

RECEIVED MAY 07 2015



WASTE MANAGEMENT OF HAWAII, INC.  
92-460 Farrington Highway  
Kapolei, Hawaii 96707  
(808) 668-2985

May 6, 2015

Mr. Steven Chang  
Solid and Hazardous Waste Branch  
Environmental Management Division  
Hawai'i Department of Health  
919 Ala Moana Blvd., Room 212  
Honolulu, HI 96814

A handwritten signature in black ink, appearing to be 'J. Wong', is written in the upper right corner of the page.

Subject: Transmittal of P-5 and P-6  
Solid Waste Permit LF-0001-08  
West Hawaii Sanitary Landfill

Dear Mr. Chang:

Waste Management of Hawaii (WMH) and the County of Hawaii received a letter from the State of Hawaii Department of Health (DOH) Solid Waste Section (SWS) dated April 8, 2015 regarding the solid waste permit renewal for the West Hawaii Sanitary Landfill. As part of the letter, the SWS requested submittal of an updated P-5 and P-6. Both of those documents were submitted via email on April 29, 2015. Please find a hardcopy of those documents attached to this letter.

Please contact me at (808) 668-2985 if you have any questions or require further clarification.

Respectfully submitted,

A handwritten signature in black ink, which reads 'Joseph R. Whelan' followed by 'FOR' and an arrow pointing to the right.

Joseph R. Whelan  
General Manager  
Waste Management of Hawaii

Cc: Gregory Goodale, P.E., Hawaii County Refuse Chief  
Richard Stringham, WHSL Site Manager  
WMH – File

Attachments

ATTACHMENT P-5  
ZONING CLEARANCE FORM  
SOLID WASTE PERMIT APPLICATION

TO THE APPLICANT:

Please be advised that a requirement for the issuance of a solid waste management permit in Hawaii is that the facility meets local ordinances and zoning requirements, including the recording of its disposal facility with the Bureau of Conveyances.

In order that the SHWB may determine whether the facility is in compliance with local land use policy, **we require that this attachment be completed and signed by the appropriate county land use/planning agency** (on Oahu, contact the Department of Planning and Permitting). No permit will be issued unless this form has been properly completed and returned. If a Use Permit or SMA Permit is required, submit a copy of said permit with this form.

Name of Applicant: County of Hawaii, Department of Environmental Management, Solid Waste Division

Name and phone number of primary contact for applicant:  
Greg Goodale, Solid Waste Division Chief  
(808) 961-8086

Address of proposed facility:  
71-1111 Queen Ka'ahumanu Highway, Waikoloa, HI 96738

Tax Map Key: 7-1-003:017

Description of proposed facility [e.g., waste processing, waste storage (indoor or outdoor), recycling, composting, waste disposal, etc.): Municipal solid waste (MSW) sanitary landfill

COUNTY AGENCY APPROVAL:

The Current Zoning of the Proposed site for the Proposed Activity / Facility / Operation is:

Allowed Identify Approved Use Permit/SMA, other Restrictions/Limitations: Special Permit No. SP91-379 applies to TMK parcel 7-1-003:017  
Special permit #807

Not Allowed Reason (ex: Use Permit/SMA required, application pending, etc.): \_\_\_\_\_

Name: Duane Kanuha Shancy Watanabe  
Director Zoning clerk

Agency: County of Hawaii Planning Department

Signature: [Signature] Date: 04/19/2015

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WGSL  
VMHawaii Inc

ATTACHMENT P-6  
PROPERTY OWNER APPROVAL FORM  
SOLID WASTE PERMIT APPLICATION

TO THE APPLICANT:

In order that the SHWB may determine whether the property owner and/or master lessee is knowingly allowing the proposed solid waste activity, we require that this attachment be completed and signed by the property owner and the master lessee, if appropriate. **No permit will be issued unless this form has been properly completed and returned.**

Name of Applicant: County of Hawaii, Department of Environmental Management, Solid Waste Division

Name and phone number of primary contact for applicant:  
Greg Goodale 808-961-8083

Address of proposed facility:  
71-1111 Queen Ka'ahumanu Highway, Waikoloa, HI 96738

Tax Map Key: 7-1-003:017

Description of proposed facility [e.g., waste processing, waste storage (indoor or outdoor), recycling, composting, waste disposal, etc.): Municipal solid waste (MSW) sanitary landfill

PROPERTY OWNER / MASTER LESSEE APPROVAL:

I/We certify that I/we have knowledge and approve of the applicant's proposed solid waste management facility for the subject location. I/We further certify that I/we fully understand the requirements under HAR Chapter 11-58.1, Subchapter 6, such that I/we am/are also responsible for the aesthetic, nonhazardous, sanitary storage, and removal of solid waste to approved solid waste management facilities.

If the property owner/master lessee is a partnership or group other than a corporation, a county, or state entity, one individual who is a member of the group shall sign this form. If the property owner/master lessee is a corporation, a county, or a state entity, an officer of the corporation, or an authorized representative of the county or state shall sign this form.

Property Owner:

Name of Authorized Representative: Carty S. Chang  
Signature: [Signature] Date: 4/22/15  
Title: Interim Chairperson Telephone: 587-0426  
Company Name: Dept. of Land & Natural Resources Termination date of  
Address: Resources, P.O. Box 621 lease/approval: \_\_\_\_\_  
Honolulu, HI 96809

Master Lessee:

Name of Authorized Representative: BJ Leithead Todd  
Signature: [Signature] Date: 4/28/15  
Title: Director Telephone: 808-961-8083  
Company Name: Co. of HI/Dept. of Env. Mgmt Termination date of  
Address: 345 Kekuanaoa St. #41 lease/approval: \_\_\_\_\_  
Hilo, HI 96720



**WASTE MANAGEMENT OF HAWAII INC.**

92-460 Farrington Highway  
Kapolei, HI 96707  
(808) 668-2985  
(808) 668-1366 Fax

August 12, 2015

Bobby-Jean Leithead-Todd  
Director  
Department of Environmental Management  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

Re: Formal Notification – WMH Personnel Changes  
West Hawaii Sanitary Landfill

Dear Ms. Leithead-Todd:

During our recent meeting with Gregory Goodale, Refuse Chief, and Gene Quiamas on August 5, 2015, Waste Management of Hawaii (WMH) informed Hawaii County of management personnel changes relating to our contract with Hawaii County. Justin Lottig, WMH environmental manager is relocating back to the mainland in another position with WM. Justin's last day was August 7<sup>th</sup>. Eddie Pettit, who was introduced to the County during our August 5<sup>th</sup> meeting, will be the interim environmental manager. We are currently interviewing for a permanent environmental manager. Mr. Pettit is very familiar with the WHSL having been the environmental manager's supervisor prior to the arrival of Mr. Lottig. He has been working closely with Mr. Lottig for over a year to reacquaint himself with the permit and compliance requirements at the landfill.

Additionally, I will be leaving my position on August 31<sup>st</sup> after an eight year stint as the WMH General Manager. Brian Bowen will be my replacement, and is currently on Oahu transitioning with me. Brian has thirty years with WM in both the environmental compliance and district manager roles, and will bring a wealth of experience to the Hawaii market. I have attached a revised WMH organizational chart.

Richard Stringham, who replaced Mike Kaha as the district manager last October, will remain as the district manager for the WHSL.

I would like to thank you personally, and your staff for your expertise, professionalism, and commitment during this most interesting period.

Best Regards,

A handwritten signature in black ink that reads 'Joe Whelan'.

Joseph R. Whelan  
WMH General Manager

Cc: File

*From everyday collection to environmental protection, Think Green® Think Waste Management.*

**Waste Management of Hawaii, Inc.**

**General Manager**

*Brian Bowen*

**DM Kekaha**  
*John Ruiz*

**Ops Specialist**  
*Crystal Suzuki*

**OPS Mgr.**  
*Ian Imamura*

**All County Operators**

**DM W. Hawaii**  
*Richard Stringham*

**Ops Specialist**  
*Kacey Alcoran*

**Ops. Foreman**  
*Robbie Giftner*

**Mechanic**  
*Leslie Darego*

**Operators**  
*Peter Gusman*  
*Clifton Tavares*  
*Stanton Loo*

**Mkt Area Engineer**  
*Jesse Frey*

**Mkt Area Env. Mgr.**  
*Eddie Pettit*

**Gas Tech**  
*Wojciech Dubis*

**Mkt Area Com. Rel. Mgr.**  
*Brian Bowen*

**Mkt. Area Fit./Mtn. Mgr.**  
*Ian Imamura*

**DM WSSL**  
*Brian Bowen*

**Ops Specialist**  
*Natalie Corella*

**Ops Supervisor**  
*Rick Kahalewai*

**Mechanic**  
*TBN*

**Operators**  
*Bob Wekenborg*  
*Richard Baang*  
*John (Keoni) Rosario*  
*Lee Ann Estrella*  
*Smith Lafaele*  
*TBN*

**Laborers**

*Kama Irvine*



April 30, 2015

Steven Y.K. Chang, P.E., Chief  
Solid and Hazardous Waste Branch  
State of Hawaii Department of Health  
Environmental Management Division  
919 Ala Moana Blvd., Suite 212  
Honolulu, Hawaii 96814

**WASTE MANAGEMENT OF HAWAII INC.**

92-460 Farrington Highway  
Kapolei, HI 96707  
(808) 668-2985  
(808) 668-1366 Fax

**RE: Lava Tube Discovery Notification  
West Hawaii Sanitary Landfill**

Dear Mr. Chang:

During our recent meeting with your staff on April 29, 2015, Waste Management of Hawaii (WMH), on behalf of Hawaii County, informed the Hawaii State Department of Health (HDOH) of the discovery of a lava tube located under Cell 10B, which is currently under construction at the West Hawaii Landfill. The lava tube appears to travel east toward Hilo in an ascending direction, and back toward the ocean in a descending pattern under some of the previously completed landfill cells for an unknown distance. The lava tube is approximately 20 feet in diameter and located 15 feet below the surface of the bottom of Cell 10B. WMH has had preliminary conversations with Golder & Associates, a mainland engineering consultant, to provide a third party analysis of the lava tube stability. We proposed to Hawaii County to retain Golder to perform this investigative work and provide guidance, if necessary, on any remedial efforts required to confirm the landfill stability. Ms. Ichinotsubo requested that WMH formally notify HDOH of this discovery.

WMH continues to prepare the bottom of Cell 10B to place liner material on or around July 1, 2015. However, WMH will not initiate actual liner placement until HDOH and Hawaii County have reviewed and approve the investigation report. I have attached a copy of the WMH notification letter to Hawaii County for your reference.

Please contact me at (808) 668-2985 with any questions or comments on this notification.

Sincerely,

A handwritten signature in black ink that reads 'Joseph R. Whelan'.

Joseph R. Whelan  
General Manager  
Waste Management of Hawaii, Inc.

cc: Mr. Gene Quiamas, (Hawaii County)  
File

*From everyday collection to environmental protection, Think Green® Think Waste Management.*



**WASTE MANAGEMENT OF HAWAII INC.**

92-460 Farrington Highway  
Kapolei, HI 96707  
(808) 668-2985  
(808) 668-1366 Fax

April 27, 2015

Bobby-Jean Leithead-Todd  
Director  
Department of Environmental Management  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

Re: Formal Notification – Lava Tube Discovery  
West Hawaii Sanitary Landfill

Dear Ms. Leithead-Todd:

During our recent meeting with Mike Kaha, Assistant Refuse Chief, and his staff on April 22, 2015, Waste Management of Hawaii (WMH) informed Hawaii County of the discovery of a lava tube located under Cell 10B, which is currently under construction at the West Hawaii Landfill. The lava tube appears to travel east toward Hilo in an ascending direction, and back toward the ocean in a descending pattern under some of the previously completed landfill cells for an unknown distance. The lava tube is approximately 20 feet in diameter and located 15 feet below the surface of the bottom of Cell 10B. Mr. Kaha requested that WMH formally notify Hawaii County of this discovery.

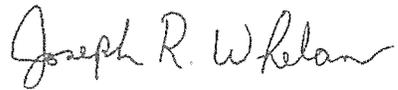
The discovery of the lava tube could not have been foreseen when the original contract between WMH and Hawaii County was signed prior to the landfill opening in 1993, thereby making the cost of any investigation and/or any resultant remediation the responsibility of Hawaii County. WMH has had preliminary conversations with Golder & Associates, a mainland engineering consultant, to provide a third party analysis of the lava tube stability. We propose to retain Golder to perform this investigative work and provide guidance, if necessary, on any remedial efforts required to confirm the landfill stability. WMH is providing Hawaii County with formal notification of the discovery of the lava tube, and requests your written concurrence that Hawaii County will assume all responsibility for the landfill stability, as well as, reimburse WMH for all costs associated with the investigation and any remediation, plus mark up and GET.

Per our conversation on April 22<sup>nd</sup>, WMH continues to prepare the bottom of Cell 10B to place liner material on or around July 1, 2015. However, please be advised that WMH will not initiate actual liner placement without prior written approval from Hawaii County, as a result of the discovery of the lava tube. Therefore, WMH requests that Hawaii County provide written approval at your earliest convenience, so that we can retain Golder & Associates to begin their investigation in a timely fashion so as not to impede cell construction.

*From everyday collection to environmental protection, Think Green.® Think Waste Management.*

Please contact me or Scott Sumner, WM Manager of Engineering Southern California at 714 328 8816 if you have any questions.

Best Regards,

A handwritten signature in cursive script that reads "Joseph R. Whelan".

Joseph R. Whelan  
WMH General Manager

Cc: File

## Fujimoto, Janice K

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**From:** Ichinotsubo, Lene K  
**Sent:** Thursday, September 18, 2014 2:45 PM  
**To:** Fujimoto, Janice K  
**Subject:** FW: Request for WHSL  
**Attachments:** Topo 2-26-14.pdf

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**From:** Lottig, Justin [mailto:JLottig@wm.com]  
**Sent:** Thursday, September 18, 2014 2:14 PM  
**To:** Ichinotsubo, Lene K  
**Subject:** Request for WHSL

Lene, I have included a site figure that shows the approximate location of the solidification pit as requested.

