Development of a Landfill Gas Utilization Project at the Central Maui Landfill

Request for Proposals

RFP No. 11-12/P-15

Prepared for

County of Maui, Solid Waste Division

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1 KEY ACTION EVENT AND DATES

1.1 EVENTS AND DATES

Event No.	Description	Date
1.	Release of RFP	August 22, 2011
2.	Pre-Proposal Site Visit – Review of RFP	September 13 and 15, 2011
3.	Last day for Proposers to submit questions	September 23, 2011
4.	Last day for Maui County to Answer Questions	October 7, 2011
5.	Addendum issued from County (if necessary)	October 14, 2011
6.	Proposal is due no later than 4:00PM HST, 7:00 PM PST, 10:00 PM EST	November 4, 2011
7.	Interviews	January 10 through 12, 2012
8.	Re Submittal of Final Proposal	January 27, 2012
9.	Award	February 24, 2012

2 GENERAL INFORMATION/INTRODUCTION SHEET

2.1 OBJECTIVE AND PROCEDURE

OBJECTIVE

The County of Maui (County) has issued this Request for Proposals (RFP) to identify a responsible, qualified DEVELOPER that will develop a landfill gas (LFG) utilization project at the Central Maui Landfill (CML).

It is the County's intent and in the County's best interest that the full financial potential of the DEVELOPER's proposed technology be realized, therefore, the County will consider all demonstrated commercial LFG utilization technologies.

PROCEDURE

The County intends to accept proposals from DEVELOPERS as outlined in this RFP and review the submitted proposals. The County then anticipates creating a shortlist of DEVELOPERS and conducting interviews. At the conclusion of interviews, the County anticipates that it will accept final proposals from the shortlisted DEVELOPERS and make an award. The County then anticipates commencing contract negotiations with the selected DEVELOPER.

The County reserves the right to alter the anticipated procedure and all terms within the RFP throughout the RFP process. The current description of items within the RFP (i.e., insurance coverage) are based on typical language utilized by the County or the County's current desired arrangements and are provided to give DEVELOPERS common understanding and direction in preparing their proposals.

2.2 BACKGROUND

CML, owned and operated by the County, is located at 1 Pulehu Road in Pu'unene, Maui, Hawaii. CML is located on the isthmus between West Maui and the Haleakala Mountains, approximately 14,000 feet southeast of the Kahului Airport. A vicinity map showing the site location is included in the Central Maui Landfill Landfill Gas Collection and Control System Drawings within Exhibit A. Proposers are invited to review the County Solid Waste Management Plan that is available at the following web site: http://www.co.maui.hi.us/index.aspx?NID=881

CML is a Class III municipal solid waste (MSW) landfill as defined by the Resource Conservation and Recovery Act of 1976 (RCRA) Subtitle D and in accordance with the Solid Waste Permit (SWP) LF-0089-08 issued by the State of Hawaii Department of Health (DOH) with an expiration date of October 31, 2014. The CML accepts various residential, commercial, and light industrial refuse. Asbestos and non-degradable materials are accepted at the CML under the conditions of its current solid waste permit, but no other regulated hazardous waste or liquid wastes are accepted at the site.

CML was designed schematically with six (6) phases of development. Phases I, II and III were the initially permitted areas of the site. CML operations began in Phases I and II in 1987. Phase III was not developed as a landfill. Phases IV, V, and VI are separated from Phases I, II, and III by Kalialinui Gulch, a seasonal stream designated as waters of the State of Hawaii. Phase IV-A began accepting waste in November 2005. Phase IV-B began receiving waste in April 2007 and was constructed with a leachate collection sump that is hydraulically separated from Phase IV-A. Phase V-A began accepting waste in December 2009 and its leachate collection system is connected to Phase IV-B. Phase V-B completed construction in December 2010, separated from Phase V-A by a rain flap, and will be connected to the Phase V-A leachate collection system once it is being used for waste disposal. Phase VI is not currently developed. The County owns and operates Phases I through V of the CML; therefore, the County owns and operates the landfill gas collection and control system (GCCS). The County constructed GCCS expansion improvements in Phase IV in spring/summer 2011. Refer to Exhibit A for GCCS drawings. All areas developed for landfilling at the CML, including Phases I, II, IV and V, were previously mined (prior to waste disposal) by the Ameron Corporation rock quarry and crushing operation.

The GCCS will be expanded by the County into Phase IV through VI within five (5) years after each area is placed in service, thereby meeting the requirements of the New Source Performance Standards (NSPS) 40 Code of Federal Regulations (CFR) §60.752 (b)(2)(ii). The vertical extraction well portion of the proposed GCCS for Phase IV was constructed in spring/summer of 2011. The County recently completed construction of Phase V waste disposal area, which will also be included in future GCCS expansions by the County. The County is currently pursuing options for the installation of a landfill-gas-utilization (LFGU) project that utilizes LFG as fuel from the current and future GCCS. In all cases, future additions (except as provided below with respect to early construction of certain GCCS additions) and operations of the GCCS will be performed by the County and will comply with the NSPS requirements and be reported in future NSPS reports.

2.3 PERMITS AND REGULATORY AGENCIES

The CML GCCS is permitted to operate by the DOH per Covered Source Permit (CSP) Number 0652-01-C, issued in accordance with Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1 and NSPS, CFR Part 60, Subpart WWW, with an expiration date of March 2, 2013.

See Exhibit D for the following permits for the landfill and GCCS:

- Solid Waste Facility Permit
- Title V Operating Permit

The County, through its Department of Environmental Management, will be the lead agency in altering permits to accommodate the LFGU project at CML.

2.4 GAS COLLECTION AND CONTROL SYSTEM

An active GCCS has been constructed and is operating at the CML in accordance with NSPS requirements and HAR §11-58.1-14. This section identifies both existing and proposed components of the GCCS at the Landfill. The description of the GCCS is provided for

informational purposes only for the DEVELOPER'S consideration. The DEVELOPER is solely responsible for confirming the current condition of the GCCS.

The County plans to retain all rights to the existing and future GCCS, to continue to expand the GCCS, and to continue to operate it. The County will endeavor to coordinate its GCCS expansions and operation with the selected LFGU DEVELOPER in an effort to supply fuel to the LFGU facility. The GCCS design, installation, and operation have been and will continue to be implemented in order to comply with the NSPS regulations. The proposed design consists of vertical and horizontal wells to extract LFG from the disposal area.

CML currently operates a GCCS with an enclosed flare capacity of 65 million British thermal units per hour (MMBTU/hr) (2,045 standard cubic feet per minute [scfm]) and 47 vertical wells. Five (5) leachate risers in the leachate collection system of Phase IV-A are currently connected to the GCCS. Proposed GCCS modifications include the installation of approximately seven (7) vertical wells in Phase IV. In addition, seven (7) horizontal collection wells have been installed along the base liner of Phase V for future connection to the GCCS.

Permanent lateral and header pipes are installed both above and below ground surface and typically constructed of high-density polyethylene (HDPE) or polyvinyl chloride (PVC) pipe. LFG is conveyed through this pipe network to an enclosed flare. Additional information concerning the GCCS can be found in the design drawings within Exhibit A.

Condensate that forms in the GCCS piping is collected in two (2) field sumps in Phases I & II where it is either pumped or gravity flowed to a sump at the flare. Then condensate is pumped from the sump to a storage tank located near the flare station.

The existing flare is designed to incinerate condensate collected in the GCCS. A condensate pump on the gas handling skid transfers condensate from the storage tank at the flare facility to injectors located at the base of the flare, which atomize the liquid and inject it into the combustion zone of the flare. Any condensate generated by the proposer must be managed by the proposer at proposer's expense and in compliance with applicable laws and regulations.

Additional information and drawings of the GCCS are included in Exhibit A.

2.5 PREDICTED LFG GENERATION AND RECOVERY RATES

Information regarding LFG reserves is provided for the DEVELOPER's information in Exhibit B, Landfill Gas Utilization Study and Conceptual Design (A-Mehr, January 2010) and Cornerstone Memorandum Dated January 17, 2011, reviewing the Findings of the Landfill Gas Utilization Study and Conceptual Design Report prepared by A-Mehr Inc. The County does not warrant that the quantity and quality of the LFG at CML is suitable for a LFG utilization project. The County will have no liability to the DEVELOPER resulting from the quantity or quality of the LFG delivered to the DEVELOPER by the County, including without limitation of liability for anticipated profits or loss of profit because of the quantity or quality of LFG at CML. Submittal of a Proposal constitutes acknowledgement that the quantity and quality of LFG collected may be different than shown in Exhibit B and can be affected by the operation of CML, the operation of the GCCS, and that the operation of the GCCS may be affected by regulatory

requirements. The contract between the County and DEVELOPER will include provisions that release the County from all liability associated with the quantity or quality of the LFG.

For the purposes of responding to this RFP, the DEVELOPER shall assume a LFG flow rate of 600 standard cubic feet per minute (scfm) at 45 percent methane as a basis of the DEVELOPER's Financial Offering to the County. The County shall, at all times, operate the GCCS as necessary to maintain compliance with applicable permits and regulations relevant to subsurface migration or surface emissions of LFG and otherwise as the County deems appropriate in connection with the operation of CML. The selected DEVELOPER will be allowed a due diligence period after award, to confirm the LFG quantity and quality before a LFG sale agreement is executed by the County and the DEVELOPER.

2.6 LFG UTILIZATION PROJECT LOCATION

If the DEVELOPER requires the use of County owned land for its facility or equipment, the County will provide up to one half (1/2) acre of an undeveloped area at CML for location of a LFGU project. This location will be located near the current LFG flare as shown in Exhibit A. The DEVELOPER shall be responsible for developing the chosen location (inclusive of all permits) as required for siting the LFGU project. Use of the site will be per a Site Lease at a cost of one (1) dollar per year. All other terms of the Site Lease shall be agreed upon by the County and the DEVELOPER.

3 CONTRACT REQUIREMENTS

3.1 CONTRACT PERIOD

The County contemplates a contract period of 20 years from the start of the DEVELOPER'S commercial operation of the LFGU project. For the financial offering, DEVELOPER's should utilize the 20 year time frame.

3.2 PERFORMANCE SCHEDULE

DEVELOPER's Proposal shall include performance milestones and remedies to ensure that the DEVELOPER pursues the project diligently. At this time, the milestones and performance times are contemplated to be as follows, with final milestones, performance deadlines, and remedies set forth in the Contract:

No.	Milestone	Time Allowed	Start Date	Documentation Provided by Developer to County
1.	Submitting application for Authority to Construct the LFGU facilities to the DOH (with prior review and approval of the County)	6 months	Notice of award of LFGU project contract issued by County	Copies of LFGU design drawings and permits
2.	LFGU Project Construction	18 months	Issuance of Permit to Operate from DOH & other permits to construct (unknown duration from submittal of permit documents to issuance of permit)	Copies of CQA report and as-built drawings
3.	Developer secures contract with end user of LFG or power	24 months	Notice of award of LFGU project contract issued by County	Copy of contract or agreement with end user
4.	Using LFG, delivery of LFG or power to the end user	3 months	Construction of LFGU facility complete	Verified by end user payment

3.3 ASSIGNMENT

The contract between the County and the DEVELOPER will prohibit the DEVELOPER from assigning the contract to another entity without approval by the County, with the exception of a collateral assignment in connection with financing the LFGU.

3.4 PREVAILING WAGE REQUIREMENT

It is the County's intent that the DEVELOPER will pay prevailing wages during any construction related to this project. Any agreement between the DEVELOPER and any subcontractor that provides for the performance of work that constitutes a public works project as defined by Hawaii law, (including, but not limited to, construction, improvement, demolition, alteration, renovation, or repair of a publicly leased or operated building or structure) will require compliance with all provisions of Hawaii law regarding construction of a public works project including, but not limited to, Chapter 104 of the Hawaii Revised Statutes. In addition, all such agreements between DEVELOPER and a third party for work that constitutes a public works project shall include the following provision:

> Contractor shall pay, and shall require any subcontractor to pay minimum prevailing wages (basic hourly rate plus fringe benefits), as determined by the State of Hawaii Director of Labor and Industrial Relations and published in wage rate schedules, to the various classes of laborers and mechanics employed by them in the execution of this Contract in accordance with the provisions of Chapter 104 of the Hawaii Revised Statutes. Laborers and mechanics working on a Saturday, Sunday, or a legal holiday of the State or more than eight hours a day on any other day shall be paid overtime compensation at one and one-half times the basic hourly rate plus the cost of fringe benefits for all hours worked. The current State of Hawaii prevailing wage rate schedules are online at http://hawaii.gov/labor and shall be posted by the contractor in a prominent and easily accessible place at the job site and given to each laborer and mechanic employed under the contract, except when the employee is covered by a collective bargaining agreement. A certified copy of all payrolls shall be submitted weekly to the contracting agency.

In addition to any other indemnification provision of the contract, DEVELOPER will be required to indemnify and hold the County harmless from and defend the County against any and all claims arising in whole or in part from a failure of DEVELOPER and/or its agents, contractors, or employees to comply with the duties proscribed by this section.

3.5 INDEMNIFICATION

The contract between the County and DEVELOPER will include indemnification provisions as required by the County. The final indemnification language will be based on the DEVELOPER's selected technology and other factors. The following minimal indemnification language is provided for DEVELOPERS's review only:

DEVELOPER shall indemnify and hold harmless the County, its elected officials, officers, employees, agents, and volunteers from any and all deaths, injuries, losses and damages to persons or property (including property of the County), and any and all losses, claims, suits, actions, costs, expenses, damages, judgments, or decrees caused by the negligent acts, willful acts, or errors or omissions of the DEVELOPER or any of DEVELOPER's subcontractors, any person employed under DEVELOPER, or under any subcontractor, or in any capacity during the progress of the work or the provision of services pursuant to this agreement.

DEVELOPER shall hold the County, its officers and employees, harmless from liability, of any nature or kind on account of use of any copyrighted or un-copyrighted composition, secret process, patented or un-patented invention articles or appliance furnished or used under this order.

DEVELOPER shall defend and indemnify the County against all costs, attorney's fees (including those of County Counsel and counsel retained by the County), expenses (including but not limited to expert fees, litigation costs, and investigation costs), and liabilities incurred in the defense of any claim, action or proceeding brought against the County during the progress of the work or the provision of services pursuant to this agreement.

The DEVELOPER's obligations under this section shall survive and shall continue to be binding upon DEVELOPER notwithstanding the expiration, termination or surrender of this contract.

3.6 ABSENCE OF CONFLICT OF INTEREST

By responding to this RFP, the DEVELOPER covenants that it currently has no interest, and before a contract is executed between the County and the DEVELOPER, that the DEVELOPER will not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under the contract. The contract between the County and the DEVELOPER will include a covenant by DEVELOPER that as of contract execution and for the term of the contract, that DEVELOPER (and any employees of DEVELOPER) will have no interests, direct or indirect, that would conflict in any manner or degree with the performance of services required of DEVELOPER under the contract.

3.7 LAWS AND REGULATIONS

The DEVELOPER shall keep fully informed of all applicable federal, state and county laws, ordinances, codes, rules and regulations, governmental general and development plans and all changes thereto including, but not limited to, the Americans with Disabilities Act, health and safety, labor, anti-discrimination and environmental laws and regulations, and the following:

(1) All Sections of the local County's Charter and Code;
(2) Article I of Title 10, Maui County Code, 1980, as amended, relating to the Maui Traffic Code;
(3) Title 12, Maui County Code, 1980, as amended, relating to Streets, Sidewalks, and Public Places;
(4) Chapter 16.04A, Maui County Code, 1980, as amended, relating to the Fire Code;
(5) Chapter 16.18A, Maui County Code, 1980, as amended, relating to the Electrical Code;
(6) Chapter 16.20A, Maui County Code, 1980, as amended, relating to the Plumbing Code;
(7) Chapters 103 and 103D, HRS, as amended, relating to Expenditure of Public Money and Public Contracts and the Hawaii Public Procurement Code, including Hawaii Administrative Rules Chapter 103D (Chapters 3-120, 3-121, 3-122, 3-123, 3-124, 3 125, 3-126, 3-128, 3-129, 3-130, 3-131, 3-132);
(8) Chapter 104, HRS, as amended, relating to Wages and Hours of Employees on Public Works;
(9) Chapter 22 of Subtitle 4 of Title 12, HAR, relating to Wage Determinations and the Administration and Enforcement of chapter 104, HRS;

(10) Chapter 132, HRS, as amended, relating to the Fire Protection;
(11) Chapter 321, HRS, as amended, relating to the Department of Health;
(12) Chapter 378, HRS, as amended, relating to Fair Employment Practices;
(13) Chapter 386, HRS, as amended, relating to Workers' Compensation Law;
(14) Chapter 396, HRS, as amended, relating to Occupational Safety and Health, and specifically, all bids and proposals in excess of $100,000 for construction jobs shall have a signed certification from the bidder or offeror that a written safety and health plan for the job will be available and implemented by the notice to proceed date of the project (see §396-18, HRS);
(15) Chapter 444, HRS, as amended, relating to contractors for construction work. Provider shall use properly licensed contractors for all construction work as required by law;
(16) Part III of Subtitle 8 of Title 12, HAR, relating to Construction Standards; and
(17) Chapters 120 to 132 of Subtitle 11 of Title 3, HAR, relating to the Hawaii Public Procurement Code.

The contract will require that DEVELOPER comply with the foregoing and with all other laws, ordinances, codes, rules, regulations, design standards and criteria, governmental general and development plans applicable to the DEVELOPER's performance of the DEVELOPER's obligations under the contract with the County and under the Site Lease.

The DEVELOPER will be required to obtain all necessary permits and approvals for the performance of the DEVELOPER's obligations under the contract and shall pay for all charges in connection with such permits.

3.8 INSURANCE REQUIREMENTS

The contract between the County and DEVELOPER will include insurance provisions as required by the County. The final insurance requirements and policy limits will be based on the DEVELOPER's selected technology and other factors. The following information is provided for information purposes only:

1. **HRS chapters 383 (Unemployment Insurance), 386 (Workers' Compensation), 392 (Temporary Disability Insurance), and 393 (Prepaid Health Care) requirements for award**. The DEVELOPER shall submit an approved certificate of compliance issued by the Hawaii State Department of Labor and Industrial Relations (DLIR). The certificate shall be valid for six (6) months from the date of issue and must be valid on the date it is received by the County. The application for the certificate shall be the responsibility of the DEVELOPER, and must be submitted directly to the DLIR and not to the County. [§103D-310(c), HRS]

2. **Employers' Liability Insurance**. The DEVELOPER and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain and require the DEVELOPER's sub-contractors (if any) at their own expense to procure and maintain in full force at all times during the term of this Agreement, employers' Liability insurance with minimum limits for bodily injury from accident

3. **Commercial General Liability Insurance**. The DEVELOPER and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain and

require the DEVELOPER's sub-contractors (if any) at their own expense to procure and maintain in full force at all times during the terms of this Agreement, Commercial General Liability. Such insurance shall include coverage in like amount for products/completed operations, contractual liability, and personal and advertising injury. "Claims made" policies are not acceptable under this section.

4. **Automobile Liability Insurance**. The DEVELOPER and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain and require the DEVELOPER's sub-contractors (if any) at their own expense to procure and maintain in full effect at all times during the term of this Agreement, Automobile Liability insurance.

5. **Fire and Standard Extended Coverage Insurance**. Except for contracts in which the scope of work is limited to roadway construction or utility improvements that do not include payment for stored materials on-site, the DEVELOPER shall insure the work at a limit acceptable to the County, plus one hundred percent (100%) of the replaceable value thereof for the life of the contract against all loss or damage by fire at the site and against all loss or damage covered by the Standard Extended Coverage Insurance endorsement, including vandalism and malicious mischief, by an insurance company or companies acceptable to the County. The insurance policy or policies shall be held jointly in the name of the County, the DEVELOPER, and the DEVELOPER's subcontractors as their interest may appear. The DEVELOPER shall submit to the County satisfactory proof of the amount of such insurance carried with each application for partial payment.

6. **County as Additional Insured**. Insurance policies providing the insurance coverage required in this section (except for Workers' Compensation) shall name the County, its agents, and its employees as additional insured for any claims arising from the DEVELOPER's activities under this Agreement. Coverage must be primary in respect to the additional insured. Any other insurance carried by the County shall be excess only and not contribute with this insurance. Such policies or certificates showing the above coverage shall be deposited with the County within ten (10) days of the execution of this Agreement and shall contain the following statement:

   "Thirty (30) days' written notice of cancellation or change will be given to County of Maui, 200 South High Street, Wailuku, Hawaii 96793, before any cancellation or change of this policy will be effective. This insurance includes coverage for the liability assumed by the insured as DEVELOPER under the Agreement between the insured and County of Maui, dated _____."

7. **Environmental Impairment Liability (Pollution Prevention)**

8. **Proof of Coverage –** After award of the contract, prior to the commencement of performance of services, DEVELOPER shall furnish certificates of insurance to the County at the addresses specified, evidencing the insurance coverage, including endorsements above required. These certificates shall provide that such insurance shall not be terminated or expire without thirty (30) days written notice to the County and DEVELOPER shall maintain such insurance from the time DEVELOPER commences performance of services hereunder until the completion of such services.

For the purpose of this document, "commencing services" refers to any activity toward completing the project goal.

If DEVELOPER does not obtain the described insurance, or if the County is not furnished at the time specified with the requisite insurance certificates, or if the described insurance is terminated, altered, or changed in a manner not acceptable to the County, then the DEVELOPER shall not commence services and the County may withhold LFG to the DEVELOPER or terminate this Agreement. Performance milestones will apply.

9. **Liability** – Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve DEVELOPER from liability in excess of such coverage, nor shall it preclude the County from taking such other actions as available to it under any other provision of the contract or otherwise in law.

10. **Acceptability of Insurers:** Insurance is to be provided by insurers licensed to do business in the State of Hawaii with a current A.M. Best's Financial Strength Rating of no less than A (Excellent), and Financial Size Category of no less than VII. Any lesser Best's Rating will be subject to approval by the County.

11. **Subcontractors:** When a subcontractor is utilized, the DEVELOPER shall furnish or require the subcontractor to furnish the County within ten (10) calendar days after execution of the contract, or within such further time as the County may allow, with a copy of a policy or policies of insurance and certificate of insurance covering the subcontractor and the subcontractor's employees or agents in the same amount and for the same liability specified above.

DEVELOPER shall submit to the County within ten (10) calendar days after execution of the contract, or within such further time as the County may allow, three (3) copies of insurance certification evidencing that the DEVELOPER has in force the insurance as required under the contract between the County and DEVELOPER.

The contract will include termination provisions related to insurance.

3.9 GCCS AND LFG UTILIZATION SYSTEMS

The GCCS and the LFGU project shall be considered to be separate systems. On its own, the GCCS in place as of the date of this RFP, is capable of collecting and controlling the LFG such that CML will comply with applicable laws, regulations, and permits relevant to the subsurface migration and surface emissions of LFG. The DEVELOPER'S LFGU projects, in addition to beneficially utilizing the LFG, shall also act as an alternate LFG control device for the GCCS.

The contract between the County and DEVELOPER will provide as follows with respect to the GCCS and LFGU project criteria and responsibilities:

A. GCCS Design and Expansion

County Design and Expansion of the GCCS

The County will be responsible for the design and expansion of the GCCS in accordance with regulatory requirements and to meet regulatory operational requirements.

DEVELOPER Design and Expansion of the GCCS Ahead of County Schedule

The contract will include provision that allow the DEVELOPER to expand the GCCS ahead of the schedule established by the County, subject to written approval of the DEVELOPER's design by applicable County and the State permitting agencies, and as further described in the following sections. Any such construction will be at the DEVELOPER's sole expense, unless the County agrees to reimburse the DEVELOPER for the reasonable costs of the GCCS expansion. GCCS design costs will be borne by the DEVELOPER with no recourse to recover the design costs.

The County must be provided with the DEVELOPER's GCCS design prior to any construction work being commenced for County review and approval of the GCCS design, to assure that the design conforms to all applicable current and future permits and regulations and the overall GCCS plan that the County has for CML. The design shall be prepared by a professional engineer licensed in the State of Hawaii. The DEVELOPER shall incorporate the County's review comments and secure the County's approval of the design in writing.

If the DEVELOPER desires to recover the cost of the GCCS installation, the DEVELOPER shall submit a construction cost estimate to the County prior to commencing any construction work, but after completion and approval of the GCCS design by the County. If the County believes that the GCCS construction estimate is in line with previous GCCS construction costs, the County may agree to compensate the DEVELOPER for some portion of the GCCS installation costs up to, but in no case, above the construction cost estimate, regardless of the actual cost of construction.

At the County's discretion, the compensation to the DEVELOPER may be in the form of not paying the County for the LFG collected from that portion of the GCCS installed by the Contractor. The form of metering of the LFG collected from that portion of the GCCS installed by the Contractor will be determined and agreed by both parties at the time that the GCCS construction cost estimate is approved by the County. Failure to reach agreement between the County and the DEVELOPER on all parts of this plan for compensation for the DEVELOPER's construction of the GCCS requires the DEVELOPER to bear all costs for the GCCS expansion without any recourse.

The DEVELOPER is required to obtain the County's written terms of any compensation agreement prior to commencing any construction work.

DEVELOPER modification of the GCCS to accommodate the LFGU project

Any GCCS design modifications to accommodate the LFGU project will be designed and installed by and at the sole cost of the DEVELOPER, subject to County review and approval of the design of such modifications. The DEVELOPER shall prepare a preliminary GCCS modification design to accommodate the addition of the LFGU project to the site for review and approval by the County. The GCCS design modifications will include piping, control device and utilization system layout and provisions for condensate management throughout the GCCS. Condensate management is currently completed by incineration in the enclosed flare. Because DEVELOPER's utilization of LFG may affect operation of the enclosed flare, such that the enclosed flare cannot operate and incinerate LFG condensate, DEVELOPER's must include a plan for alternate means of condensate management to be implemented by the DEVELOPER as part of the LFGU project. The DEVELOPER's proposals should address this issue with the cost of the modifications borne by the DEVELOPER. The final design (after award to the DEVELOPER) shall be prepared by a professional engineer licensed in the State of Hawaii.

The GCCS modifications shall be designed to conform to and operate in accordance with all applicable current and future permits and regulations that must be obtained or met to install and operate such GCCS. Arrangement of equipment will be as such to simplify pipe routing and installation, to take advantage of the available space around the site and to avoid interference with facility operations as best possible.

The GCCS design modifications shall include a Design Basis Memorandum (DBM) which discusses the engineering approach, strategies for LFG routing, and basis for equipment selection. The DBM will cover the design intent and specifics for all areas of the design. The DBM is subject to review and approval by the County.

Following County written approval of the preliminary GCCS modification design, the DEVELOPER will prepare for County review and approval drawings, specifications, and an operations and maintenance manual with sufficient detail for installation and operations by qualified, experienced GCCS contractors.

The DEVELOPER will provide the County with copies of the following, including, but not limited to:

- Final piping and instrumentation diagram (P&ID) and equipment list;
- Final performance specifications;
- Final DBM;
- Final GCCS Drawings; and
- Operations and Maintenance Manual.

B. Permits, Agreements, Easements, Rights-of-Way

County Design and Expansion of the GCCS

The County will be responsible for obtaining permits required in connection with the County's design and expansion of the GCCS.

DEVELOPER Design and Expansion of the GCCS, DEVELOPER Modification of the GCCS to Accommodate the LFGU Project, and DEVELOPER Design of the LFGU Project

If the DEVELOPER chooses to obtain permit(s) for modification or expansion of the GCCS ahead of the schedule established by the County, the DEVELOPER shall be responsible for all costs of and for obtaining all permits, agreements, easements, and rights-of-way required to complete GCCS additions as agreed to by the County and to modify the GCCS for addition of the LFGU project, and for the LFGU project, including for example, but not necessarily limited to:

1. Authority to Construct and Permit to Operate the GCCS and the LFG utilization system.
2. Notification of GCCS modification or expansion per site permit.
3. Interconnection agreement with the electrical utility (if electrical generation is proposed) or another end user.
4. Those items as required by any applicable regulation or code.
5. Compliance with all applicable state and federal environmental laws, assessment, review, and analysis.

DEVELOPER shall obtain a separate Title V permit for the LFGU project. If a separate Title V permit is not allowed by the State of Hawaii, DEVELOPER shall prepare, at DEVELOPER's expense, an application to be signed and submitted by the County, to modify the County's Title V permit.

DEVELOPER shall complete all items required by the permits for the GCCS additions, GCCS modifications, or LFG utilization system and provide copies to the County and shall maintain all documents as required by the permits.

The DEVELOPER must obtain written approval from the County prior to any action related to modification of any existing permit or attempt to obtain a new permit for any aspect of the LFGU project. The County must also be provided with any permit modification or new permit application prior to submittal for review and concurrence with all applicable regulations and the overall GCCS plan that the County has for CML. The permit application shall be prepared by a professional engineer licensed in the State of Hawaii. The DEVELOPER shall secure the County's approval of the permit applications in writing.

DEVELOPER shall reimburse the County for all costs associated with administration of any permits required for this project.

C. Installation

County Design and Expansion of the GCCS

The County will be responsible for installation of the GCCS in accordance with regulatory requirements.

DEVELOPER Design and Expansion of the GCCS and DEVELOPER modification of the GCCS to accommodate the LFGU project

If the DEVELOPER chooses to install the GCCS ahead of the schedule established by the County, the DEVELOPER is responsible for hiring a qualified, state-licensed contractor(s) acceptable to the County and experienced in GCCS piping and control device installation for any construction modification of the GCCS for the LFGU project addition, any GCCS expansion completed by the DEVELOPER, or any work on the LFGU project. Upon selection of the contractor(s), DEVELOPER will secure contracts with each party. The DEVELOPER will oversee construction of the GCCS and is responsible for all construction quality assurance (CQA) and construction quality control. The work will be conducted in accordance with all relevant permits and applicable regulations.

The DEVELOPER will submit to the County records pertaining to GCCS construction, including, but not necessarily limited to:

- CQA report summarizing engineering and quality control observations and inspections of GCCS installation. Report will include copies of contractor's field reports and photographic documentation;
- Record drawings based on contractor's construction notes, photographs, as-built survey data and as-built drawings; and
- Manufacturer-provided equipment specifications and operations instructions.

The construction documents above shall be prepared by a professional engineer licensed in the State of Hawaii.

D. Operation and Maintenance

GCCS Operation and Condensate Management

The County will own the GCCS including any portion of the GCCS installed by the DEVELOPER and the County will operate, maintain and be responsible for regulatory compliance of the GCCS, including disposal of condensate from the GCCS.

The GCCS shall be operated and maintained in such a way that the landfill and the wellfield will comply with regulations related to surface emissions, subsurface migration, and wellhead operating requirements as applicable. Operation and maintenance of the GCCS shall include responsibility for operation and maintenance of the LFG condensate management systems to ensure proper operation of the GCCS, except that during periods when the County's flare is not operating due to LFG utilization by the DEVELOPER, the

DEVELOPER will be responsible for management and disposal of condensate for the GCCS.

DEVELOPER shall take all necessary steps to ensure that once the LFGU project is in operation, that the LFGU and GCCS together in with the currently enclosed LFG flare(s) can operate efficiently to collect and utilize or destroy all LFG in order to maintain compliance with applicable permits, laws, and regulations. If, at any time during the term of the contract, low LFG flow rates or low BTU content inhibit the current flare's ability to combust LFG in accordance with permit requirements, and if combustion in the flare is needed to comply with County or other regulatory requirements, then the DEVELOPER shall, at DEVELOPER's cost, modify the flare, to ensure such combustion with concurrence from the County, provide supplemental fuel (e.g. propane) for the flare, or provide and install a new flare that will meet permit requirements.

DEVELOPER is required to provide automated controls which enable all or any portion of LFG not utilized by the LFGU facility to be diverted to the flare or backup control device. DEVELOPER's operations shall be conducted so as to ensure continuous recovery of LFG generated by the landfill to ensure compliance with applicable permits and regulations.

DEVELOPER LFGU project

DEVELOPER will be responsible for operating, maintaining, and ensuring regulatory compliance of the LFGU project.

DEVELOPER will be required to operate and maintain the LFGU and other DEVELOPER system(s) in accordance with all CML Permits, all of DEVELOPER's permits, and all other applicable laws and regulations. DEVELOPER will be required to operate and maintain the LFGU and other DEVELOPER system(s) in accordance with the manufacturer's recommended maintenance schedule and good maintenance practices.

The DEVELOPER shall monitor its responsible system(s) in accordance with applicable permits and regulations and shall report results of monitoring as required by permits and regulation to the County within ten (10) days of monitoring completion. Should an exceedance of LFG control-related permits and regulations be detected by the DEVELOPER or its contractors, the DEVELOPER shall notify the County within one (1) hour of the exceedance being detected. DEVELOPER is responsible for all reporting requirements under DEVELOPER's permits and applicable regulations. DEVELOPER will be responsible for coordinating and conducting/subcontracting periodic performance (source) testing of the DEVELOPER'S responsible control device(s) in accordance with the operating permit(s).

Further, DEVELOPER shall complete, provide copies to, keep and make available to the County records required by regulatory agencies for the longer of five (5) years after the agreement terminates or the duration required by the regulations.

E. Noise

DEVELOPER shall provide noise containment as needed to reduce the noise from the equipment installed by the DEVELOPER measured at a distance of 200 feet from any item of equipment installed by the DEVELOPER, as follows:

Hourly Equivalent Sound Level (Leq): 50 dB

F. Odor

No odor nuisances shall occur from the LFGU. The County shall have authority to determine whether an odor is considered a nuisance.

G. Future Improvements and Modifications

1. Relocation of Piping

   The DEVELOPER may relocate GCCS piping or LFGU appurtenances at the DEVELOPER's cost, subject to the other requirements of the contract. Such modifications shall be coordinated with the landfill operation and shall be subject to review and approval of the County, as previously described.

   The County's operation of the landfill, including but not limited to: waste placement location, waste placement hours, waste filling traffic routing, placement of final cover, types of waste accepted, amount of waste accepted, etc. shall be primary and take priority over LFG collection and the availability of LFG to fuel the LFGU. The County shall have no liability to DEVELOPER for any impact on DEVELOPER's operations resulting from County's operation of the landfill or GCCS. The County may request that the DEVELOPER relocate/replace installed GCCS piping or LFGU appurtenances at the DEVELOPER's cost, as necessary, to avoid conflict with or inhibition of landfill operations. Any such relocation or replacement will be completed by DEVELOPER in a manner that does not interfere with the operation of the landfill or GCCS.

2. Expansion for the Sole Purpose of Increasing Production

   The DEVELOPER is responsible for the cost of construction of GCCS improvements solely to increase the production and output of DEVELOPER's utilization system even if those improvements will be required in the future for the GCCS' regulatory compliance.

3. Expansion for the Sole Purpose of Compliance with Regulatory Requirements

   The County is responsible for the cost of construction of GCCS improvements solely to achieve regulatory compliance.

4. Expansion for the Dual Purpose of Increasing Production and Compliance with Regulatory Requirements.

   The County and DEVELOPER will either agree to an appropriate sharing ratio of these costs or the County will not be obligated to expand beyond that necessary for regulatory compliance, and the County will not be obligated to allow the Developer to proceed.

H. Removal of LFGU Facility

DEVELOPER's Proposal shall address decommissioning/removal of the LGFU facility. DEVELOPER will be responsible for removal or abandonment of the LFG utilization system unless otherwise agreed to by the County and for restoration of the site of the LFGU facility and of the surface of the CML at locations where the DEVELOPER removes its property. DEVELOPER's proposal shall include provisions for adequate financial assurances to the County that the DEVELOPER will bear the cost of the decommissioning of the LFGU project and returning the GCCS and enclosed LFG flare to a condition to operate without the LFGU project.

I. Ownership

The County shall own the GCCS system. Any expansion or modification of the GCCS by the DEVELOPER shall be sold to the County for $1 upon completion of construction.

The LFGU facility will be owned by DEVELOPER. Upon the earlier of the termination of the contract or abandonment of the project by the DEVELOPER, at the option of and in the sole discretion of the County, the ownership of the LFGU facilities may be transferred to the County for one (1) dollar.

The DEVELOPER shall be responsible for preparing the GCCS and LGFU facility sale/transfer documentation to the County's satisfaction.

3.10 LFG QUANTITIES

The contract with the DEVELOPER will address the issue of LFG produced in the landfill in excess of that used by the DEVELOPER's LFGU project.

DEVELOPER's proposal shall provide for compensation to the County if LFG flows exceed 600 scfm at 45 percent methane.

DEVELOPER is responsible for modifying the GCCS and LFG flare including all design, permitting, and construction, if the DEVELOPER's LFGU project will impact the operation of the GCCS and/or LFG flare. Impacts to be considered by the DEVELOPER shall include scenarios such as insufficient LFG flow to the flare to continue LFG condensate incineration in the flare or operation of the flare to combust LFG that is not utilized by the LFGU project that must be combusted for regulatory compliance purposes.

The DEVELOPER's proposal and final contract with the County will address the potential scenario in which the predicted LFG flow of 600 scfm at 45 percent methane is unachievable. DEVELOPER shall include proposed arrangements with the County during the period before the predicted LFG flow is achieved.

3.11 FUTURE BENEFITS NOT NOW DEFINED

Future financial benefits may become available to the DEVELOPER due to changing regulations, tax credits, or other incentives that cannot be foreseen, and these benefits

may not be covered by the compensation plan with the DEVELOPER'S financial offering. The DEVELOPER's proposal should describe the manner in which the DEVELOPER proposes to share these benefits with the County. The contract between the County and the DEVELOPER will include remedies available to the County if DEVELOPER fails to identify and share any such future benefits with the County during the term of the Contract.

3.12 LFGU FACILITY SITE LEASE

The LFGU project shall be located on a portion of the site to be leased to the DEVELOPER by the County. The cost of the lease shall be one (1) dollar per year. All other terms of the lease will be as agreed upon by the County and the DEVELOPER. As part of the Technical Proposal, the DEVELOPER should describe how the DEVELOPER's facility will be provided with utilities required by the DEVELOPER (e.g. water, sewer, waste disposal, etc.). The DEVELOPER's responsibility to provide these utilities and coordination with existing utilities will be addressed in the Site Lease. County will provide DEVELOPER with the Site Lease form to be used as a basis for negotiations between County and DEVELOPER.

The DEVELOPER will maintain the existing drainage paths and storm water volume within the lease area except as approved by the County. DEVELOPER will adhere to all rules, laws, and regulations pertaining to drainage and storm water.

4 PROPOSAL REQUIREMENTS

4.1 GENERAL

The County reserves the right to retain all Proposals and to use any ideas in a Proposal regardless of whether that Proposal is selected.

All Proposals will become the sole property of the County. At such time as a Proposer agrees to enter into a contract with the County and the contract is executed, or the County decides to terminate this RFP process without entering into a contract, all Proposals and related documents will become a matter of public record, with the exception of those parts of a Proposal which are trade secrets, as that term is defined by statute. If any part of a Proposal contains any trade secrets that the Proposer does not want disclosed to the public, the Proposer shall mark that part of the Proposal as a "trade secret." The County, however, shall not in any way be liable or responsible for the disclosure of any such Proposal or any part thereof if disclosure is required under the Public Records Act (Government Code, Section 6250 et seq.), Hawaii Uniform Practices Act (Hawaii Revised Statutes Section 92F et seq.), or pursuant to law or legal process. In addition, by submitting a Proposal a Proposer agrees to save, defend, keep, bear harmless, and fully indemnify the County, its elected officials, officers, employees, agents, and volunteers from all damages, claims for damages, costs, or expenses, whether in law or in equity, that may at any time arise or be set up for not disclosing a trade secret pursuant to the Public Records Act.

Initiation of this solicitation and RFP process does not commit the County to finalize an agreement or to pay any costs associated with the preparation of any Proposal, nor to enter into an agreement with the Proposer submitting the most advantageous Proposal.

The County reserves the right to accept or reject any or all Proposals received, to negotiate with qualified Proposers, or to cancel in part or in its entirety this solicitation and RFP process.

Unless the Proposer provides all information required pursuant to this RFP process, the Proposal may, at the County's sole discretion, be rejected and given no consideration. Any Proposer attempting to influence this RFP process by interfering or colluding with other Proposers or with any County employee will be disqualified.

Any Proposer submitting a Proposal understands and agrees that submission of said Proposal shall constitute acknowledgment and acceptance of, and intent to comply with, all the terms and conditions contained in this RFP. The determination of the compliance with the terms and conditions of this RFP shall be in the County's sole judgment and its judgment shall be final and conclusive.

The Proposer agrees not to make any claims for, or have any right to, damages because of any misunderstanding or misrepresentation of the terms and conditions of this RFP, or because of any misinformation or lack of information.

Proposals delivered to the County after the proposal deadline will be returned unopened and will not be deemed to have been received.

Proposals will not be opened prior to the submittal deadline identified herein.

Proposals shall demonstrate the responsibility of the Proposer (Refer to Section 4.2). The responsible Proposers with the proposals that are considered by the County to be the most advantageous to the County will be selected for negotiations to implement a LFG utilization project.

The County shall consider any protest or objection regarding the award of an agreement pursuant to this RFP, whether submitted before or after the award, provided that it is submitted in writing and received by County's Department of Finance, Purchasing Division within 10 days of the award notice. Notice of the award of the agreement shall be mailed to each Proposer at the address specified in the Proposal, and shall be deemed received three days after mailing.

4.2 RESPONSIBLE PROPOSER CRITERIA

A responsible Proposer is one who meets the following minimum criteria:

A. Provides required information: The Proposal shall provide information requested in this RFP. Failure to provide information requested may result in a lower score for the Proposer upon review of the Proposer's proposal.

B. Proposes demonstrated technology (refer to Section 5.3, Demonstrated Technology Form): For the purpose of this RFP, "demonstrated technology" is technology that has been permitted in at least five (5) projects within the United States of America (USA), each operating at a rate of at least 500 scfm at 40 to 60 percent methane (or equivalent BTU input). Each of these projects shall have been in operation for at least two (2) years prior to the submittal of the proposal, with operation at least 92 percent of the time (up-time) during that year. Calendar year 2011 may also be used for calculating up-time. At least two of these projects should be those of the Proposer (developed, owned, and operated). For the purpose of this RFP, the technology of converting LFG to electricity by internal combustion engines or gas turbines and compression and direct pipeline for use by a third party is considered well demonstrated. Proposers need not provide the documentation described in this paragraph for such a LFG utilization system.

C. Demonstrates a successful and satisfactory project history (refer to Section 5.3, Successful and Satisfactory Project History Form): The Proposer shall demonstrate a history of successful and satisfactory LFG utilization projects. These projects shall have been operating at a rate of at least 500 scfm at 40 to 60 percent methane (or equivalent BTU input) for a minimum of two (2) years.

   These projects must be those of the Proposer (developed, owned, and operated).

   The successful and satisfactory project history requirement may be met by:

   1. Three (3) projects permitted in the USA.

   A successful and satisfactory project shall be characterized as successful and satisfactory by the project owner.

D. Demonstrates longevity: The Proposer shall have been in existence since at least 2007. Proposer shall submit documentation attesting to the term of existence (e.g. articles of incorporation).
E. Financial Offering: The Proposer shall provide a complete and clear financial offering with their proposal as outlined within Section 5.2.

4.3 COUNTY CONTACT, QUESTIONS AND COMMUNICATIONS

The contact person for this RFP is Mr. Michael Kehano, Project Manager, Solid Waste Division (CONTACT). All communication between the County and prospective Proposers will be by email to the CONTACT at (Michael.Kehano@co.maui.hi.us). Proposers are specifically directed not to contact other County personnel for meetings, conferences, or technical discussions related to this RFP. Failure to comply with the preceding requirement may result in a lower score for the Proposer upon review of the Proposer's proposal. No questions regarding this RFP will be answered by other County staff.

The above communication prohibitions do not apply to communications regarding regulatory or permitting requirements, which are administered by the DOH.

If a Proposer finds discrepancies or omissions in the RFP or supporting documents, or is in doubt as to their meaning, then the Proposer shall request clarification from the CONTACT.

Questions must be received on or before the date identified herein. Responses to written questions that warrant a clarification of the RFP will be issued as an addendum. All registered interested parties will be notified by email of the issuance of addenda.

4.4 MECO (MAUI COUNTY'S ELECTRICAL UTILITY) QUESTIONS, AND COMMUNICATIONS

Maui County has been in contact with Maui Electric Company (MECO) regarding the potential LFGU project and LFGU RFP (see meeting minutes within Exhibit E). Based on the current LFG flows from CML and the anticipated size of an electrical generation LFGU project that may result, MECO does not have a standard offer/electricity purchase price for the electricity that may be generated by the DEVELOPER. MECO has stated that the process for determining an electrical purchase price may include the following steps in some sequence (the list is not meant to be all inclusive):

- Receive an initial offer with details of the electricity to be generated, costs to generate, type of power, etc.
- MECO would negotiate based on this information a purchase price for electrical power.
- Once an agreed price is determined, MECO would seek the Public Utility Commission's approval.
- An interconnect study would need to be completed.
- Project construction and interconnect to the utility electrical grid.

Since this process is time consuming for MECO, MECO has requested that all interested DEVELOPERS not be allowed to contact MECO, as MECO cannot respond to each

DEVELOPER and cannot assure that each DEVELOPER is given equal information and service. Proposers are specifically directed not to contact MECO personnel for meetings, conferences, or technical discussions related to this RFP. Failure to comply with the preceding requirement may result in a lower score for the Proposer's proposal.

The County will invite MECO representatives to the site visits to provide information on the MECO electrical purchase price determination, and answer questions from the Proposers.

In order to prepare the financial offering based on a LFGU project that would sell electricity to MECO, Proposers should utilize the information contained herein to prepare two (2) financial offerings with assumed electrical sales prices of 14 and 18 cents per kilowatt hour.

If a Proposer finds discrepancies or omissions in the RFP or supporting documents, or is in doubt as to their meaning, then the Proposer shall request clarification from the County CONTACT.

Questions must be received on or before the date identified herein. Responses to written questions that warrant a clarification of the RFP will be issued as an addendum. All registered interested parties will be notified by email of the issuance of addenda.

4.5 REGISTERING AS AN INTERESTED PARTY

Firms that wish to respond to this RFP shall send an email to the CONTACT listed in Section 4.3 requesting that they be registered as an "interested party". Interested parties will be notified of availability of addenda, questions and answers from interested parties and County staff, and other notices as appropriate by email.

4.6 NON-MANDATORY PRE-PROPOSAL MEETING

Two (2) pre-proposal site visits are scheduled for Tuesday, September 13, 2011 and Thursday September 15, 2011. Proposers are asked to register for the site visits via email to the County Contact listed in Section 4.3. There will be no other pre-proposal site visits.

The site visits will allow interested parties to tour the facility and to ask questions. Statements made by County staff or their representatives during these site visits are non-binding. Any issue that may affect the proposals will be clarified in an addendum at the County's discretion.

These will be your only opportunities for on-site visits.
Visits at other times will not be permitted.

Not attending these site visits does not exclude firms from submitting Proposals. The County will consider proposals from firms that did not attend the site visit.

4.7 LFG SAMPLING AND ANALYSIS

A location on the LFG piping will be made available during the non-mandatory pre-proposal site visits discussed in Section 4.6 for the Proposers to take a sample of the LFG for laboratory analysis. The Proposers should arrange in advance with a laboratory for sampling train, sampling containers, shipping requirements, etc. Outside of receiving of sampling materials at the site and storage and providing the location for sampling, the County will not assist with the

sample and analysis of the LFG. Further, the County makes no warranty that the LFG sampled during the site visits will represent the LFG at any point forward due to the ever changing conditions of LFG generation within CML.

These will be your only opportunities for on-site visits.
Visits at other times will not be permitted.

Proposals placing conditions on the constituents of the LFG will be considered less desirable than those that do not.

5 PROPOSAL CONTENTS

Proposals shall be submitted in two (2) parts, Parts A and B, to be packaged separately. Each Part shall be submitted in a three-ring binder and shall contain the following sections and titles, in the following order, with the contents indicated. Failure to adhere to these guidelines may result in a lower score for the Proposer's proposal upon review.

5.1 PART A: TECHNICAL PROPOSAL

Section 1: General Information

Contents:

1. Proposing Firm Identification Form (refer to Section 5.3).
2. Size and office locations of the Proposer's firm.
3. Name, contact information, and full resume of the proposed utilization project's Manager. The Manager must be available for discussions and coordination with County staff during development of the project, as required.
4. An organizational chart of the Proposer's firm showing the relationship of the utilization project's Manager to the firm's top management and subcontractors for all phases of the project, including marketing, permitting, engineering, construction, start-up, and operations. Name and show the relationship of any partner or affiliate.
5. Other personnel, consultants and contractors that will be working on the project. Include a brief resume of each key person on the organization chart, highlighting specific qualifications relevant to tasks they will perform.
6. Proposer to identify the major business terms/provisions they would expect to include in the future LFG sale agreement. Note: The County is not obligated to incorporate any provisions into the contract between the County and the DEVELOPER for the utilization of LFG at CML.
7. Non-Collusion Affidavit (refer to Section 5.3)
8. Proposal Authorization Form (refer to Section 5.3)

Section 2: Proposed Method of LFG Utilization

Contents:

1. The product to be generated from the LFG (electricity, medium Btu grade fuel, pipeline quality fuel, LNG, or other), the market to which this product will be sold, and method by which the product will be transmitted to that market.
2. Provisions for future capacity expansion of LFG utilization system.

3. Provisions to ensure continuous LFG recovery sufficient to ensure site compliance with applicable regulations in the event of LFG utilization system breakdown, malfunction, maintenance, or utility outage.
4. Area needed for construction and operation of the LFG utilization system in accordance with the locations identified in Exhibit A. Additionally, the Proposer shall include a plan for providing the Proposer's facility with resources (e.g. water, sewer, waste disposal, etc.) for the construction and operation of the proposed facility.
5. How the noise limits will be met.
6. The number of Proposer's staff that will attend to the facility once in operation, how often they will be on site, and how quickly they will be able to respond to a condition of the LFGU when they are offsite.
7. How backup control device(s) such as a flare station, will be integrated into the project.
8. The extent of County involvement that will be needed to execute the project.
9. A project schedule, identifying key benchmarks in construction, especially those which require County and regulatory agency participation.
10. A discussion of the required County permit(s) for the project, and any necessary revisions needed to the County's Title V permit.
11. Any other information that the Proposer feels is relevant to the project that is not provided elsewhere.

