presence of flame prior to beginning system operation.

C. Automatic Start/Restart

1. Automatic startup when power applied in automatic mode

2. Automatic restart after power failure (when in automatic mode)

3. Attempt to restart up to 3 times on flame failure

4. Safe shutdown and alarm status upon failure to prove main flame after 3 restart attempts.

D. Safe Shutdown

1. All alarms to be normally closed circuits to prevent device failure, wire off conditions, or removal of equipment that would compromise the alarm.

E. Blower stops and fail-closed valve closes immediately under any shut-down or malfunction scenario including:

1. Flame failure

2. High flame arrestor temperature

3. High moisture separator liquid level

4. Operator shutdown

5. Emergency Stop

6. Fail-closed valve not fully open or fully closed (as applicable)

7. Blower failure

8. Pilot failure

9. Data recorder system failure or memory storage capacity below 15%

10. Failure of any control system component

F. The control system must provide a quick manual method of disconnecting all system power to machinery, equipment or process. The disconnect device or switch must be clearly labeled “Emergency Stop”.

G. Upon shutdown, panel to indicate initial shutdown mechanism

H. The proposed control system will be designed to permit both automatic and manual start-up and will be sequenced in the following manner:

a) System start-up will begin with a timed air purge cycle to evacuate any fugitive hydrocarbons from the flare enclosure.

b) After purge is completed, the pilot will be lit using an electronic spark ignitor.

c) Upon proving the pilot flame by the flame scanner, the waste gas valve will open and the waste gas blower will be started allowing waste gas to flow to the flare enclosure.

d) After the waste gas valve has been opened, a timer will then shut off the pilot gas limiting propane gas usage.

e) If a flame is not sensed on the main burner after extinguishing the pilot burner, the blower will shut off, the waste gas control valve will close, and the unit will shut down on flame failure.

2. During normal operation the unit will maintain an operating temperature of at least 1400^0F by automatically adjusting the air flow into the unit. If the unit shuts down for any reason except high stack temperature, the automatic mode will allow the unit to attempt to purge and restart for a specified time period. If the unit fails to restart, the entire system will shut down and a signal is sent to a remote alarm.

3. As a minimum, the control system will be complete with the following:

a) Automatically actuated combustion air dampers to control the unit operating temperature.

b) High temperature shut-down switch with panel-mounted temperature indicator.

c) Pilot gas control system including pressure regulator, fail-closed shut-down valve, manual block valve and pressure indicator.

d) Ignition system including ignition transformer, pilot spark electrode and ignition timer.

e) Self-checking flame scanner.

f) Panel power on/off switch.

g) Auto-Manual relight switch.

h) “Manual-Off-Automatic” blower selector switch.

i) The following indicating lights with 6 volt push to test bulbs or visible display PLC touch screen:

1) Panel Power ON

2) Purging

3) Purge Complete

4) Pilot Gas ON

5) Flame Proved

6) High Stack Temperature (Shutdown)

7) Flame Failure (Shutdown)

j) Customer contacts for remote monitoring of the system.

2.17 SCADA OUTPUT

A. PLC equipped to output key operating parameters via Ethernet interface using TCP/IP protocol to facilitate interface with future SCADA system interface with Renewable Energy plant. Minimum output parameters are:

B. Failure to restart (YES/NO)

C. Fail-Closed Valve Closed (YES/NO)

1. Logic: fail-closed valve is open unless the valve closed limit switch indicates that it is fully closed

D. Flame Proved (YES/NO)

1. Logic: flame is not present unless the presence of a pilot or main flame is detected via thermocouple(s)

E. Pilot Flame Temperature (DEG F)

F. Main Flame Temperature (DEG F)

G. LFG Flow Rate (SCFM)

H. Knockout Pot – High High Level (YES/NO)

I. LFG Blower Motor– Electrical Current (Amps)

1. Provide separate signal for each blower motor

J. LFG Blower Motor– On (YES/NO)

1. Provide separate signal for each blower

K. LFG Blower Motor – Speed (RPM)

1. Provide separate signal for each blower motor

L. LFG Blower – VFD Frequency (Hz)

1. Provide separate signal for each blower

M. Header Pressure (In. WC)

N. Flare system operating status (On/Off)

1. Logic: flare system is on when the flame is proved and fail-closed valve is not closed (per valve closed limit switch)

O. Flare system venting of unburned LFG (Yes/No)

1. Logic: flare system is venting unburned LFG when the flame is not proved and fail-closed valve is open (per valve closed limit switch)

2.18 OPERATING MANUALS

A. Five (5) hard copies minimum

B. One complete electronic copy of entire Operations Manual in Adobe .pdf format provided to OWNER.

C. Minimum Contents

1. Installation Instructions

2. Instrument Specification Sheets

3. Operating Instructions

4. Maintenance Instructions

5. Detailed list of recommended spare parts

6. PLC ladder logic printout

7. PLC program in hard copy and electronic (CD) format

8. Detailed equipment, panel layout, and electrical drawings. All drawings shall be in hard copy & PDF format. P&ID drawings shall have I.O. addresses for each device labeled next to each I.O. point on the P&I D.
   a) Structural
   b) Electrical schematic
   c) P&ID

9. Data sheet, suitable for mounting in control panel, indicating all flare shutdowns, alarm, and call out situations. Intended as supplement to what conditions shall be programmed into the PLC call out device.

10. All manuals and manufacturer information for all equipment and parts

11. Settings for all user programmable devices such as data recorders, PID loop controllers, VFD, etc.

12. Detailed bill of materials

13. Recommended service schedule

2.19 START-UP ASSISTANCE

A. Minimum of two days of service on-site by a qualified technician to perform installation verification, initial operation, and field training services. Additional days, if necessary to complete these tasks, to be at suppliers expense if delays are within suppliers control.

2.20 ENERGY RECOVERY DISTRIBUTION

A. The flare system shall be designed as an independent unit but must be capable of working in parallel with a future renewable energy project. The unit shall combust all the collected gas in the range specified and be capable of combusting all gas in excess of that which is used for renewable energy project in accordance with the provisions of the NSPS.

B. System shall include one of the following provisions to direct gas flow to an energy recovery project.

1. A tee and blind flange at the discharge of the blowers to accommodate the connection of a future renewable energy project and shall be of the same size as the blower discharge piping to the flare stack(s).
   a) Location of tee and blind flange to be such that future piping from the energy recovery plant would not impede operation of the flare or access to components on the skid.
   b) An additional flanged 18 inch long spool piece of pipe shall be installed after the tee noted above to allow for the installation of “future” control valves to allow for modulating gas flow to a future energy recovery system and to ensure that a minimum flow is combusted in the flare stack. The “future” control valves are not part of this project and need not be included in the bid price.
   c) 3-way butterfly control valves can be used if suitable to the flow control intended

2. Alternatively, a 3-way valve can be used to provide the necessary control.
   a) FlowTek Multi-port Flanged Ball Valve or equal
      1) 3 way
      2) ASME Class 150
      3) Stainless Steel

4) Full Port

5) Valve to be sized consistent with the discharge pipe of the blower.

6) 180 degree T-port (option J): straight through and proportional

b) Electro-Pneumatic Actuation

1) Actuator to include limit switches

3. The valves of either installation scenario (1 or 2) are to be controlled based on flow with flow limits established by inlet blower vacuum and minimum flow requirements of the flare stack.

C. The system shall be designed with a minimum flow rate directed to the flare to maintain system operation and compliance with the NSPS while the energy recovery system is operating.

D. Multiple flare stacks can be used to accomplish this goal if necessary. At a minimum, the flare system controls shall be designed for two modes of operation selectable on the PLC HMI panel:

1. Standalone flare operation

a) As described in Section 2.15

2. Energy recovery operation

a) This mode will include flow modulation to maintain a minimum flow to the flare to maintain compliance with the NSPS

b) Provisions to combust gas collected that is not being utilized by the energy recovery plant up to the maximum design capacity of the flare.

c) Provisions to interlock operational status of energy recovery project to flare operating status

PART 3 EXECUTION

3.01 FABRICATION

A. Electrical:

1. Electrical requirement shall conform to the latest edition of the National Electric Code.

2. Motor starters shall be furnished as part of the packaged system.

B. Welding:

1. All welding on pipe spools shall conform with ANSI B31-1.

2. Welders shall be certified and all necessary documentation shall be produced to OWNER on request.

3. All of the welds shall be verified by in-process inspection.

C. Piping:

1. All piping and piping fabrication shall be consistent with recognized industry standards.

2. All pipe flanges shall be ANSI 150# RF. Fabricated flanges are not acceptable.

3. Piping 2 inch and larger shall be butt welded.

4. All screwed piping shall have a minimum wall thickness of Schedule 80 pipe with 300# fittings. Close thread nipples or street ells shall not be used.

D. Cleaning:

1. Prior to testing and final assembly, all gas process piping shall be thoroughly cleaned. This shall be a proven method to remove foreign materials, corrosion products and mill scale.

2. All stainless steel piping shall be cleaned and filed with stainless steel files and wire wheels prior to welding. At no time shall stainless steel components come in contact with carbon steel cleaning devices.

E. Painting:

1. All carbon steel piping, vessels, mechanical equipment and pipe racks shall be painted per SSPC paint specification. Commercial sandblast per SSPL-SP6-63 to remove mill lacquer, corrosion products, mill scale and foreign material and received one coat (2 - 3) mils of heat-resistant inorganic zinc primer (gray).

2. Prior to cleaning and painting, all openings shall be plugged and all nameplates and glass shall be covered.

3. All coverings shall be removed when painting is complete.

4. Provide one gallon of each paint (i.e., high temperature and standard) used in construction (for field touch-up).

F. Preparation for Shipment:

1. Flanged connections shall be covered with a minimum 3/8" plywood and bolted in place.

2. Screwed connections shall be sealed with plastic covers.

3. Instruments vulnerable to shipping damage shall be removed and boxed for reinstallation at job site.

4. All ship loose items shall have weather resistant tags indicating item and serial number.

3.02 INSTALLATION

A. Install equipment according to manufacturer's written instructions and approved submittals.

B. Install ship loose equipment such as not to damage or impede successful operation of the unit.

3.03 FIELD QUALITY CONTROL

A. Manufacturer’s Field Services:

1. Supplier's or manufacturer's technician for equipment specified herein shall be present at job site or classroom designated by OWNER for man-days indicated (travel time excluded) for assistance during construction, startup, and training of OWNER'S personnel. Include minimum of:

a) 1 man-day for installation services.

b) 1 man-day for instructional services.

c) 1 man-day for post startup services.

2. Supplier or manufacturer shall direct services to system and equipment operation, maintenance, troubleshooting, and equipment and system related areas.

B. Functional Test:

1. Prior to system start-up, inspect for proper connection. Perform initial equipment startup and system adjustment in presence of, and with assistance of, equipment manufacturer's representative.

2. Conduct OWNER-witnessed field demonstration tests on completed systems to demonstrate ability to perform specified functions.

3. Test shall demonstrate functions and features of controls under actual operating conditions.

* * * END OF SECTION * * *

SECTION 26 40 00
LIGHTNING AND ELECTRICAL SURGE PROTECTION – FLARE STATION

PART 1 GENERAL

1.01 SUMMARY

A. This section provides specifications to minimize the potential of low and high voltage transient surges, which may damage electrical components, which may be located at blower/flare station. These surges are often caused by lightening or undependable utility service. A properly designed protection system shall control the lightning discharge to minimize personal injury or equipment damage.

1.02 REFERENCES

A. National Electric Code

B. Underwriters Laboratories UL 1283 and UL 1449

C. National Fire Protection Association (NEMA LS-1 1992 Peak Current Testing)

D. Institute of Electrical and Electronic Engineers (ANSI/EEE C62.11, C62.41, C62.45)

1.03 SUBMITTALS

A. Product Data: Provide equipment supplier information illustrating physical dimensions, voltage, suppressed voltage ratings, enclosure details, and warranty period and replacement terms.

B. Manufacturer's Installation Instructions: Provide information on storage and handling, and start-up procedures of equipment.

C. All material used shall comply with all requirements of NFPA UL and LPI for the class of system in which they are installed.

PART 2 PRODUCTS

2.01 ELECTRICAL GROUNDING

A. Grounding Rods:

1. ERITECH Model 613480 or equal.

2. Pointed grounding rod 8 feet long x 3/4-inch diameter.

B. Hammerlock Clips: ERITECH Model EHL34C1V or equal.

C. #4 Bare Stranded Copper Wire

PART 3 EXECUTION

3.01 ELECTRICAL GROUNDING

A. Install ground rods as shown on drawings.

B. Install grounding rods vertically and with top of rod length a maximum of 6 inches below ground.

C. Clip stranded copper wire to fence post, as applicable.

* * * END OF SECTION * * *

SECTION 31 20 00
TRENCHING, FILLING AND BACKFILLING

PART 1 GENERAL

1.01 REFERENCES

A. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lbf/ft3 (2,700 kN-m/m3)].

C. ASTM D2216 — Standard Test Method for determining water content of soil aggregate mixtures.

D. ASTM D2937 — Standard Test method for Density of Soil by the Drive Cylinder Method.

E. ASTM D6938 - 08a Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

F. Unified Soil Classification System.

G. ASTM D 422 – Standard Test Method for Particle Size Analysis of Soils

H. ASTM D 1140 – Standard Test Method for Amount of Material in Soils finer than the No. 200 Sieve

I. Standard Specifications for Public Works Construction, September 1986, Departments of Public Works, County of Kauai, City and County of Honolulu, County of Maui, County of Hawaii, of the State of Hawaii.

PART 2 PRODUCTS

2.01 GENERAL BACKFILL

A. Backfill material used for pipe support and coverage is subject to the approval of the CQAC and ENGINEER.

2.02 BACKFILL MATERIALS

A. Type 1 Gas Piping Backfill: Soil removed from a trench that is free of waste.

B. Type 2 Gas Piping Embedment: Soil with a maximum grain size of 1 inch.

C. Type 3 Flare Station and Storage Unit Subgrade: Compacted fill as specified in Section 3.07.

D. Type 4 Aggregate: Roadway bedding as specified in Section 3.08

E. If available, OWNER may provide on-site materials for use as backfill.

1. CONTRACTOR must have available source of material meeting the specifications if material from OWNER is not available.

2.03 SOURCE QUALITY CONTROL

A. Perform quality control planning and procedures to assure refuse is not incorporated into the backfill materials.

B. Coordinate source quality control program with CQAC.

PART 3 EXECUTION

3.01 PRECAUTIONS

A. Barricade open holes or trenches and other depressions occurring as part of the Work.

B. Operate warning lights during hours from dusk to dawn each day that trenches are left open.

C. Use means to control dust.

D. Maintain access to other portions of the Work at all times.

E. Mark all existing utilities in the area of maintenance shop prior to proceeding with trenching of electrical conduit.

3.02 PREPARATION

A. Layout line and grade of trench/fill as needed to provide a minimum 2 percent slope on the landfill gas system lateral pipes per drawings.

B. Slope lateral pipe down towards perimeter header pipe.

C. Layout line and grade of trench/fill as needed to provide slope on the landfill gas header to the slopes indicated on the drawings.

3.03 LATERAL PIPE TRENCHING/FILL

A. Trench/Fill as necessary to provide a minimum of 6 inches of soil below the lateral pipe invert elevation.

B. If it is necessary to remove refuse, trench to an elevation 12 inches of soil below the lateral pipe invert elevation.

C. Stockpile removed soil adjacent to the trench.

D. Load and haul excavated refuse to the active landfill working face.

1. CONTRACTOR must following all site requirements for the safe disposal of the material including any directions provided for where to dump.

3.04 LANDFILL GAS HEADER TRENCHING/FILL

A. Trench/Fill as necessary to provide a minimum of 6 inches of soil below the header pipe invert elevation.

B. Stockpile removed soil adjacent to the trench.

3.05 LATERAL BACKFILLING

A. Do not begin backfilling operations until all lateral pipe pressure testing, and other inspections have been completed and approved by the CQAC.

B. Do not compact or consolidate backfill by jetting with water.

C. Backfill with materials as indicated on the drawings and described in this Section.

D. Place and compact Type 2 embedment materials in a continuous layer not exceeding 9 inches compacted depth to the flow line of the lateral pipe and to a minimum slope parallel to the pipe of 2 percent.

E. Hand compact remaining Type 2 embedment around haunches and top of lateral pipe to an elevation at least 6 inches above the top of the lateral pipe.

F. Place and compact Type 1 backfill in equal continuous layers not exceeding 12 inches to the thickness and dimensions indicated on the Drawings.

G. Employ a placement method that does not disturb or damage lateral pipe.

3.06 HEADER BACKFILLING

A. Do not begin backfilling operations until all header pipe pressure testing, and other inspections have been completed and approved by the CQAC.

B. Do not compact or consolidate backfill by jetting with water.

C. Backfill with materials as indicated on the Drawings and described in this Section.

D. Place and compact Type 2 embedment materials in a continuous layer not exceeding 9 inches compacted depth to the flow line of the header pipe and to the pipe slope shown on the Drawings.

E. Hand compact remaining Type 2 embedment around haunches and top of header pipe to an elevation at least 6 inches above the top of the header pipe.

F. Place and compact Type 1 backfill in equal continuous layers not exceeding 12 inches to the thickness and dimensions indicated on the Drawings.

G. Employ a placement method that does not disturb or damage header pipe in trench.

H. Where Type 1 backfill is placed in areas under roadways compact to a minimum relative compaction of 92 percent as determined by ASTM 1557.

I. Maintain optimum moisture content of fill materials to attain required compaction density.

3.07 CLEARING AND GRUBBING

A. Prior to grading, the areas within the limits of structural excavation shall be stripped off all vegetation and the top at least 12 inches of soil containing roots, vegetation, and organic matter. Completely remove the surface clayey soil in structural areas.

3.08 SUBGRADE PREPARATION

A. After clearing, grubbing, excavating, and cleaning to the subgrade level and limits as indicated on the drawings, proof roll subgrade of structural areas including Flare Station and Storage Unit area with 8 passes of a roller weighing at least 20 tons. Proof rolling shall be done on a prepared subgrade free of surface water. Operate the roller in a systematic manner to ensure the number of passes over all areas, and at speeds between 2 to 4 miles per hour. Proof rolling of subgrade for Flare Station and Storage Unit shall extend at least 2 feet beyond the slab limits.

Proof rolling shall be performed in the full time presence of the Contractor's Quality Control Geotechnical Engineer. Yielding or pumping of material in the subgrade shall be undercut to firm material and replaced with properly compacted structural fill.

B. Prior to placing any structural fill, scarify the top of the proof rolled subgrade to a depth not less than 6 inch, moisture condition to within 2 percent of optimum moisture content, and compact to at least 95 percent relative compaction. Any soft or loose materials, or yielding or pumping areas observed in the subgrade that do not readily compact as specified herein shall be over excavate to a depth of at least 12 inch or as directed by the Owner and replace with additional structural fill material.

Relative compaction is defined as the dry unit weight of the compacted material expressed as a percentage of the maximum dry unit weight of the same material based on ASTM D1557 method.

After subgrade compaction and prior to placement of structural fill, the subgrade shall be lined with a woven geotextile. The geotextile shall overlap at least 2 feet along all joints.

C. Structural fill shall consist of materials classified as GW, GW-GM, GP-GM, SW, or SW-SM by ASTM D2487 where indicated. The maximum particle size shall be 3 inches. The liquid limit of such material shall not exceed 25 percent when tested in accordance with ASTM D4318. The plasticity index shall not be greater than 10 percent when tested in accordance with ASTM D 4318, and not more than 15 percent by weight shall be finer than a No. 200 mesh sieve when tested in accordance with ASTM D1140. At 0.1 inch penetration, the California Bearing Ratio shall be at least 30 percent when compacted at optimum moisture content at 95 percent relative compaction as determined in accordance with ASTM D1883 for a laboratory soaking period of not less than 4 days. Maximum expansion shall be one percent.

D. Place structural fill in loose horizontal lifts of not more than 8 inches in thickness. Do not place material on surfaces that are muddy. Compact each lift of fill with equipment well suited to the fill being placed. Moisture condition material to within 2 percent of its optimum moisture content. Compact each lift to at least 95 percent relative compaction before placing the overlying lift. Compaction shall be accomplished continuously over the entire area. Sufficient passes shall be made to ensure that specified density is obtained.

The excavation should extend at least 24 inches beyond the edge of the slab. A subgrade modulus of 250 pounds per square inch per inch (psi/in) may be used for slab supported on properly compacted subgrade and select granular fill.

E. Select granular fill shall consist of crusher run waste, mud-rock, coral, sand, or cinders. The material shall be free of organic matter and other deleterious substances and shall have a minimum California Bearing Ratio value of 25 percent.

F. The maximum size of any particle in its greatest dimension shall not exceed 3 inches. The material shall be well graded so as to form a dense compacted layer. The amount of material passing the 200 mesh sieve shall be less than 15 percent.

3.09 AGGREGATE

A. Material shall conform to Section 31 of the Standard Specifications for Public Works Construction, September 1986, Department of Public Works, County of Kauai.

B. Aggregate shall consist of crushed product of stone or coral. The material shall be free of organic matter and other deleterious substances and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable base.

C. CONTRACTOR to get approval from OWNER prior to using material for road bases. OWNER may direct CONTRACTOR to use specific material to conform to existing conditions.

D. Aggregate used for asphalt road base shall be 1.5 inch maximum gradation.

E. Compaction should be 95% of ASTM D1557.

3.10 QUALITY CONTROL TESTING

A. All quality control testing is the responsibility of the Contractor and shall be performed at no additional cost to the Owner.

B. Testing

1. Perform one of each of the following tests for each material used. Provide additional tests for each source change.

a) Test on-site subgrade soil in accordance with ASTM D1557 for moisture density relations.

b) Test structural fill in accordance with ASTM C136 for conformance with ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D1557 for moisture density relations; and ASTM D1883 for California Bearing Ratio.

c) Field In-Place Dry Density and Moisture Content Test

1) One test per 200 square feet, or fraction thereof, of subgrade and each lift of structural fill for slabs, but not less than one test per structure.

2) Field in-place dry density shall be determined in accordance with ASTM D1556 or ASTM D6938. If ASTM D6938 is used to test in-place density, verify test results by performing at least one test per day using ASTM D1556 at location already tested with ASTM D6938. Perform at least one additional test using ASTM D1556 for every ten tests performed with a nuclear device, at locations checked in accordance with ASTM D6938.

2. When test results indicate that compaction is not as specified, the material shall be recompacted to meet specification requirements. Tests on recompacted areas shall be performed to determine conformance with specification requirements.

3. Submit field dry density and moisture content test results within 48 hours of test date. Furnish a plan showing test locations, test number, test elevations, and test results.

3.11 QUALITY ASSURANCE

A. The CQAC may perform soil sampling, and compaction testing during placement of backfill materials.

B. Cooperate fully with the CQAC in performance of their sampling and testing.

* * * END OF SECTION * * *

SECTION 40 10 00.1
POLYETHYLENE PIPE

PART 1 GENERAL

1.01 REFERENCES

A. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.

B. ASTM D696 – Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between –30 degrees C and 30 Degrees C With a Vitreous Silica Dilatometer.

C. ASTM - D748 - Standard Specification for Natural Block Mica and Mica Films Suitable for Use in Fixed Mica-Dielectric Capacitors.

D. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

E. ASTM D1238 - Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.

F. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable.