Regarding the request to include Appendix D of the Hazardous Waste Exclusion Plan, I believe that reference was inserted in error. There is no Appendix D of the plan.

**Justin H. Lottig**  
Environmental Protection Manager  
[jlottig@wm.com](mailto:jlottig@wm.com)

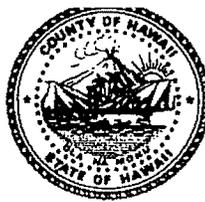
**Waste Management of Hawaii**  
92-460 Farrington Hwy.  
Kapolei, HI 96707  
Tel 808 668 2985  
Cell 808 479 0749

---

**Recycling is a good thing. Please recycle any printed emails.**



William P. Kenoi  
Mayor



BJ Leithead Todd  
Director

Margaret K. Masunaga  
Deputy

West Hawai'i Office  
74-5044 Ane Keohokalole Hwy  
Kailua-Kona, Hawai'i 96740  
Phone (808) 323-4770  
Fax (808) 327-3563

**County of Hawai'i**  
**PLANNING DEPARTMENT**

East Hawai'i Office  
101 Pauahi Street, Suite 3  
Hilo, Hawai'i 96720  
Phone (808) 961-8288  
Fax (808) 961-8742

July 2, 2012

Gary Hooser, Director  
Office of Environmental Quality Control  
235 South Beretania Street, Suite 702  
Honolulu, HI 96813

Dear Mr. Hooser:

Determination of Applicability Pursuant to §11-200-27, HAR Relating to the  
Application for Renewal of the Solid Waste Management Permit for the  
West Hawai'i Sanitary Landfill  
TMK: 7-1-003: 017; Pu'uuanahulu, North Kona, Hawai'i

This letter will inform you of our determination, as an accepting authority under your administrative rules, that a supplemental EIS will not be required for the purpose of an application to the State Department of Health for renewal of a solid waste management permit for the West Hawai'i Sanitary Landfill (WHSL). We ask that this determination be published in your next available bulletin.

For the reasons as detailed in the attached June 14, 2012, memorandum from the Department of Environmental Management, we find that the application for renewal of the solid waste management permit for the continuing operation of the WHSL would not warrant a supplemental EIS since the continuing operations of the WHSL have not increased in scope or size, nor increased the intensity of environmental impacts with all mitigating measures originally planned still being implemented. There are no new circumstances or evidence that have brought to light different or likely increased environmental impacts not previously dealt with.

Please do not hesitate to contact Daryn Arai of this office at 961-8142 should there be any questions or if additional information is necessary.

Sincerely,

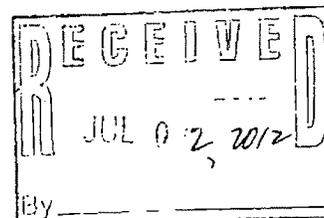
BJ LEITHEAD TODD  
Planning Director

DSA:syhf  
p:/wpwin60/dsa/2012/WHSL-SupplementalEISDetermination.doc

Enclosure

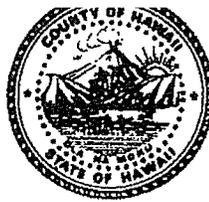
cc/enc: DEM ✓

Planning Department - Kona



William P. Kenoi  
Mayor

William T. Takaba  
Managing Director



Dora Beck, P. E.  
Acting Director

Hunter Bishop  
Deputy Director

**County of Hawai'i**  
**DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**

25 Aupuni Street • Hilo, Hawai'i 96720  
(808) 961-8083 • Fax (808) 961-8086  
[http://co.hawaii.hi.us/directory/dir\\_envmng.htm](http://co.hawaii.hi.us/directory/dir_envmng.htm)

**MEMORANDUM**

**DATE** : June 14, 2012

**TO** : Bobby Jean Leithead Todd, Planning Director

**FROM** : Dora Beck, P.E., Acting Director *DB*

**SUBJECT:** **State Department of Health Request for County Determination of Whether SEIS Required**

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The Department of Environmental Management ("DEM"), through its Solid Waste Division ("SWD"), has applied to the State of Hawai'i, Department of Health ("DOH") Solid and Hazardous Waste Branch ("SHWB") for an extension of solid waste management permit No. LF-0001-08 for the West Hawai'i Sanitary Landfill ("WHSL").

By letter dated March 15, 2012, DOH noted that the Final EIS ("FEIS") for WHSL, dated October 1991, stated the landfill was expected to be in operation for about 25 years, until 2015, with: (1) a 4:1 refuse to cover ratio; (2) 25 percent buffer area; (3) landfill depth of 30 feet; and (4) final slopes not exceeding 4:1. DOH stated: "Since some of these assumptions have changed since the final EIS, the SHWB requests that the county determine whether an updated EIS is warranted for the site.

Pursuant to HAR § 11-200-27: "The accepting authority or approving agency in coordination with the original accepting authority shall be responsible for determining whether a supplemental statement is required." The Planning Department was designated the original accepting authority for the WHSL FEIS. We don't know of designation of any other accepting authority. Therefore, we respectfully ask for your review of the following analysis, and determination of whether an SEIS is now required for the WHSL FEIS.

1. 4:1 Refuse Cover Ratio: The WHSL currently utilizes alternative daily cover in efforts to reduce cover usage. Cover usage for this site remains at 4:1 or slightly higher.
2. 25 Percent Buffer Area: The 25 percent Buffer Area remains unchanged.

3. Landfill Depth of 30 Feet: The 30-foot "landfill depth" was an assumption used solely for calculation of landfill life on p. 2-7 of the SEIS. Aside from that, that depth assumption was never used for impact assessment. The actual discussion of impacts reflects excavation of up to 25', plus height limited to 25 to 30' above existing grades (FEIS p. 3-24). This is consistent with the actual landfill construction to date. Besides lifetime estimate, none of the FEIS impact assessment was dependent on landfill depth or lifetime. That is appropriate, as the impacts of a properly constructed and mitigated landfill do not significantly increase based on depth. As stated below, the actual volume/intensity to date has been well below estimates, and there have not been any changed circumstances requiring an SEIS.
4. Final Slopes Not Exceeding 4:1: Final slopes will not change from the original 4:1 slope.

None of the above indicates any different or likely increased environmental impacts not previously dealt with, which might require an SEIS. The WHSL site and operation has not changed in size, scope, location intensity or use as envisioned in the FEIS.

In addition, please consider the following analysis of possible timing-related circumstantial factors since October 1991:

1. Population Growth Below Projections  
FEIS section 4.1.1 projected West Hawai'i population (North and South Kona, and South Kohala) to grow to 122,000 by year 2015, roughly triple the 1991 population. However, according to the State Department of Business and Economic development Data Book, said West Hawai'i population as of April 1, 2010 was only 71,821, or less than double the 1991 population. See, Table 1.12, Resident Population of Counties and Districts: 1990, 2000, and 2010. <http://hawaii.gov/dbedt/info/economic/databook/2010-individual/01/011210.pdf>. Hence, it's unlikely that traffic, waste volume and other population density-related impacts are approaching levels considered by the FEIS.
2. Solid Waste Volume Below Projections  
FEIS section 2.2 projected West Hawai'i solid waste generation to be 144,800 tons/year by 2011, and 160,000 tons/year by 2015. However, according to County SWD records, the 2011 WHSL tonnage deposited was 91,530 tons, well below the 2011 estimate. SWD continues its public recycling programs, further moving toward zero waste. Again, the burden on WHSL is well below projections in the FEIS and it is unlikely that there are any new or increased impacts due to waste volume.
3. Traffic Volume Below Projections  
FEIS section 4.4 discussed traffic impacts, based on a June 6, 1991 Traffic Impact Analysis Report for WHSL. The WHSL intersection with Queen Ka'ahumanu Highway is fully channelized for truck ingress and egress. The FEIS assumed that peak hour afternoon truck traffic at WHSL would triple from 20 to 75 by 2015, along with the tripling of population. Even based upon that, the EIS concluded that this "would have little impact on traffic conditions at the study intersection. The controlling factors

would be the growth in traffic on Queen Ka'ahumanu Highway and the physical conditions of Queen Ka'ahumanu Highway, such as number of lanes, by the year 2016." FEIS p. 4-11. A 2003 Traffic Impact Assessment of potential trucking of waste from East Hawai'i to WHSL similarly indicated no significant traffic impacts. The current daily (not just peak hour) traffic at WHSL is less than 60 trips per day, well below the traffic volumes assumed by the FEIS with a West Hawai'i population that roughly doubled since 1991. DEM consulted with state Department of Transportation ("DOT") in 2010 regarding these facts and possible additional traffic from potential WHSL rock sales. DOT concurred that based upon such evidence, there was no need for an EA for the potential rock sales. Hence, there does not appear to be any new or increased traffic impacts requiring an SEIS.

4. Recurring Solid Waste Permit Issuance Provides Safeguards

Solid Waste permits are renewable for up to five (5) years. HAR §11-58.1-04(E)(1). Hence, even if the life of WHSL continues significantly beyond 2015, DOH will continue to monitor WHSL operations and impacts at least every five years. Hence, there is no need to prematurely require an SEIS. Moreover, 2015 is still three years away, the lifetime assumed in the FEIS has not yet elapsed, and an SEIS would be premature.

Finally, please consider the lack of any SEIS triggers as detailed in HAR § 11-200-27 which states: "A supplemental statement shall be warranted when the scope of an action has been substantially increased, when the intensity of environmental impacts will be increased, when the mitigating measures originally planned are not to be implemented, or where new circumstances or evidence have brought to light different or likely increased environmental impacts not previously dealt with."

1. Scope of Action Not Substantially Increased: The scope of the Landfill operations has not increased from that treated in the FEIS. The FEIS, p. 2-7, contemplated that landfill "life is dependent on the population projection and may vary if the projections are not as anticipated." Continued landfill operations will have the same ongoing impacts, and will have continued mitigation measures, including continuing regulatory requirements.
2. Intensity of Environmental Impacts Not Increased: The impacts will continue as before, and if anything, regulatory standards and requirements are likely to increase. For instance, the 1996 federal New Source Pollutant Standards, Subpart WWW, now requires gas collection and monitoring at WHSL. And continued WHSL operations provide vital solid waste disposal services to mitigate the entire West Hawai'i community's solid waste impacts.
3. Mitigating Measures Are Increasing: As noted above, the impact mitigation is increasing, not decreasing.
4. No New Circumstances or Evidence of Different or Likely Increased Impacts:

DEM is not apprised of any significant changes in circumstances which would present new or increased environmental impacts not considered in the FEIS. As stated in the foregoing discussions, circumstances such as population size, solid waste tonnage, and traffic have actually fallen below expected levels, indicating probable reduced impacts.

Based upon all of the foregoing, DEM respectfully asks for the Accepting Authority's concurrence that no WHSL SEIS is currently necessary.

cc: Greg Goodale, SWD Chief  
Mike Kaha, WMI Operations Manager

MAY 04 2012



WASTE MANAGEMENT OF HAWAII, INC.  
92-460 Farrington Highway  
Kapolei, Hawaii 96707  
(808) 668-2985

*[Handwritten initials]*  
Janice ✓  
Tom ✓  
Letizia ✓

April 23, 2012

Steven Chang, P.E., Chief  
Solid & Hazardous Waste Branch  
Department of Health  
Environmental Management Division  
919 Ala Moana Blvd, Room 212  
Honolulu, Hawaii 96814

Subject: Geosyntec Consultants Response to DOH Permit Renewal Application Comments  
Solid Waste Management Permit No. LF-0001-08  
West Hawaii Sanitary Landfill

Attention: Janice Fujimoto

Dear Ms. Fujimoto:

On behalf of the County of Hawaii (County), Waste Management of Hawaii, Inc. (WMH) provides our follow up response to your comment letter dated March 15, 2012 relative to our permit renewal application for the West Hawaii Sanitary Landfill. Specifically, DOH comments 5a, 5b, & 6. Please see the attached report from Geosyntec.

WMH appreciates the opportunity to address any concerns the SHWB may have regarding the permit renewal application. Due to the complex nature of the responses required by many of the requests contained within your March 15, 2012 comment letter, WMH and the County previously requested a sixty (60) day extension in order to provide a more detailed and complete response. WMH will forward Hawaii County responses once received.

Please contact me at (808) 668-2985 if you have any questions or require further clarification.

Respectfully submitted,

*Joseph R. Whelan*

Joseph R. Whelan  
General Manager  
Waste Management of Hawaii

Cc: Gregory Goodale, P.E., Hawaii County Refuse Chief  
Mike Kaha, WHSL District Manager  
WMH - File

18 April 2012

Mr. Joseph R. Whelan  
General Manager  
Waste Management of Hawaii, Inc.  
92-460 Farrington Highway  
Kapolei, Hawaii 96707  
*via email: jwhelan1@wm.com*

Subject: Geosyntec Responses to Permit Renewal Application Comments  
West Hawaii Sanitary Landfill  
Waikoloa, Hawaii

Dear Mr. Whelan:

This letter provides Geosyntec Consultants, Inc.'s (Geosyntec's) responses to Waste Management of Hawaii, Inc.'s (WMH's) letter to the Hawaii Department of Health (HDOH), Environmental Management Division, dated 30 March 2012. WMH's letter (attached herein for reference) was to provide responses to HDOH comments on the permit renewal application for the West Hawaii Sanitary Landfill (WHSL).

## **RESPONSES TO HDOH COMMENTS**

As described in the 30 March 2012 letter, HDOH comments 5a, 5b, and 6 required responses from Geosyntec. Additionally, at the request of Rick Von Pein (WMH), Geosyntec is providing additional comments on the HDOH's comments on the Alternate Base Elevations. Below are relevant the HDOH comments, WMH responses, and Geosyntec responses.

### **HDOH Comment 5. Slope Stability Analyses**

- a. Based on our review of past CQA reports, Cells 1-7 were constructed with smooth-smooth geomembrane, while Cells 8+ were constructed with single-sided texture geomembrane. The slope stability analyses for Cells 9A Remainder and 10A Partial, prepared by Geosyntec dated June 4, 2010, assumed that all previously constructed cells, in particular, Cells 1 and 2, were constructed with the same materials as Cells

Mr. Joseph R. Whelan  
18 April 2012  
Page 2

8A Remainder and 9A. Submit a revised analysis to reflect actual materials used in the construction.