Section 3: Responsible Proposer Criteria

Contents:

1. Demonstrated Technology Form(s), if required (refer to Sections 4.2 and 5.3)
2. Successful and Satisfactory Project History Form(s) (refer to Sections 4.2 and 5.3).
3. Documentation showing the longevity of the Proposer's firm (refer to Section 4.2)

5.2 PART B: FINANCIAL OFFERING AND ADDENDA

Section 1: General Information

Contents:

1. Economic Benefits Summary Form (refer to Section 5.3).
2. Description of how the project will be financed, including the source(s) of financing. Indicate whether tax credits (or other Federal, state, or local subsidies) are to be used. Indicate whether carbon credits or other "green" attributes are to be registered and sold. If used, describe how this may affect the project.
3. Description of how the items or resources required by the DEVELOPER from the County for the construction and operation of the proposed facility will be tracked

or administered under the terms of the Financial Offering. The Proposer shall include a plan for providing the Proposer's facility with resources (e.g. water, sewer, waste disposal, etc.) for the construction and operation of the proposed facility.

4. Description and basis of value for all additional benefits to be provided to the County. As an example, if the Proposer's facility will be able to provide electrical power to the County's GCCS equipment (blower flare skid) or County's Landfill offices and buildings, this should be noted along with a basis (both electrical usage and electrical rate). County will normalize these if warranted.

Section 2: Addenda

Contents:

1. A copy of each addendum issued for this RFP with the financial offering. The County will reject any Proposal that does not include all addenda.

5.3 REQUIRED FORMS

The following forms are required to be included with your Proposal submission.

PROPOSING FIRM IDENTIFICATION FORM

PROPOSER SHALL COMPLETE AND RETURN WITH PART A OF PROPOSAL

Type or print the following information:

Company: _____

Address: _____

_____

(City) (State) (Zip)

Name: _____

Title: E-Mail: _____

Telephone: ( ) Fax: ( ) _____

Years of Business: _____

Number of Employees: _____

Name of Insurance Carriers: _____

Public Liability: Expires: _____

Workers' Compensation: Expires: _____

NON-COLLUSION AFFIDAVIT

PROPOSER SHALL COMPLETE AND RETURN WITH PART A OF PROPOSAL

(Title 23 United States Code Section 112 and Public Contract Code Section 7106)

In accordance with Title 23, United States Code Section 112, and Public Contract Code 7106, the bidder declares that the proposal is not made in the interest of, or on behalf of any undisclosed person, partnership, company, association, organization, or corporation; that the proposal is genuine and not collusive or sham; that the Proposer has not directly or indirectly induced or solicited any other proposer to submit a false or sham proposal, and has not directly or indirectly colluded, conspired, connived, or agreed with any Proposer or anyone else to put in a sham proposal, or that anyone shall refrain from proposing; that the Proposer has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the proposal price of the Proposer or any other proposer, or to fix any overhead, profit of cost element of the proposal price, or of that of any other proposer, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the proposal are true; and further, that the Proposer has not, directly or indirectly, submitted their proposal price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, proposal depository, or to any member or agent thereof to effectuate a collusive or sham proposal.

NOTE: The above Non-collusion Affidavit is part of the Proposal. Signing this Proposal in the signature portion thereof shall also constitute signature of this Non-collusion Affidavit.

Proposers are cautioned that making a false certification may subject the certifier to criminal prosecution.

Proposer's Signature **Date**

PROPOSAL AUTHORIZATION FORM

PROPOSER SHALL COMPLETE AND RETURN WITH PART A OF PROPOSAL

The undersigned, having carefully read and examined this RFP, and being familiar with (1) all the conditions applicable to the work for which this proposal is submitted; (2) with availability of the required equipment, materials and labor hereby agrees to provide everything necessary to complete the work for which this proposal is submitted in accordance with the proposal documents for the amounts quoted herein and further agrees that if this proposal is accepted, within five (5) days after the contract is presented for acceptance, will execute, and mail a signed contract to the County of Maui.

Signature of Authorized Agent Date

Printed Name of Authorized Agent

DEMONSTRATED TECHNOLOGY FORM

IF REQUIRED, PROPOSER SHALL COMPLETE AND RETURN WITH PART A OF PROPOSAL

(Copy this form as necessary to identify FIVE projects)

Refer to Section 4.2 for definition of demonstrated technology.

This form is not required if proposing to convert LFG to electricity by internal combustion.

Utilization Technology: _____

Location of Project: _____

Project Owner: _____

Owner Contact Name: _____

Contact Phone Number: _____

Air pollution Control District: _____

The Size of the Project: _____

(e.g. KWH generation capacity, SCFM CNG production capacity).

The LFG input into the project in the year prior to this Proposal: _____

(CFM and Percent Methane)

SUCCESSFUL AND SATISFACTORY PROJECT HISTORY FORM

PROPOSER SHALL COMPLETE AND RETURN WITH PART A OF PROPOSAL

(Copy this form as necessary to identify the required number of projects)

Refer to Section 4.2 for definition of successful and satisfactory project history.

Location of the Project: _____

Landfill Owner: _____

Landfill Contact Name: _____

Project Owner: _____

Owner Contact Name: _____

Contact Phone Number: _____

Air Pollution Control District: _____

The Size of the Project: _____

(e.g. KWH generation capacity, SCFM CNG production capacity)

The LFG input into the project in the year prior to this proposal: _____

(CFM and Percent Methane)

ECONOMIC BENEFITS SUMMARY

PROPOSER SHALL COMPLETE AND RETURN WITH PART B OF PROPOSAL

Proposer must complete this form without making any alterations to its format.

Fill in values where appropriate and circle appropriate answers as indicated.

Utilization product (electricity or other): _____

Number of units proposed at initial installation: _____

Total capacity at installation: _____
(need not equal LFG available at installation)

Make and Model of units proposed: _____

_____

DEVELOPER will pay County _____ percent of the gross revenue received from DEVELOPER's sale of one or more products produced by DEVELOPER's facility. The DEVELOPER's estimated gross revenue in the first full year of operation is estimated to be _____ (DEVELOPER shall provide basis for estimate). DEVELOPER estimates the first full year of operation will begin _____.

Developers estimated gross revenue estimate in the next 19 years is listed below (provide back up for this estimate:

If DEVELOPER desires payments to County to not be tied to gross revenue, DEVELOPER may provide alternate financial package.

A _____ percent per year escalation will be applied to DEVELOPER's estimated gross revenue.

DEVELOPER will pay $1 per year for a Site Lease of the area used for the DEVELOPER's project.

DEVELOPER proposes that DEVELOPER's LFG utilization facility will/will not (circle one) supply the power from DEVELOPER's LFGU project for the GCCS (blower/flare station). County will use its 2010 electrical meter usage and rate for GCCS power usage in the NPV calculation if this benefit is supplied by DEVELOPER.

Explanation of other service or benefits the DEVELOPER offers the County: (attach additional pages if necessary): _____

_____

Value of other services or benefits the DEVELOPER offers the County: $_____

Proposer acknowledges that production from DEVELOPER's facility is secondary to the operation of the CML, including without limitation regulatory compliance. Collecting LFG to meet environmental regulations and/or otherwise in connection with the operation of the Landfill will take precedence over collecting LFG for commercial use if the two conflict.

Proposer acknowledges that DEVELOPER will assume all costs, labor, and equipment to design, permit, construct, and operate DEVELOPER's facility.

Gross revenue is defined as: Income from all possible sources such as but not limited to; electric power sales, gas sales, capacity payments, renewable energy credits, tax credits, grants, etc.. without consideration for expenses of any kind, including but not limited to business development, operation costs, capital payback, interest, depreciation, etc..

Proposers Signature_____ Date_____

6 PROPOSAL EVALUATION

Following the deadline for receipt of Proposals, all Proposals submitted will be analyzed and reviewed by a review panel consisting of representative(s) to be determined by the County. The County anticipates that three (3) Proposers will be short listed and interviewed by the County's staff, representatives, and panel during January 12 through 14, 2012.

Through the RFP process, the County reserves the right to negotiate a contract based on all factors involved in the written Proposal without further discussion or interview. The County, however, reserves the right to conduct interviews, request additional information, or to conduct further inquiries and research as the County, in its sole discretion, deems appropriate. The County also reserves the right to accept or reject any or all of the Proposals submitted, in whole or in part, and to negotiate any or all elements of the Proposal and the terms of the agreement between DEVELOPER and the County.

6.1 MINIMUM CRITERIA

The County will verify that the Proposal is complete, including documents identified in this RFP. Those Proposals found not to be complete may be scored lower upon review.

The County will make a good-faith effort to contact the persons identified at the telephone numbers provided. If the contact person listed for reference projects on the Demonstrated Technology or Successful and Satisfactory Project History forms cannot be reached at the number provided by the Proposer, the County may exclude that reference project from consideration without notifying the Proposer of this exclusion. Such exclusions may result in elimination of a Proposer.

The County may choose to discuss a Proposal with the Proposer as needed for clarification of that Proposal.

6.2 NET PRESENT VALUE

The County will calculate the Net Present Value (NPV) of those Proposals that have been verified to meet the Minimum Criteria.

The NPV will be calculated over a 20-year period based on the information presented in the Economic Benefit Summary Form. This calculation will use the capacity of the utilization equipment proposed and will account for expansion of the system as the LFG supply increases.

If the DEVELOPER chooses to supply the GCCS power requirements, the NPV will include the estimated values listed on the Economic Benefit Summary. A discount rate of 3 percent will be applied to the NPV calculation.

6.3 EVALUATION CRITERIA

Proposals will be evaluated for NPV, DEVELOPER's previous project experience and references, resources, project financial backing, and compliance with all requirements set forth in

this RFP, including timely submission and provision of all documents requested. Proposals will be ranked and scored according to these factors (See score table within Exhibit F). The County estimates that the Proposals will be evaluated under the following guidelines. The County reserves the right to alter these guidelines as appropriate without notice to the Proposers.

- Technical Approach
- Experience and qualifications
- Economic benefit to the County
- Timeline – ability to get a project operating in the shortest timeframe
- Financial status of Proposer

The County will base the selection of the DEVELOPER upon the proposal that is considered to be the most advantageous to the County.

Proposer must complete and submit the Economic Benefits Summary Form, refer to Section 5.3, without making any alternations to the format.

7 SUBMITTAL OF PROPOSALS

7.1 SUBMITTAL FORMAT

Proposers shall submit Proposals in two parts (Eight copies of each), each packaged separately:

PART A: (8 copies)

Part A of the submission shall contain the Technical Proposal. Label this part:

Part A: Technical Proposal
for the Development of a LFG Utilization Project
Proposing firm's name and address

PART B: (8 Copies)

Part B of the submission shall contain the Financial Offering and any Addenda. Label this part:

Part B: Financial Offering
for the Development of a LFG Utilization Project
Proposing firm's name and address

Proposers may propose more than one (1) LFG utilization method, e.g. electrical generation and compressed natural gas. If so elected, each utilization method shall be submitted as separate Proposals, with both a Financial Offering and Technical Proposal for each method.

Proposers will submit one (1) Financial Offering for each Technical Proposal. Each Financial Offering will be evaluated separately. Failure to provide clear indication of which Financial Offering is associated with which Technical Proposal is cause for rejection of those Financial Offerings.

7.2 SUBMITTAL PROCEDURE

Sealed Proposals will be received by the Bid Receiver, County of Maui Purchasing Division, Department of Finance, 2145 Wells Street, Suite 104, Wailuku, Maui, Hawaii 96793, until 4:00 PM Hawaii Standard Time, 7:00 PM Pacific Standard Time, 10:00 PM Eastern Standard Time on Friday, November 4, 2011, or as identified in addenda.

The Proposal envelope shall have stated thereon the name and address of the Proposer.

PLEASE NOTE THAT OVERNIGHT MAIL FROM AREAS OUTSIDE THE STATE OF HAWAII TO HAWAII REQUIRES A MINIMUM OF 2 DAYS.

ALL PROPOSALS RECEIVED AFTER SAID TIME AND DATE WILL BE TIME-STAMPED AND RETURNED UNOPENED TO THE SUBMITTER.

THE COUNTY WILL NOT ACCEPT PROPOSAL RESPONSES SUBMITTED BY FAX OR EMAIL.

All Proposals shall be signed by a person or persons legally authorized to execute a binding contract on behalf of the person or entity submitting the Proposal and by that signature, the person or persons understand and agree (upon submission of a Proposal) to abide by the terms and conditions of the RFP.

All Proposals will become the sole property of the County. At such time as a Proposer agrees to enter into a contract with the County, or the County decides to terminate this RFP process without entering into a contract, all Proposals and related documents become a matter of public record, with the exception of those parts of a Proposal which are trade secrets, as that term is defined by statute. If any part of a Proposal contains any trade secrets that the Proposer does not want disclosed to the public, the Proposer shall mark that part of the Proposal as a "trade secret." The County, however, shall not in any way be liable or responsible for the disclosure of any such Proposal or any part thereof if disclosure is required under the Public Records Act (Government Code, Section 6250 et seq.) or pursuant to law or legal process. In addition, by submitting a Proposal a Proposer agrees to save, defend, keep, bear harmless, and fully indemnify the County of Maui, its elected officials, officers, employees, agents, and volunteers from all damages, claims for damages, costs, or expenses, whether in law or in equity, that may at any time arise or be set up for not disclosing a trade secret pursuant to the Public Records Act.

EXHIBIT A: CENTRAL MAUI LANDFILL GAS COLLECTION AND CONTROL SYSTEM DRAWINGS

PLANS FOR THE

2010 PHASE IV GCCS IMPROVEMENTS

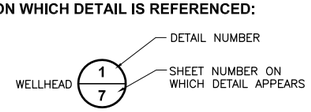
PREPARED FOR CENTRAL MAUI LANDFILL

PU'UNENE, HAWAII

SEPTEMBER 2010

DETAIL INDICATOR:

SHEET ON WHICH DETAIL IS REFERENCED:



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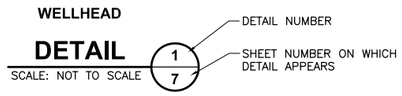

PROFILE INDICATOR:

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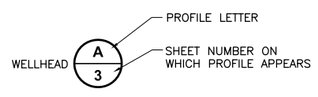

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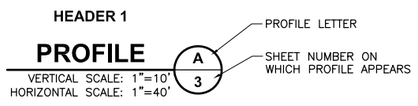

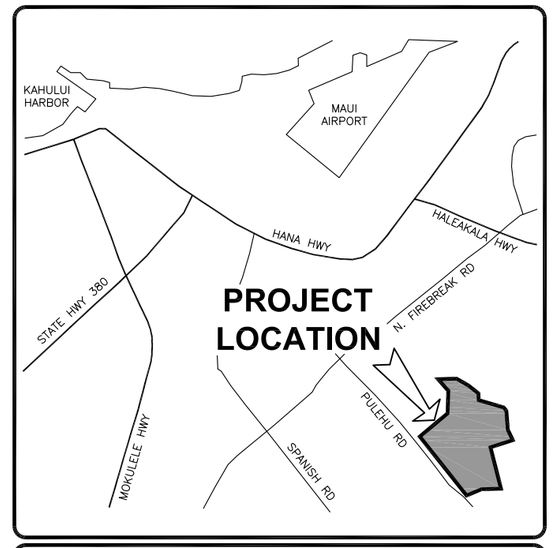

LOCATION MAP

ISSUED FOR CONSTRUCTION

CORNERSTONE
Environmental Group, LLC

7600 DUBLIN BLVD. SUITE 200
DUBLIN, CALIFORNIA 94568
Tel. (877) 633-5520

SHEET INDEX

PAUL J. STOUT, P.E.

P.E. Lic. No. 12145 Date

1" 1/2" 0" 1"

File: X:\PROJECTS\MAUI COUNTY - 2010 LFG ENGINEERING - 100245_PROJECT DRAWINGS\DAMAGE-01_IMPROVEMENT PLANS.dwg Layout: TITLE User: michael.fritz Sep 29, 2010 - 8:35am

ALL EXISTING WELL TOP BORE SEALS TO BE REPAIRED (47 PLACES) 4/11

EXISTING FLARE STATION

SUMP (LOCATION APPROXIMATE)

LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING LFG HEADER
- EXISTING UNDERGROUND LFG HEADER
- EXISTING HORIZONTAL COLLECTOR
- GW-A-1 EXISTING LFG EXTRACTION WELL
- EXISTING CONTROL VALVE
- EXISTING BLIND FLANGE
- EXISTING FLANGE CONNECTION
- EXISTING REDUCER FITTING
- SUMP EXISTING CONDENSATE PUMP STATION
- EXISTING ROAD CROSSING
- LCRS-1 EXISTING LEACHATE CLEANOUT RISER

0 150 300
SCALE IN FEET

NOTES:

1. TOPOGRAPHIC CONTOURS PREPARED USING PHOTOGRAMMETRIC METHODS BY AMERICAN AERIAL MAPPING, INC. DATE OF PHOTOGRAPHY: JUNE 11, 2010. DATUM: HORIZONTAL – LOCAL BASED ON NAD83 BENCHMARKS, VERTICAL: GEOID09.
2. FEATURES, CONTOURS, AND ELEVATIONS OF THESE BASE MAPS ARE APPROXIMATE INDICATIONS OF CURRENT AND FUTURE CONDITIONS. CONTRACTOR SHALL VERIFY THE ACTUAL LOCATIONS OF THESE ELEMENTS PRIOR TO, AND DURING CONSTRUCTION, AND SHALL FINALIZE THE ELEMENTS LOCATIONS TO ACCOMMODATE FINAL FIELD CONDITIONS, AS APPROVED BY THE OWNER/ENGINEER.
3. ALL CONNECTIONS TO EXISTING PIPING SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO BIDDING. SOME CONNECTIONS MAY REQUIRE EXCAVATION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL DISCONNECTIONS AND RECONNECTIONS FOR INSTALLATION OF NEW PIPING INCLUDING EXISTING WELLS AND PIPING WHERE NECESSARY.
5. CONTRACTOR TO REMOVE AND REUSE EXISTING PIPING AND FITTINGS WHERE APPLICABLE. CAP ALL ABANDONED PIPE.
6. SITE CONDITIONS AND TOPOGRAPHY MAY HAVE CHANGED SINCE DATE OF DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR INSPECTING WORK AREAS AT PRE-BID SITE WALK AS CURRENT CONDITIONS FOR BIDDING PURPOSES.
7. WORK SHALL NOT VARY FROM DESIGN WITHOUT APPROVAL OF THE ENGINEER. WORK THAT VARIES FROM DESIGN WITHOUT APPROVAL WILL NOT BE PAID FOR.

ISSUED FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 9/29/2010
DRAWN BY MRF
DESIGNED BY JBS
CHECKED BY MED
APPROVED BY PJS

CORNERSTONE Environmental Group, LLC

CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
OVERALL SITE PLAN

SHEET NO. 1
PROJECT NO. 100245

1" 1/2" 0" 1"

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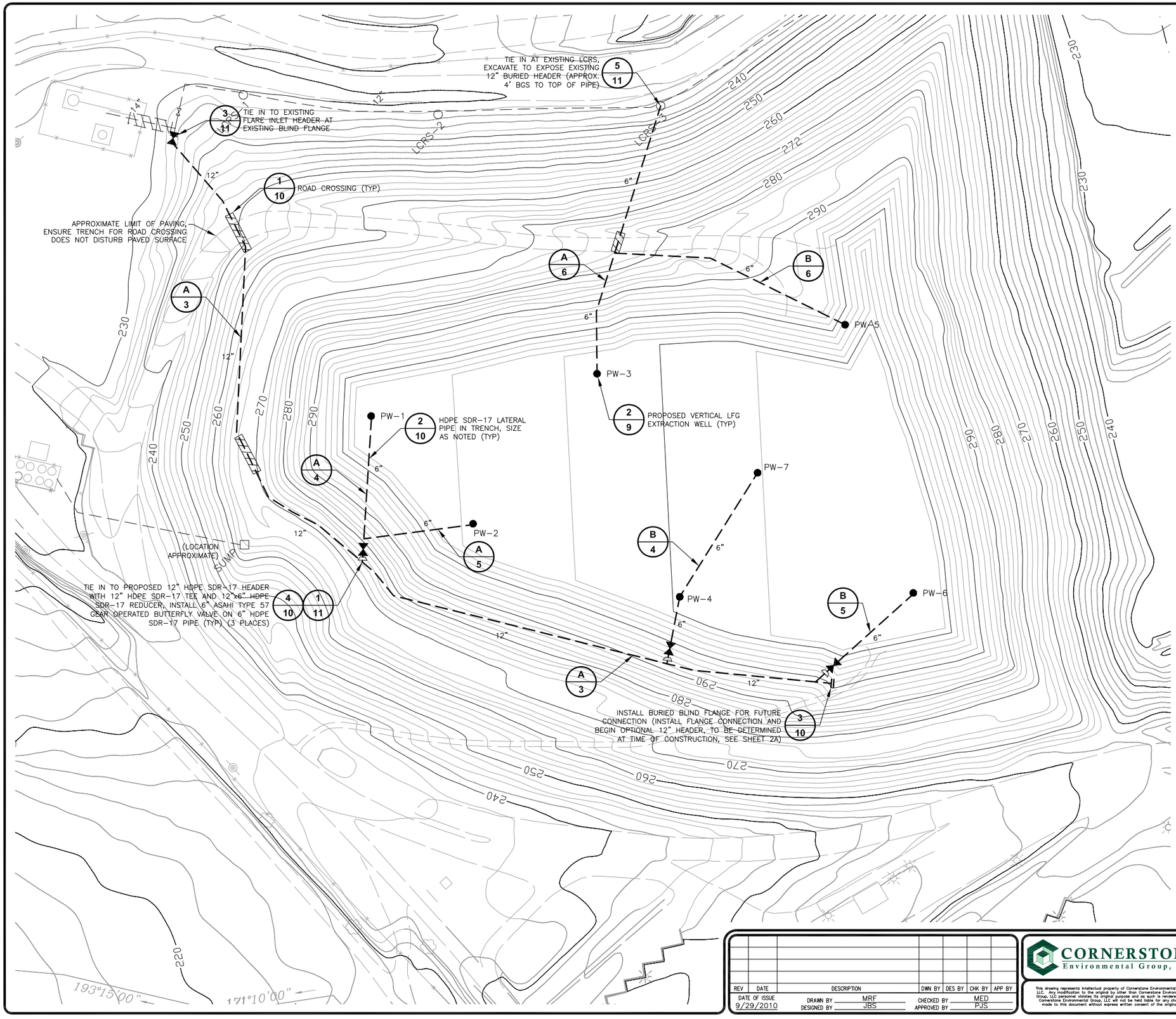

LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING LANDFILL GAS HEADER
- EXISTING UNDERGROUND LANDFILL GAS HEADER
- EXISTING CONTROL VALVE
- EXISTING BLIND FLANGE
- EXISTING ROAD CROSSING
- EXISTING LEACHATE CLEANOUT RISER
- PROPOSED UNDERGROUND LANDFILL GAS HEADER/LATERAL
- PROPOSED LFG EXTRACTION WELL
- PROPOSED CONTROL VALVE
- PROPOSED BLIND FLANGE
- PROPOSED REDUCER FITTING
- PROPOSED ROAD CROSSING

N

0 50 100

SCALE IN FEET

NOTES:

1. TOPOGRAPHIC CONTOURS PREPARED USING PHOTOGRAMMETRIC METHODS BY AMERICAN AERIAL MAPPING, INC. DATE OF PHOTOGRAPHY: JUNE 11, 2010. DATUM: HORIZONTAL – LOCAL BASED ON NAD83 BENCHMARKS, VERTICAL – GEOID09.
2. CONTRACTOR TO SURVEY AND STAKE HEADER PIPING ALIGNMENT WITH GRADES AND OBTAIN APPROVAL FROM ENGINEER AND OWNER PRIOR TO PROCEEDING.
3. THE CONTRACTOR SHALL LAY OUT THE PIPE TO CONFORM TO FIELD CONDITIONS. PROVIDE 30" MINIMUM COVER AND 7% MINIMUM SLOPE CROSSING BELOW PERIMETER AND MAIN HAUL ROADS. PROVIDE MINIMUM PIPE DRAINAGE SLOPES OF 3% WITHIN WASTE LIMIT AND 0.5% OUTSIDE OF WASTE LIMIT. CONTRACTOR RESPONSIBLE FOR CUT AND FILL BENEATH PIPE TO ENSURE PROPER DRAINAGE, AS APPROVED BY THE OWNER/ENGINEER. SEE DETAILS AND NOTES.
4. FEATURES, CONTOURS, AND ELEVATIONS OF THESE BASE MAPS ARE APPROXIMATE INDICATIONS OF CURRENT AND FUTURE CONDITIONS. CONTRACTOR SHALL VERIFY THE ACTUAL LOCATIONS OF THESE ELEMENTS PRIOR TO, AND DURING CONSTRUCTION, AND SHALL FINALIZE THE ELEMENTS' LOCATIONS TO ACCOMMODATE FINAL FIELD CONDITIONS, AS APPROVED BY THE OWNER/ENGINEER.
5. PRIOR TO STARTING ANY EXCAVATION OR DRILLING, CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND DEPTH OF ALL LANDFILL LINERS AND UNDERGROUND UTILITIES, WHETHER INDICATED ON THESE DRAWINGS OR NOT.
6. ALL CONNECTIONS TO EXISTING PIPING SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO BIDDING. SOME CONNECTIONS MAY REQUIRE EXCAVATION.
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11. WORK SHALL NOT VARY FROM DESIGN WITHOUT APPROVAL OF THE ENGINEER. WORK THAT VARIES FROM DESIGN WITHOUT APPROVAL WILL NOT BE PAID FOR.
12. ALL PIPING GREATER THAN 6 INCHES IN DIAMETER SHALL BE PRESSURE TESTED FOR 1 HOUR AT 10 PSI. GREATER THAN 1% DROP IN PRESSURE OVER 1 HOUR SHALL INDICATE A LEAK EXISTS AND SHALL BE REPAIRED. PIPE SHALL BE TESTED IN SEGMENTS NO LONGER THAN 2,000 FEET UNLESS APPROVED BY THE ENGINEER.

ISSUED FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 9/29/2010
DRAWN BY MRF
DESIGNED BY JBS
CHECKED BY MED
APPROVED BY PJS

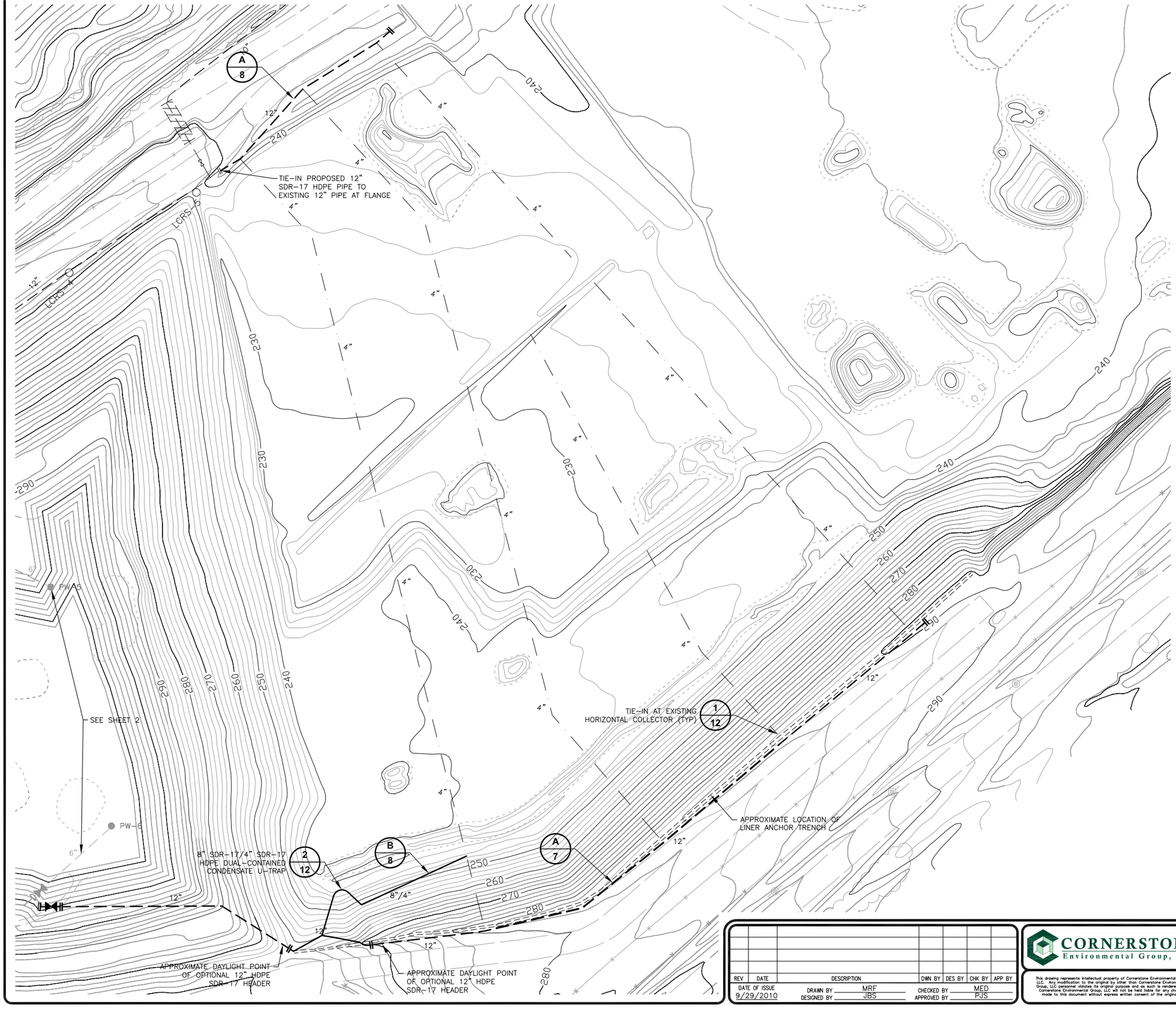
CORNERSTONE Environmental Group, LLC

CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
CONSTRUCTION SITE PLAN

SHEET NO. **2**

PROJECT NO. 100245



LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING LANDFILL GAS HEADER
- EXISTING UNDERGROUND LANDFILL GAS HEADER
- EXISTING HORIZONTAL COLLECTOR
- EXISTING CONTROL VALVE
- EXISTING BLIND FLANGE
- EXISTING ROAD CROSSING
- EXISTING LEACHATE CLEANOUT RISER
- PROPOSED UNDERGROUND LANDFILL GAS HEADER/LATERAL
- PROPOSED LFG EXTRACTION WELL
- PROPOSED CONTROL VALVE
- PROPOSED BLIND FLANGE
- PROPOSED REDUCER FITTING
- PROPOSED ROAD CROSSING

N

0 50 100

SCALE IN FEET

NOTES:

1. TOPOGRAPHIC CONTOURS PREPARED USING PHOTOGRAMMETRIC METHODS BY AMERICAN AERIAL MAPPING, INC. DATE OF PHOTOGRAPHY: JUNE 11, 2010. DATUM: HORIZONTAL – NAD83, VERTICAL – GEOID09.
2. CONTRACTOR TO SURVEY AND STAKE HEADER PIPING ALIGNMENT WITH GRADES AND OBTAIN APPROVAL FROM ENGINEER AND OWNER PRIOR TO PROCEEDING.
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CORNERSTONE Environmental Group, LLC

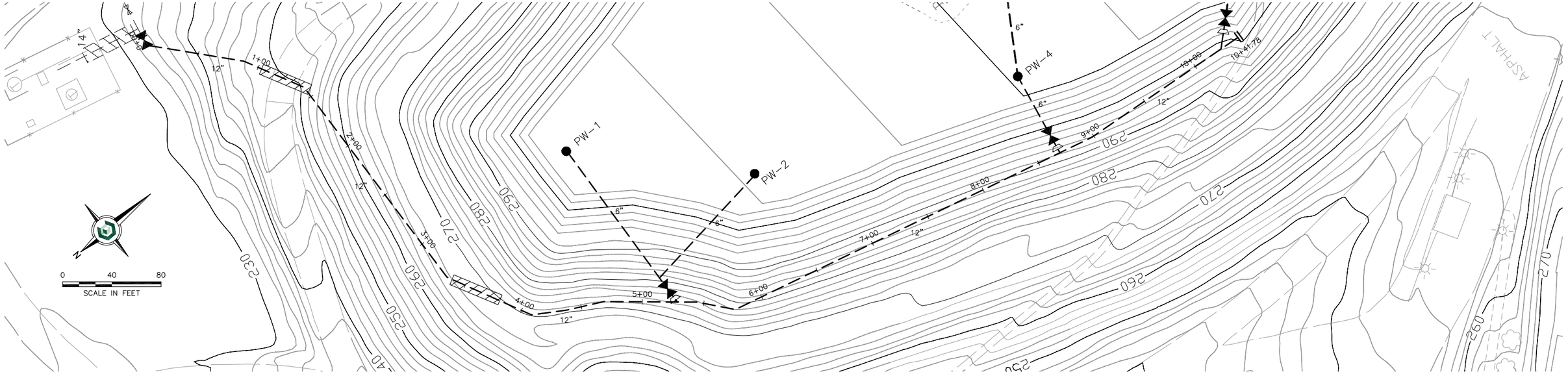
CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

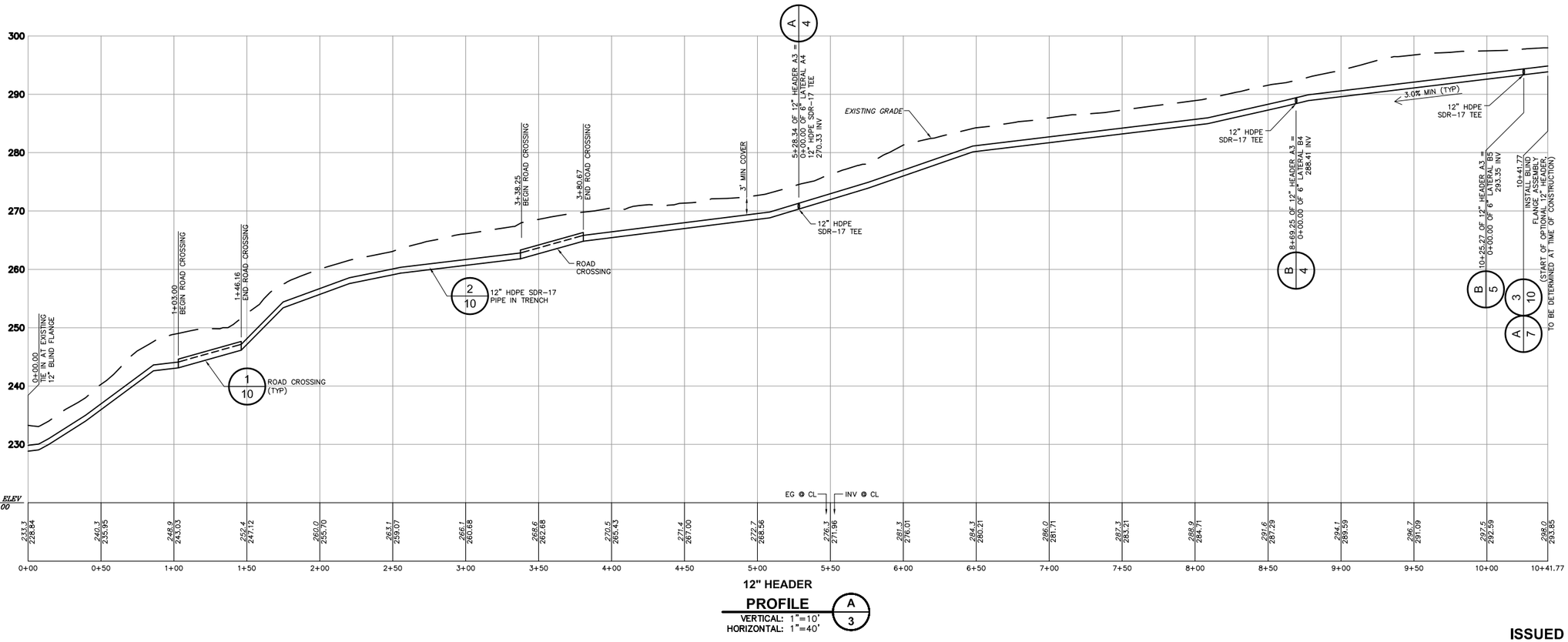
2010 PHASE IV GCCS IMPROVEMENTS
OPTIONAL GCCS IMPROVEMENTS

SHEET NO. **2A**

PROJECT NO. 100245

1" 1/2" 0" 1"





12" HEADER PROFILE (A/3)

VERTICAL: 1"=10'
HORIZONTAL: 1"=40'

ISSUED FOR CONSTRUCTION

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CORNERSTONE Environmental Group, LLC

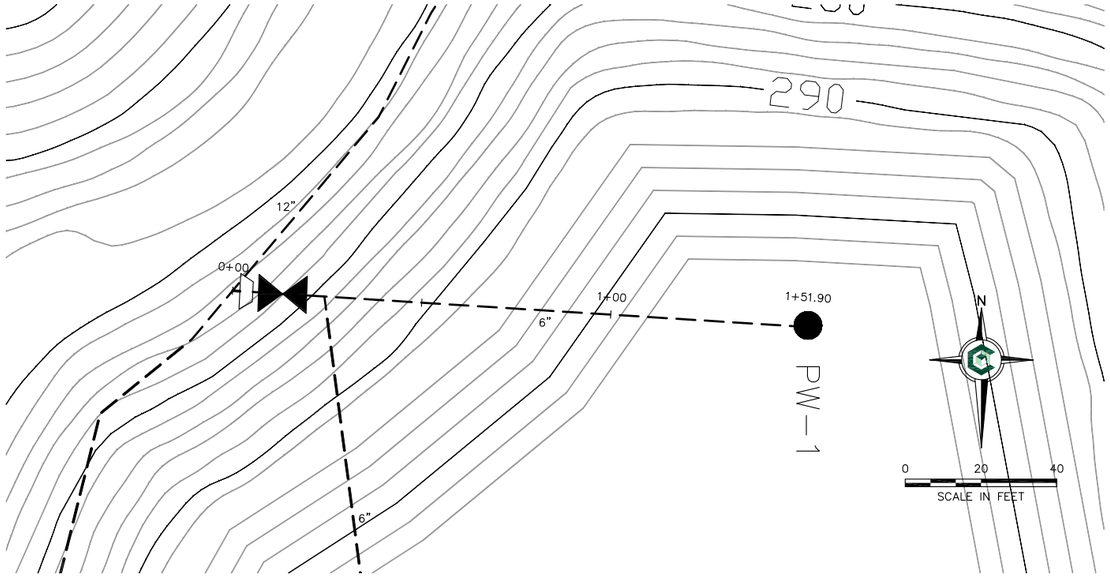
CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

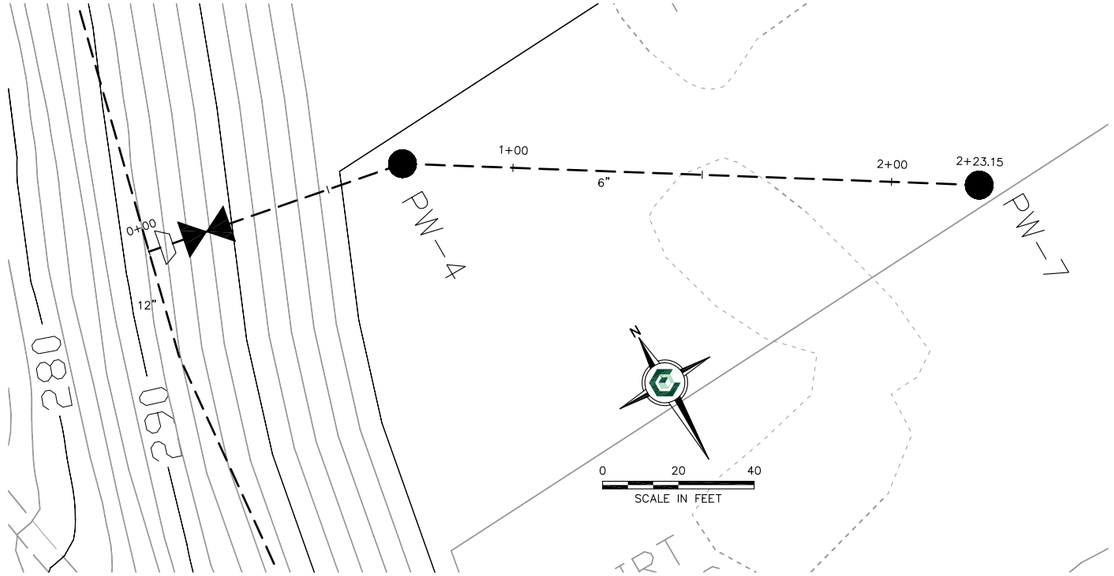
2010 PHASE IV GCCS IMPROVEMENTS
HEADER PROFILE

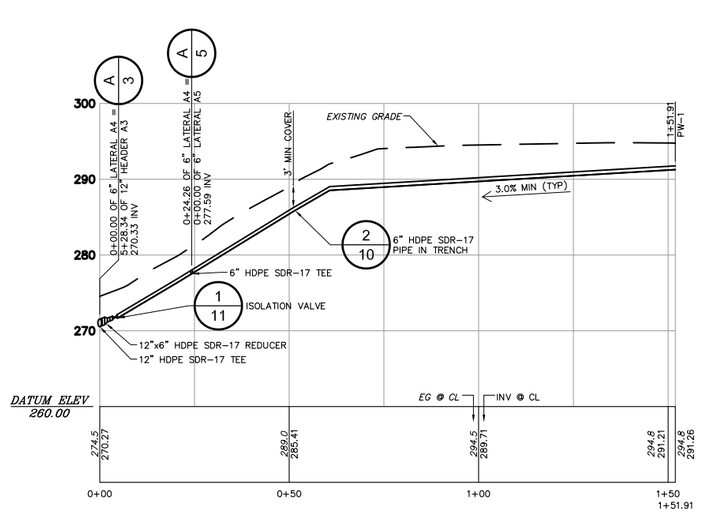
SHEET NO. 3
PROJECT NO. 100245

1" 1/2" 0" 1"

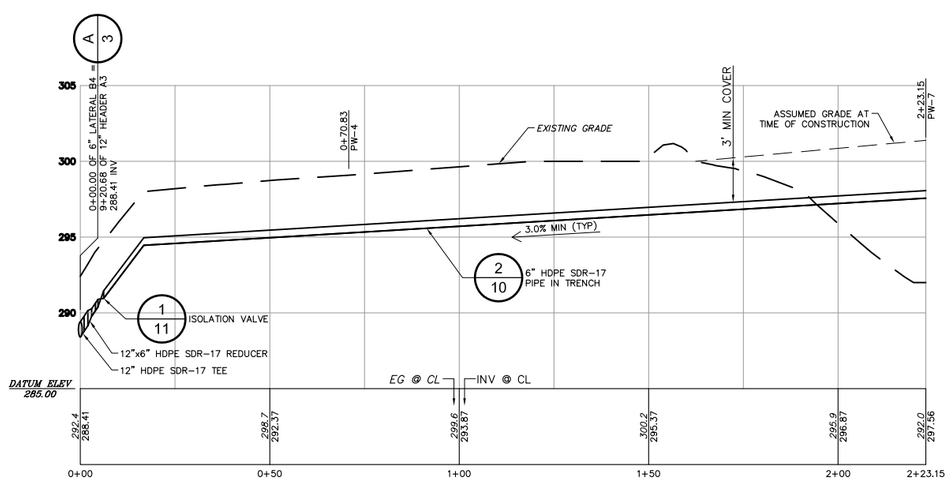
File: X:\PROJECTS\MAUI COUNTY - 2010 LFG ENGINEERING - 100245_PROJECT DRAWINGS\DJAMAUSOE-01_IMPROVEMENT PLANS.dwg Layout: SHT 3 User: michael.fritz Sep 29, 2010 - 8:36am







6" LATERAL
PROFILE (A/4)
VERTICAL: 1"=10'
HORIZONTAL: 1"=20'



6" LATERAL
PROFILE (B/4)
VERTICAL: 1"=5'
HORIZONTAL: 1"=20'

ISSUED FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

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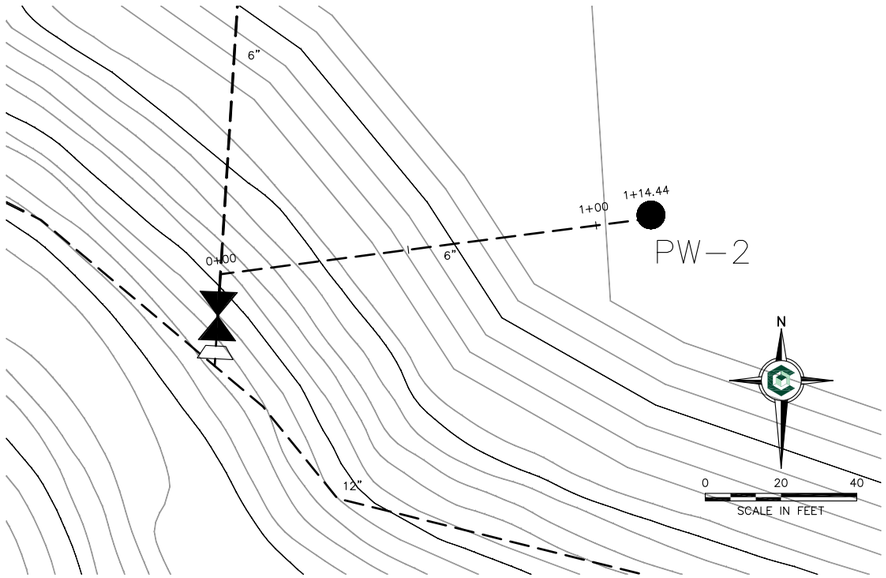
CORNERSTONE Environmental Group, LLC

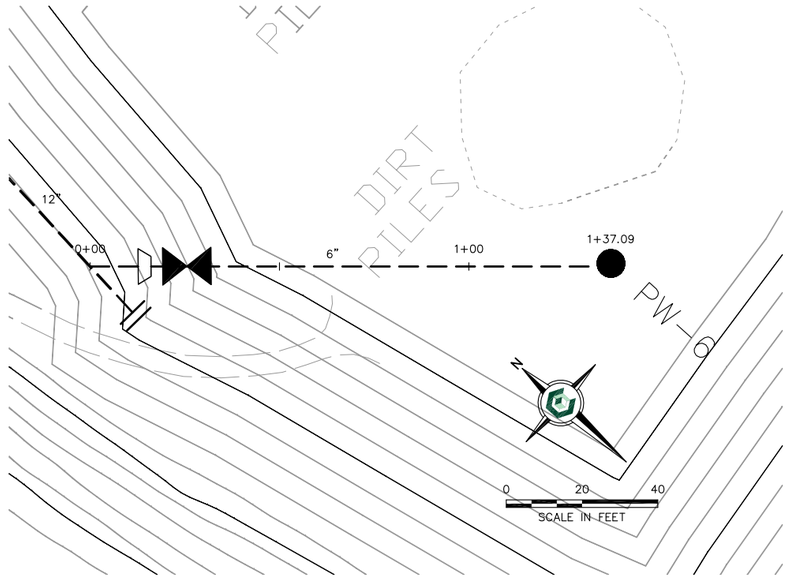
CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

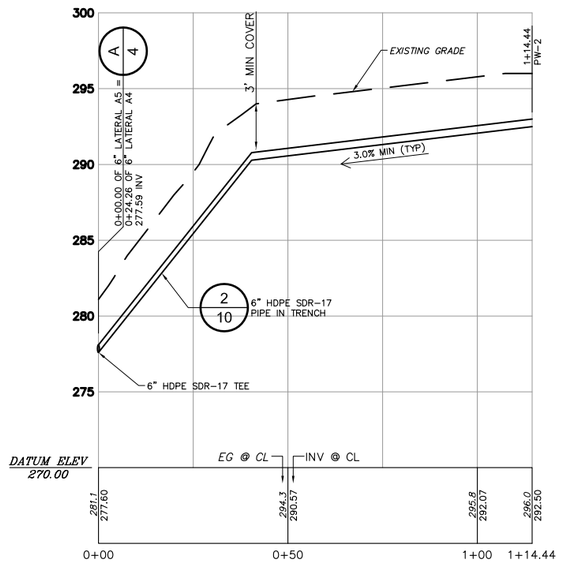
2010 PHASE IV GCCS IMPROVEMENTS
LATERAL PIPE PROFILES

SHEET NO. 4
PROJECT NO. 100245

1" 1/2" 0" 1"
File: X:\PROJECTS\MAUI COUNTY - 2010 LFG ENGINEERING - 100245_PROJECT DRAWINGS\LMAUISE-01_IMPROVEMENT PLANS.dwg Layout: SHT 4 User: michael.fitz Sep 29, 2010 - 8:36am



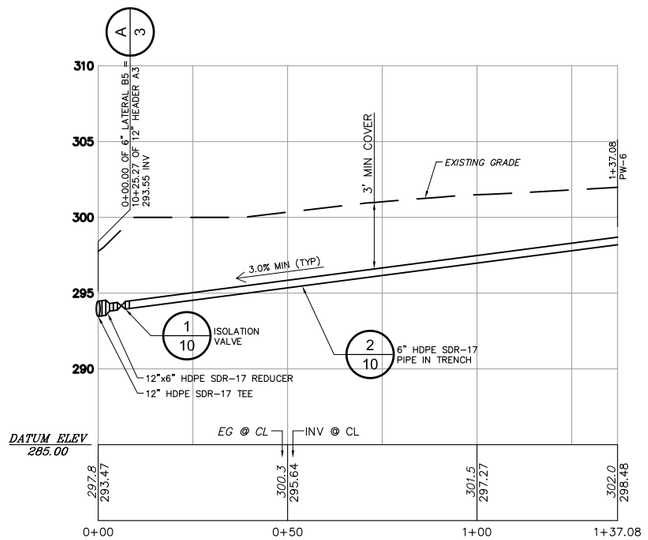




6" LATERAL

PROFILE A/5

VERTICAL: 1"=5'
HORIZONTAL: 1"=20'



6" LATERAL

PROFILE B/5

VERTICAL: 1"=5'
HORIZONTAL: 1"=20'

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CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