G. ASTM D1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique.

H. ASTM D1525 - Standard Test Method for Vicat Softening Temperature of Plastics.

I. ASTM D1603 - Standard Test Method for Carbon Black In Olefin Plastics.

J. ASTM D1693 - Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.

K. ASTM D2240 - Standard Test Method for Rubber Property—Durometer Hardness.

L. ASTM D2657 - Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.

M. ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

N. ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.

O. ASTM D3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

P. ASTM D3350 — Specification for Polyethylene Plastics Pipe and Fitting Materials.

Q. ASTM F714-08 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

1.02 DEFINITIONS

A. Standard Dimensional Ratio (SDR) is defined as the actual outside pipe diameter divided by the wall thickness.

1.03 SUBMITTALS FOR INFORMATION

A. Prior to fusion welding submit a list of those individuals certified for polyethylene pipe fusion welding with copies of their current certificates.

1.04 SUBMITTALS FOR REVIEW

A. Submit pipe and fittings product data and manufacturer's quality control data demonstrating material complies with Part 2 of this Section.

1.05 DELIVERY, STORAGE AND HANDLING

A. Exercise care during loading, transit, and unloading to prevent damage by abrasion or puncturing, or both.

B. Store HDPE pipe with support to prevent developing a permanent set.

C. Stack the heaviest series of HDPE pipe on the bottom.

D. Stack HDPE pipe no more than eight layers high or consistent with the Manufacturer's recommendations.

E. Document HDPE pipe damaged during transportation, loading, unloading, delivery or storage. Set damaged pipe aside and do not install. Provide documentation of damage to OWNER.

F. Replace HDPE pipe damaged during delivery, storage or handling.

G. CONTRACTOR may not weld and drag along the ground more than 1000 feet of pipe during construction.

PART 2 PRODUCTS

2.01 HPDE PIPE AND FITTINGS

A. All pipe sizes indicated on the Drawings and specified in this Section reference nominal diameter, unless otherwise in this Section.

B. Provide pipe conforming to the requirements of ASTM D3035 and the following:

Property	Test Procedures	Unit	Required Values
Material Designation	Plastic Pipe Inst	—	PE4710
Cell Classification	ASTM D3350	—	345464C
Pipe Properties			
Density	ASTM D1505	gm/cm3	min. 0.955 (black)
Melt Index	ASTM D1238	gm/10 min.	≤0.15
Hydrostatic Design Basis73°F (23°C)	ASTM D2837	Psi	min. 1,600
Hydrostatic Design Basis 140°F (60°C)	ASTM D2837	Psi	min. 800
Material Properties			
Flexural Modules	ASTM D790	Psi	min. 110,000
Tensile Strength	ASTM D638 Type IV	psi	min. 3,200
Elastic Modulus	ASTM D638	Psi	>150,000
Shore Hardness	ASTM D2240	Shore D	min. 62
Environmental Stress Crack (PENT)	ASTM F1473	HRS	>100

Property	Test Procedures	Unit	Required Values
Thermal Properties			
Vicat Softening Temperature	ASTM D1525	°F	256
Brittleness Temperature	ASTM D746	°F	103
Thermal Expansion	ASTM D696	in/in/°F	1.0×10^{-4}

C. Containing no recycled compound except that generated in the manufacturer's own plant and from resin of the same specification as the raw material supplier.

D. Resin for pipe and fittings listed by both N.S.F. and P.P.I. and manufactured in accordance with ASTM F714.

E. Homogeneous throughout and free of visible cracks, holes, foreign inclusions, or other injurious defects.

F. Uniform in color, capacity, density, and other physical properties.

G. Provide the following information continuously marked on the pipe or spaced at intervals not exceeding 5 feet.

1. Name and/or trademark of the pipe manufacturer.
2. Nominal pipe size.
3. Standard Dimensional Ratio (SDR).
4. PE 4710
5. Manufacturers Standard Reference.
6. A production code from which the date and place of manufacturer can be determined.

2.02 PIPE COUPLINGS AND FITTINGS

A. Provide HDPE blind flange adapters, molded stub ends, molded end caps and other fittings in accordance with the drawings and manufactured from the same resin as the pipe.

2.03 FABRICATED FITTINGS

A. Provide fabricated or molded fittings as indicated on the Drawings.

PART 3 EXECUTION

3.01 PLACING AND LAYING PIPE

A. Follow the manufacturer's recommendations when hauling, unloading, and stringing the pipe.

B. Do not push or pull pipe and fittings over sharp projections, or drop, or have objects dropped on the pipe.

C. Inspect for defects before installation.

D. Remove any pipe showing kinks, buckles, cuts, gouges, or any other damage that in the opinion of the CQAC will impact pipe performance.

E. Replace pipe found to be defective with pipe that meets specifications.

F. Carefully lower pipe and accessories into place by means of derrick, ropes, belt slings, or other equipment that will not damage the pipe.

G. Rest the full length of each section of pipe solidly upon Type 2 embedment. Grub area along pipe if necessary to ensure that pipe attains designed slope.

H. Grade control equipment shall maintain design grades and slopes during installation of pipe.

I. Dewatering: Remove standing water in trench before pipe installation.

J. Coordinate construction of header lines near access roads with OWNER to limit impediment of normal landfill operations.

K. Maximum lengths of fused pipe to be handled as one section shall be placed according to manufacturer's recommendations as to pipe size, pipe SDR, and topography so as not to cause excessive gouging or surface abrasion; but not to exceed 1000 ft.

L. Cap pipe sections longer than single joint (usually 40 ft) on both ends during pipe pulling.

3.02 FUSION WELDING PIPE

A. Allow only fully trained personnel to perform the welding, installation, supervision, or inspection of welded polyethylene pipe and fitting joints.

B. Training: Provide manufacturer/supplier training of personnel assigned to fusion welding of pipe and fittings.

C. Join the polyethylene pipe by the method of thermal butt or side wall fusion, outlined in ASTM D2657, and ASTM D3261.

D. Perform fusion joining of pipe and fittings in accordance with the procedures established by the pipe manufacturer. Of particular importance is the use of proper interface pressures and heater plate temperatures.

E. Use fusion pressures, temperatures, and cycle times according to pipe manufacturer's recommendations.

F. Do not perform pipe fusion in water or when trench conditions are unsuitable.

G. Keep water out of the trench until joining is completed.

H. Secure open ends of pipe when work is not in progress, so that no animals, water, soil, refuse, or other substance enters the pipe.

I. Plug or cap pipe ends left for future connections.

J. Clear welding and grade sites, if necessary, to provide enough space for pipe storage and fusion.

K. Keep the site free of rocks, stumps, and debris that could cut, scar, or gouge the pipe.

L. In order to allow the joining operation to continue in adverse weather conditions, a shelter may be required for the joining machine.

M. Particular caution should be exercised to prevent water from entering the pipe and from coming in contact with the heater plate.

N. Clean interior of pipe of all shavings and other debris.

O. Butt fusion equipment for joining procedures shall be capable of meeting conditions recommended by pipe manufacturer including, but not limited to, temperature requirements, alignment, and fusion pressures.

P. For cleaning pipe ends, solutions such as detergents and solvents, when required, shall be used in accordance with manufacturer's recommendations.

Q. Do not bend pipe to greater degree than minimum radius recommended by manufacturer for type and grade.

R. Do not subject pipe to strains that will overstress or buckle piping or impose excessive stress on joints.

3.03 FLANGE JOINTING

A. Use on flanged pipe connection sections.

B. Connect slip on carbon steel backup flanges with nuts and bolts. Convoluted ductile iron backup rings may be substituted for joining HDPE pipes per manufacturer's recommendations.

C. Butt fuse fabricated flange adapters to pipe.

D. Observe following precautions in connection of flange joints.

1. Align flanges or flange/valve connections to provide tight seal. Nitrile gaskets are required for flange/valve connections.

2. Place U.S. Standard round washers as may be required on some flanges in accordance with manufacturer's recommendations. Bolts shall be lubricated in accordance with manufacturer's recommendations.

E. Tighten flange bolts in sequence and accordance with manufacturer's recommendations. Do not over torque bolts.

F. Pull bolt down by degrees to uniform torque in accordance with manufacturer's recommendations.

G. Protect nuts, bolts, washers and backup ring with spray cold galvanizing compound (Bowman Galvcoat or equivalent).

3.04 PRESSURE TESTING PIPE

A. Pressure test all new sections of HDPE pipe in accordance with Section 02900 - Testing HDPE Piping Systems.

B. Test piping before connecting to gas wells or existing gas collection systems.

3.05 CONNECTION OF PIPING TO GAS COLLECTION SYSTEM

A. After successfully completing pressure testing, connect new piping to new gas wells and gas collection system.

B. Use fusion welding (preferred), electrofusion couplings, or flanged connections to complete connections.

* * * END OF SECTION * * *

SECTION 40 10 00.2
LANDFILL GAS EXTRACTION WELLS AND WELLHEADS

PART 1 GENERAL

1.01 DEFINITIONS

A. Bottom Liner Elevation: The as-constructed elevation of the primary geomembrane bottom liner system or bottom of solid waste in areas where new gas wells are proposed.

1.02 OWNER PROVIDED INFORMATION

A. Record drawings showing the bottom liner system or bottom of solid waste.

Record information showing the record location of buried utilities in the area of the work.

1.03 SUBMITTALS

A. Product Data: 10 days prior to installing the following Products, provide ENGINEER with the following information.

1. 40 pound sample of filter pack (3/4" to 2" angular to sub-angular crushed volcanic basalt)

2. Test results for filter pack showing that proposed gravel meets specified requirements.

3. Catalog cut for the proposed bentonite backfill.

4. Shop drawing of proposed centralizer.

1.04 DELIVERY STORAGE AND HANDLING

A. Deliver, store and handle all materials in accordance with the manufacturers' recommendations and to protect the materials from damage.

1.05 FIELD QUALITY CONTROL

A. Pipe will be rejected by CQAC if it fails to conform to Specifications, or if it is found to meet the following conditions:

1. Fractures or cracks pass through pipe wall, except a single crack not exceeding 2 inches in length at either end of pipe that can be cut off and discarded. Pipes from the same lot or within one shipment to the site of the cracked pipe will also be rejected if defects exist in more than 5% of any shipment or delivery to the site.

2. Cracks sufficient to impair strength, durability or serviceability of pipe.

3. Defects indicating improper polyethylene proportioning, mixing, and molding.

4. Damaged ends, where such damage prevents making satisfactory joint.

B. CQAC will accept pipe, fittings, stubs or other specifically fabricated pipe sections based on visual inspection at job site.

PART 2 PRODUCTS

2.01 EARTHFILL FOR DRILLING PADS

A. Obtain from on-site sources designated by OWNER if available. CONTRACTOR is responsible for obtaining material from outside sources if not available from OWNER.

B. Do not use existing soil cover for drilling pad construction

2.02 CPVC PIPE WELL CASING

A. Schedule 80 CPVC conforming to ASTM D 1784, ASTM F 441 (for pipe), and ASTM F 439 (for fittings).

B. Perforations: hole perforations in accordance with the Drawings.

C. Manufactured from a compound which meets the requirements of Type 4, Grade 1, Chlorinated Polyvinyl Chloride CPVC 4120, Class 23447, as outlined in ASTM D 1784.

D. Compound from which pipe is produced: design stress rating of 2000 psi at 73 degrees F, listed by the Plastic Piping Institute.

E. Materials from which pipe and pipe fittings are manufactured: tested and approved by NSF International.

F. Conforming to the requirements of ASTM F 442.

G. Homogenous throughout and free from cracks, holes, foreign inclusions, and other defects.

2.03 CPVC PIPE STORAGE:

A. Store or stack so as to prevent damage by marring, crushing, or piercing.

B. Maximum stacking height: 6 feet.

C. For storage over 5 days, chose a location out of direct sunlight, or cover the pipe and fittings.

2.04 PRE-FABRICATED WELLHEADS

A. CONTRACTOR shall supply a complete pre-fabricated wellhead meeting all functional performance requirements as shown on the Drawings. The wellhead shall be orifice plate style.

1. Supplier shall be:
   a) LFG&E
   b) QED Environmental Systems,
   c) Or equivalent

2. Contractor to provide cost of low flow (fine control) gas extraction wellheads in addition to standard 2 inch diameter wellheads offered by supplier.

3. OWNER will approve wellhead (low flow or standard) prior to purchase by CONTACTOR.

4. CONTRACTOR to provide the following orifice plate sizes suitable for use in the wellheads provided:

Size	Quantity
0.5 inch	20
0.75 inch	20
1.0 inch	60
1.25 inch	20
1.4 inch	20

a) No hand fabricated plates are to be used – each must be commercially available from the supplier of the wellhead.

b) Materials of construction to be suitable for landfill gas service and be free from warping or other defects that could cause inaccurate flow measurement.

2.05 GAS WELL SOIL BACKFILL AND SOIL FOR DRILLING PADS

A. Use on-site soil from borrow source designated by OWNER. If insufficient material is available, CONTRACTOR must have an outside source of materials meeting the specifications.

2.06 BENTONITE BACKFILL

A. Provide granular sodium bentonite approved during submittal process.

2.07 FILTER PACK

A. Washed angular to sub-angular crushed volcanic basalt – No.2.

B. Material shall be free from vegetable matter and other deleterious substances both upon receipt and stockpiling of material at the project site and during installation.

C. Low carbonite content. No coral based aggregates are allowed.

D. Meeting the following gradation

U.S. Sieve Size	**Percent Passing By Weight**
2.5 - inch	100
2 - inch	90 - 100
1.5 - inch	0 - 15
¾ -inch	0

PART 3 EXECUTION

3.01 VERIFICATION SURVEY

A. Prior to drilling, CONTRACTOR is to verify drill depth and distance from bottom liner via survey. Offset survey stakes marking a well's location shall be clearly marked as such to avoid drilling in the wrong location.

B. Following drilling pad construction (if any), well shall be resurveyed to verify the horizontal and vertical location of each proposed gas well.

C. Compare that data to survey data provided by OWNER and drawings.

D. Verify the following:

1. The horizontal position of the gas well boring is within one foot of the OWNER's data, within one foot of data written on OWNER's survey stake, and within one foot of data provided on gas well schedule.

2. Verify that the total depth of well boring as indicated on gas well schedule will result in a boring that terminates at the designed distance above the bottom liner system. Make this verification by comparing the surveyed elevation of the proposed well boring at existing ground surface to the as-constructed bottom liner elevation where the bottom of the well boring is terminated at the same horizontal coordinates as the top of the well.

E. Present verification data to ENGINEER and CQAC. Do not start drilling until ENGINEER concurs that OWNER's survey data and CONTRACTOR's survey data both confirm that the planned depth of well boring will terminate the designed vertical distance above the bottom liner.

3.02 DRILLING PAD CONSTRUCTION AND ACCESS ROAD CONSTRUCTION

A. Construct drilling pads as needed to provide a stable location for a drill rig to complete vertical well borings.

B. Use existing access roads to access boring locations. Do not construct or grade new access roads, unless approved by OWNER.

3.03 WELL DRILLING

A. Drill borings at the locations determined by ENGINEER and verified by CONTRACTOR.

B. Dimensions:

1. Drill well borings to the dimensions shown on the drawings.

2. Drill no closer than the designed vertical distance above the bottom liner system, unless approved in writing by OWNER.

C. Do not use drilling muds or liquids to aid in the drilling process.

D. Drill borings vertical with a tolerance to vertical of less than 2 degrees.

E. Obstructions and Saturated Conditions:

1. Make reasonable efforts to drill through obstructions and saturated conditions. If an impenetrable obstruction is encountered, cease drilling and notify ENGINEER and CQAC immediately.

2. If wet conditions are encountered, the boring may be terminated and the length of perforated pipe adjusted by ENGINEER, or the well may be relocated. If wet conditions cease (e.g., due to trapped water layer), continue drilling to design depth.

3. Do not abandon borings unless approved in writing by OWNER.

F. Boring Abandonment and Re-drilling

1. Measure and record depth of incomplete borings.

2. Backfill incomplete boring with drill cuttings or soil from borrow source designated by OWNER if available. CONTRACTOR is responsible for obtaining outside source if none is available from OWNER.

3. Drill at new location designated by ENGINEER. Do not drill at new location until ENGINEER has provided design depth in writing to CONTRACTOR.

4. Compensation: OWNER will pay for re-drilling and boring abandonment only with written approval of ENGINEER. Compensation will be based on a Work Change Directive or subsequent Change Order.

G. Re-drill collapsed borings at no additional cost to OWNER.

H. Provide secure, vandal-proof covers and supply safety precautions around and over all incomplete borings.

1. CONTRACTOR is to ensure that all personnel working within 10 feet of the bore are harnessed.

2. CONTRACTOR to provide work area security to keep unauthorized personnel out of the work zone.

a) This can include barriers, tape, or other such devices.

I. As soon as drilling is completed, place a safety screen over the boring. Maintain screen in place until backfilling is within at least 4 feet of ground surface.

J. Safety screen size

1. Overall dimensions: Large enough to cover entire boring and have perimeter of grate resting on stable ground.

2. Grate dimensions: large enough to accommodate all backfill materials and any tools used during backfill yet not large enough for a human to fall through the screen.

K. Do not proceed with pipe installation or backfill until CQAC verifies completed depth and checks boring for moisture infiltration, such as leachate.

3.04 REFUSE DISPOSAL

A. Load, haul, and dispose of refuse from well drilling operations at the active landfill working face at the direction of the OWNER.

1. CONTRACTOR shall provide all labor and equipment to complete this task.

2. CONTRACTOR shall follow all directions provided as to location for dumping and shall follow all safety and site disposal protocols for dumping.

3. Approximately 685 cubic yards of material from drilling operations must be properly managed.

3.05 ASBESTOS MANAGEMENT PLAN

A. Asbestos may be encountered during drilling, especially in Phase I. Every effort has been made to locate extraction wells in Phase II in areas where asbestos was not landfilled, however, CONTRACTOR is to be aware that early records (prior to 2000) are not available and should take appropriate precautions when drilling in Phase II.

B. CONTRACTOR shall prepare an asbestos management drilling plan for the landfill prior to conducting any drilling work.

1. The following company is recommended, however, CONTRACTOR can use an equivalent firm to provide the plan.

   a) Daniel P. Ford, P.G.
   Vice President, Pacific Region
   Bureau Veritas North America, Inc.
   Health, Safety, and Environmental Services
   ISO 9001:2008 Certified
   841 Bishop Street, Suite 1100, Honolulu, Hawaii 96813
   phone: 808.543-6116 cell: 808-479-3454 fax: 808.537-4084
   Dan.ford@us.bureauveritas.com
   Todd.sakuda@us.burearuveritas.com

2. The Asbestos Drilling Plan shall address the following minimum content:
   a) Health and Safety
   b) Monitoring Requirements
   c) Notification
   d) Record-keeping
   e) Training

C. The asbestos management drilling plan must be prepared and submitted to VENDOR a minimum of 90 days prior to the start of drilling to allow for VENDOR to submit a notification to the Department of Health (DOH) prior to the regulatory required 45 days.

1. VENDOR will notify CONTRACTOR when it has received approval from DOH and CONTRACTOR can commence drilling

D. CONTRACTOR must familiarize itself with the asbestos management disposal plan developed by VENDOR.

1. "Asbestos Management & Disposal Plan, Kekaha Municipal Solid Waste Landfill – Phase II, March 2010" found in Section I, Part B, Appendix A of the Operations Manual for Kekaha Landfill.

E. CONTRACTOR to provide a separate cost for handling asbestos waste.

F. CONTRACTOR to provide immediate notification to OWNER and VENDOR if asbestos is found.

1. CONTRACTOR to have qualified personnel on-site during drilling operations to identify asbestos material.

2. CONTRACTOR will implement the asbestos management drilling plan and in cases where asbestos is located implement the asbestos disposal plan.

3. CONTRACTOR to dispose of asbestos waste material only in locations specified by VENDOR and in accordance with the Asbestos Management & Disposal Plan.

4. CONTRACTOR must also implement control measures as specified in the DOH approved drilling plan including but not limited to wetting the waste, personal protection equipment and any associated monitoring as specified in the plan.

3.06 CASING PIPE FABRICATION AND INSTALLATION

A. Assemble the solid-wall and slotted-wall well casing pipe as shown on Drawings.

B. Install casing in boring with the bottom cap placed at depth shown on drawings and centered in the well boring.

C. Verify that top of pipe casing is at design elevation.

3.07 FILTER PACK PLACEMENT

A. Determine top elevation of filter pack based on the length of perforated casing and the dimensions shown on the drawings.

B. Start placing filter pack immediately after the well casing has been installed, is centered in the well boring, and the top elevation of filter pack is determined.

C. Install to the vertical dimensions based on the length of perforated casing and the dimensions shown on the Drawings.

D. Use an end-discharge loader bucket or other device that allows pouring the filter pack aggregate into the boring in a stream not exceeding the width of the boring.

E. Do not damage well pipe during filter pack placement.

F. During filter pack installation, verify its top elevation to assure it covers all of the perforated casing as shown on the Drawings.

3.08 BENTONITE SEAL INSTALLATION

A. Install bentonite chips to the vertical dimensions shown on the drawings.

B. Hydrate the bentonite by pouring water down the boring.

3.09 SOIL BACKFILL

A. Immediately following bentonite hydration, place the soil backfill.

B. Material used for backfilling well shall be approved by ENGINEER and if deemed insufficient to limit air intrusion down the well bore (too porous), shall be augmented by CONTRACTOR with concrete slurry, bentonite, or other such material that reduces the materials porosity.

3.10 FINAL COVER RESTORATION

A. Backfill the boring around well casing to match original ground surface elevation.

B. Use soil materials and construction methods consistent with construction of the existing cover.

C. Geosynthetics Repair:

1. Repair geosynthetics with materials equivalent to existing geosynthetics.

2. Extrusion weld geomembrane patches to existing geomembrane.

3. Use vacuum box non-destructive testing to evaluate seam quality. Repair or replace seams that exhibit leakage.

4. Perform geosynthetics repair only when CQAC is present to observe work. Cooperate with CQAC to allow quality assurance activities to be performed.

3.11 PHASE I GAS VENTS

A. Abandon select vents as depicted on drawings

B. CONTRACTOR to use caution when cutting vent pipe at specified height because of the likely presence of combustible gas.

1. Use of a pig or other measure to block gas flow during modification or render the work safe is an acceptable method of minimizing hazard.
   a) CONTRACTOR to ensure pig is removed after completing the vent modification.
2. CONTRACTOR to ensure that all safety precautions are in-place prior to starting this work including conducting any monitoring or other such measures to establish that area is a safe working environment
3. Existing vents are 4 inch HDPE pipe that transitions to 4 inch galvanized steel. The vents are supported by guy wires.
4. Concrete base of vents to remain in place.

C. CONTRACTOR to install wellheads on select wells using suitable adapters to transition from 4" existing vent pipe to wellhead.

D. CONTRACTOR to review "Postconstruction Report, Kekaha Sanitary Landfill, Phase I Closure" (1996) prepared by Harding Lawson Associates for existing vent system details.

3.12 WELLHEADS

A. Install wellheads as shown on Drawings.

B. Make connections from the wellhead to the lateral as shown on Drawings.

C. CONTRACTOR is responsible for ensuring that wellheads are secured tightly to the well casing and header piping

1. CONTRACTOR to provide all adapter fittings necessary to connect the wellhead to the well casing and header piping

3.13 WELL CONSTRUCTION LOGS

A. Prepare detailed well logs and construction diagrams for all completed vertical wells.

B. Include the following minimum information on the well log:

1. Northing, easting and elevation at top of well casing;
2. Total depth of boring below ground surface, and bottom elevation of boring;
3. Static water level, if encountered;
4. Length of installed slotted and solid wall well casing;
5. Waste Characteristics;
   a) Composition (household refuse, soil, construction debris, etc.), including dates from any readable material;
   b) Degree of decomposition;
   c) Degree of saturation;
   d) Depth, thickness, and description of soil or waste strata, and the occurrence of any water bearing zones; and
   e) Approximate depth of noticeable change in waste composition, degree of decomposition, and degree of saturation.