WMH Response:

Geosyntec Consultants will provide an updated analysis based on the data provided in the March 12, 2012 Master Plan Report by Geosyntec.

Geosyntec Response:

**As-built interface strength data for the Cells 1 and 2 liner systems are not available. At the time of the 4 June 2010 report, Geosyntec assumed an interface strength for Cells 1 and 2. However, since that time, Geosyntec has developed an assumed conservative strength envelope for evaluation of the liners for Cells 1 through 7 based on information available in the literature and on our experience with similar materials. The envelope is shown below for Part b. The analyses from the 4 June 2010 report have been revised with this conservative envelope for consistency, and are provided herein.**

- b. Provide the basis for determining the  $F_n$  values used in each slope stability analysis. For example, in Cell 2, the  $F_n$  value is listed as  $F_n=1$ , for the analysis of Cell 10A (remainder) and 11A (partial), but is listed as  $F_n=3$  for the analysis of Cell 9A (remainder) and 10A (partial).

WMH Response:

We are reviewing data relative to the various  $F_n$  values used in our calculations, and will provide a response once this evaluation is complete.

Geosyntec Response:

**$F_n$  numbers represent strength functions which are presented in the various stability analyses performed for specific phases of the landfill, and are described in the respective report text for those analyses. The  $F_n$  numbers do not necessarily correspond to each other, from one report to another, since each set of analyses is independent. The following summarizes the strength functions (that is, the  $F_n$ ) for the various cell liners and their basis.**

**Previously Constructed Cells 1 through 7 (pre-2009)  
(strength envelope based on Geosyntec's experience with similar products)**

**Strength function  $F_n = 1$  from 25 March 2010  
report is the table below:**

| <b>Normal Stress<br/>(psf)</b> | <b>Assumed Shear<br/>Strength (psf)</b> |
|--------------------------------|---|
| <b>0</b>                       | <b>0</b>                                |
| <b>1,000</b>                   | <b>141</b>                              |
| <b>4,000</b>                   | <b>562</b>                              |
| <b>8,000</b>                   | <b>1,124</b>                            |
| <b>10,000</b>                  | <b>1,204</b>                            |
| <b>15,000</b>                  | <b>1,405</b>                            |

**Cells 8A, and 9A (Partial)  
(strength envelope based on CQA test results)**

**Strength function in table below is  $F_n = 1$  from 25 March  
2010 report;  $F_n = 3$  from 4 June 2010 report; and  $F_n = 4$   
from 14 June 2010 and 9 August 2010 reports:**

| <b>Normal Stress<br/>(psf)</b> | <b>Assumed Shear<br/>Strength (psf)</b> |
|--------------------------------|---|
| <b>0</b>                       | <b>0</b>                                |
| <b>1,000</b>                   | <b>157</b>                              |
| <b>5,000</b>                   | <b>736</b>                              |
| <b>10,000</b>                  | <b>1,269</b>                            |
| <b>15,000</b>                  | <b>1,747</b>                            |

**Cells 9A (Remainder) and 10A (Partial)  
(strength envelope based on CQA test results)**

**Strength function  $F_n = 2$  from 25 March 2010 and  
4 June 2010 reports:**

| <b>Normal Stress<br/>(psf)</b> | <b>Assumed Shear<br/>Strength (psf)</b> |
|--------------------------------|---|
| <b>0</b>                       | <b>0</b>                                |
| <b>1,000</b>                   | <b>214</b>                              |
| <b>4,000</b>                   | <b>741</b>                              |
| <b>8,000</b>                   | <b>957</b>                              |
| <b>10,000</b>                  | <b>1,040</b>                            |
| <b>15,000</b>                  | <b>1,291</b>                            |

**Cells 10A (Remainder) and 11A (Partial)  
(strength envelope based on CQA test results)**

| <b>Normal Stress<br/>(psf)</b> | <b>Internal Friction<br/>Angle (degrees)</b> | <b>Cohesion<br/>(psf)</b> |
|--------------------------------|--|---------------------------|
| <b>&lt; 8,000</b>              | <b>7.8</b>                                   | <b>0</b>                  |
| <b>&gt; 8,000</b>              | <b>1.6</b>                                   | <b>-</b>                  |

**HDOH Comment 6. Groundwater Monitoring Plan**

The Solid Waste Section also received correspondence from Geosyntec Consultants, dated February 28, 2012, responding to questions raised by the SHWB. We have performed a cursory review and request further justification for the elimination of nitrogen-ammonia and other detection monitoring parameters with a leachate/groundwater ratio > 100. Please note that we are continuing to review your submission and may provide additional comments.

WMH Response:

Geosyntec will provide additional justification for elimination of nitrogen-ammonia parameters as requested.

**Geosyntec Response:**

**Geosyntec understands that WMH will look further into this comment, and will respond accordingly.**

**However, the following points may be useful for WMH's consideration. As noted in the groundwater monitoring plan, the parameters with leachate/groundwater ratios > 100 are all redox sensitive and/or have a propensity to adsorb on mineral surfaces. Therefore, they may not be good indicators of leachate due to the expected oxidizing environment of local groundwater (which could cause them to transform or otherwise become relatively immobile). Their expected behavior is not compatible with the defined performance of indicator parameters since these parameters tend to cause false positives due to their inconsistent concentration responses in the leachate-soil-groundwater system.**

**HDOH Comment on Alternate Base Elevations**

The SHWB is providing a final opportunity for Waste Management of Hawaii, Inc. (WMH) to proposed alternate base elevations for future cells under this permit review period. As discussed in our meetings with WMH, we expect the engineering plans and associated information for this proposal must be submitted by March 13, 2012. If we do not receive updated information within this time period, we will proceed to process the previously submitted application. New engineering plans for the alternate base elevations may be submitted as a proposed modification, or with the renewal permit application. At a minimum this request shall include:

1. New engineering concept drawings, including base elevations and sump locations.
2. The drawings shall contain enough detail and information to determine compliance with regulations. Considerations that will be evaluated include, but are not limited to, seismic stability; leachate collection and removal to ensure less than 30 centimeters of head on the liner system, pint of compliance evaluation; storm water management; sump construction; anchor trenches; etc.
3. Any associated updates to the groundwater monitoring plan.
4. Evaluation of whether this proposed change triggers an Environmental Assessment/Environment Impact Statement, or other land use related permits.
5. New Attachment P5, Zoning Clearance Form.
6. New Attachment P6, Property Owner Approval Form.

Mr. Joseph R. Whelan  
18 April 2012  
Page 6

7. Updates to Attachment P2, Public Interest Statement, and relevant portions of Attachment P-3, Operations Plan, addressing the new design capacity of the landfill.

WMH Response:

Response to comments 1 and 2: The requested drawings were sent to the SHWB thru correspondence dated March 20, 2012.

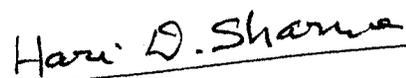
Responses to comments 3 thru 7 will be provided once WMH and the County have obtained preliminary approval of the submitted engineering concept drawings, and Hawaii County has concluded their evaluation of the need for other updated documents, such as the EIS.

**Geosyntec Additional Response for Comment 3:**

**If the Master Plan prepared by Geosyntec (dated 12 March 2012) is approved, WMH will update the groundwater monitoring plan to propose at least one additional groundwater monitoring well south of the landfill. Please refer to Section 3.13 and Sheet 4 of the Master Plan for additional details.**

Please contact us at (510) 836-3034 if you have any questions or comments, or if you need additional information.

Sincerely,

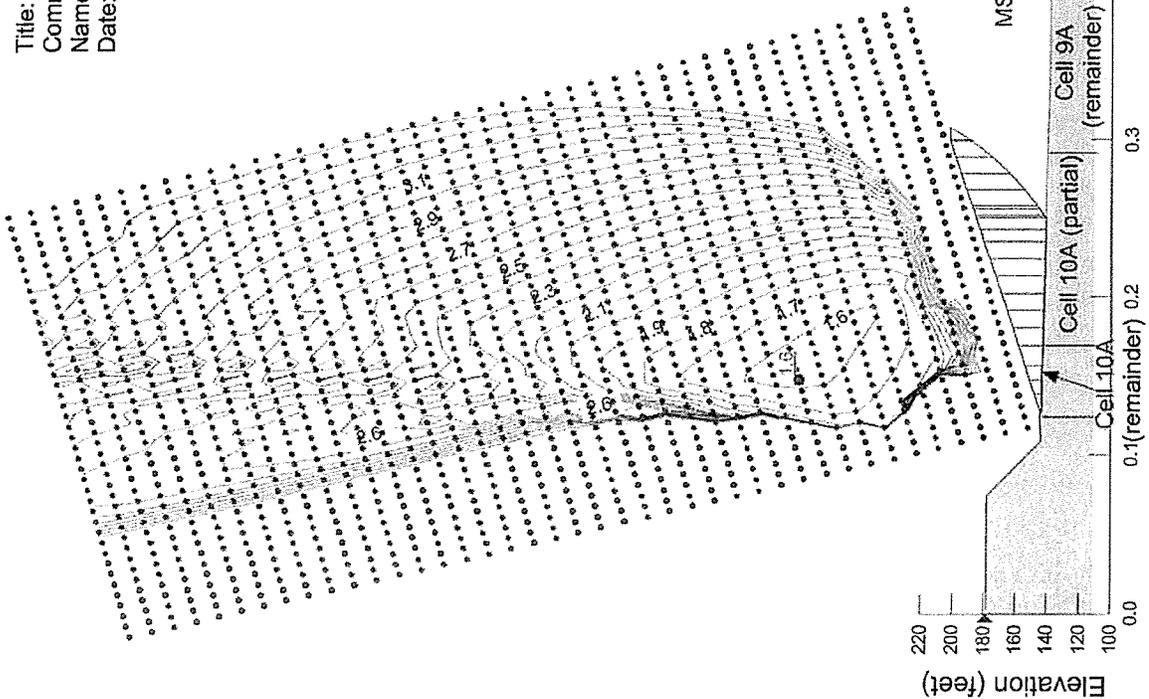


Hari D. Sharma, Ph.D., P.E.  
Principal

Attachments: 30 March 2012 WMH Letter to HDOH  
Slope Stability Outputs for Revised Analyses from 4 June 2010 Geosyntec Report

P:\PRJ2003Geo\WMI\West Hawaii\WG1339-06 (2012 Master Plan)\Responses to DOH Comments\_Geosyntec 4-18-12.docx

Title: Section A\_A'  
 Comments: West Hawaii- Cell 9A (remainder) & Cell 10A (partial)  
 Name: A\_A' (As-Built)\_to EL202ft\_REV.gsz  
 Date: 4/4/2012



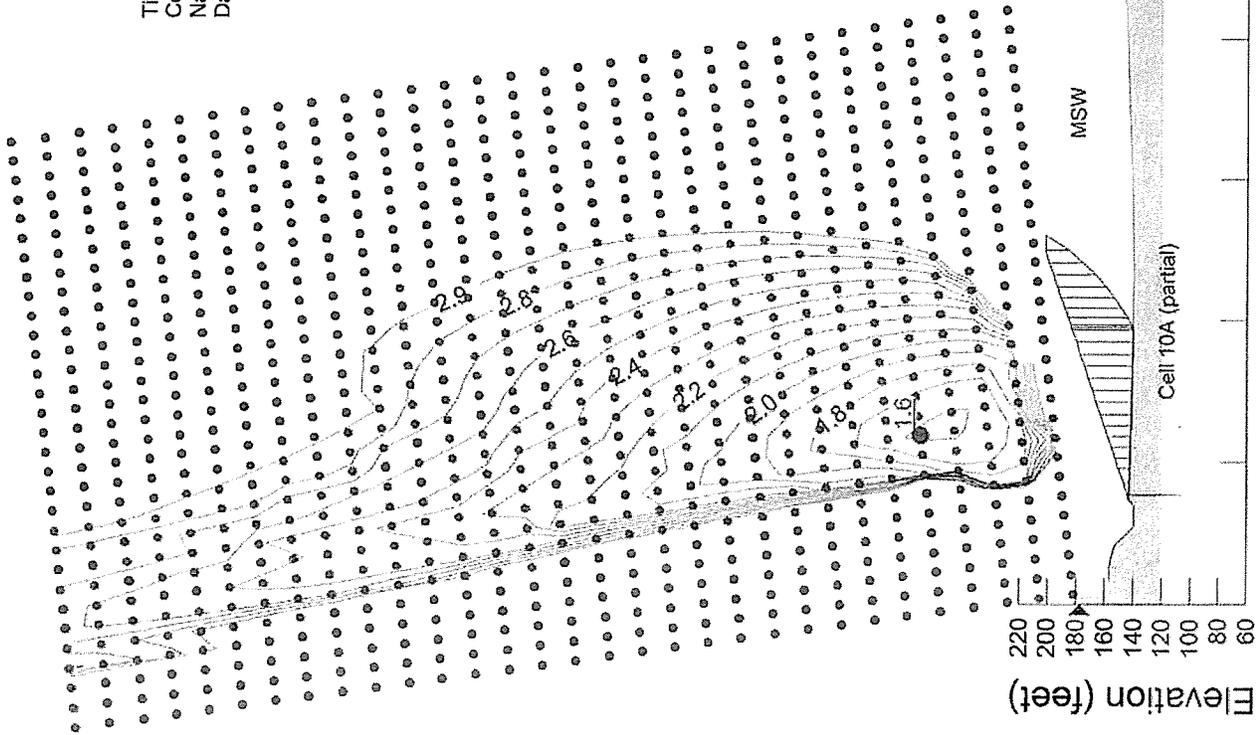
| STRENGTH FN 2    |              |  |
|------------------|--------------|--|
| $\sigma_n$ (psf) | $\tau$ (psf) |  |
| 0                | 0            |  |
| 1,000            | 214          |  |
| 4,000            | 741          |  |
| 8,000            | 957          |  |
| 10,000           | 1040         |  |
| 15,000           | 1291         |  |