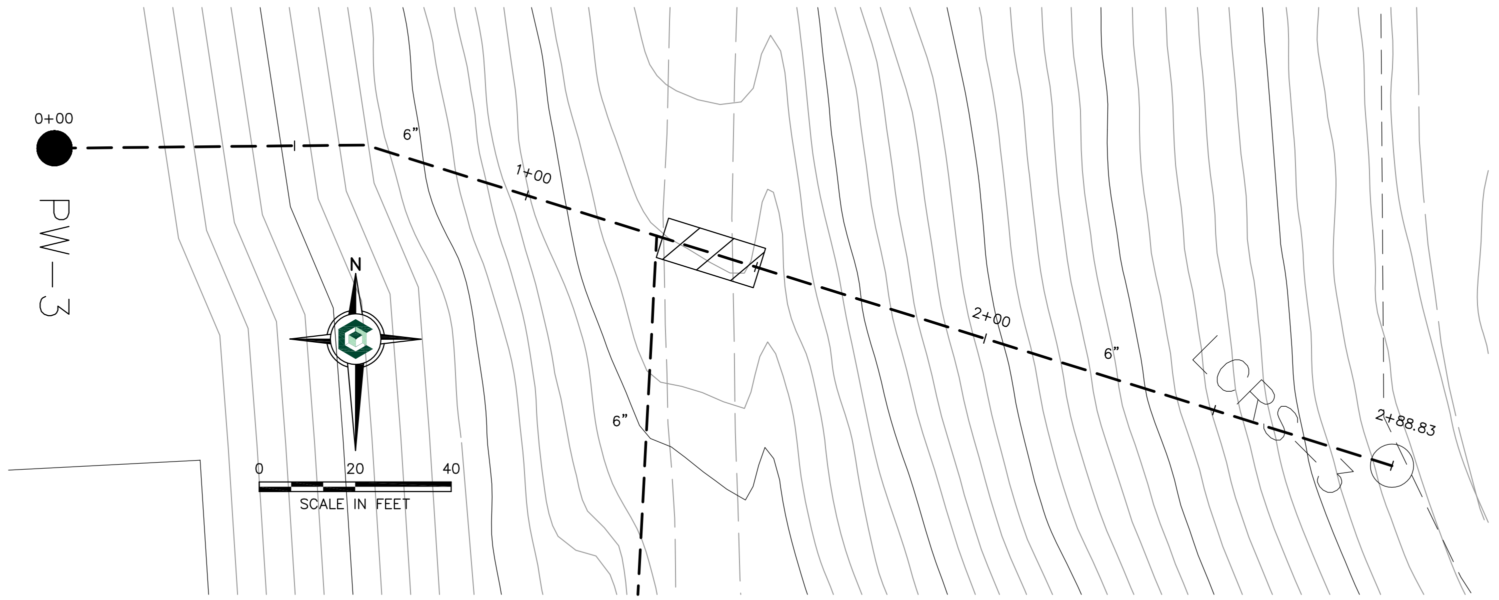
2010 PHASE IV GCCS IMPROVEMENTS
LATERAL PIPE PROFILES

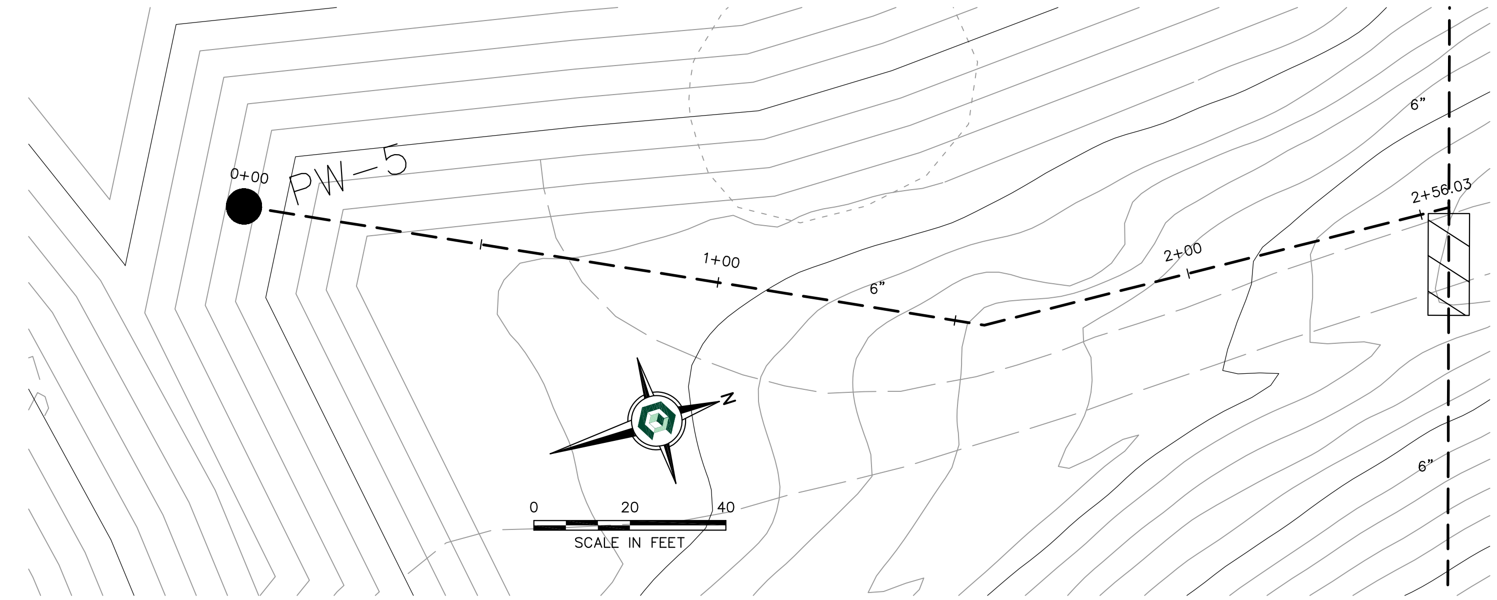
SHEET NO. **5**

PROJECT NO. 100245

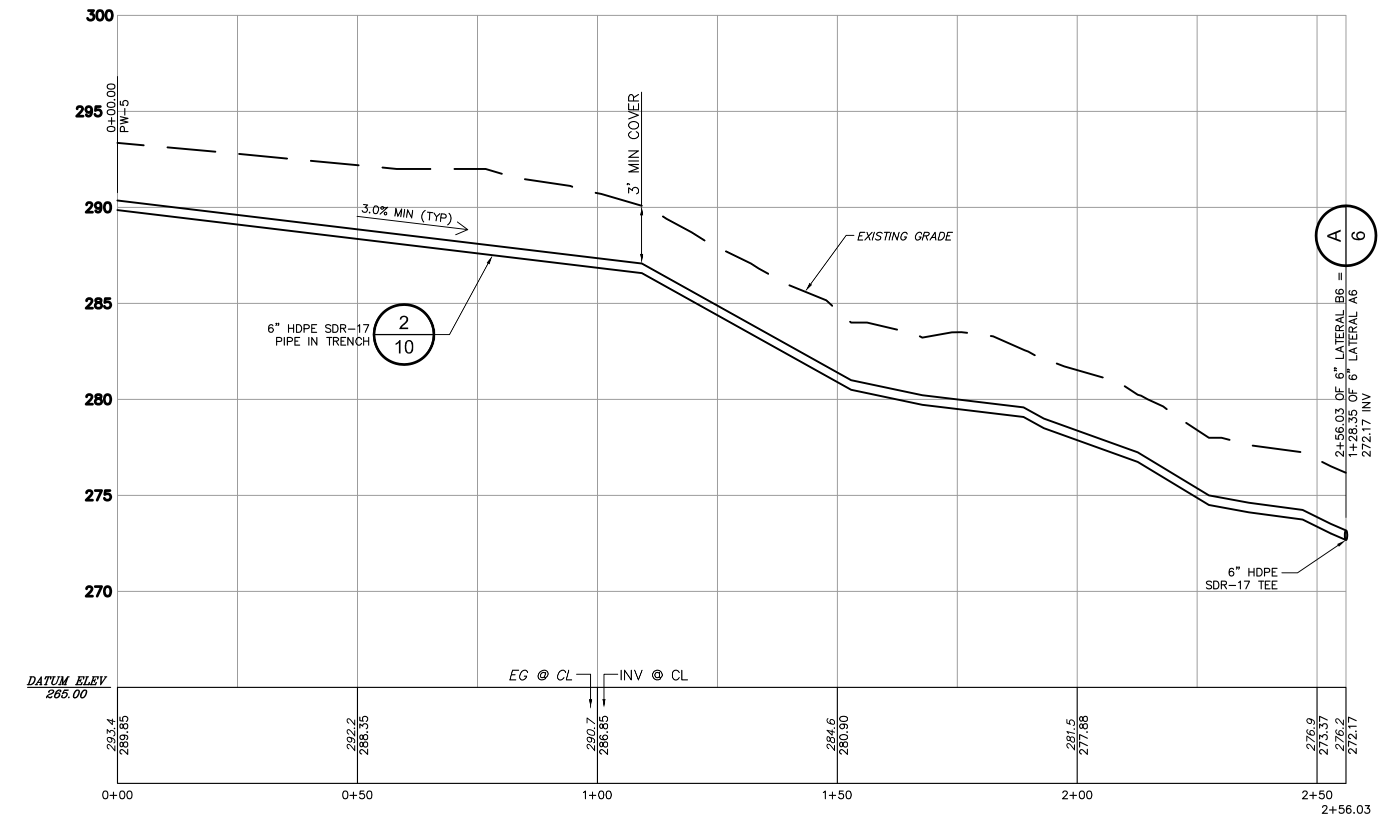
1" 1/2" 0" 1"

File: X:\PROJECTS\MAUI COUNTY - 2010 LFG ENGINEERING - 100245_PROJECT DRAWINGS\LUAKAOSDE-01_IMPROVEMENT PLANS.dwg Layout: SHT 5 User: michael.fritz Sep 29, 2010 - 8:36am





6" LATERAL
PROFILE A/6
VERTICAL: 1"=10'
HORIZONTAL: 1"=20'



6" LATERAL
PROFILE B/6
VERTICAL: 1"=5'
HORIZONTAL: 1"=20'

ISSUED FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

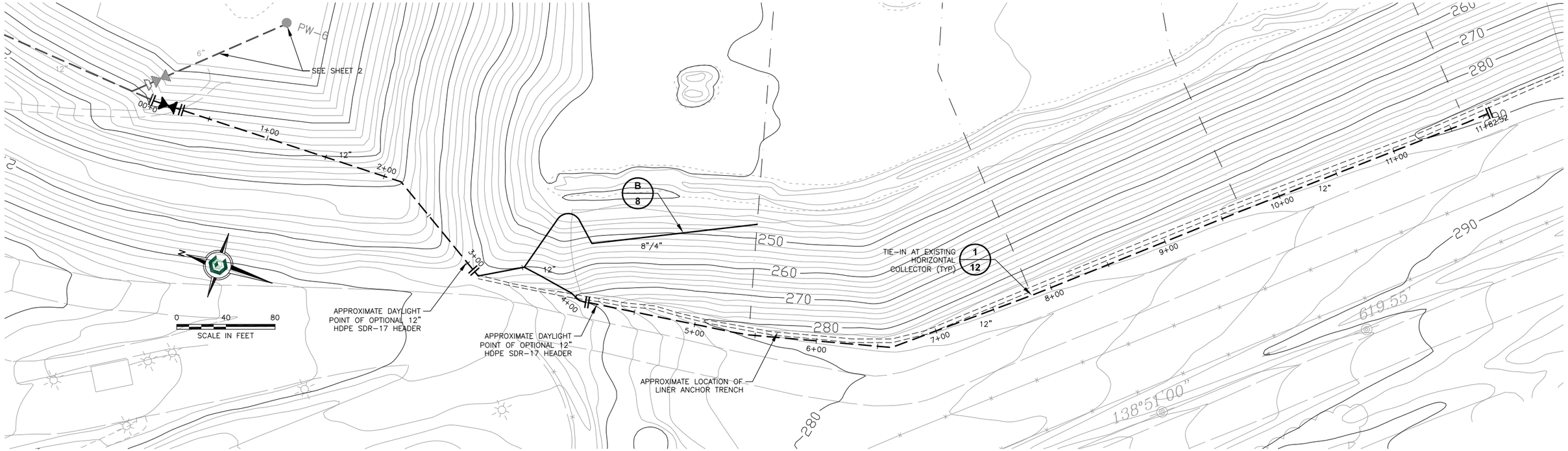
DATE OF ISSUE 9/29/2010 — DRAWN BY MRF — DESIGNED BY JBS — CHECKED BY MED — APPROVED BY PJS

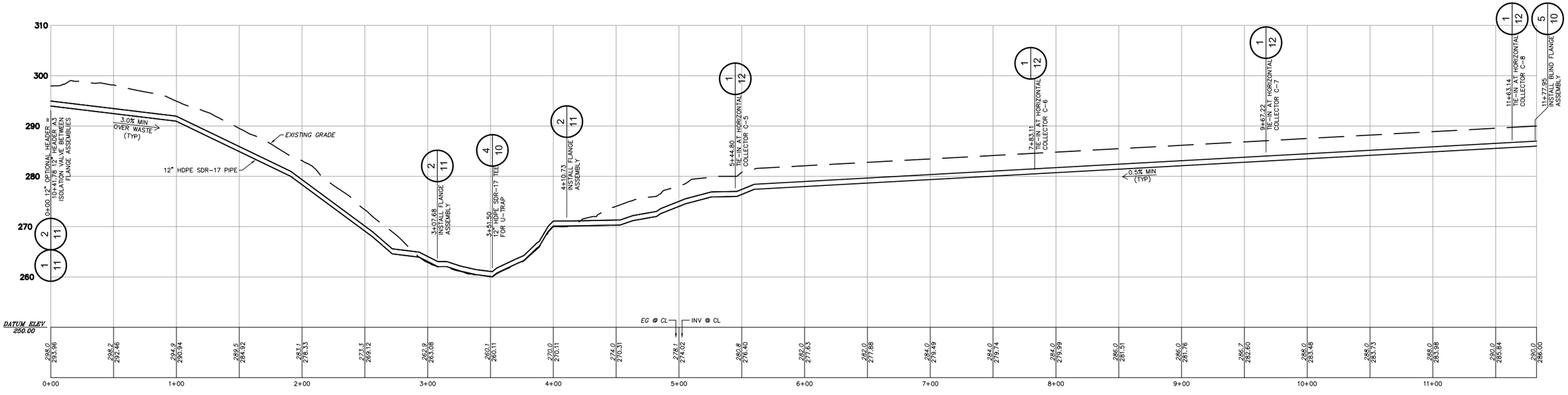
CORNERSTONE Environmental Group, LLC

CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
LATERAL PIPE PROFILES

SHEET NO. **6**
PROJECT NO. 100245





OPTIONAL 12" HEADER

PROFILE (A 7)

VERTICAL: 1"=10'
HORIZONTAL: 1"=40'

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CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
OPTIONAL HEADER PROFILE

SHEET NO. **7**
PROJECT NO. 100245

1" 1/2" 0" 1"

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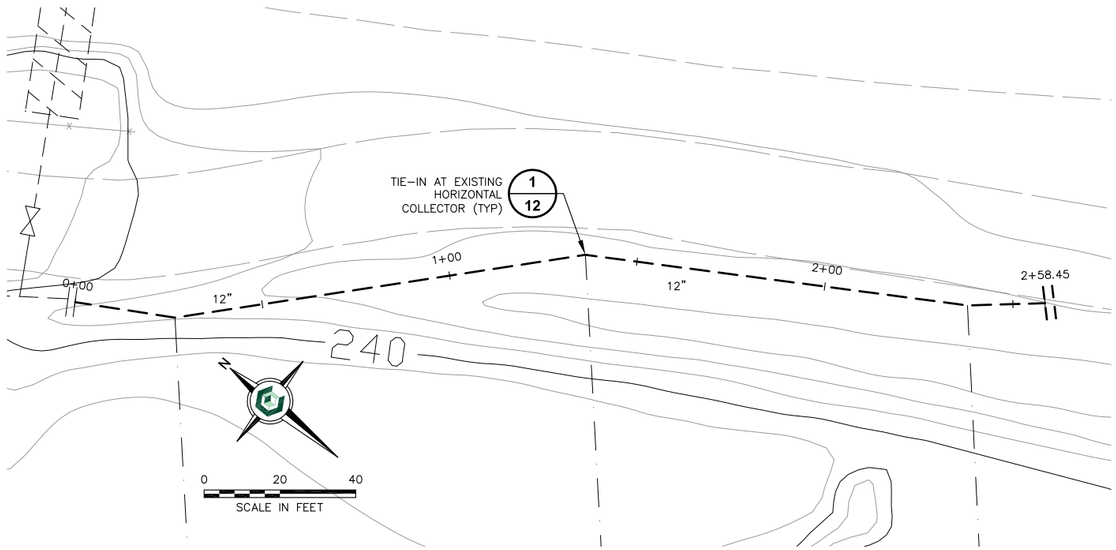
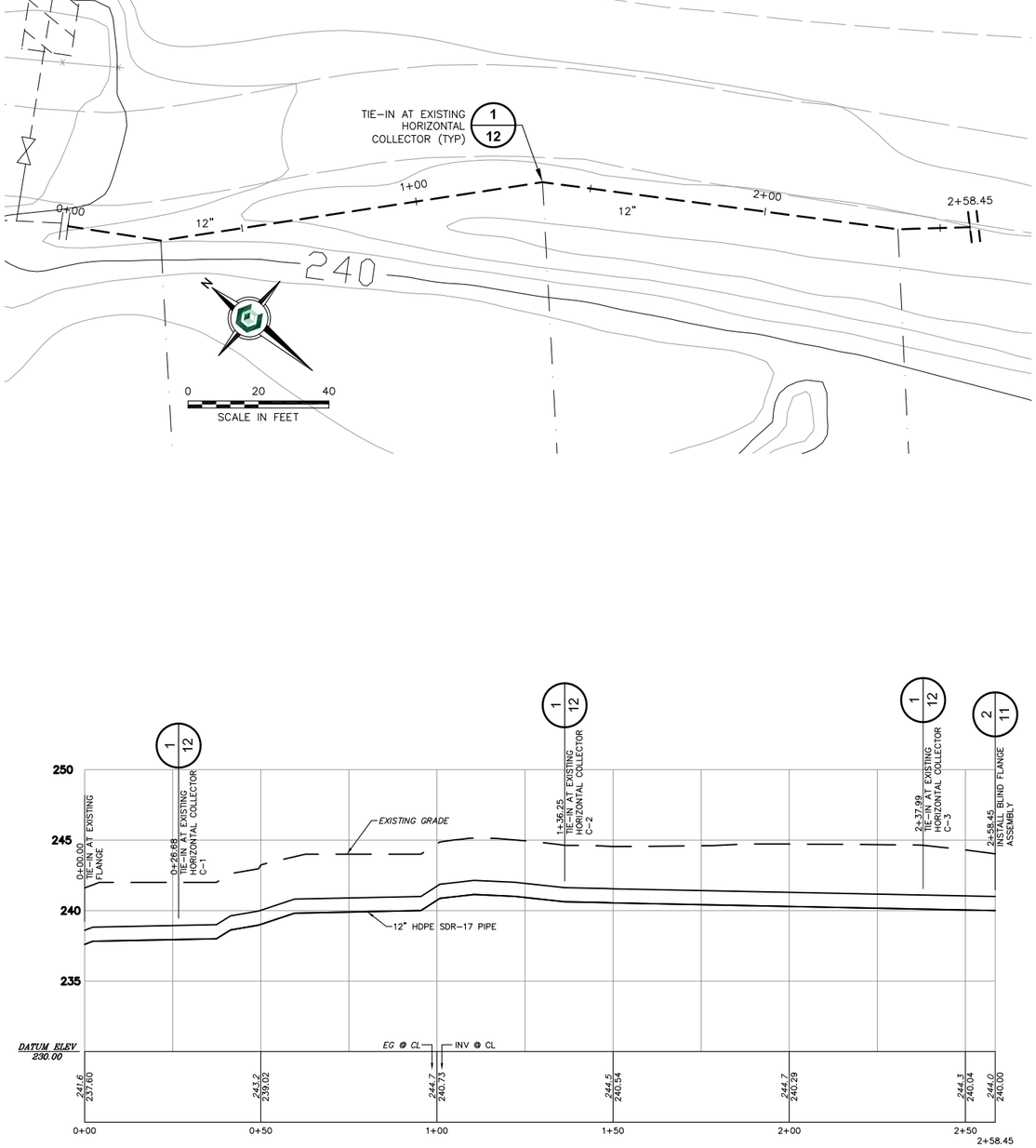
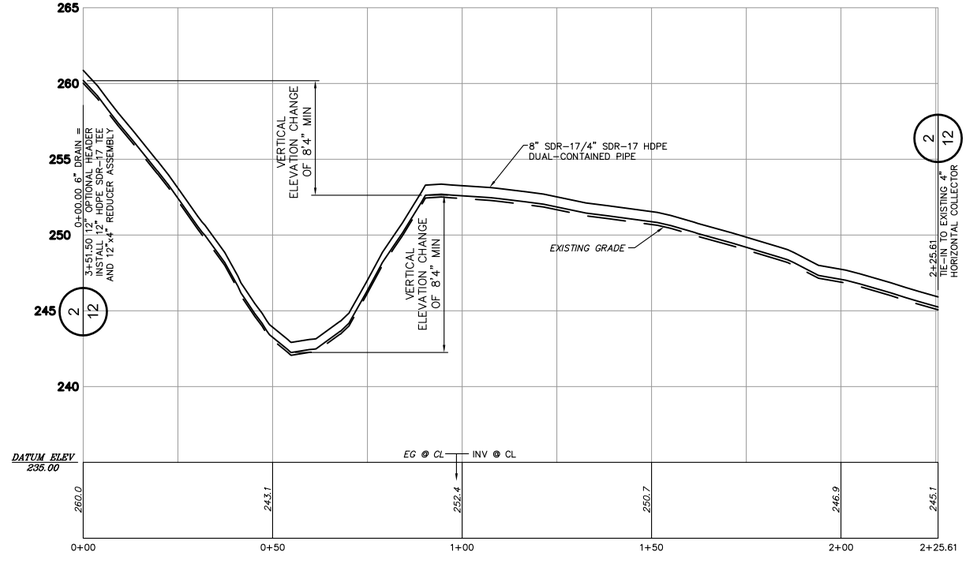




OPTIONAL 12" HEADER

PROFILE A/8

VERTICAL: 1"=5'
HORIZONTAL: 1"=20'



OPTIONAL 6" PRAIN PIPE

PROFILE B/8

VERTICAL: 1"=10'
HORIZONTAL: 1"=20'

ISSUED FOR CONSTRUCTION

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CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
OPTIONAL HEADER/DRAIN PIPE PROFILES

SHEET NO. **8**

PROJECT NO. 100245

1" 1/2" 0" 1"

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Central Maui Municipal Solid Waste Landfill
2010 GCCS Improvements
Proposed Well Schedule

New Well ID	COORDINATES		DIMENSIONS						
	Northing	Easting	GS[1] (06/11/10) (FT. MSL)	BASE[2] (FT. MSL)	ESTIMATED REFUSE DEPTH[3] (FT. BGS)	Bore[4] (FT. BGS)	D_S[5] (FT.)	D_P[6] (FT.)	D_R (FT.)
PW-1	-13,939	-8,874	294	212	82	67	25	40	47
PW-2	-14,045	-8,986	296	214	82	67	25	40	47
PW-3	-14,174	-8,830	296	216	80	65	25	38	45
PW-4	-14,260	-9,062	298	216	82	67	25	40	47
PW-5	-14,432	-8,779	292	220	72	57	25	30	37
PW-6	-14,503	-9,058	300	226	74	59	25	32	39
PW-7	-14,341	-8,933	292	218	74	59	25	32	39
Proposed: 7 New We					Totals:	441	175	252	301

Notes:

GS - Ground Surface
BGS - Below ground surface
FT. MSL - Feet above Mean Sea Level
FT. BGS - Feet below ground surface

APPROXIMATE WELL SCHEDULE

DETAIL 1/9
SCALE: NOT TO SCALE

Notes:

1. Ground Surface Elevation from American Aerial Mapping, Inc. dated June 11, 2010.
2. Base Elevation provided by A–Mehr, Inc. dated June 24, 2008.
3. The estimated refuse depth is assumed to be equal to the mathematical difference between the ground surface elevation (see note 1) and base elevation (see note 2).
4. The bore depth is designed to be equal to the estimated refuse depth (see note 3) minus 15 feet.
5. All wells to have 5 feet of stickup not included in solid total (D_S).
6. Well perf. section (D_P) shall be installed 2 foot off bottom of boring.
7. Well locations are approximate and may be adjusted by project engineer or project manager to accommodate field conditions and facilitate construction. If proposed well location does change, the new location needs to be surveyed and approved by owner/engineer prior to drilling.
8. Well depths are approximate and listed for reference only. Do not drill to these depths. Actual well depths to be computed and provided by project engineer based on survey of exact well locations by contractor prior to drilling.
9. This project requires drilling of landfill gas extraction wells in a landfill which contains non–homogenous soil and solid waste materials. As such, drilling progress (rates) in landfills can vary greatly based on the materials encountered during drilling. Variations in drilling rates will not be considered a changed condition per the contract documents.
10. Under no circumstances shall drilling activities begin until all five signatures are obtained below. Any change to well locations or depths shall require these signatures to be obtained again.

The undersigned hereby have thoroughly reviewed and accept the proposed drilling locations and depths. Well installation shall not begin until all six signatures are obtained below.

Cornerstone QA/QC by: _____ date: _____.

Cornerstone Project Manager check: _____ date: _____.

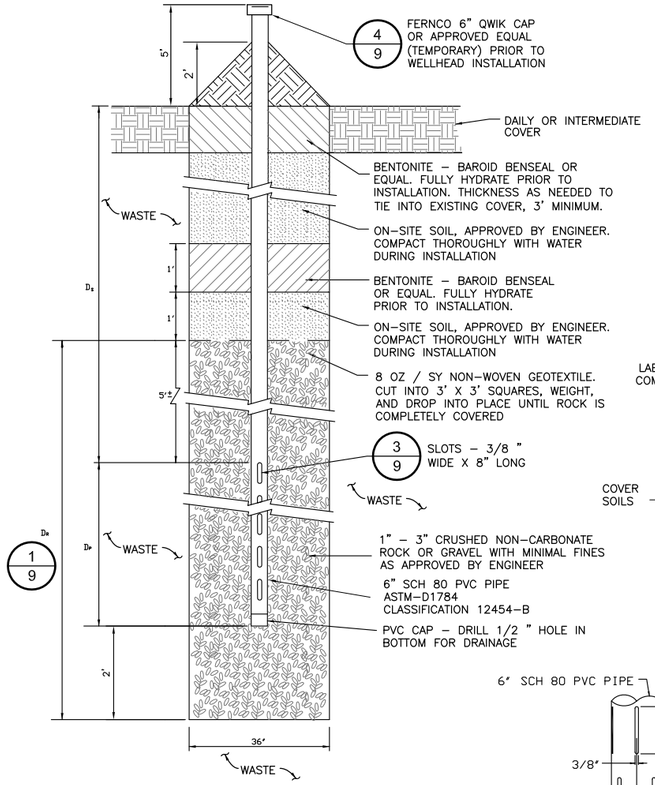
Cornerstone Project Engineer check: _____ date: _____.

Contractor Driller Check: _____ date: _____.

Contractor Surveyors Check*: _____ date: _____.

Central Maui Landfill Check: _____ date: _____.

*Surveyor shall confirm location and ground surface elevation and stake proposed well location.

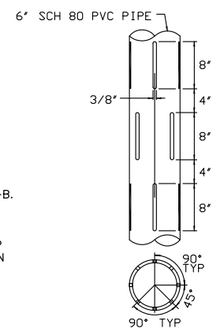


NOTES:

1. WELL PIPE TO BE BELL AND SPIGOT OR JOINED WITH SCH 80 PVC COUPLINGS.
2. SOLVENT WELD AND INSTALL THREE 1/2"DIA. x 3/4" LONG GALVANIZED LAG BOLTS @ 120° CENTERS ON EACH JOINT.
3. PVC WITH MINIMUM ASTM D–1784 CELL CLASSIFICATION OF 12454–B.
4. D_R = DEPTH OF ROCK
   D_S = DEPTH OF SOLID PIPE (BELOW GRADE) –25 FEET MINIMUM
   D_P = LENGTH OF PERFORATED PIPE
5. MINIMUM 15 FEET SEPARATION BETWEEN BASE OF BORING AND TOP OF LINER SYSTEM, PROVIDE MINIMUM 20 FEET SEPARATION BETWEEN BASE OF BORING AND TOP OF LINER SYSTEM ON LINER SIDE SLOPES.
6. 1"–3" NON–CARBONATE GRAVEL WITH MINIMAL FINES.
7. WELL DRILLING WILL NOT COMMENCE UNTIL BOTTOM LINER ELEVATIONS ARE IDENTIFIED AND VERIFIED BY PROJECT SURVEYOR, DESIGN ENGINEER, AND CQA REPRESENTATIVE.
8. WELL DRILLING TABLE WILL BE MANAGED BY THE CLIENT OR A DESIGNATED REPRESENTATIVE TO ENSURE ONLY THE VERIFIED WELL DEPTHS ARE PRESENT, AND THAT DRILLER AND CQA REPRESENTATIVE HAVE THE IDENTICAL INFORMATION PRIOR TO DRILLING.

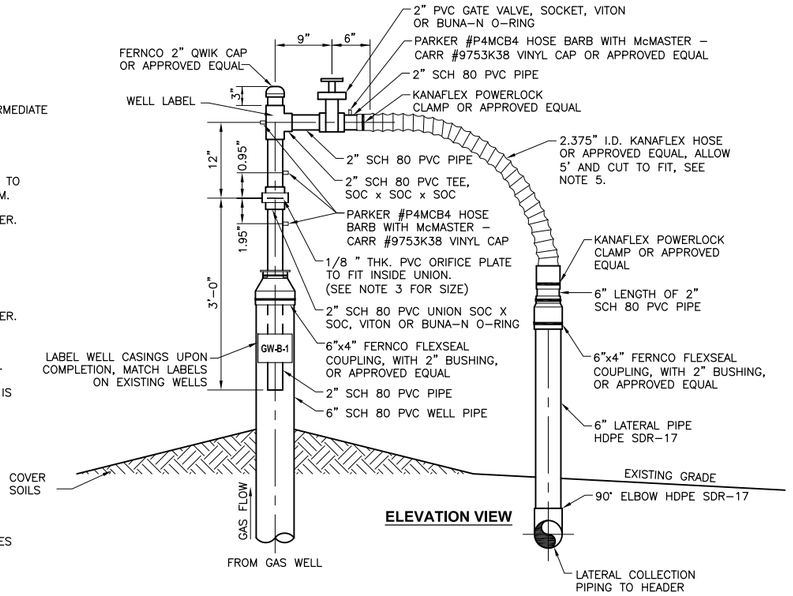
TYPICAL LFG EXTRACTION WELL

DETAIL 2/9
SCALE: NOT TO SCALE

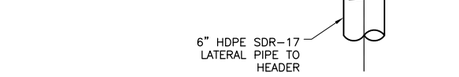


SLOT DETAIL

DETAIL 3/9
SCALE: NOT TO SCALE



ELEVATION VIEW



PLAN VIEW

NOTES:

1. WELL HEADS SHALL BE MANUFACTURED BY LFG SPECIALTIES, INC. OR APPROVED EQUAL.
2. CERTAIN WELL HEADS MAY BE 3" AS DIRECTED BY OWNER'S REPRESENTATIVE.
3. CONTRACTOR TO INSTALL 1" ORIFICE PLATE ON WELLHEAD. CONTRACTOR TO PROVIDE AN ADDITIONAL FULL SET OF ORIFICE PLATES (1–1/2", 1–1/4", 1", 3/4", 1/2", 1/4").
4. WELLHEAD SHALL BE INSTALLED 90° FROM LATERAL PIPE. SEE PLAN VIEW DETAIL ABOVE.
5. INSTALL FLEX HOSE WITH EXCESS HOSE TO ALLOW MOVEMENT OF LATERAL BUT CONFIGURE AS NECESSARY TO PREVENT SAG AND WATER ACCUMULATION. ALL INSTALLATIONS SHALL BE INSPECTED BY ENGINEER PRIOR TO APPROVAL.

WELLHEAD

DETAIL 4/9
SCALE: NOT TO SCALE

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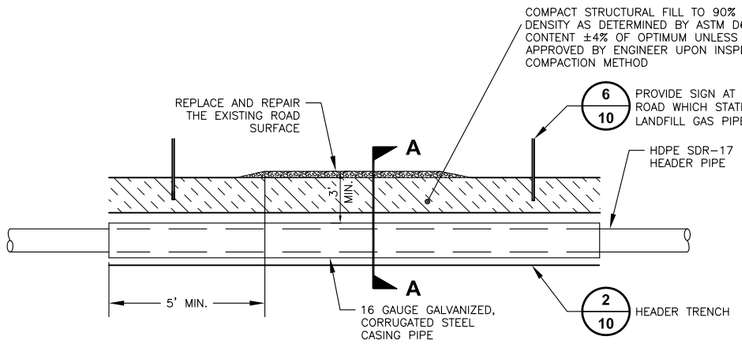
CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
WELL SCHEDULE / LANDFILL GAS DETAILS

SHEET NO. **9**
PROJECT NO. 100245



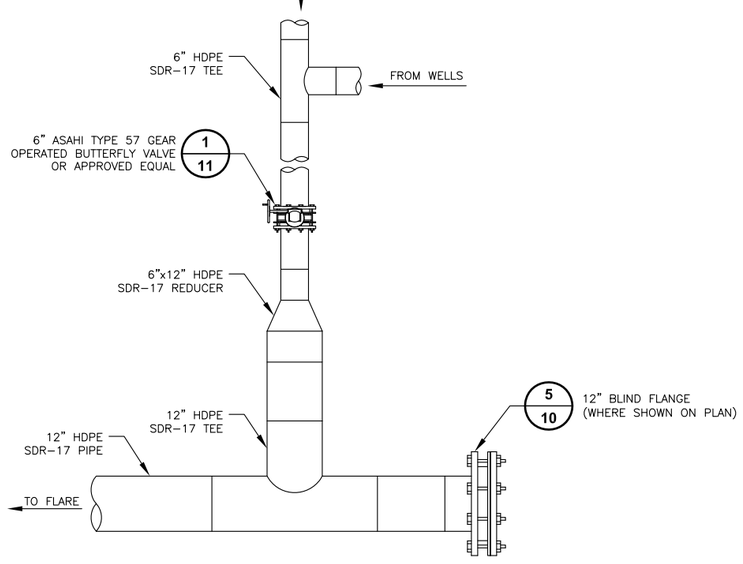
PIPE SCHEDULE	
12" HEADER PIPE	18" CASING PIPE OR APPROVED EQUAL

NOTES:

1. THE CONTRACTOR SHALL LAY OUT THE PIPE TO CONFORM TO FIELD CONDITIONS. PROVIDE 36" MINIMUM COVER. PROVIDE MINIMUM PIPE DRAINAGE SLOPES OF 7% UNDER PERIMETER ROADS AND MAIN HAUL ROADS, 3% WITHIN WASTE LIMIT AND 0.5% OUTSIDE OF WASTE LIMIT, AS APPROVED BY THE OWNER/ENGINEER.

TYPICAL ROAD CROSSING

DETAIL SCALE: NOT TO SCALE 1/10



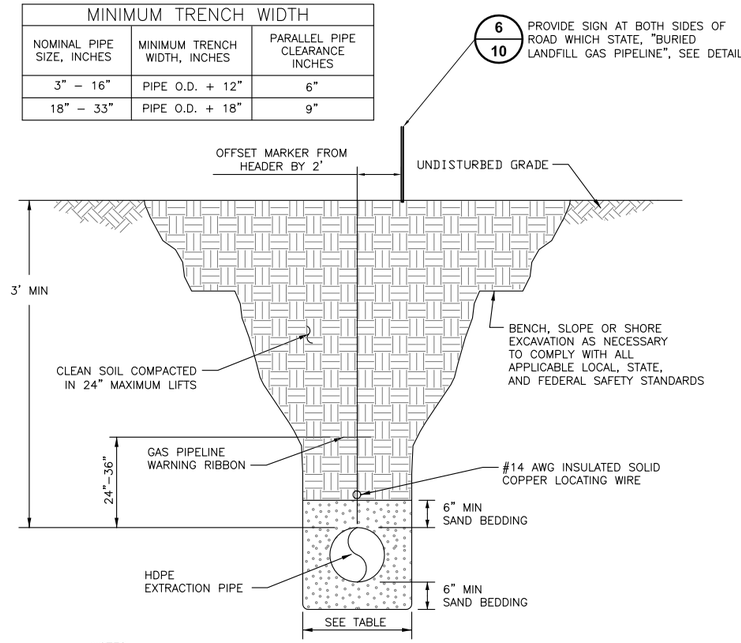
TYPICAL HEADER-SUBHEADER-LATERAL JUNCTION

DETAIL SCALE: NOT TO SCALE 4/10

NOTES:

1. THE CONTRACTOR SHALL LAY OUT THE PIPE TO CONFORM TO FIELD CONDITIONS. PROVIDE 36" MINIMUM COVER. PROVIDE MINIMUM PIPE DRAINAGE SLOPES OF 7% UNDER PERIMETER ROADS AND MAIN HAUL ROADS, 3% WITHIN WASTE LIMIT AND 0.5% OUTSIDE OF WASTE LIMIT, AS APPROVED BY THE OWNER/ENGINEER.

MINIMUM TRENCH WIDTH		
NOMINAL PIPE SIZE, INCHES	MINIMUM TRENCH WIDTH, INCHES	PARALLEL PIPE CLEARANCE INCHES
3" – 16"	PIPE O.D. + 12"	6"
18" – 33"	PIPE O.D. + 18"	9"

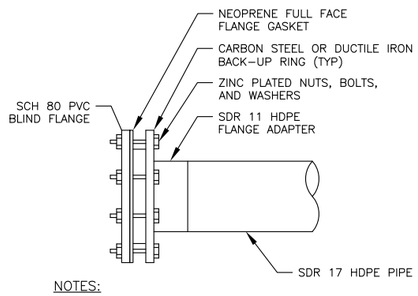


NOTES:

1. COMPACT SAND BEDDING UNTIL NO NOTICEABLE DEFORMATION IS OBSERVED.
2. DISTURBED AREAS TO BE RESTORED TO ORIGINAL OR BETTER CONDITION.
3. THE CONTRACTOR SHALL LAY OUT THE PIPE TO CONFORM TO FIELD CONDITIONS. PROVIDE 36" MINIMUM COVER. PROVIDE MINIMUM PIPE DRAINAGE SLOPES OF 7% UNDER PERIMETER ROADS AND MAIN HAUL ROADS, 3% WITHIN WASTE LIMIT AND 0.5% OUTSIDE OF WASTE LIMIT, AS APPROVED BY THE OWNER/ENGINEER.
4. TRENCHES OUTSIDE LIMITS OF WASTE TO BE BACKFILLED WITH CLEAN SOIL FILL AS APPROVED BY ENGINEER.

HEADER TRENCH

DETAIL SCALE: NOT TO SCALE 2/10

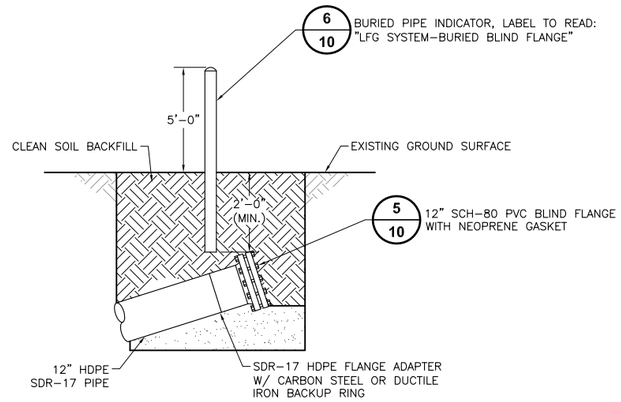


NOTES:

1. TAPE 5 MIL PLASTIC AROUND ALL BLIND FLANGES.

BLIND FLANGE ASSEMBLY

DETAIL SCALE: NOT TO SCALE 5/10

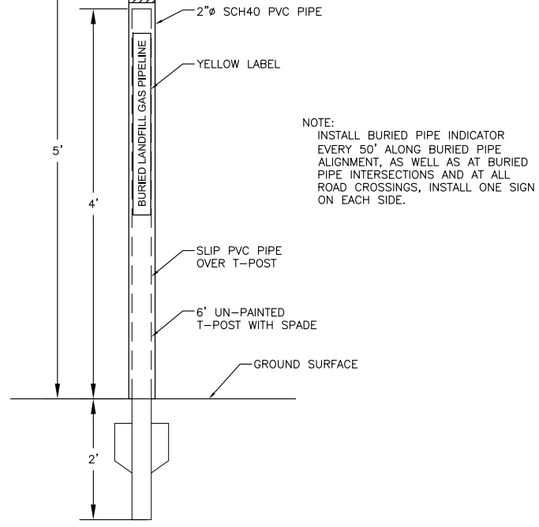


NOTES:

1. THOROUGHLY COAT ENTIRE SURFACE OF BOLTS, WASHERS, NUTS, AND BACKUP RING W/ POLYCOAT RUBBERIZED PRIMER OR EQUAL, AFTER TIGHTENING BOLTS. WRAP FLANGE IN PLASTIC WRAP PRIOR TO BACKFILLING.

BURIED BLIND FLANGE FOR FUTURE EXPANSION

DETAIL SCALE: NOT TO SCALE 3/10



NOTE:
INSTALL BURIED PIPE INDICATOR EVERY 50' ALONG BURIED PIPE ALIGNMENT, AS WELL AS AT BURIED PIPE INTERSECTIONS AND AT ALL ROAD CROSSINGS, INSTALL ONE SIGN ON EACH SIDE.

BURIED PIPE INDICATOR

DETAIL SCALE: NOT TO SCALE 6/10

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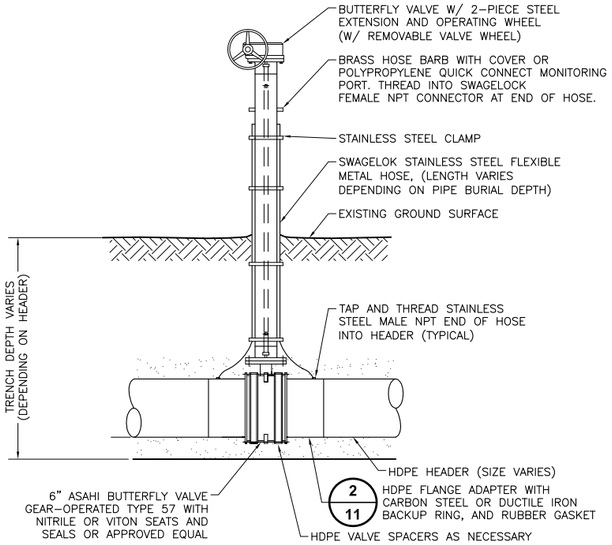
CENTRAL MAUI LANDFILL
PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
LANDFILL GAS DETAILS

SHEET NO. **10**
PROJECT NO. 100245

1" 1/2" 0" 1"

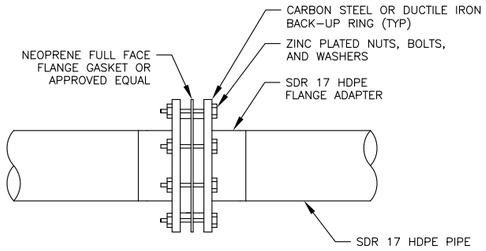


NOTES:

1. WRAP FLANGE IN PLASTIC WRAP PRIOR TO BACKFILLING.

HEADER AND LATERAL ISOLATION VALVE

DETAIL SCALE: NOT TO SCALE 1/11

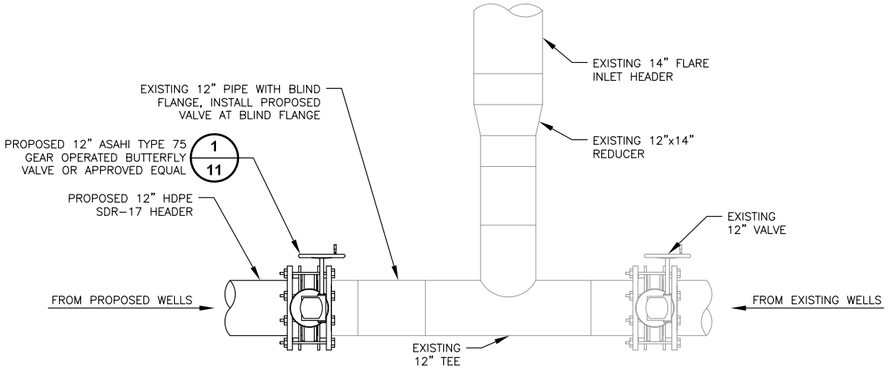


NOTES:

1. TAPE 5 MIL PLASTIC AROUND ALL FLANGE CONNECTIONS
2. LOCATE VALVE BETWEEN FLANGES WITH APPROPRIATE SPACERS AS REQUIRED.
3. IF USING VALVE, INSTALL EVERY OTHER BOLT THROUGH BOTH FLANGES, AND EVERY OTHER BOLT THROUGH FLANGE ON HEADER SIDE THROUGH VALVE ONLY. VALVE SHALL BE ASAHI TYPE 57 BUTTERFLY VALVE OR APPROVED EQUAL. GEAR OPERATED, PVC BODY PPDISK, NITRILE OR VITON SEATS AND SEALS. SEE DETAIL 1, SHEET 11.
4. VALVE SHALL INCLUDE HDPE FLANGE ADAPTER, D.I. BACKUP RING, AND GALVANIZED OR ZINC PLATED NUTS, BOLTS AND WASHERS, HDPE VALVE SPACER OR ROUTER FLANGE ADAPTER TO ALLOW VALVE TO FULLY OPEN.

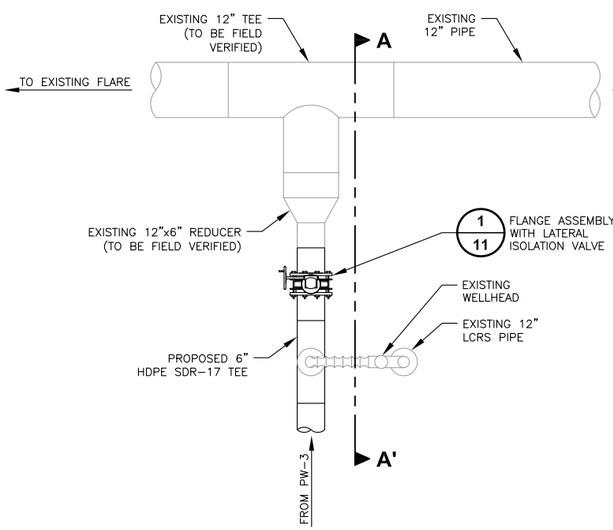
FLANGE ASSEMBLY

DETAIL SCALE: NOT TO SCALE 2/11

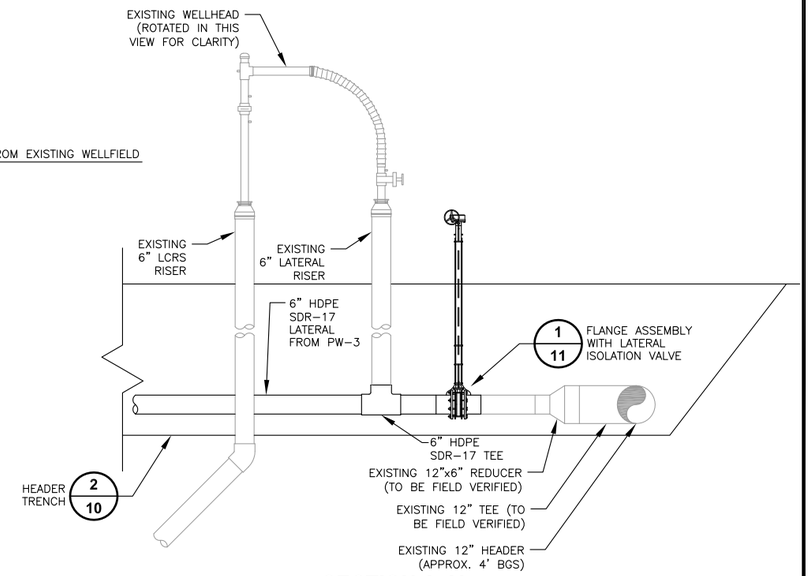


TIE-IN AT FLARE STATION

DETAIL SCALE: NOT TO SCALE 3/11



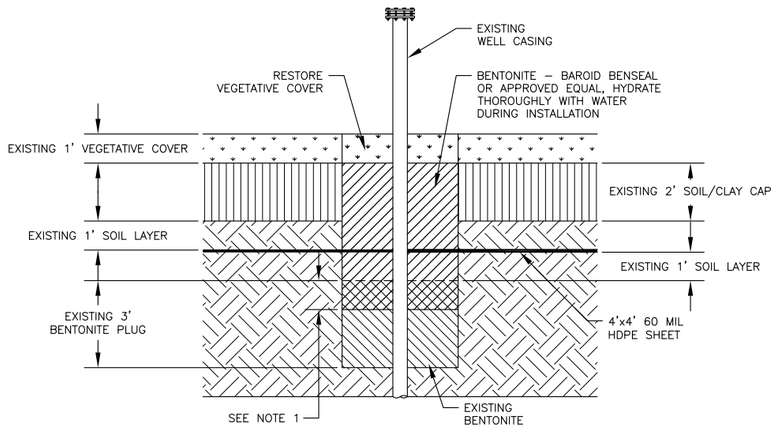
PLAN VIEW



SECTION A-A'

TIE-IN AT EXISTING LCRS

DETAIL SCALE: NOT TO SCALE 5/11



NOTES:

1. CONTRACTOR TO EXCAVATE 1' INTO EXISTING BENTONITE SEAL. BACKFILL WITH PROPERLY HYDRATED BENTONITE SLURRY TO 1' BGS. INSTALL AND RESEED VEGETATIVE SOIL COVER TO MATCH EXISTING OR BETTER.
2. CONTRACTOR TO PROTECT WELL CASING FROM DAMAGE DURING EXCAVATION.
3. CONTRACTOR TO NOTIFY ENGINEER WHEN HDPE WELL SEAL BOOT ENCOUNTERED TO ALLOW FOR INSPECTION.
4. CONTRACTOR TO NOTIFY ENGINEER WHEN BENTONITE BORE SEAL ENCOUNTERED TO ALLOW FOR INSPECTION.
5. ENGINEER TO DETERMINE EXTENT OF NUMBER OF WELLS TO REPAIR SEALS ON BASED UPON THE STATUS OF INITIAL EXCAVATIONS. (SEE SECTION 6 IN CQA PLAN)

EXISTING WELL BORE SEAL REPAIR

DETAIL SCALE: NOT TO SCALE 4/11

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PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
LANDFILL GAS DETAILS

SHEET NO. **11**

PROJECT NO. 100245

1" 1/2" 0" 1"

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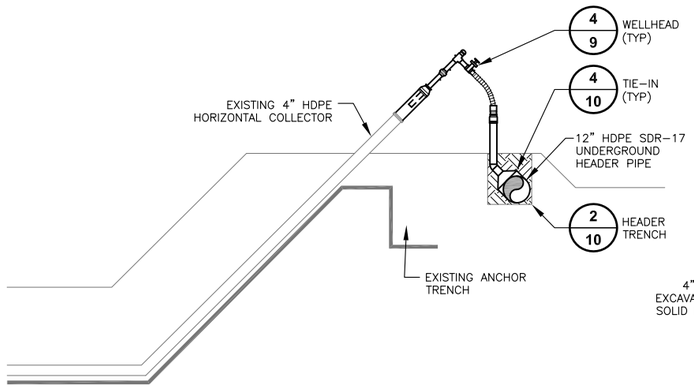
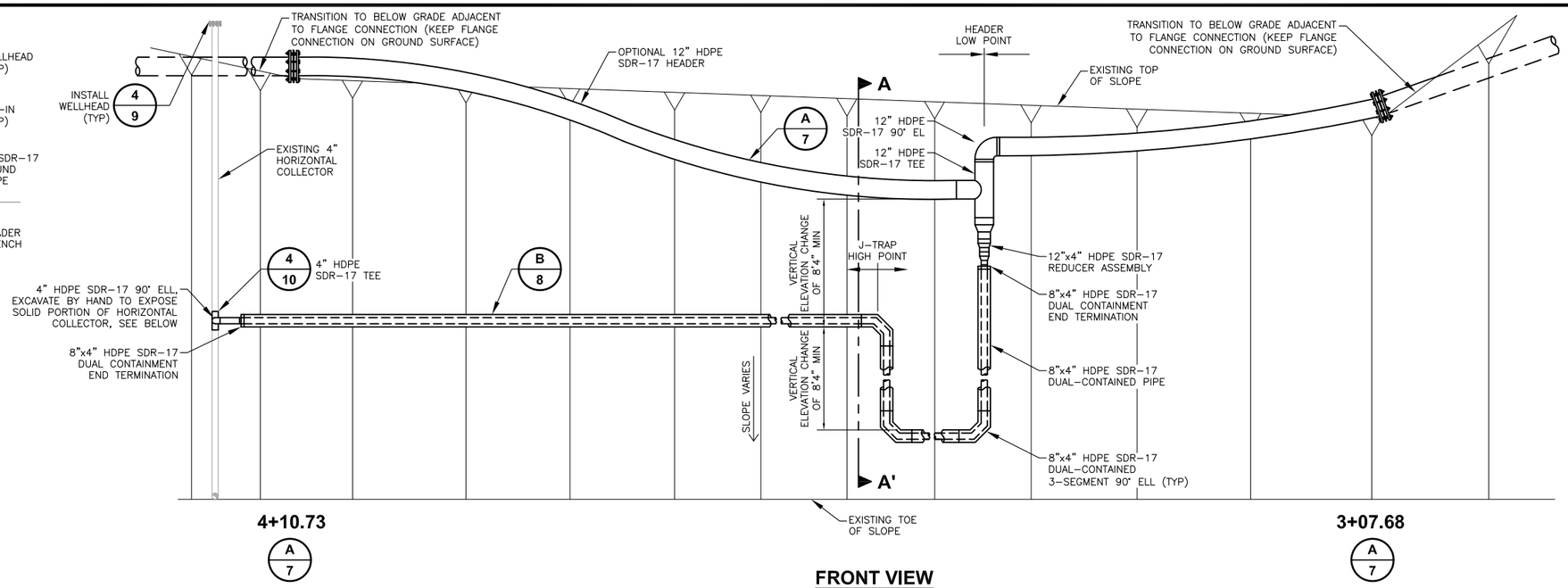
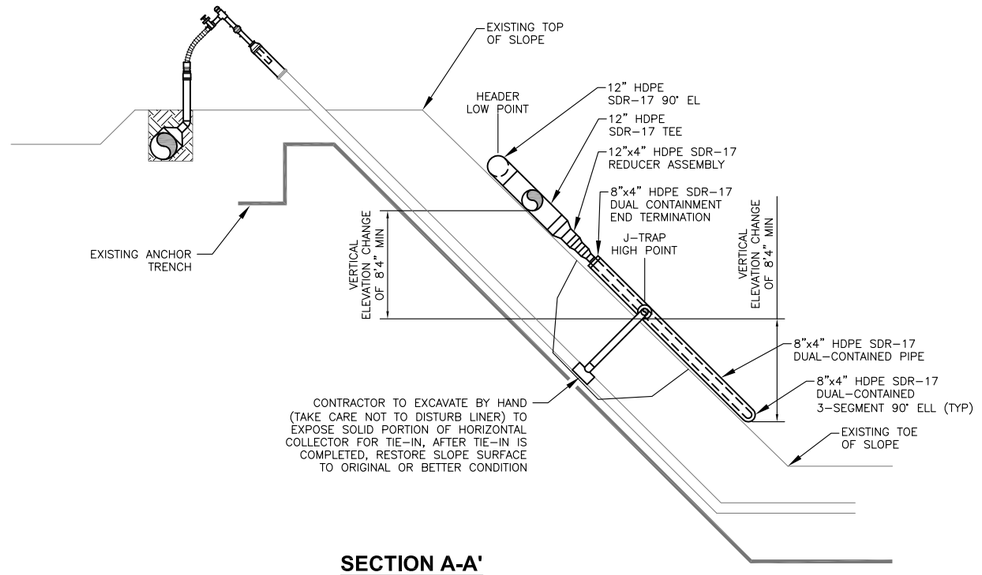


TIE-IN AT EXISTING HORIZONTAL COLLECTOR

DETAIL 1/12
SCALE: NOT TO SCALE



FRONT VIEW



SECTION A-A'

CONDENSATE U-TRAP AND TIE-IN AT HORIZONTAL COLLECTOR

DETAIL 2/12
SCALE: NOT TO SCALE

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PU'UNENE, HAWAII

2010 PHASE IV GCCS IMPROVEMENTS
OPTIONAL WORK LANDFILL GAS DETAILS

SHEET NO. **12**
PROJECT NO. 100245

1" 1/2" 0" 1"

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EXHIBIT B: LANDFILL GAS UTILIZATION STUDY AND CONCEPTUAL DESIGN (REPORT – A-MEHR, JANUARY 2010) AND CORNERSTONE MEMORANDUM DATED JANUARY 17, 2011, REVIEWING THE FINDINGS OF THE LANDFILL GAS UTILIZATION STUDY AND CONCEPTUAL DESIGN REPORT PREPARED BY A-MEHR INC.