6. Submit well logs to CQAC at the end of each work day, and at the completion of each well.

3.14 DRILLING PAD REMOVAL

A. Excavate drilling pad soil and transport to an on-site stockpile designated by OWNER if available. CONTRACTOR responsible for supplying material from outside source if not available from OWNER.

B. Alternatively, spread drilling pad soil evenly over area around gas well, if approved by OWNER.

C. Re-grade area around gas well to match surrounding ground and to provide positive drainage.

* * * END OF SECTION * * *

SECTION 40 10 00.3
TESTING HDPE PIPING SYSTEMS

PART 1 GENERAL

1.01 REFERENCES

A. ASTM F2786 - 10 Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Gaseous Media Under Pressure (Pneumatic Leak Testing).

PART 2 PRODUCTS

2.01 PRESSURE TESTING EQUIPMENT

A. Air compressor capable of supplying adequate pressure for testing.

B. Regulator set to avoid over-pressurizing and damaging otherwise acceptable piping.

C. Polyethylene flange adaptor with PVC blind flange(s) and/or HDPE cap(s).

D. Temperature gauge (0°C to 100°C) tapped and threaded into blind flange or cap.

E. Pressure gauge (0 to 15 psi and 0 to 40 psi).

F. Tire valve to facilitate air pressure hose.

G. Ball valve to release pipe pressure at test completion.

H. Polyethylene reducers to be used to adapt test flange to size of pipe being tested.

I. Bulkheads, flanges, valves, bracing, blocking or other temporary sectionalizing devices as required.

J. Provide verification and results of gauge calibration that was performed less than 60 days before the testing, and again after testing.

PART 3 EXECUTION

3.01 SEGMENTAL TESTING

A. Notify ENGINEER and CQAC a minimum of 8 hrs prior to test.

B. Allow pipe to reach constant or ambient air temperature before test.

C. Perform test during time of day when pipe temperature will not fluctuate significantly during test period due to sun exposure, ambient temperature changes, etc.

D. Clean pipe section to be tested to be free of dirt or other foreign material.

3.02 TEST PROCEDURE

A. Plug pipe outlets with test plugs or sectionalizing devices.

B. Brace each plug securely to prevent blowouts.

C. Add air slowly.

D. Test pressure for each segment: 5 psi min.

E. Observe test pressure for 1 hr.

F. Perform calculations to correct pressure drop for temperature.

G. Maximum pressure drop over 1 hr period with temperature correction: 1% maximum.

H. Release pressure slowly after test is complete.

I. Remove temporary plugs and sectionalizing devices after test is complete.

3.03 TEST FAILURE

A. Perform the following when a pipe segment fails a pressure test.

1. Check entire length of pipe and all welds for cracks, pinholes, perforations or other possible leakage points.

2. Check blocked risers and capped end for leakage.

3. Verify leaks by applying soapy water solution with pipe under pressure and observe for bubble formation.

B. Repair pipe and fused joint leaks by cutting out leaking area and re-weld suitable segments, or repair by other methods approved by CQAC.

C. Retest after leaks are repaired.

3.04 TEST REPORTING

A. Document each test in writing on form approved by OWNER.

B. Include the following information:

1. Location, length, diameter, and type of tested pipe segment.

2. Test results.

C. Include the following information if failure occurs.

1. Location of failed segment.

2. Nature of leaks.

3. Details of repairs performed.

4. Retest results.

D. Submit test report documentation to CQAC within 24 hours of test.

* * * END OF SECTION * * *

SECTION 40 10 00.4
CONDENSATE SUMPS

PART 1 GENERAL

1.01 SYSTEM DESCRIPTION AND SUMMARY

A. Use this specification to provide proper condensate management sump, pump, monitoring and control system.

B. Designed and constructed to operate as a complete unit to minimize installation and start-up time.

C. Completely fabricated, assembled, pre-wired, and tested (functional wiring check, simulated operation, proper operation of all safety systems, etc.) prior to shipment.

1.02 DESIGN REQUIREMENTS

A. Design system to manage condensate in the presence of landfill gas.

1. Typical Landfill Gas Composition:
   a) 40% to 60% methane.
   b) 30% to 50% carbon dioxide.
   c) <100 ppmv hydrogen sulfide.
   d) Less than 2000 ppm volatile organic compounds.

B. Design for ambient air temperatures ranging from 40^0F to 110^0F.

C. Maximum anticipated wind velocities up to 110 mph.

D. Zone 1 seismic classification

E. Electricity: 480 VAC/3 phase/60 Hz

F. Area Classification: Class 1, Division 1. Intrinsically safe barriers in place.

G. The OSHA Lockout/tagout guidelines need to be included in all energy storage devices. The design shall include the ability to shut off, neutralize, or isolate any energy source.

H. Designed to operate in presence of vacuum up to 40 inches water column.

1.03 REFERENCES

Latest editions of codes and guidelines published by National Fire Protection Association (NFPA), Occupational Safety and Health Administration (OSHA), National Electrical Manufacturers Association (NEMA), and National Electric Code (NEC)

1.04 SUBMITTALS

A. Shop Drawings:

1. Within two (2) weeks after system fabrication, submit Drawings of equipment offered with detailed description of operation including following:
   a) Outline dimensions.
   b) Electrical schematics.

c) External and internal connection diagrams showing door-mounted items, incoming and outgoing contacts, and terminals as specified.

d) Integrated terminal to terminal wiring, schematic and composite electrical diagrams including control interconnection diagrams of entire system assemblies, including:

1) Elementary schematic diagram.

2) Wiring and interconnecting diagram.

3) Bill of material listing components.

e) Identification of manufacturer's standard or optional equipment.

B. Documentation:

1. Contractor shall supply the following documentation.

a) A project schedule showing the major activities with their commencement dates and projected completion dates shall be issued to OWNER within two (2) weeks after flare system is ordered by CONTRACTOR.

b) Weekly written progress reports shall be issued to OWNER starting from date of order by CONTRACTOR to include:

1) Project schedule status

2) Scheduling problems

3) Possible delays

4) Deviations from initial schedule

c) Within four (4) weeks after order is placed by CONTRACTOR, three (3) sets of prints of the following should be submitted to OWNER and ENGINEER for review and comments:

1) Equipment specification sheets

2) Preliminary P&ID

3) Control logic

4) Elevation and plan drawings with customer connections certified dimensionally correct (before issuance for shop fabrication).

5) Electrical wiring diagrams

6) Control panel layout with name plate wording

d) Within three (3) weeks after the system fabrication is complete the CONTRACTOR shall submit to ENGINEER and OWNER three (3) sets of "as-built" drawings with all revisions noted, certified, and dated.

C. Operation and Maintenance (O&M) Data:

1. Five (5) Operation and Maintenance manuals per system shall be provided at the time the system is ready to ship and shall include the following information:

a) Catalog descriptions of all equipment utilized in the system as well as performance criteria for the operation conditions.

b) Recommended spare parts lists for all equipment, to include part name, manufacturer, part number, cost and supplier, etc.

c) Operating instructions for the entire unit under the conditions for which it was designed, including:

1) System start-up and shutdown procedures

2) Preventative maintenance schedule

3) Operating and safety procedures

4) Maintenance procedures

d) Certified copies of asbuilt drawings issued to OWNER and ENGINEER.

e) Troubleshooting instructions.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Conform to all federal, state, and local requirements.

PART 2 PRODUCTS

2.01 DESIGN

A. Each SurePump Vertical Sump Drainer shall be capable of pumping landfill gas condensate. A level sensor mount shall be welded to the side of the Sump Drainer for liquid level control. The Sump Drainer shall permit "pump down" to within 6 inches of the sump or wet well bottom without any loss of performance or damage to the pump. External "priming" shall not be required nor allowed. The Sump Drainer shall be equipped with a vent valve to assist with the evacuation of air from the Sump Drainer.

2.02 MATERIALS

A. Major components shall be made of 316 stainless steel. The seal rings and bearings are to be made of E-Glide™. In addition, all fasteners shall be 316 stainless steel.

2.03 CHECK VALVE

A. Each unit shall include a built-in check valve with non-metallic seat, and housing and disc of 316 stainless steel.

2.04 SHAFT

A. The shaft shall be of 316 stainless steel and rotate on E-Glide™bearings that are product lubricated.

2.05 DIFFUSER CHAMBER

A. The diffuser chambers for each impeller shall be of 316 stainless steel and fitted with E-Glide impeller seal rings.

2.06 IMPELLERS

A. The impeller(s) shall be closed and consist of 316 stainless steel.

2.07 MOTOR

A. The motor shall be a submersible, hermetically sealed Franklin motor in Pollution Recoverv construction. The motor shall be designed for continuous duty, capable of sustaining up to 100 starts per day. The motor shall be connected to the pump via a motor adaptor and coupling in 316 stainless steel. Single phase motors in *1/2* HP to 1 HP only shall have thermal protection in the motor windings to protect the windings from overload. The unit will restart automatically after the motor cools down. Larger horsepower single phase motors and three phase motors shall have thermal protection located in the control panel that is manually reset.

2.08 MOTOR LEAD WIRE

A. The lead wire shall be no-splice with EPG's “CP” waterproof and chemically resistant jacket over 600 Volt insulation and be a minimum of 25 feet long.

2.09 PUMP

A. Centrifugal submersible EPG VSDPT SurePump™ Vertical Sump Drainer with built-in level sensor. Sensor shall be supplied with a minimum of 25 feet of cable lead wire.

1. SUMP 1
   a) Model VSDPT 2 - 4 with 4 impeller stages.
   b) Each unit shall be equipped with a 1/2 HP, submersible electric motor for operation on 460 Volts, 3 phase, 60 Hertz service with 25 feet of power cable.
   c) Each SurePump Vertical Sump Drainer shall have a 1 *1/4* inch MNPT threaded discharge nozzle and be capable of delivering 10 GPM at 100 feet of TDH.
   d) Each SurePump will be fitted with 25 feet of 1/8 inch stainless steel lifting cable of sufficient strength to raise and lower the pump unit. Suitable clamps shall be supplied with the cable.

2. SUMP 2
   a) Model VSDPT 2 - 4 with 4 impeller stages.
   b) Each unit shall be equipped with a 1/2 HP, submersible electric motor for operation on 460 Volts, 3 phase, 60 Hertz service with 25 feet of power cable.
   c) Each SurePump Vertical Sump Drainer shall have a 1 *1/4* inch MNPT threaded discharge nozzle and be capable of delivering 10 GPM at 100 feet of TDH.
   d) Each SurePump will be fitted with 25 feet of 1/8 inch stainless steel lifting cable of sufficient strength to raise and lower the pump unit. Suitable clamps shall be supplied with the cable.

3. SUMP 3
   a) Model VSDPT 2 - 4 with 4 impeller stages.
   b) Each unit shall be equipped with a 1/2 HP, submersible electric motor for operation on 460 Volts, 3 phase, 60 Hertz service with 25 feet of power cable.
   c) Each SurePump Vertical Sump Drainer shall have a 1 *1/4* inch MNPT threaded discharge nozzle and be capable of delivering 10 GPM at 100 feet of TDH.
   d) Each SurePump will be fitted with 25 feet of 1/8 inch stainless steel lifting cable of sufficient strength to raise and lower the pump unit. Suitable clamps shall be supplied with the cable.

2.10 PUMP CONTROLLER

A. Furnish one EPG Companies Inc., UL listed 508A/698A, Series L925PT controller to operate pump motor and auxiliary equipment in manual or automatic mode. The control panel enclosure shall be NEMA type 4X Stainless

B. The enclosure shall be equipped with a window in the outer door, an inner door, a stainless steel drip shield, and a tamper resistant latch.

C. The control system will operate from a 460 Volt, 60 Hertz, three phase power supply.

D. Pump control components will be sized to operate pump motor of specified horsepower.

E. The control panel shall include the following as standard features:

1. Main Disconnect Switch: The main disconnect switch shall be 60 Amp rated and will prevent opening of the control panel while power is on, and includes 460 Volt, 2 Amp dual element fuses.

2. "Hand-Off-Auto" Selector Switch: Allows manual or automatic operation of the pump motor. The selector switch shall be a heavy duty, oil tight, NEMA 4 rated switch mounted on the inner door. The hand position shall be momentary with a spring return.

3. Motor Starter: The motor starter shall be sized to the pump motor horsepower, and shall be equipped with built in single phasing protection and ambient compensated, quick trip adjustable thermal overloads.

4. Control Transformer: A transformer with fused primary and secondary shall isolate the control circuit from the power circuit and provide easier and safer field wiring of accessories. It shall lower incoming voltage to 120 Volts.

5. Run Light: Indicates energization of motor circuit. It shall be heavy duty, oil tight, NEMA 4 rated and shall have an LED lamp with 100,000 hour life. The light shall be mounted on the inner door and will be green in color.

6. Motor Overload Light: Indicates motor not running due to overload condition. It shall be heavy duty, oil tight, NEMA 4 rated and shall have an LED lamp with 100,000 hour life. The light shall be mounted on the inner door and will be red in color.

7. LevelMaster™ Level Control: The LevelMaster level control meter shall be mounted on the inner door. The meter shall have a digital readout and the capability to monitor and maintain liquid levels as well as output a high level alarm. It shall also provide a high-high level alarm fail safe feature that shuts off the pump motor. The high-high alarm may indicate level sensor failure or a problem with the pump. Level control shall be accurate to within 0.1 inch.

8. Level Simulator: The level simulator shall be mounted on the inner door. The level simulator is a built-in test circuit designed to simulate a 4-20 mA load to assist in level meter setup and troubleshooting.

9. Intrinsically Safe Barrier: The level sensor circuit shall be by protected by an intrinsically safe barrier.

10. Lightning Arrestor: Shall be grounded, metal-to-metal, to water strata. When properly grounded, the lightning arrester will protect electrical equipment against lightning induced surges.

11. Terminal Strip: Labeled and numbered terminal strip provides easy connection of external components.

12. Corrosion Inhibitor Emitter: Inclusion of an industrial corrosion inhibitor emitter shall protect intemal components of control panel from corrosion for up to one year and shall be replaceable.

F. SYSTEM LOGIC AND FUNCTION

The controller is designed to start and stop a pump using the LevelMaster level control meter with a submersible pressure transmitter. The pump starts at the pump start level set point and continues to rim until the liquid level decreases to the pump stop level set point as programmed in the LevelMaster level control meter. If the liquid level rises to the high level alarm set point, a high level alarm will be annunciated. If the liquid level rises to the highhigh level fail-safe set point, the pump motor will shut off. The pressure transmitter level sensor shall have a range of 0 to 11.5 feet with a 4-20 mA output signal.

The controller should include the following optional features:
• Elapsed time meter.

• Tank full shutdown with pass along and inner door mounted alarm light.
• Top mounted high level alarm light.

2.11 Moter Breakout Box

A. EPG Breakout Box, NEMA 4X non-metallic enclosure for 1 ea. motor lead, includes connection terminals.

B. Model BJBP500

2.12 Level Sensor Breakout Box

A. EPG Breakout Box, NEMA 4X non-metallic enclosure, for risers under vacuum. Junction box for 1 ea. level sensor. Includes a desiccant dryer, bellows, and connection terminals.

B. Model BJBL600BVA

2.13 SCADA

A. Wireless system to transmit liquid level and high level alarm from each sump to central station located at flare station.

1. EPG E-Wave™ or equivalent

2. System to transmit alarms and liquid level to a central base station located at sump (CS-1) at the flare station.

3. System may include one or more repeater stations to properly transmit signals from the two remote condensate pump stations (CS-2 and CS-3) to the main panel at CS-1.

PART 3 EXECUTION

3.01 FABRICATION

A. Electrical:

1. Electrical requirement shall conform to the latest edition of the National Electric Code.

2. Motor starters shall be furnished as part of the packaged system.

3.02 INSTALLATION

A. Install equipment according to manufacturer's written instructions and approved submittals.

B. Install ship loose equipment such as not to damage or impede successful operation of the unit.

3.03 FIELD QUALITY CONTROL

A. Manufacturer’s Field Services:

1. Supplier's or manufacturer's technician for equipment specified herein shall be present at job site (travel time excluded) for assistance during construction, startup, and training of OWNER'S personnel. Include minimum of:

a) 1 man-day for installation services.

b) 1 man-day for instructional services.

2. Supplier or manufacturer shall direct services to system and equipment operation, maintenance, troubleshooting, and equipment and system related areas.

B. Functional Test:

1. Prior to system start-up, inspect for proper connection. Perform initial equipment startup and system adjustment in presence of, and with assistance of, equipment manufacturer's representative.

2. Conduct OWNER-witnessed field demonstration tests on completed systems to demonstrate ability to perform specified functions.

3. Test shall demonstrate functions and features of controls under actual operating conditions.

* * * END OF SECTION * * *

ATTACHMENT A – PROJECT DRAWINGS

ATTACHMENT B – MINIMUM HEALTH AND SAFETY REQUIREMENTS

GENERAL SITE SAFETY PLAN

Environmental Information Logistics, LLC

September 2012

GENERAL SITE SAFETY PLAN (GSSP)

This General Site Safety Plan does not supersede or in any way relieve subcontractors of their obligations under any applicable OSHA regulations including 29 CFR 1910: Occupational Safety and Health Standards and 29 CFR 1926: Health and Safety Regulations for Construction.

The health and safety procedures set forth in this General Site Safety Plan (GSSP) are based on the site conditions and chemical hazards expected to be present at a typical Environmental Information Logistics, LLC (EIL) worksite. This GSSP is intended solely for the use of EIL personnel. This GSSP is subject to review and revision by EIL's Health and Safety Manager (HSM) or designated alternate. For each EIL project, a Site-Specific Safety Plan (SSSP) will be created that addresses actual site conditions that will be encountered during the construction activities.

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1 KEY PERSONNEL, RESPONSIBILITIES, AND TRAINING

1.1 General

Training of Site personnel will conform to pertinent OSHA regulations. Environmental Information Logistics, LLC (EIL) workers are provided with a copy of the GSSP upon employment. Prior to initiating work on a project, site personnel will be supplied with a copy of the SSSP. There will be a pre-project Safety Meeting at which the Site Safety Officer (SSO) will discuss Site operations, and workers will be instructed in the recognition, avoidance and prevention of unsafe activities and conditions. Emergency practices and procedures from the GSSP that are pertinent to the project and the SSSP will be reviewed.

The SSO has the authority and responsibility to change levels of protection in accordance with the guidelines of this document. In addition, the SSO and Health and Safety Manager (HSM) have authority to shutdown the operations should conditions warrant such action.

1.2 Personnel Roles

1.2.1 Project Manager (PM)

The PM will be responsible for general oversight of project activities including the health and safety plan, providing for on-site inspection of plan compliance, and assigning a SSO.

1.2.2 Health and Safety Manager (HSM)

The HSM is responsible for providing hazard communication information, training employees in safe operating procedures, and advising the PM on any matters concerning the health and safety of employees or the public. The HSM may be required to perform various types of area or personnel monitoring for purposes of determining worker exposure and proper selection of personal protective equipment if unforeseen chemical hazards are encountered. The HSM should be consulted when any changes in the recommended procedures or levels of protective equipment are made. A. Michael Hirt is the HSM for EIL.

1.2.3 Site Safety Officer (SSO)

The SSO is responsible for field implementation of the GSSP, SSSP, and enforcement of safety rules and regulations. The SSO will handle liaison with subcontractors and clients on matters relating to health and safety. Other site-specific SSO functions include:

- Verify that utility clearance has been performed.
- Oversee day-to-day implementation of the SSSP by subcontractor employees.
- Interact with subcontractor and client project personnel on health and safety matters.

- Determine levels of protection.
- Provide "refresher" training to new EIL and subcontractor site personnel on health and safety matters.
- Inspect and maintain (daily) safety equipment that includes calibration of any monitoring instrumentation.
- Perform or direct ambient air quality monitoring as warranted.
- Modify SSSP as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents/incidents.
- If EIL employees enter excavations, act as the competent person and ensure OSHA excavation requirements are enacted.
- Verify that EIL and subcontractor site personnel are familiar with the hospital route, and that the route map is posted in the work trailer or site vehicles.
- Establish detailed procedures and routes for evacuation from the site.

The SSO will hold initial startup and daily safety briefings with EIL staff and subcontractors. The SSO will report accidents such as injury, overexposure, or property damage to the HSM, and will consult with the HSM on specific health and safety issues arising over the course of the project.

1.3 Education and Training

Personnel involved in site activities must participate in routine health and safety education and training programs as determined by the HSM. These programs directed by the HSM are designed to provide employees with a thorough knowledge of hazardous materials, health and safety hazard potentials and compliance with applicable federal OSHA and U.S. EPA requirements. Health and Safety Training includes the following:

- General Safety Rules
- Basics of Chemistry
- Basics of Toxicology/Physiology
- Hazardous Materials (types/characteristics)
- Hazard Communication Information
- Respiratory Protection
- Chemical Protective Clothing
- Decontamination Procedures/Personal Hygiene
- Atmospheric Testing/Sampling Procedures
- Emergency Response Procedures

The EIL SSO will have received additional training related to specific responsibilities. This will include instruction (formal and informal) in the use of monitoring equipment to be utilized on-site, where necessary.

2 GENERAL SITE HEALTH AND SAFETY RULES

Some general safe work practices apply to all sites. Many of these are described below.

2.1 Weather Condition Restrictions

The Site Safety Officer (SSO) has the authority, should severe weather threaten, to place site activities on standby, cease operations and/or evacuate the Site as deemed necessary. Weather conditions on Site cannot be controlled. Site personnel are to be aware of the warnings of impending severe weather and the precautions that are to be taken when severe weather threatens.

2.1.1 Thunderstorms and Lightning

Monitor weather conditions at all times while working. At a sign of an impending storm - increased cloudiness, darkened skies, increased wind - listen to a radio for the latest weather information.

When a thunderstorm accompanied by lightning is in the project area, cease work immediately. All powered equipment, such as drill rigs, are to be shut down.

Seek shelter inside nearby buildings or trailers. If there are no buildings nearby, seek shelter inside your vehicle.

If you are caught outside, do not stand beneath tall, isolated trees or telephone poles. Avoid areas projecting above the landscape such as hill tops. In open areas, go to a low place such as a ravine or valley. Stay away from open water, metal equipment, wire fences and metal pipes. If you are in a group of people in the open, spread out, staying several yards apart.

If you are caught in a level field or open area far from shelter and you feel your hair stand on end, lightning may be about to strike you. Drop to your knees and bend forward, putting your hands on your knees. You should minimize the body area in direct contact with the ground. Do not lie flat on the ground.

If someone has been struck by lightning, monitor life signs and begin administering mouth-to-mouth resuscitation or cardiopulmonary resuscitation as needed. Send for help.

Check conscious victims for burns, especially at the fingers and toes and next to buckles and jewelry. Administer first aid for shock. Do not let the victim walk around.

2.1.2 Tornados

Tornados usually develop from thunderstorms and normally occur at the trailing edge of the storm. Most tornados occur in the months of April, May, June, and July in the late afternoon and early evening hours.

When storms are predicted for the project area, monitor weather conditions on a radio. A tornado watch is issued when favorable conditions exist for the development of a tornado. A tornado warning is issued by the local weather service office whenever a tornado has actually been sighted or is strongly indicated by radar.

If a tornado warning is issued, seek shelter immediately. If there are permanent buildings located on site, go there immediately, moving toward interior hallways or small rooms on the lowest floor.

If a tornado warning is issued and you are in a vehicle or a site trailer, leave and go to the nearest building. If there are no buildings nearby, go in the nearest ditch, ravine or culvert, with your hands shielding your head.