Description: MSW  
 Model: Bilinear  
 Wt: 65  
 Cohesion: 500  
 Phi 1: 0  
 Phi 2: 33  
 Bilinear Normal: 770  
 Description: 9A (Remainder) & 10A (Partial)  
 Model: ShearNormalFn  
 Wt: 100  
 Strength Fn: 2

| STRENGTH FN 3    |              |  |
|------------------|--------------|--|
| $\sigma_n$ (psf) | $\tau$ (psf) |  |
| 0                | 0            |  |
| 1,000            | 157          |  |
| 5,000            | 736          |  |
| 10,000           | 1269         |  |
| 15,000           | 1747         |  |

Description: Bedrock  
 Model: Bedrock  
 Description: 8A (Remainder) & 9A (Partial)  
 Model: ShearNormalFn  
 Wt: 100  
 Strength Fn: 3

Title: Section B-B'  
 Comments: West Hawaii- Cell 9A (remainder) & Cell 10A (partial)  
 Name: B2\_B2' (As-Built)\_to EL202ft\_REV.gsz  
 Date: 4/4/2012



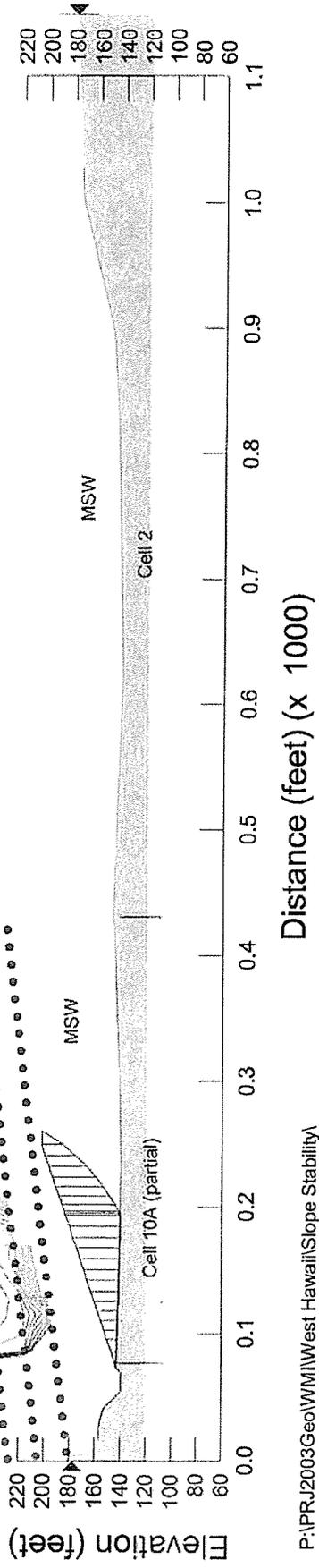
| STRENGTH FN 2    |              |  |
|------------------|--------------|--|
| $\sigma_n$ (psf) | $\tau$ (psf) |  |
| 0                | 0            |  |
| 1,000            | 214          |  |
| 4,000            | 741          |  |
| 8,000            | 957          |  |
| 10,000           | 1040         |  |
| 15,000           | 1291         |  |

Description: MSW  
 Model: Bilinear  
 Wt: 65  
 Cohesion: 500  
 Phi 1: 0  
 Phi 2: 33  
 Bilinear Normal: 770

Description: Liner System (Geotextile/60-mil HDPE)  
 Model: ShearNormalFn  
 Wt: 100  
 Strength Fn: 2

| STRENGTH FN 4    |              |  |
|------------------|--------------|--|
| $\sigma_n$ (psf) | $\tau$ (psf) |  |
| 0                | 0            |  |
| 1,000            | 141          |  |
| 4,000            | 562          |  |
| 8,000            | 1124         |  |
| 10,000           | 1264         |  |
| 15,000           | 1405         |  |

Description: Bedrock  
 Model: Bedrock  
 Description: Cells 1 & 2  
 Model: ShearNormalFn  
 Wt: 100  
 Strength Fn: 4



MAY 31 2012



WASTE MANAGEMENT OF HAWAII, INC.  
92-460 Farrington Highway  
Kapolei, Hawaii 96707  
(808) 668-2985

May 30, 2012

Steven Chang, P.E., Chief  
Solid & Hazardous Waste Branch  
Department of Health  
Environmental Management Division  
919 Ala Moana Blvd, Room 212  
Honolulu, Hawaii 96814

**Subject: Response to Permit Renewal Application Comments  
Solid Waste Management Permit No. LF-0001-08  
West Hawaii Sanitary Landfill**

Dear Mr. Chang:

On behalf of the County of Hawaii (County), Waste Management of Hawaii, Inc. (WMH) provides our follow up response to the Department of Health's (DOH) comment letters dated March 15, March 30, and April 24, 2012 concerning the Solid Waste Permit renewal application for the West Hawaii Sanitary Landfill. Your comments are listed below followed by the individual response. Comments that have been addressed in previous letters are also summarized below.

---

**Comment 1. Provide an updated site plan, showing the location of the other proposed County operations at the site.**

**Response to Comment 1:** The County of Hawaii has provided an updated site plan, which is attached hereto.

---

**Comment 2. Provide a summary of design specifications and as-built construction information for Cells 1-7.**

**Response to Comment 2:** WMH responded to this comment by letter dated March 30, 2012, stating that the requested information had been submitted by Geosyntec Consultants on March 20, 2012. Based on subsequent discussions, we understand that these prior submittals adequately addressed this comment. If DOH needs additional information or clarification concerning the specifications and drawings, please let us know.

---

**Comment 3. Submit an interim closure plan to address areas where waste has been filled to final grades in portions of Cells 1-8 (approximately 30.7 acres), as shown in correspondence dated May 13, 2010.**

**Response to Comment 3:** Based on subsequent discussions and correspondence with your office, WMH understands that this comment requests WMH to provide information necessary to satisfy the criteria under HAR 11-58.1-17(a)(6) and that submission of an interim closure plan is not required if WMH provides the information required by the regulation. The regulation, HAR

11-58.1-17(a)(6), allows DOH to grant extensions to the one-year closure deadline the landfill owner or operator demonstrates that (1) the landfill unit has the capacity to receive additional wastes, and (2) the owner or operator has taken and will continue to take all steps necessary to prevent threats to human health and the environment from the unclosed unit.

Therefore, in accordance with HAR 11-58.1-17(a)(6), WMH requests an extension of the deadline for beginning closure on currently inactive landfill cells 1 through 8. The County intends to seek modifications to the solid waste permit to allow the steepening of portions of the outside slopes of the landfill. If approved, the steepening of the outside slopes will increase the capacity of these landfill cells to receive significant additional waste volumes. Therefore, the extension of the closure deadline is necessary to allow the County to obtain the necessary permit changes and use the resulting additional landfill capacity.

During the extension, WMH will take steps necessary to protect human health and the environment. In addition to the current controls for the entire landfill site, WMH has implemented the following additional measures for cells 1 through 8:

- Application of 18 inches of crushed rock materials as interim cover on the inactive landfill cells.
- Implementation of monthly visual inspections of the inactive landfill cells to identify any settling or erosion.
- Remediation of any settling or erosion identified during monthly visual inspections or through routine landfill operational observations.
- Reduction of vehicular traffic in this part of the landfill. Roadways have been and will be constructed to include crushed rock thickness greater than 18 inches.

As DOH is aware, the Landfill is located on the dry side of Hawai'i and receives very little rainfall (typically less than 20 inches per year). As a result, rainfall impacts (e.g. stormwater, erosion, etc.) are minimal, and leachate and landfill gas generation is low. With maintenance of adequate cover on the inactive cells, there are no threats to human health and the environment anticipated from the inactive landfill cells during the extension of the closure deadline.

---

**Comment 4. Your original 1993 application indicates that the landfill design and construction is in accordance with Special Permit No. SP91-379. The most recent P-5 Zoning Clearance Form, approved by the County of Hawaii Planning Department, does not make reference to any land use or zoning-related permits. Please clarify whether any land use permits apply to the facility and whether your facility is in compliance with such permits.**

**Response to Comment 4:** The only applicable land use permit is Special Permit SP91-379, as DOH noted. The County of Hawaii has reviewed the P-5 Zoning Clearance Form and determined that no other land use permits are required at this time. Reference to Special Permit SP91-379 was inadvertently omitted from the application. The County will separately submit to DOH a revised P-5 Zoning Clearance Form that will specifically reference Special Permit SP91-379. To the best of our knowledge, the Landfill is currently operating in compliance with SP91-379.

---

**Comment 5. Slope Stability Analysis**

- a. Based on our review of past CQA reports, Cells 1-7 were constructed with smooth-smooth geomembrane, while Cells 8+ were constructed with single-sided textured geomembrane. The slope stability analyses for Cells 9A Remainder and 10A Partial, prepared by Geosyntec dated June 4, 2010, assumed that all previously constructed cells, in particular, Cells 1 and 2, were constructed with the same materials as Cells 8A Remainder and 9A Submit a revised analysis to reflect actual materials used in the construction.

**Response to Comment 5.a:** Waste Management submitted the original response to this question on April 23, 2012. A follow-up response from Geosyntec Consultants is provided as an attachment to this letter.

- b. Provide the basis for determining the Fn values used in each slope stability analysis. For example, in Cell 2, the Fn value is listed as Fn=1, for the analysis of Cell 10A (remainder) and 11A (partial), but is listed as Fn=3 for the analysis of Cell 9A (remainder) and 10A (partial).

**Response to Comment 5.b:** This information was provided by WMH to the DOH in the letter dated April 23, 2012.

- c. Please note that future submissions should clearly identify the basis for parameters used in the evaluations.

**Response to Comment 5.c:** So noted.

---

**Comment 6. Groundwater Monitoring Plan. The Solid Waste Section also received correspondence from Geosyntec Consultants, dated February 28, 2012, responding to questions raised by the SHWB. We have performed a cursory review and request further justification for the elimination of nitrogen-ammonia and other detection monitoring parameters with a leachate/groundwater ratio > 100. Please note that we are continuing to review your submission and may provide additional comments.**

**Response to Comment 6:** While WMH believes that it is unnecessary to use nitrogen-ammonia as a detection monitoring parameter as part of the Groundwater Monitoring Plan, WMH has decided not to seek elimination of monitoring parameters with a contrast greater than 100 at this time. These parameters include iron, manganese, nitrogen (ammonia), nitrogen (total Kjeldahl), and zinc. WMH will revise the Groundwater Monitoring Plan accordingly.

---

**Comment 7. Please also provide copies of CQA Reports for Cells 3-East, Cell 4, and Cell 5A.**

**Response to Comment 7:** On March 28, 2012, WMH submitted CQA Reports for Cell 4 and Cell 5A. There is no separate CQA Report for Cell 3-East; however, the CQA Report for Cell 3 addresses Cell 3-East and was previously submitted to DOH. Please let me know if you need further clarification concerning the CQA Reports that have been submitted.

---

## Environmental Impact Statement

The SHWB also reviewed the Final Environmental Impact Statement for the West Hawaii Landfill, dated October 1991. According to the EIS (Section 2.3), the landfill was expected to be in operation for about 25 years until 2015, with a 4 to 1 refuse to cover ratio, 25 percent buffer area, landfill depth of 30 feet, and final slopes that should not exceed 4-to-1. Since some of these assumptions have changed since the final EIS, the SHWB requests that the county determine whether an updated EIS is warranted for the site.

**Response:** The County will separately submit to DOH documentation providing its determination as to whether an updated EIS is required at this time.

---

## Alternate Base Elevations

The SHWB is providing a final opportunity for Waste Management of Hawaii, Inc. (WMH) to proposed alternate base elevations for future cells under this permit review period. As discussed in our meetings with WMH, we expect the engineering plans and associated information for this proposal must be submitted by March 13, 2012. If we do not receive updated information within this time period, we will proceed to process the previously submitted application. New engineering plans for the alternate base elevations may be submitted as a proposed modification, or with the renewal permit application. At a minimum, this request shall include:

1. New engineering concept drawings, including base elevations and sump locations.
2. The drawings shall contain enough detail and information to determine compliance with regulations. Considerations that will be evaluated include, but are not limited to, seismic stability; leachate collection and removal to ensure less than 30 centimeters of head on the liner system, pint of compliance evaluation; storm water management; sump construction; anchor trenches; etc.
3. Any associated updates to the groundwater monitoring plan.
4. Evaluation of whether this proposed change triggers an Environmental Assessment/Environment Impact Statement, or other land use related permits.
5. New Attachment P5, Zoning Clearance Form.
6. New Attachment P6, Property Owner Approval Form.
7. Updates to Attachment P2, Public Interest Statement, and relevant portions of Attachment P-3, Operations Plan, addressing the new design capacity of the landfill.

**Response:** During this permit renewal process, WMH and the County will not be altering final base grades at the West Hawaii Sanitary Landfill.

---

## Seismic Impact Zone Demonstration

DOH has also requested that WMH provide DOH with the seismic impact zone demonstration required under HAR 11-58.1-13(e), which states that new cells or lateral expansions shall not be located in seismic impact zones unless the owner/operator demonstrates that "all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site." The regulation further requires that the demonstration must be placed into the operating record.

In its attached letter, Geosyntec Consultants has provided the demonstration required by HAR 11-58.1-13(e), which will be placed into WHSL's operating record.

\* \* \*

Please contact me at (808) 668-2985 if you have any questions or require further clarification.