FINAL REPORT

CENTRAL MAUI LANDFILL
LANDFILL GAS UTILIZATION STUDY AND CONCEPTUAL DESIGN

Prepared for

County of Maui
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January 2010

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CENTRAL MAUI LANDFILL
LANDFILL GAS UTILIZATION STUDY AND CONCEPTUAL DESIGN

1. INTRODUCTION

1.1 Landfill Gas Collection at Central Maui Landfill

Central Maui Landfill (CML), like all other municipal solid waste landfills, generates landfill gas (LFG) as a result of the anaerobic (without air) decomposition of organic material contained within the landfill. LFG typically consists of approximately 50% methane and 50% carbon dioxide and has a higher heating value (HHV) of approximately 500 BTU per standard cubic foot (BTU/SCF). The actual composition and energy content vary depending on how the gas collection system is operated, characteristics of the waste (e.g., composition and age of the refuse) and a number of environmental factors (e.g., the presence of oxygen in the landfill, moisture content, and temperature).

In order to manage the release of LFG to the atmosphere, prevent off-site migration of LFG, and comply with State of Hawaii and federal regulations, CML has installed a gas collection and control system (GCCS). The system, consisting of a series of wells and collection pipes, blowers and a flare, is designed to manage LFG from the closed, currently operating, and future disposal areas at CML. With the basic GCCS now in place, the County of Maui (County) currently is evaluating alternatives for beneficial use of LFG as a renewable energy source.

1.2 Beneficial Use of Landfill Gas

More than 450 LFG beneficial use projects in the United States utilize LFG as fuel in a variety of ways, including the following:

- Electrical generation
- Direct-use to replace fossil fuels
- Cogeneration, combining the production of thermal and electrical energy
- Production of alternative fuels by converting LFG to a high-BTU fuel

Energy recovery from LFG is cost effective and relies on proven technology to achieve the following identifiable benefits:

- Reduces greenhouse gas emissions and air pollution by replacing non-renewable fuels
- Generates revenue from the sale of LFG or electricity. These revenues can also be used to offset the costs of environmental compliance at the landfill

- Benefits the local economy through the creation of jobs associated with the design, construction and operation of the energy recovery systems

1.3 Scope of Work

The purpose and goal of this report is to assist the County in moving forward with an LFG energy recovery facility at CML. The report summarizes the results of the following study elements designed to achieve the project goal:

1. Provide background information regarding the development of the landfill, compliance requirements associated with LFG and LFG volume and energy projections from collected LFG;
2. Evaluate alternative technologies that can be used for the beneficial use of LFG;
3. Identify and evaluate LFG energy recovery facility ownership options for consideration by the County;
4. Provide a conceptual design analysis to describe the scope, capital costs and operating costs associated with a LFG energy recovery facility; and
5. Provide recommendations for development of a LFG energy recovery facility based on the above.

2. SUMMARY OF RESULTS AND RECOMMENDATIONS

The volume of landfill gas projected to be produced at Central Maui Landfill during its remaining active life and post-closure period is most suitable for utilization in two alternative ways:

- Direct gas sales to a third party for use as fuel for steam boilers or electrical generation facilities; or
- Production of electric power in an on-site facility.

Conversion of LFG to high-BTU compressed natural gas (CNG) as a substitute for bottled propane or fuel for refuse trucks or other vehicles was evaluated, but determined unlikely to be economically viable.

The only known third party with a potential capability to use LFG in a direct sales agreement is the Hawaiian Cane and Sugar (HC&S) sugar mill at Puunene. HC&S would require substantial investment in retrofit of its boiler systems in order to use LFG as a fuel, but also expressed interest in potentially participating in an electric power generation project. If the County elects to contract for third-party development of the LFG energy resource, it would be appropriate to structure the bid process in a way that would allow HC&S or any other user the opportunity to participate with a project for direct use of LFG as an alternative to electric power generation.

Among available technologies for electricity generation, the use of internal combustion engines is not only the most commonly used method for generating electricity from landfill gas; it is also ideally suited to the range of gas volumes projected at CML. Based on current estimates, the potential power production from the landfill during the period 2010 – 2040 using this technology is projected to be:

- If waste continues to be disposed in the landfill at current rates, within the range of 1.6 megawatts (MW) to 3.2 MW, which is equivalent to the energy use of approximately 1,500 to 3,000 typical Maui homes; or

- If refuse is diverted from the landfill to a waste-to-energy facility in 2015 as projected in the County's proposed Integrated Solid Waste Management Plan (ISWMP), within the range of 0.7 MW to 1.6 MW (equivalent to the electrical use of 700 to 1500 typical Maui homes).

The estimated capital cost of a LFG energy recovery facility using internal combustion engines is approximately $12.6 million for a 3.2 MW facility and $8.575 million for a 1.6 MW facility. Power sales revenues would depend on available rates paid by the purchaser, which presumably would be Maui Electric Company (MECO). Avoided Cost rates paid by MECO have varied generally between $0.10 and $0.25 per kilowatt-hour, although higher rates may be negotiated. The economic feasibility of a project may depend on negotiating a mutually satisfactory long-term rate.

We recommend the County proceed to implement an LFG energy recovery project at CML after determining what role the County will play in development, financing, and operation of the facility. The key decision is whether the County, or a contracted third party, will design, construct, own and operate the facility. After the County has made this decision, after consideration of evaluation factors listed in Section 7 of this report, A-Mehr, Inc. can develop a detailed implementation plan for moving the project forward. Presented below are proposed actions based on the County's ownership decisions:

a. If the County decides to proceed with a plan under which a third party designs, constructs, owns and operates the gas-to-energy facility, the County will retain a consultant to prepare an RFP for the selected option. The RFP will include a sample contract between the County and the developer. The contract could be structured to include an option under which the County could acquire ownership of the facility from the third party after a specified time or under certain specified conditions.

b. If the County elects to own and operate the gas-to-energy facility, A-Mehr, Inc. will prepare a detailed implementation plan for the design,

permitting, contract negotiations, construction and operation of a County owned gas-to-energy recovery facility

Preparation of an RFP to select a third-party developer for the LFG energy recovery facility will require several additional decisions to be made by the County. Among these issues are: the flexibility that will be given to proposers relative to the type of LFG energy recovery facility to be developed at CML; whether to allow either electrical generation or direct use, or to limit the facility to a single type of use; and whether the County will dictate what technology can be used for electrical generation. These issues are particularly important if the program is to include an option for the County to purchase the facility from the developer under specified circumstances.

3. BACKGROUND INFORMATION

3.1 Site Description

CML is located on the isthmus between West Maui and Haleakala, approximately 14,000 feet southeast of the Kahului Airport. Figure 1 is a vicinity map showing the site location.

Figure 2 presents an overall site map for CML, showing schematically six phases of development. Phases I and II were operational from 1987 through November 2005, after which disposal operations were begun in Phase IV-A. Phases I and II were closed and capped during 2006. Phase III is not currently slated for construction and the area is being used for co-composting of biosolids and green waste and the production of biodiesel fuel.

Phases IV, V and VI are separated from Phases I, II, and III by the Kalialinui Gulch, a seasonal stream designated as waters of the State. Phase IV, consisting of approximately 18 acres, is currently in operation. Phase V-A, containing approximately 12 acres, is being constructed during 2009. Phase V-B will add an additional area of approximately 6 acres to the available disposal area. At currently projected disposal rates, Phases IV and V will provide disposal capacity through approximately 2020, by which time the County expects to acquire additional property required for Phase VI and expand the landfill into it in accordance with the site's master plan.

3.2 Landfill Gas Compliance Requirements

Hawaii state regulations in Hawaii Administrative Rules, Title 11, Chapter 58.1 Solid Waste Management Control, require owners and operators of municipal solid waste (MSW) disposal units to ensure that concentrations of methane gas do not exceed the lower explosive limit (approximately five percent by volume) at

the property boundary, or 25 percent of the lower explosive limit in any on-site structure.

Federal regulations contained in 40 CFR 60.752 specify requirements for control of landfill gas in landfills with a total design capacity of 2.5 million metric tons (approximately 2.75 million tons) of solid waste. The requirements include an estimate of landfill gas emissions of non-methane organic compounds (NMOC) to determine whether NMOC emissions exceed a threshold value of 50 metric tons per year. If the calculated NMOC emissions exceed 50 metric tons per year, the facility is required to install a landfill gas collection and control system.

Phases I and II of CML were shown to exceed the regulatory thresholds triggering the requirement for installation of a gas collection and control system. The system was designed, installed, and is being operated in conformance with a complex set of state and federal requirements summarized in Appendix A.

3.3 Landfill Gas Collection and Control System

Installation of CML's landfill gas collection and control system (GCCS) began in April 2008 and was completed in July 2008. The GCCS has been in continuous operation since that time.

The GCCS was designed by A-Mehr, Inc. and installed by SCS Field Services. The design was based in part on the results of USEPA's Landfill Gas Emissions Model (LandGEM), an industry standard method for estimating landfill gas generation volumes. The model results were used to determine:

- Number and size of vertical wells
- Collection system line sizes
- Condensate holding tank sizing and configuration
- Flare combustion capacity for LFG and LFG condensate

Figure 3 is a drawing showing the existing GCCS. LFG is routed from 48 vertical extraction wells in Phases I and II and five (5) leachate cleanout risers in Phase IV-A through a piping network to an inlet sump located at the limits of the flare and blower system station. The inlet sump collects gas condensate prior to LFG being routed to an inlet knockout vessel located on the gas handling skid (GHS). Two (2) additional sumps are located at low points within the collection system for the collection and transfer of condensate to the inlet sump at the flare station.

LFG is then routed to the suction side of two (2) 700 SCFM blowers, each capable of delivering one third (33%) of the flare design capacity of LFG, at a total vacuum of approximately seventy-five (75) inches of water and positive discharge pressure of approximately twenty (20) inches. Two (2) additional blowers will be added in the future as Phases V and VI are developed and the LFG collection system approaches its design capacity. Each blower is equipped

with variable frequency drives (VFD) to optimize performance and reduce operating costs. LFG discharged from the blowers is then sent to the enclosed ground flare for combustion. The flare is designed to burn a minimum of 6.5 million BTUs per hour (MMBTU/hr) and a maximum of 65 MMBTU/hr of LFG. The maximum design flow rate of the flare is 2,045 SCFM.

Condensate collected from the sumps, inlet vessels and throughout the system is routed to an above ground storage tank. Condensate is pumped from the tank to the flare at a maximum flow rate of 2.2 gallons per minute for combustion.

The GHS also has within it an air compression system equipped with two (2) compressors capable of delivering 175 pounds per square inch gauge (psig) air for condensate management and valve actuation throughout the entire system.

4. EVALUATION OF THE LFG ENERGY RESOURCE

This section describes the quantity, quality and energy potential of landfill gas at CML. It presents the results of original modeling of gas generation during design of the GCCS, and refinement of the results based on actual results from the early months of GCCS operation. Projections of gas volume and energy potential are presented for two cases: with and without future diversion of solid waste from the landfill to a waste-to-energy facility as proposed in the County's 2008 Integrated Solid Waste Management Plan.

4.1 Original USEPA Model Results

As noted in Section 3.3, A-Mehr, Inc. used the LandGEM computer model, Version 3.02, to estimate the landfill gas generation potential for CML. 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 existing LFG collection system will be expanded into phases IV, V and VI as the landfill develops. Figure 4 illustrates the conceptual GCCS system at full development. The LandGEM model was run separately for the closed Phases I and II area, and for Phases IV, V and VI. The resulting estimates of landfill gas production for the two areas were then summed to produce an estimate of LFG from the combined areas. Model output, consisting of annual projections of the volume of LFG generated in the landfill, was used to estimate the quantity of gas that could be collected for treatment or use, assuming typical collection efficiencies of gas systems (70% to 80%, depending on the stage of development of the landfill).

Selected results are presented in Table 1, with gas volumes in units of standard cubic feet per minute (scfm).

TABLE 1
Landfill Gas Generated and Collected (scfm)
Based on Original Pre-Construction Modeling

Year	Phase I & II		Phases IV – VI		Total	
	Generated	Collected	Generated	Collected	Generated	Collected
2009	1,010	758	318	207	1,329	965
2010	961	721	415	270	1,376	990
2015	748	561	847	551	1,595	1,112
2020	583	437	1,210	787	1,793	1,244
2025	454	340	1,522	1,080	1,975	1,421
2030	354	265	1,482	1,185	1,835	1,450
2035	275	206	1,154	923	1,429	1,130

4.2 Adjusted Model Based on Initial GCCS Operating Results

Results of the first year of operation of the GCCS demonstrate that gas volume and quality from the extraction wells in Phases I and II are less than the levels calculated in the 2007 landfill gas master plan. Total volume collected from the Phases I and II gas system is approximately 65% of the values calculated in the LFG master plan, and the gas contains less than 40% methane. We believe these results are due in large part to the presence of large volumes of inert waste in Phases I and II, which was substantially filled before the implementation of recycling and diversion programs by the County. The lower methane concentration may also be affected by the need to operate portions of the GCCS at a higher volume than optimum in order to control lateral gas migration and emissions to the atmosphere, which may result in air intrusion into the GCCS and dilution of the gas stream.

Limited data from the Phase IV-B cleanouts connected to the system indicate reasonable agreement with the master plan projections. Accordingly, the LFG quantity and quality projections have been updated and revised for Phases I and II. The original projections are maintained for Phases IV through VI.

Table 2 summarizes selected results reflecting the model as calibrated using the GCCS operating results including the lower volume and methane concentration of the Phases I and II gas stream.

TABLE 2
Landfill Gas Generated and Collected (scfm)
Based on Initial Operating Results of Gas Collection and Control System

Year	Phase I & II		Phases IV – VI		Total	
	Generated	Collected	Generated	Collected	Generated	Collected
2009	656	492	318	207	974	699
2010	624	467	415	270	1,038	737
2015	486	364	847	551	1,333	915
2020	378	284	1,210	787	1,589	1,070
2025	295	221	1,522	1,035	1,816	1,256
2030	229	172	1,482	1,185	1,711	1,357
2035	179	134	1,154	923	1,333	1,057

4.3 Adjusted Model for ISWMP

During 2008 the County developed an ISWMP to guide the long-term development of solid waste management facilities and programs in the County. The ISWMP includes a recommendation for development of a waste-to-energy facility over a period of approximately 5 years. Diversion of waste to the facility, in combination with other ISWMP initiatives related to recycling, would greatly reduce the volume of MSW disposed in Phases IV through VI, and in turn, reduce the volume of LFG generated and collected.

Table 3 summarizes results based on waste being diverted to a waste-to-energy plant in 2015. As a conservative measure to estimate the maximum impact of this diversion, the calculations assume all combustible waste is diverted and that no biodegradable waste is landfilled after implementation of the waste-to-energy facility.

TABLE 3
Landfill Gas Generated and Collected (scfm)
Based on Implementation of Waste-to-Energy Facility in 2015

Year	Phase I & II		Phases IV – VI		Total	
	Generated	Collected	Generated	Collected	Generated	Collected
2009	656	492	318	207	974	699
2010	624	467	415	270	1,039	737
2015	486	364	847	551	1,333	915
2020	378	284	660	429	1,038	713
2025	295	221	514	365	809	576
2030	229	172	400	320	629	492
2035	179	134	312	249	491	383

4.4 Energy Projections

The potential energy content of a landfill gas stream is dependent primarily on its volume and its methane content. Based on early operational results from the GCCS at Central Maui Landfill, we assume that gas collected from the closed Phases I and II area contains 38.9% by volume. LFG from Phases IV, V and VI is assumed to have a methane concentration of 52.2% by volume.

Combining these assumed methane concentrations with the gas generation and collection data presented in Table 2 and Table 3, the energy potential of the CML gas stream is estimated in Tables 4 and 5. Table 4 presents the energy potential for the baseline case without implementation of a waste-to-energy facility; Table 5 addresses the case in which a waste-to-energy facility is implemented in 2015. The energy estimates are based on the HHV of the LFG based on its methane concentration, and is expressed in terms of million BTU per hour (MMBTU/hr).

If waste-to-energy is not implemented, the energy potential of LFG would increase to a peak of about 41-42 MMBTU/hr in 2029, after which it would steadily decrease. Implementation of waste-to-energy in 2015 would result in the peak being reached that year, at 26 MMBTU/hr, with a steady decline thereafter. Diversion of waste from the landfill would reduce the potential for LFG energy recovery by 35% to 65% during the study period.

TABLE 4
LFG Energy Potential
Assuming Waste-to-Energy Is Not Implemented

Year End	Collected LFG Volume (scfm)	Average Composition		Gross Fuel Value (MMBTU/hr)
		% Methane	HHV (BTU/scf)	
2010	737	44%	441	19.5
2015	915	47%	473	25.9
2020	1,070	49%	490	31.5
2025	1,301	50%	503	39.3
2030	1,357	50%	508	41.4
2035	1,057	50%	508	32.2
2040	823	50%	508	25.1

TABLE 5
LFG Energy Potential
Assuming Waste-to-Energy Is Implemented in 2015

Year End	Collected LFG Volume (scfm)	Average Composition		Gross Fuel Value (MMBTU/hr)
		% Methane	HHV (BTU/scf)	
2,010	737	44%	441	19.5
2015	915	47%	473	25.9
2020	712	47%	473	20.2
2025	586	47%	475	16.7
2030	492	47%	479	14.1
2035	383	47%	479	11.0
2040	299	47%	479	8.6

5. ALTERNATIVE TECHNOLOGIES FOR BENEFICIAL USE

5.1 Background and History of LFG Energy Recovery

Widespread installation of landfill GCCS began in the 1970s and has increased in response to more stringent regulations governing the control of landfill gas to prevent off-site migration and emissions to the atmosphere. Utilization of LFG for energy recovery has occurred in locations where favorable economics or public interest provided adequate incentives for the necessary investment. In recent years, development of LFG energy recovery facilities has been highly promoted as a means of increasing the use of renewable energy sources and reducing dependence on fossil fuels. Equally important has been the reduction in emissions of greenhouse gases and the overall improvement of air quality.

With over thirty years of experience, the industry relies upon proven technology for beneficial use of LFG. Currently, there are over 450 LFG to energy facilities operating in the United States. The majority (approximately 70%) of these projects involve the combustion of LFG for generation of electricity. These electrical generation projects provide approximately 1,380 megawatts of power annually. The remaining thirty percent (30%) of LFG projects provide direct gas sales to replace the consumption of natural gas or other fuels. These projects deliver approximately 235 million cubic feet per day of LFG for direct use applications.

Sections 5.2, 5.3 and 5.4 below describe the three most commonly used technologies for LFG energy recovery:

- Direct gas sales of medium-BTU gas;
- Direct gas sales of high-BTU gas; and
- Electrical generation.

Section 5.4 presents information on development costs and potential markets for each of these alternatives using LFG from CML. Section 6 presents detailed information on the recommended alternative.

5.2 Direct Gas Sales of Medium BTU Gas

The simplest way of utilizing LFG is direct sales and the replacement of fossil fuels with LFG. LFG can be used as fuel for combustion in boilers, dryers, kilns and other thermal applications. A wide range of industries use LFG as fuel, including manufacturing, waste water treatment, chemical production, refinery operations, and many others.

LFG as collected at the landfill has a HHV of 450 to 500 BTU/scf. Natural gas has a HHV of approximately 1,100 BTU/scf. The difference between the two fuels is the presence of carbon dioxide, nitrogen and oxygen in LFG that

compose approximately 50% or more of the gas but add no fuel value. These characteristics of LFG determine the markets for direct gas sales and the technology required to prepare it for use.

Most direct gas use and sales projects involve the utilization of medium-BTU LFG with a HHV of 450 to 500 BTU/scf, with minimal processing after its collection from the landfill. Medium-BTU gas can be blended with natural gas or other higher BTU gases for use in industrial boilers and heaters with only minor modifications to equipment.

LFG intended for use as medium-BTU gas is collected from the landfill, compressed to a desired pipeline pressure, chilled for removal of moisture and, depending on the gas composition, treated for removal of siloxane, hydrogen sulfide and other contaminants prior to being delivered to an end user by pipeline.

Figure 5 is a photograph of a typical LFG medium BTU gas processing system in Los Angeles, California that removes siloxane and other contaminants and compresses LFG before transferring it through a 5-mile long pipeline to a cogeneration facility. Figure 10 is a process flow diagram showing the arrangement of process required to prepare LFG for use as medium-BTU gas.

5.3 Direct Gas Sales of High-BTU Gas

High-BTU gas use and sales involve the upgrading of medium-BTU LFG by separating and removing the carbon dioxide from the methane. The resulting gas is roughly 100% methane and has an approximate heating value of 1,000 BTU/scf, approximately the same as natural gas. LFG-derived high-BTU gas can then be delivered to natural gas pipelines. An alternative use of high-BTU LFG is the production of compressed natural gas (CNG) or liquefied natural gas (LNG) for vehicle fuel.

As shown on Figure 10A, processes required for production of high-BTU fuels from LFG are substantially more involved and, as a result, more expensive than those needed to prepare medium-BTU gas. The process involves the compression of LFG collected from the field to a pressure dictated by the separation technology used. The example shown on Figure 10 A illustrates the use of membrane technology for the removal of carbon dioxide, operating at approximately 520 psig. Similar technology and operating conditions are used by the Sanitation Districts of Los Angeles, California for the production of CNG. Following compression, the LFG is processed to remove moisture, carbon dioxide, and trace contaminants such as hydrogen sulfide, siloxane and condensed organics. After removal of these constituents, the high-BTU gas is chilled prior to entering a natural gas pipeline or, being further processed into CNG.

The processes required for production of high-BTU gas are adversely impacted by the oxygen and nitrogen that are typically present in LFG collected in systems installed for compliance purposes. LFG collection systems designed for compliance, such as the system at CML, are operated at relatively high vacuum in order to minimize emissions of LFG to the atmosphere. As a result, compliance systems inherently draw some amount of atmospheric air containing oxygen and nitrogen into the gas stream. Collection systems designed specifically for high quality gas collection are operated at lower vacuum, or limit collection to deep areas of the landfill, in order to avoid drawing air into the system. Thus, production of high-BTU gas from LFG is generally considered an additional process that augments, but does not replace, a basic energy recovery system using medium-BTU gas.

Figure 6 is a photograph of a facility in Dallas, Texas, that produces pipeline quality high-BTU gas from LFG using a pressure swing absorption process.

5.4 Electrical Generation

As noted above, the most common beneficial use of LFG is generation of electricity. Electricity can be generated from LFG using a variety of technologies including internal combustion engines, gas turbines, microturbines, steam turbines and combined cycle. For these applications, the processing of LFG follows that of the medium-BTU direct use and sales but without the chiller, pipeline and need for additional compression to overcome pressure losses in the pipeline. Also, unlike the high-BTU option, the majority of technologies used for electrical generation can utilize lower BTU fuels (400 – 500 BTU/scfm) that contain carbon dioxide, oxygen and nitrogen. This provides flexibility in the way the LFG collection system is operated and is not adverse to a system used to prevent LFG from escaping to the atmosphere or adjacent properties.

5.4.1 Internal Combustion Engines

The most frequently used technology for producing electricity from LFG is internal combustion engines, which typically are large diesel engines modified to burn medium-BTU gaseous fuel. LFG is processed as described above, and supplied to the engine at a pressure of 1 psig to 5 psig. A variety of generation options are available, ranging from approximately 300 kw to 3,000 kw. The major suppliers of internal combustion engine generator sets that utilize LFG include:

- Caterpillar (C3412 – 300 KW, C3516 – 800 KW, C3520 – 1.6 MW)
- GE Energy Jenbacker (J2 – 300 KW, J320 – 1.3 MW, J6 – 1.6 MW)
- Dresser-Waukesha (L5954 – 700 KW, L7074 – 1 MW)
- MWM (2020 V12 - 1.0 MW, V16 – 1.3 MW, V-20 – 1.68 MW)

Figure 7 shows a Caterpillar C3520 engine generator set with 1.6 MW capacity. Figure 8 is an aerial photograph of a typical LFG electric generation facility equipped with two Caterpillar C3520 engines.

A detailed description including process flow diagrams, a typical facility layout, capital and operating costs are included in this section.

5.4.2 Gas Turbine Engines

Gas turbines are often used for larger projects in which the minimum long-term electrical generation exceeds 3 MW. Such projects may be feasible for sites with at least 1,000 tons per day (TPD) of long-term waste intake (CML approx. 500 TPD). Major equipment providers for this option include Solar (units range from 1.8 MW to 5 MW), Siemens (4.4 MW) and GE Energy (76 MW). Gas turbines are also used in large combined cycle projects, in which LFG is used to fuel gas turbines for electrical generation, and heat is recovered from the turbine exhaust to generate steam and/or additional power.

5.4.3 Microturbines

Microturbines have been used recently to generate power from LFG, typically for small projects with a generation potential less than 1 MW. While the use of microturbines has certain advantages such as low emissions and the ability to link modules, their use presents certain disadvantages, including:

- Low power generation efficiencies;
- Low fuel usage and power output;
- Requirement for more gas clean-up than internal combustion engines and larger turbines; and
- A limited track record using LFG as fuel.

Major microturbine providers include Capstone (30 – 65 KW) and Ingersoll Rand (80 – 250 KW). Figure 9 shows a facility in which 12 30-kw Capstone microturbines are installed to produce up to 360 kw of electricity from LFG.

5.4.4 Steam and/or Combined Cycle

Relatively few LFG energy recovery projects have used medium-BTU LFG as a primary or supplemental fuel in conventional boilers to generate steam for industrial processes or power generation. Combined cycle plants use LFG in gas turbines and then recover heat from the turbine exhaust, most often in the form of steam. Use of LFG in these kinds of projects is generally limited either to very large landfills or to sites located near existing industrial plants or generating stations with all or part of the necessary equipment already in place.

5.5 Cost and Market Evaluation

This section describes potential markets and potential development costs for each of the three main technologies available for energy recovery from CML landfill gas.

5.5.1 Medium-BTU Gas Sales

The HC&S Puunene sugar mill, located approximately two miles from the landfill, is a potentially viable market for medium-BNTU gas. The HC&S boiler plant is co-fired with coal and bagasse (sugar cane pulp) to produce steam for plant processes and generation of electricity. Most electricity generated at the plant is used internally, with excess power sold to MECO under an existing power sales agreement.

Theoretically, HC&S could modify the existing boiler plant to burn LFG and replace or reduce the amount of coal used in the facility, or to increase their production of electricity. Such a project would require installation of a gas preparation process at the landfill and construction of a pipeline to deliver gas to the sugar mill. Figure 10 is a typical process flow diagram for the gas preparation process. We estimate that the on-site cost to acquire and install the necessary equipment to prepare the gas for this use would be in the range of $6 million to $8 million, not including the pipeline from the landfill to the sugar mill. Tables B-3 and B-4 in Appendix B present an estimated capital cost breakdown for the on-site equipment needed to support a medium-BTU direct gas sale of LFG from CML.

Representatives of A-Mehr, Inc. and the County met informally with a responsible HC&S manager to explore the potential for LFG utilization in the HC&S boiler plant. Based on the discussions, it appears that the age and design of the boilers at HC&S would make their retrofit to burn LFG as an auxiliary fuel somewhat challenging but not necessarily infeasible. HC&S also indicated interest in participating in a gas-to-electricity project. Either form of LFG utilization would allow HC&S to reduce their use of coal for production of electricity to meet internal requirements. It would be appropriate for the County to structure any solicitation for third party LFG utilization proposals such that HC&S could submit a proposal for either electricity generation or direct use of LFG as fuel.

5.5.2 High-BTU Gas Sales

Potential users of high-BTU gas from LNG might include one or more of the following existing companies:

- The Gas Company, which provides bottled liquid propane gas to residential and commercial customers
- Maui Gas Service, which also sells bottled liquid propane

Replacement of existing propane service by CNG would be require substantial changes to distribution systems, and major issues for customer appliances and combustion units equipped exclusively for propane fuel.

Alternative energy developers using biomass, such as the proposed Real Green Power facility, conceivably could incorporate methane from LFG into their process. The viability of such a market would be a matter of speculation at this time.

The most feasible use for high-BTU gas at CML would be as compressed natural gas (CNG) for vehicle fuel. CNG is increasingly used as a clean alternative fuel for public transit vehicles and truck fleets, as well as for automobiles and light-duty trucks. A number of private waste companies and public jurisdictions have converted refuse collection trucks to operate on CNG.

As noted in Section 5.3 above, production of high-BTU gas requires a dedicated gas collection system to extract only the highest quality gas from deeper areas of the landfill. For CML, we estimate that approximately 200 SCFM out of the total LFG volume of 700 to 1,300 SCFM could be collected in dedicated system and converted to approximately 100 SCFM of high-BTU CNG. On an annual basis, with a system availability of 90%, such a system would produce approximately 47.3 million SCF of gas per year. In terms of gross energy content, this volume can be shown to be equivalent to approximately 381,000 gallons of gasoline or 365,000 gallons of diesel fuel per year.

According to the Maui County Integrated Solid Waste Management Plan, in fiscal year 2006 the County used approximately 75,000 gallons of diesel fuel in its collection trucks, while collecting approximately 25% of the total waste delivered to CML. Private collection companies delivered approximately 65% of the waste to CML, with the balance delivered by the public in private vehicles. Based on this data, it is estimated that diesel fuel consumption by County and private company refuse collection trucks used approximately 270,000 gallons of diesel fuel.

Although the data cited above are at best rough approximations, they indicate that the volume of CNG that could be generated from LFG at CML is of the right order of magnitude to fuel collection vehicles serving the site. If priced

competitively, a CNG fueling station at the landfill could serve public and private fleets of collection trucks converted to the alternative fuel.

Conversion of LFG to high-BTU CNG requires substantially more equipment and capital cost than production of medium-BTU gas. We estimate the additional cost (over and above the costs for either direct gas sales or electrical generation) to develop a high BTU system for the production of CNG to be approximately $6,748,000. The estimate is based on the following assumptions:

- LFG for high-BTU gas production will be collected from dedicated wells and collection piping, and routed directly to the high BTU unit; and

- Because the primary purpose of the existing and proposed future well and collection system is for compliance purposes, we estimate that a maximum of 200 SCFM of LFG would be available for CNG production. The balance would be used for medium BTU sales or electrical generation.

- Waste-to-energy is not implemented as suggested in the County ISWMP. Because the high-BTU gas option requires dedicated wells, future ongoing landfill disposal in Phases V and VI of the landfill would be required to produce the volume of high-quality gas required for the system.

Details of the conceptual level cost estimate, which includes a contingency cost of 25%, are contained in Appendix B, Table B-5.

5.5.3 Electricity Generation

Based on preliminary estimates, the potential electric generation capacity using CML gas as a fuel is within the ideal range for application of internal combustion engine technology. Depending on the future decision regarding implementation of waste-to-energy, the site can power a facility to produce from 1 to 3 MW of electric power (equivalent to the electricity consumption of approximately 1,000 to 3,000 Maui homes) during the next 30 years. This range is generally too large for a microturbine installation and too small for conventional gas turbine or steam plant technology.

The market for electricity in Maui is fully developed, readily available and permanent. The local utility, Maui Electric Company (MEC), has incentives for purchasing electricity from alternative sources. Of all possible uses, electricity generation has by far the lowest technological risk and, depending on the form of power purchase agreement (PPA) negotiated, potentially little financial risk.

Section 6 below presents a detailed design analysis, including capital and operating costs and potential revenues, for use of all LFG at CML in an on-site

electricity generation facility. We estimate the total cost to develop the LFG energy recovery facility to be approximately:

- $ 12,600,000 for a 3.2 MW facility, for the case in which waste-to-energy is not implemented; and

- $ 8,575,000 for a 1.6 MW facility, for the case in which waste-to-energy is implemented in 2015.

Costs are generally based on the experience of comparable projects on the mainland, with a substantial escalation for additional costs of construction in Hawaii. Details of the conceptual level cost estimates, which include a contingency cost of 25%, are contained in Appendix 5, Tables B-1 and B-2.

6. TECHNOLOGY RECOMMENDATION AND CONCEPTUAL DESIGN

6.1 Recommendation

Based on the evaluation and discussion in Section 5 above, we recommend implementation of a LFG energy recovery facility based on electricity generation using internal combustion engines. Selection of this alternative does not rule out future addition of a system to convert a portion of the total LFG stream to high-BTU CNG for vehicle fueling or other uses, while continuing to utilize the bulk of LFG for electricity generation.

6.2 Conceptual Facility Design

The following sections discuss conceptual plans including process flow diagrams, site layout and estimated capital costs for an electrical generation facility utilizing Caterpillar G3516 engine generator sets. Estimated revenues from electrical power sales are also provided. Cost and revenue estimates are provided for two cases. The baseline case assumes that CML operates through closure, currently anticipated to occur in 2027, without diversion of waste to a waste-to-energy facility. The second case assumes implementation of a waste-to-energy facility in 2015, with the resulting decrease in waste disposal and gas production at CML.

Caterpillar G3516 engines were selected for the conceptual design based on their extensive use for power generation using LFG, and because the phasing in of additional generator sets fit well with the estimated volumes and energy of recovered LFG at CML. Additional evaluation of generator sets including fuel consumption and electrical output would be performed in a more detailed final design analysis to optimize energy recovery from the LFG at CML.

Clearly, equipment of different sizes by manufacturers other than Caterpillar can be used to meet project objectives, and it is to be expected that a Request For Proposal (RFP) to implement a facility using this technology would be open to other suppliers. For illustrative purposes, however, basing this conceptual design study on specific proven equipment is appropriate.

Figure 11 is a process flow diagram showing the new equipment that would be added to the existing blower and flare system. LFG would be delivered from the existing blowers to a pre-cooler and pressure boosting blower system which would deliver the gas through an after-cooler to equipment for removal of hydrogen sulfide (H_2S) and/or siloxane. The requirements for removal of H_2S and siloxane would be established through extensive gas testing during the final design stage. From this treatment system the LFG would be delivered to the Caterpillar C3516 engine-generator sets. We anticipate installation of two engines during initial construction of the facility, with up to two more being added as the volume of LFG increases.

It should be emphasized that the LFG energy recovery facility does not replace the existing flare. The flare must be maintained in operational readiness at all times to manage LFG during periods when one or more engine-generators is shut down for maintenance. In addition, it can be expected that during certain phases of landfill development, LFG will be generated in excess of engine capacity and that the flare will be required in addition to full operation of the LFG energy recovery facility.

Figure 12 is a conceptual layout drawing showing how the LFG energy recovery facility would be arranged adjacent to the existing blower skid and flare system. The gas handling and preparation equipment and the engine-generator sets would be housed in a pre-engineered steel building of approximately 4,500 square feet.

The following section describes how the installation generating capacity would be phased, and provides estimates of the electric power production the facility would provide during the operational life and post-closure period of the landfill.

6.3 Generation Capacity Phasing and Power Production

Tables 4 and 5 provide estimates of the landfill gas volume and energy potential for the period 2010 – 2040, for the cases with and without implementation of a waste-to-energy facility. These estimates can be used to project the potential kilowatts of electric power that can be generated by the proposed LFG energy recovery facility using internal combustion engines.

Based on operating experience in the industry, the Caterpillar 3516 engine-generator set is capable of producing 800 kw of electricity with an input gross lower heating value of 9.1 MMBTU/hr, which is equivalent to a gross heating

value of 10.1 MMBTU/hr. The ratio of power output to input, 88 kw/MMBTU/hr HHV, can be used to convert the data in Tables 4 and 5 to potential electrical output. Table 6 and 7, respectively, present this information together with an assumed number of 800 kw engine-generators, for the cases without and with implementation of waste-to-energy. Addition and subtraction of engines is phased to maintain acceptable load factors on the operating engines. Figures 13 and 14 present the information graphically for the period 2010-2050.

As indicated in Table 6 and Figure 13, a maximum of 3.2 MW of electricity can be produced from LFG at CML if waste-to-energy is not implemented. The facility would initially be constructed with two CAT 3516G engine-generators, with a third unit added in 2014 and a fourth in 2020. One of the original units would be retired in 2037 as the gas volume decreases and an additional unit retired in 2045.

Table 7 and Figure 14 present the electric generation capacity for LFG energy recovery if waste-to-energy is implemented. For this case, only two units would be installed to achieve a peak electrical generation of 1.6 MW, declining to about 0.5 MW by 2045.

TABLE 6
Electrical Power Generated Using Internal Combustion Engines
Assuming Waste-to-Energy Is Not Implemented

YEAR END	COLLECTED LFG VOLUME (scfm)	GROSS FUEL VALUE HHV (MMBTU/hr)	POWER GENERATION POTENTIAL (MW)	NO. OF ENGINES	POWER GENERATION ACTUAL (MW)
2010	737	19.5	1.54	2	1.54
2015	915	25.9	2.05	3	2.05
2020	1,070	31.5	2.49	4	2.49
2025	1,301	39.3	3.11	4	3.11
2030	1,357	41.4	3.28	4	3.20
2035	1,057	32.2	2.55	4	2.55
2040	823	25.1	1.99	3	1.99

TABLE 7
Electrical Power Generated Using Internal Combustion Engines
Assuming Waste-to-Energy Is Implemented In 2015

YEAR END	COLLECTED LFG VOLUME (scfm)	GROSS FUEL VALUE HHV (MMBTU/hr)	POWER GENERATION POTENTIAL (MW)	NO. OF ENGINES	POWER GENERATION ACTUAL (MW)
2010	737	19.5	1.54	2	1.54
2015	915	25.9	2.05	3	2.05
2020	712	20.2	1.598	2	1.60
2025	586	16.7	1.322	2	1.32
2030	492	14.1	1.119	2	1.12
2035	383	11.0	0.871	2	0.87
2040	299	8.6	0.679	1	0.68

6.4 Estimated Costs and Revenues

6.4.1 Capital Costs

We estimate the total cost to develop the LFG energy recovery facility to be approximately:

- $ 12,600,000 for a 3.2 MW facility, for the case in which waste-to-energy is not implemented; and
- $ 8,575,000 for a 1.6 MW facility, for the case in which waste-to-energy is implemented in 2015.

Costs are generally based on the experience of comparable projects on the mainland, with a substantial escalation for additional costs of construction in Hawaii. Details of the conceptual level cost estimates, which include a contingency cost of 25%, are contained in Appendix B, Tables B-1 and B-2.

6.4.2 Operating Costs

Operating costs for LFG energy recovery facilities using internal combustion engines are typically about $.04 per kilowatt-hour of electricity produced. Operation of a sulfur and siloxane removal system is estimated to cost an additional $235,000 per year for a 3.2 MW system and about 75% that amount

for a 1.6 MW system. These costs do not include the cost of operating the landfill gas collection system or existing blower skid and flare system. Based on these assumptions, the estimated annual average operating costs for the two alternative systems are:

Maximum Capacity	3.2 MW (4 Engines)	1.6 MW (2 Engines)
Average Production, 2010-2040 (MW)	2.5	1.3
Total Annual Generation (kwh)	21,900,000	11,200,000
Annual O&M Cost @ $.04/kwh	$ 876,000	$ 448,000
Siloxane Removal System Operation	$ 235,000	$ 176,000
Total Annual O&M Cost	$1,111,000	$ 624,000

Operating labor costs are included in the $.04/kwh annual O&M cost. A 3.2 MW system typically requires a two-person staff for 365 day/year operation. Both are trained in system operations, with one person having supervisory responsibility and the other having mechanic skills. They have a staggered 5-day workweek to provide 7 days/week coverage of the facility. Assuming hourly standard time pay rates of $35 and $30 per hour and a reasonable allowance for overtime, the estimated annual labor cost for operations is approximately $ 144,000 per year, or 13 to 23 percent of total operating and maintenance costs.

6.4.3 Revenues

Tables 8 and 9 illustrate the potential revenue from an electrical generation project utilizing CAT 3516 engine generator sets and landfill gas from CML. Table 8 assumes that the waste-to-energy plan does not occur while Table 9 assumes the waste-to-energy facility is implemented in 2015. Both tables assume the following:

1. Revenues are derived from avoided cost rates used by MECO. No other tax credits or renewable energy credits are assumed.

2. Four initial avoided cost rates were used to cover the range of volatility in rates that has been seen over time

3. Rates and revenues are expressed in 2009 dollars

4. Rates represent an average of on and off peak

5. Annual power generation is calculated assuming 90% uptime for the LFG energy recovery facility

TABLE 8
Power Sales Revenues Using Internal Combustion Engine-Generators Assuming Waste-to-Energy Is Not Implemented

YEAR END	POWER GENERATION RATE (MW)	ANNUAL POWER GENERATION[1] (KWH)	ANNUAL REVENUE AT SPECIFIED RATE[2]			
			$0.10 PER KWH	$0.15 PER KWH	$0.20 PER KWH	$0.25 PER KWH
2011	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2012	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2013	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2014	1.96	15,453,000	$1,545,300	$2,317,950	$3,090,600	$3,863,250
2015	2.05	16,162,000	$1,616,200	$2,424,300	$3,232,400	$4,040,500
2016	2.14	16,872,000	$1,687,200	$2,530,800	$3,374,400	$4,218,000
2017	2.23	17,581,000	$1,758,100	$2,637,150	$3,516,200	$4,395,250
2018	2.32	18,291,000	$1,829,100	$2,743,650	$3,658,200	$4,572,750
2019	2.40	18,922,000	$1,892,200	$2,838,300	$3,784,400	$4,730,500
2020	2.49	19,631,000	$1,963,100	$2,944,650	$3,926,200	$4,907,750
2021	2.57	20,262,000	$2,026,200	$3,039,300	$4,052,400	$5,065,500
2022	2.65	20,893,000	$2,089,300	$3,133,950	$4,178,600	$5,223,250
2023	2.73	21,523,000	$2,152,300	$3,228,450	$4,304,600	$5,380,750
2024	2.91	22,942,000	$2,294,200	$3,441,300	$4,588,400	$5,735,500
2025	3.11	24,519,000	$2,451,900	$3,677,850	$4,903,800	$6,129,750
2026	3.20	25,229,000	$2,522,900	$3,784,350	$5,045,800	$6,307,250

Note: 1. Power generation assumes 90% uptime for engine-generators.
2. Rates are MECO avoided cost at constant 2009 dollars. See Appendix C for information on recent MECO avoided cost rates.

TABLE 9

Power Sales Revenues Using Internal Combustion Engine-Generators
Assuming Waste-to-Energy Is Implemented in 2015

YEAR END	POWER GENERATION RATE (MW)	ANNUAL POWER GENERATION[1] (KWH)	ANNUAL REVENUE AT SPECIFIED RATE[2]			
			$0.10 PER KWH	$0.15 PER KWH	$0.20 PER KWH	$0.25 PER KWH
2011	1.54	12,141,000	$1,214,100	$1,821,150	$2,428,200	$3,035,250
2012	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2013	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2014	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2015	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2016	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2017	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2018	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2019	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2020	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2021	1.60	12,614,000	$1,261,400	$1,892,100	$2,522,800	$3,153,500
2022	1.52	11,984,000	$1,198,400	$1,797,600	$2,396,800	$2,996,000
2023	1.45	11,432,000	$1,143,200	$1,714,800	$2,286,400	$2,858,000
2024	1.38	10,880,000	$1,088,000	$1,632,000	$2,176,000	$2,720,000
2025	1.35	10,643,000	$1,064,300	$1,596,450	$2,128,600	$2,660,750
2026	1.32	10,407,000	$1,040,700	$1,561,050	$2,081,400	$2,601,750

Note: 1. Power generation assumes 90% uptime for engine-generators.
2. Rates are MECO avoided cost at constant 2009 dollars. See Appendix C for in formation on recent MECO avoided cost rates.

7. FACILITY OWNERSHIP AND FINANCING

This section describes the alternatives available for developing a LFG energy recovery system at CML. It discusses four major ownership options commonly used in LFG energy recovery projects, and then presents a discussion of state and federal incentive programs that may provide financial assistance in financing the facility.

7.1 Ownership Alternatives

Four ownership alternatives are distinguished by the division of ownership and operating responsibility for the LFG GCCS and the LFG energy recovery facility.

7.1.1 Option 1: Third Party Owns LFG Energy Recovery Facility Only

Under this option, the third party designs, constructs, owns and operates the LFG energy recovery facility, while the County continues to own and operate the collection system. This arrangement gives CML complete control over the collection system and environmental compliance. The County would continue to operate the GCCS as it is currently doing, and deliver LFG to a third party for energy recovery. The considerations for this option center on the County's obligation to deliver landfill gas that meets the third party quantity and quality specifications for utilization at the energy recovery facility. Typically, a range of heating values is chosen for the specification depending on the equipment used to burn the landfill gas. Other considerations include: gas constituents, projected volumes of landfill gas, lease or license arrangement for the placement of energy recovery facility, indemnification and of course, pricing.

7.1.2 Option 2: Third Party Owns LFG Energy Recovery Facility and GCCS

This option gives the third party developer complete control over the LFG energy recovery facility as well as the GCCS, including environmental compliance. With this option, the third party would purchase or lease and operate the existing GCCS and flare system. They would also be responsible for the expansion of the GCCS into Phases IV, V and VI. This arrangement presents additional considerations as compared to the previous option as there are always issues related to maximizing energy recovery while maintaining environmental compliance at the site. Some of these issues include: delineation of the third party's responsibilities relative to compliance since the owner of the landfill (the County) can never relinquish responsibility for compliance; determination of which party is responsible for financing and installing additional well and collection systems if needed for compliance purposes; and determination of which party is responsible for correcting landfill gas migration issues. These concerns are in addition to the issues that must be addressed under Section 4.1, including gas constituents, projected volumes of landfill gas, lease or license arrangements, indemnification and pricing.