If a tornado is sighted or a warning issued while you are in open country, lie flat in a ditch or depression. Hold onto something on the ground, such as a bush or wooden fence post, if possible.

Once a tornado has passed the site, site personnel are to assemble at the designated assembly area to determine if anyone is missing. Administer first aid and seek medical attention as needed.

2.1.3 Winter Storms

When snow or ice storms are predicted for the project area, site personnel should monitor weather conditions on a radio. A winter storm watch is issued when a storm has formed and is approaching the area. A winter storm warning is issued when a storm is imminent and immediate action is to be taken.

When a storm watch is issued, monitor weather conditions and prepare to halt site activities. Notify the project manager of the situation. Seek shelter at site buildings or leave the site and seek warm shelter.

If you are caught in a severe winter storm while traveling, seek warm shelter if road conditions prevent safe travel.

If you are stranded in a vehicle during a winter storm:

- Stay in the vehicle. Disorientation comes quickly in blowing and drifting snow.
- Wait for help.
- Keep a window open an inch or so to avoid carbon monoxide poisoning.
- Run the engine and heater sparingly.
- Keep watch - do not let everyone sleep at the same time.
- Exercise occasionally.

2.2 Temperature Stress

Hot or cold weather is generally a consideration at any site and cannot be controlled. Site workers need to be aware of engineering controls that can reduce temperature stress, the signs and symptoms of temperatures stress and first aid measures for victims of temperature stress.

This following outlines the signs and symptoms of temperature stress in addition to the engineering controls, work practice controls and other management techniques that should be used to reduce temperature stress. Individual susceptibilities to temperature stress need to be considered and used to pace the work being performed with the most susceptible person controlling the work/rest schedule. Monitoring for heat stress is to be performed as detailed in this section.

2.2.1 Cold Stress

The following engineering controls are recommended for reduction of cold stress:

- Use general or spot heating to increase temperature at work site if this does not create a hazardous situation.
- Shield work area from wind.
- Cover metal handles of tools and equipment with thermal insulating materials.
- Do not sit on unprotected metal chair seats.
- Use heated rest areas if work is to be performed in an equivalent chill temperature of 20^{o} F or below.

The following work practice controls are recommended to reduce cold stress:

- Drink warm, caffeine-free, sweet, non-alcoholic drinks or soup frequently.
- Schedule work for warmest part of the day.
- Use heated rest areas regularly.
- Use the buddy system. Do not work alone. Observe your co-workers for signs and symptoms of cold stress.
- Allow and encourage workers to pace themselves and take extra breaks when needed. The work schedule should be set by the person most susceptible to cold stress. Do not pressure someone to work beyond their capabilities.
- Whenever possible, allow new workers time to adjust to working in a cold environment before working full time. Ideally, acclimation should occur over five days: 20% Day 1 with a 20% increase on each successive day.

- When possible, arrange the work to minimize standing or sitting still for long periods of time.
- Reorganize work procedures so as much of a job as possible can be done in a warm environment.
- Avoid overtime.
- Remove outer layer of clothing when entering warm shelter.
- If clothes are wet, change to dry work clothes before returning to work in cold. If not possible, loosen clothing to facilitate evaporation of sweat.
- Develop and adhere to a work-rest schedule, using the guidelines which follow.

Air Temperature with Sunny Sky (degrees F)	Work/Break Schedule (minutes)				
	no wind	5 mph wind	10 mph wind	15 mph wind	20 mph wind
-15 to -19	110/10	110/10	75/10	55/10	40/10
-20 to -24	110/10	75/10	55/10	40/10	30/10
-25 to -29	75/10	55/10	40/10	30/10	cease
-30 to -34	55/10	40/10	30/10	cease	cease
-35 to -39	40/10	30/10	cease	cease	cease
-40 to -44	30/10	cease	cease	cease	cease
-45 & below	cease	cease	cease	cease	cease

Notes

1. These recommendations and guidelines are adapted from Threshold Limit Values and Biological Exposure Indices for 1993-1994, published by the American Conference of Governmental Industrial Hygienists, Cincinnati, OH.
2. 05 mph wind - light flag moves, 10 mph wind - light flag fully extended, 15 mph wind - raises newspaper sheet, 20 mph wind - blowing and drifting snow

The practicality of working under a work-rest schedule, together with the ability of the necessary equipment to function properly in cold weather, may be more restrictive than the health hazards and also need to be considered. The cold stress schedules noted above apply to moderate to heavy work activities. Light to moderate work activities can be moved down one level.

2.2.2 Signs and Symptoms

Send a worker to warm shelter immediately if any of the following symptoms are noted:

- Heavy shivering
- Frostnip (skin turns white)
- Feeling of excessive fatigue
- Drowsiness

- Euphoria

2.2.3 First Aid

Take victim to a warm area. Remove the outer layers of clothing. Gently warm the affected area, submerge it in tepid water if possible but do not rub. If there is evidence of frostbite, obtain medical attention immediately.

2.3 Heat Stress

While site specific conditions need to be considered, the following guidelines are recommended to prevent or reduce the effects of heat stress.

- Develop and adhere to a work-rest schedule using the guidelines at the end of this section.
- Take breaks in cool areas.
- Drink fluids hourly. The fluids should be caffeine-free and non-alcoholic. Water or electrolyte-replacement drinks, such as Gatorade™, are good choices. Do not wait until you are thirsty. Your normal thirst mechanism is not sufficient to overcome the effects of dehydration. If you feel thirsty, you are already becoming dehydrated.
- Schedule work for the cooler part of the day -- early morning and/or early evening.
- Allow and encourage workers to pace themselves and take extra breaks when needed. The work schedule should be set by the person most susceptible to heat stress. Do not pressure someone to work beyond their capabilities.
- Whenever possible, allow new workers time to adjust to working in a hot environment before working full time. Ideally, acclimation should occur over five days: 20% Day 1 with a 20% increase on each successive day.
- Avoid overtime.
- Use the buddy system. Never work alone and watch your co-workers for signs of heat stress.

2.3.1 Personal Monitoring

At each work break, count your pulse during a 30 second period as early as possible in the rest period.

- If your heart rates exceeds 110 beats per minute (BPM) at beginning of rest period, shorten your next work cycle by 1/3 and keep the rest period the same.
- If your heart rate still exceeds 110 BPM at that next rest period, shorten the following work cycle by 1/3.

At the beginning and end of each work shift, measure your weight, ± 0.25 LB, wearing similar clothes. You should not lose more than 1.5 % of your total body weight in a work day. If you do, drink fluids to compensate and to prevent dehydration.

A summary of recommended work breaks and personal monitoring schedule follows. These values apply to moderate work levels. For heavy work levels, apply monitoring schedule one level up. Light to sedentary work activities can be moved down one level if workers are acclimated and show no signs of heat stress.

	Heat Stress Monitoring (min)	
Adjusted Temperature* **(°)**	**Normal Work Clothes**	**Impermeable Work Clothes**
above 90	45	15
88 to 90	60	30
83 to 87	90	60
77 to 82	120	90
72 to 78	150	120

* Adjusted temperature = measured temperature + (13 x % sunshine)

Note

1. These recommendations and guidelines are adapted from Threshold Limit Values and Biological Exposure Indices for 1990-1991, published by the American Conference of Governmental Industrial Hygienists, Cincinnati, OH.

2.3.2 Signs and Symptoms

The signs and symptoms of heat stress include:

- Heat rash
- Heat cramps: Muscle spasms; pain in hands, feet or abdomen
- Heat exhaustion: Pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting
- Heat stroke: Red, hot, usually dry skin; lack of, or reduced, perspiration; nausea; dizziness; confusion; strong, rapid pulse; coma

2.3.3 First Aid

Remove the affected individual's protective clothing and equipment. Wrap the victim in wet towels or clothing. If there are signs or symptoms of heat exhaustion or heat stroke, get medical attention immediately.

2.4 Alcohol/Controlled Substances

The possession, use, sale and/or distribution of alcohol or controlled substances without a prescription is strictly prohibited.

2.5 Firearms And Other Weapons

Possession of any firearm or other weapon at a job site is strictly prohibited unless approved by the SSO and the HSM prior to the site work. An example of a work site at which a weapon would be appropriate would be a remote area at which bears or other wildlife pose a threat.

2.6 Heavy Equipment

Special safety procedures are required when working around operating heavy equipment. Heavy equipment includes, backhoes, scrapers, loaders, bulldozers, trucks and drill rigs. Hazards associated with operating heavy equipment include obstructed view, moving parts, rollover, overhead clearance, noise and dust.

- Heavy equipment should be operated by trained, authorized personnel.
- Equipment should be inspected daily.
- Equipment should be equipped with backing alarms and if driven over uneven terrain rollover protection and seat belts.
- Personnel working on the equipment or in the area should wear safety glasses with side shields, steel-toe steel-shank safety boots, and hard hats.
- A spotter should be used when backing up to avoid blind spots.
- All guards should be in place and safety switches should be operational.
- Drill rigs and other equipment with tall booms should, at a minimum, remain at least 10 ft from overhead power lines and should not be moved with the boom raised.

2.7 Traffic

If personnel will be in a roadway or within 10 ft of a roadway during work activities, orange safety vests must be worn. Barricades and warning signs and/or cones may be required. The SSO will determine if additional measures are warranted and will implement necessary control measures.

2.8 Biological Hazards

There is a potential for additional hazards at the site that include biological hazards. Such hazards will be limited due to the performance of the field investigation during the winter months.

- Plants - A broad variety of plants and wood cause injury to skin through primary irritation or allergic sensitization. Although the chemical identity of many plant toxins has not been established, it is well known that an irritant or allergenic agent can be present in the leaves, stems, flowers, bark, and other components of the

plant. Examples include poison ivy and sumac. Personnel will be wearing long pants at the site. If work is to be performed in areas with poison ivy or sumac, contact with the plant should be avoided. The SSO will identify locations where poisonous plants are present during daily site briefings. Personnel may need to wear gloves or chemical resistant clothing (Tyvek). If contact is made with poison plants, remove contaminated clothing and wash all exposed areas with soap and water followed by rubbing alcohol. Apply calamine or other soothing skin location. Seek medical advice if severe reaction occurs.

- Insects - Insect bites and stings can be serious to hypersensitive persons and even deadly depending on the type of insect. Examples include bees, wasps, hornets, brown recluse spiders, and ticks. Lyme disease is a tick-borne disease and starts out with flu- like symptoms but may lead to arthritis and serious nerve and heart damage. Avoid tall grassy areas or other areas of thick vegetation. If work is performed in these areas, personnel should wear light colored clothing, tape pants' cuffs around their ankles, use a commercially available repellant and check for ticks regularly.

- Animals - Animal bites are a concern because of the potential for the animal to carry the rabies virus, which attacks the nervous system. If an animal bit occurs the victim must be taken to the nearest medical facility immediately.

2.9 Excavations

Excavations pose two primary hazards to employees working in them. The first is cave-in of the sidewalls or sudden movement of soils which can entrap, bury or injure workers. The second hazard is associated with hazardous gases that are heavier than air which may accumulate in trenches or excavations and cause oxygen deficient conditions, explosive environments or be at concentrations that are hazardous.

A trench is defined as a narrow excavation made below the ground in which the depth is greater than the width - the width not to exceed 15 ft. An excavation is defined as any man-made cut, cavity, trench or depression in the earth's surface formed by earth removal.

2.9.1 Causes of Cave-ins

- Soil Type - Loose-grained sandy soils have little cohesive strength and are not self-supporting. Clays and silts tend to stick together and be self-supporting.

- Moisture - Water affects soil particle cohesiveness. Too much water affects the ability of soils to stick together allowing them to slide and move more easily. Too little water results in drying and cracking which allows soils to collapse.

- Recent Excavations - Soil that has never been disturbed is stronger than soil that has been previously disturbed.

- Freezing and Thawing - When water freezes, it expands, and when ice thaws, it contracts. Movement of soil and shoring materials can result from the expansion and contraction during freeze-thaw cycles.

- Surcharged Loads - Construction materials, heavy equipment and the weight of spoils piles all contribute to the downward force on soil. The greater the surcharged load, the less stable the soil will be.

- Shock and Vibration - Moving trains, highway traffic, pile driving and blasting are all source of vibration which can weaken the cohesiveness of soil.

- Intersecting Trenches - The point formed by the intersection of two trenches is particularly vulnerable to collapse if not properly protected.

2.9.2 Work Practices for Excavations

Standard protocol is to not go into any excavation or trench if there is another work practice or engineering control that can be used to eliminate the need for entry. These include:

- Using a backhoe to collect soil samples from the base or sidewalls of an excavation.

- Assembling piping and other apparatus outside an excavation and then laying it in the excavation by remote means.

- Collecting air quality measurements by lowering a sampling line into the excavation.

- Conducting and documenting soil classification by taking pictures or by taking notes from outside the excavation.

If personnel must enter an excavation in the course of field activities, the SSO will act as the OSHA specified "competent person". No one is to enter the excavation until the competent person inspects the excavation and determines conditions are safe for entry. When subcontractors are hired to perform excavation activities, the subcontractor will provide the competent person and perform necessary inspections and controls to conduct work in a safe manner. The SSO will monitor the subcontractor's excavation activities and will ensure that the subcontractor corrects any deficiencies in the excavation or trenching operation that are noted.

The SSO will keep detailed notes of the excavation inspections and determinations that conditions are safe for personnel to enter the excavation. The inspections will include:

- Excavations.

- Adjacent areas.

- Protective systems.
- Indications of possible cave-ins or protective system failure.
- Hazardous atmospheres.
- Any other hazardous conditions.

Inspections shall be made again after every rainstorm or other hazard increasing occurrence.

When the SSO finds evidence of a condition that could result in possible cave-in, failure of protective systems, hazardous atmosphere or other hazardous condition, the hazards must be corrected before anyone is allowed to enter the excavation.

2.9.3 General Requirements

The SSO shall inspect and ensure the following safeguards are in place during excavation operations.

- All surface encumbrances that create a hazard shall be removed, supported or safeguarded.
- Underground utilities such as sewer, telephone, fuel, electric, water lines or any other installation will be cleared before opening an excavation.
- While the excavation is open, underground utilities will be supported, protected or removed to safeguard workers.
- A means of egress must be located every 25 ft laterally along trenches 4 or more feet deep.
- Workers exposed to vehicular traffic must wear warning vests.
- Workers must not be permitted to work underneath loads handled by lifting or digging equipment.
- When mobile equipment is operated adjacent to an excavation or must approach the edge of an excavation, a warning system such as barricades, hand or mechanical signals, or stop logs must be used to prevent the equipment from falling into the excavation.
- When hazardous atmospheres exist or could reasonably be expected to exist in excavations, the competent person will perform air monitoring as specified in the GSSP. Confined Space Entry procedures will be implemented during entry into excavations with hazardous atmospheres.

- Emergency rescue equipment, such as breathing apparatus, a safety harness and line will be available where hazardous atmospheric conditions exist or may reasonably be expected to develop during excavation work.

- Workers are not to work in excavations with accumulated water. Water removal equipment should be used as necessary and diversion ditches, dikes or berms used to direct surface runoff away from excavations.

- Excavations below the base of footings, foundations or walls are not permitted unless a support system designed by a professional engineer is in place.

- Sidewalks, pavement and other structures will not be undermined unless a support system is provided.

- Workers must be protected from loose rock or soil that poses a hazard by falling or rolling from an excavation face.

- All excavated soil piles, equipment and other materials must be at last 2 ft from the edge of excavations to prevent them from falling into the excavation.

- Walkways and bridges over excavations must be equipped with guardrails.

- Adequate barriers must be installed ground excavations or they must be barricaded to protect workers and the general public from fall hazards.

2.9.4 Cave-In Protective Systems

The competent person will ensure that all workers in excavations be protected from accidental wall collapse. Protective measures are not required when:

- Excavations are made entirely in stable rock.

- Excavations are less than 5 ft deep and the competent person inspects the excavation and determines there is no potential for cave-in.

If excavations are over 5 ft deep or under 5 ft deep and there is a potential for cave-in, sloping, shoring or bracing is required to protect workers during entry into the excavation. There are three protection options. They are:

1. Slope the sides of the excavation no steeper than one and one-half horizontal to one vertical (34 degrees measured from horizontal).

2. Determine the slopes of the sidewalls based on soil classification.

3. Have a professional engineer design a protective system or select a shoring or bracing system. This option requires a written copy of the design plan to be at the site.

When support systems are in place, materials are not to be excavated more than 2 ft below the bottom of the support and they must be installed and removed in a safe manner so workers involved with these operations are protected from collapse and cave-in.

2.9.5 Soil Classification

For the most part, excavations that are to be entered will be sloped. Soil classification will be performed to determine the slope of excavation sidewalls. Documentation of the classification is required. Soil and rock will be classified into one of four categories. They are Stable Rock and Types A, B, and C. Stable Rock is any natural solid mineral matter.

Type A soils are cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

- The soil is fissured.
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects.
- The soil has been previously disturbed.
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater.
- The material is subject to other factors that would require it to be classified as a less stable material.

Type B are cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa). Type B soils include:

- Granular cohesionless soils such as angular gravel (similar to crushed rock), silt loam, sandy loam and, in some cases silty clay loam and sandy clay loam.
- Previously disturbed soils except those which would otherwise be classed as Type C soil.
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration.
- Dry rock that is not stable.

- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C soils are cohesive soils with an unconfined compressive strength of 0.5 tsf (48 kPa) or less, Type C soils include:

- Granular soils such as gravel, sand, and loamy sand.
- Submerged soil or soil from which water is freely seeping.
- Submerged rock that is not stable.
- Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

2.9.6 Soil Tests

Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

- Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.
- Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.
- Observe the side of the open excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.
- Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.
- Observe the opened side of the excavation to identify layered systems. Examine layered systems not identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

- Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

- Observe the area adjacent to the excavation and the area within the excavation for source of vibration that may affect the stability of the excavation face.

Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

Soil plasticity can be evaluated by molding a moist or wet sample of soil into a ball and attempting to roll it into threads as thin as 1/2 -in. in dia. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a 2 in (50 mm) length of 1/2-in. thread can be held on one end without tearing, the soil is cohesive.

The dry strength of a soil can be evaluated in the field based on the following simple observations. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488 - "Standard Recommended Practice for Description of Soils (Visual - manual Procedure)." Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification the soil must be changed accordingly.

Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

A drying test can be conducted to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately 1 in. thick (2.54 cm) and 6 in. (15.24 cm) in diameter until it is thoroughly dry.

- If the sample develops cracks as it dries, significant fissures are indicated.

- Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined.

- If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

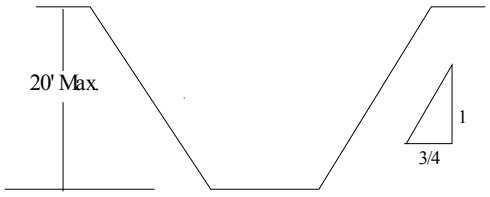
In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

2.9.7 Slope Configurations

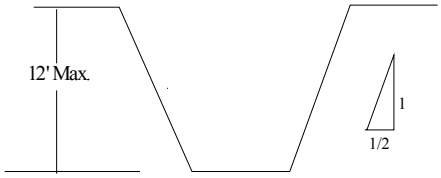
Slope configurations for soil types A, B, and C are 53 degrees (3/4:1), 45 degrees (1:1), and 34 degrees (1 1/2:1), respectively. When classification is performed, the competent person will use at least one visual and at least one manual analysis as described above.

Simple slope excavations of 20 feet or less in depth made in Type A soil shall have a maximum allowable slope of 3/4:



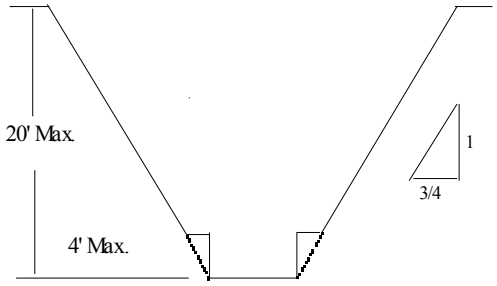
Simple Slope Dimensions in Type A Soil

Simple slope excavations made in Type A soil which are open 24 hours or less (short term) and which are 12 feet or less in depth can have a maximum allowable slope of 1/2:1:



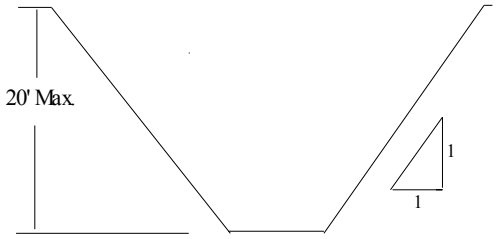
Short Term Simple Slope Dimensions in Type A Soil

Benched excavations 20 feet or less in depth made in Type A soil shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:



Single Bench Dimensions in Type A Soil

Simple slope excavations 20 feet or less in depth made in Type B soil shall have a maximum allowable slope of 1:1.

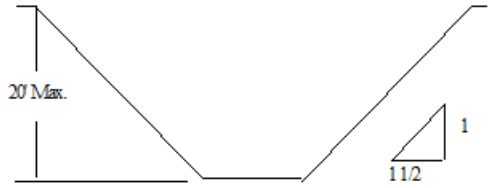


Simple Slope Dimensions in Type B Soil

Benched excavations 20 feet or less in depth made in Type B soils shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:

Single Bench Dimensions in Type B Soil

Simple slope excavations 20 feet or less in depth made in Type C soil shall have a maximum allowable slope of 1 1/2:1.



Simple Slope Dimensions in Type C Soil

2.10 Utilities

All utilities must be cleared before performing any intrusive activities. The SSO will verify that utilities have been cleared before work begins at the site. Additional clearance measures beyond the normal utility service clearance are not required unless specified in the SSSP.

2.11 Noise

Hearing protection is required when working in close proximity to heavy equipment, the level of noise interferes with communications or the sound level exceeds 85 dB. Generally, if you cannot hear someone speaking at a normal conversational level when they are 3 ft from you, you need hearing protection.

2.12 Confined Spaces

Confined space entry is not allowed under the scope of this plan. Should a confined space entry situation be encountered, the HSM must be notified and provisions for confined space entry must be added to the SSSP.

2.13 Slips, Trips, and Falls

Construction sites must manage work areas, including access routes, such as stairwells, corridors, footpaths and site cabins, so that people can move safely around the site. EIL personnel must keep their work area in a clean and orderly condition so as to reduce the chance of injury through slips and trips. If you see a risk, sort it, or report it to someone who can.

Key aspects of construction slips and trips include:

- Uneven surfaces
- Obstacles
- Trailing cables
- Wet or slippery surfaces
- Changes in level

2.13.1 Uneven surfaces

Many slips and trips occur when people are walking on uneven surfaces. The risk can be reduced by providing walkways that are;

- clearly designated as a walkway;
- provided with good conditions underfoot;
- signposted and provided with adequate lighting.

You can also use mechanical lifting aids rather than carrying unwieldy loads that block the view ahead and make sure everyone wears suitable footwear with a good grip.

2.13.2 Obstacles

Other slips and trips happen because there is something in the person's way, such as building materials or waste. You can help avoid these incidents by:

- Housekeeping - everyone keeping their work and storage areas tidy;
- Deliveries - planning deliveries to minimise the amount of materials on site;
- Waste - designating areas for waste collection, providing skips and bins where needed and making clear the responsibilities for waste removal.

2.13.3 Trailing cables

If you can use cordless tools you may not need to use cables. Where you need cables for temporary lighting or mains-powered tools, run them off the path, especially along corridors. Use gaffer's tape or mats in a color that contrasts with the flooring or work surface to cover cords that cross heavily-trafficked areas.