Respectfully submitted,

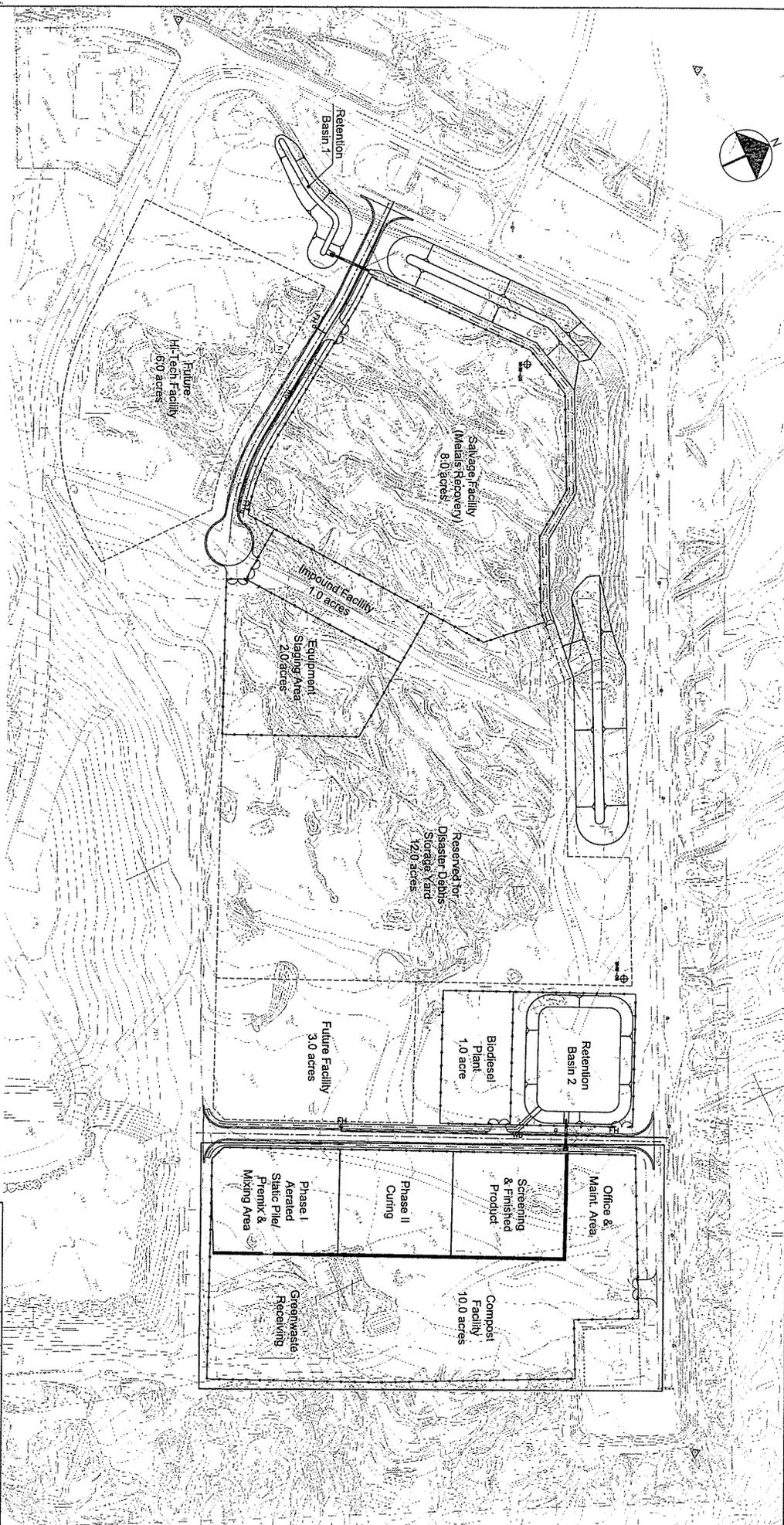


Damon DeFrates  
Director of Operations  
Los Angeles Market Area  
Waste Management

Attachments:

Update Site Plan  
Letter from Geosyntec Consultants (May 30, 2012)

Cc: Janice Fujimoto – Department of Health  
Gregory Goodale, P.E., Hawaii County Refuse Chief  
Mike Kaha, WHSL District Manager  
WMH - File



|   |  |   |  |
|---|--|---|--|
|   |  | DATE: 4/29/08<br>DRAWN BY: RSB<br>CHECKED BY: RSB |  |
| DEPARTMENT OF ENVIRONMENTAL MANAGEMENT<br>SOLID WASTE DIVISION<br>SITE IMPROVEMENTS FOR THE<br>WEST HAWAII RESOURCE<br>RECOVERY INFRASTRUCTURE<br>GENERAL SITE PLAN |  | SHEET: SW-3755<br>OF: 3                           |  |



1111 Broadway, 6<sup>th</sup> Floor  
Oakland, California 94607  
PH 510.836.3034  
FAX 510.836.3036  
www.geosyntec.com

30 May 2012

Mr. Joseph R. Whelan  
General Manager  
Waste Management of Hawaii, Inc.  
92-460 Farrington Highway  
Kapolei, Hawaii 96707  
*via email: jwhelan1@wm.com*

Subject: Responses to Additional Permit Renewal Application Comments  
West Hawaii Sanitary Landfill  
Waikoloa, Hawaii

Dear Mr. Whelan:

This letter provides Geosyntec Consultants, Inc.'s (Geosyntec's) responses to two items related to the permit renewal application for the West Hawaii Sanitary Landfill (WHSL). For reference, we have first presented the Hawaii Department of Health (HDOH), Environmental Management Division comment followed by the Geosyntec response to each of the HDOH comments.

## **RESPONSES TO HDOH COMMENTS**

### **HDOH Comment in 24 April 2012 Letter to WMH**

**Response to Item 5.a. Your Master Plan Report of March 2012 includes slope stability analyses for cross sections through Cells 8-15 and Cells 16-23. Please also evaluate and include a slope stability analysis for a cross section through Cells 1-7.**

### **Geosyntec Response:**

Geosyntec performed the requested slope stability analyses for a new Section A3 through Cells 1-7. The static factor of safety is higher than the minimum acceptable factor of safety of 1.5 and the estimated seismic deformation at the liner level is less than the acceptable seismic deformation of 6 inches. Appendix A includes the calculation package.

P:\PRJ2003Geo\WMI\West Hawaii\WG1339-06 (2012 Master Plan)\Response to HDOH Comments - 30 May 2012\Responses to HDOH Comments\_Geosyntec 30May12.docx

Mr. Joseph R. Whelan  
Responses to Additional Permit Renewal Application Comments  
30 May 2012  
Page 2

**HDOH Comment Received from Justin Lottig (WMH) on 23 May 2012**

**HDOH has requested that certification be made under HAR 11-58.1-13(e).**

**Geosyntec Response:**

Hawaii Administrative Rules, Title 11, Department of Health, Chapter 58.1, Solid Waste Management Control HAR 11-58.1-13(e) states:

*“(e) Seismic impact zone. New MSWLF units and lateral expansions shall not be located in seismic impact zones, unless the owner or operator demonstrates to the director that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site. The owner or operator must place the demonstration in the operating record and notify the director that it has been placed in the operating record.”*

The *Master Plan Report, West Hawaii Landfill, Waikoloa, Hawai'i* (the Report) prepared by Geosyntec and dated 12 March 2012 includes the site-specific seismic hazard evaluation, site response, and deformation analyses performed for WHSL in its Appendix A. The evaluation showed that the design earthquake (event) for the site is a Moment Magnitude ( $M_w$ ) 6.7 resulting in a peak ground acceleration (PGA) of 0.60g.

The evaluations presented in the Report were performed to meet the requirements in Title 40, Part 257 and Part 258 of the Code of Federal Regulations (i.e., Subtitle D) which require addressing seismic impact zones (i.e., same requirement as HAR 11-58.1.13(e) cited above).

For the design event, the estimated seismic deformations are less than 6 inches at the liner level. For the final cover system, the Report states “Seismic slope stability analyses for the cover system presents a range of internal soil strengths to limit deformations to 12 inches or less.” Therefore, appropriate materials will be selected by the designer performing the final cover

Mr. Joseph R. Whelan  
Responses to Additional Permit Renewal Application Comments  
30 May 2012  
Page 3

design for closure to meet the regulatory requirements. The seismic deformations listed above meet the accepted requirements<sup>1</sup>.

Thus, the containment structures are designed to resist the maximum horizontal earthquake in lithified earth material at the site.

### **Base Grades Elevations**

#### **Geosyntec Response:**

Using the existing permitted base grades and the revised final grades as per the 12 March 2012 *Master Plan Report*, the landfill slopes are stable.

Please contact us at (510) 836-3034 if you have any questions or comments, or if you need additional information.

Sincerely,



Hari D. Sharma, Ph.D., P.E.  
Principal

Attachments:

Appendix A – Additional Slope Stability Analyses

---

<sup>1</sup> Seed, R.B. and Bonaparte, R., 1992. "Seismic Analysis and Design of Lined Waste Fill: Current Practice," *Proceedings of Stability and Performance of Slopes and Embankments-II*, June 29-July 1, 1992; ASCE Geotechnical Special Publication No. 31; R.B. Seed and R. Boulanger (Editors).

Mr. Joseph R. Whelan  
Responses to Additional Permit Renewal Application Comments  
30 May 2012  
Page 4

Copy to:

Richard T. Von Pein, PE (WM)

## **APPENDIX A**

### **Additional Slope Stability Analyses**

COMPUTATION COVER SHEET

Client: WMH Project: West Hawaii Landfill Project/  
Proposal No.: WG1339-06  
Task No.

Title of Computations Additional Slope Stability Analyses for Master Plan Design

Computations by: Signature *A. Padovani* 05/24/2012  
Printed Name Amy Padovani Date  
Title Project Engineer

Assumptions and Procedures Checked by: Signature *F. Settepani* 25 May 12  
(peer reviewer) Printed Name F. SETTEPANI Date  
Title

Computations Checked by: Signature *F. Settepani* 25 May 12  
Printed Name F. SETTEPANI Date  
Title

Computations backchecked by: Signature \_\_\_\_\_  
(originator) Printed Name Amy Padovani Date  
Title Project Engineer

Approved by: Signature \_\_\_\_\_  
(pm or designate) Printed Name \_\_\_\_\_ Date  
Title \_\_\_\_\_

Approval notes: \_\_\_\_\_

Revisions (number and initial all revisions)

| No.   | Sheet | Date  | By    | Checked by | Approval |
|-------|-------|-------|-------|------------|----------|
| _____ | _____ | _____ | _____ | _____      | _____    |
| _____ | _____ | _____ | _____ | _____      | _____    |
| _____ | _____ | _____ | _____ | _____      | _____    |

Written by: ACP Date: 05/24/12 Reviewed by: MJ Date: 5/24/12

Client: WMH Project: West Hawaii Landfill,  
Master Plan Project No. WG1339 Task No.: 06

**SLOPE STABILITY ANALYSES  
FOR MASTER PLAN  
WEST HAWAII LANDFILL**

**PURPOSE**

This calculation package presents the additional slope stability analyses performed for the Master Plan design (Geosyntec, 2012) for the West Hawaii Sanitary Landfill (WHSL), at the request of the Hawaii Department of Health (HDOH). The WHSL, located in North Kona on the island of Hawaii, is owned by the County of Hawaii, Department of Public Works, Division of Solid Waste, and is operated by Waste Management of Hawaii, Inc. (WMH). The 149-acre permitted landfill comprises 23 planned cells, of which Cells 1 through 8 and approximately half of Cells 9, 10, and 11 have been constructed and are receiving waste.

**ASSUMPTIONS**

The following assumptions were made:

- the permitted base grades for WHSL (Figure 1) were assumed for Cells 1 through 7, as they have all been constructed, and no as-built information is available for them.
- the proposed final grades (Figure 2) consist of:
  - i. peak elevation of 262 feet mean sea level (ft MSL);
  - ii. a minimum 3% grade on the top deck for drainage; and
  - iii. side slopes of 10 horizontal to 1 vertical (10H:1V) within the existing Cells 1 through 8A and up to 5H:1V within the future cells.
- both static and seismic stability analyses were performed in the analyses;
- typical liner systems and details assumed in analyses are presented on Figure 3; and
- leachate is assumed to be maintained below the permitted 1-ft maximum head above the liner and was therefore excluded from the analyses.

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Written by: ACP Date: 05/24/12 Reviewed by: MS Date: 5/24/12  
Client: WMH Project: West Hawaii Landfill, Master Plan Project No. WG1339 Task No.: 06

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## ANALYSES

Static slope stability was analyzed using the Spencer (1967) method of slices employed in the Slope/W software (GEO-SLOPE 2007). The Spencer method satisfies both moment and force equilibrium conditions (Duncan, 1992). The program generates potential slip surfaces using a grid of circle centers and a series of tangent lines.

In addition, the pseudo-static stability of the final grades was also evaluated to estimate the  $k_y$  that results in a static factor of safety equal to 1.

To address a request by the HDOH, one additional cross section, Section A3 (Figures 1-2), was evaluated. Section A3 corresponds to a West-East section and was evaluated assuming final fill conditions (Figure 2). Cross section A3 is presented in Figure 4.

## MATERIAL PROPERTIES

The material properties assumed in analyses are described below.

### Municipal Solid Waste (MSW) (Kavazanjian et al., 1995)

Unit weight  $\gamma = 65$  pcf

Bilinear strength envelope:

$$\phi_1 = 0^\circ \text{ and cohesion (c) of } 500 \text{ psf for normal stress } \sigma_n \leq 770 \text{ psf, and}$$
$$\phi_2 = 33^\circ \text{ for } \sigma_n \geq 770 \text{ psf}$$

### Base Liner System for Cells 1-7

As shown on Figure 3, the composite liner systems for Cells 1-7 consist of a nonwoven cushion geotextile overlying a 60 mil smooth HDPE geomembrane overlying a geosynthetic clay liner (GCL). Interface strengths for the site-specific materials are not available for these cells. Therefore, based on Geosyntec's experience with similar liner systems, the following interface strengths were assumed:

Written by: ACP Date: 05/24/12 Reviewed by: [Signature] Date: [Signature]

Client: WMH Project: West Hawaii Landfill, Master Plan Project No. WG1339 Task No.: 06

| Cells 1 through 7   |                              |
|---------------------|------------------------------|
| Normal Stress (psf) | Assumed Shear Strength (psf) |
| 0                   | 0                            |
| 1,000               | 141                          |
| 4,000               | 562                          |
| 8,000               | 1,124                        |
| 10,000              | 1,204                        |
| 15,000              | 1,405                        |

**RESULTS**

The results of the slope stability analyses are summarized on Table 1 below. All sections achieved the minimum acceptable 1.5 static factor of safety. Slope stability outputs are provided in Attachment 1. Seismic deformations at the liner level were estimated to be less than 6 inches, based on the site specific data presented on Attachment 2.