7.1.3 Option 3: County Owns and Operates the Energy Facility

With this option the County would continue to own and operate the existing GCCS and flare system and would install and operate the expansion of this system into Phases IV, V and VI. In addition the County would install and operate (or pay a company to operate) the LFG energy recovery facility.

If the project is direct gas sales, the considerations will be similar to the first option with focus on landfill gas quantity, quality and delivery pressure. If the project is electrical generation, the issues will be centered on the sale of electricity to the utility or other third party user. These usually follow standard agreements, such as power purchase agreements (PPA), prepared by the utility.

7.1.4 Option 4: Third Party Owns LFG Energy Recovery Facility With County Option For Future Purchase

Under this ownership option, the County would continue to own and operate the current as well as future expansion of the LFG GCCS and flare, with a third party developing and operating the LFG energy recovery facility. Following a specified period of time, or once the facility has met certain performance criteria, the County would have the option to purchase, own and operate the facility.

7.1.5 Evaluation of Ownership Options

One of the critical decisions the County needs to make before proceeding with the next step in implementing a landfill gas utilization program is whether to have the facility developed and owned by a third party, or to develop the facility under County ownership. Some of the considerations in this decision are listed below, in the form of listed advantages and disadvantages of each basic alternative.

<u>Third Party Ownership</u>

The positive attributes of third party development and ownership of a LFG energy recovery facility include:

- The third party provides all capital investment needed for the facility.
- Private sector developers may indirectly pass along to the County a portion the financial benefits of tax credit incentives.
- The facility requires no County personnel or other cost of operations.
- The third party is responsible for all permit and compliance issues associated with construction and operation of the facility.
- The third party assumes technological and financial risk.

Potential disadvantages of third party ownership include:

- The procurement process for the facility is somewhat more complex, time-consuming and prone to legal complications than development of construction and bid documents for a County-owned facility
- Revenues to the County are decidedly less than would be received by a successful County-owned facility.
- The County may have an obligation to deliver a contractual minimum volume of gas to the facility owner, potentially reducing the County's flexibility in developing waste diversion programs.
- In the case of Option 1, in which the County maintains responsibility for the GCCS, there is a significant potential for coordination conflicts with potential legal issues relative to maintaining a steady flow of LFG to the energy facility.
- Option 2, in which the third party also takes over operation of the GCCS, creates a potential for conflicts over regulatory compliance, for which the County is ultimately responsible to the regulatory agencies.

County Ownership

The advantages to the County of owning and operating the facility include:

- Procurement is straightforward and can be completed in less time than a competitive process for third-party ownership.
- The County is able to maintain full control over the GCCS and LFG energy recovery/utilization systems, eliminating potential coordination conflicts.
- County revenues will be maximized.
- The County has full flexibility in operating the landfill and related solid waste programs.

Disadvantages of County ownership include:

- All capital investment for design, permitting and construction must come from County funds, although the amount may be offset by some of the incentive programs described in Section 7.2 below.
- The County assumes all technological and financial risk. A system based on internal combustion engine-generators has very little technological risk, but financial risk in relation to avoided cost revenue rates and available gas volumes is significant.
- County staff must be hired and trained in operation and maintenance of the system, or an operating contract must be funded with a qualified third-party operator.

7.2 Potential Financial Assistance and Incentives

A variety of incentives, financial and otherwise, are in place to encourage the continued development of renewable energy resources. These incentives and their applicability to CML are described below in three categories:

- Incentives for the electricity purchaser:
- Incentives for a public agency energy developer/operator; and
- Incentives for a third-party private energy developer/operator.

7.2.1 Incentive for the Electricity Purchaser

In June 2004, the state of Hawaii mandated an enforceable Renewable Energy Portfolio Standard (RPS), which replaced previous renewable energy goals. The RPS establishes a timeline with specific renewable energy sales requirements that each electric utility company is required to achieve. The RPS requires that each electric utility company achieve the following renewable electric energy sales goals:

- 10% of net electricity sales by December 31, 2010
- 15% of net electricity sales by December 31, 2015
- 20% of net electricity sales by December 31, 2020

Eligible renewable energy technologies include electricity derived from landfill gas, solar, wind, municipal solid waste, biomass, hydroelectric, geothermal, tidal energy, wave energy, ethanol, methanol and biodiesel, among others.

These requirements should provide a strong incentive to Maui Electric Company (MECO) to procure renewable energy derived from a landfill gas to electricity facility at CML.

7.2.2 Incentive for Public Agency Energy Developer/Operator

Clean Renewable Energy Bonds (CREBs) and New CREB's

CREB's are bonds issued by approved electric cooperatives, government entities and public power producers to facilitate the construction of renewable energy facilities. Qualified projects include energy projects utilizing landfill gas, wind, biomass, geothermal, solar, municipal solid waste and small hydroelectric.

In contrast to conventional bonds, in which the issuer pays interest to the bond holder, in lieu of interest payments, the federal government provides a tax credit to the bond holder, which results in a zero interest loan to the issuer. The ARRA

established a new national volume cap for CREB's (referred to as New CREB's) at $2.4 billion.

The County, as a governmental body, is a qualified issuer of CREB's and is eligible to submit an application for the allocation of CREB's. A qualified issuer may only issue CREB's to qualified owners. Qualified owners are defined as electric cooperatives, governmental bodies and public power producers, as such; the County is also a qualified owner.

The Internal Revenue Service (IRS) grants bond authority on an annual basis, and criteria for allocations and application procedures are published each year. The application deadline for 2009 was August 4, 2009. Application procedures and deadlines for 2010 have not been made public at this time.

7.2.3 Incentives for Third-Party Private Energy Developer/Operator

Following is a brief overview of federal incentives that may be available to a private third-party developer or operator of CML's LFG energy recovery project. At this time, the state of Hawaii does not have financial incentives applicable to the proposed LFG energy recovery facility; however, the available funding from the state may change during the development of the project and should be continuously monitored.

As the County is not eligible to receive the tax credits or grants described below, for these incentives to be applicable to the Project, the County would need to enter into a Third Party Ownership agreement for at least the ten (10) years the tax credits are claimed. Contractual arrangements with a third party developer could be structured to provide additional revenues to the County associated with the receipt of these tax credits.

Renewable Electricity Production Tax Credit (PTC)

Under Section 45 of the U.S. tax code, the PTC is a per kilowatt-hour (kWh) corporate federal tax credit for energy derived from qualified resources. Energy produced from landfill gas is eligible for a 1.1 cents/kWh tax credit. To qualify, landfill gas energy projects must be placed in service by December 31, 2013 and the credit can only be claimed when electricity is being produced and sold to an unrelated third party. Project owners can claim the PTC for the first ten (10) years of operation and there is no maximum limit for credits claimed through the PTC.

Business Energy Investment Tax Credit (ITC)

The American Resource and Recovery Act of 2009 (ARRA) modified Section 48 of the U.S. tax code to allow owners of PTC-eligible renewable energy projects to opt for a one-time corporate ITC in lieu of claiming the PTC. The ITC is equal to thirty (30) percent of the costs attributable to the facility. A taxpayer may receive either the PTC or the ITC, but not both.

Section 1603 Cash Grant for Renewable Energy

Section 1603 of the ARRA created a new grant program applicable to all projects eligible for the Business Energy Investment Tax Credit discussed above. A facility owner has the option to receive a one-time grant equal to thirty (30) percent of the construction and installation costs for the facility, as long as the facility is depreciable or amortizable. To be eligible, a facility must be placed in service in 2009 or 2010, or construction must begin in either of those years and completed prior to December 31, 2013. The application deadline for Section 1603 Cash Grants is October 1, 2011.

8. RECOMMENDATIONS

Based on the contents of this report, our knowledge of the site and of the LFG industry, A-Mehr, Inc. has the following recommendations to move forward with the development of an energy recovery facility at CML. Figure 15 is a generalized flowchart of the decision making and implementation process.

1. The County needs to finalize their decision relative to the ownership arrangement for the development and operation of the LFG energy recovery facility.

2. Following this discussion, A-Mehr can develop a detailed implementation plan for moving the project forward. Presented below are proposed actions based on the County's ownership decisions:

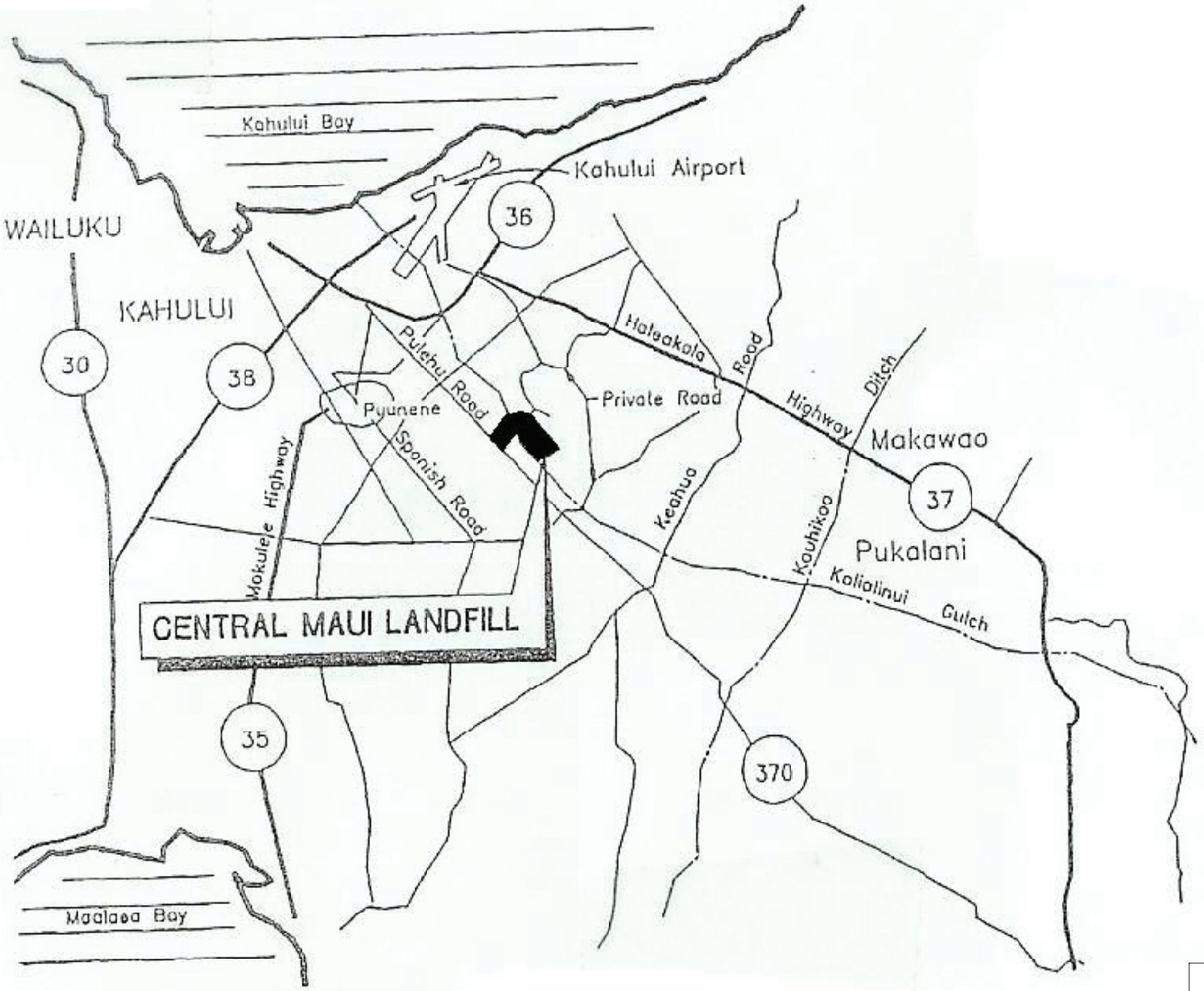
    a. If the County decides to proceed with Option 1, 2 or 4, under which a third party constructs, owns and operates the LFG energy recovery facility and in one case the GCCS, the County will retain a consultant to prepare an RFP for the selected option. Included in this RFP will be a sample contract.

    b. If Option 3 is selected, under which the County constructs, owns and operates the LFG energy recovery facility and the GCCS, A-Mehr will prepare a detailed implementation plan for the design, permitting, contract negotiations, construction and operation of a County owned LFG energy recovery facility

3. Preparation of an RFP to select a third-party developer for the LFG energy recovery facility will require several additional decisions to be made by the County. Among these issues are: the flexibility that will be given to proposers relative to the type of LFG energy recovery facility to be developed at CML; whether to allow either electrical generation or direct use, or to limit the facility to a single type of use; and whether the County will dictate what technology can be used for electrical generation. These issues are particularly important for Option 4, under which the County has an option to purchase the facility from the developer under specified circumstances.

The plans presented in this report are conceptual, prepared with the objective of providing a general overview of the appearance, capital and operating costs, and potential revenue generation from these types of facilities. A-Mehr is prepared to move forward with a more detailed evaluation of a selected option as directed by the County.

FIGURES



Vicinity Map

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23016 Mill Creek Drive, Laguna Hills, CA 92653
(949) 206-0157 (949) 206-9157 FAX

Central Maui Landfill
Landfill Gas Utilization Study
Vicinity Map

FILE	LFG Util Study
DRAFT	RM
CHECK	
DATE	4/15/09
FIGURE	1

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Central Maui Landfill

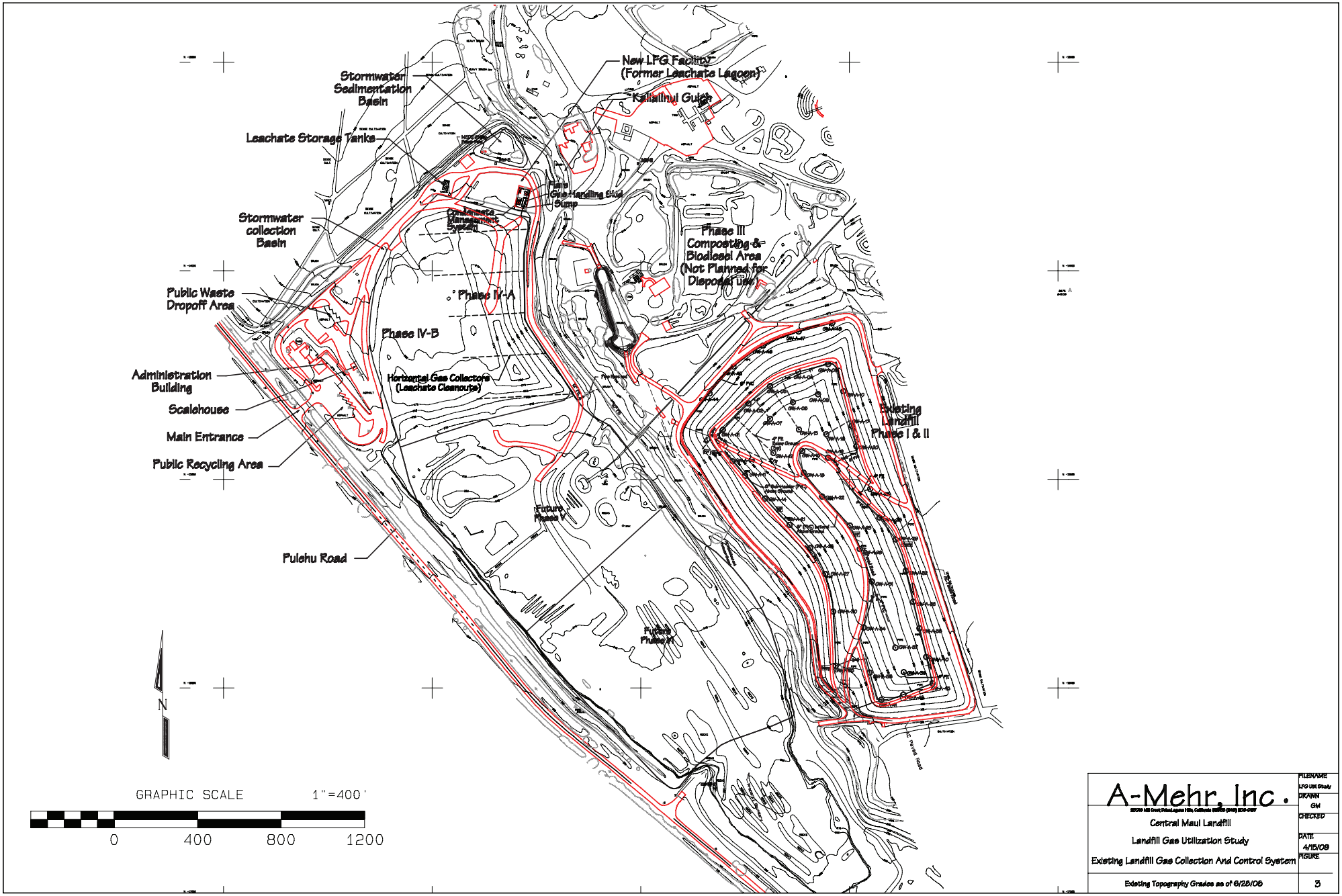
Landfill Gas Utilization Study

Site Map

Existing Topography Grades as of 6/28/05

FILENAME: LFG Util Study
DRAWN: TM
CHECKED:
DATE: 4/18/06
REVISED:

2



A-Mehr, Inc.

Central Maui Landfill

Landfill Gas Utilization Study

Existing Landfill Gas Collection And Control System

Existing Topography Grades as of 6/28/06

FILENAME	LFG Util Study
DRAWN	GM
CHECKED	
DATE	4/15/09
FIGURE	3

Note:

(1) Existing Topography Based on Aerial Survey By Walker & Associates Dated 1/18/06

Legend

- Vertical Extraction Well
- Horizontal Gas Collection (On Floor of Disposal Cell)
- Landfill Gas Pipeline (Material as Labeled)
- Phase IV Limit
- Phase V Limit
- Phase VI Limit

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Central Maui Landfill

Landfill Gas Utilization Study

Conceptual GCCS At Full Development

Existing Topography Grades as of 1/18/06

FILENAME	LFG Util Study
DRAWN	RM
CHECKED	
DATE	4/15/09
FIGURE	4

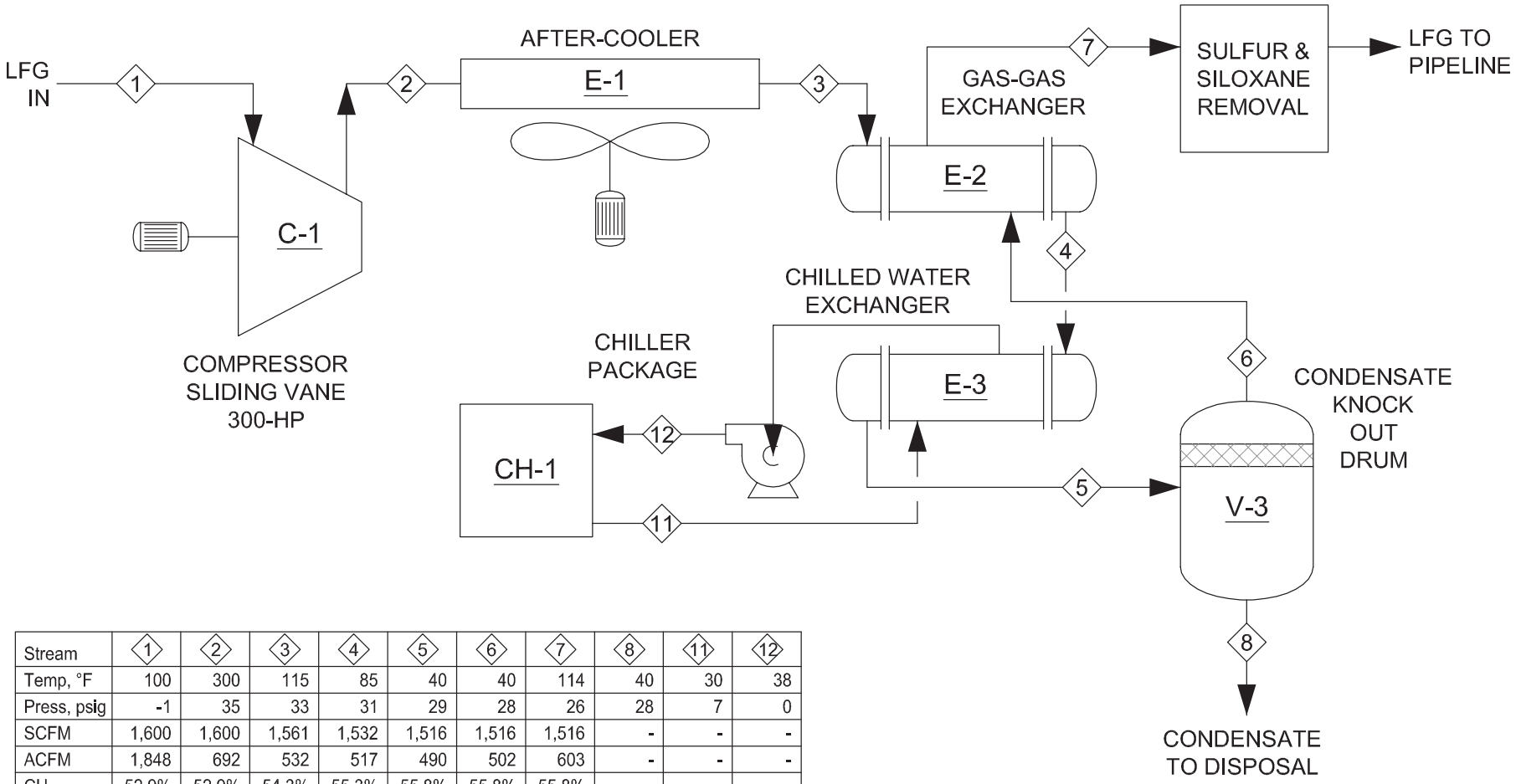
FIGURE 5 - Typical LFG Medium BTU Gas Processing System

FIGURE 6 - Typical LFG High BTU Gas Processing Facility

FIGURE 7 - Caterpillar LFG Engine-Generator Set

FIGURE 8 - Typical LFG Electricity Generating Facility Using Internal Combustion Engine-Generator Sets

FIGURE 9 - LFG Electricity Generating Facility Using 12 30-KW Capstone Microturbines



Stream	1	2	3	4	5	6	7	8	11	12
Temp, °F	100	300	115	85	40	40	114	40	30	38
Press, psig	-1	35	33	31	29	28	26	28	7	0
SCFM	1,600	1,600	1,561	1,532	1,516	1,516	1,516	-	-	-
ACFM	1,848	692	532	517	490	502	603	-	-	-
CH_4	52.9%	52.9%	54.3%	55.3%	55.8%	55.8%	55.8%	-	-	-
CO_2	37.8%	37.8%	38.8%	39.5%	39.9%	39.9%	39.9%	238.5	-	-
N_2	3.3%	3.3%	3.4%	3.5%	3.5%	3.5%	3.5%	238.5	-	-
O_2	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	-	-	-
H_2O	5.5%	5.5%	3.1%	1.3%	0.3%	0.3%	0.3%	-	-	-
lb/hr, vap	6,879	6,879	6,766	6,686	6,640	6,640	6,640	-	-	-
lb/hr, liq	0	0	112.4	193.2	238.5	0	0	238.5	25,420	25,420
gpm	-	-	0.22	0.39	0.48	-	-	0.48	48	48
lb/hr, total	6,879	6,879	6,879	6,879	6,879	6,640	6,640	238.5	25,420	25,420

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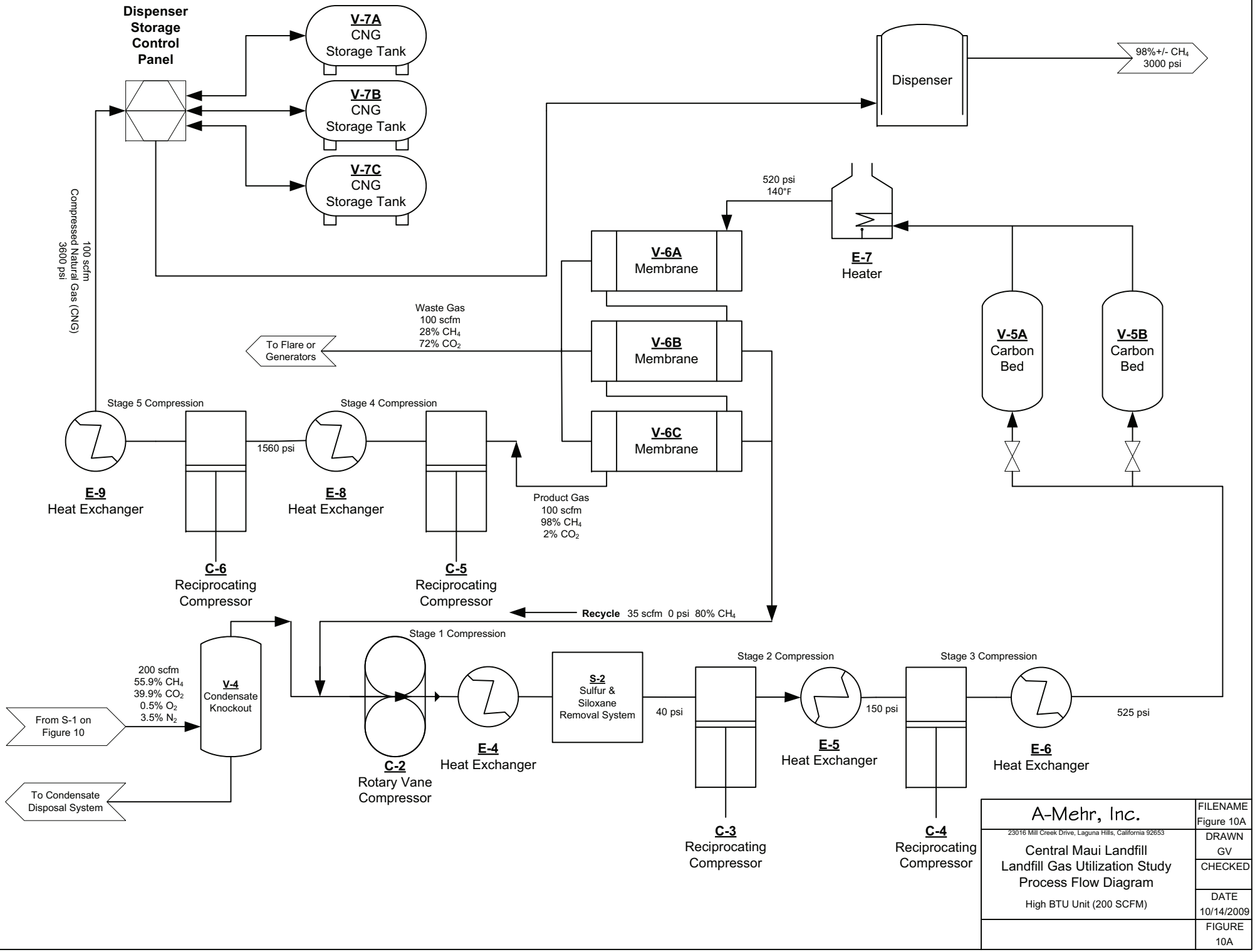
Central Maui Landfill

Landfill Gas Utilization Study

Process Flow Diagram

Medium BTU Gas Process for Direct Sale

FILENAME: LFG Util Study
DRAWN: RM
CHECKED:
DATE: 4/15/09
FIGURE: 10


Dispenser Storage Control Panel
V-7A CNG Storage Tank
V-7B CNG Storage Tank
V-7C CNG Storage Tank
Dispenser
98%+/- CH4 3000 psi
100 scfm Compressed Natural Gas (CNG) 3600 psi
520 psi 140°F
E-7 Heater
V-6A Membrane
V-6B Membrane
V-6C Membrane
V-5A Carbon Bed
V-5B Carbon Bed
Waste Gas 100 scfm 28% CH4 72% CO2
To Flare or Generators
Stage 5 Compression
Stage 4 Compression
1560 psi
E-9 Heat Exchanger
E-8 Heat Exchanger
Product Gas 100 scfm 98% CH4 2% CO2
C-6 Reciprocating Compressor
C-5 Reciprocating Compressor
Recycle 35 scfm 0 psi 80% CH4
Stage 1 Compression
200 scfm 55.9% CH4 39.9% CO2 0.5% O2 3.5% N2
From S-1 on Figure 10
V-4 Condensate Knockout
To Condensate Disposal System
C-2 Rotary Vane Compressor
E-4 Heat Exchanger
S-2 Sulfur & Siloxane Removal System
40 psi
Stage 2 Compression
150 psi
Stage 3 Compression
525 psi
E-5 Heat Exchanger
E-6 Heat Exchanger
C-3 Reciprocating Compressor
C-4 Reciprocating Compressor
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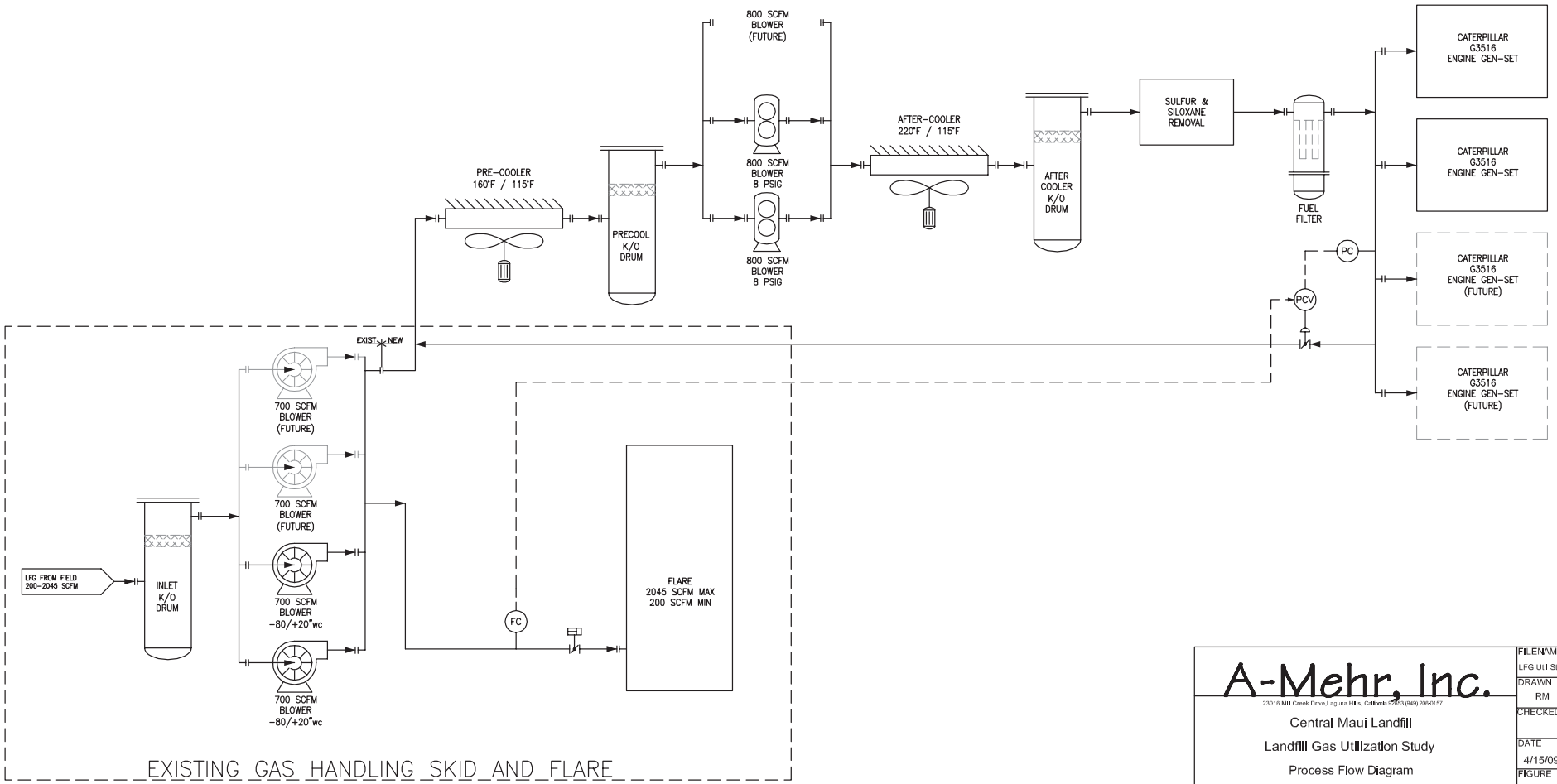
Central Maui Landfill
Landfill Gas Utilization Study
Process Flow Diagram
High BTU Unit (200 SCFM)
FILENAME Figure 10A
DRAWN GV
CHECKED
DATE 10/14/2009
FIGURE 10A



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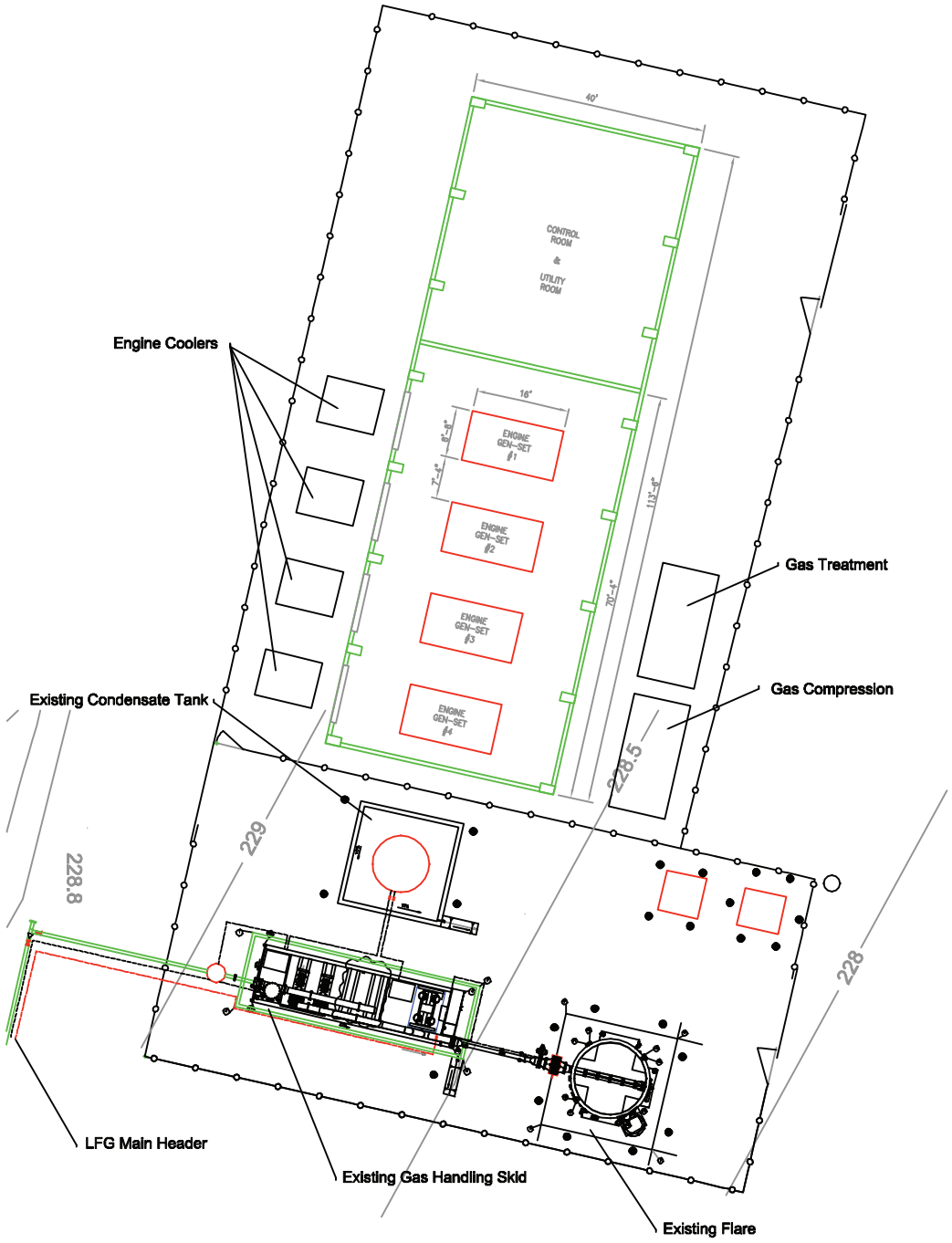
Central Maui Landfill

Landfill Gas Utilization Study

Process Flow Diagram

Electric Generation Facility

FILENAME	LFG Util Study
DRAWN	RM
CHECKED	
DATE	4/15/09
FIGURE	11



GRAPHIC SCALE 1"=30'

0 30 60 90

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Central Maui Landfill

Landfill Gas Utilization Study

Conceptual Layout
Electrical Generation Facility

FILENAME	LFG Util Study
DRAWN	RM
CHECKED	
DATE	4/15/09
FIGURE	12

Figure 13
Recoverable Gas Volume and Electric Generation
Assuming Waste-to-Energy Not Implemented

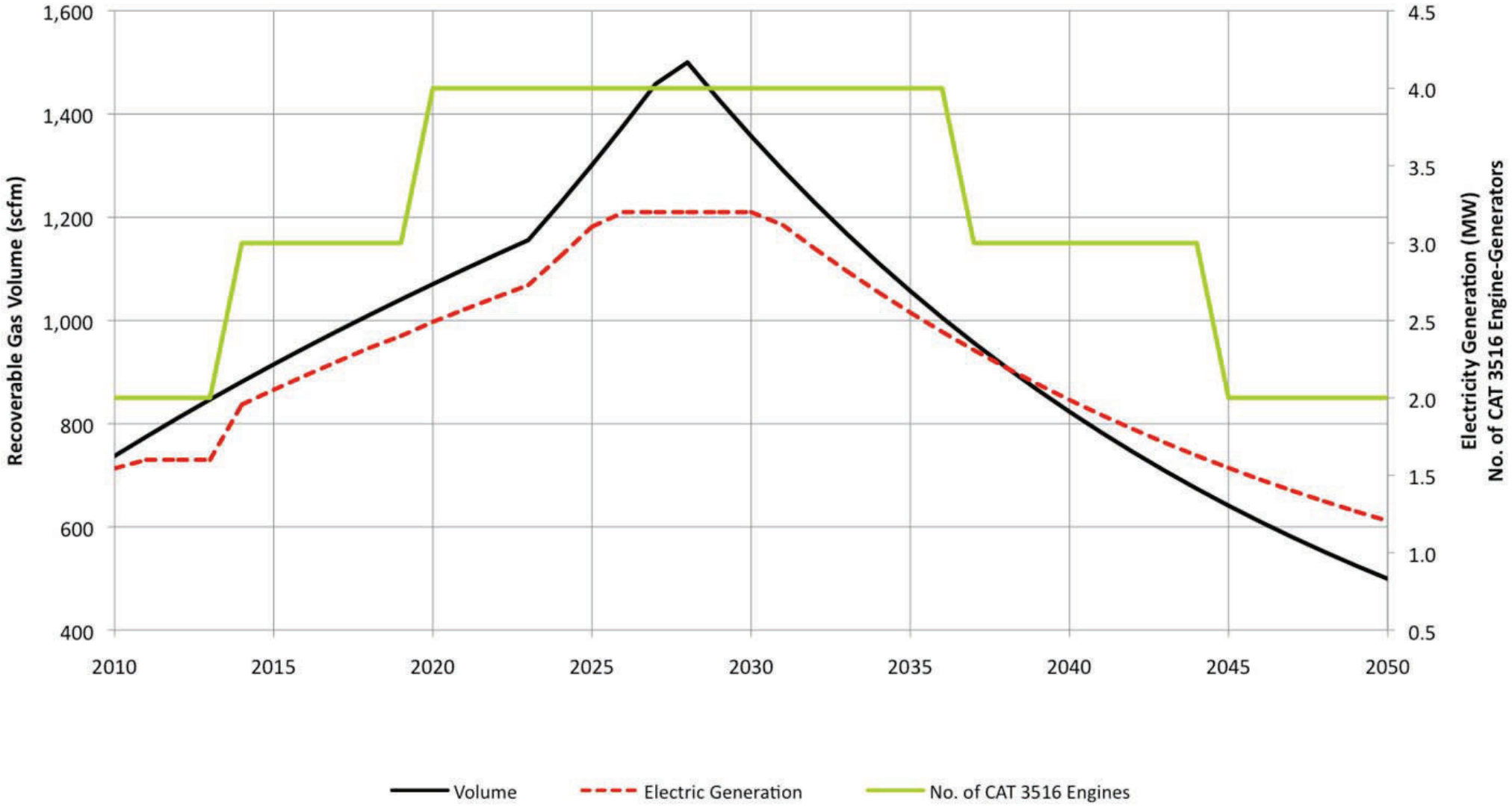


Figure 14
Recoverable Gas Volume and Electric Generating Potential
Assuming Waste-to-Energy Implemented In 2015

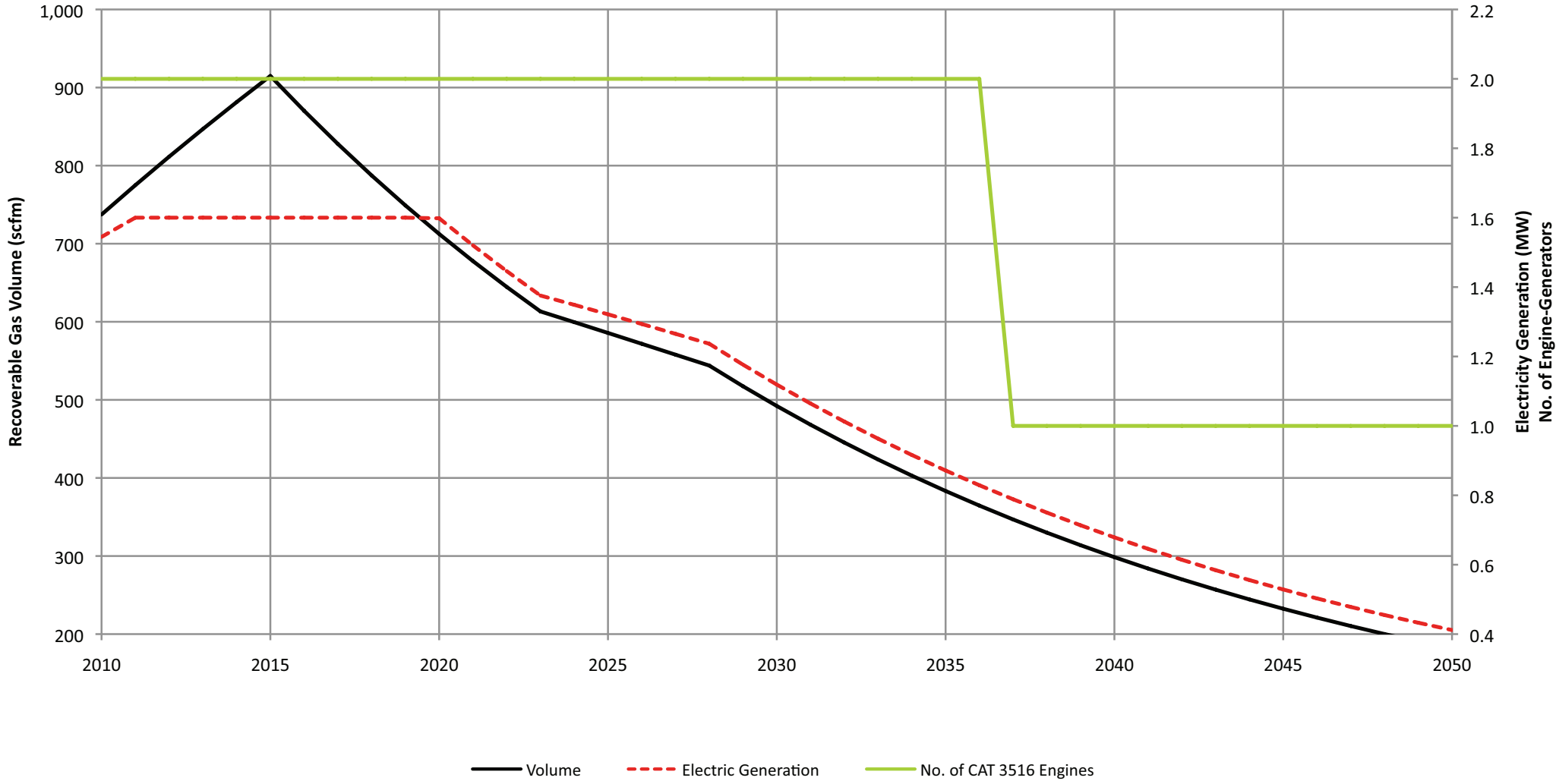
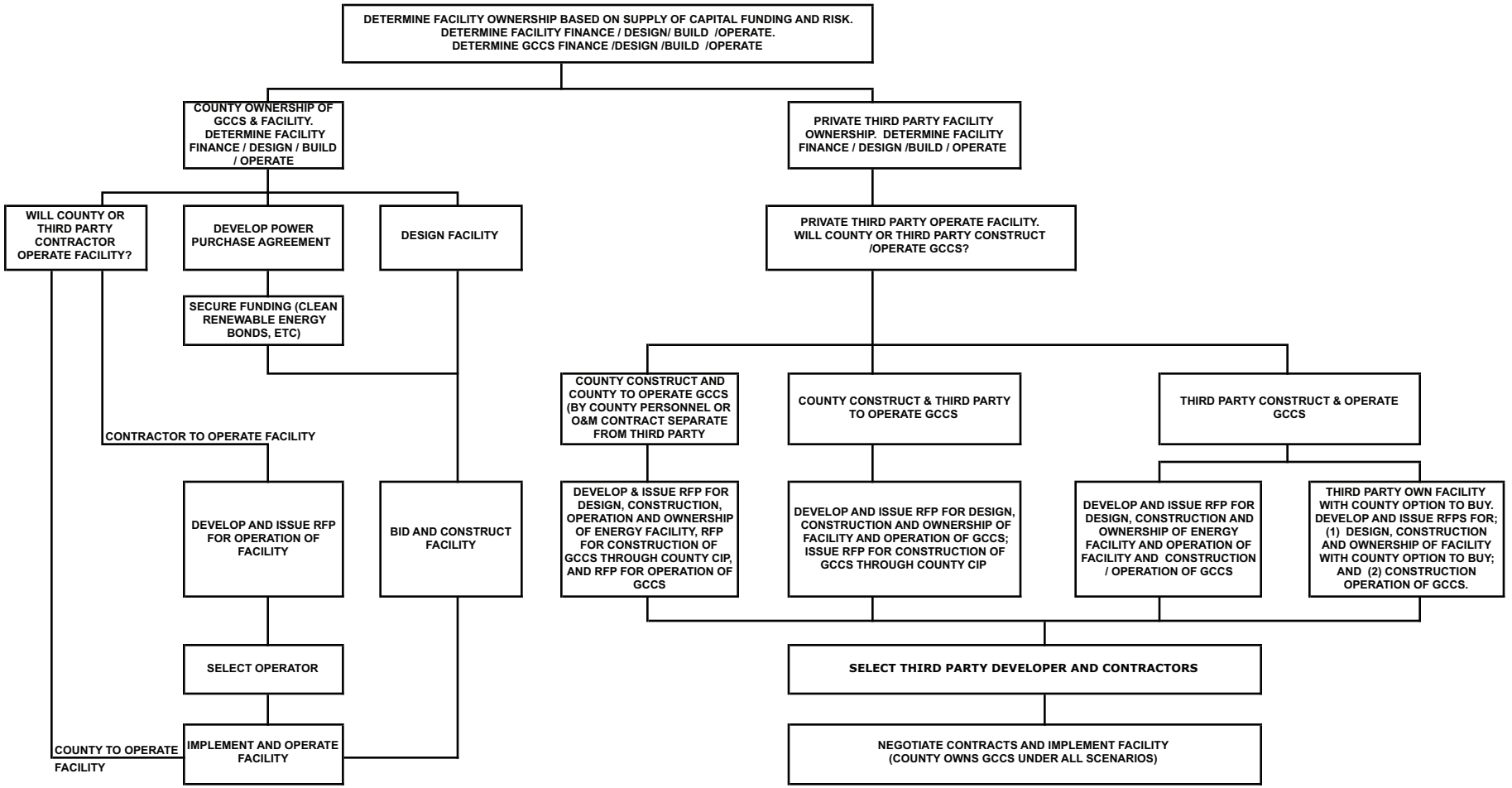


FIGURE 15
PROJECT DEVELOPMENT DECISION FLOWCHART



APPENDIX A

SUMMARY OF REGULATORY REQUIREMENTS RELATIVE TO LANDFILL GAS

APPENDIX A
SUMMARY OF REGULATORY REQUIREMENTS RELATIVE TO LANDFILL GAS COLLECTION AND CONTROL

Presented below is a more detailed summary of the general requirements of state and federal regulations relative to landfill gas, to which this landfill gas collection, control, and flare system has been constructed. The regulations include Hawaii Administrative Rules (HAR) Section 11-58.1-15 (operating criteria for solid waste landfills) and Section 11-60.1-161 (new source performance standards); and 40 CFR, Sections 60.752-60.759.

State of Hawaii Requirements

HAR 11-58.1-15(d) specifies requirements for explosive gas control at municipal solid waste landfills. It requires monitoring and corrective action as needed to prevent explosive concentrations of methane in on-site structures or in landfill gas migrating beyond the site boundaries.

HAR 11-60, Subpart 5 (Covered Sources), consisting of sections 11-60.1-81 through 11-60.1-104, establishes requirements for permitting, operation and monitoring stationary emission sources.

HAR 11-60.1-161 requires new sources of air emissions in Hawaii to comply with federal requirements for new sources, including 40 CFR Part 60, Subpart WWW for municipal solid waste landfills. It incorporates all federal requirements, including emission limits, control, operational, and maintenance requirements, compliance dates, and associated recordkeeping, monitoring, testing, notification, and reporting requirements into the state permit requirements of HAR 11-60, Subpart 5.

Federal Requirements

40 CFR 60.752 establishes applicability criteria and basic requirements for municipal solid waste landfill gas collection and control systems (GCCS). Key provisions include the following:

- All landfills are required to submit to EPA a design capacity report, documenting the design capacity of the landfill in terms of megagrams (metric tons of 1000 kilograms of solid waste, equivalent to 1.102 tons of 2000 pounds) and cubic meters of volume.
- If the design capacity reported to EPA exceeds 2.5 million megagrams and 2.5 million cubic yards, the site is required to prepare and submit an emissions report to EPA, containing a calculation of emissions of non-methane organic compounds (NMOC) from the landfill. The calculation and report is to be updated and submitted annually.