2.13.4 Wet or slippery surfaces

Treat slippery surfaces with stone (mud) or grit (for ice) or provide temporary covering. Signpost any slippery areas and make sure footwear with a good grip is worn.

2.13.5 Changes in level

Where you cannot avoid small changes in level, such as in doorways, consider installing ramps. If you cannot do this, use signs to warn workers to look out for the change in level.

2.14 Fall Hazards and Ladder Safety

If work is performed on an elevated level six (6) feet above the ground or work surface, fall protection is required. Fall protection may still be necessary for heights less than six feet in certain situation if there is a potential for injury from falls at lower heights. These may

include falls onto protruding rebar or other sharp objects. Ladders also pose a significant hazard associated with falls.

Ladders pose a significant hazard when improperly used or maintained. There are four causes of accidents involving ladders. They include:

- Improperly securing ladder top and/or bottom
- Structural failure of ladders
- Ascending or descending ladders improperly
- Carrying objectives when ascending or descending ladders

2.14.1 Step Ladders

Step ladders must have positive locking spreaders which will fully spread and lock when the ladder is in use.

- Do not use a step ladder as a straight ladder.
- Do not use the top two steps of a step ladder.
- Do not climb the cross-bracing on the rear side of stepladders.

2.14.2 Straight Ladders

Portable manufactured straight ladders may be used. Job-built ladders require special regulations and will not be used unless approval is given by the Health and Safety Manager.

- When portable ladders are used for access to an upper landing surface, the side rails must extend at least 3 feet above the upper landing surface. The ladder must be secured, and a grasping device, such as a grab rail, must be provided to assist workers in mounting and dismounting the ladder.

- Ladders must be maintained free of oil, grease, and other slipping hazards.

- Ladders must not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.

- Ladders must be used only for the purpose for which they were designed.

- Non-self-supporting ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder.

- Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement.

- Ladders must not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not be used

as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces.

- Ladders placed in areas such as passageways, doorways or driveways, or where they can be displaced by workplace activities or traffic, must be secured to prevent accidental movement, or a barricade must be used to keep traffic or activities away from the ladder.

- The area around the top and bottom of the ladders must be kept clear.

- Ladders must not be moved, shifted, or extended while in use.

- Ladders must have nonconductive side-rails if they are used where the worker or the ladder could contact exposed energized electrical equipment.

- Ladders must be inspected by a competent person for visible defects on a periodic basis and after any incident that could affect their safe use.

- Single-rail ladders must not be used.

- When ascending or descending a ladder, the worker must face the ladder.

- Each worker must use at least one hand to grasp the ladder when moving up or down the ladder.

- A worker on a ladder must not carry any object or load that could cause the worker to loose balance and fall.

2.14.3 Other Procedures

- Don't reach beyond a normal arm's length sideways when working on a ladder. A good rule of thumb is to "keep your belt buckle between the side rails." Move the ladder as often as necessary to get close to the work.

- When extending extension ladders, keep your hands on the rails, not the rungs to prevent injuring your hands. Be sure the interlocking guides and connecting mechanisms are set and securely latched.

- Tools should not be left hanging or dangling from ladders or ladder rungs.

2.15 Fall Protection

OSHA requires fall protection when the distance from a working surface to a lower level is more than six (6) feet. Fall protection may be required for distances less than six (6) feet if there are obstructions or other hazards present. The SSO will be responsible for implementing fall protection procedures during field activities.

A fall protection system consists of four components - an anchorage point, a lanyard, a body support, and associated connectors.

2.15.1 Anchorage Point

Anchorage points for fall protection systems must be able to withstand 5,400 lbs static load strength for a 6 ft fall or 3,000 lbs for a 2 ft or less fall. The anchorage point should be directly overhead of the worker to prevent horizontal swing in the event of a fall.

A horizontal lifeline is a cable rigged between two fixed anchorage points on the same level and independent of the work surface. Horizontal lifelines are used when there are no anchorage points above the work area. A horizontal lifeline system requires careful engineering and will not be used without authorization of the HSM.

2.15.2 Lanyards

A lanyard is a short, flexible rope, or strap webbing used to connect a worker's safety harness to the anchorage point. Lanyards should have a minimum strength of 5,000 lbs and absorb the shock of a free fall of 6 ft or less. Shock absorbing lanyards are also available that absorb the energy of a free fall and decelerate the fall of the worker.

It is policy to purchase manufactured lanyards. Homemade lanyards or ropes and tie-offs not allowed.

When attaching a lanyard to an anchorage point special crossover straps, or tie off adapters will be used. These are webbed straps with a D-ring on each end: The strap is looped around a pipe, beam or other anchor and the lanyard in anchored into both D-rings. Looping a lanyard around the anchor and hooking back onto itself is not permitted.

2.15.3 Self-Retracting Lifelines

Self-retracting lifelines are portable devices which are fixed to an anchorage point above a work area and play out or retract line automatically as workers move away and toward the device. When a fall occurs, a locking device automatically arrests movement.

2.15.4 Body Support

A body harness is a web belt system designed to spread the shock from a fall over the entire body. A full body harness is required for all operations requiring fall protection systems. A body belt which is worn around the waist and chest harnesses are not permitted.

2.15.5 Connectors

Hardware connectors consist of D-rings, snap-hooks and metal links used to connect fall protection systems together. Connectors should be corrosion-resistant and all surfaces and edges should be smooth to prevent damage to interfacing parts. D-rings and snap-hooks should be able to withstand 5,000 lbs static loads and 3,600 proof tested pounds without cracking, breaking or sustaining distortion. Only use snap-hooks with a positive locking device or spring loaded keeper, which prevents "roll-out" or unintentional release of components.

2.15.6 Additional Requirements

- Lifelines, lanyards and harnesses should be protected from sharp edges or cutting edges such as along the edge of "I" beams. A webbing material should be used in these cases.

- Knots reduce the strength of ropes, lanyards and cable by as much as 50%. Standard manufactured components will be used and employees will not use knots in fall protection systems.

- A lanyard should not be connected to a harness and a deceleration device such as a retractable lifeline since the maximum fall distance of 6 ft may be exceeded.

- When work is performed in an aerial lift device such as a "cherry picker", workers must wear a harness and lanyard. The lanyard should be attached to the lift device bucket. Never attach the lanyard to anything outside the bucket.

- Safety belts, lanyards and lifelines must only be used for employee protection. They are never to be used for lifting static loads.

- Once used to arrest a fall, the fall protection equipment must be taken out of service and destroyed unless the equipment is inspected by the SSO and deemed safe for reuse. Lanyards will always be destroyed after use. The SSO will document that the equipment was inspected and deemed safe for reuse in the field logbook.

2.15.7 Maintenance

Wipe off surfaces of fall protection lanyards, harnesses and connectors to remove gross contamination. Materials can be cleaned with soap and water. A soft brush can be used to scrub the equipment. Hang freely to dry. Do not use solvents or abrasive materials to clean the equipment.

2.15.8 Inspections

The SSO will inspect fall protection equipment each day before use. Document the inspection in field logbooks.

- Check lanyards for knots, cuts, fraying, chemical degradation. Rotate the lanyard and check the entire surface for damage. Make sure spliced connections are tight and secure.

- Inspect harness for damage including cuts, fraying, and chemical degradation. Make sure buckles and rings are not damaged.

- Inspect hooks for corrosion, dirt, and physical damage. All snap-hooks must fully close and lock. Visually check and physically test the hook. Do not rely on the sound of the hook closing.

- All broken, damaged or questionable lifelines, lanyards, harnesses and hooks should be taken out of service and be replaced.

Contact the HSM if defective parts are found. Do not use damaged equipment.

2.16 Electrical Hazards

2.16.1 Electrical Cords

Electrical cords passing through work areas should be covered or elevated to protect the cord from damage and reduce hazards to employees. Extension cords used with portable tools will be 3-wire type and will be protected from damage when in use. Extension cords must be inspected on a routine basis. Cords with cuts in the insulation or that are worn or frayed or have insulation pulled back from the plug or receptacle fittings will be taken out of service immediately.

2.16.2 Grounding

Portable tools and other electric equipment will be grounded or double insulated. Ground fault circuit interrupters (GFCIs) will be used in wet areas and on all field sites and outdoor operations if power is supplied through the utilities. GFCI's are not required on portable generators rated less than 5kW which are single phase, two wire type.

2.17 Lifting/Materials Handling

Back injuries from lifting are a primary workplace safety problem. Common sense and preplanning can prevent most back injuries.

2.17.1 Material Handling

- Inspect materials for silvers, jagged or sharp edges, burrs, rough or slippery surfaces.
- Grasp the object with a firm grip.
- Keep fingers from pinch and shear points, especially when setting materials down.
- Wipe off greasy, wet, slippery, or dirty objects before handling them.
- Keep hands free form oil and grease.
- Use leather or cloth gloves to protect hands.

2.17.2 Preparation for Lifting and Carrying

Before starting to lift or carry anything, check your entire walkway to make sure your footing will be solid. Your shoes should give you good balance, support and traction.

- Clear any moveable obstacles out of the way, and make sure you know the location of immovable ones.

- Cautiously heft the object to be moved to check its weight and center of gravity.

2.17.3 Lifting Procedure

- Get a firm footing. Keep your feet apart for a stable base; point toes out.

- Bend your knees. Don't bend at the waist. Keep the principals of leverage in mind. Don't do more work than you have to.

- Tighten you stomach muscles. Abdominal muscles support the spine offsetting the force of the load.

- Lift your legs. Let your powerful leg muscles do the work of lifting, not your weaker back muscles.

- Keep the load close. Don't hold the load away from your body. The closer it is to your spine, the less force it exerts on you back.

- Keep your back upright. Whether lifting or putting down the load; don't add the weight of your body to the load.

2.17.4 Safety Tips for Lifting

- Don't lift objects over your head.

- Don't twist your body when lifting or setting an object down.

- Don't reach over an obstacle to lift a load. Move the obstacle or go around it.

- Pace yourself to avoid fatigue when doing heavy work for long periods.

- Use common sense.

2.17.5 Alternatives to Lifting

For difficult lifting tasks, keep the following in mind:

- Ask a co-worker for help.

- Use a cart or other material handling device.

Pushing a load is easier on the back than pulling it. When pushing a load:

- Stay close to the load.
- Don't lean forward.
- Use both arms.
- Keep the stomach muscles tight.

If you must pull something:

- Face the object squarely, with one foot at least 12 in. in front of the other.
- Keep your back straight.
- Bend your knees slightly.
- Pull with one smooth motion.

2.17.6 Shoveling

General lifting procedures also apply to shoveling. Use the following procedure:

- Make sure your grip and balance are solid.
- Tighten you abdomen as you lift.
- Keep the shovel close to your body.
- Bend your knees not your back.
- Use the strength of the thighs to bring you to an upright position.
- Increase you leverage by keeping your bottom hand low and toward the shovel blade. This allows you to use the strength of your arms and shoulders instead of your back.

2.18 Fires and Explosions

Even a minor fire can become a serious problem, particularly when adjacent to flammable or combustible materials. The first few minutes after discovery of a fire are the most critical in preventing a larger emergency.

In case of a fire or explosion, immediately turn off burners and other heating devices and stop any work in progress. Give priority to assisting injured persons.

2.18.1 Small Fires

Take the following actions immediately:

- Alert other personnel in the vicinity and send someone for assistance

- If it is a small fire - one that can be extinguished within 30 seconds or with one fire extinguisher - attempt to extinguish the blaze if:
  - Conditions are safe
  - You have the proper type of fire extinguisher
  - You have been trained to use a fire extinguisher properly
  - You are not alone

Combination (ABC) extinguishers can be used against the following classes of fires, which include the typical fires that could occur at an EIL job site:

- Class A fires - ordinary combustible solids such as paper, wood, coal, rubber and textiles

- Class B fires - petroleum hydrocarbons (diesel fuel, motor oil and grease) and volatile flammable solvents

- Class C fires - electrical equipment

These extinguishers, however, are not effective against Class D fires which include combustible or reactive metals (such as sodium and potassium), metal hydrides or organometallics. Special Class D extinguishers are required.

Avoid entrapment by a fire; always fight from a position accessible to an exit.

If there is any chance that the fire cannot be controlled by locally available personnel and equipment, the following action should then be taken:

- Activate the emergency alarm system (if available) and notify the local fire department.

- Confine the emergency to prevent further spread of the fire.

- Assist injured personnel and provide first aid or transportation to medical aid, if necessary.

Next notify the client if the client is in close proximity to the fire. (If not, notify the fire department). Assess the need with the client to contact the fire department. If the fire department is contacted, be prepared to tell them:

- Who you are

- Your location
- Type of fire (i.e., electrical, chemical, combustible solids, vapor)
- If the fire is extinguished
- The need for medical assistance
- Other potential hazards in the area (i.e., proximity to bulk tanks, downed electrical lines, poor access)
- What you will be doing after you hang up the phone and where they can find you or reach you

Upon arrival of the local fire department, brief them of the incident. When given permission, contact the PM and the HSM.

2.18.2 Large Fire or Explosion

If other people are in the area, immediately notify them and then call the local fire department. Be prepared to tell them:

- Who you are
- Your location
- Type of fire (i.e., electrical, chemical, combustible solids, vapor)
- If the fire is extinguished
- The need for medical assistance
- Other potential hazards in the area (i.e., proximity to bulk tanks, downed electrical lines, poor access)
- What you will be doing after you hang up the phone and where they can find you or reach you

Upon arrival of the fire department, turn over command to them and supply as much information as possible. When given permission, contact the PM and HSM.

2.19 Flammable/Combustible Liquid Spills

If a spill of a flammable or combustible liquid occurs, all possible sources of ignition should be extinguished or removed immediately.

Use Material Safety Data Sheets (MSDSs), analytical information from laboratory personnel, and any other available sources of information, together with your own expertise

to determine if spill control and clean up can be safely accomplished with the personnel and materials on site.

The following general spill cleanup procedures can be utilized, but more specific techniques might be required for certain chemicals.

- Vermiculite or other suitable absorbent may be used to solidify free liquids.
- Both spilled liquids and solids residues must be contained in drums.
- If a spill occurs on soil, it must be scraped and contained.

2.20 Evacuation

Prior to beginning work, the SSO should brief all EIL and subcontractor employees on what the evacuation signal should be. It may be nothing more than a verbal command or it may be some audible alarm such as a bell or horn. If working at a client's site, familiarize yourself with their warning system.

Prior to work, the SSO should determine a meeting place if evacuation is necessary. Preferably the meeting place should be upwind of the work activities and at a safe distance. EIL and subcontractor employees working at the job site should be informed of the meeting location.

If evacuation is necessary, everyone should go directly to the meeting area. The SSO should ensure all personnel are accounted for. The local on-scene commander should immediately be notified of any missing personnel as well as their last known whereabouts.

2.20.1 Site Evacuation

If an evacuation of the site is necessary, certain rules must be strictly followed:

- Employees in the vicinity should immediately shut down all equipment and disconnect electrical or flammable power sources to machinery.
- Immediately after personnel are alerted, they will evacuate the facility via the nearest escape route.
- All evacuated personnel will assemble at the predetermined meeting place.
- Employees should not wait for friends; the SSO will ensure all personnel have evacuated before departing.
- Employees should move quickly and calmly without panic.
- Once assembled, employees should remain calm and quiet while the SSO takes roll call and assesses the situation. Each employee must report to the SSO and remain in the meeting place until everyone is accounted for and evacuation is complete.

2.20.2 Off-Site Evacuation

If an incident is large enough, off-site personnel may also need evacuation. If off-site evacuation is necessary, follow the appropriate local notification procedures, generally through the fire department. EIL personnel should not attempt to evacuate off-site personnel but should leave that task to the local authorities. All EIL employees should follow the evacuation directions given by the local authorities. The SSO should offer to remain at the command post to supply information. If told to leave, the SSO should leave.

Local authorities will have present an on-scene commander. The on-scene commander will direct emergency operations and will have assistance from the local fire department, police department and emergency government.

After evacuating to a safe area, the PM and HSM should be contacted.

2.20.3 Discussion of Incident

At no time should a EIL employee discuss an emergency incident with members of the media. Politely refuse to discuss the situation and instead, direct all inquiries to the HSM. Provide the media people with the office phone number.

EIL employees should always provide whatever useful information they can to response personnel. Stick to helpful facts and avoid placing blame or judgement. That will be sorted out later. Politely refuse to find fault or place blame.

At a safe place and at the appropriate time, write down all you remember of the incident. How did it happen? Who was doing what? What did I see? What did I hear? All these types of things may be important later when things are sorted out.

3 FIRST AID

First aid should only be administered when it is safe for both the victim and the rescuer. If the accident warrants, emergency responders should be contacted as soon as possible after the accident. When in doubt, contact the local emergency reponders.

3.1 Open Wounds

Stop the bleeding by direct pressure, elevation, and if necessary, direct pressure on the supply artery. Do not attempt to cleanse severe wounds. Apply a sterile dry dressing to protect the wound from contamination. Provide shock care. Obtain medical attention.

3.2 Minor Burns

The object of first aid for burns is to relieve pain, prevent contamination, and prevent shock. First degree and second degree burns should be submerged in cold water until the pain subsides. Gently blot dry then apply a sterile dry dressing as a protective bandage. Do not break blisters, or remove any tissue. Do not use an antiseptic preparation, ointment or spray. Seek medical attention immediately if burns are severe.

3.3 Eye Injuries

Foreign objects are often blown or rubbed into the eyes. Keep victim from rubbing eye. Wash hands before examining eye. Do not attempt to remove foreign objects by inserting toothpicks, or other instruments. If object is embedded in eye, seek medical attention immediately. If object is not embedded try to remove by teardrops, or flushing with water. If object is not easily removed, seek medical attention.

Contusions may be caused by direct blow or explosion. Stop hemorrhage by gently applying direct pressure, then protect eye from contamination with a dry sterile dressing. Seek medical attention immediately.

3.4 Chemical Exposures

1. Quickly protect yourself from exposure before attempting to rescue the victim.
2. Decontaminate the victim and terminate exposure.
3. Treat cessation of breathing first.
4. If the heart is not beating, perform cardiopulmonary resuscitation (CPR).
5. Treat eye injuries next.
6. Treat skin contact.
7. Treat shock.
8. Call for help.

3.4.1 Preliminary Assessment

Make a quick assessment of the likely routes of exposure by examining the eyes, mouth, nose and skin of the victim for signs of the chemical itself or damage it has caused such as swelling, redness, bleeding, burns, discharge of fluid or mucous or pallor.

Drooling, difficult swallowing, a distended and painful or hard, rigid abdomen indicate possible ingestion of a corrosive or caustic substance. If respirations are rapid, shallow, noisy or labored, suspect inhalation. If the face has been splashed with chemical, eye contact is likely.

3.4.2 Poisoning by Inhalation

Remove the victim from exposure while protecting yourself from exposure. If breathing has stopped, administer artificial resuscitation using a disposable resuscitator and avoid mouth-to-mouth contact. Do not use mouth-to-mouth resuscitation if the nature of the chemical exposure is unknown.

Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.

3.4.3 Poisoning by Ingestion

Remove the victim from exposure while protecting yourself from exposure. Call a poison control center, emergency room or physician for advice. Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility. Consult the MSDS to determine whether to offer victim water to drink or to induce vomiting and by what means.

If the victim is conscious:

- Have the victim rinse out mouth with water.
- If there are no signs of burns, swallowing difficulty or abdominal problems and victim is conscious and if so advised by a physician or poison control center:
    - Induce vomiting by giving two teaspoons of Syrup of Ipecac. Follow with at least one cup of water. Do not use milk. If you do not have Syrup of Ipecac, induce vomiting by asking the victim to touch the back of the throat with a finger, spoon handle or blunt instrument.
    - Have the victim sit up or lean forward while vomiting.
    - Save any vomitus and give it to the emergency medical service personnel to take to the medical facility for analysis.
    - Give the victim one to two cups of water to drink after vomiting has ceased.
- Keep talking to the victim to prevent sleepiness.

If the victim is unconscious:

- Lay the victim on the victim's left side, bending the victim's right hip.
- Maintain an open airway.
- Arrange for transport to the nearest medical facility.
- Stand by to administer artificial resuscitation and CPR if needed. Be sure to wipe or rinse all traces of chemical from in and around the victim's mouth before giving artificial resuscitation. Always use disposable resuscitators supplied in the EIL First Aid kits when performing CPR. Do not use mouth-to-mouth resuscitation if the nature of the chemical exposure is unknown.
- If breathing has stopped, administer artificial resuscitation using a disposable resuscitator and avoid mouth-to-mouth contact.

If the victim vomits, save the vomitus and send it to the medical facility for analysis.

If the victim shows signs of shock (a weak, rapid pulse; pale clammy skin; cold hands and feet), elevate the victim's feet eight to twelve inches and cover the victim with a blanket.

Do not give an unconscious person anything to drink.

Do not give someone who is convulsing anything to drink.

3.4.4 Poisoning by Skin Contact

Remove the victim from the contaminated area, being careful to protect your lungs, skin and eyes.

Remove the victim's clothing, shoes and jewelry from the affected areas, cutting them off if necessary. Do this under a shower or while flushing with water.

Continue to flush with water until all trace of the chemical is gone and any slippery feeling has disappeared also. Rinse for at least 15 minutes.

Cover the victim with a blanket or dry clothing.

Notify a physician, emergency room or poison control center of the accident and obtain advice.

In case of inflammation, burns, blisters or pain:

- Loosely apply a dry sterile dressing, if available, or use a clean dry cloth.

- Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.

- If the victim is in a state of shock:

    - Lay the victim down on the victim's side and cover the victim with a blanket.

    - Elevate the victim's feet eight to twelve inches.

    - Notify an emergency medical service of the nature of the accident and arrange for transport to a medical facility.

Do not break open blisters or remove skin. If clothing is stuck to the skin after flushing with water, do not remove it.

Do not rub or apply pressure to the affected area.

Do not apply any oily substance to the affected skin.

Do not use hot water.

3.4.5 Poisoning by Eye Contact

Remove the victim from the contaminated area, being careful to protect your lungs, skin and eyes.

Act quickly. Seconds count. Flush the victim's eye(s) with clean tepid water for at least 15 minutes. Have the victim lie or sit down and tilt head back. Hold eyelid(s) open and pour water slowly over the eyeball(s) starting at the inner corners by the nose and letting the water run out of the outer corners. The victim may be in great pain and want to keep eyes closed or rub them but you must rinse the chemical out of the eye(s) in order to prevent possible permanent damage.

Ask the victim to look up, down and side to side as you rinse.

Call an emergency medical service and arrange for transport to the nearest facility for examination and treatment as soon as possible. Even if there is no pain and vision is good, a physician should examine the eye(s) since delayed damage may occur.

If the eye(s) is(are) painful:

- Cover loosely with gauze or a clean, dry cloth
- Maintain verbal and physical contact with the victim

4 AIR MONITORING

Under certain conditions at landfills, air monitoring will be necessary to ensure the health and safety of workers. The following air quality parameters are typically monitored under these conditions. Any necessary air monitoring will be described in the SSSP.

4.1 Oxygen

During excavation activities, a direct reading oxygen meter will be used to determine the percent of oxygen in the atmosphere.

Instrument Reading	**Action to be Taken**
<19.5% or >23.5%	Cease operations and move to a safe area. Re-evaluate the work plan. Engineering controls such as forced ventilation and use of non-sparking tools are to be implemented if operations are to continue. **DO NOT CONTINUE WORKING UNTIL OXYGEN LEVELS ARE BETWEEN 19.5 AND 23.5%.** When oxygen levels are outside this range, combustible gas meter readings are not reliable.