**Table 1. Summary of Slope Stability Analyses**

| Section | Direction                 | Base Configuration | Factor of Safety | Yield Acceleration $k_y$ |
|---------|---------------------------|--------------------|------------------|--------------------------|
| A3      | West Slope (east to west) | Permit             | 4.4              | 0.16g                    |
|         | East Slope (west to east) | Permit             | 6.1              | 0.20g                    |

**REFERENCES**

Duncan, J.M. 1992. "State-of-the-Art: Static Stability and Deformation Analysis," ASCE Geotechnical Special Publication No. 31, Stability and Performance of Slopes and Embankments-II, Vol. I, pp. 222-266.

GEO-SLOPE International Limited [GEO-SLOPE]. 2007. *GeoStudio for slope stability analysis, Version 7.17*. Calgary, Alberta, Canada.

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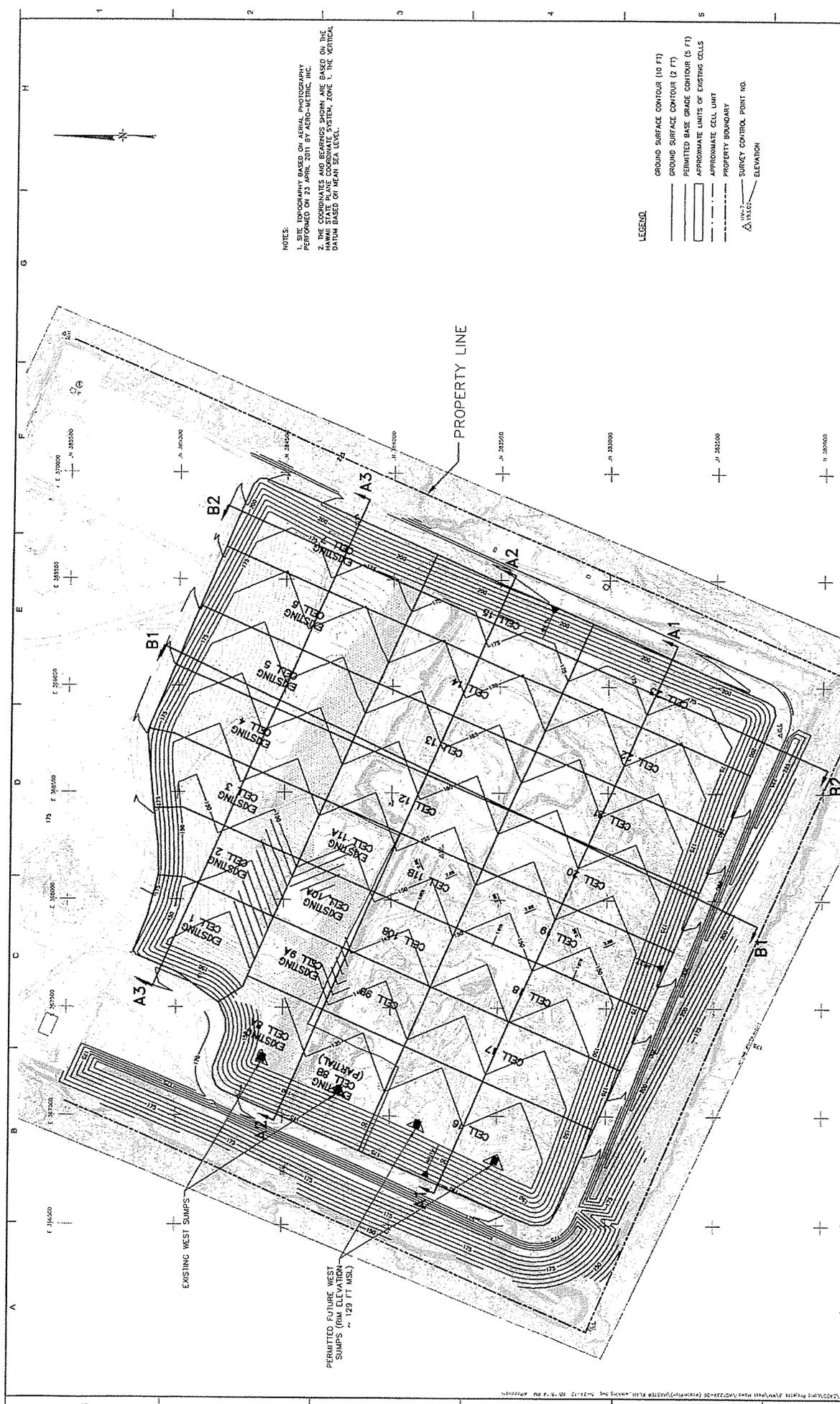
Written by: ACP Date: 05/24/12 Reviewed by: MS Date: 5/24/12  
Client: **WMH** Project: **West Hawaii Landfill,  
Master Plan** Project No. **WG1339** Task No.: **06**

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Geosyntec Consultants, Inc., 2012. "*Master Plan Report, West Hawaii Sanitary Landfill, Waikoloa, Hawaii,*" prepared for Waste Management of Hawaii, Inc., project WG1339-06, 12 March.

Kavazanjian, E., N. Matasovic, R. Bonaparte, and G.R. Schmertmann. 1995. "*Evaluation of MSW Properties for Seismic Analysis,*" Proceedings of Geoenvironment 2000: Characterization, Containment, Remediation, and Performance in Environmental Geotechnics, New Orleans, Louisiana, February 24-26, 1995, Edited by Yalcin B. Acar and David E. Daniel, Geotechnical Special Publication No. 46.

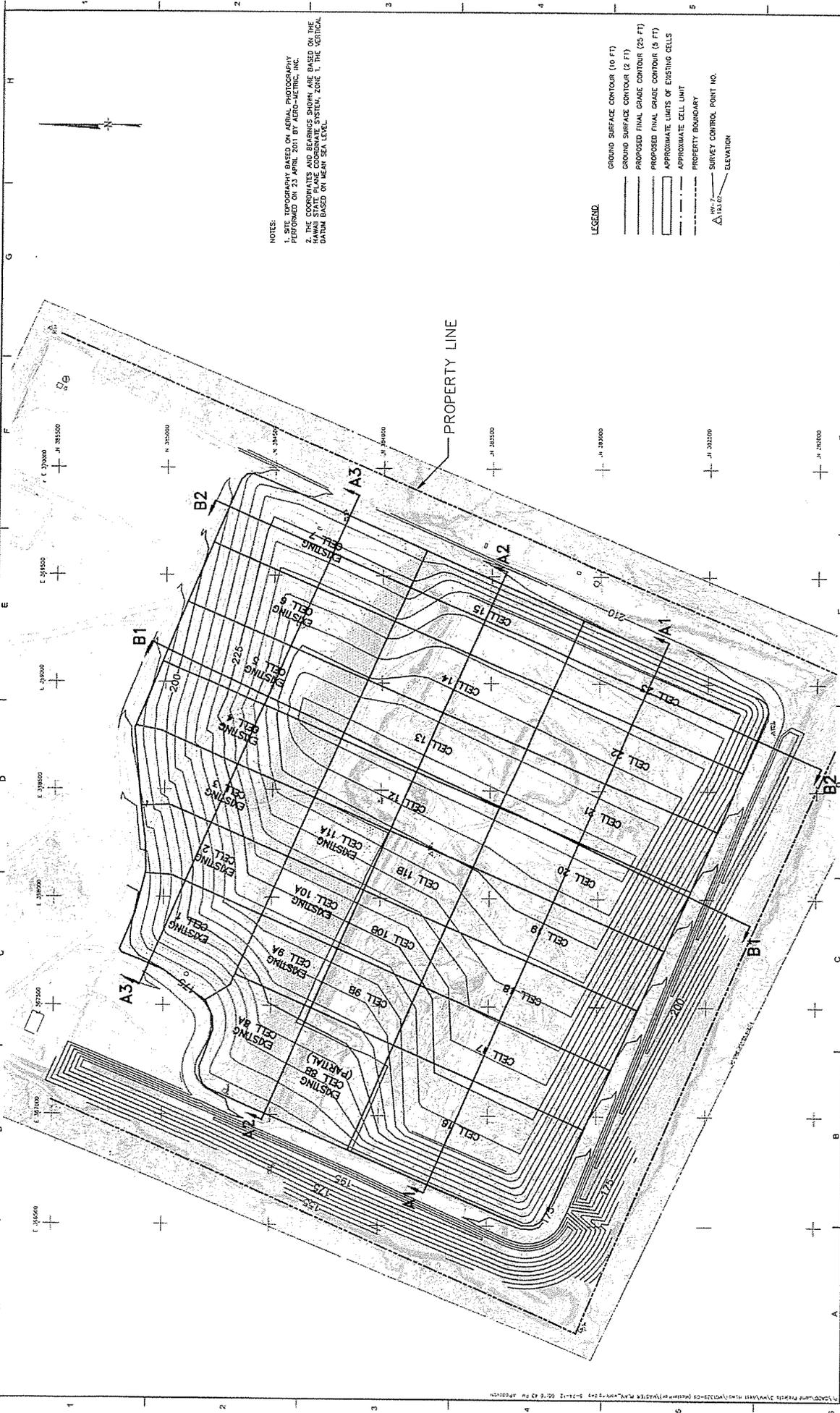
Spencer, E. 1967. "*A Method of Analysis of the Stability of Embankments Assuming Parallel Interslice Forces,*" Geotechnique, Vol. 17, No. 1, March, pp.11-26.



NOTES:  
 1. SITE TOPOGRAPHY BASED ON AERIAL PHOTOGRAPHY PERFORMED ON 23 APRIL 2011 BY AERO-TECH, INC.  
 2. ELEVATIONS AND BEARINGS SHOWN ARE BASED ON THE HAWAIIAN DATUM SYSTEM, ZONE 1, THE VERTICAL DATUM BASED ON MEAN SEA LEVEL.

LEGEND:  
 GROUND SURFACE CONTOUR (10 FT)  
 PERMITTED BASE GRADE CONTOUR (2 FT)  
 APPROXIMATE LIMITS OF EXISTING CELLS  
 PROPERTY BOUNDARY  
 SURVEY CONTROL POINT NO. ELEVATION

|                               |                                |  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
|-------------------------------|--------------------------------|--|--|---|--|-----------------------------|-----------------|-------------------------------|--------------------------------|----------------|-------------------------------|----------------|-------------------------------|---|--|-----|-----------|---------|--|-------------|--|--|--|--|--|--|--|
|                               |                                | <b>1111 Broadway</b><br><b>Sixth Floor</b><br><b>Oakland, CA 94607</b> |  | <b>PERMITTED BASE GRADING PLAN</b><br><b>"UPPER LIMIT"</b>  |  | <b>NOT FOR CONSTRUCTION</b> |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
|                               |                                |  |  | <table border="1"> <tr> <td>DATE: 28 FEBRUARY 2017</td> <td>SCALE: AS SHOWN</td> </tr> <tr> <td>PROJECT: WEST HAWAII LANDFILL</td> <td>DOCUMENT: WEST HAWAII LANDFILL</td> </tr> <tr> <td>DATE: 07/15/16</td> <td>PROJECT: WEST HAWAII LANDFILL</td> </tr> <tr> <td>DATE: 07/15/16</td> <td>PROJECT: WEST HAWAII LANDFILL</td> </tr> </table> |  | DATE: 28 FEBRUARY 2017      | SCALE: AS SHOWN | PROJECT: WEST HAWAII LANDFILL | DOCUMENT: WEST HAWAII LANDFILL | DATE: 07/15/16 | PROJECT: WEST HAWAII LANDFILL | DATE: 07/15/16 | PROJECT: WEST HAWAII LANDFILL | <table border="1"> <tr> <td>NO.</td> <td>REVISIONS</td> <td>DATE BY</td> </tr> <tr> <td> </td> <td>DESCRIPTION</td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table> |  | NO. | REVISIONS | DATE BY |  | DESCRIPTION |  |  |  |  |  |  |  |
| DATE: 28 FEBRUARY 2017        | SCALE: AS SHOWN                |  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
| PROJECT: WEST HAWAII LANDFILL | DOCUMENT: WEST HAWAII LANDFILL |  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
| DATE: 07/15/16                | PROJECT: WEST HAWAII LANDFILL  |  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
| DATE: 07/15/16                | PROJECT: WEST HAWAII LANDFILL  |  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
| NO.                           | REVISIONS                      | DATE BY  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
|                               | DESCRIPTION                    |  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
|                               |                                |  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |
|                               |                                |  |  |   |  |                             |                 |                               |                                |                |                               |                |                               |   |  |     |           |         |  |             |  |  |  |  |  |  |  |



NOTES:  
 1. SITE TOPOGRAPHY BASED ON AERIAL PHOTOGRAPHY PERFORMED ON 23 APRIL 2011 BY AERO-METRIC, INC.  
 2. THE COORDINATES AND BEARINGS SHOWN ARE BASED ON THE NAD 83 COORDINATE SYSTEM, ZONE 1. THE VERTICAL DATUM IS BASED ON MEAN SEA LEVEL.