- If the calculated emissions of NMOC exceed 50 megagrams per year, the landfill is required to submit to EPA a collection and control system design plan for landfill gas. The EPA is to review the design plan and either approve, disapprove or request additional information regarding it.
- The collection and control system is to be installed within 30 months after the first annual report in which the NMOC emission rate exceeds 50 megagrams per year.
- The collection and control system must be installed within two years in closed areas or areas at final grade, and within 5 years after waste in placed in active areas.
- The control system must reduce NMOC emissions by 98 percent, or to a concentration of less than 20 parts per million. Compliance with this requirement must be demonstrated by a performance test conducted within 180 days after startup of the system.

40 CFR 60.753 specifies operational standards for collection and control systems, including:

- The collection system is to be operated under negative pressure except under specific conditions.
- Wells are to be operated with a landfill gas temperature less than 55ºC and either nitrogen below 20 percent or oxygen less than 5 percent, unless a showing can be made that higher values will not cause fires or inhibit the production of methane.
- The collection system must be operated such that the methane concentration at the surface of the landfill is less than 500 parts per million.

40 CFR 60.754 prescribes test methods and procedures for determining compliance with the provisions of Section 60.752. Three types of procedures are specified:

- Procedures for calculating NMOC emissions, including three alternative methods that may be employed. In order of increasing complexity, they are:
    - Tier 1 is a theoretical calculation of landfill gas volume and NMOC emissions using parameters prescribed in the regulation, including a default NMOC concentration of 4,000 parts per million by volume.
    - Tier 2 calculates NMOC emissions using the landfill gas volumes calculated as in Tier 1, and NMOC concentrations determined by a sampling program according to methods and guidelines spelled out in the regulation. The sampling program requires placement and testing of gas probes in the landfill at a minimum density of two probes per hectare (1 probe per 1.2 acres).

    - Tier 3 uses site specific parameters in the calculation of landfill gas generation together with the average concentration of NMOC determined by Tier 2 methods.
- Test methods for computing NMOC emissions from a landfill with an operating GCCS, based on measured gas flow and NMOC concentrations.
- Test methods for the initial performance test of the control system to demonstrate compliance with the NMOC reduction requirements of 98% or 20 parts per million.

40 CFR 60.755 specifies methods for determining compliance with section 60.752, including:

- Procedures are specified for calculating the maximum expected landfill gas generation flow rate before a collection and control system is installed.
- Monthly measurements of gauge pressure at the gas collection header connection of each well are required to verify that the well is under negative pressure, with corrective measures to be taken as specified if a well is under positive pressure.
- Each well must be monitored monthly for temperature and oxygen or nitrogen to ensure that excess air infiltration is not occurring.
- Surface emissions monitoring shall be conducted on a quarterly basis using specified procedures. Specific methods and timelines are prescribed for correcting and retesting areas where surface concentrations of methane are measured at greater than 500 parts per million.

40 CFR 60.756 establishes requirements for monitoring the GCCS. Major components include:

- Each wellhead must be equipped with a sampling port and means of temperature measurement.
- Monthly measurements of gas temperature, pressure and oxygen or nitrogen concentration must be made at each wellhead.
- Enclosed flares must be equipped with continuous recorders for temperature and flow.

40 CFR 60.757 provides reporting requirements including:

- Initial and amended design capacity reports with specified contents must be submitted to EPA whenever the design capacity changes.
- Initial and annual updates of NMOC emission rate reports with specified contents and time schedules must be submitted to EPA after the design capacity exceeds 2.5 million megagrams and 2.5 million cubic meters.
- After installation of a GCCS, the landfill is required to submit an annual report containing specified information on the collection system, monitoring results, flare operations, and additions to modifications to the

system. The first annual report is required to be submitted within 180 days after installation and startup of the collection and control system, and must contain the initial performance test report of the system including the NMOC reduction efficiency test.

40 CFR 60.758 specifies requirements for records that must be maintained for a minimum of five years, including:

- Landfill waste intake records including the design capacity report that triggered the need for a GCCS, the year-by-year waste acceptance rate, and current amount of solid waste in place.
- Information on the gas collection system including the calculated maximum gas generation rate and density of collection wells or horizontal collectors.
- For control systems utilizing an enclosed flare: the average combustion temperature measured at least every 15 minutes and averaged over the same time period as the performance test; gas flow data; information on occurrences of 3-hour periods when the average combustion temperature was more than 28ºC below the average temperature measured during the performance test; continuous records of flow to the flare and flow to bypass systems.
- An up-to-date site map showing the location of each collector with a unique identification label of each collector, with information available as to the installation date and location of any newly installed collectors.
- Data regarding any areas of asbestos or non-degradable waste that have been excluded from the collection system.
- All other data applicable to determining compliance with operating standards of Section 60.753.

40 CFR 60.759 sets forth design specifications for active collection systems. It contains a combination of design criteria, specific requirements and performance criteria for installed collection systems, and procedures for justifying the exclusion from the collection system of areas containing asbestos or non-degradable material.

APPENDIX B

CAPITAL COST ESTIMATES

TABLE B-1
ESTIMATED CAPITAL COST
LFG ENERGY RECOVERY USING INTERNAL COMBUSTION ENGINES
ASSUMING WASTE-TO-ENERGY FACILITY IS NOT IMPLEMENTED (MAXIMUM 3.2 MW GENERATION)

Line Item	Description	Unit	Qty.	Unit Cost	Cost
1	**Equipment**				**$ 7,566,841**
2	3516 Landfill Gas Generator Sets	Ea.	4	800,000	3,200,000
3	Rotary Lobe Blower	Ea.	3	32,000	96,000
4	LFG Precooler	Ea.	1	30,000	30,000
5	Precooler Knockout	Ea.	1	25,000	25,000
6	Aftercooler	Ea.	1	30,000	30,000
7	Aftercooler Knockout	Ea.	1	25,000	25,000
8	Coalescing Filter	Ea.	1	5,000	5,000
9	Condensate Pump	Ea.	3	1,200	3,600
10	LFG Conditioning System*	Ea.	1	4,152,241	4,152,241
11	Freight	L.S.	1	500,000	500,000
12	**Site Work******				**$ 104,350**
13	Clearing and Grubbing	Sq. Ft.	6000	8.50	51,000
14	Foundations	CY	95	550	52,250
15	Pipe Supports	CY	2	550	1,100
16	**Construction******				**$ 1,610,000**
17	Electrical (includes utility interconnect)**	L.S.	1	900,000	900,000
18	Mechanical***	L.S.	1	535,000	535,000
19	Building/Control Room	L.S.	1	175,000	175,000
20	**Architectural/Engineering**				**$ 260,000**
21	Process Engineering	L.S.	1	30,000	30,000
22	Mechanical Engineering	L.S.	1	50,000	50,000
23	Architectural	L.S.	1	30,000	30,000
24	Civil Engineering	L.S.	1	50,000	50,000
25	Structural Engineering	L.S.	1	50,000	50,000
26	Electrical Engineering	L.S.	1	50,000	50,000
27	**Construction Management**				**$ 450,000**
28	Permitting	L.S.	1	100,000	100,000
29	Construction Quality Assurance	L.S.	1	350,000	350,000
30	**Start-up Costs**				**$ 100,000**
31	Start-up, Shakedown, and Troubleshooting	L.S.	1	75,000	75,000
32	Operation and Maintenance Manual Development	L.S.	1	25,000	25,000
33				**Sub Total**	**$ 10,091,191**
34				**Contingency 25%**	**$ 2,522,798**
35				**Grand Total**	**12,613,989**

Notes: * LFG Conditioning System includes installation, equipment, piping, and instrumentation for sulfur and siloxane removal.

**Electrical includes; power to site (480V service), switchgear, interior and exterior lighting, blower skid, gen-sets, and instrumentation

***Mechanical includes; setting of blower skid, setting of 4 gen-sets, erection of all vessels, installation of pumps, installation of all off-skid and loose piping, field fabrication, and associated piping materials and fittings.

**** Adjusted for Maui, HI

TABLE B-2
ESTIMATED CAPITAL COST
LFG ENERGY RECOVERY USING INTERNAL COMBUSTION ENGINES
ASSUMING WASTE-TO-ENERGY FACILITY IS IMPLEMENTED IN 2015 (MAXIMUM 1.6 MW GENERATION)

Line Item	Description	Unit	Qty.	Unit Cost	Cost
1	**Equipment**				**$ 4,896,781**
2	3516 Landfill Gas Generator Sets	Ea.	2	800,000	1,600,000
3	Rotary Lobe Blower	Ea.	2	32,000	64,000
4	LFG Precooler	Ea.	1	30,000	30,000
5	Precooler Knockout	Ea.	1	25,000	25,000
6	Aftercooler	Ea.	1	30,000	30,000
7	Aftercooler Knockout	Ea.	1	25,000	25,000
8	Coalescing Filter	Ea.	1	5,000	5,000
9	Condensate Pump	Ea.	3	1,200	3,600
10	LFG Conditioning System*	Ea.	1	3,114,181	3,114,181
11	Freight	L.S.	1	375,000	375,000
12	**Site Work******				**$ 91,288**
13	Clearing and Grubbing	Sq. Ft.	6000	8.50	51,000
14	Foundations	CY	71.25	550	39,188
15	Pipe Supports	CY	2	550	1,100
16	**Construction******				**$ 1,207,500**
17	Electrical (includes utility interconnect)**	L.S.	1	675,000	675,000
18	Mechanical***	L.S.	1	401,250	401,250
19	Building/Control Room	L.S.	1	131,250	131,250
20	**Architectural/Engineering**				**$ 260,000**
21	Process Engineering	L.S.	1	30,000	30,000
22	Mechanical Engineering	L.S.	1	50,000	50,000
23	Architectural	L.S.	1	30,000	30,000
24	Civil Engineering	L.S.	1	50,000	50,000
25	Structural Engineering	L.S.	1	50,000	50,000
26	Electrical Engineering	L.S.	1	50,000	50,000
27	**Construction Management**				**$ 325,000**
28	Permitting	L.S.	1	60,000	60,000
29	Construction Quality Assurance	L.S.	1	265,000	265,000
30	**Start-up Costs**				**$ 80,000**
31	Start-up, Shakedown, and Troubleshooting	L.S.	1	60,000	60,000
32	Operation and Maintenance Manual Development	L.S.	1	20,000	20,000
33				**Sub Total**	**$ 6,860,568**
34				**Contingency 25%**	**$ 1,715,142**
35				**Grand Total**	**8,575,710**

Notes:

* LFG Conditioning System includes installation, equipment, piping, and instrumentation for sulfur and siloxane removal.
**Electrical includes; power to site (480V service), switchgear, interior and exterior lighting, blower skid, gen-sets, and instrumentation

***Mechanical includes; setting of blower skid, setting of 4 gen-sets, erection of all vessels, installation of pumps, installation of all off-skid and loose piping, field fabrication, and associated piping materials and fittings.
**** Adjusted for Maui, HI

TABLE B-3
ESTIMATED CAPITAL COST
ON-SITE FACILITIES FOR DIRECT SALES OF LFG AS MEDIUM-BTU GAS
ASSUMING WASTE-TO-ENERGY FACILITY IS NOT IMPLEMENTED

Line Item	Description	Unit	Qty.	Unit Cost	Cost
1	**Equipment**				**$ 4,552,241**
2	Sliding Vane Compressor 300-Hp Skid	Ea.	1	125,000	125,000
3	After Cooler	Ea.	1	30,000	30,000
4	Gas-Gas Exchanger	Ea.	1	40,000	40,000
5	Chilled Water Exchanger	Ea.	1	40,000	40,000
6	Chiller Package	Ea.	1	78,000	90,000
7	Condensate Knockout Drum	Ea.	1	25,000	25,000
8	LFG Conditioning System*	Ea.	1	4,152,241	4,152,241
	Freight	L.S.	1	50,000	50,000
8	**Site Work******				**$ 87,850**
9	Clearing and Grubbing	Sq. Ft.	6000	8.50	51,000
10	Foundations	CY	65	550	35,750
11	Pipe Supports	CY	2	550	1,100
12	**Construction******				**$ 1,025,000**
13	Electrical (Includes utility interconnect)**	L.S.	1	600,000	600,000
14	Mechanical***	L.S.	1	425,000	425,000
15	**Engineering**				**$ 200,000**
16	Process Engineering	L.S.	1	25,000	25,000
17	Mechanical Engineering	L.S.	1	50,000	50,000
18	Civil Engineering	L.S.	1	50,000	50,000
19	Structural Engineering	L.S.	1	25,000	25,000
20	Electrical Engineering	L.S.	1	50,000	50,000
21	**Construction Management**				**$ 350,000**
22	Permitting	L.S.	1	100,000	100,000
23	Construction Quality Assurance	L.S.	1	250,000	250,000
24	**Start-up Costs**				**$ 95,000**
25	Start-up, Shakedown, and Troubleshooting	L.S.	1	75,000	75,000
26	Operation and Maintenance Manual Development	L.S.	1	20,000	20,000
27				**Sub Total**	**$ 6,310,091**
28				**Contingency 25%**	**$ 1,577,523**
29				**Grand Total**	**$ 7,887,614**
30					
31	**Operations and Maintenance**				**$ 535,000**
32	System Operations and Maintenance	L.S.	1	300,000	300,000
33	Sulfur and Siloxine Annual Operations & Maintenance	L.S.	1	235,000	235,000
34					

Notes:

* LFG Conditioning System includes installation, equipment, piping, and instrumentation for sulfur and siloxane removal.
*Electrical includes; power to site (480V service), switchgear, interior and exterior lighting, compressor skid, chiller package, and instrumentation

**Mechanical includes; setting of compressor skid, chiller package, erection of all vessels, installation of pumps, installation of all off-skid and loose piping, field fabrication, and associated piping materials and fittings.

**** Adjusted for Maui, HI

TABLE B-4
ESTIMATED CAPITAL COST
ON-SITE FACILITIES FOR DIRECT SALES OF LFG AS MEDIUM-BTU GAS
ASSUMING WASTE-TO-ENERGY FACILITY IS IMPLEMENTED IN 2015

Line Item	Description	Unit	Qty.	Unit Cost	Cost
1	**Equipment**				**$ 3,470,931**
2	Sliding Vane Compressor 300-Hp Skid	Ea.	1	93,750	93,750
3	After Cooler	Ea.	1	30,000	30,000
4	Gas-Gas Exchanger	Ea.	1	40,000	40,000
5	Chilled Water Exchanger	Ea.	1	40,000	40,000
6	Chiller Package	Ea.	1	78,000	90,000
7	Condensate Knockout Drum	Ea.	1	25,000	25,000
8	LFG Conditioning System*	Ea.	1	3,114,181	3,114,181
	Freight	L.S.	1	38,000	38,000
8	**Site Work******				**$ 87,850**
9	Clearing and Grubbing	Sq. Ft.	6000	8.50	51,000
10	Foundations	CY	65	550	35,750
11	Pipe Supports	CY	2	550	1,100
12	**Construction******				**$ 770,000**
13	Electrical (Includes utility interconnect)**	L.S.	1	450,000	450,000
14	Mechanical***	L.S.	1	320,000	320,000
15	**Engineering**				**$ 200,000**
16	Process Engineering	L.S.	1	25,000	25,000
17	Mechanical Engineering	L.S.	1	50,000	50,000
18	Civil Engineering	L.S.	1	50,000	50,000
19	Structural Engineering	L.S.	1	25,000	25,000
20	Electrical Engineering	L.S.	1	50,000	50,000
21	**Construction Management**				**$ 265,000**
22	Permitting	L.S.	1	75,000	75,000
23	Construction Quality Assurance	L.S.	1	190,000	190,000
24	**Start-up Costs**				**$ 80,000**
25	Start-up, Shakedown, and Troubleshooting	L.S.	1	60,000	60,000
26	Operation and Maintenance Manual Development	L.S.	1	20,000	20,000
27				**Sub Total**	**$ 4,873,781**
28				**Contingency 25%**	**$ 1,218,445**
29				**Grand Total**	**$ 6,092,226**
30					
31	**Operations and Maintenance**				**$ 401,250**
32	System Operations and Maintenance	L.S.	1	225,000	225,000
33	Sulfur and Siloxine Annual Operations & Maintenance	L.S.	1	176,250	176,250
33					

Notes:

* LFG Conditioning System includes installation, equipment, piping, and instrumentation for sulfur and siloxane removal.
*Electrical includes; power to site (480V service), switchgear, interior and exterior lighting, compressor skid, chiller package, and instrumentation

**Mechanical includes; setting of compressor skid, chiller package, erection of all vessels, installation of pumps, installation of all off-skid and loose piping, field fabrication, and associated piping materials and fittings.
**** Adjusted for Maui, HI

TABLE B-5
ADDITIONAL CAPITAL FOR HIGH-BTU GAS PRODUCTION
200 SCFM CONVERTED TO COMPRESSED NATURAL GAS

Item No.	Description	1992 Cost	2009 Cost	Maui Adjustment
1	Compressor Skid(s)	$ 175,000	$ 278,950	$ 697,375
2	Membrane Skid	$ 140,000	$ 223,160	$ 557,900
3	Sulfer and Siloxane Removal System			$ 1,689,556
4	Dispenser	$ 50,000	$ 79,700	$ 199,250
5	Storage Tanks	$ 45,000	$ 71,730	$ 179,325
6	Instrumentation/Controls	$ 115,000	$ 183,310	$ 458,275
7	Electrical	$ 135,000	$ 215,190	$ 537,975
8	Additional High BTU Wells/Collection System	$ 72,000	$ 122,400	$ 306,000
9	Start-up, Shakedown, and Troubleshooting	$ 40,000	$ 75,000	$ 110,000
10				
11	**SUB TOTAL (1)**	**$ 772,000**	**$ 1,249,440**	**$ 4,735,656**
12				
13	Engineering (8% of Sub Total)	$ 61,760	$ 99,955	$ 378,852
14	Tax & Shipping (6% of Sub Total)	$ 46,320	$ 74,966	$ 284,139
15				
16	**SUB TOTAL (2)**	**$ 880,080**	**$ 1,424,362**	**$ 5,398,648**
17	**Contingency 25%**	**$ 220,020**	**$ 356,090**	**$ 1,349,662**
18	**TOTALS**	**$ 1,100,100**	**$ 1,780,452**	**$ 6,748,310**

Notes:

1. Cost for items 1 - 8 includes; equipment, site work, installation of skids, interconnecting piping, and instrumentation
2. Cost for item 3 includes system cost ($1,639,556.00) and installation and start-up ($100,000.00)

COST SUMMARY (All units required for total system)

ELECTRICAL GENERATION	**$ 12,613,989**
HIGH BTU UNIT (200 SCFM)	**$ 6,748,310**
TOTAL ESTIMATED CAPITAL COST	**$ 19,362,299**

APPENDIX C

MECO AVOIDED COST INFORMATION

Avoided Energy Costs

Hawaiian Electric Company
Hawaii Electric Light Company
Maui Electric Company

Avoided Energy Cost (> 100 kW)
Schedule "Q" Rates (< or = 100 kW)
¢/kWh

	HECO			HELCO			MAUI			LANAI			MOLOKAI		
	On Peak	Off Peak	Sched Q	On Peak	Off Peak	Sched Q	On Peak	Off Peak	Sched Q	On Peak	Off Peak	Sched Q	On Peak	Off Peak	Sched Q
11/1/2009	16.077	11.096	13.54	14.894	12.046	13.36	12.857	12.440	12.23	25.784	19.506	22.41	18.443	16.631	16.99
10/1/2009	16.406	11.385	13.85	14.579	11.680	13.03	12.976	12.555	12.34	26.337	19.920	22.90	18.316	16.52	16.86
9/1/2009	16.052	10.931	13.45	14.385	11.435	12.82	11.966	11.577	11.36	24.233	18.344	21.03	16.976	15.341	15.61
8/1/2009	15.470	10.021	12.75	13.633	10.967	12.18	12.290	11.889	11.67	24.606	18.624	21.35	16.473	14.899	15.12
7/1/2009	12.502	8.529	10.41	12.809	10.314	11.43	10.518	10.174	9.94	22.007	16.677	19.05	14.935	13.546	13.67
6/1/2009	11.748	7.566	9.59	13.338	10.447	11.77	10.484	10.137	9.91	20.556	15.590	17.75	14.868	13.488	13.61
5/1/2009	11.521	7.116	9.26	13.585	10.778	12.05	9.295	8.987	8.74	19.398	14.722	16.72	14.616	13.266	13.38
4/1/2009	12.099	7.136	9.61	14.216	11.353	12.65	9.701	9.380	9.14	20.004	15.176	17.25	15.602	14.134	14.31
3/1/2009	12.276	7.301	9.78	16.027	12.988	14.38	10.267	9.928	9.70	20.432	15.497	17.64	17.269	15.599	15.87
2/1/2009	12.854	7.894	10.36	16.576	13.364	14.85	10.111	9.777	9.55	21.662	16.418	18.73	19.556	17.611	18.04
1/1/2009	17.230	10.475	13.95	19.540	15.751	17.56	13.155	12.724	12.51	25.992	19.661	22.59	22.217	19.950	20.54
12/1/2008	19.045	15.208	16.97	23.034	18.609	20.77	18.544	17.133	17.45	36.871	27.809	32.28	24.942	22.330	23.11
11/1/2008	23.460	19.099	21.12	25.104	19.940	22.52	21.625	19.906	20.38	39.181	29.539	34.34	28.797	25.720	26.74
10/1/2008	25.198	20.466	22.69	26.376	20.817	23.62	23.224	21.248	21.85	40.967	30.877	35.93	31.354	27.968	29.16
9/1/2008	26.049	21.439	23.59	27.192	21.506	24.38	25.680	23.894	24.36	43.263	32.597	37.98	34.699	30.911	32.31
8/1/2008	24.347	19.959	21.99	25.939	19.909	22.99	25.986	24.512	24.80	43.436	32.727	38.13	33.716	30.045	31.38

As of August 1, 2008 the calculation of Avoided Cost is based on the methodology approved in Docket No. 7310, D&O 24086
HELCO and Maui Avoided Cost values were updated to reflect the 1-1-09 filing.

CORNERSTONE
Environmental Group, LLC

Memorandum

Date: January 17, 2011

To: Mike Kehano - County of Maui Landfill – General Manager

CC: Freddie Greenberg - Council

From: Paul Stout, Mike Michels, Maura Dougherty

Subject: Central Maui Landfill, Wailuku, Hawaii

Project No.: 100430-001

Cornerstone conducted a peer review of the report completed by A-Mehr, Inc., entitled "Landfill Gas Utilization Study and Conceptual Design" (Report) for the Central Maui Landfill in Wailuku, Hawaii. The purpose of the report was to assist the County in assessing whether the recently installed landfill gas collection and control system (GCCS) and current and predicted LFG flows would be suitable for a landfill gas to energy (LFGTE)/beneficial use project. The report highlights background information, compliance requirements for landfill gas (LFG) recovery and volumes of LFG available for a LFGTE project. The report evaluated alternative technologies for LFGTE projects, ownership options for the facility, a conceptual design with associated costs, and recommendations for development.

Cornerstone was requested by the County to review the report and summarize our findings. Cornerstone's review focused on the report's current and future predictions of LFG flows, assessment of LFGTE technologies, financial options, and comments related to project ownership options.

LANDFILL GAS FLOWS CURRENT AND FUTURE PROJECTIONS

Cornerstone reviewed the LFG modeling completed by A-Mehr. A-Mehr used the United States Environmental Protection Agency's (USEPA) Landfill Gas Emissions Model (LandGEM) V3.02 as their LFG generation model (LFG model) and ran the model in two phases, the first incorporating the closed area (Phase I and II), followed by the current and future phase (Phases IV, V and VI).

The value designated as Lo in the LandGEM model accounts for the waste composition within the landfill and is the methane generation potential. The USEPA reports that the national average Lo is 100 cubic meters of methane per megagram of waste (m^3/Mg). The k value which is the methane generation rate used in LandGEM is primarily dependent on waste moisture content. Historic data from other landfills across the United States show that rainfalls, leachate recirculation, cover material, and filling patterns all affect the k value. A k value of 0.04 /year is typically used for landfills with 25 inches or more of precipitation thus

a value of 0.02 /year is used for a dry site while a value of 0.06 /year would be used for a wetter landfill. The report did not provide the input value for Lo or k that was chosen by A-Mehr for their model.

A-Mehr used a typical LFG collection efficiency for the GCCS of 70 to 80 percent, which coincides with standard operating percentages as seen throughout the United States. A-Mehr then calibrated the LandGEM model using existing data (including flow and methane composition) from the initial GCCS operation to estimate LFG quantity and quality for the future. Table 4 and 5 of the report show the prediction of future LFG flows; one indicating energy potential without implementing a waste-to-energy facility and the other with waste diversion to a future waste to energy facility.

The following table is "Table 4: LFG Energy Potential Assuming Waste-to-Energy is Not Implemented" from the A-Mehr report:

Year End	Collected LFG Volume (scfm)	Average Composition		Gross Fuel Value (MMBTU/hr)
		% Methane	HHV (BTU/scf)	
2010	737	44%	441	19.5
2015	915	47%	473	25.9
2020	1,070	49%	490	31.5
2025	1,301	50%	503	39.3
2030	1,357	50%	508	41.4
2035	1,057	50%	508	32.2
2040	823	50%	508	25.1

The following table is "Table 5: LFG Energy Potential Assuming Waste-to-Energy is Implemented in 2015" from the A-Mehr report:

Year End	Collected LFG Volume (scfm)	Average Composition		Gross Fuel Value (MMBTU/hr)
		% Methane	HHV (BTU/scf)	
2010	737	44%	441	19.5
2015	915	47%	473	25.9
2020	702	47%	473	20.2
2025	586	47%	475	16.7
2030	492	47%	479	14.1
2035	383	47%	479	11
2040	299	47%	479	8.6

Cornerstone has reviewed the report's assessment of the future LFG quality and quantity with the advantage of an additional year of actual GCCS operational data. January 2011 LFG flow and quality is approximately 500 cubic feet per minute (CFM) at 45 percent methane on average. This flow is less than the 737 scfm at 44 percent methane as predicted in Table 4 of the report. A portion of the difference is that the report assumes that the GCCS is expanded continually with LFG generation increases. The reality is that the GCCS is expanded per regulatory requirements every 3 to 5 years. Thus, until the GCCS is expanded to capture all LFG currently generated at the site, the actual LFG flows will fall below those predicted within the LFG model. Currently, GCCS expansion is scheduled in early 2011. Upon completion of the expansion, the GCCS flow should increase as a result of LFG extraction from additional landfill area. Cornerstone estimates that even with GCCS expansion, the LFG collection will not increase to the 737 scfm at 44 percent methane as predicted in Table 4, however it is believed that the LFG collection will increase beyond the current 500 scfm at 45 percent methane.

The report suggests that the methane content is currently lower than industry wide methane concentrations due to the amount of inert waste in Phase 1 and II of the landfill. Upon review of the current GCCS operational data, Cornerstone concurs that the Phase I and II LFG has lower methane content than the current landfill phases. With all future GCCS expansions being in the current landfill phases, we believe that the methane content of the LFG will improve with each GCCS expansion if care is taken by GCCS operations not to over pull the system.

For comparison, Cornerstone estimated LFG recovery using LandGEM for the GCCS design plan in September of 2010. It is very important to note that the purpose of this estimate was to establish an upper LFG flow which corresponds to the design for future expansions of the GCCS at the site, and to assure that the future designs of the GCCS would have the capacity for all the LFG flow collected from the site. As such, this LFG model completed by Cornerstone should be slightly higher than actual operational data over the course of the site.

To complete the Cornerstone LFG model, all waste intake rates and future rates were provided to Cornerstone by A-Mehr. The inputs for the k and Lo values shown below were used in the models, one for Phase I-II and another separate model for Phase IV, V and VI:

Phase I-II

- The actual average flow rate observed at the blower for July 2010 and the average methane concentration was 627 scfm at 40 percent;
- The actual July 2010 flow was normalized to 50 percent methane concentration, this resulted in flow rate of about 502 scfm;
- Based on the GCCS layout and assuming good operations of the GCCS we assumed that the collection system had 80 percent collection efficiency. This resulted in a LFG generation rate in year 2010 of 628 scfm at 50 percent methane; and
- This resulted in the k value of 0.022/year, which corresponds to high rainfall intensity and leachate recirculation that occurs on this part of the landfill.

Phase IV-VI

- Due to no final cover, slightly higher k value of 0.025/year was used. This was based on the fact that the calibrated k value of 0.022 for Phase I-II was for a closed landfill with minimal water infiltration;
- Tonnages were provided by the county for 2006 through 2010 using a one percent growth rate beginning in 2011 and ending with the closing of the landfill. Cornerstone assumed that the total tonnage of the landfill were the tonnages totaled from the A-Mehr in 2010 report; and
- We assume the county continues to expand the GCCS each year and therefore can achieve an 80 percent overall LFG collection efficiency for Phase IV-VI.

Cornerstone estimates result in a peak generation rate of 1,385 scfm for the combined sites in 2033, with a collection rate of 1,058 scfm at 50 percent methane. This peak flow is less than the LFG collection estimated in the A-Mehr report in Table 4, which is 1,357 scfm collected in 2030 at 50 percent methane. Despite these slight flow differences, Cornerstone concurs with the A-Mehr report that sufficient LFG flow exists for a LFGTE project and believes that the LFGTE RFP process should continue.

TECHNOLOGIES FOR BENEFICIAL USE

Cornerstone has reviewed the A-Mehr discussion of available technologies within the report. Based on Cornerstone's understanding of the Central Maui Landfill and current state of the industry in LFGTE facilities, we are in general agreement with the reports' list of technologies findings.

Cornerstone does believe that some of the costs for the various technologies discussed within the report may be high based on recent developments within the LFGTE field. Improvements in LFG cleaning systems for example have led to reduced costs in LFG filtering systems needed for many LFGTE projects. The report contains a rather large cost, for the LFGTE filtering system within the cost estimates within Appendix B. Cornerstone does believe that a private developer experienced with LFGTE projects will have access to the greatest technological advances and reduced costs to develop the project.

Cornerstone also agrees with the A-Mehr report in that the LFGTE request for proposals (RFP) should be written to allow developers to select any proven technology that will provide the greatest financial returns that can then be shared with the County via royalty payments or other.

FINANCIAL ASSITANCE REVIEW

Section 7 of the LFG Utilization Study provided a thorough summary of financial incentives available for potential LFG beneficial use projects at CML. As a result of Federal and State legislation in 2010, several updates and additions should be considered. Although Section 7.2 was focused on electricity generation, there are also notable incentives available for LFG to High-BTU gas for use as an Alternative Fuel (AF) in vehicles.

Section 7.2.1 describes Hawaii's Renewable Portfolio Standard (RPS). Somewhat related to this, the Hawaii Public Utilities Commission (PUC) established a Feed-in-Tariff for renewable electricity in 2009. The first set of tariffs, schedules, and standard interconnection agreements for "Tier 1" and "Tier 2" technologies were approved in 2010. Landfill gas projects are designated "Tier 3", for which rates have not been set yet. Feed-in-Tariffs guarantee renewable energy producers grid access and other provisions that would otherwise be negotiated directly with the power company (in this case an investor-owned utility – Maui Electric Company). Also related to distributed generation options, it should be noted that Hawaii's Public Utilities Commission Renewable Energy Act allows utilities to invest in renewable energy technologies even if project costs are more than the fossil fuel costs it aims to avoid.

Section 7.2.2 describes the Federal Clean Renewable Energy Bond (CREB) program that is available to approved electrical cooperatives, government agencies and public power producers. Those that were originally authorized by the Energy Policy Act (EPAct) of 2005, known as "Old CREBs," were fully allocated by February 2008 while those that were originally authorized by the Energy Improvement and Extension Act of 2008 were fully allocated (for government agencies and public power providers) by October 2008. A recent IRS solicitation for "New CREBs" was applicable to electrical cooperatives only with a deadline of November 1, 2010. Also, at this time, it is unknown if the Internal Revenue Service (IRS) will issue new solicitations for the "Old CREBs" which were not issued by the December 31, 2009 deadline.

Section 7.2.3 describes incentives available for a third-party private energy developer/operator. Another tax incentive that may apply to a landfill gas fueled combined heat and power (CHP) system is the Modified Accelerated Cost-Recovery System (MACRS). This allows business to recover investments in certain eligible renewable energy property. MACRS is a complex set of regulations and the specific CHP project would need to be evaluated for applicability.

Section 7.2.3 also describes the Section 1603 Cash Grant for Renewable Energy, which allows a facility owner the option to receive a one-time grant equal to 30 percent of the construction and installation costs for an eligible renewable energy facility. Facilities must have been placed in service in 2009 or 2010, or construction commenced by December 31, 2010 and completed prior to December 31, 2013, to be eligible. The Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 extended the date for which construction of a facility must have commenced by to December 31, 2011.

Currently, there are several incentives available for the use of AF in vehicles which could warrant further consideration of LFG to High-BTU technologies. The Federal Alternative Fuel Vehicle Refueling Property Credit provides a Federal income tax credit worth 30 percent to 50 percent of the cost of qualified alternative fuel vehicle (QAFV) refueling station for the taxable year (30 percent or $30,000 maximum), if placed in service prior to December 31, 2011. The Credit for Alcohol Fuel, Biodiesel and Alternative Fuel Mixtures

provides a refundable Federal alternative fuel excise tax credit of $0.50 per gallon of gasoline equivalent (GGE) of CNG (against the current CNG excise tax of $0.183 per GGE) *sold for use* or *used* as a fuel in a motor vehicle or motorboat, to the alternative fueler; expires December 2011. The State of Hawaii has established an AF Tax Rate equal to 25 percent of the equivalent rate for on-road diesel on an energy content basis; the current on-road diesel fuel tax rate is $0.16/gal plus any applicable County component and a $0.05/gal environmental response fee. Related to AF for use in vehicles, it should also be noted that Hawaii Statutes requires State Agencies to move toward purchasing light duty vehicles that reduce petroleum consumption; CNG vehicles apply to this mandate.

Cornerstone believes that active LFGTE developers will be well versed in these financial incentives. As such, Cornerstone concurs with references to positive financial gains for the project from the incentives to the developer described above in exchange for financial compensation to the County. Thus, the County will see economic benefits from the developers taking advantage as best they can from these financial incentives.

CONCLUSIONS

The LFG modeling presented in A-Mehr's LFG Utilization Study and Conceptual Design appears to be in general conformance to standard engineering practices. The data A-Mehr has presented using the LandGEM LFG generation model appears to be reasonably accurate. With an additional year's worth of GCCS operational data, Cornerstone believes that future LFG flows will fall slightly below those estimated within the report. Cornerstone does not believe that this change will change the eventual recommendation to move forward with development of a LFGTE project.

The report outlines energy recovery options for beneficial use including direct gas sales and electrical generation with a cost and market evaluation for ideas for methods of technology implementation. This was followed by A-Mehr selecting the most appropriate technology option for the site and including a conceptual design of the recommended technology. The final report ended with a cost breakdown and ownership details.

While the report does present valid points in support of their recommended technology, Cornerstone feels it would be in the best interest of the County to allow the developers to propose the specific energy recovery option for the site. With this method, the developers will not be limited in their choice of technology and may utilize their own experience to help decide what will be best for the landfill. Cornerstone believes that the experienced developers will be able to take advantage of all current available financial incentives with some of those benefits provided to the County within their financial offering.

EXHIBIT C: CONCEPTUAL LFG COLLECTION AND CONTROL SYSTEM MASTER PLAN

The *Conceptual LFG Collection and Control System Master Plan* is provided for the benefit of the DEVELOPER and is intended for informational purposes only. The County is not bound by the document and does not warrant the document's contents or conclusions.

PLANS FOR THE

GCCS MASTER PLAN

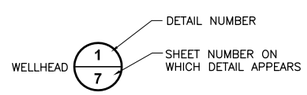
PREPARED FOR MAUI COUNTY LANDFILL

MAUI, HAWAII

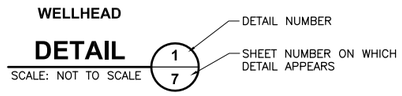
NOVEMBER 2010

DETAIL INDICATOR:

SHEET ON WHICH DETAIL IS REFERENCED:



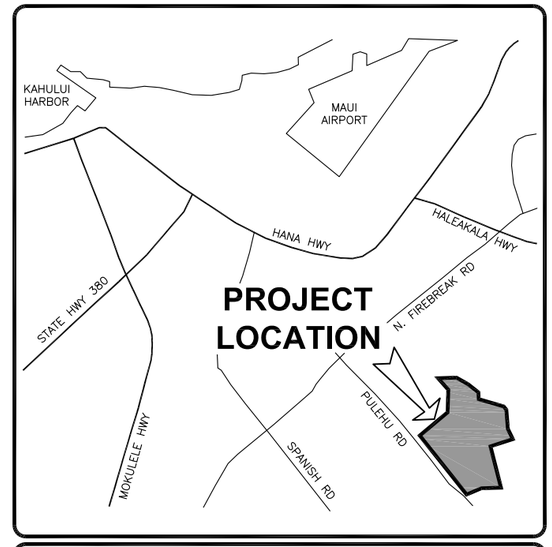
SHEET ON WHICH DETAIL APPEARS:



CORNERSTONE
Environmental Group, LLC

7600 DUBLIN BLVD. SUITE 200
DUBLIN, CALIFORNIA 94568
Tel. (877) 633-5520

SHEET INDEX



LOCATION MAP

PRELIMINARY - NOT FOR CONSTRUCTION

PAUL J. STOUT, P.E.

P.E. Lic. No. 12145 Date

1" 1/2" 0" 1"

File: X:\PROJECTS\MAUI COUNTY - 2010 LFG ENGINEERING - 100245_PROJECT DRAWINGS\DAMAGE-02_MASTER DESIGN PLAN.dwg Layout: TITLE User: michael.fritz Nov 09, 2010 - 2:02pm

LEGEND

1400	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR
12"	EXISTING LFG HEADER
	EXISTING UNDERGROUND LFG HEADER
⊕ GW-A-1	EXISTING LFG EXTRACTION WELL
	EXISTING CONTROL VALVE
	EXISTING BLIND FLANGE
	EXISTING FLANGE CONNECTION
	EXISTING REDUCER FITTING
◇ SUMP	EXISTING CONDENSATE PUMP STATION
	EXISTING ROAD CROSSING
○ LCRS-1	EXISTING LEACHATE CLEANOUT RISER

0 150 300
SCALE IN FEET

NOTES:

1. TOPOGRAPHIC CONTOURS PREPARED USING PHOTOGRAMMETRIC METHODS BY AMERICAN AERIAL MAPPING, INC. DATE OF PHOTOGRAPHY: JUNE 11, 2010. DATUM: HORIZONTAL – LOCAL, VERTICAL – LOCAL.
2. FEATURES, CONTOURS, AND ELEVATIONS OF THESE BASE MAPS ARE APPROXIMATE INDICATIONS OF CURRENT AND FUTURE CONDITIONS. CONTRACTOR SHALL VERIFY THE ACTUAL LOCATIONS OF THESE ELEMENTS PRIOR TO, AND DURING CONSTRUCTION, AND SHALL FINALIZE THE ELEMENTS LOCATIONS TO ACCOMMODATE FINAL FIELD CONDITIONS, AS APPROVED BY THE OWNER/ENGINEER.
3. ALL CONNECTIONS TO EXISTING PIPING SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO BIDDING. SOME CONNECTIONS MAY REQUIRE EXCAVATION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL DISCONNECTIONS AND RECONNECTIONS FOR INSTALLATION OF NEW PIPING INCLUDING EXISTING WELLS AND PIPING WHERE NECESSARY.
5. CONTRACTOR TO REMOVE AND REUSE EXISTING PIPING AND FITTINGS WHERE APPLICABLE. CAP ALL ABANDONED PIPE.
6. SITE CONDITIONS AND TOPOGRAPHY MAY HAVE CHANGED SINCE DATE OF DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR INSPECTING WORK AREAS AT PRE-BID SITE WALK AS CURRENT CONDITIONS FOR BIDDING PURPOSES.
7. WORK SHALL NOT VARY FROM DESIGN WITHOUT APPROVAL OF THE ENGINEER. WORK THAT VARIES FROM DESIGN WITHOUT APPROVAL WILL NOT BE PAID FOR.

PRELIMINARY - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 11/9/2010
DRAWN BY MRF
DESIGNED BY JBS
CHECKED BY MED
APPROVED BY PJS

CORNERSTONE Environmental Group, LLC

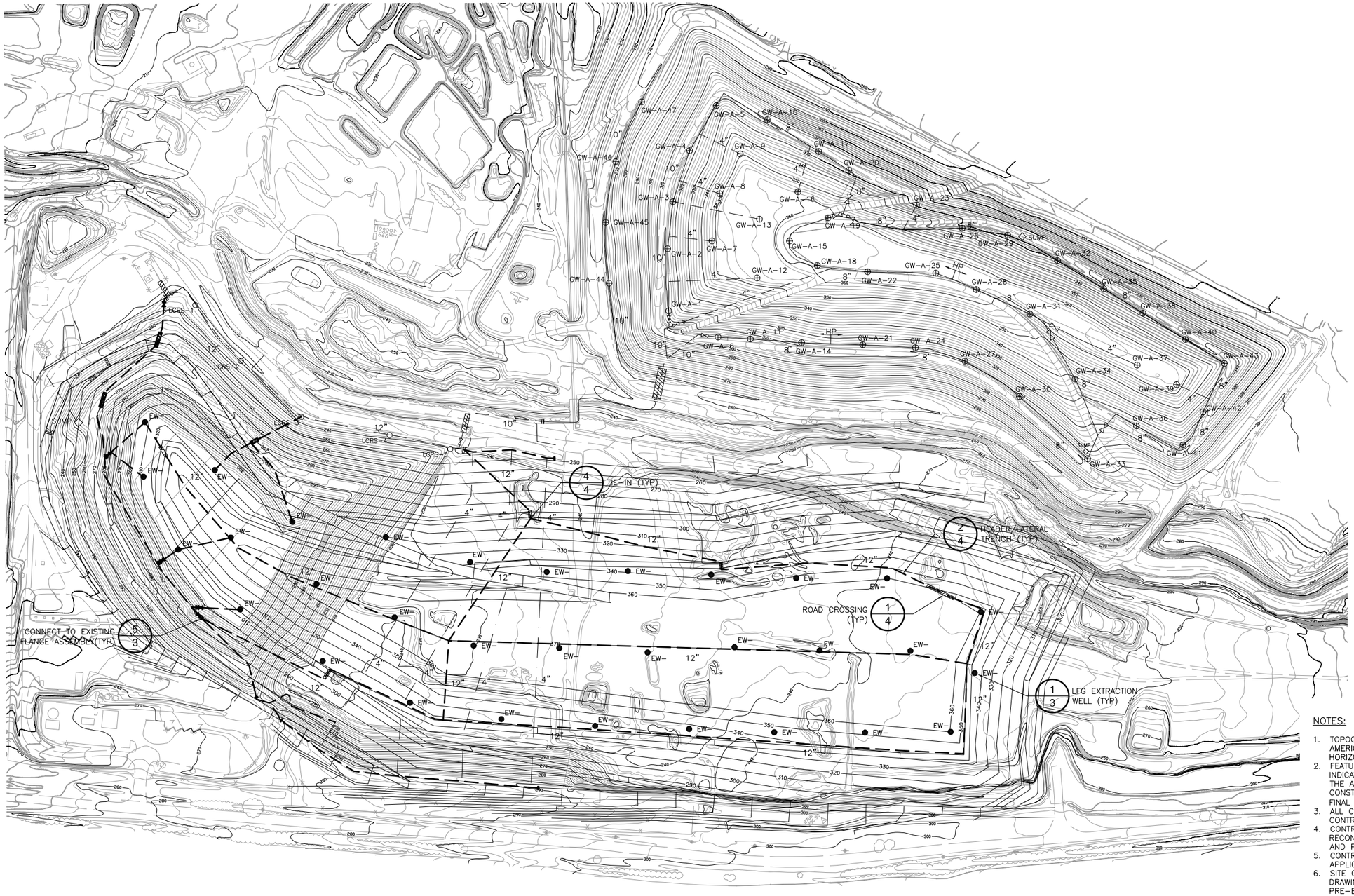
CENTRAL MAUI MUNICIPAL
SOLID WASTE LANDFILL
MAUI COUNTY, HAWAII

2010 GCCS IMPROVEMENTS
OVERALL SITE PLAN

SHEET NO. **1**
PROJECT NO. 100245

1" 1/2" 0" 1"

File: X:\PROJECTS\MAUI COUNTY - 2010 LFG ENGINEERING - 100245_PROJECT DRAWINGS\LMAKDSE-02_MASTER DESIGN PLAN.dwg Layout: SHT 1 User: michael.fitz Nov 09, 2010 - 2:02pm



LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING LANDFILL GAS HEADER
- EXISTING CONTROL VALVE
- EXISTING BLIND FLANGE
- EXISTING ROAD CROSSING
- EXISTING LEACHATE CLEANOUT RISER
- PROPOSED UNDERGROUND LANDFILL GAS HEADER/LATERAL
- PROPOSED LFG EXTRACTION WELL
- PROPOSED CONTROL VALVE
- PROPOSED BLIND FLANGE
- PROPOSED REDUCER FITTING
- PROPOSED ROAD CROSSING

0 60 120
SCALE IN FEET

NOTES:

1. TOPOGRAPHIC CONTOURS PREPARED USING PHOTOGRAMMETRIC METHODS BY AMERICAN AERIAL MAPPING, INC. DATE OF PHOTOGRAPHY: JUNE 11, 2010. DATUM: HORIZONTAL – LOCAL, VERTICAL – LOCAL.
2. FEATURES, CONTOURS, AND ELEVATIONS OF THESE BASE MAPS ARE APPROXIMATE INDICATIONS OF CURRENT AND FUTURE CONDITIONS. CONTRACTOR SHALL VERIFY THE ACTUAL LOCATIONS OF THESE ELEMENTS PRIOR TO, AND DURING CONSTRUCTION, AND SHALL FINALIZE THE ELEMENTS LOCATIONS TO ACCOMMODATE FINAL FIELD CONDITIONS, AS APPROVED BY THE OWNER/ENGINEER.
3. ALL CONNECTIONS TO EXISTING PIPING SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO BIDDING. SOME CONNECTIONS MAY REQUIRE EXCAVATION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL DISCONNECTIONS AND RECONNECTIONS FOR INSTALLATION OF NEW PIPING INCLUDING EXISTING WELLS AND PIPING WHERE NECESSARY.
5. CONTRACTOR TO REMOVE AND REUSE EXISTING PIPING AND FITTINGS WHERE APPLICABLE. CAP ALL ABANDONED PIPE.
6. SITE CONDITIONS AND TOPOGRAPHY MAY HAVE CHANGED SINCE DATE OF DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR INSPECTING WORK AREAS AT PRE-BID SITE WALK AS CURRENT CONDITIONS FOR BIDDING PURPOSES.
7. WORK SHALL NOT VARY FROM DESIGN WITHOUT APPROVAL OF THE ENGINEER. WORK THAT VARIES FROM DESIGN WITHOUT APPROVAL WILL NOT BE PAID FOR.

PRELIMINARY - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 11/9/2010
DRAWN BY MRF
DESIGNED BY JBS
CHECKED BY MED
APPROVED BY PJS

CORNERSTONE Environmental Group, LLC

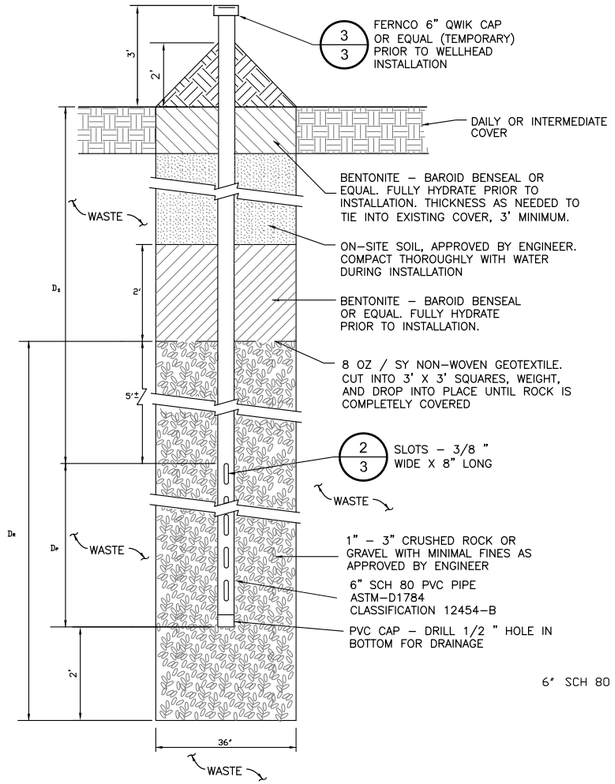
CENTRAL MAUI MUNICIPAL
SOLID WASTE LANDFILL
MAUI COUNTY, HAWAII

2010 GCCS IMPROVEMENTS
CONSTRUCTION SITE PLAN

SHEET NO. **2**
PROJECT NO. 100245

1" 1/2" 0" 1"

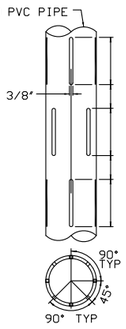
File: X:\PROJECTS\MAUI COUNTY - 2010 LFG ENGINEERING - 100245_PROJECT DRAWINGS\DRAWINGS\SSE-02_MASTER DESIGN PLAN.dwg Layout: SHT 2 User: michael.fritz Nov 09, 2010 - 2:02pm



NOTES:
1. WELL PIPE TO BE BELL AND SPIGOT OR JOINED WITH SCH 80 PVC COUPLINGS.
2. SOLVENT WELD AND INSTALL THREE 1/2"DIA. x 3/4" LONG GALVANIZED LAG BOLTS @ 120° CENTERS ON EACH JOINT.
3. PVC WITH MINIMUM ASTM D–1784 CELL CLASSIFICATION OF 12454–B.
4. D_R = DEPTH OF ROCK
   D_S = DEPTH OF SOLID PIPE (BELOW GRADE) –25 FEET MINIMUM
   D_P = LENGTH OF PERFORATED PIPE
5. MINIMUM 15 FEET SEPARATION BETWEEN BASE OF BORING AND TOP OF LINER SYSTEM, PROVIDE MINIMUM 20 FEET SEPARATION BETWEEN BASE OF BORING AND TOP OF LINER SYSTEM ON LINER SIDE SLOPES.
6. 1"–3" WASHED NON–CARBONATE GRAVEL (NO FINES).
7. WELL DRILLING WILL NOT COMMENCE UNTIL BOTTOM LINER ELEVATIONS ARE IDENTIFIED AND VERIFIED BY PROJECT SURVEYOR, DESIGN ENGINEER, AND CQA REPRESENTATIVE.
8. WELL DRILLING TABLE WILL BE MANAGED BY ENVIRONMENTAL MANAGER OR DESIGNATED REPRESENTATIVE TO ENSURE ONLY THE VERIFIED WELL DEPTHS ARE PRESENT, AND THAT DRILLER AND CQA REPRESENTATIVE HAVE THE IDENTICAL INFORMATION PRIOR TO DRILLING.