4.2 Combustible Gases

During excavation activities in waste material, readings of a combustible gas meter will be collected continuously. The readings are generally given as a percentage of the lower explosion limit (% LEL). When air monitoring is required, take area air samples at the following locations daily. Record time, location and results of monitoring and actions taken based upon the readings:

- Upwind of work areas to establish background air contaminants
- In Support Zone to check for contamination
- Along decontamination line to check that decontamination workers are properly protected and on-site workers are not removing protective equipment in a contaminated area
- Exclusion Zone to verify level of protection and Exclusion Zone boundaries
- Downwind of work area to track any contaminants leaving site

Instrument Reading	Action to be Taken
0 to 10% LEL	Continue working and monitoring the atmosphere for combustible gases. Inform personnel working in the area whenever readings are >5% LEL.
10 to 20% LEL	Continue working with caution. Inform personnel working in the area of the readings. Be prepared to cease operations.
> 20% LEL	Cease operations and move to a safe area. Re- evaluate the work plan. Engineering controls such as forced ventilation and use of non-sparking tools are to be implemented if operations are to continue. Do not continue working until conditions are consistently below 20% LEL.

4.3 Volatile Organic Compounds (VOCs)

A Photoionization detector (PID) with a lamp rating of 10.6 eV will be used in the event that VOC monitoring is deemed necessary. Should readings taken in the breathing zone consistently exceed background for 15 minutes, cease operations and move to a safe area. Contact the project manager and the Health and Safety Manager and re-evaluate the work plan.

4.4 Calibration Requirements

Calibrate all monitoring equipment at the beginning and end of each work day and as recommended by the monitoring instrument's operating manual. Calibration data will be recorded in a bound field notebook or in the field notes. Documentation should include:

- Date/time
- Zero reading before calibration
- Concentration of calibration gas
- Reading obtained with calibration gas before adjusting span
- Final reading obtained with calibration gas after adjusting span

5 PERSONAL PROTECTIVE EQUIPMENT (PPE)

All PPE clothing and equipment should be of safe design and construction, should be maintained in a clean and reliable fashion, and fit properly. OSHA requires that many categories of PPE meet or be equivalent to standards developed by the American National Standards Institute (ANSI). For the categories listed below, equipment must meet or exceed the cited ANSI standard.

- Eye and Face Protection: ANSI Z87.1-1989 (USA Standard for Occupational and Educational Eye and Face Protection).
- Head Protection: ANSI Z89.1-1986.
- Foot Protection: ANSI Z41.1-1991.

For hand protection, there is no ANSI standard for gloves but OSHA recommends that selection be based upon the tasks to be performed and the performance and construction characteristics of the glove material. For protection against chemicals, glove selection must be based on the chemicals encountered, the chemical resistance and the physical properties of the glove material.

The following list outlines the personal protective equipment to be utilized for all site work conducted by EIL employees.

- Safety Boots - Steel toe/steel shank
- Hard Hat

At the discretion of the SSO, additional PPE may be required. This can include:

- Safety Glasses with side shields
- Face Shield
- Hearing Protection
- Outer Gloves - neoprene or nitrile
- Boot Covers – latex
- Chemical Resistant Clothing - Polycoated Tyvek
- Inner Gloves - vinyl or latex

Safety glasses are required within 50-ft of operating equipment, tools or machinery. Face shields are required during operations that may cause materials to fly into or spray the face. These include:

- Sawing metal or concrete
- Grinding or sanding operations
- In the vicinity of drilling operations when mud and liquids are sprayed in the work area
- When opening drums or tanks when hazardous materials under pressure are potentially present
- Cutting with a torch or when welding

6 LANDFILL GAS HAZARDS

Much of EIL's work occurs adjacent to or on landfill sites. A byproduct of the degradation of waste is landfill gas. Landfill gas typically consists of 55% to 60% methane, 40% to 45% carbon dioxide and trace amounts (typically less than 2%) of other gases. These gasses account for the odors emanating from a landfill and pose possible explosion, asphyxiation, and low-level chemical exposure hazards.

Any person performing construction or maintenance activities on or within 1,000 feet of a refuse filled area shall be made aware of the existence of or the potential for development of hazardous conditions. A distance of 1,000 feet is used by some authorities as the distance that landfill gas will migrate through soils under average conditions. Migration distance may be greater where gases pass through underground conduits or where surface conditions interfere with normal venting through soil cover. No smoking will be allowed at the construction site except in the areas designated by the site location contact.

6.1 Odors

An odorant is a chemical capable of eliciting an olfactory response whereas odor is the sensation resulting from that response. Odorants create odors by reacting with specialized sensory cells in the olfactory epithelium, a 5 cm2 region located at the roof of the nostril, by a much researched but still little-understood mechanism. Much of the literature cites the statistic that humans can smell between 4,000 and 10,000 different odors. In fact, no two substances smell exactly alike. The current understanding of smell discrimination indicates that humans are sensitive to an infinite number of odors with each odorant activating a unique combination of olfactory receptors.

The ability to detect odor and the perception of a particular odor (that is the like or dislike of an odor) varies widely among individuals. Scientists have found that the ability to detect odor and the perception of an odor can be dependent on age, gender, physical condition, smoking habits, exposure to odorants, and even sexual orientation. These factors can add up to a thousand fold difference between the least and most sensitive individuals in odor acuity and some interesting differences in odor perception. For example, it has been found that children younger than five years old rate the odor of sweat and feces as pleasant but above that age as unpleasant. Furthermore, the perception of an odor can change with odorant concentration.

An "odor threshold" is used to quantify the ability of an odorant to be detected by the human nose. The odor threshold, also referred to as a "detection threshold", for an odorant is the concentration at which 50 percent of a human panel can identify the presence of an odorant. Panels consist of individuals (panelists) that are selected and trained following the "Guidelines for Selection and Training of Sensory Panel Members" (ASTM Special Technical Publication 758).

An odorant must possess certain molecular properties in order to provide sensory properties. It must be at least somewhat both water and fat soluble and have a sufficiently

high vapor pressure and low polarity. Consequently, odorants are small molecules with molecular weights below 300 atomic mass units (amu) and are typically organic although there are some notable inorganic odorants (e.g., hydrogen sulfide).

6.1.1 Odorants associated with landfills

Landfills have the potential to cause malodors. These odors can originate from a number of different areas within the landfill of which the most important of these are:

- The working face
- The cap or temporary cover
- The gas collection and control system
- The leachate collection system
- Construction activities

Additional but typically less important odor-causing activities include arriving and queuing hauling trucks, on-site vehicles and heavy equipment, and adjacent unrelated landfill activities and businesses.

The majority of the odors detected at a landfill are a result of exposure of leachate or condensate to the atmosphere or the fugitive emission of landfill gas. Leachate is water that has been in contact with garbage. Condensate is the liquids that condense in the gas system as the landfill gas moves through the landfill collection system piping. While methane and carbon dioxide, the major components of landfill gas, are odorless, the trace organic chemicals include sulfides and ammonia. These chemicals are also present in leachate and condensate. It is primarily these chemicals that give landfill gas and leachate their unique odor.

Hydrogen sulfide, dimethyl sulfide, and mercaptans (thiols) are the three most common sulfides responsible for landfill odors. Hydrogen sulfide produces a very strong rotten-egg smell—even at very low concentrations. Humans can detect hydrogen sulfide at concentrations as low as 0.5 parts per billion (ppb). At levels approaching 50 ppb, people can find the odor offensive. The odor of dimethyl sulfide is associated with the decaying (and cooking) of certain vegetables, notably corn and cabbage, and seafoods. Like hydrogen sulfide, dimethyl sulfide is detectable at very low concentrations (the odor threshold is 1 ppb).

Mercaptans have a strongly disagreeable odor that humans can also detect at minute concentrations. For example, the odor threshold for ethyl mercaptan (ethanethiol) is 0.19 parts per billion (ppb). The low odor threshold of mercaptans is utilized by gas distributors to make otherwise odorless fuels such as natural gas, propane, and butane and propane easily detectable by smell. Mercaptans are also responsible for the strongly repellent odor of skunks.

Ammonia is another odorous landfill gas that is produced by the decomposition of organic matter in the landfill. Ammonia is common in the environment and an important compound for maintaining plant and animal life. People are exposed daily to low levels of ammonia in the environment from the natural breakdown of manure and dead plants and animals. Because ammonia is commonly used as a household cleaner, most people are familiar with its distinct smell.

Humans are much less sensitive to the odor of ammonia than they are to sulfide odors. The odor threshold for ammonia is between 28,000 and 50,000 ppb. Landfill gas has been reported to contain between 1,000,000 and 10,000,000 ppb of ammonia, or 0.1% to 1% ammonia by volume. Concentrations in ambient air at or near the landfill site are expected to be much lower.

Odors can be a source of undesirable health effects or symptoms, such as headaches and nausea. It is unclear whether it is the constituent itself or its odors that trigger a response. Typically, these effects fade when the odor can no longer be detected. Consequently, should odor-related health complaints occur, the affected person should be moved to an area outside of Medical attention is usually not required.

6.2 Explosion Hazards

Landfill gas may form an explosive mixture when it combines with air in certain proportions. The concentration levels at which gas has the potential to explode has a lower explosive limit (LEL) and an upper explosive limit (UEL). The LEL and UEL are measures of the percent of a gas in the air by volume. At concentrations below the LEL or above the UEL, a gas is not explosive. However, an explosion hazard may exist if a gas is present in the air between the LEL and UEL and an ignition source is present.

Methane is the constituent of landfill gas that is likely to pose the greatest explosion hazard. Methane is explosive between it's LEL of 5% by volume and it's UEL of 15% by volume. Continuous methane monitoring is typically required in buildings associated with the landfill operations including gas to energy plants. If a continuous methane monitor is not present in the building, continuous methane monitoring will be coordinated by the SSO.

6.3 Asphyxiation Hazards

Landfill gas poses an asphyxiation hazard only if it collects in an unventilated or enclosed space (e.g., a basement or utility corridor) at concentrations high enough to displace existing air and create an oxygen-deficient environment. OSHA defines an oxygen-deficient environment as one that has less than 19.5% oxygen by volume. Ambient air contains approximately 21% oxygen by volume.

If workers are to be entering areas where asphyxiation hazards are a concern, the workers will be equipped with, and required to carry, quad gas meters that measure methane, carbon monoxide, hydrogen sulfide and oxygen. The SSO will include this requirement in the SSSP.

7 SITE SPECIFIC SAFETY PLAN (SSSP)

Prior to beginning any new job, the SSO will develop a SSSP. The SSO will identify physical and health hazards at the work site. Those deemed to be significant potential hazards will be listed and discussed in the SSSP using the guidelines of this GSSP. The SSSP will include a brief description of the project and the following information:

- A list of key personnel including the SSO with contact information.
- A list of emergency contacts including the emergency phone numbers for local ambulance, fire, and police.
- The nearest non-emergency medical facility with directions and contact information.
- A discussion of the health and safety responsibilities of the client, contractor, and subcontractor.
- General rules and regulations applicable to the specific job site.
- Safety Rules and Regulations to be emphasized based on the actual physical and health hazards at the work site.
- Accident reporting guidelines.
- A site map showing entrances to be used by workers, designated parking area, materials storage area, speed limits, direction of travel, break area, and smoking area.
- A site specific emergency evacuation plan.
- A sign off-sheet signed by the contractor that certifies that:
    - Contractor acknowledges and, if appropriate, is aware that the client's facility is located on a sanitary landfill site.
    - Contractor's employees have been trained in the applicable work/task being performed.
    - All Contractor employees are medically qualified to perform their work/task. If applicable, the Contractor is to submit all verification of employee training for any special operations (i.e. confined space, respirator, 40 hour HAZWOPER).

- Contractor's agents and employees will be properly supervised to ensure strict observance of all safety rules and regulations referenced herein.

- Contractor has received the Company's Safety Procedures.

- Contractor agrees to fully advise all of its employees, subcontractors and others working for the Contractor of the facility risk and of all necessary environmental, safety and health procedures required by Federal, State, or Municipal regulations and of Company requirements.

APPENDIX D7

Flare Compliance Emissions Test Report 2021

Geosyntec consultants

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14 October 2021

Ms. Allison Fraley;
Solid Waste Management Division
Department of Public Works
The County of Kaua‘i
4444 Rice Street, Suite 295
Lihue, Kaua‘i, HI 96766

Subject: Annual Flare Performance Test Report for the Year 2021
Landfill Gas Collection and Control System
Kekaha Municipal Solid Waste Landfill, Kekaha, Kaua‘i, Hawai‘i

Dear Ms. Fraley:

Geosyntec Consultants, Inc. (Geosyntec) is pleased to submit the 2021 Annual Flare Performance Test Report for the Kekaha Municipal Solid Waste Landfill (KMSL), Kekaha, Kaua‘i, Hawai‘i.

The annual flare performance test was conducted on August 18, 2021 in accordance with the KMSL covered source permit (CSP) # 0802-01-C requirements and the test protocol submitted on July 14, 2021. The CSP requires that the flare must either reduce nonmethane organic compounds (NMOC) by 98% by weight average or reduce the outlet NMOC concentration to less than twenty (20) parts per million by volume (ppmv) average, dry basis as hexane at three (3) percent oxygen (O_2).

The flare performance test results demonstrate that the flare complies with the CSP permit requirement as the measured average effluent NMOC concentration is 2.2 ppmv at 3% O_2 as hexane which is less than the permit limit of 20 ppmv at 3% O_2 as hexane. The annual flare performance test report includes source description, project team, sampling and analytical methods and test results.

Geosyntec appreciates the opportunity to be of continued service to the County of Kaua‘i, Department of Public Works, Solid Waste Management Division. Please contact the undersigned at 510-285-2683 if you have any questions.

Sincerely,

Aklilu A. Tesfamichael, Ph.D.
Senior Engineer

Annual Flare Performance Test Report (2021)
Kekaha Municipal Solid Waste Landfill
Kekaha, Kaua‘i, Hawai‘i

1. Terms of Reference

On behalf of the County of Kaua’i, Department of Public Works, Geosyntec Consultants, Inc. (Geosyntec) has prepared the 2021 Annual Flare Performance Test Report for the KMSL enclosed flare located at 6900D Kaumuali‘i Highway, Kekaha, Kaua‘i, Hawai‘i. The flare performance test was conducted by Zeeco Inc., a flare manufacturing and testing subcontractor retained by Geosyntec. The full compliance certification report as provided by Zeeco Inc. is attached to this summary report.

The annual flare performance test was conducted in accordance with the Kekaha Municipal Solid Waste Landfill covered source permit (CSP) # 0802-01-C requirements and the New Source Performance Standard (NSPS) for Municipal Solid Waste Landfills (40 Code of Federal Regulations [CFR] 60, Subpart WWW). The CSP requires that the operator conduct performance test on the flare annually.

2. Source Description

The Kekaha Solid Waste Landfill is approximately 98 acres active, municipal solid waste (MSW) landfill, consisting of Phase I and Phase II fill areas. Phase I received MSW circa 1960 to 1993 and Phase II began operations in 1993 and has since been actively receiving waste. In 2020, the County completed construction of Cell 2, extending Phase II fill area. In 2016, the site installed a landfill gas collection and control system (GCCS) consisting of 57 vertical extraction wells, three condensate collection sumps, and a skid mounted control system comprising enclosed flare in compliance with the site’s covered source permit requirements. Landfill gas (LFG) is collected from the entire landfill area, and no area is excluded from collection based on the presence of asbestos or nondegradable material or based on nonproductivity. The site is projected to receive approximately 3.0 million tons of waste by estimated year of landfill closure in 2027 with the projected LFG flow rate approximately 874 standard cubic feet per minute (scfm) and collection rate of 655 scfm at standard 75% collection efficiency.

The flare is approximately 40 feet high and 6-ft in diameter and is designed to handle LFG flow up to 750 scfm. Two multistage centrifugal blowers (duty and standby) each with a Variable Frequency Drive are used to extract LFG and control of off-site migration and surface emission. The blowers’ range can accommodate full rated flare capacity of 750 scfm with 40 inches water column capacity at the skid inlet to the knock-out vessel.

3. Sampling and Analytical Methods

The flare performance test was conducted in accordance with the test protocol submitted to DOH. The sampling and analytical methods used include EPA 25C / 3C, EPA Method 19, and ASTM 1945/ ASTM 3588 as well as Method 25A for outlet. Three, 60-minute test runs were performed following the test protocol and test results were based on the average of the three runs. During the test, the flare was operated at an average operating temperature of 1,547 degrees Fahrenheit (°F) based on the middle thermocouple readings and average LFG flow rate of 429 cfm. The average LFG methane content ranged from 42.5 % to 43.2 %, the average methane content during testing was 42.9%.

4. Summary of Performance Test Results

The performance test was conducted on the enclosed Zeeco flare to establish the reduction efficiency or parts per million volume (ppmv) of the control system designed and operated to reduce NMOC by ninety-eight (98) weight-percent or reduce the outlet NMOC concentration to less than twenty (20) ppm by volume, dry basis as hexane at three (3) percent oxygen. The results are as follows:

- Average outlet NMOC concentration was 2.2 ppmv at 3% O_2 as hexane
- Average NMOC Destruction Efficiency was 91.5%

The flare meets the CSP permit requirement as the average NMOC concentration of 2.2 ppmv at 3% O_2 as hexane is less than the 20 ppmv at 3% O_2 as hexane permit limit.

The complete test report including sampling and analytical methods, pollutants tested, test results and supporting calculations are attached to this summary report.

ATTACHMENT

Compliance Test Report

Kekaha Municipal Solid Waste Landfill
6900 Kaumaulii Highway #A
Kauai, HI 96752

For

Zeeco 30 MMBTU Landfill Gas Flare
Hawaii Department of Health – Environmental Health
Permit No. 0802-01-C

Zeeco Inc.
11505 Commonwealth Drive
Suite 104
Louisville, Kentucky 40299

DECLARATION OF ACCURACY

Certification of sampling procedures by the team leader of the personnel conducting the sampling procedures and compiling the test report:

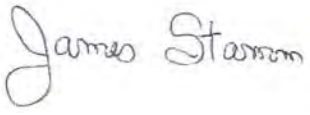
"I certify that the sampling procedures were performed in accordance with the approved test plan and that the data presented in this report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: Name of Person Signing: Troy Hardin

Title: Environmental Test Technician Date: 9/20/21

Certification of test report by the senior staff person at the company who is responsible for checking the test report:

"I certify that this test report and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed sampling and analysis relating to the performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature:  Name of Person Signing: James Stamm, P.E.

Title: Sr. Environmental Engineer Date: 9/20/21

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Table 2-1 Summary of Testing Results
Table 3-1 Source Testing Methodology

Introduction

Zeeco Inc. (Zeeco) was contracted to perform a compliance emissions test at the Kekaha Municipal Solid Waste Landfill (KMSL) Flare located at 6900 Kaumaulii Hwy, Kauai, Hawaii. The facility operates under Hawaii Department of Health- Environmental Management Division Permit No. 0802-01-C. The performance test was conducted on a Zeeco 30 MMBTU Enclosed Flare on August 18, 2021. Three test runs were completed on the enclosed flare using the following methods:

USEPA TEST METHOD	MEASUREMENT
Method 25C	Inlet and Outlet NMOC and CH_4
Method 25A	Outlet VOC (measured as TGNMO)
Method 3C	Outlet Oxygen
Method 19	Outlet flow
ASTM 1945 & 3588	LFG Fuel analysis for BTU Content, CH4, N_2, O_2 CO_2 and CO

As listed in the test protocol, outlet emissions were sampled and analyzed using both Methods 25A and 25C. Both sets of data are presented in this report. The performance test is intended to meet the requirements listed in 40 CFR 60, Subpart WWW and 40 CFR 63, Subpart AAAA. Testing was performed to demonstrate that the enclosed flare met either a 20 ppmv outlet concentration or a 98% weight percent destruction efficiency as described in 40CFR60.752.

Facility Description

The KMSL is an active 98-acre, municipal solid waste (MSW) landfill. It was constructed over two phases from 1960 to 1993 (Phase I) and 1993 to present (Phase II). A landfill gas collection and control system (GCCS) was installed in 2016 and consists of 57 vertical extraction wells, three condensate collection sumps and an enclosed flare that serves as the site's air pollution control device (APCD).

The APCD is a Zeeco Inc.30 MMBTU enclosed flare. It is approximately 40 feet high with a 6 ft. internal diameter. The enclosed flare is designed to accommodate up to 750 scfm of landfill gas (LFG) and supply up to 40 inches of water column of vacuum to main collection header. The enclosed flare was operated at an average operating temperature of 1,547 F^{o} measured by a thermocouple located in the middle portion of the stack.

Project Team

Testing was conducted by Mr. Troy Hardin and Jeff Breedon of Zeeco and Mr. Chris Scott of Geosyntec. Mr. James Stamm served as Zeeco's Project Manager. Mr. Chris Scott of Geosyntec also served as Zeeco's onsite contact and Mr. Aklilu Tesfamichael of Geosyntec served as the overall project manager. Mr. Troy Tanigawa of the Kauai Department of Public Works – Solid Waste Division is the source contact and manages the Kekaha Landfill facility.

Method Deviations

There were no deviations from the U.S. EPA Reference Test Methods during the onsite testing.

Summary of Results

Zeeco conducted compliance emission testing at the Kekaha Landfill on August 18, 2021. Testing was conducted to determine if the enclosed flare either met the regulatory emission limit of 20 ppmv (as Hexane) or a destruction efficiency of 98%. (It is noted that the regulation allows the source to meet either the emission concentration or destruction efficiency).

Table 2-1 provides a summary of the emission testing results with comparisons to the applicable state permit limits. Any differences between the summary results listed in the following table and the detailed calculations are contained in Appendix B are due to rounding for presentation.

Table 2-1
Summary of Testing Results

Emission Parameter	Average Result	Permit Limit	Compliance Status
NMOC (ppmvd @3% O2 as Hexane)	2.2	< 20 ppmvd	In Compliance
NMOC Destruction Efficiency	91.5%	>98%	Not applicable*

**: Does not apply due to meeting the concentration-based emission limit standard*

Outlet VOC data was measured using U.S. EPA Method 25A as described in 40 CFR 60, Appendix A in addition to Method 25C. Analysis of the VOC data (measured as total gaseous nonmethane organics (TGNMO)) showed much higher outlet concentration which is not consistent with historic previous year's results and the current year test results at the flare. The flare unit is operating at historically similar LFG flow, LFG concentration and temperature, and these operating parameters have not changed from previous years. Therefore, results from Method 25A were deemed inconsistent and not used in the performance evaluation of the flare. Based on field observations, the presence of moisture and other possible interferences present in similar landfill sites may have caused erroneous reading by the instrument. Without additional sampling and analysis, it would not be possible to identify specific compounds that would be the cause of the interferences. U.S. EPA documents have suggested that alcohols such as methanol and ethanol as well as complex organics such as acetaldehyde or formaldehyde may not measure or respond well to this method.

Testing Methodology

The emission testing program was conducted in accordance with the U.S. EPA Reference Test Methods listed in Table 3-1. Method descriptions are provided below while quality assurance/quality control data is provided in Appendix C.

Table 3-1
Source Testing Methodology

Source	Target Parameter	Proposed Method	Number of Test Runs	Test Run Duration
Enclosed Flare	NMOC, CH4, O2, VOC (measured as gaseous nonmethane organics)	EPA 25C/3C, EPA 25A(outlet only	3	1 hour
Enclosed Flare	Outlet Flow	EPA 19	3	1 hour
Enclosed Flare	Stack Temperature	Process	3	1 Hour
Enclosed Flare	LFG Flow	Process	3	1 Hour
Enclosed Flare	LFG NMOC, CH4 and BTU Content	EPA 25C, ASTM 1945 and 3588	3	1 Hour

EPA 25C/3C: Sampling consisted of collecting emissions into pre-evacuated 6 liter SUMMA canisters using preset flow controllers. The controllers were set to collect samples over a one-hour period. The samples were analyzed for NMOC by gas chromatograph (GC) using EPA Method 25C and O_2, CO and CO_2 using EPA Method 3C. These results are presented in Appendix C.