- LEGEND
- GROUND SURFACE CONTOUR (10 FT)
  - GROUND SURFACE CONTOUR (2 FT)
  - PROPOSED FINAL GRADE CONTOUR (25 FT)
  - PROPOSED FINAL GRADE CONTOUR (5 FT)
  - APPROXIMATE LIMITS OF EXISTING CELLS
  - APPROXIMATE CELL LIMIT
  - PROPERTY BOUNDARY
  - SURVEY CONTROL POINT NO.
  - ELEVATION

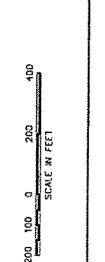
|                      |                        |            |
|----------------------|------------------------|------------|
| NOT FOR CONSTRUCTION |                        | FIGURE NO. |
| DES. BY: JAC         | DATE: 28 FEBRUARY 2012 | 2          |
| DRN. BY: LKH         | SCALE: AS SHOWN        |            |
| REV. BY: JDS         | PROJECT: WJ1339-05     |            |
| APP. BY: JDS         | DRAWING:               |            |
| FILE:                | master_plan.dwg        |            |

PROPOSED FINAL GRADING PLAN  
 MASTER PLAN LANDFILL  
 WEST HAWAII, HAWAII  
 WAIKOLOA

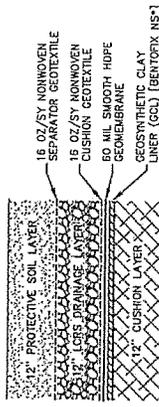
1111 Broadway  
 Sixth Floor  
 Oakland, CA 94607



| NO. | REVISIONS DESCRIPTION | DATE BY |
|-----|-----------------------|---------|
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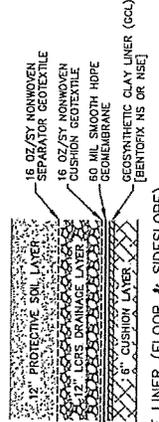
**CELLS 1, 2, & 3**



**BASE LINER (FLOOR & SIDESLOPE)**

SOURCES: \* QUALITY ASSURANCE REPORT, WEST HAWAII LANDFILL, CELL 1, PUNAHOU, HAWAII, BY HARDING LAWSON ASSOCIATES, 14 OCTOBER 1993; \* QUALITY ASSURANCE REPORT, WEST HAWAII LANDFILL, CELL 2, PUNAHOU, HAWAII, BY HARDING LAWSON ASSOCIATES, 7 JULY 1994; AND \* WEST HAWAII SANITARY LANDFILL, CELL 3 GEOTECHNICAL INSTRUMENTATION, CONSTRUCTION QUALITY ASSURANCE REPORT, BY RUST ENVIRONMENT & INFRASTRUCTURE, INC., 9 MAY 1996.

**CELLS 4, 5, 6, & 7**

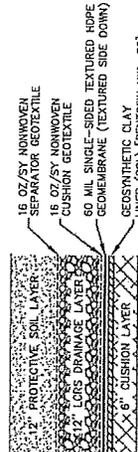


**BASE LINER (FLOOR & SIDESLOPE)**

NOTES: (1) CUSHION LAYER THICKNESS UNKNOWN FOR CELLS 4 AND 6A.  
(2) PROTECTIVE SOIL COVER THICKNESS UNKNOWN FOR CELL 5A.  
(3) CELLS 4, 5, 6, & 7: 12\"/>

SOURCES: \* FINAL CONSTRUCTION QUALITY ASSURANCE REPORT, ASH CELL 4, COMPOSITE LINER & LEACHATE COLLECTION & REMOVAL SYSTEM, BY RUST ENVIRONMENT & INFRASTRUCTURE, INC., 14 MAY 1998; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR WEST HAWAII SANITARY LANDFILL, CELL 5-A, WASTE MANAGEMENT OF HAWAII, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR WEST HAWAII SANITARY LANDFILL, CELL 5-B, WASTE MANAGEMENT OF HAWAII, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR WEST HAWAII SANITARY LANDFILL, CELL 6, WASTE MANAGEMENT OF HAWAII, HAWAII, BY A-MERK, MARCH 2003; AND \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR WEST HAWAII SANITARY LANDFILL, CELL 7, WEST HAWAII SANITARY LANDFILL, HAWAII, BY EARTH TECH, INC., SEPTEMBER 2004; AND \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 7 REMAINDER, WEST HAWAII SANITARY LANDFILL, HAWAII, BY EARTH TECH, INC., MAY 2007.

**CELLS 8A & 9A (PARTIAL)**

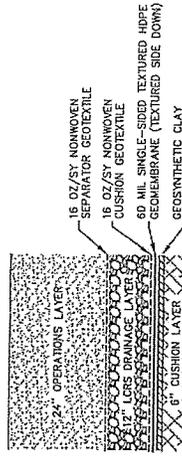


**BASE LINER (FLOOR & SIDESLOPE)**

NOTE: 12\"/>

SOURCE: \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 8A (REMAINER) AND 8A (PARTIAL), WEST HAWAII SANITARY LANDFILL, HAWAII, BY EARTH TECH, INC., DECEMBER 2007.

**CELL 9A (REMAINDER), 10A, & 11A**

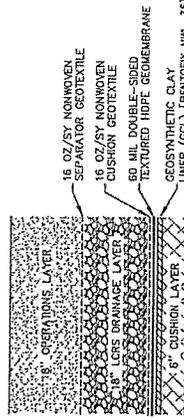


**BASE LINER (FLOOR & SIDESLOPE)**

NOTE: CELLS 9A (REMAINDER), 10A, AND 11A DO NOT HAVE SIDESLOPES.

SOURCES: \* REPORT OF CONSTRUCTION QUALITY ASSURANCE, CELLS 9A (REMAINDER) & 10A (PARTIAL) CONSTRUCTION, WEST HAWAII LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 10A (REMAINDER) AND 11A (PARTIAL), WEST HAWAII SANITARY LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 11A (REMAINDER), WEST HAWAII SANITARY LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 9A (REMAINDER), WEST HAWAII SANITARY LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 10A (REMAINDER) AND 11A (PARTIAL), WEST HAWAII SANITARY LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 11A (REMAINDER), WEST HAWAII SANITARY LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 9A (REMAINDER), WEST HAWAII SANITARY LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 10A (REMAINDER) AND 11A (PARTIAL), WEST HAWAII SANITARY LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001; \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 11A (REMAINDER), WEST HAWAII SANITARY LANDFILL, HAWAII, BY A-MERK, NOVEMBER 2001.

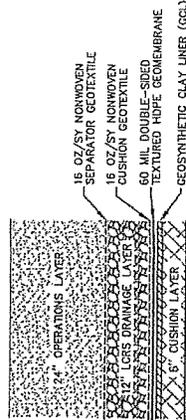
**CELL 8B**



**FLOOR LINER**

SOURCES: \* CONSTRUCTION QUALITY ASSURANCE REPORT FOR CELL 8B (PARTIAL), WEST HAWAII LANDFILL, HAWAII, BY AECOM TECHNICAL SERVICES, INC., NOVEMBER 2011, REVISED OCTOBER 2011.

**FUTURE CELLS**



**BASE LINER (FLOOR & SIDESLOPE)**

SOURCE: \* CONSTRUCTION DRAINAGE, CELL 4B, WEST HAWAII LANDFILL, HAWAII, BY GEOSYNTEC CONSULTANTS, INC., MAY 2011, REVISED OCTOBER 2011.

|  |  |
|--|--|
| BASE CONTAINMENT SYSTEM DETAILS<br>MASTER PLAN<br>WEST HAWAII LANDFILL<br>WAIKOLOA, HAWAII | Geosyntec<br>consultants                                   |
|  | FIGURE NO. <b>3</b>  |
|  | PROJECT NO. <b>WG1339-06</b><br>DATE: <b>12 MARCH 2012</b> |



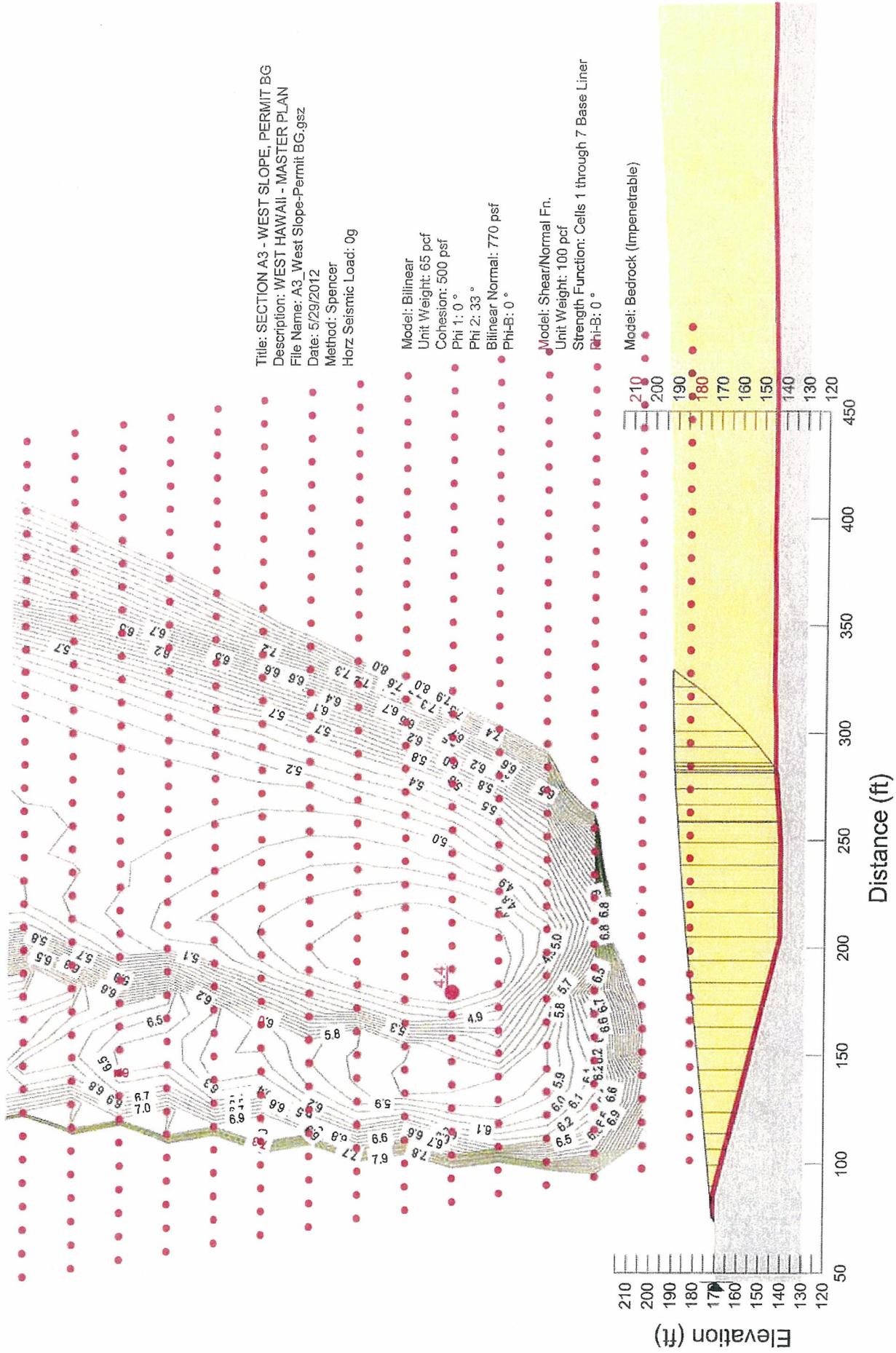
Attachment 1  
Slope Stability Outputs

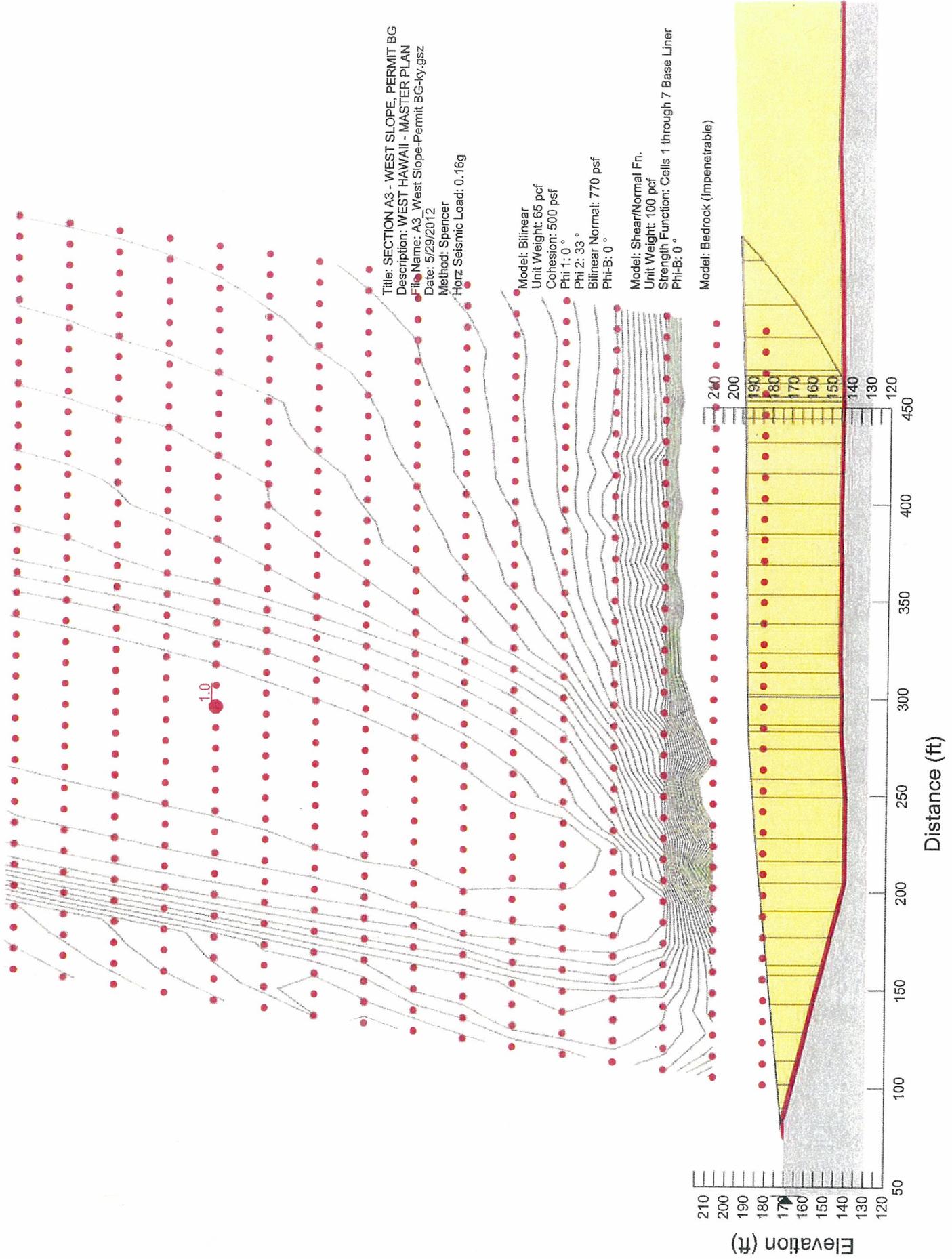
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 Description: WEST HAWAII - MASTER PLAN  
 File Name: A3\_West Slope-Permit BG.gsz  
 Date: 5/29/2012  
 Method: Spencer  
 Horz Seismic Load: 0g