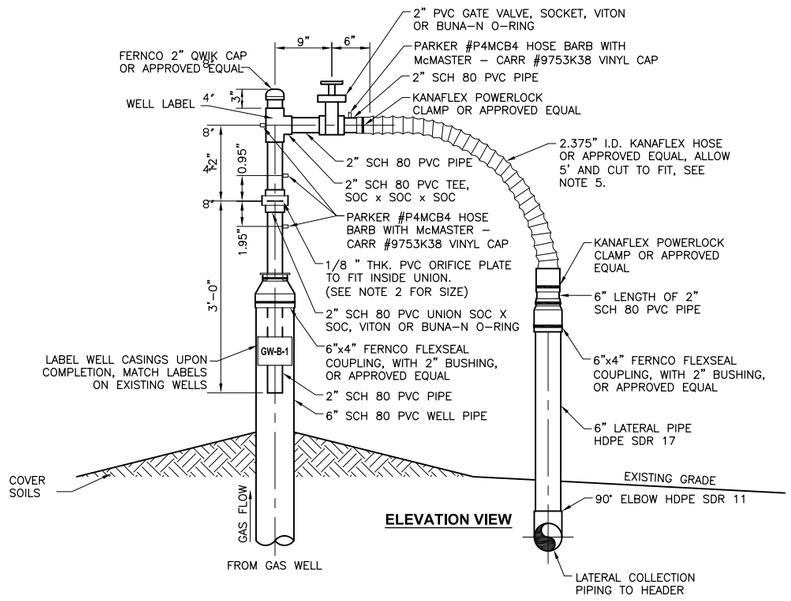
TYPICAL LFG EXTRACTION WELL

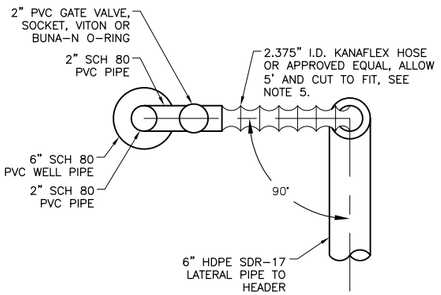
DETAIL 1/3 — SCALE: NOT TO SCALE



SLOT DETAIL

DETAIL 2/3 — SCALE: NOT TO SCALE



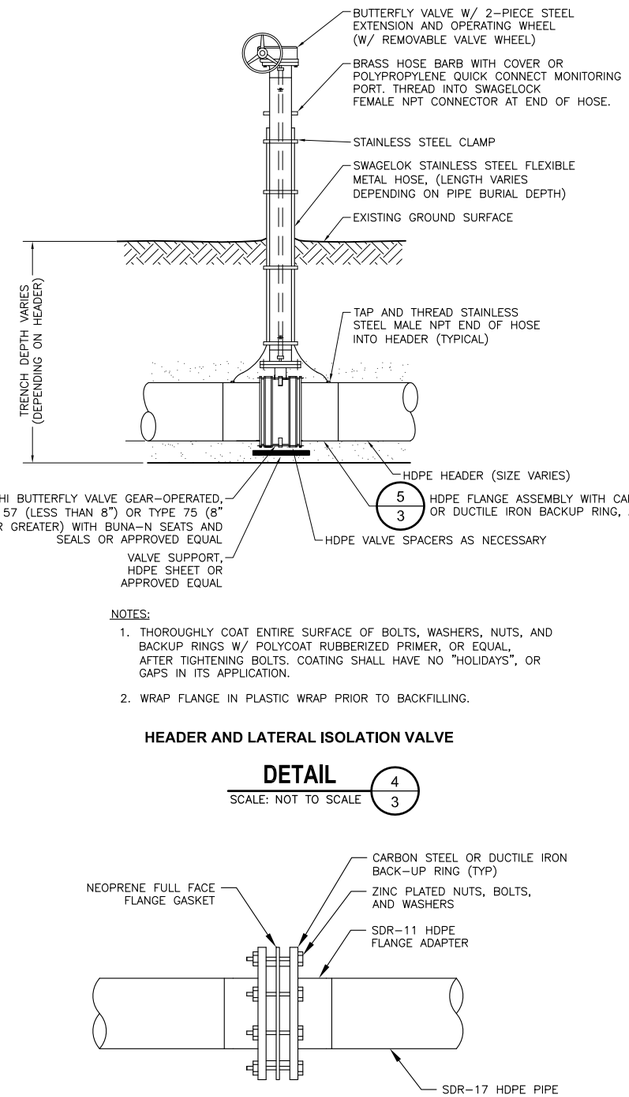


PLAN VIEW

NOTES:
1. WELL HEADS SHALL BE MANUFACTURED BY LFG SPECIALTIES, INC.
2. CERTAIN WELL HEADS MAY BE 3" AS DIRECTED BY OWNER'S REPRESENTATIVE.
3. CONTRACTOR TO INSTALL 1" ORIFICE PLATE ON WELLHEAD. CONTRACTOR TO PROVIDE TWO ADDITIONAL ORIFICE PLATES (ONE SIZE LARGER AND ONE SIZE SMALLER).
4. WELLHEAD SHALL BE INSTALLED 90° FROM LATERAL PIPE. SEE PLAN VIEW DETAIL ABOVE.
5. INSTALL FLEX HOSE WITH EXCESS HOSE TO ALLOW MOVEMENT OF LATERAL BUT CONFIGURE AS NECESSARY TO PREVENT SAG AND WATER ACCUMULATION. ALL INSTALLATIONS SHALL BE INSPECTED BY ENGINEER PRIOR TO APPROVAL.

WELLHEAD

DETAIL 3/3 — SCALE: NOT TO SCALE



NOTES:
1. THOROUGHLY COAT ENTIRE SURFACE OF BOLTS, WASHERS, NUTS, AND BACKUP RINGS W/ POLYCOAT RUBBERIZED PRIMER, OR EQUAL, AFTER TIGHTENING BOLTS. COATING SHALL HAVE NO "HOLIDAYS", OR GAPS IN ITS APPLICATION.
2. WRAP FLANGE IN PLASTIC WRAP PRIOR TO BACKFILLING.

HEADER AND LATERAL ISOLATION VALVE

DETAIL 4/3 — SCALE: NOT TO SCALE

NOTES:
1. TAPE 5 MIL PLASTIC AROUND ALL FLANGE CONNECTIONS
2. LOCATE VALVE BETWEEN FLANGES WITH APPROPRIATE SPACERS AS REQUIRED.
3. IF USING VALVE, INSTALL EVERY OTHER BOLT THROUGH BOTH FLANGES, AND EVERY OTHER BOLT THROUGH FLANGE ON HEADER SIDE THROUGH VALVE ONLY. VALVE SHALL BE ASAHI TYPE 57 BUTTERFLY VALVE OR APPROVED EQUAL. GEAR OPERATED, PVC BODY PPDISK, NITRILE OR VITON SEATS AND SEALS.
4. VALVE SHALL INCLUDE HDPE FLANGE ADAPTER, D.I. BACKUP RING, AND GALVANIZED OR ZINC PLATED NUTS, BOLTS AND WASHERS, HDPE VALVE SPACER OR ROUTER FLANGE ADAPTER TO ALLOW VALVE TO FULLY OPEN.

FLANGE ASSEMBLY

DETAIL 5/3 — SCALE: NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 11/9/2010
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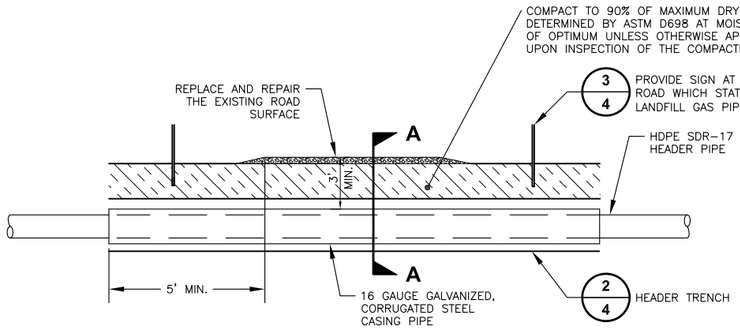
DESIGNED BY JBS
CHECKED BY MED
APPROVED BY PJS

CORNERSTONE Environmental Group, LLC

CENTRAL MAUI MUNICIPAL SOLID WASTE LANDFILL
MAUI COUNTY, HAWAII

2010 GCCS IMPROVEMENTS
WELL SCHEDULE / LANDFILL GAS DETAILS

SHEET NO. **3**
PROJECT NO. 100245



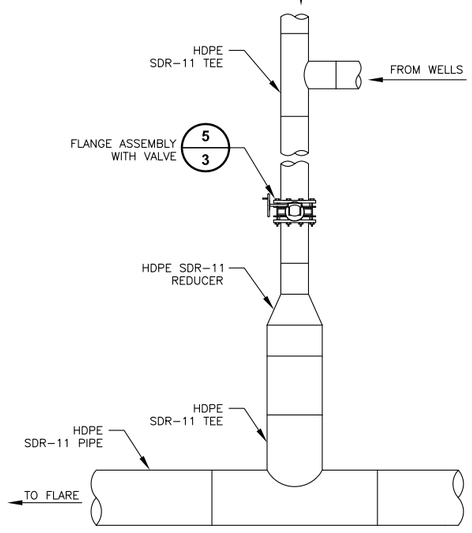
PIPE SCHEDULE	
12" HEADER PIPE	18" CASING PIPE OR APPROVED EQUAL

NOTES:

1. THE CONTRACTOR SHALL LAY OUT THE PIPE TO CONFORM TO FIELD CONDITIONS. PROVIDE 30" MINIMUM COVER. PROVIDE MINIMUM PIPE DRAINAGE SLOPES OF 7% WITHIN WASTE LIMIT AND 3% OUTSIDE OF WASTE LIMIT, AS APPROVED BY THE OWNER/ENGINEER.

TYPICAL ROAD CROSSING

DETAIL 1/4 SCALE: NOT TO SCALE



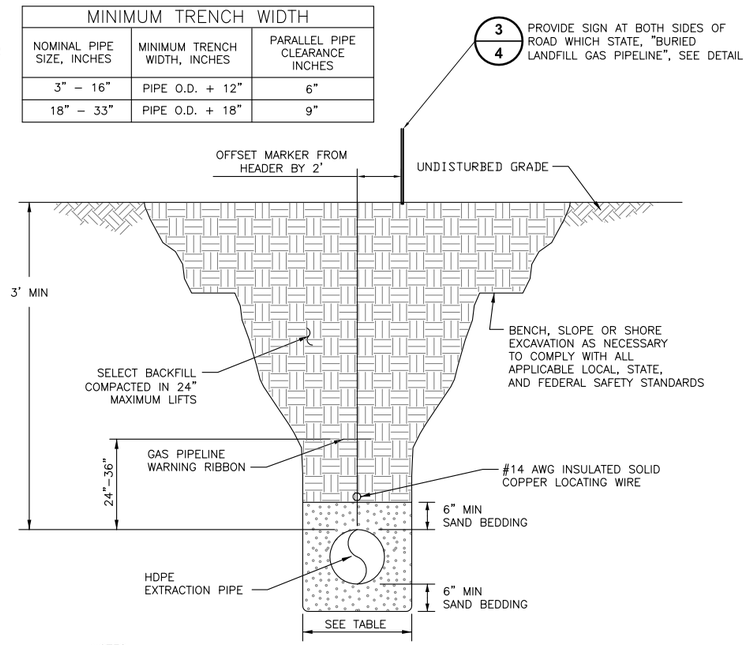
TYPICAL HEADER-SUBHEADER-LATERAL JUNCTION

DETAIL 4/4 SCALE: NOT TO SCALE

NOTES:

1. THE CONTRACTOR SHALL LAY OUT THE PIPE TO CONFORM TO FIELD CONDITIONS. PROVIDE 30" MINIMUM COVER. PROVIDE MINIMUM PIPE DRAINAGE SLOPES OF 7% WITHIN WASTE LIMIT AND 3% OUTSIDE OF WASTE LIMIT, AS APPROVED BY THE OWNER/ENGINEER.
2. ONE ELECTRO-FUSION COUPLING TO BE PLACED NEXT TO EACH TEE TO FACILITATE PROPER INSTALLATION AND PREVENT DAMAGE TO FITTINGS (TO BE APPROVED BY ENGINEER PRIOR TO INSTALLATION).

MINIMUM TRENCH WIDTH		
NOMINAL PIPE SIZE, INCHES	MINIMUM TRENCH WIDTH, INCHES	PARALLEL PIPE CLEARANCE INCHES
3" – 16"	PIPE O.D. + 12"	6"
18" – 33"	PIPE O.D. + 18"	9"

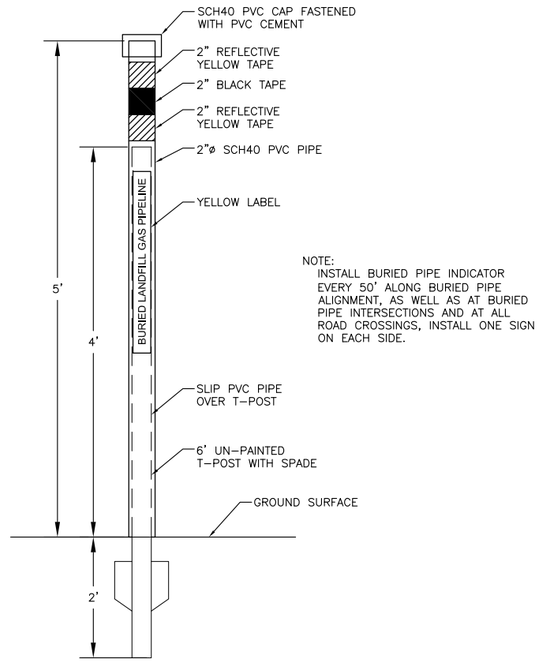


NOTES:

1. COMPACT SAND BEDDING IN 9" MAXIMUM LIFTS (95% MAX DENSITY AROUND PIPE WITH LONGITUDINAL SLOPE LESS THAN 1.5%).
2. DISTURBED AREAS TO BE RESTORED TO ORIGINAL OR BETTER CONDITION.
3. THE CONTRACTOR SHALL LAY OUT THE PIPE TO CONFORM TO FIELD CONDITIONS. PROVIDE 30" MINIMUM COVER. PROVIDE MINIMUM PIPE DRAINAGE SLOPES OF 7% WITHIN WASTE LIMIT AND 3% OUTSIDE OF WASTE LIMIT, AS APPROVED BY THE OWNER/ENGINEER.

HEADER/LATERAL TRENCH

DETAIL 2/4 SCALE: NOT TO SCALE



NOTE:
INSTALL BURIED PIPE INDICATOR EVERY 50' ALONG BURIED PIPE ALIGNMENT, AS WELL AS AT BURIED PIPE INTERSECTIONS AND AT ALL ROAD CROSSINGS, INSTALL ONE SIGN ON EACH SIDE.

BURIED PIPE INDICATOR

DETAIL 3/4 SCALE: NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 11/9/2010
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DESIGNED BY JBS
CHECKED BY MED
APPROVED BY PJS

CORNERSTONE Environmental Group, LLC

CENTRAL MAUI MUNICIPAL
SOLID WASTE LANDFILL
MAUI COUNTY, HAWAII

2010 GCCS IMPROVEMENTS
LANDFILL GAS DETAILS

SHEET NO. **4**
PROJECT NO. 100245

1" 1/2" 0" 1"

EXHIBIT D: PERMITS

/5105

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801-3378

☐ RUSH

In reply, please refer to:
EMD/SHWB

DEPT. OF ENVIRONMENTAL MANAGEMENT

	INFO	ACTION	SEE ME	COMMENTS	COPY	FILE
DIRECTOR	☑	☐				
DEPUTY DIR.	☑	☐				
PERS.						
WWR						
SW		☑				☑
SECTY.						

S1144GS

SCAN

Return to _____ Date _____
By _____ Time _____

November 16, 2009

CERTIFIED MAIL NO. 7008 1140 0002 7260 3959
RETURN RECEIPT REQUESTED

Ms. Cheryl K. Okuma, Director
Department of Environmental Management
County of Maui
One Main Plaza, Suite 175
2200 Main Street
Wailuku, Hawaii 96793

File: LF-0089-08

Dear Ms. Okuma:

SUBJECT: Solid Waste Management Permit LF-0089-08
Central Maui Landfill Phases I, II & IV, V and Entrance Facility
Pulehu Road, Puunene, Maui

This letter is in response to your solid waste permit application dated October 2008, for renewal and modification to include Phase V. Submitted with the application were the Closure/Post-Closure Plan and revised Operating Plan revised February 2008. The permit application has been approved. In accordance with Hawaii Revised Statutes, Chapter 342H and Hawaii Administrative Rules Chapter 11-58.1, the Department is issuing Solid Waste Management Permit LF-0089-08 (enclosed) for the closed Phases I and II, the current operation of Phase IV and the new Phase V, and the entrance facility at the Central Maui Municipal Solid Waste Landfill. The subject permit expires on October 31, 2014. A receipt for your permit-filing fee is enclosed.

The public notice on the subject draft permit was published in *The Maui News* on June 28 and 29, 2009. The public notice stated that the Department was accepting comments for 30 days on the draft permit and application. During the public comment period from June 28, 2009 to July 31, 2009, the Department of Health, Solid and Hazardous Waste Branch did not receive any public comments. In addition, we discussed with your staff clarifying changes to Landfill Gas Management, Section F and Groundwater and Leachate Management, Section G of the draft permit Special Conditions I. These clarifying changes resulted in changes to the two permit sections and have been incorporated into the permit. Therefore, the Department is issuing the permit with changes to Special Conditions I, Section F and G, and other more significant changes listed below. Other changes to the permit are considered minor and non-substantive.

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.

HRS 342H-14 states that unless the submitted documents and other information secured by the Department 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 Solid and Hazardous Waste Branch 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.

We recommend that you read through all of the permit conditions carefully. In particular, we call your attention to the following conditions and ask that certain programs be updated to meet the final permit conditions:

- Identification and management of buffer areas (Special Conditions I, Section A, Item 1).
- Revised language in Special Conditions I, Section A, Item 4. Revision was necessary, as the previous use of the term buffer did not comply with the regulatory definition.
- The Master Plan dated December 2007 shall be revised on a regular basis (not greater than five-year intervals) with the first revision due December 2012 (Special Conditions I, Section A, Item 2).
- Revised language in Special Conditions I, Section D, Item 12, and Section E, Item 4 to allow for storage of wet weather material and to specify cover requirements prior to storage.
- Daily cover verification program (Special Conditions I, Section D, Item 15).
- A Surface Water Management Plan needs to be updated and filed annually by September of each year (Special Conditions I, Section E, Item 2).
- Increased reporting requirements due July and September each year (Special Conditions I, Section I Item 2).
- Clarified recordkeeping requirements (Special Conditions I, Section I Item 3).
- Appendix F, Hazardous Waste Exclusion Program dated September 1993, updated November 1994 of the operations Plan dated September 2004, revision of October 2008 should be revised to meet current permit waste acceptance conditions (Special Conditions I, Section C, item 1, 2 and 3).
- A Radioactive Waste Monitoring Program shall be added to the Operation Plan (Special Conditions I, Section C, item 4)
- A Special Waste Acceptance Program shall be added to the Operation Plan (Special Conditions I, Section C, item 5)
- The Groundwater and Leachate Monitoring Plan for Phase I/II and IV dated 1997 shall be revised within one year to include all landfill Phases I, II, IV and V (Special Conditions I, Section G).
- Appendix H, Landfill Gas Migration Monitoring Procedures dated 1997 of the

Operations Plan dated September 2004, revised October 2008 should be revised to meet the revised permit conditions (Special Conditions I, Section F).

Please be aware that we may require the construction of the new Phase V to be inspected by the Department prior to it receiving waste disposal, Special Condition I, Section B, Item 11. In addition, all subsequent future designs (i.e. Phase V and VI) need to remain hydraulically independent from Phase IV-A.

Should you have any questions regarding this letter, please contact Mr. Gary Siu of the Solid and Hazardous Waste Branch at (808) 586-4226.

Sincerely,

THOMAS E. ARIZUMI, P.E, CHIEF
Environmental Management Division

Enclosure: Solid Waste Permit LF-0089-08
Application filing fee receipt

c: Mr. Tracy Takamine, Solid Waste Division, County of Maui

PERMITTEE:
OWNER/OPERATOR:
County of Maui
Pulehu Road
Puunene, Hawaii

PERMIT NUMBER: LF-0089-08
DATE OF ISSUE: November 1, 2009
EXPIRATION DATE: October 31, 2014
COUNTY: Maui
LATITUDE/LONGITUDE: 20° 51'N/156° 25'W
PROJECT: Central Maui MSW Landfill

SOLID WASTE MANAGEMENT PERMIT

This solid waste management permit renewal and 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 permittee is hereby authorized to construct and to operate the existing landfill Phases I, II, IV, the new Phase V lateral expansion, and a materials drop-off facility as shown on the application and additional submittals, and other documents on file with the Department of Health as follows:

To Construct: (1) A municipal solid waste (MSW) sanitary landfill consisting of approximately 42 acres in Phases I and II, approximately 18 acres in Phase IV (10 acres in Phase IV-A, 8 acres in Phase IV-B), and approximately 19 acres in Phase V. Phases I and II are existing closed disposal areas constructed and placed in operation prior to 1993, and are not equipped with a bottom liner but do have a leachate collection system. Phase IV-A was constructed with a bottom and side slope composite liner system comprised of a 60-mil HDPE liner on top of a geosynthetic clay liner with a permeability of $5x10^{-9}$ cm/sec or less. Phase IV-B was constructed with a prescribed liner system. Phase IV-A shall be hydraulically isolated from future cells and phases.

The leachate collection system of Phases IV and V consists of a minimum of 12 inches of gravel with a minimum hydraulic conductivity of 1×10^{-3} cm/sec, or a geosynthetic drainage net or geocomposite with equivalent drainage capacity. Leachate shall be maintained to less than a thirty-centimeter (12-inches) depth over the liner. The leachate collection system for side slopes is a geonet, geocomposite or minimum 16 ounce per square yard geotextile. The operations layer consists of 1-1/2- inch minus material with not more than 12% passing the number 200 sieve. The thickness of the operations layer on the cell floor shall be a minimum of 36 inches above a geonet drainage layer, or 24 inches above a drainage layer consisting of 12 inches of gravel. The operations layer on side slopes shall be a minimum of 24 inches thick.

Phases I and II (42-acres) was closed in 2007 and has a maximum elevation of 375 feet above mean sea level (MSL). Phase IV has already been construed and is currently active. Phase V is a proposed expansion and will be divided into two or more construction phases. Phases IV and V are contiguous and shall be limited to a maximum interim elevation of 390 feet above MSL.

Not included in the landfill acreage are areas used for appurtenant uses such as offices, equipment and maintenance facilities, leachate management facilities consisting of a leachate manhole and aboveground tanks, landfill gas management area, public convenience center, soil stockpile area, buffer zones, stormwater ditches, perimeter road, and parking.

(2) A materials drop-off facility including a self-haul waste drop-off area, recyclables (fiber, plastic, glass and metal) collection and special waste (white goods, used oil, lead acid batteries and tires) collection.

To Operate: (1) A municipal solid waste (MSW) sanitary landfill consisting of approximately 42 acres of closed landfill in Phases I, and II, approximately 18 acres in Phase IV and approximately 19 acres in Phase V.

The peak daily disposal rate for MSW shall not exceed 1200 tons per day. Adequate equipment and personnel to operate the MSW landfill facility shall be maintained. At the nominal operating rate of 800 tons per day, the site shall have a minimum of one bulldozer, one compactor, one water truck and one spotter. Greater than a nominal rate of 800 tons to a peak daily rate of 1200 tons per day will require a minimum of two bulldozers, one compactor, one water truck and 2 spotters. These requirements shall be met unless otherwise approved by the Department.

(2) A materials drop-off facility including a self-haul waste drop-off area, recyclables (fiber, plastic, glass and metal) collection and special waste (white goods, used oil, lead acid batteries and tires) collection.

IN ACCORDANCE WITH: (a) A permit renewal application for a permit to operate a Solid Waste Facility dated June 27, 1997 for Phases I and II; (b) an application for renewal and modification for Phases I and II dated December 2004; (c) an application for Phase IV-A dated September 2004; (d) amendments to applications for Phase I and II and Phase IV dated September 2005; (e) an application for Phase V dated October 2008; and (e) all other engineering plans, as built drawings, engineering data, and the revised operations plan dated September 2004 and last revised in February 2008, submitted by the County of Maui, Department of Environmental Management.

LOCATED AT: Pulehu Road, Puunene, Maui, Hawaii (TMK (2) 3-8-003:019, 025).

SUBJECT TO: HRS 342H; HAR 11-58.1; and Standard Conditions; Special Conditions I. Sections A through I; and Special Conditions II.

Acceptance of this permit constitutes an acknowledgement and agreement that the holder will comply with all rules, regulations, and orders of the Department and the conditions precedent to the granting of this permit.

This permit supercedes the Solid Waste Management Permit Number LF-0091-04 dated January 25, 2006.

(for) DIRECTOR OF HEALTH
State of Hawaii

The solid waste management facility is subject to HRS Chapter 342H, *Solid Waste Pollution* and HAR Chapter 11-58.1, *Solid Waste Management Control*, and the following conditions:

STANDARD CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of HRS Chapter 342H. The Department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants, or 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 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, construction, operation, maintenance, closure or post-closure of this facility;

    c. does not release the permittee 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 permittee 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 Department from the permittee contain confidential information, such as secret processes or methods of manufacture, they shall be made available for inspection by the public (HRS 342-14). The permittee shall be responsible for identifying, in writing, the specific information asserted to be confidential. The Department shall review the permittee's assertion 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 submittals on file with the Department. Any unauthorized deviation from the submitted application, approved drawings, operations manual, additional submittals, or conditions of this permit may constitute grounds for revocation of this permit and enforcement action by the Department. 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 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 shall be submitted with the request [HAR 11-58.1-04(h)(3)].

8. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. The facility shall be designed, constructed and equipped so as to operate without causing a violation of applicable rules and regulations.

9. Incident Notification Requirements: The permittee shall notify the Department of Health, in writing or facsimile, 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 or fax and reported within eight hours, whenever possible, and no more than 24 hours. The notification report shall be completed and submitted by an Environmental Compliance Officer or other responsible official within seven (7) calendar days (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 prevent, reduce, eliminate, and prevent recurrence, including an implementation schedule; and
j. Other information or monitoring as required by the Department.

Notification requirements for releases only apply to releases of a quantity equal or exceeding the reportable quantity (RQ) listed in HAR Section 11-451.

10. Noncompliance Notification Requirements. If, for any reason, the permittee does not comply with, or will be unable to comply with, any condition or limitation specified in the permit, the permittee shall notify the Department verbally within 24 hours followed by a written report within seven (7) calendar days (three (3) calendar days for waste disposal facilities, such as landfills and incinerators) of the verbal notification. The written report shall be completed and submitted by an Environmental Compliance Officer or other responsible official contain the following information:

a. a description of and the cause of noncompliance;
b. period of noncompliance, including exact dates and times, or, 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 Department.

The permittee may be subject to enforcement action by the Department, penalties or revocation of this permit.

The use of electronic facsimile device (FAX) for use in notifications is acceptable. Any data transmission or detailed explanations transmitted shall be accompanied by regular mail submissions. Failure to notify in accordance to this requirement may initiate enforcement action.

11. Monitoring and Recordkeeping Requirements: The permittee shall comply with the following monitoring and record keeping requirements:
    a. Upon request, the permittee shall furnish all records (i.e. transaction reports, disposal receipts) and plans required by the Department. The retention period for all transaction reports and disposal receipts shall be a minimum of five (5) years; however, there shall be an indefinite retention period for all records associated with any unresolved enforcement action as determined by the Department.
    b. The permittee 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 a minimum of five (5) years, or longer, as may be specified in the Special Conditions, from the date of the sample, measurement, report, or application unless otherwise specified by Department rule. 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 shall include:
        - The dates, exact place, 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 permittee shall submit complete and detailed plans and reports on existing solid waste management systems and 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 Department in the form prescribed by the Department. Any submission for permit modification shall be submitted in accordance with Standard Condition No. 13. The plans and reports shall be prepared by a competent person acceptable to the Department, and at the expense of the permittee.

13. Should the permittee decide to modify the permit or continue operation of the solid waste facility beyond the expiration date of the permit, the permittee(s) shall submit a complete permit modification or renewal application at least one hundred eighty (180) days (one year for municipal solid waste landfills) 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 Department.

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 Department; and
    c. conducting tests in connection therewith (including collecting soil, water, air, ash, and any other material or samples).

    The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises.

15. The Department may require the permittee 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).

16. When requested by the Department, the permittee shall within a reasonable time, as specified by the Department, furnish any information required by law, which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be submitted or corrected promptly. Upon the written request of the permittee, the deadline for submission of information may be extended, if the Department determines that reasonable justification exists for the extension.

17. If the Department determines that the permittee(s) has violated or is violating any provision of HRS §342H, HAR §11-58.1, or these permit conditions, the Department 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 Department may, on its own motion, modify, suspend, or revoke a permit if, after affording the applicant a hearing in accordance with HRS 91, the Department 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 permittee 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).

SPECIAL CONDITIONS I: MSW Landfill
Section A. General Facility Conditions

1. MSW disposal activities shall not occur within **buffer areas,** a minimum 150 feet from the property line along Pulehu Road, minimum 1000 feet from the property line along any present or future urban area, and minimum 80 feet of any agricultural area.

2. The **Master Plan** dated December 2007 shall be maintained by the County for planning purposes and be revised on a regular basis of not greater than five-year intervals with the first revision submitted by December 31, 2012. The Master Plan shall provide 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 the existing Phase IV and future lateral expansion Phases V and VI. The Master Plan shall include the proposed Basis of Design (BOD), buffer areas, appurtenant and support facilities. The Master Plan shall address special measures to permanently isolate Phase IV-A from the remaining facility phases.

3. The maximum height of this landfill shall be 390 feet above mean sea level and in accordance with Operations Plan for Central Maui Landfill dated October 2008, prepared by A-Mehr, Inc.

4. **Impacted Areas.** The permittee shall rectify any impacts from the site on nearby areas, including any adjacent public roads or environmentally sensitive areas. The permittee shall incorporate methods to minimize impacts from litter, vectors and odors.

5. **Air Criteria.** The permittee is responsible for obtaining permits and maintaining compliance with any state or federal Clean Air regulations, in accordance with HAR 11-58.1-15(e).

6. **Access Control.** The permittee is responsible for providing measures to control public access in accordance with HAR 11-58.1-15(f).

7. The permittee shall provide adequate queuing and storage space for a minimum of 15 waste delivery vehicles at the landfill disposal site.

Section B. Construction and Maintenance – MSW Disposal Cells

1. Construction of Phase V, or significant modification of the Phases IV-A and/or IV-B disposal cells, shall not occur prior to the Department's approval of the final construction plans and specifications prepared and certified by a professional engineer, registered in the state of Hawaii, with at least five (5) years experience in designing landfills. The construction of each sub-phase of Phase V is also subject to the submission of an engineering design report by the permittee and approval by the Department. Upon

approval, construction shall be in conformance with the final construction plans and specifications.

2. Prior to liner installation, the subgrade shall be prepared to provide a smooth, firm, unyielding, rut-less foundation with well-graded material no larger than 0.75-inch gravel.

3. The permittee is responsible for obtaining the services of a registered land surveyor who shall provide a minimum second order of accuracy on: triangulation, traverse, leveling and baseline measurements of the base grades, liner grades and key location and elevation points of the leachate collection and sump system as shown on the approved drawings. The liner contractor and installer prior to liner placement shall certify the base grades in writing.

4. Construction of the composite liner system shall be in accordance with the plans and specifications approved by the Department. The QA/QC engineer shall observe construction, perform testing as specified, and certify that the thickness and hydraulic conductivity of the soil liner comply with the approved plans and specifications. The soil liner in Phase V shall be a minimum of 24 inches thick and constructed with a maximum permeability of 1.0×10^{-7} cm/sec. The soil liner shall be overlain by an 80-mil HDPE liner.

5. Lined side slopes shall not exceed a slope of two to one (horizontal: vertical). The drainage layer on side slopes may either consist of gravel or a geosynthetic material provided that the design provides adequate leachate collection and removal capabilities. The operations layer on side slopes shall be a minimum of 24 inches of soil material with 100 percent passing a 2-inch sieve. A protecting geotextile of appropriate thickness shall be provided between the operations layer and the drainage layer and between the liner and any gravel drainage layer.

6. 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 QA/QC landfill inspector with at least five (5) years of experience in landfill CQA, and works under the supervision of a professional engineer, shall observe liner installation and grade elevations. The permittee shall notify the Department, in writing, at least five (5) days prior to any liner installation work.

7. The leachate collection system shall be installed according to the approved plans and drawings, and designed to maintain less than a 12-inch head on any portion of the liner system, except in the leachate collection sump area located in Phase IV-B. The sump area shall be lined with two layers of 80-mil high-density polyethylene liner over the minimum 24-inch-thick earthen liner.

8. In order to protect the primary liner, a minimum 16-ounce geotextile fabric and a twelve-inch gravel drainage layer, with gravel not to exceed 1.5-inch in diameter with a minimum hydraulic conductivity of 1.0×10^{-2} cm/sec, shall be placed over the liner on the cell floor. If approved by the Department, a geonet/geocomposite material or alternative design may be used in place of a twelve-inch gravel drainage layer.

9. An operations layer shall be placed over the drainage layer on the cell floor, consisting of a separating geotextile and a minimum 24 inches of earthen material. The entire thickness of the drainage layer and operations layer combined shall be a minimum of 36 inches. Operations layer material shall have a maximum particle size of 6 inches, and not more than 12 percent passing a No. 200 sieve if placed over a geonet or geocomposite leachate collection system. This specification does not apply to Phase IV-A, which was constructed prior to issuance of this permit.

10. The permittee shall retain a professional engineer, with at least five (5) years experience in designing landfills, and registered in the state of Hawaii, to provide construction quality assurance (CQA) for construction of new lined disposal cells. Upon completion of construction, the professional CQA engineer shall prepare a report for submittal to the Department containing, at a minimum:

    a. Documentation of quality assurance/ quality control testing procedures
    b. Summary of field test results
    c. Summary of results of laboratory analyses
    d. A map of each sector showing panel layouts as installed
    e. Certification that all weld test results and vacuum or pressure testing of all welded seams was visually observed.
    f. Certification that the bottom liner and leachate collection system have been installed in accordance with the plans as approved by the Department.
    g. As-built and survey drawings documenting the cell construction, including the location and elevation of base grades, liner system, and leachate collection system.
    h. Detailed documentation to show that panels were properly joined to liner in previous constructed sections, and/or the construction of anchor trenches and berms.
    i. Identification of any deviations from the construction plan, reason for the deviation and affects on the integrity of the design.

11. No solid waste shall be placed in any new cell or sector until: (1) the professional CQA engineer certifies, by submittal of the report referenced in Special Conditions Section B, Item 10 or a letter containing the certifications required therein, completion of construction in accordance with approved drawings; and (2) the Department completes inspection of each new sector. The permittee shall coordinate the inspection of each

new sector by the Department, with the presence of the design engineer and on-site facility operator.

12. The first layer of solid waste shall consist of a minimum thickness of 5 to 6 feet of select waste that is screened for the removal of objects that can cause puncture or displacement damage. The thickness of the select waste layer shall be determined based on the size/weight of the compactor and shall be defined in the Operation Plan. Material that may cause puncture or displacement damage to the liner shall be removed. Compactor work on the select waste layer shall avoid wheel spinning and twisting. Equipment operation directly on the operation layer shall be prohibited. A record documenting select waste screening and placement shall be maintained at the facility and provided to the Department with verification by the construction quality assurance (QQA) engineer including photo documentation. An alternate select waste placement may be used if approved by the Department.

13. Containment systems in Phases 4 B and 5 shall be designed with no deformation to withstand the maximum horizontal acceleration due to the design earthquake (0.36g) for Seismic Zone 2B as defined by the United States Geological Survey. Following any occurrence of an earthquake determined to cause horizontal acceleration at the site equal to or greater than the design event, the permittee shall inspect any exposed liner system to identify and assess any damage that may have occurred. A report of the inspection shall be filed with the Department within 30 days following the event, including proposed corrective actions to repair any damage identified by the inspection. A professional engineer registered in the state of Hawaii shall conduct the inspection and prepare the report.

14. Once constructed, the permittee shall maintain the integrity of the liner system and leachate collection system as designed and constructed. In the event that damage has occurred, the permittee shall repair the liner and/or leachate collection system, or implement equivalent or better alternative environmental controls as approved by the Department.

Section C. Acceptance Criteria

1. The permittee is authorized to accept for landfill disposal, solid wastes, as defined in HAR 11-58.1-03.

2. The permittee shall implement a Waste Acceptance & Hazardous Waste Exclusion Program as set forth in the Operations Plan for Central Maui Landfill that meets the following conditions, Section C Items 2 to 4. Should there be conflicts between the Operations Plan and the permit or solid waste rules, the latter shall prevail.

a. The permittee shall make every practicable effort to screen waste and prevent unacceptable waste from entering and being disposed at the landfill.
b. The permittee shall post a sign on the property that lists unacceptable wastes.
c. The permittee 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 week, to spot check for unacceptable wastes. The permittee shall document findings on the Load Check Data Sheet.
d. The landfill operators at the active workface shall visually screen the contents of each load and remove unacceptable waste.
e. If unacceptable waste is observed, the permittee shall reject the load. If the waste has been unloaded, the permittee shall separate the unacceptable waste, move it away from the active workface, and manage it in accordance with Special Condition No. C.3.
f. Operators 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 permittee 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 HAR 11-261 through 268;
    ii. Radioactive waste, which shall be managed in accordance with HAR 11-58.1-64;
    iii. Polychlorinated biphenyl (PCB) waste, as defined in 40 CFR Part 761;
    iv. Untreated infectious waste, excluding infectious waste generated within the household, in accordance with HAR 11-58.1-53;
    v. Bulk or non-containerized liquid waste, except as provided in HAR 11-58.1-15(i);
    vi. Containers holding liquid waste, except as provided in HAR 11-58.1-15(i)(2);
    vii. 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);
    viii. Scrap automobiles, white goods, and whole motor vehicle tires, in accordance with HAR 11-58.1-65(c);
    ix. Lead acid batteries, in accordance with HRS 342I;
    x. Compressed gas tanks; and
    xi. Other unacceptable wastes listed in the Operations Plan.

3. Should unacceptable waste be identified at the landfill, the permittee shall separate the waste, manage, store, transport, and recycle/dispose of it in accordance with the Central

Maui Landfill Operations Plan and applicable laws and rules. Unacceptable waste identified at the facility shall not be disposed of at the landfill.

a. Unacceptable waste shall be transported from the landfill 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 appropriate out-of-state recycling/ disposal facility.

c. The permittee shall maintain a daily log of unacceptable waste turned away from the landfill or separated from disposal, including date, hauler, waste type, estimated quantity, and destination.

d. The permittee shall notify the Department, in writing, within 24-hours or 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 permittee 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 permittee shall implement a Radioactive Waste Monitoring Program, to be provided in the Central Maui Landfill Operations Plan within one-year of permit issuance. All incoming loads shall be screened to prevent the acceptance of radioactive wastes or an alternative program acceptable to the Department. Radioactive wastes shall be managed in accordance with HAR 11-58.1-64. In the event that a radioactive load is identified, the facility shall follow the procedures of the Radioactive Waste Monitoring Program. The permittee shall complete and submit a Radiation Monitoring Report, documenting the date, time, actions taken, and resolution of the event.

5. The permittee shall implement the Special Waste Acceptance Program provided in the Central Maui Landfill Operations Plan that meets the following conditions of Section C, Item 5. Should there be conflicts between the Operations Plan and the permit or solid waste rules, the permit and rules shall prevail. The Department may require revisions to the plan from time to time.

   a. The permittee shall pre-approve special wastes, prior to acceptance at the facility.

   b. The permittee 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, requires special consideration for its proper processing or disposal, or both, includes, but is not limited to:
   i. Asbestos;
   ii. Semi-solid wastes including:
      (1) Water separation, car and equipment wash wastes;
      (2) Sewage sludges;
      (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 Operations Plan.

d. The owner and operator may accept contaminated materials (as defined in Special Condition C item 5.c.viii), on a case-by-case basis, provided that a plan with specified procedures to screen, manage and dispose contaminated materials is submitted to the department prior to acceptance and the plan is implemented.
   i. The plan for the screening, acceptance and disposal of contaminated soils shall include procedures that will be implemented for all contaminated materials defined in this Special Condition C item 5.c.viii.
   ii. A notice of contaminated material approval shall be submitted to the Department prior to acceptance at the facility. The use of facsimile submissions is acceptable. The notice shall include: 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.

iii. Contaminated soils under current (DOH Tier 1 and Tier 2 soil action levels for commercial/industrial direct-exposure) may be used as daily cover or void space fill within MSW landfill working face, provided that the daily cover will not be exposed for more than 24 hours. Contaminated soil materials shall not be used as intermediate or final cover.

e. Records of all special waste documentation shall be maintained at the facility.

Section D. Operation of the MSW Landfill

1. The peak daily disposal rate for MSW shall not exceed 1200-tons per day based on two dozers and one compactor. The Department shall be notified if the average disposal rate for a 12-month period exceeds an 800-ton per day nominal average or the 1200-ton per day peak disposal rate limit. Additional equipment shall be made available to address increased daily tonnages.

2. 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.

3. An **all-weather access road** shall be maintained into/out of the facility site, through the entrance facility and to/from the working face of the landfill.

4. Provide and maintain **controlled access** to the facility site in the form of fences and gates along the perimeter where natural barriers do not provide a means of controlled access. When natural barriers no longer prove to be an effective means of providing controlled access, then fences and gates shall be provided to meet the requirements of controlled access. All gates shall be kept locked when an attendant is not on duty.

5. Scavenging at the facility by the general public is prohibited.

6. Operations Personnel Training. Landfill operations shall be supervised at all times by an individual who has completed a Manager of Landfill Operations training course conducted by the Solid Waste Association of North America or equal as determined by the Department. Records of such training shall be placed in the Operations Plan files.

7. The facility shall have a Site Manager and Environmental Compliance Officer, who shall be knowledgeable of state solid waste laws, regulations, these permit conditions and the permit application components including the Operations Plan.

8. The **Operations Plan dated September 2004**, as subsequently revised (February 2008), shall be implemented. If there are discrepancies between the Operations Plan and these permit conditions or HAR 11-58.1, the permit conditions or rules shall take

precedence. The Department may periodically require revisions to the Operations Plan. The contents of the Operations Plan shall address permit requirements and be implemented to ensure compliance. Any changes to the Operations Plan require approval from the Department. Depending on the scope of the change, a permit modification may also be required. At a minimum, the following items and these entire permit requirements shall be included in the Operations Plan and incorporated into landfill operations:

a. **General Site Description**, providing information on the location, size, elevations and limits of the site, and the types and quantities of waste received per day, a discussion of the climate, and a discussion of the surrounding area.

b. **Equipment and personnel requirements**, describing the number and types of equipment and the personnel with their respective titles needed to operate the facility on a minimum basis. The facility Site Manager and Environmental Compliance Officer shall be identified by name and have their responsibilities described.

c. **User Population**, identify and describe the user population that will be allowed to utilize the landfill site for disposal. Discuss the screening and review process to identify legitimate users. A list of the types of users shall be maintained for operator reference and regulatory review.

d. **Site Utilization Concept**, providing a plan to coordinate the overall use of the landfill site including the designation of areas for the temporary storage of unacceptable items for disposal and the management/disposal of special waste.

e. **Waste Placement Procedures**, including methods of compaction, grading, and placing cover material.

f. **Operational Controls**, including control of disease vectors, explosive gases, mud, dust and litter.

g. **Emergency Operating Procedures**, including methods for managing fires, severe storm events and hazardous waste spills.

9. **Program for Regular Training**. The permittee, at a minimum, shall provide training to landfill operators annually. Operators shall be familiar with the Operations Plan by the uses of regular training presentations by supervising staff. Records of such training shall be maintained at the facility and provided to the Department upon request.

10. **Mud Prevention Program**. The permittee shall provide measures for minimizing the tracking of mud onto public roads from the site. The measures shall include on-site road

maintenance and cleaning, a wet-weather disposal area, and a truck or truck wheel cleaning area for vehicles prior to leaving the site. Possible truck or truck wheel cleaning measures that may be implemented include: rumble strip, drive-through tire wash, trash clean out pad, and/or wash pad.

11. **Dust Control Program.** The permittee shall provide measures to control dust from roads and all other areas of the site. The measures shall include road treatments and water sprays to minimize dust generation. Open areas of the landfill that are not to receive waste for a one-year period or more shall be further treated to minimize dust generation and erosion.

12. **Daily Cover Stockpile** stored within the landfill waste footprint shall be limited to a 30-day capacity and shall include stormwater controls. Cover material stored on the MSW landfill shall be placed on top of at least 12-inches of intermediate cover and shall not impede surface water flow. Storage of gravel for roads/wet weather and landfill equipment on the MSW landfill shall also be placed atop at least 12-inches of intermediate cover and shall not impede surface water flow.

13. **Adequate equipment and personnel** to operate the MSW landfill facility shall be maintained including provisions for back-up personnel and equipment. At an average operating rate of less than 800 tons per day of MSW, the site shall have a minimum of one dozer, one compactor, one water truck and one spotter. At a peak-operating rate greater than 800 tons per day of MSW up to a maximum of 1200 tons per day, the site shall have a minimum of 2 dozers, 1 compactor, one water truck and 2 spotters. These equipment and personnel requirements shall be met unless otherwise approved by the Department. The peak daily disposal rate shall not exceed 1200 tons per day.

14. **Daily Cover Material** shall be a minimum of six inches of earthen material or an alternative in accordance with HAR 11-58.1-15(b), with no exposed waste. Aggregate size shall be less than 2.5 inches and well-graded (having the representation of all particle sizes less than the specified maximum).

    Request for the use of an Alternative Daily Cover (ADC) as cover shall be submitted in writing to the Department at the address listed in Special Conditions I.1. The request shall evaluate the proposed ADC to its specific characteristics and its appropriate use at the facility. The Department requires demonstration periods in 6-month increments to show that the ADC and its proposed thickness can control disease vectors, fires, odors, nuisance, litter and scavenging without presenting a threat to human health and the environment. The permittee shall obtain Department approval prior to commencement of the demonstration project. The use of ADC is limited to daily cover use. The demonstration period shall include oversight by the Department and at the end of increment period, the permittee shall report the performance of the ADC as to its specific characteristics and appropriate use at the facility. The demonstration period or the

approved use of an ADC may be rescinded or cancelled by either the Department or Permittee at anytime without cause.

15. **Daily Cover-Monitoring-Verification-Program with Recordkeeping**. The permittee, using appropriate personnel shall take digital photos of the workface at the middle of each workday and at the end of each workday, from the same perspective, to demonstrate adequate placement of daily cover. The photos shall be transmitted to the Department's landfill inspector via email on a daily basis within 12 hours with cell location information. The photos shall be maintained on file at the facility and certified as to its authenticity by the appropriate personnel. The Department may require changes to the program at any time including the use of independent third parties.

    The Daily Cover Monitoring Verification Program shall include quantitative records of daily waste disposed, approximate cell dimensions and daily soil cover and/or ADC used in tons and cubic yards.

16. **Intermediate cover** is required for all inactive waste areas. Inactive waste areas are areas that do not receive waste within a 30-day period. Intermediate cover shall be a minimum of 12-inches of earthen material including daily cover, and be capable of shedding and directing stormwater to conveyance systems and withstanding traffic. Regardless of the time period since last receiving waste, all areas that have vehicular traffic shall be covered with intermediate cover.

    Intermediate cover shall be maintained on a regular basis including repairs by September 1 of each year for erosion and cracking. Recordkeeping of annual repairs shall be in accordance with Section E, Item 2a. All intermediate slopes that are not to receive waste for a 1-year period shall be vegetated or have an equal approved by the Department. Measures shall be taken for all top deck areas that are not to receive waste for a 1-year period to control dust and erosion. Intermediate cover shall shed and direct stormwater to conveyance systems.

17. **Disease Vector Control**. The permittee shall provide measures to evaluate, prevent and/or control on-site populations of disease vectors and minimize nuisance conditions, and document any associated activities. At a minimum, such measures shall be taken on a monthly basis. The measures shall meet the requirements of HAR 11-58.1-15(c).

18. **Litter Control**. The permittee shall provide measures to minimize free litter in the landfill and prevent its occurrence beyond the property line of the facility. All windblown material on the primary litter fences shall be collected and be properly disposed of by the end of the workday. The measures, at a minimum, shall include:

    a. The use of portable litter screens which shall be deployed within 100 yards of the active workface.

b. The use of permanent or semi-permanent litter screens or fences in primary and secondary control positions.
c. Litter cleanup in the event of a major windstorm or other incident in which litter escapes the normal litter containment systems.
d. Provisions for a truck clean-out area near the active workface that shall be maintained on a daily basis. The truck clean-out area shall have litter control fencing and disposal receptacles for truck clean-out.
e. The collection of litter shall be quantified with the number of litter pickers and the number of bags of litter collected on a daily basis.

19. **Asbestos Disposal.** The permittee shall ensure that the disposal of asbestos waste is in accordance with current NESHAP (National Emission Standards for Hazardous Air Pollutants) regulations, 40 CFR Part 61. Asbestos disposals shall be immediately covered on a daily basis with a minimum of 2 feet of cover unless managed in a dedicated disposal area. Disposals in dedicated disposal area shall be identified to the public and covered daily. All disposal locations for asbestos shall be recorded by GPS (global positioning system) for future reference.

20. **Odor Control**. The permittee shall implement procedures for identifying odorous waste received at the landfill, and implement odor control procedures and/or mechanisms to control odor at the landfill. Odor control measures include acceptance standards for the receipt of waste, special handling at the landfill and immediate burial under a minimum of 2 feet of compacted soil. If the selected mechanisms are not adequate, the Department may require that additional measures be taken.

21. **Dead Animals and Offal**. The permittee shall immediately place a minimum of two feet of compacted soil over any accepted dead animals, offal or odorous waste. The cover soil shall be compacted and be of sufficient thickness (2 feet minimum) to control the release of odors.

22. **Inclement Weather**. A wet weather deck shall be prepared to allow for safe disposal of MSW material during times of inclement weather.