EPA 25A: Sampling consisted of sampling and measuring outlet emissions using a Flame Ionization Detector (FID) analyzer calibrated using a mixture of propane and nitrogen for the full-scale range of the instrument. US EPA Protocol 1 gases was used to calibrate the analyzer. US EPA Protocol gases are referenced in “EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards”, U.S. Environmental Protection Agency, Quality Assurance and Technical Support Division, Research Triangle Park, N.C. September 1993.

The exhaust VOC (as total gaseous nonmethane organics (TGNMO)) sample was taken through a heated sample line that is automatically regulated to 248º F +/- 25Fº. Following analysis of the vapor samples by the FID instrument, data was stored digitally in Yokogawa data logger and complied into one-hour averages. This data was collected for additional analysis of the unit.

ASTM D-1945/ ASTM D-3588: Emission samples were collected in SUMMA canisters using present flow controllers to take samples for a duration of 60 minutes. Method D-1945 used a gas chromatograph/mass spectroscopy (GC/MS) to measure gas components including alkane hydrocarbons C1-C6. Method D-3588 was used to calculate heat value (BTU/CF), compressibility, density and f-factor.
Process Data: The KMSL monitors and records landfill gas flowrate and operating temperature in site PLC. Data from this system was collected during each test run at 1 minute intervals. The summary of these results is presented in Appendix D.

Conclusions

Sampling and analysis were completed on the enclosed flare located at the Kekaha Landfill in Kauai, Hawaii. The average outlet concentration of non-methane organic compounds was 2.2 ppmv (expressed as hexane) and below the regulatory standard of 20 ppmv. Based on this result, the enclosed flare complies with emissions standard in 40CFR60 subpart WWW and 40CFR63 subpart AAAA.

Appendix A

Tabulated Results

Test Run	Run 1	Run 2	Run 3	Average
Test Date	8/18/2021	8/18/2021	8/18/2021	
Test time	13:25-14:25	14:32-15:32	15:37-16:37	
Standard Temperature (F)	68	68	68	
Flare Temperature (F)	1,553	1,549	1539	1,547
Fuel Flow Rate (DSCFM)	426	428	433	429
Fuel Heat Input (MMBTU/HR)	11.4	11.2	10.9	11.2
Exhaust Flow Rate (DSCFM)	5232	5563	5187	5327
Oxygen (%)	12.7	13.4	12.9	13.0
Carbon Dioxide (%)	6.8	6.4	6.8	6.7
NMHC (ppm as CH4)	6.1	5.5	5.7	5.8
NMHC ppm as Hexane)	1.00	0.90	0.93	0.94
NMHC (LBS/HR as Hexane)	0.0130	0.0125	0.0121	0.0125
NMHC (ppm @3% O2 as Hexane)	**2.2**	**2.2**	**2.1**	**2.2**
Inlet NMHC (ppm as CH4)	607	1,045	1,053	902
Inlet NMHC (ppm as Hexane)	99	171	172	148
Inlet NMHC (LBS/HR as Hexane)	0.105	0.182	0.186	0.158
NMHC (Removal Efficiency)	**87.7%**	**93.2%**	**93.5%**	**91.5%**
CH4 (ppm)	1.9	1.8	3.7	2.5
CH4 (LBS/HR)	0.0	0.0	0.0	0.0
Inlet CH4 (ppm)	429,000	425,000	432,000	428667
Inlet CH4 (LBS/HR)	455.5	453.4	466.2	458.4
CH4 Removal Efficiency	100.0%	100.0%	100.0%	100.0%
THC (ppm)	607	1,045	1,053	902
THC (LBS/HR as CH4)	7.9	14.5	13.6	12.0
Inlet THC (TOC) (ppm as CH4)	481,277	471,146	483,114	478,512
Inlet THC (TOC) (LBS/HR as CH4)	511.0	502.6	521.4	511.7
THC (TOC Removal Efficiency)	98.5%	97.1%	97.4%	97.7%

Terms

ppm = parts per million concentration

LBS/HR = Pounds per Hour emission rate

DSCFM = Dry Standard Cubic Feet per Minute

TOC =THC= Total Organic Carbon as methane (CH4, MW=16)

CH4 = Methane (MW = 16)

THC = Total Hydrocarbon as Methane (MW = 16)

NMHC = Total Non-Methane Hydrocarbons as Methane (MW=16)

MMBTU = Million British Thermal Units (BTU)

T Std R = Standard temperature (absolute in Degrees Rankin)

Calculations

PPM @3% O2 = PPM (17.9/(20.9-%O2))

LBS/HR = ppm (8.223X10-5)(DSCFM)(MW) / T stdR

LBS/MMBTU = (LBS/HR)/(MMBTU/HR)

Removal Efficiency = (inlet LBS/HR - outlet LBS/HR) / inlet LBS/HR

NMHC as Hexane @3%O2 = (NMHC as CH4/6)(17.9/(20.9-%O2))

Appendix B

Calculations

Facility:	Kekaha Landfill		
Unit:	30.0 mmBTU Enclosed Flare		
Test Date:	8/18/2021		
Run Number	1	2	3
Time:	13:25-14:25	14:32-15:32	15:37-16:37
Gas Temperature (F^o)	90	90	90
Stack Oxygen (%)	12.7	13.4	12.9
Landfill Gas Flowrate (FT^3 /MIN)	438	435	428
LFG Heating Value, BTU/SCF	435	431	438
LFG Fd Factor, DSCF/MMBTU	10,755	10,816	10,750
Fuel Rate, SCFH	26,298	26,076	25,668
Stack Volumetric Flow Rate			
Flow, DSCFH (using Method 19)	313,901	333,794	311,192
Flow DSCFM(using Method 19)	5,231.7	5,563.2	5,186.5

CALCULATIONS:

Flow (DSCFH) = (LFG Rate)(LFG Heating Value)(LFG Factor per LFG Analysis)(20.9/(20.9-%O2))/1.0 X E06

where:

LFG Temperature is measured in the field

Stack Oxygen is measured in outlet samples

LFG Rate was measured in the field

LFG Heat Value is determined in the inlet LFG samples

LFG Fd Factor was calculated based on ratio of combustion gas volumes to heat inputs

Facility: Kekaha Landfill
Unit: 30.0 mmBTU Enclosed Flare
Condition: Run #1
Test Date: August 18 2021

	Molecular Weight	Ideal Gas Specific Gravity Gi	Ideal Gas Total Caloric Value Hi	Compressibility Summuation Factor	Specific Volume (Ft3/LB)	Concentration (%/ppm)	Comparsion Mole Fraction xi	Specific Gravity Fraction	Caloric Value Fraction	Compressibility Fraction	Xi MW	Weight Fraction	Carbon Weight Fraction	Hydrogen Weight Fraction	Oxygen Weight Fraction	Nitrogen Weight Fraction	Sulfer Weight Fraction	CHONS Sum	Specific Volume (FT3/LB)
Helium	4.00	0.1382	0	-0.017			0	0	0.0	0.0000	0.0000	0							
Hydrogen	2.02	0.0696	324.9		187.7	1.9	0.019	0.0013	6.2	0.0000	0.03838	0.0014							
Nitrogen	28.01	0.9672	0	0.016	13.44	22.5	0.225	0.2176	0.0	0.0037	6.30225	0.2223				0.2223		0.2223	2.988991
Oxygen	32.00	1.1053	0		11.82	1.1	0.011	0.0122	0.0	0.0000	0.3520	0.0124						0.0000	0.0000
Carbon Monoxide	28.01	0.9671	321.3	0.022	13.51	0.2	0.002	0.0019	0.6	0.0000	0.0560	0.0020	0.0008		0.0011			0.0020	0.0267
Carbon Dioxide	44.01	1.5194	0	0.064	8.548	33.4	0.334	0.5075	0.0	0.0214	14.6993	0.5186	0.1416		0.3775			0.5191	4.4374
Methane	16.04	0.5539	1012	0.044	23.57	42.9	0.429	0.2376	434.1	0.0187	6.88116	0.2428	0.1821	0.0607				0.2428	5.7209
Ethane	30.01	1.0382	1773	0.092	12.46	4.8	0.00000	0.0000	0.0	0.0000	0.00014	0.0000	0.0000	0.0000				0.0000	0.0001
Propane	44.09	1.5224	2523	0.134	8.365	45.5	0.00005	0.0001	0.1	0.0000	0.00201	0.0001	0.0001	0.0000				0.0001	0.0006
Isobutane	58.12	2.0067	3260	0.174	6.321	10.4	0.00001	0.0000	0.0	0.0000	0.0006	0.0000	0.0000	0.0000				0.0000	0.0001
n-butane	58.12	2.0067	3270	0.183	6.321		0.00000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
isopentane	72.14	2.491	4009	0.228	5.252	5.9	0.00001	0.0000	0.0	0.0000	0.00043	0.0000	0.0000	0.0000				0.0000	0.0001
n-pentane	72.14	2.491	4019	0.238	5.252		0.00000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
hexane	86.17	2.9753	4758	0.283	4.398	9	0.00001	0.0000	0.0	0.0000	0.00078	0.0000	0.0000	0.0000				0.0000	0.0001
C6+	86.17	2.9753	4758	0.283	4.398	131	0.00013	0.0004	0.6	0.0000	0.01129	0.0004	0.0003	0.0001				0.0004	0.0018
Total						206.6		0.979	441.81	0.022	28.34	1.0000	0.3249	0.0608	0.3787	0.2223	0.0000	0.9867	13.177

Calculated Specific Gravity (SG) (Air = 1.00@ 760 mmHG, 60 F) 0.985
Compressibility Factor (Z) 0.999
Z=1-(CompFactor)2 + (2(H)(H2) (0.0005)

Specific Gravity (corrected) 0.984

Specific Volume (FT3/LBS) 13.2 FT3/LBS

Gross Calorific Value (CGV) @ 60F BTU/Ft3 442 BTU/FT3
Gross Calorific Value (CGV) @ 68F BTU/FT3 435 BTU/FT3
BTU/LBS = BTU/FT3(FT3/LBS)

Gross Calorific Value (GCV) BTU/LBS 5,734 BTU/LBS

Gas Fd Factor @ 68F DSCF/MMBTU 10,755 DSCF/MMBTU
DSCF/MMBTU = 10^6* ((3.64*%H2) + (1.53*%C)+(0.57*%S)+(0.14*%N2)-(0.46*%O2))/BTU/LBS
Gas Fd Factor @ 60F DSCF/MMBTU 10,594 DSCG/MMBTU

Facility: Kekaha Landfill
Unit: 30.0 mmBTU Enclosed Flare
Condition: Run #2
Test Date: August 18 2021

	Molecular Weight	Ideal Gas Specific Gravity Gi	Ideal Gas Total Caloric Value Hi	Compressibility Summuation Factor	Specific Volume (Ft3/LB)	Concentration (%/ppm)	Comparsion Mole Fraction xi	Specific Gravity Fraction	Caloric Value Fraction	Compressibility Fraction	Xi MW	Weight Fraction	Carbon Weight Fraction	Hydrogen Weight Fraction	Oxygen Weight Fraction	Nitrogen Weight Fraction	Sulfer Weight Fraction	CHONS Sum	Specific Volume (FT3/LB)
Helium	4.00	0.1382	0	-0.017			0	0	0.0	0.0000	0.0000	0							
Hydrogen	2.02	0.0696	324.9		187.7	1.9	0.019	0.0013	6.2	0.0000	0.03838	0.0014							
Nitrogen	28.01	0.9672	0	0.016	13.44	23.1	0.231	0.2234	0.0	0.0038	6.47031	0.2281				0.2281		0.2281	3.065963
Oxygen	32.00	1.1053	0		11.82	1.4	0.014	0.0155	0.0	0.0000	0.4480	0.0158						0.0000	0.0000
Carbon Monoxide	28.01	0.9671	321.3	0.022	13.51	0.2	0.002	0.0019	0.6	0.0000	0.0560	0.0020	0.0008		0.0011			0.0020	0.0267
Carbon Dioxide	44.01	1.5194	0	0.064	8.548	33	0.33	0.5014	0.0	0.0211	14.5233	0.5119	0.1398		0.3727			0.5124	4.3804
Methane	16.04	0.5539	1012	0.044	23.57	42.5	0.425	0.2354	430.1	0.0185	6.817	0.2403	0.1802	0.0601				0.2403	5.6625
Ethane	30.01	1.0382	1773	0.092	12.46	4.7	0.00000	0.0000	0.0	0.0000	0.00014	0.0000	0.0000	0.0000				0.0000	0.0001
Propane	44.09	1.5224	2523	0.134	8.365	44.4	0.00004	0.0001	0.1	0.0000	0.00196	0.0001	0.0001	0.0000				0.0001	0.0006
Isobutane	58.12	2.0067	3260	0.174	6.321	10.1	0.00001	0.0000	0.0	0.0000	0.00059	0.0000	0.0000	0.0000				0.0000	0.0001
n-butane	58.12	2.0067	3270	0.183	6.321		0.00000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
isopentane	72.14	2.491	4009	0.228	5.252	5	0.00001	0.0000	0.0	0.0000	0.00036	0.0000	0.0000	0.0000				0.0000	0.0001
n-pentane	72.14	2.491	4019	0.238	5.252		0.00000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
hexane	86.17	2.9753	4758	0.283	4.398	8.1	0.00001	0.0000	0.0	0.0000	0.0007	0.0000	0.0000	0.0000				0.0000	0.0001
C6+	86.17	2.9753	4758	0.283	4.398	150	0.00015	0.0004	0.7	0.0000	0.01293	0.0005	0.0004	0.0001				0.0005	0.0020
Total						222		0.980	437.84	0.022	28.37	1.0000	0.3213	0.0602	0.3738	0.2281	0.0000	0.9834	13.138

Calculated Specific Gravity (SG) (Air = 1.00@ 760 mmHG, 60 F) 0.985
Compressibility Factor (Z) 0.999
Z=1-(CompFactor)2 + (2(H)(H2) (0.0005)

Specific Gravity (corrected) 0.984

Specific Volume (FT3/LBS) 13.1 FT3/LBS

Gross Calorific Value (CGV) @ 60F 438 BTU/FT3
Gross Calorific Value (CGV) @ 68F 431 BTU/FT3
BTU/LBS = BTU/FT3(FT3/LBS)

Gross Calorific Value (GCV) 5666 BTU/LBS

Gas Fd Factor @ 68F 10816 DSCF/MMBTU
DSCF/MMBTU = 10^6* ((3.64*%H2) + (1.53*%C)+(0.57*%S)+(0.14*%N2)-(0.46*%O2))/BTU/LBS
Gas Fd Factor @ 60F 10653 DSCF/MMBTU

Facility: Kekaha Landfill
Unit: 30.0 mmBTU Enclosed Flare
Condition: Run #3
Test Date: August 18 2021

	Molecular Weight	Ideal Gas Specific Gravity Gi	Ideal Gas Total Caloric Value Hi	Compressibility Summuation Factor	Specific Volume (Ft3/LB)	Concentration (%/ppm)	Comparsion Mole Fraction xi	Specific Gravity Fraction	Caloric Value Fraction	Compressibility Fraction	Xi MW	Weight Fraction	Carbon Weight Fraction	Hydrogen Weight Fraction	Oxygen Weight Fraction	Nitrogen Weight Fraction	Sulfer Weight Fraction	CHONS Sum	Specific Volume (FT3/LB)
Helium	4.00	0.1382	0	-0.017			0	0	0.0	0.0000	0.0000	0							
Hydrogen	2.02	0.0696	324.9		187.7	1.9	0.019	0.0013	6.2	0.0000	0.03838	0.0014							
Nitrogen	28.01	0.9672	0	0.016	13.44	22	0.22	0.2128	0.0	0.0036	6.1622	0.2171				0.2171		0.2171	2.918097
Oxygen	32.00	1.1053	0		11.82	1.1	0.011	0.0122	0.0	0.0000	0.3520	0.0124						0.0000	0.0000
Carbon Monoxide	28.01	0.9671	321.3	0.022	13.51	0.2	0.002	0.0019	0.6	0.0000	0.0560	0.0020	0.0008		0.0011			0.0020	0.0267
Carbon Dioxide	44.01	1.5194	0	0.064	8.548	33.7	0.337	0.5120	0.0	0.0216	14.8314	0.5225	0.1426		0.3803			0.5230	4.4704
Methane	16.04	0.5539	1012	0.044	23.57	43.2	0.432	0.2393	437.2	0.0188	6.92928	0.2441	0.1831	0.0610				0.2441	5.7521
Ethane	30.01	1.0382	1773	0.092	12.46	4.8	0.00000	0.0000	0.0	0.0000	0.00014	0.0000	0.0000	0.0000				0.0000	0.0001
Propane	44.09	1.5224	2523	0.134	8.365	43.1	0.00004	0.0001	0.1	0.0000	0.0019	0.0001	0.0001	0.0000				0.0001	0.0006
Isobutane	58.12	2.0067	3260	0.174	6.321	10	0.00001	0.0000	0.0	0.0000	0.00058	0.0000	0.0000	0.0000				0.0000	0.0001
n-butane	58.12	2.0067	3270	0.183	6.321		0.00000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
isopentane	72.14	2.491	4009	0.228	5.252	5.3	0.00001	0.0000	0.0	0.0000	0.00038	0.0000	0.0000	0.0000				0.0000	0.0001
n-pentane	72.14	2.491	4019	0.238	5.252		0.00000	0.0000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000				0.0000	0.0000
hexane	86.17	2.9753	4758	0.283	4.398	8.8	0.00001	0.0000	0.0	0.0000	0.00076	0.0000	0.0000	0.0000				0.0000	0.0001
C6+	86.17	2.9753	4758	0.283	4.398	172	0.00017	0.0005	0.8	0.0000	0.01482	0.0005	0.0004	0.0001				0.0005	0.0023
Total						244		0.980	445.03	0.023	28.39	1.0000	0.3271	0.0611	0.3815	0.2171	0.0000	0.9868	13.170

Calculated Specific Gravity (SG) (Air = 1.00@ 760 mmHG, 60 F)	0.985	
Compressibility Factor (Z)	0.999	
Z=1-(CompFactor)2 + (2(H)(H2) (0.0005)		
Specific Gravity (corrected)	0.984	
Specific Volume (FT3/LBS)	13.2	FT3/LBS
Gross Calorific Value (CGV) @ 60F	445	BTU/FT3
Gross Calorific Value (CGV) @ 68F	438	BTU/FT3
BTU/LBS = BTU/FT3(FT3/LBS)		
Gross Calorific Value (GCV)	5773	BTU/LBS
Gas Fd Factor @ 68F	10749.9	DSCF/MMBTU
DSCF/MMBTU = 10^6* ((3.64*%H2) + (1.53*%C)+(0.57*%S)+(0.14*%N2)-(0.46*%O2))/BTU/LBS		
Gas Fd Factor @ 60F	10588.7	DSCF/MMBTU

Appendix C

Laboratory

Atmospheric Analysis & Consulting, Inc.

CLIENT : Zeeco
PROJECT NAME : Kekaha Landfill
AAC PROJECT NO. : 211481 Rev 1
REPORT DATE : 09/03/2021

On August 23, 2021, Atmospheric Analysis & Consulting, Inc. received three (3) Six-Liter Summa Canisters for TNMOC and Methane analysis by EPA 25C and Fixed Gases analysis by EPA 3C and three (3) Six-Liter Summa Canisters for ASTM D-1945 analysis and TNMOC analysis by EPA 25C. Upon receipt, the samples were assigned unique Laboratory ID numbers as follows:

Client ID	Lab No.	Return Pressure (mmHg)
Flare 1	211481-22636	736.1
Flare 2	211481-22637	747.3
Flare 3	211481-22638	734.8
LFG 1	211481-22639	731.1
LFG 2	211481-22640	735.5
LFG 3	211481-22641	730.8

This analysis is performed in accordance with AAC's Quality Manual. Test results apply to the sample(s) as received. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of these samples. The Technical Director or his/her designee, as verified by the following signature, has authorized release of the data.

If you have any questions or require further explanation of data results, please contact the undersigned.

Sucha Parmar, Ph.D.
Technical Director

This report consists of pages.

Amended Report 211481 Rev 1 supersedes Original Report 211481. The amended report was issued on 09/08/2021. Methane was reported down to ppmV levels for Flare samples 1,2 and 3.

This report consists of 9 pages.