Section E. Surface Water Management

1. **Surface Water Management**. At a minimum, the permittee shall:

a. Provide run-on and collection and control run-off from a twenty-five year 24-hour storm, as provided in HAR 11-58.1-15(g).

b. Prevent soil erosion and exposure of waste. Surface water that comes into contact with waste material shall be managed as leachate. Should waste

become exposed or soil cover materials erode, the permittee shall repair the cover immediately.

c. Prevent a discharge of pollutants into waters of the United States, or the violation of any requirement of the Clean Water Act or statewide water quality management plan, Title 11 Chapter 54.

d. Comply with all state and federal requirements related to water quality, as provided in HAR 11-58.1-15(h).

2. **A Surface Water Management Plan** shall be prepared and updated **annually** and filed with the Department no later than September 1 of each year. The surface water plan shall include the surface water management of all areas in the Central Maui Landfill. It shall contain the following information:

a. Report of an annual inspection of surface water management features and facilities, together with a description of required maintenance and changes, which shall be completed by September 1 of each year.

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. All areas with intermediate cover shall be graded to direct surface water away from the workface and towards the surface 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 Conditions Section E, Item 1.

e. Any Storm Water Pollution Prevention Plan or Spill Prevention Control and Countermeasure Plan prepared pursuant to federal requirements under the Clean Water Act.

3. Top deck areas of the landfill shall have minimum slopes of 2% to 5% to promote drainage. Side-slope grades shall not exceed 2 horizontal to 1 vertical. Silt control fences shall be used as needed to maintain silt on-site.

4. Stockpiled materials within the landfill waste boundary shall be limited to cover material, and gravel for roads/wet weather pad. The volume of stockpiled soil shall not exceed a limit of 30 days capacity and have stormwater controls. Stockpiled soil shall not exceed permit grades.

Section F. Perimeter Gas Management

1. Within one year after issuance of this permit the permittee shall submit a revised Perimeter Landfill Gas Management Monitoring Plan for all phases (I, II, IV and V) of the landfill, to replace the existing Landfill Gas Migration Monitoring Procedures dated 1994. Permittee shall implement the existing plans until the Department has reviewed the new revised plan. The Department may periodically require revisions to the new revised plan. The program shall be conducted in accordance with HAR 11-58.1-15(d) and these permit conditions:

    a. The permittee shall monitor the concentration at depths that will minimize the infiltration of and dilution from atmospheric air.
    b. The permittee shall minimize the amount of time that the probe is open prior to recording the gas concentrations.
    c. The permittee shall install additional permanent gas monitoring probes within one (1) year of notification that the Department's review of the revised Perimeter Landfill Gas Management Monitoring Plan for all phases (I, II, IV and V) has been completed and provide documentation of installation within sixty (60) days of completion. 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.

2. The permittee shall monitor the concentration of gases, including oxygen, methane and carbon dioxide. The permittee shall monitor the concentration of gases in facility structures, including temporary structures, and at the property boundary on a quarterly basis, or other frequency as approved by the Department. If an exceedance is identified, the permittee may conduct a verification-monitoring event, provided that the verification monitoring is conducted within one (1) hour of the initially detected exceedance. If exceedances or other anomalous condition is identified, the Department may increase the frequency of monitoring events.

    a. The concentration of methane gas shall not exceed 25% of the lower explosive limit (LEL) for methane in facility structures.
    b. The concentration of methane gas shall not exceed the LEL for methane at the facility property boundary.

3. The permittee shall inspect and maintain the gas monitoring probes. In the event that a probe is unusable, the permittee shall repair the probe or install a new probe prior to the next monitoring event.

    a. If the probe is repaired, submit documentation to the Department indicating the reason for repair, type of repairs completed, and evaluations performed to ensure the probe is acceptable for use.

b. If the probe is replaced:
   i. The permittee shall update the Perimeter Gas Monitoring Plan to show the new probe location and identification number within thirty (30) days. The update shall also document the reason for replacing the probe.
   ii. The permittee shall submit an installation report for the new probe within thirty (30) days of completion. The installation report shall include the information specified in Special Conditions, Section F, Item 1.
   iii. The permittee shall abandon the unusable probe, and submit associated documentation.

4. The permittee shall ensure that the field meters are factory calibrated in accordance with manufacturer's specifications. The permittee shall also field calibrate the meters prior to each monitoring event. The permittee shall conduct monitoring events only with equipment that has been properly calibrated and maintained.

5. The permittee shall submit a report with results within 45 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 verification monitoring performed within one (1) hour of the initial exceedance shows concentrations below the limits in Special Conditions, Section F, Item 2, the permittee shall place results in the operating record and send written notification of the exceedance and verification monitoring results to the Department within seven (7) days.

7. If combustible gas concentrations exceed the limits in Special Conditions, Section F, Item 2, and verification monitoring is not performed within one (1) hour of the initial exceedance or verification monitoring confirms the initial exceedance, the permittee shall perform the following.

   a. Immediately take all necessary steps to ensure protection of human health,
   b. Immediately notify the Department of the exceedance,
   c. Within three (3) days of detection, place in the operating record and submit to the Department, the type of gas, gas levels detected and a description of the steps taken to protect human health,
   d. Within sixty (60) days of detection, prepare and 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 Department, and notify the Department that the plan has been implemented.
   e. Within thirty (30) days after the remediation plan has been completed, submit a report to the Department documenting the actions taken, additional monitoring results, and plans to prevent future recurrences.

f. The Department may modify the reporting and implementation schedule, as necessary to protect human health and the environment.

Section G. Groundwater and Leachate Management

1. Within one year after issuance of this permit the permittee shall submit a revised Groundwater and Leachate Monitoring Plan for all phases (I, II, IV and V) of the landfill, to replace the final Groundwater and Leachate Monitoring Plan for Phase I and II and the Groundwater and Leachate Monitoring Plan for Phase IV dated 1997, as subsequently amended and approved by the Department. Permittee shall implement the Existing Plans until the Department has reviewed the new revised Plan. The Department may periodically require revisions to the new revised Plan.

2. The permittee shall maintain reasonable access to all groundwater monitoring stations and leachate manholes/sumps required by this permit. In order to assure that representative samples are obtained, it shall be the responsibility of the permittee to maintain the integrity of the monitoring stations and manholes and protect them from destruction or vandalism. Should any of these stations/manholes be destroyed, the permittee shall notify the Department immediately. The notification shall include pertinent information as to the cause, and what steps are being taken to replace the monitoring station/manhole and prevent the recurrence of such problems in the future. A Well Completion Report shall be sent to the Department within 30 days of any new groundwater well construction.

3. All groundwater and leachate analyses shall be submitted to the Department within 45 days of sampling and analysis. Groundwater sampling shall be on a quarterly basis unless otherwise approved by the Department.

4. Leachate Management. The permittee shall implement leachate management measures as provided in the Operations Plan including the following:

   a. Storm water that comes in contact with solid waste shall be treated as leachate. Leachate shall be managed to prevent any entry into the stormwater collection system and any contact with the public.

   b. Leachate shall be removed from the landfill in a manner that maintains a maximum depth of 12-inches of leachate above any part of the liner in the leachate manhole for IV-A, and the cell outside the sump area in IV-B. The IV-B sump services Phases IV-B and V. The compliance level for the leachate manhole for IV-A is 210 feet above MSL (mean sea level). The compliance level for leachate in the IV-B sump is 212 feet above MSL. The compliance level for leachate in the Phase I and II manholes is one-foot of leachate in the manhole.

c. Leachate from IV-A manhole and IV-B sump shall be pumped to on-site storage tanks having a minimum total capacity of 30,000 gallons for temporary storage, currently consisting of eight 4,000-gallon tanks. Storage tanks shall be double lined or be located within a secondary containment structure with capacity to hold the contents of the largest storage tank. Leachate shall be removed from the storage tanks and managed in accordance with Special Condition G.4.e. Leachate from Phase IV-A manhole shall be pumped via an automated pump that is triggered by a high level sensor. Leachate removal from the IV-B sump shall be though its own dedicated pump and piping system.

d. The permittee shall inspect the leachate storage tanks servicing Phase IV-A, IV-B and V weekly, record the volume of leachate in the tank, and record the volume of leachate removed. Any leachate pumped and removed from Phases I and II shall also be recorded. Leachate shall be pumped and removed from the tank(s) on any day whenever more than 10,000 gallons is present, and removed at a rate to ensure that no more than 10,000 gallons is present at the end of the day.

e. Permittee shall manage leachate removed from storage tanks or sumps in one or more of the following ways:

i. Not more than 2,000 gallons per day may be spread at the active disposal face when the active disposal face is located above the liner system of Phase IV-A. Spreading leachate shall be done by a water truck using methods that ensure leachate does not come in contact with site personnel or the public, and is only used to aid litter control and waste compaction.

ii. Leachate may be reintroduced to refuse in Phase IV-B or Phase V by spreading at the active face for litter control and aid to waste compaction, or outside the active face using vertical injection wells or infiltration trenches. Methods used for leachate reintroduction shall be approved by the Department and shall not allow leachate to be released from the site or permit exposure to the public or site personnel.

iii. Leachate may be transported to a public wastewater treatment facility. Permittee shall maintain a list of one or more qualified and properly licensed third-party contractors to remove and transport leachate from the temporary storage tanks, to supplement any leachate transport capability of the permittee. The combined pumping and transport capability of the permittee and contractors shall be not less than 20,000 gallons per day.

f. The permittee shall maintain daily records of leachate monitoring and pumping and management activities, and shall report results in the Annual Operating Report as provided in Special Conditions I, Item 2(e).

5. Leachate Monitoring. Leachate levels in the leachate collection points in closed landfill Phases I and II, the leachate manhole in Phase IV-A, and the leachate sump in Phase IV-B shall be monitored at a minimum once each week and after storm events. If measured leachate levels exceed the levels specified in Special Conditions Section G, Item 4.b, leachate level monitoring shall be performed before and after leachate pumping on a daily basis until the level has remained within the allowable limit for a period of one week. All monitoring activities and measured levels shall be recorded and maintained by the permittee.

A sample of leachate shall be collected from each collection point or sump on a minimum semi-annual basis for constituent analysis. Leachate samples shall be analyzed for parameters listed in CFR Part 40, Appendix I and major leachate indicators including cations/anions per the Hawaii Landfill Groundwater Monitoring Guidance Document.

Section H. Closure and Post-Closure

1. The permittee shall maintain and implement the Closure and Post-Closure Plan dated October 2008, prepared by A-Mehr, Inc., or approved subsequent documents, HAR 11-58.1, and these permit conditions. Should there be discrepancies between these documents, the HAR and these conditions will take precedence.

2. At a minimum, the Closure and Post-Closure Plan and the Financial Assurance report shall be revised every five (5) years or earlier if facility plans are updated or changed. Revisions to the plan shall be prepared in accordance with HAR 11-58.1-17, "Closure and Post-Closure Care," and HAR 11-58.1-18, "Financial Assurance." The Closure Plan and all revisions 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. The Closure Plan shall identify all buffer areas.

3. The permittee shall submit two years prior to the final receipt of waste at the facility a Final Closure and Post-Closure Plan, prepared by a professional engineer registered in the state of Hawaii. The final closure plan shall contain detailed engineering drawings, plans and specifications for construction of closure cap, surface water management improvements and other elements of final closure. The final post-closure plan shall include all maintenance and monitoring requirements based on HAR 11-58.1-17 and the design/construction of the closure. The Department shall review the submitted Final Closure and Post-Closure Plan for conformance to requirements of HAR 11.58-17 and

HAR 11-58.1-18, and approve it following correction of any deficiencies noted by the Department.

4. The permittee shall begin closure activities within 30 days after the date on which the facility receives the known final receipt of waste, unless the Department grants an extension of time pursuant to HAR 11.58.1-17(a)(6). Closure activities shall be completed within 180 days following the beginning of closure unless the Department grants an extension of time pursuant to HAR 11.58.1-17(a)(7).

5. The permittee shall retain a professional engineer registered in the state of Hawaii for the supervision of the closure construction, and upon the completion, the engineer shall submit a summary report to the Department as to the complete conformity to the plans and specifications as approved. This summary report shall include a documented control program of the closure cap construction, and the quality assurance/quality control testing procedures, laboratory analyses, and engineer's certification of construction.

6. Following completion of any closure construction, the permittee 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 as provided in the approved post-closure plan in accordance with HAR 11-58.1-17. The Department may periodically require revisions to the plan.

7. The permittee shall maintain and submit evidence that HAR 11-58.1-18, Financial Assurance, is satisfied on an annual basis.

Section I. Recordkeeping and Reporting

1. The permittee shall submit an **Annual Operating Report** (AOR), using June 30 of each year as the year-end point, within 30 days to:

   Solid and Hazardous Waste Branch
   Environmental Management Division
   Hawaii Department of Health
   P.O. Box 3378
   Honolulu, Hawaii 96801-3378
   Fax No. (808) 586-7509

2. The **Annual Operating Report** shall include the following information:

   a. Types of solid waste received (MSW, greenwaste, industrial/commercial, tires, wood, metals, metal containers of 20-gallons or larger capacity, asbestos, and other special wastes).

b. Quantities of solid wastes received by type with totals using an appropriate unit of measure.

c. The average daily disposal rate on a yearly basis.

d. Quantities of semi-solid liquid waste (tons) received and how it is handled or disposed.

e. Quantities of leachate (gallons) generated and how it was handled or disposed. If requested by the Department, the permittee shall also provide water balance estimates of leachate generation by the use of the most recent EPA HELP model using climatic information collected in accordance with Special Conditions Section I, Item 4. Annual rain data for the site on a daily basis shall be provided with this analysis.

f. Volume of airspace filled during the reporting year, airspace filled during previous years, and airspace remaining in both cubic yards and years shall be provided. The information shall be provided in both numerical and graphical presentations.

g. An annual topographic survey of the site as prepared by a land surveyor registered in the state of Hawaii or an approved alternate method. Any exceedance of permit grades shall be identified and the Department shall be notified by the use of a Non-Compliance Report. This survey shall clearly show the horizontal and vertical dimensions of the landfill area.

h. 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.

i. Final fill areas, intermediate fill areas, and future unused fill areas shall be identified for the projected year.

j. 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 in a daily, weekly and monthly basis. Any incomplete/non-application of daily cover shall be identified. Current soil use records shall be maintained at the facility for review.

k. After closure of any portion of the landfill, a summary of post-closure care and maintenance activities conducted at the closed landfill phases.

l. A copy of the detailed written estimates and documentation of financial assurance.

3. **Recordkeeping Requirements.** The permittee shall maintain records in accordance with HAR 11-58.1-15(j), General Conditions, Item 11, and the conditions of this permit. Records shall include the following list and any other recordkeeping requirements set forth in this permit:

a. Impact buffer area identification within operations plan drawings (Special Conditions I, Section A, Item 4)
b. Training records (Special Conditions I, Section D Item 6 and 9)
c. Load Check Data Sheet (Special Conditions I, Section C Item 2g)
d. Daily log of unacceptable waste (Special Conditions I, Section C item 3c)
e. Special Waste Acceptance Program records (Special Conditions I, Section C Item 5b and 5d.ii)
f. Radiation Monitoring Report (Special Conditions I, Section C, item 4)
g. Litter control (Special Conditions I, Section D Item 18e)
h. Asbestos disposal locations (Special Conditions I, Section D Item 19)
i. Annual surface water management plan (Special Conditions I, Section E Item 2)
j. Daily Cover-Monitoring-Verification-Program (Special Conditions I, Section D Item 15)
k. Landfill gas monitoring records (Special Conditions I, Section F item 1)
l. Leachate monitoring records (Special Conditions I, Section G items 4d, 4f and 5)
m. Financial assurance requirements (Special Conditions I, Section H, Item 7)
n. Climatic information (Special Conditions I, Section I, Item 4)

4. **Climatic Information.** Climate information shall be collected on a daily basis and shall include information on daily rainfall, solar radiation, evaporation, wind speed and direction, humidity, temperature, and other applicable meteorological data, as applicable, for use in modeling evapotranspiration and leachate generation with the HELP Model at the landfill.

SPECIAL CONDITIONS II: ENTRANCE FACILITY WASTE TRANSFER AND RECYCLING OPERATIONS:

1. The facility may only accept, store, and transport household and commercial waste as defined in HAR §11-58.1-03. The facility may accept and temporary store waste materials and special waste for recycling, as identified under Special Conditions II, Items 6 and 7. Industrial waste, construction & demolition waste, and waste identified under Special Conditions II, Items 2 and 3 shall not be accepted at the entrance facility. The

operations of the facility shall be in accordance with the *Central Maui Landfill Entrance Facility Operations Plan* dated September 2004 received November 1, 2004 and approved subsequent submissions, unless otherwise specified in these permit conditions.

2. No regulated hazardous waste as defined in 40 CFR Part 261 or HAR Chapter 11-261, whichever is more stringent, and polycholrinated biphenyls (PCB) waste as defined in 40 CFR Part 761 shall be accepted at the facility.

3. No infectious waste as defined by HAR Chapter 11-104, shall be accepted at the facility. The permittee may only accept household generated infectious waste.

4. The permittee shall implement a screening program at the entrance to ensure that only acceptable solid wastes enter the facility. If the facility inadvertently accepts unacceptable wastes or receives unacceptable wastes from the landfill disposal area of Central Maui Landfill, the permittee shall properly manage and dispose of the unacceptable materials, in accordance with applicable federal, state, and local laws and regulations prior to causing a nuisance, health or environmental threat.

5. Household waste for disposal from incoming vehicles shall be unloaded directly into the roll-off containers by the self-haul disposal bays. Roll-off containers shall be switched with empty ones when they are filled and be transported to the landfill. Household waste shall not be stored in roll-off containers for period exceeding 24 hours.

6. Acceptance of source-separated waste materials for recycling shall be limited to fiber materials (including cardboard, newspaper, and paper bags), plastic bottles and bags, glass containers, metal (aluminum, bi-metal, and steel) containers, and scrap metals unless otherwise specified under Special Conditions II, Item 7. The accepted materials listed in this condition shall be free of fluids and/or contaminants that may cause harm to human health or the environment (i.e., paints, oils, solvents, etc.). Leaded glass such as lead crystals shall not be accepted. The accepted materials for recycling shall be stored in a safe and orderly manner in the designated drop-off containers indicated in the site plan submitted August 5 and 9, 2005, and transported to Department-permitted recycling facilities. Measures shall be taken to control windblown litter, insects, odors, and vectors.

   The permittee may accept additional types of recycling materials provided that an updated site plan and operation plan addressing nuisance controls, storage method and location, site holding capacity, removal frequency is submitted and approved by the Department prior to accepting recyclables. Upon approval of the updated site plan and operation plan, the plan shall become part of this permit.

7. Acceptance of special waste shall be limited to used motor oil, scrap tires, white goods, batteries, from residential sources. The special waste shall be stored in a safe and orderly manner at the designated areas/containers indicated in the site plan submitted August 5 and 9, 2005, and transported to Department-permitted/approved facilities before creating a nuisance, health, safety, or environmental hazard. Measures shall be taken to prevent and respond to fires, and to control nuisance and environmental impact (spills, leaks, and emissions).

   a. Used motor oil collection, storage, transport, and recordkeeping should be managed in accordance with HAR §11-279, *Standards For The Management Of Used Oil.*

   b. The permittee shall comply with the tire disposal requirements specified under HRS 342 I for *Used Motor Vehicle Tire Recovery.* Tire storage must be free of all contaminants such as oil, grease, gasoline, diesel, etc. that could create fire hazards. Tires must be stored so that they minimize the accumulation of water and creation of a vector problem. Tires shall only be transported to a Department-permitted recycling or tire processing facility, or out of state recycling facility.

   c. White goods that enter the facility shall be unloaded properly, stored in an upright position at the designated area, and transported to a permitted facility for refrigerant removal and processing. Refrigerant containing items shall not be pushed into a scrap metal roll-off container unless refrigerant is removed and verified by an EPA certified personnel. Measures shall be taken to prevent the release of CFC's from refrigerant containing items into the atmosphere during storage and transport. Federal regulations prohibit venting of CFCs into the atmosphere.

   d. Batteries shall be placed in a covered leak-proof container. The permittee shall comply with the disposal, collection, and recycling requirements specified under HRS 342I *Lead Acid Battery Recycling.* Releases that occur shall be removed immediately and disposed of accordingly. Cracked or leaking batteries must be managed as hazardous waste, in accordance with applicable requirements of HAR §11-260 through 280 *Hazardous Waste Management.* Battery storage shall be limited to the floor in the container and shall be removed from the site, at a monthly basis.

8. Should special solid waste require processing at the site, such as refrigerant removal and mercury switch and/or mercury thermostat removal from the white goods, an operations plan for special solid waste processing shall be submitted for Department review and approval, at least 60 days prior to processing. Upon approval of the revised

plan, the plan shall become part of this permit. Depending on the nature of the processing, a permit modification may be required.

9. The maximum storage capacity for collected household waste, recyclable materials, and special waste is as follows:

Household Waste:		Eight 20-cubic yard roll-offs.
Recyclables:		Four 20-cubic yard roll-offs or compactors below grade Five 20-cubic yard roll-offs at grade.
Special Waste:		
a.	White goods:	Twenty-five pieces in the designated area
b.	Used oil:	Eight 55-gallon drums in the designated area
c.	Used tires:	One 20-cubic yard roll-off container below grade
d.	Batteries:	One 20-cubic yard container

10. The permittee may conduct event-type of Household Hazardous Waste Collection (HHWC) at the entrance facility. Should an event type of HHWC be conducted at the facility, a notification of a collection date, an operation plan, a specific site layout, shall be submitted to the Department for review and approval at least 60 days prior to the tentative collection date. The HHWC operational plan shall include a site cleanup plan and a post-collection summary report shall be submitted for each event. A qualified operator/contractor, experienced in management of hazardous waste, shall prepare the plans and conduct the HHWC.

11. An all weather access road shall be maintained into and within the facility.

12. The facility shall be supervised, secured, and have a permanent sign posted at the facility entrance identifying the facility, the name and address of the operator, a contact in case of an emergency, the hours and days of operation, and the waste accepted or not accepted.

13. Scavenging at the facility by the general public is prohibited.

14. Adequate measures shall be prepared to prevent standing water, and to control stormwater run-on and run-off.

15. Adequate measures shall be implemented to collect generated leachate. Any collected leachate shall be properly managed and disposed of prior to creating a nuisance, health or environmental threat. Records shall be maintained as to the quantity and management of all collected leachates.

16. Suitable means shall be provided to prevent and control fires, including the implementation of *Fire Prevention and Control Plan* and *Hazardous Material Spill*

Response Plan. All incidents shall be reported to the Department and records of incidents shall be maintained for five (5) years.

17. Suitable means shall be provided to prevent solid waste from scattering; control litter, odors, insects, and vectors; and minimize nuisance conditions.

18. All solid waste passing through this facility shall be collected, treated, recycled, or disposed of at a permitted solid waste management disposal and/or recycling facility.

19. Operational records shall be maintained and shall include a daily log of type and volume of solid waste received, waste screening, waste transported, and the disposal/recycling destination of the solid waste.

20. The permittee shall submit an annual operation report to the Department by July 31 of each year for the preceding fiscal year (July 1 to June 30). The annual operation report shall be submitted to:

    Department of Health
    Solid and Hazardous Waste Branch
    919 Ala Moana Blvd., Room 212
    Honolulu, Hawaii 96814

    The annual operation reports shall include the following information:

    a. Quantities of solid waste received by type including destination for disposal.
    b. Quantities (in gallons) of liquid waste (leachate) generated and method of management disposal.
    c. Quantities of materials recycled from the waste stream by type and destination.

    An estimate in gross values of tons, cubic yards, or quantity count, as appropriate, is sufficient.

21. The permittee shall comply with the recordkeeping requirements relating to used motor vehicle tires as provided under HRS Chapter 342 I. The statute requires facilities that accept used tires to submit a summary of the following information by July 31 of each year:
    a. date of receipt of used tires;
    b. quantity of used tires received; and
    c. 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.

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

RECEIVED
2008 MAR -6 PM 4:37
COUNTY OF MAUI
ENVIRONMENTAL MANAGEMENT

In reply, please refer to:
File:

March 3, 2008

RUSH

08-207E CAB
File No. 0652

DEPT. OF ENVIRONMENTAL MANAGEMENT

	INFO	ACTION	SEE ME	COMMENTS		FILE
DIRECTOR	X					
DEPUTY DIR.	X					
PERS.						
WWR						
SW	X	X				
SECTY.		X				
SEAN						

Return to________ Due________
By:________ Date:________

RECEIVED
COUNTY OF MAUI
2008 MAR 11 AM 8:47
ENVIRONMENTAL DEPT.
SOLID WASTE DIVISION

→ Important Annual compliance certificate required. See attached. Thx. CKO

3/7/08

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
(7006 0100 0004 9701 2564)

Ms. Cheryl K. Okuma
Director of Environmental Management
Department of Environmental Management
County of Maui
One Main Plaza, Suite 175
2200 Main Street
Wailuku, Hawaii 96793

Dear Ms. Okuma:

Subject: **Covered Source Permit (CSP) No. 0652-01-C**
Initial Application No. 0652-01
Central Maui Municipal Solid Waste Landfill
Landfill Gas Collection and Control System
Located at: Pulehu Road, Puunene, Maui
Date of Expiration: March 2, 2013

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 June 8, 2007 and additional information received on August 14, August 15 and October 8, 2007. 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 form(s) for submission are as follows:

Compliance Certification Form	
Monitoring Report Form:	Collection and Control System
Monitoring Report Form:	Visible Emissions
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:	Initial Compliance Report
Supplemental Report Form:	Notification of Collection and Control Equipment Removal
Ringelmann Chart	

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 (hereinafter "Department of Health"), 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.

Sincerely,

THOMAS E. ARIZUMI, P.E., CHIEF
Environmental Management Division

KK:nn
Enclosures

c: CAB Monitoring Section
Blake Shiigi, EHS - Maui

ATTACHMENT I: STANDARD CONDITIONS
COVERED SOURCE PERMIT NO. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date: March 2, 2013**

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 of Health, 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 of Health.

   (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 of Health 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 of Health, 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 of Health 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 of Health 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 of Health 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 of Health 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 of Health 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 Health 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 of Health 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 of Health.

(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 of Health 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 of Health and the U.S. EPA Region 9 no less than twelve months and no more than eighteen 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 of

Health 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 of Health 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. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date: March 2, 2013**

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. Central Maui Municipal Solid Waste Landfill; and

   b. 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 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 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 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 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 Code of Federal Regulations, 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. An MSW landfill may also receive other types of RCRA 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 an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An 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 an 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 Central Maui municipal solid waste 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.

   (Auth: HAR §11-60.1-3, §60.1-90, §60.1-174; 40 CFR §60.1, §60.750, 40 CFR §63.1930)[1]

3. 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 60, Subparts A and WWW and 40 CFR 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)[1]

Section D. Operational Standards for the Collection and Control System

1. Landfill Air Emission Standards

   a. The permittee shall submit an initial design capacity report. The landfill may calculate design capacity in either megagrams (Mg) or cubic meters (m^3) for comparison with the exemption values.

   b. The permittee shall submit to the administrator an amended design capacity report when there is any increase in the design capacity of a landfill subject to the provisions of 40 CFR 60 Subpart WWW.

   c. The control system for the landfill gas shall be designed and operated to reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million (ppm) by volume. The reduction efficiency or parts per million by volume shall be established by the initial performance test.

(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 an 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. 5 years or more if active; or
   ii. 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 monotoring reports as provided in 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 Administrator.

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 20 percent or an oxygen level less than 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.
   ii. The oxygen level shall be determined by an oxygen meter using 40 CFR Part 60, Appendix A, Method 3A except that:

      (A) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span;
      (B) A data recorder is not required;
      (C) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;
      (D) A calibration error check is not required;
      (E) The allowable sample bias, zero drift, and calibration drift are ±10 percent.

Alternate test methods may be used provided prior approval is obtained from the Department of Health.

d. Operate the collection system so that the methane concentration is less than 500 parts per million 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 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 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. 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; and

f. Operate the control or treatment system at all times when the collected gas is routed to the system.

If monitoring demonstrates that the operational requirements of 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. The permittee shall adopt a startup, shutdown and malfunction plan which conforms to the provisions of 40 CFR Part 63, Subpart A, §63.6. The permittee shall operate and maintain the facility in accordance with the procedures specified in the current startup, shutdown, and malfunction plan. Any revisions made to the startup, shutdown, and malfunction plan in accordance with the procedures established by 40 CFR §63.6(e)(3) shall not be deemed to constitute permit revisions under 40 CFR 70 or 40 CFR 71. Moreover, none of the procedures specified by the startup, shutdown and malfunction plan for an affected source shall be deemed to fall within the permit shield provision in section 504(f) of the Clean Air Act.

(Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.753, 40 CFR §63.6)[1]

4. Discontinuance of Collection and Control System

The permittee may cap or remove a collection and control system provided that all the following conditions are met:

a. The landfill is a closed landfill as defined in this Attachment, Section B.4 A closure report

shall be submitted to the Department of Health as provided in Special Condition G.7;

b. The collection and control system shall have been in operation a minimum of fifteen (15) years; and

c. The calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The procedures specified in Special Condition G.10 shall be used. 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(b))[1]

5. Visible Emissions

a. The permittee shall take measures to control fugitive dust at all material transfer points and throughout the workyard. The Department of Health 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 greater than twenty, but not exceeding sixty (60) percent opacity for a period aggregating not more than six 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 approved by the Department of Health, the permittee shall use the following methods to determine whether the gas collection system is in compliance with Special Condition D.2.

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 of Health. 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 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:

$Q_m = 2L_oR (e^{-kc} - e^{-kt})$ 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 = O 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. The permittee may use actual flow data to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations listed in 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 paragraphs (a)(1)(i) or (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 Administrator, 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 permittee shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists,

i. Action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under Special Condition No. D.2.b.
ii. If negative pressure cannot be achieved without excess air infiltration within 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.
iii. 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 Administrator for approval.

d. The permittee is not required to install additional wells as required in Special Condition E.1.c during the first 180 days after gas collection system startup.

e. Identification of Excess Air Infiltration

The permittee shall monitor each well monthly for temperature and concentration of nitrogen or oxygen as provided in Special Condition D.2.c. If a well exceeds one of these operating parameters,

i. Action shall be initiated to correct the exceedance within 5 calendar days.
ii. If correction of the exceedance cannot be achieved within 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.
iii. 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 Administrator for approval.

(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 60 days after the date on which the initial solid waste has been in place for a period of:

a. 5 years or more if active; or
b. 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 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 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 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 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 60 appendix A, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.
d. Any reading of 500 parts per million 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 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 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 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in Special Condition E.3.d.v shall be taken, and no further monitoring of that location is required until the action specified in 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 10-day re-monitoring specified in Special Conditions E.3.d.ii or E.3.d.iii shall be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the actions specified in 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 parts per million above background three 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 Administrator 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 parts per million in air.
   c. To meet the performance evaluation requirements in section 3.1.3 of Method 21 of 40 CFR 60 appendix A, the instrument evaluation procedures of section 4.4 of Method 21 of 40 CFR 60 appendix A shall be used.
   d. The calibration procedures provided in section 4.2 of Method 21 of 40 CFR 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 Attachment II, 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 5 days for collection systems and shall not exceed 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]

Section F. Monitoring and Recordkeeping Requirements

Monitoring Requirements

1. Gas Collection System

   Except as provided in the collection and control system design plan approved by the Administrator, each 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; and
   b. Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis; and
   c. Monitor temperature of the landfill gas on a monthly basis.

   (Auth: HAR §11-60.1-3,§11-60.1-90, §11-60.1-174; 40 CFR §60.769)[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 ±1 percent 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 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 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

Each 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 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 Administrator.

(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 Attachment II, Section G; and
b. NMOC emission rate reports shall be submitted in accordance with Attachment II, 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 (V.E.).

a. The permittee shall conduct **monthly** (*calendar month*) V.E. observations for the enclosed flare in accordance with 40 CFR Part 60 Appendix A, Method 9 or by use of a Ringlemann Chart as provided. For each period, 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*.

b. The permittee shall conduct annually (calendar year) V.E. observations for the enclosed flare in accordance with Method 9. For each period, two (2) observations shall be taken at fifteen (15) second intervals for six (6) consecutive minutes for each equipment. Records shall be completed and maintained in accordance with the *Visible Emissions Form Requirements*.

c. Upon justification by the permittee, the Department of Health may waive the requirement for a specific annual V.E. 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 prior tests indicating compliance by a wide

margin, documentation of continuing compliance, and further that operation of the source not changed since the previous source test.

(Auth: HAR §11-60.1-8, §11-60.1-15, §11-60.1-16, §11-60.1-90)

Recordkeeping Requirements

8. Except where otherwise specified, all records, including supporting information, data, calculations, sample reports, and measurements used to calculate emissions, shall be true, accurate, and maintained in a permanent form suitable for inspection for **at least five (5) years** following the date of such records, and provided to the Department of Health or their authorized 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 of Health.

(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 of Health, the permittee shall maintain the following records:

    a. Equipment operating parameters specified to be monitored in 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 5 years.

        i. The maximum expected gas generation flow rate as calculated in 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 Administrator.
        ii. The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in 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, including:

    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 Attachment II, 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 and 60.758)[1]

11. 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 and 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, 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 of Health. 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),* shall be signed and dated by an authorized representative, and shall include:

a. Information as required by the Initial Compliance Report in Special Condition G.3; and
b. Additional information, including:
   i. Average and maximum gauge pressure within each gas extraction well measured over 6-month period;
   ii. Average and maximum nitrogen concentration or average and maximum oxygen concentration measured over 6-month period;
   iii. Average and maximum landfill gas temperature in extraction well measured over 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; and
   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.

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. Initial Compliance Report

The permittee with an active collection system shall submit an initial compliance report **within 180 days** *of installation and start-up of the collection and control system.* The initial annual report shall include the initial performance test and the following information:

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 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 *Initial Compliance 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 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 of Health determines that reasonable justification exists for the extension.

(Auth: HAR §11-60.1-3, §11-60.1-90)

5. Performance test reports

a. At least **thirty (30) days prior** *to conducting a source performance test*, the permittee shall submit to the Department of Health a test plan in accordance with 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 of Health **within sixty (60) days** *after the completion of the performance test* in accordance with Special Condition H.6.

(Auth: HAR §11-60.1-3, §11-60.1-90)

6. Design Capacity Increase

The permittee shall submit information regarding landfill modifications (as defined in Special Condition B.12 to the Department of Health 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; and
   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 of Health; 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)

7. Landfill Closure

The permittee shall submit a **closure report** to the Department of Health **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); and
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 of Health 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]

8. Equipment Removal Notification

The permittee shall submit an equipment removal report to the Department of Health **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 15 year minimum control period has expired; and
   iii. Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year.
b. The Department of Health may request such additional information as may be necessary to verify that all of the conditions for removal in Special Condition G.10 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]

9. Compliance Certification

During the permit term, the permittee shall submit at least **annually** to the Department of Health and USEPA 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 an 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
f. Any additional information as required by the Department of Health including information to determine compliance.

The compliance certification shall be submitted within ninety (90) days after the end of each calendar year, and shall be signed and dated by an authorized representative.

Upon written request of the permittee, the deadline for submitting the compliance certification may be extended, if the Department of Health determines that reasonable justification exists for the extension.

(Auth: HAR §11-60.1-4, §11-60.1-86, §11-60.1-90)

10. 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 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 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 60 appendix A by six 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 Administrator.

(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 of 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 20 parts per million by volume, dry basis as hexane at 3 percent oxygen.

The Department of Health 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. On an annual basis or other times as may be specified by the Department of Health, 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 of Health shall be used:
   a. The permittee shall use Method 25, 25C, or Method 18 of 40 CFR 60 Appendix A to determine compliance with the 98 weight-percent efficiency or the 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 of Health.
   b. The permittee shall use Method 3 or 3A determine the oxygen for correcting the NMOC concentration as hexane to 3 percent.
   c. The permittee shall use Method 25A in place of Method 25 in cases where the outlet concentration is less than 50 parts per million NMOC as carbon (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).
   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 of Health.
(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90, SIP §11-60-15)[2]

5. 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 of Health 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 of Health 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]

6. 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 of Health before the tests.

(Auth: HAR §11-60.1-3, §11-60.1-11, §11-60.1-90)

7. **Within sixty (60) days after** *completion of the performance test*, the permittee shall submit to the Department of Health 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)

8. Upon written request and justification, the Department of Health 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. 29.

(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. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date: March 2, 2013**

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 of Health 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 of Health 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 of Health 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 of Health 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. Any additional information as required by the Department of Health including information to determine compliance.

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.

The compliance certification shall be submitted **within ninety (90) 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 of Health determines that reasonable justification exists for the extension.

(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. 29.

(Auth: HAR §11-60.1-4, §11-60.1-90)

ATTACHMENT III: ANNUAL FEE REQUIREMENTS
COVERED SOURCE PERMIT NO. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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 of Health.

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. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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. 0652-01-C
PAGE 1 OF ___

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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. 0652-01-C
(CONTINUED, PAGE 2 OF ___)

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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. 0652-01-C
(CONTINUED, PAGE ____ OF ___)

Issuance Date: March 3, 2008 **Expiration Date: March 2, 2013**

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. 0652-01-C
(CONTINUED, PAGE ___ OF ___)

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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:	

(Make Additional Copies if Needed)

MONITORING REPORT FORM
COLLECTION AND CONTROL SYSTEM (Page 1 of 3)
COVERED SOURCE PERMIT 0652-01-C
Issuance Date: March 3, 2008 **Expiration Date: March 2, 2013**

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. (°C) 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 (PAGE 2 of 3)
COVERED SOURCE PERMIT 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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

MONITORING REPORT FORM
COLLECTION AND CONTROL SYSTEM (PAGE 3 of 3)
COVERED SOURCE PERMIT 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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

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

ANNUAL EMISSIONS REPORT FORM
MUNICIPAL SOLID WASTE LANDFILLS

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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 thelandfill 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. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date: March 2, 2013**

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
INITIAL COMPLIANCE REPORT (Page 1 of 2)
COVERED SOURCE PERMIT NO. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date: March 2, 2013**

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
INITIAL COMPLIANCE REPORT (Page 2 of 2)
COVERED SOURCE PERMIT NO. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

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 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 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
VISIBLE EMISSIONS
COVERED SOURCE PERMIT NO. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date: March 2, 2013**

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 "no 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. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

The following Visible Emissions (V.E.) Form shall be completed **monthly** (*each calendar month*) for each equipment subject to opacity limits in accordance with Method 9 or by use of a Ringlemann Chart as provided. At least **annually** (*calendar year*), V.E. observations shall be conducted for each equipment subject to opacity limits by a certified reader in accordance with Method 9. The V.E. Form shall be completed as follows:

1. Visible emissions observations shall take place during the day only and shall be compared to the Ringlemann Chart provided. The opacity shall be noted in 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 V.E. 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.

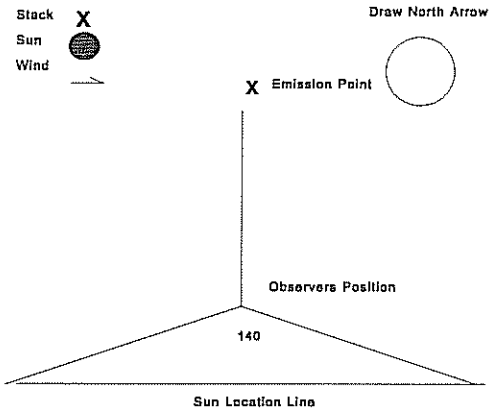
The permittee shall retain the completed V.E. Forms for recordkeeping. These records shall be in a permanent form suitable for inspection, retained for a minimum of five (5) years, and made available to the Department of Health, or their representative upon request.

VISIBLE EMISSIONS FORM
STATE OF HAWAII
COVERED SOURCE PERMIT NO. 0652-01-C

Issuance Date: March 3, 2008 **Expiration Date:** March 2, 2013

Make Copies for Future Use For Each Equipment)

Permit No.: 0652-01-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 (°F):_____

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 (%):					

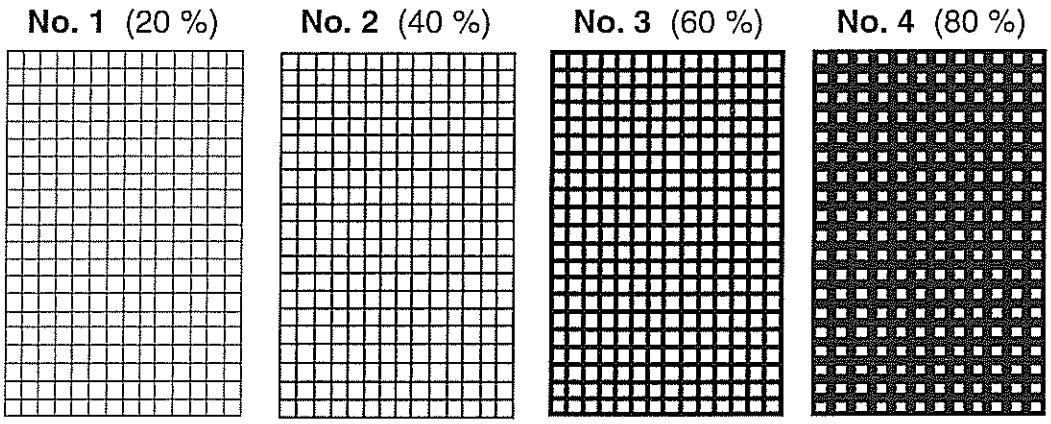
Observation Date and Start Time:_____

SECONDS / MINUTES	0	15	30	45	COMMENTS
1					
2					
3					
4					
5					
6					
Six (6) Minute Average Opacity Reading (%):					

The Ringelmann Chart

In the late 1800's in Paris, France, Professor Maximilian Ringelmann developed the **Ringelmann Chart** to measure the combustion efficiency of coal-fired boilers. The shade of the smoke plume shows how well a boiler is operating - the poorer its combustion efficiency, the more unburned carbon particles in the smoke and the darker the plume.

Professor Ringelmann's chart established four measured shades of gray between white, valued at zero, and black, at five. These specific shades of gray, Ringelmann No. 1 to Ringelmann No. 4, can be accurately reproduced by placing a grid of black lines of a given width and spacing on a white background. Viewed from a distance, the grid lines and background merge into the shades of gray, to be compared to the shade of the smoke plume.



Ringelmann Chart (not to scale)

Regulating Visible Emissions

The Ringelmann Chart became one of the first tools used to measure visible emissions. Introduced into the United States in 1897, it was soon accepted as the standard measure of smoke density and was used by engineers for power plant testing and smokeless combustion studies. In 1910, the Chart was officially adopted as part of the Smoke Ordinance for Boston, Mass.

Many city, state, and federal regulations now set smoke density limits based on the Ringelmann Smoke Chart. Although not originally designed as a regulatory tool to control air pollution, it gives good practical results when used by well-trained observers.

EXHIBIT E: MECO MEETING MINUTES

Meeting minutes from meetings between the County and other parties are provided.

Cornerstone Environmental Group, LLC

Memo

To: County of Maui (County)

From: Cornerstone Environmental Group, LLC (Cornerstone)

CC:

Date: 2/17/2011

Re: Central Maui Landfill (CML) Landfill Gas to Energy (LFGTE) Request for Proposal (RFP) Meeting with MECO – 1/24/2011

The following are the meeting notes from the LFGTE RFP meeting with MECO which took place at MECO's office at 210 W. Kamehameha Avenue on January 24, 2011.

Attendees:

Tracy Takamine, PE – County of Maui – Solid Waste Division Chief (SWD)
Michael Kehano – County of Maui – Project Manager (SWD)
Tia Stupplebeen – County of Maui
Sharon Suzuki – MECO – Manager Renewable Energy Services Department
Matt McNeff, PE – MECO – Supervisor, Renewable Energy Projects
Mike Michels, PE – Cornerstone Environmental Group – Project Advisor
Paul Stout, PE – Cornerstone Environmental Group – Project Manager

Notes

Tracy Takamine started the meeting and then all did self introductions.

Paul Stout presented the project history as outlined in the agenda and included below for reference.

a. GCCS installed in July 2008
b. GCCS operation and maintenance continues
c. GCCS expansion to occur spring or summer of 2011
d. GCCS flow and quality should make it viable for LFGTE project
e. County conducted LFGTE feasibility study (A-Mehr, Inc.)
f. LFGTE study concluded that the LFGTE project is feasible at this time
g. County hired Cornerstone to assist with LFGTE RFP

Mike Michels asked if MECO would be interested in developing a LFGTE project with MECO capital funds for MECO to own and operate. Sharon Suzuki indicated that is not likely as MECO is not structured in a way to make this happen at this time.

Mike Michels stated that based on the LFG quantity being flared and expected after an expansion to the LFG collection system this summer that he expects a electric power plant of approximately 2 megawatts (MW's) would initially be installed and as waste disposal continues would be expanded in future years to 4 or more MW's. Matt McNeff indicated that he desired the future power purchase agreement (PPA) between MECO and the owner of this plant be a firm capacity such as 2 MW's without consideration of the expansion potential. MECO would prefer that if a future plant expansion occurred that a new PPA for that power be negotiated at that time. MECO also indicated that the maximum capacity a LFGTE plant can be is 2.7 MW's otherwise if larger MECO must competitively bid out to purchase of its electricity.

Mr. Michels explained that it is the County's intent to issue an RFP for 3rd party developers to respond with a gas payment royalty or electric revenue sharing that the 3rd party developers will share from the project with the County. Mr. Michels indicated that once the RFP is issued that he predicts numerous respondents will contact MECO seeking MECO's biogas electric buyback tariff rates so the 3rd party developers can run economic analysis and make the offer to the County.

Matt McNeff requested that today's discussions be included in the RFP so that he is not inundated with 3rd Party developer questions; as this would take too much of his time to respond to them all. Mr. Michels and the County staff attending this meeting were sympatric to Mr. McNeff's request and we agreed to make our best efforts to accommodate it.

Matt McNeff and Sharon Suzuki also indicated that our planned approach to get quotes from the 3rd party developers is flawed. They explained that MECO's feed-in-tariff does not include landfill gas thus MECO has no preapproved published rates to purchase electricity from this future project. MECO instead would have to negotiate with each energy developer before they reply to the County's RFP. The challenge with that approach is negotiation can take 12 to 18 months in order for MECO to run their process of interconnect studies, determining the 3rd party developers capital and O&M costs, making an assessment if those 3rd party developer costs are reasonable, etc… MECO's interconnect study alone was predicted by Matt McNeff to take 6 months and cost approx $100,000. All agreed that MECO's need to negotiate PPA would slow the County RFP process too long and create extra effort for each respondent to the RFP.

We brainstormed several alternatives to address this issue and concluded that the County's RFP should:

- Inform the respondents that the feed-in-tariff is not applicable;
- Inform the respondents that an extended negotiation process will have to occur once the 3rd party developer is selected by the County; and
- Seek revenue sharing from the 3rd party developers with the developer assuming ranges for the all-in power/capacity/REC rates from MECO, such as: less than 8 cents/kWh; 8 to 12 cents/kWh; 12 to 18 cents/kWh; 18 to 22 cents/kWh; and more than 22 cents/kWh.

MECO indicated that they are currently compliant with the renewable energy portfolio standards set by the public utility commission and as the renewable requirements increase, with time, MECO will be seeking more renewable power.

Lastly, we explored if the County could negotiate a PPA with MECO then assign/transfer the PPA to the selected 3rd party developer. MECO indicated that they would not allow such an assignment/transfer because MECO needs to approve the transferee's financial history and MECO must make sure that the transferee is a sound business.

In summary, although the MECO meeting went well in terms of their desire to purchase electricity from LFGTE project, MECO does not have what Cornerstone considers typical terms of electrical pricing or quick means by which to obtain such pricing. Cornerstone estimates that the time for the County or a 3rd party developer to reach an agreement with MECO regarding buyback price, interconnect study, etc. could be 2 to 3 years or more.

Meeting adjourned.

EXHIBIT F: EVALUATION WEIGHING AND SCORING SHEET

Ranking of Proposals
For
Maui County
Landfill Gas Utilization Project

Item #	*Criteria*	*Weight*	Points / Weighted Score							
			1		*2*		*3*		*4*	
	Project Experience									
1	Project Management	***4***		0		0		0		0
2	Regulatory Compliance Record	***5***		0		0		0		0
3	Design and Construction Experience	***5***		0		0		0		0
4	Permitting Capital Improvements	***4***		0		0		0		0
5	O&M Experience	***3***		0		0		0		0
6	Record of Contract Performance	***5***		0		0		0		0
7	Team Experience	***4***		0		0		0		0
8	Hawaii Experience	***5***		0		0		0		0
9	References	***5***		0		0		0		0
	Subtotal Project Experience	**40**		**0**		**0**		**0**		**0**
	Project Approach									
10	Size of Proposed Project	***5***		0		0		0		0
11	Equipment Quality	***4***		0		0		0		0
12	Capital Improvements/Site Requirements	***5***		0		0		0		0
13	Landfill Gas Requirements (Quality & Quantity)	***5***		0		0		0		0
14	Project Feasibility (Likelihood of Success)	***7***		0		0		0		0
15	Project Feasibility (Likelihood of successful permitting)	***7***		0		0		0		0
16	Proven and Reliable Technology	***5***		0		0		0		0
17	Odor Control and Other Environmental Advantages or Impacts	***4***		0		0		0		0
18	Operation and Maintenance Advantages	***3***		0		0		0		0
19	Management Personnel	***3***		0		0		0		0
	Subtotal Project Approach	**48**		**0**		**0**		**0**		**0**
	Financial Advantages									
20	Financial Incentive to Maui County	***18***		0		0		0		0
	Subtotal Financial Advantages	**18**		**0**		**0**		**0**		**0**
	Business Issues									
21	Financial Strength	***10***		0		0		0		0
22	Capital Expenditure Required of Maui County	***20***		0		0		0		0
23	Risk Assumed by Proposer (Including Landfill Gas Quality and Availability)	***6***		0		0		0		0
	Subtotal Business Issues	**36**		**0**		**0**		**0**		**0**
	Submittal Quality									
24	Completeness of Submittal	***1***		0		0		0		0
25	Comprehensiveness of Proposal	***2***		0		0		0		0
26	Responsiveness of Proposer	***3***		0		0		0		0

	Subtotal Submittal Quality	**6**		**0**		**0**		**0**		**0**
	Time Frame to Implement									
27	Scheduled Start-up Date	*20*		0		0		0		0
	Subtotal Time Frame to Implement	**20**		**0**		**0**		**0**		**0**
	Other									
	Other Economic Advantages to Maui County	*12*		0		0		0		0
28	Other	*7*		0		0		0		0
	Subtotal Other	***19***		**0**		**0**		**0**		**0**
	TOTALS	**187**		**0**		**0**		**0**		**0**

Notes:

Points are based on a scale of 1 to 5. With 5 being the most advantageous to Maui County and 1 being the least advantageous to Maui County.

Highest weighted total score is the first proposer to start negotiations with.