2225 Sperry Ave., Ventura, CA 93003 www.aaclab.com • (805) 650-1642

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT : Zeeco
PROJECT NO. : 211481
MATRIX : Air

SAMPLING DATE : 08/18/2021
RECEIVING DATE : 08/23/2021
ANALYSIS DATE : 08/31/2021
REPORT DATE : 09/03/2021

ASTM D-1945 & EPA 25C

Client ID	LFG 1	LFG 2	LFG 3
AAC ID	211481-22639	211481-22640	211481-22641
Can Dilution Factor	1.92	1.89	1.92
Analyte	Result	Result	Result
H_2	< 1.9 %	< 1.9 %	< 1.9 %
O_2	1.1 %	1.4 %	1.1 %
N_2	22.5 %	23.1 %	22.0 %
CO	< 0.2 %	< 0.2 %	< 0.2 %
CO_2	33.4 %	33.0 %	33.7 %
CH_4	42.9 %	42.5 %	43.2 %
C_2 (as Ethane)	< 4.8 ppmV	< 4.7 ppmV	< 4.8 ppmV
C_3 (as Propane)	45.5 ppmV	44.4 ppmV	43.1 ppmV
C_4 (as Butane)	10.4 ppmV	10.1 ppmV	10.0 ppmV
C_5 (as Pentane)	5.9 ppmV	5.0 ppmV	5.3 ppmV
C_6 (as Hexane)	9.0 ppmV	8.1 ppmV	8.8 ppmV
C_6+ (as Hexane)	131 ppmV	150 ppmV	172 ppmV
TNMOC (as Carbon)	607 ppmC	1,045 ppmC	1,053 ppmC

All fixed gases have been normalized to 100% on a dry basis
Sample Reporting Limit (SRL) is equal to Reporting Limit x Analysis Dil. Fac x Canister Dil. Fac (if applicable)

2225 Sperry Ave., Ventura, CA 93003 www.aaclab.com • (805) 650-1642

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT : **Zeeco**
PROJECT NO. : **211481**
MATRIX : **AIR**

SAMPLING DATE : **08/18/2021**
RECEIVING DATE : **08/23/2021**
ANALYSIS DATE : **08/30-31/2021**
REPORT DATE : **09/03/2021**

EPA 3C & EPA 25C

Client ID	**Flare 1**	**Flare 2**	**Flare 3**
AAC ID	**211481-22636**	**211481-22637**	**211481-22638**
Can Dilution Factor	**2.04**	**1.84**	**1.90**
Analyte	**Result**	**Result**	**Result**
H_2	< 2.0 %	< 1.8 %	< 1.9 %
O_2	**12.7 %**	**13.4 %**	**12.9 %**
N_2	**80.5 %**	**80.2 %**	**80.3 %**
CO	< 0.2 %	< 0.2 %	< 0.2 %
CO_2	**6.8 %**	**6.4 %**	**6.8 %**
CH_4	< 0.2 %	< 0.2 %	< 0.2 %
TNMOC (as Carbon)	< 6.1 ppmC	< 5.5 ppmC	< 5.7 ppmC

All fixed gases have been normalized to 100% on a dry basis

Sample Reporting Limit (SRL) is equal to Reporting Limit x Analysis Dil. Fac x Canister Dil. Fac

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LABORATORY ANALYSIS REPORT

CLIENT	**: Zeeco**	**SAMPLING DATE**	**: 08/18/2021**
PROJECT NO.	**: 211481**	**RECEIVING DATE**	**: 08/23/2021**
MATRIX	**: Air**	**ANALYSIS DATE**	**: 08/30/2021**
UNITS	**: ppmV**	**REPORT DATE**	**: 09/03/2021**

Methane analysis by 25C Modified

Client ID	Flare 1		SRL (RL x DF's)	Flare 2		SRL (RL x DF's)	Flare 3		SRL (RL x DF's)	Reporting Limit (RL)
AAC ID	211481-22636			211481-22637			211481-22638			
Canister Dil. Fac.	1.9			1.8			1.9			
Analyte	Result	Analysis Dil. Fac.		Result	Analysis Dil. Fac.		Result	Analysis Dil. Fac.		
C_1 (as Methane)	<SRL	1	1.9	<SRL	1	1.8	3.7	1	1.9	1.0

Sample Reporting Limit (SRL) is equal to Reporting Limit (RL) x Canister Dilution Factor x Analysis Dilution Factor (if applicable)

Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Date Analyzed : 08/31/2021
Analyst : DB/DL
Units : %

Instrument ID : TCD #1
Calb Date : 10/05/20
Reporting Limit : 0.1%

I - Opening Continuing Calibration Verification - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
CCV	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	Result	9.8	10.3	20.4	10.2	10.1	9.9
	% Rec *	99.2	99.1	101.1	102.2	100.8	99.3

II - Method Blank - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	LCS Result	9.8	10.3	20.4	10.2	10.1	9.9
	LCSD Result	9.8	10.4	20.4	10.3	10.1	10.0
	LCS % Rec *	98.8	99.3	101.2	102.5	100.8	99.6
	LCSD % Rec *	98.9	99.5	101.3	102.7	101.2	100.4
	% RPD ***	0.1	0.2	0.1	0.2	0.4	0.7

IV -Sample & Sample Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
211477-22627	Sample	0.0	10.7	39.4	0.0	0.0	0.0
	Sample Dup	0.0	10.6	39.8	0.0	0.0	0.0
	Mean	0.0	10.6	39.6	0.0	0.0	0.0
	% RPD ***	0.0	0.2	1.0	0.0	0.0	0.0

V - Matrix Spike & Duplicate- BTU/ASTM D-1945

AAC ID	Analyte	H_2	N_2	CH_4	CO	CO_2
211477-22627	Sample Conc	0.0	19.8	0.0	0.0	0.0
	Spike Conc	9.9	10.1	10.0	10.0	10.0
	MS Result	9.4	29.9	10.3	10.3	10.0
	MSD Result	9.8	29.9	10.2	10.2	9.9
	MS % Rec **	94.7	100.3	103.6	103.1	99.9
	MSD % Rec **	98.5	99.5	102.4	101.6	99.1
	% RPD ***	3.9	0.7	1.2	1.4	0.9

VI - Closing Continuing Calibration Verification - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
CCV	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	Result	9.5	10.3	20.3	10.1	10.1	9.7
	% Rec *	96.0	98.8	100.6	101.6	100.6	97.6

** Must be 85-115%*

*** Must be 75-125%*

**** Must be < 25%*

ND = Not Detected

<RL = less than Reporting Limit

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Quality Control/Quality Assurance Report

Date Analyzed : 08/31/2021
Analyst : DB/DL
Units : %

Instrument ID : TCD #1
Calb Date : 10/05/20
Reporting Limit : 0.1%

I - Opening Continuing Calibration Verification - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
CCV	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	Result	9.8	10.3	20.4	10.2	10.1	9.9
	% Rec *	99.2	99.1	101.1	102.2	100.8	99.3

II - Method Blank - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	LCS Result	9.8	10.3	20.4	10.2	10.1	9.9
	LCSD Result	9.8	10.4	20.4	10.3	10.1	10.0
	LCS % Rec *	98.8	99.3	101.2	102.5	100.8	99.6
	LCSD % Rec *	98.9	99.5	101.3	102.7	101.2	100.4
	% RPD ***	0.1	0.2	0.1	0.2	0.4	0.7

IV -Sample & Sample Duplicate - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
211477-22627	Sample	0.0	10.7	39.4	0.0	0.0	0.0
	Sample Dup	0.0	10.6	39.8	0.0	0.0	0.0
	Mean	0.0	10.6	39.6	0.0	0.0	0.0
	% RPD ***	0.0	0.2	1.0	0.0	0.0	0.0

V - Matrix Spike & Duplicate- EPA 3C

AAC ID	Analyte	H_2	N_2	CH_4	CO	CO_2
211477-22627	Sample Conc	0.0	19.8	0.0	0.0	0.0
	Spike Conc	9.9	10.1	10.0	10.0	10.0
	MS Result	9.4	29.9	10.3	10.3	10.0
	MSD Result	9.8	29.9	10.2	10.2	9.9
	MS % Rec **	94.7	100.3	103.6	103.1	99.9
	MSD % Rec **	98.5	99.5	102.4	101.6	99.1
	% RPD ***	3.9	0.7	1.2	1.4	0.9

VI - Closing Continuing Calibration Verification - EPA 3C

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
CCV	Spike Conc	9.9	10.4	20.2	10.0	10.0	10.0
	Result	9.5	10.3	20.3	10.1	10.1	9.7
	% Rec *	96.0	98.8	100.6	101.6	100.6	97.6

** Must be 85-115%*

*** Must be 75-125%*

**** Must be < 25%*

ND = Not Detected

<RL = less than Reporting Limit

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Quality Control/Quality Assurance Report

Date Analyzed : 08/31/2021
Analyst : DL/DB
Units : ppmv

Instrument ID : FID #3
Calb Date : 03/31/21
Reporting Limit : 0.5 ppmv

I - Opening Continuing Calibration Verification - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
CCV	Spike Conc	98.9	99.1	98.7	98.1	98.1	99.7
	Result	96.1	95.2	94.1	94.7	95.1	96.5
	% Rec *	97.3	96.1	95.4	96.5	96.9	96.7

II - Method Blank - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	98.9	99.1	98.7	98.1	98.1	99.7
	LCS Result	93.5	93.4	92.6	93.3	94.4	94.9
	LCSD Result	95.3	95.1	94.5	94.0	95.6	96.8
	LCS % Rec *	94.5	94.3	93.8	95.2	96.2	95.2
	LCSD % Rec *	96.4	95.9	95.7	95.8	97.4	97.0
	% RPD ***	1.9	1.7	2.0	0.7	1.2	2.0

IV - Sample & Sample Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
211447-22527	Sample	0.9	0.0	0.0	0.0	0.0	0.0
	Sample Dup	0.8	0.0	0.0	0.0	0.0	0.0
	Mean	0.9	0.0	0.0	0.0	0.0	0.0
	% RPD ***	11.8	0.0	0.0	0.0	0.0	0.0

V - Matrix Spike & Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
211447-22527	Sample Conc	0.4	0.0	0.0	0.0	0.0	0.0
	Spike Conc	49.4	49.6	49.4	49.0	49.1	49.9
	MS Result	48.1	48.2	47.6	47.6	47.7	48.0
	MSD Result	52.2	52.6	51.7	52.1	52.1	52.5
	MS % Rec **	96.4	97.2	96.5	97.1	97.3	96.2
	MSD % Rec **	104.8	106.2	104.9	106.2	106.3	105.2
	% RPD ***	8.3	8.8	8.3	9.0	8.9	8.9

VI - Closing Continuing Calibration Verification - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
CCV	Spike Conc	98.9	99.1	98.7	98.1	98.1	99.7
	Result	91.6	93.4	92.5	92.5	92.5	92.8
	% Rec *	92.7	94.2	93.7	94.3	94.2	93.1

** Must be 85-115%*

*** Must be 75-125%*

**** Must be < 25%*

ND = Not Detected

<RL = less than Reporting Limit

Quality Control/Quality Assurance Report

Analysis Date : **08/30/2021**
Analyst : **DL**
Units : **ppmv**

Instrument ID: **GCTCA#2-FID**
Calibration Date: **8/26/2021**

I - Opening Calibration Verification Standard - Method 25C

Analyte	xRF	DRF	%RPD*
Propane	1355304	1389719	2.5

II - TNMOC Response Factor - Method 25C

Analyte	xRF	CV RF	CV dp RF	CV tp RF	Average RF	% RPD***
Propane	1355304	1389719	1260424	1266784	1305642	3.7

III - Method Blank - Method 25C

AAC ID	Analyte	Sample Result
MB	TNMOC	0.00

IV - Laboratory Control Spike & Duplicate - Method 25C

AAC ID	Analyte	Spike Added	LCS	LCSD	LCS % Rec **	LCSD % Rec **	% RPD***
LCS/LCSD	Propane	51.0	46.61	46.85	91.5	91.9	0.5

V - Closing Calibration Verification Standard - Method 25C

Analyte	xCF	dCF	%RPD*
Propane	2710609	2721299	0.4

xCF - Average Calibration Factor from Initial Calibration Curve
dCF - Daily Calibration Factor
* Must be <15%
** Must be 90-110 %
*** Must be <20%

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211481

Standard CHAIN OF CUSTODY RECORD

CLIENT NAME: Kekaha Landfill	PROJECT: Kekaha LF Flare Test
ADDRESS: 6900 Kaumaulii Hwy, Kauai, HI 96752	PHONE: 918-607-7443 FAX: EMAIL: troy_hardin@zeeco.com
PROJECT MANAGER: Stamm/Hardin	SAMPLER: Hardin

ID# (Lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	Cl_2 Y/N	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	ANALYSES REQUESTED: 3C	25C	ASTM 1945	COMMENTS
	08/18/21	13:25-14:25			Flare 1 - Summa Canister - 1278 22636		X	X		Flare Outlet Sample
	08/18/21	14:32-15:32			Fare 2 - Summa Canister - 149 22637		X	X		Flare outlet samples should have ppm detection limit, please see John Y
	08/18/21	15:37 - 16:37			Flare 3 - Summa Canister - 1318 22638		X	X		
	08/18/21	13:25-14:25			LFG-1 - Summa Canister - 3081 22639			X	X	LFG Inlet Samples
	08/18/21	14:32-15:32			LFG-2 - Summa Canister - 1413 22640			X	X	
	08/18/21	15:37 - 16:37			LFG-3 - Summa Canister - 3358 22641			X	X	

RELINQUISHED BY	DATE / TIME 8/19/21 - 10:00am	RECEIVED BY	DATE / TIME 8/23/21 1019	**SAMPLE CONDITION:** Actual Temperature:
RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME	Received On Ice Y / N; Preserved Y / N; Evidence Seals Present Y / N; Container Attacked Y / N; Preserved at Lab Y / N
RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME	

SAMPLE TYPE CODE: AQ=Aqueous; NA= Non Aqueous; SL = Sludge; DW = Drinking Water; WW = Waste Water; RW = Rain Water; GW = Ground Water; SO = Soil; SW = Solid Waste; OL = Oil; OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

COC version 042797

Fx - 7x cans (1x unused) + 2x 25.3 FC's

Appendix D

Process Data

Kekaha Landfill Enclosed Flare Operating Data

Date	Time	Run #	Temperature (F^o)	LFG Feed Rate (SCFM)
8/18/2021	13:25	1	1569	425
8/18/2021	14:25	1	1537	428
Average			1553	426
8/18/2021	14:32	2	1539	428
8/18/2021	15:32	2	1552	430
Average			1549	428
8/18/2021	15:37	3	1538	431
8/18/2021	16:37	3	1540	432
Average			1539	433

Appendix E

Sample Train Configuration and Stack Diagram

SUMMA Canister Integrated Sampling Configuration

Zeeco Inc. Enclosed Flare and Control Skid

6 Ft. Diameter and 40 Ft. Height

From: dmoises@kauai.gov <dmoises@kauai.gov>
Sent: Tuesday, July 6, 2021 10:20 AM
To: Allison Fraley <afraley@kauai.gov>; Troy Tanigawa <ttanigawa@kauai.gov>; John Ruiz <jeruiz@kauai.gov>; Rick Renaud <rrenaud@kauai.gov>; Zahid Khan <zkhan@kauai.gov>
Cc: Ron.Boyle@aecom.com; Keola Aki <kaki@kauai.gov>; Sherri Yasutake <syasutake@kauai.gov>; mark.hofferbert@aecom.com
Subject: RE: Kekaha Landfill NPDES exempt

Hi all,

As some of you know, we had a DOH NPDES inspection last week at a few of our transfer stations. After the inspections, we had a debriefing and topic of landfills came up so I asked about our Kekaha Landfill situation and got the following response from DOH (Matt Kurano).

1. Landfill does not require an industrial permit since we're to keep all water within property. As long as we do that (as most of you have said we're doing below) and there is no storm discharge from the facility, no permit required. However, if for any reason we have a discharge, the operator should notify DOH immediately and it is a $25K a day fine.
2. We could look into getting an NPDES permit if we may have discharge if we think necessary.

John, at this point, the good news is it looks like we are in option 1. At minimum, please follow the operations manual to assure no water ever discharges and BMP's remain functional.

I'm not too familiar with the various phases of the landfill and our perimeter BMPs so I plan to go out there this Thursday with Boyd to see our BMP's that maintain water onsite in Kekaha.

Thanks
Dustin

From: Dustin Moises
Sent: Tuesday, June 29, 2021 7:42 AM
To: Hofferbert, Mark <mark.hofferbert@aecom.com>; Zahid Khan <zkhan@kauai.gov>; Allison Fraley <AFraley@kauai.gov>; Troy Tanigawa <ttanigawa@kauai.gov>
Cc: Boyle, Ron <Ron.Boyle@aecom.com>; Keola Aki <kaki@kauai.gov>; Sherri Yasutake <syasutake@kauai.gov>; John Ruiz <jeruiz@kauai.gov>; Rick Renaud <rrenaud@kauai.gov>

Subject: RE: Kekaha Landfill NPDES exempt

Hi all,

Been hectic dealing with other NDPES stuff but now that I'm able to look at this email……can someone give me a concrete answer on the landfill industrial NPDES permit with Waste Management out of the picture? I want to verify if Kekaha Landfill has a permit like the RTS sites. If we are "waived', there should be something in writing. (Keola, can you search the DOH website link you been using the past couple days for RTS sites to see if anything for Kekaha landfill industrial permit?)

John/Allison – Can I get a copy of the current Operations Manual used to see the SWMP.

Thanks
Dustin

From: Hofferbert, Mark <mark.hofferbert@aecom.com>
Sent: Monday, June 21, 2021 10:47 AM
To: Zahid Khan <zkhan@kauai.gov>; Dustin Moises <dmoises@kauai.gov>; Allison Fraley <AFraley@kauai.gov>; Troy Tanigawa <ttanigawa@kauai.gov>
Cc: Boyle, Ron <Ron.Boyle@aecom.com>; Keola Aki <kaki@kauai.gov>; Sherri Yasutake <syasutake@kauai.gov>; John Ruiz <jeruiz@kauai.gov>; Rick Renaud <rrenaud@kauai.gov>
Subject: RE: Kekaha Landfill NPDES exempt

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All,
I think Zahid's recollections are correct.
I notice that Waste Management (the landfill operator at the time) is not on the email string…. The documents and statements which I quoted below are theirs.

Dustin,
The Surface Water Management Plan and the Operations Plan are chapters within your overall Operations Manual. They may have been updated by someone (?) since 2017.

Mark Hofferbert, PE
Senior Engineer, Project Manager
Environment, West Region, Pacific District
D 808.356.5317 C 808.397.7629
mark.hofferbert@aecom.com

AECOM

Bishop Square, American Savings Bank Tower
1001 Bishop Street, Suite 1600, Honolulu, HI 96813
T 808.523.8874 F 808.523.8950
www.aecom.com

From: Zahid Khan <zkhan@kauai.gov>
Sent: Sunday, June 20, 2021 3:21 PM
To: Dustin Moises <dmoises@kauai.gov>; Allison Fraley <AFraley@kauai.gov>; Troy Tanigawa <ttanigawa@kauai.gov>
Cc: Hofferbert, Mark <mark.hofferbert@aecom.com>; Boyle, Ron <Ron.Boyle@aecom.com>; Keola Aki <kaki@kauai.gov>; Sherri Yasutake <syasutake@kauai.gov>; John Ruiz <jeruiz@kauai.gov>; Rick Renaud <rrenaud@kauai.gov>
Subject: [EXTERNAL] Re: Kekaha Landfill NPDES exempt

Aloha,

If I recall correctly, the contractor for the Kekaha Landfill Lateral Expansion project applied and obtained the NPDES permit for the construction to:

1) Ensure they are covered if there are any temporary/accidental stormwater discharge from the construction site into the waters of the United States; and
2) Exemption may take longer for the contractor's consultant to demonstrate justifications for the waiver.

Mark Hofferbert's email below indicates, NPDES industrial permit requirement is waived because there is no point source from Kekaha Landfill into the waters of the United States. Mark, please chime in as you see fit.

Mahalo,

Zahid

From: Dustin Moises <dmoises@kauai.gov>
Sent: Sunday, June 20, 2021 12:51 PM
To: Allison Fraley <AFraley@kauai.gov>; Troy Tanigawa <ttanigawa@kauai.gov>; Zahid Khan <zkhan@kauai.gov>
Cc: mark.hofferbert@aecom.com <mark.hofferbert@aecom.com>; Boyle, Ron <Ron.Boyle@aecom.com>; Keola Aki <kaki@kauai.gov>; Sherri Yasutake <syasutake@kauai.gov>; John Ruiz <jeruiz@kauai.gov>; Rick Renaud <rrenaud@kauai.gov>
Subject: Re: Kekaha Landfill NPDES exempt

Allison, Troy, Zahid and Aecom team,

So what does this mean? I'm confused. I see you guys got npdes for construction runoff but where are we on npdes for industrial? What is SWMP and how does it tie to DOH requirements? I'm new here so please let me know as I want to assure we are compliant at Kekaha landfill.
Thanks
Dustin

From: Allison Fraley <AFraley@kauai.gov>
Sent: Friday, June 18, 2021 4:20 PM
To: Troy Tanigawa <ttanigawa@kauai.gov>; Dustin Moises <dmoises@kauai.gov>; Zahid Khan <zkhan@kauai.gov>
Cc: mark.hofferbert@aecom.com <mark.hofferbert@aecom.com>; Boyle, Ron <Ron.Boyle@aecom.com>; Keola Aki <kaki@kauai.gov>; Sherri Yasutake <syasutake@kauai.gov>; John Ruiz <jeruiz@kauai.gov>; Rick Renaud <rrenaud@kauai.gov>
Subject: FW: Kekaha Landfill NPDES exempt

Aloha,

Please see the information below provided by AECOM re NPDES permit for Kekaha Landfill.

Allison Fraley
Solid Waste Programs Coordinator
County of Kaua'i Solid Waste Division
4444 Rice Street, Suite 295
Lihue, HI 96766
Phone: (808) 241-4837

From: Hofferbert, Mark <mark.hofferbert@aecom.com>
Sent: Friday, June 18, 2021 4:13 PM
To: Boyle, Ron <Ron.Boyle@aecom.com>; Allison Fraley <AFraley@kauai.gov>
Subject: RE: Kekaha Landfill NPDES exempt

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Ron, Allison,

In addition to the quote Allison found, the following can be found in the October 2017 Operations Manual:

Operations Plan (by WM) -

2.5.4 Storm Water Pollution Management and Control System

Storm water run-off associated with industrial activities is regulated by the NPDES General Permit (HAR §11-55, Appendix B). Because there is no storm water discharge point from the KLF Phase II, a request for exclusion under the NPDES General Permit was submitted to the DOH by the County of Kaua'i, Inc. on September 7, 2007 and resubmitted on February 27, 2013.
In addition, the KLF Phase II implements a *Spill Prevention Control and Countermeasure Plan* (see Section IV of this Site Operation Manual) to prevent releases of petroleum products used on site from being discharged to surface water.

Surface Water Management Plan (by WM) -

1.2.3 National Pollutant Discharge Elimination System

A NPDES General Permit at the KLF is not required as there is no discharge of storm water from the facility. The DOH determined that the NPDES determination only applies to the surface water requirements of HAR 11-58.1-15(h). As such, a SWMP is still required for the facility.

Mark Hofferbert, PE
Senior Engineer, Project Manager
Environment, West Region, Pacific District
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From: Boyle, Ron <Ron.Boyle@aecom.com>
Sent: Friday, June 18, 2021 3:16 PM
To: Hofferbert, Mark <mark.hofferbert@aecom.com>
Subject: Fwd: Kekaha Landfill NPDES exempt

Hi Mark,

Can you answer Allison's question below regarding NPDES permit at Kekaha Landfill?

Thanks

Ron

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From: Allison Fraley <AFraley@kauai.gov>
Sent: Friday, June 18, 2021 2:54:12 PM
To: Boyle, Ron <Ron.Boyle@aecom.com>

Subject: [EXTERNAL] Kekaha Landfill NPDES exempt

Aloha Ron,

Do you or anyone at AECOM have written documentation that the Kekaha landfill is exempt from is exempt from NPDES permit? I discussed this with Zahid and he said this might be in the AECOM Cell 2 Expansion Design docs which I cannot find. Zahid said no storm water leaves the site and it goes to ground water and/or the leachate pond and there are no outlet points at Kekaha so it should be exempt.

Below is what I found in the SW permit application for Kekaha Landfill Phase II – Cell 2 that AECOM developed:

"Clean Water Act (CWA) § 402 National Pollutant Discharge Elimination System (NPDES) Permit(s). Section 402 of the CWA establishes the NPDES program regulating the discharge of pollutants to waters of the United States. NPDES permits are required to authorize discharges of storm water associated with construction activities that result in disturbance of one acre or more of total land area. The administrative authority is DOH Clean Water Branch (CWB). Several years ago, the County had submitted a request for Exclusion from NPDES General Permit Coverage for Storm Water Associated with Industrial Activity for KSLF to the CWB to exempt the KSLF from the NPDES requirements. We continue to work with the CWB to try to obtain the Exclusion, which also includes the Cell 2 expansion.

A NOI-C NPDES permit has been obtained for the construction of Cell 2."

Please let me know if you or your colleagues have anything else on file on this matter.

Mahalo,

Allison Fraley
Solid Waste Programs Coordinator
County of Kaua'i Solid Waste Division
4444 Rice Street, Suite 295
Lihue, HI 96766
Phone: (808) 241-4837

From: Dustin Moises <dmoises@kauai.gov>
Sent: Friday, June 18, 2021 2:21 PM
To: Allison Fraley <AFraley@kauai.gov>; John Ruiz <jeruiz@kauai.gov>
Cc: Rick Renaud <rrenaud@kauai.gov>; Justin Lottig (JLottig@Geosyntec.com) <JLottig@Geosyntec.com>
Subject: RE: Kekaha NPDES exempt

Good to hear, now if someone can show me in writing

From: Allison Fraley <AFraley@kauai.gov>
Sent: Friday, June 18, 2021 2:20 PM
To: Dustin Moises <dmoises@kauai.gov>; John Ruiz <jeruiz@kauai.gov>
Cc: Rick Renaud <rrenaud@kauai.gov>; Justin Lottig (JLottig@Geosyntec.com) <JLottig@Geosyntec.com>
Subject: Kekaha NPDES exempt

Folks,

I am on a call with Zahid and he said the Kekaha Landfill

Allison Fraley
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