Model: Bilinear  
 Unit Weight: 65 pcf  
 Cohesion: 500 psf  
 Phi 1: 0°  
 Phi 2: 33°  
 Bilinear Normal: 770 psf  
 Phi-B: 0°

Model: Shear/Normal Fn.  
 Unit Weight: 100 pcf  
 Strength Function: Cells 1 through 7 Base Liner  
 Phi-B: 0°

Model: Bedrock (Impenetrable)



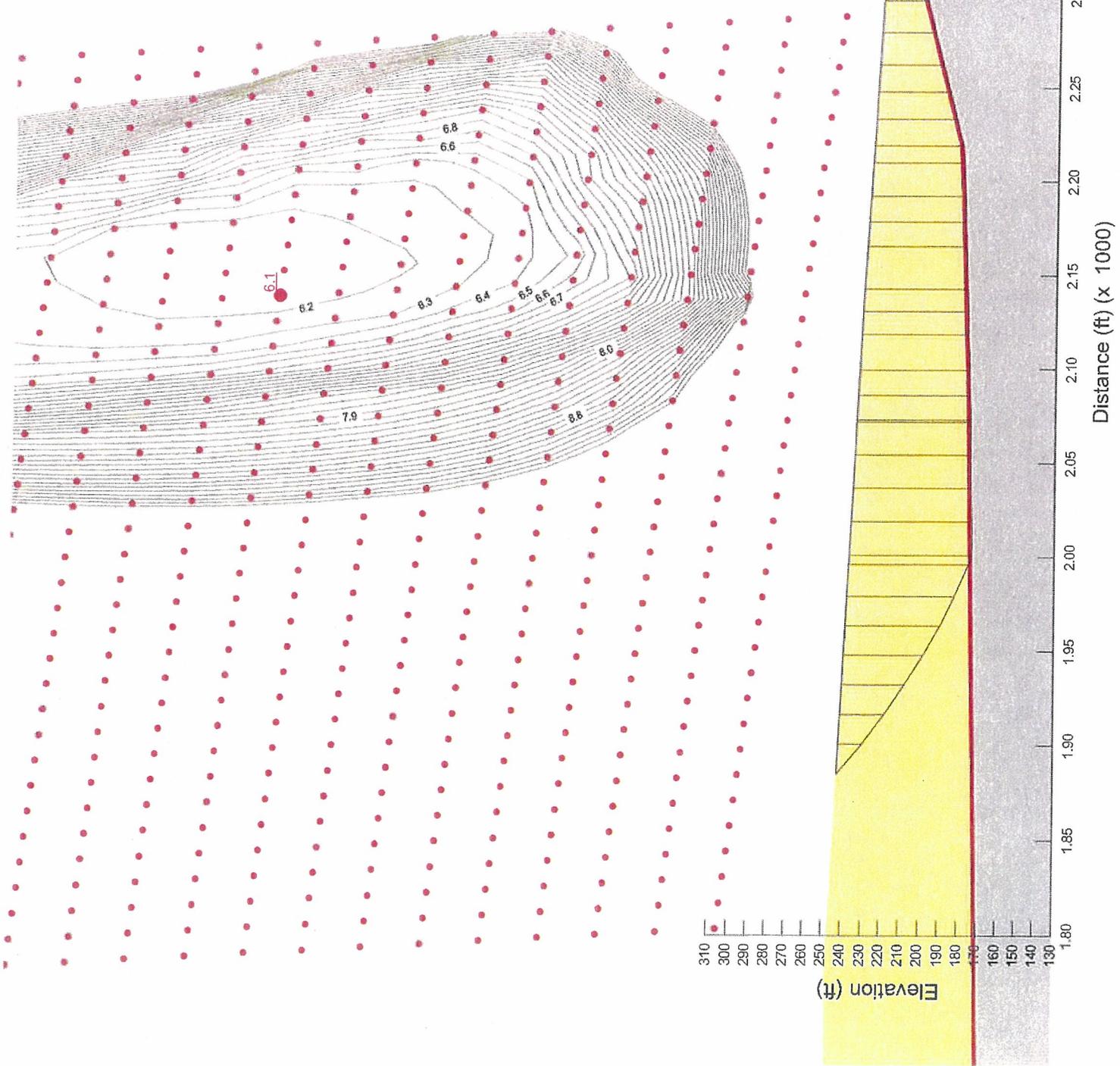


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 Description: WEST HAWAII - MASTER PLAN  
 File Name: A3\_East\_Slope-Permit BG.gsz  
 Date: 5/29/2012  
 Method: Spencer  
 Horz. Seismic Load: 0g

Model: Bilinear  
 Unit Weight: 65 pcf  
 Cohesion: 500 psf  
 Phi 1: 0°  
 Phi 2: 33°  
 Bilinear Normal: 770 psf  
 Phi-B: 0°

Model: Shear/Normal Fn.  
 Unit Weight: 100 pcf  
 Strength Function: Cells 1 through 7 Base Liner

Model: Bedrock (Impenetrable)

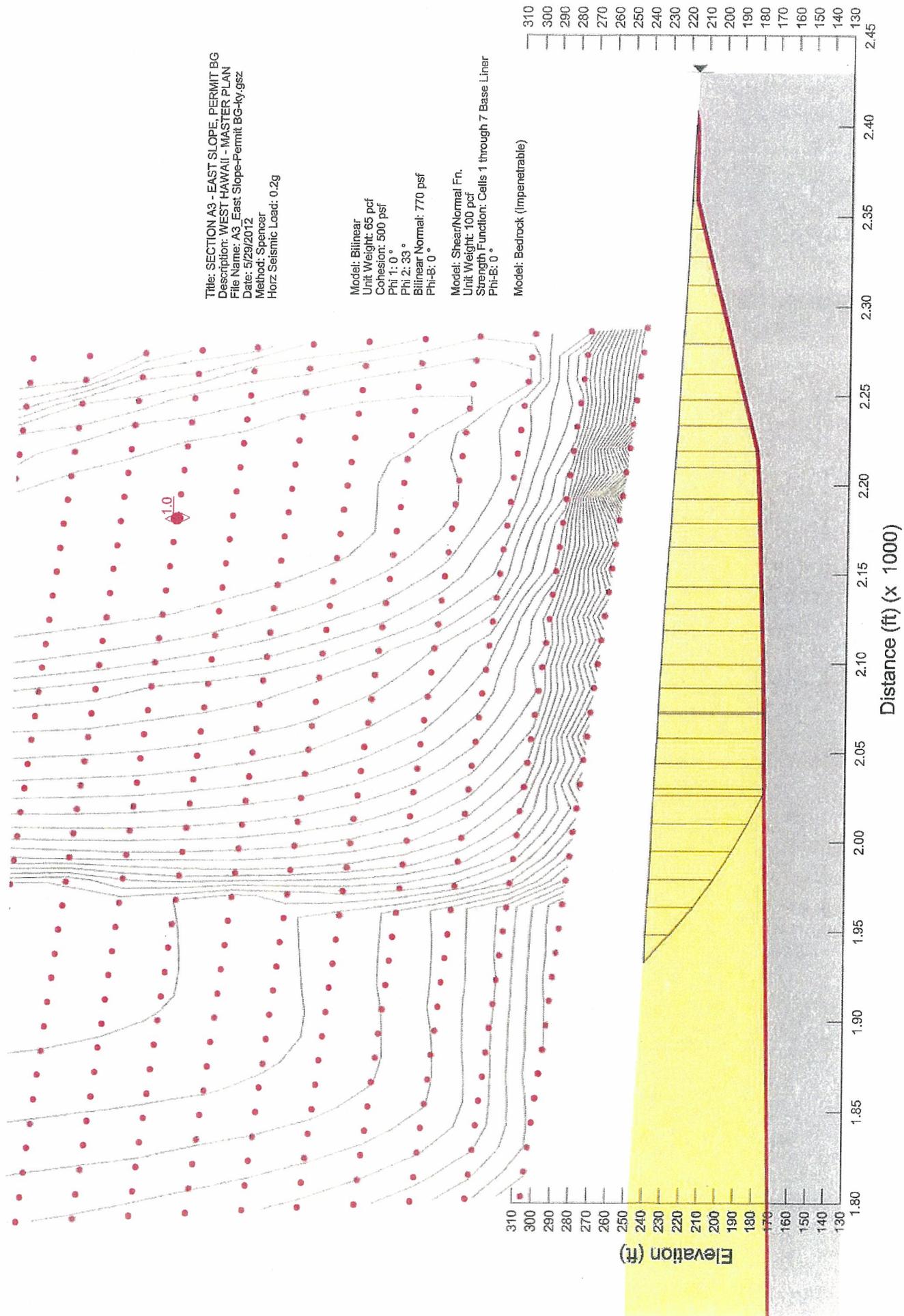


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 File Name: A3\_East Slope-Permit BG-ky.gsz  
 Date: 5/29/2012  
 Method: Spencer  
 Horz Seismic Load: 0.2g

Model: Bilinear  
 Unit Weight: 65 pcf  
 Cohesion: 500 psf  
 Phi 1: 0°  
 Phi 2: 33°  
 Bilinear Normal: 770 psf  
 Phi-B: 0°

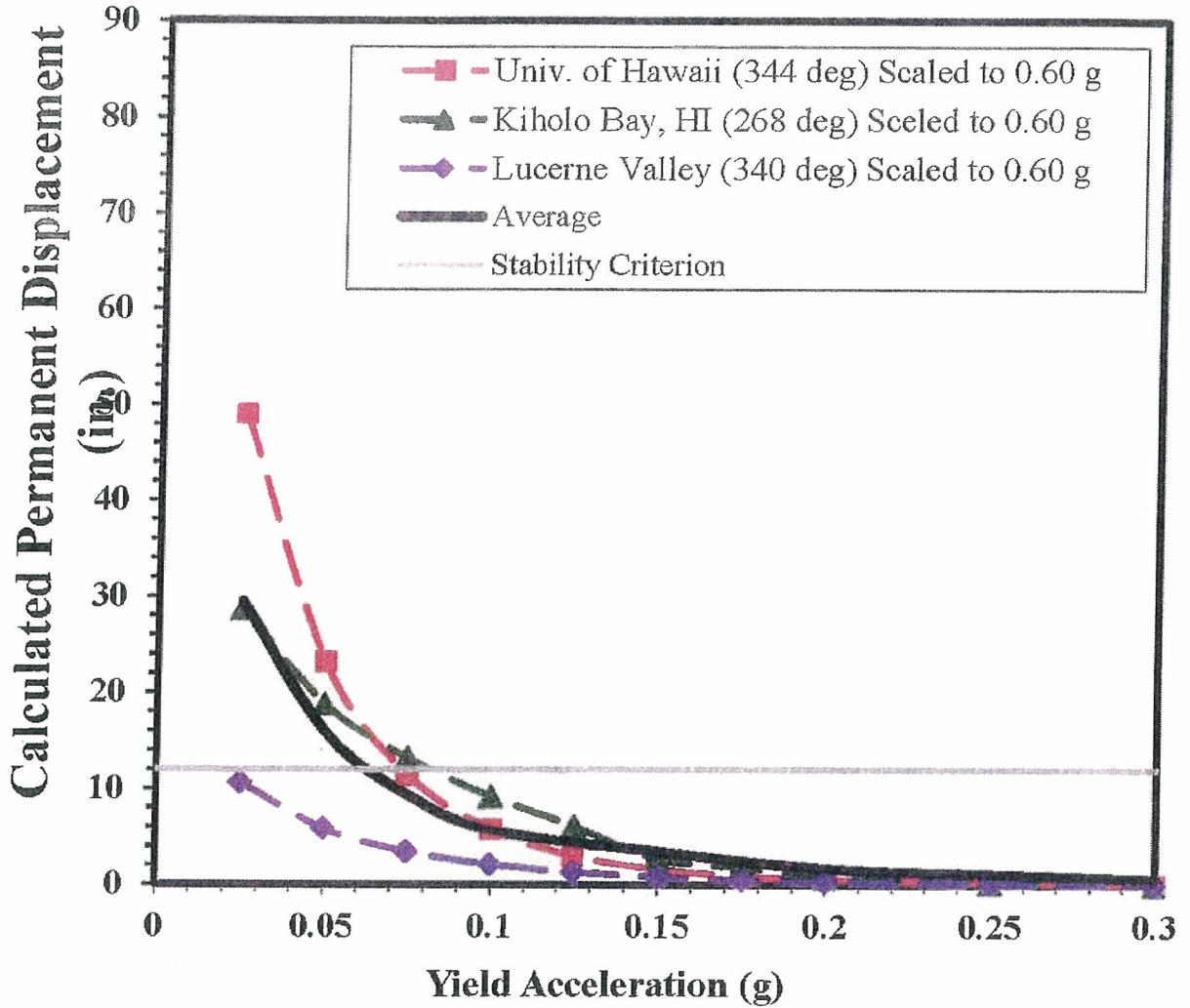
Model: ShearNormal Frn.  
 Unit Weight: 100 pcf  
 Strength Function: Cells 1 through 7 Base Liner  
 Phi-B: 0°

Model: Bedrock (Impenetrable)



Attachment 2  
Seismic Displacement Chart

## West Hawaii Landfill - Liner / 80 ft



**Figure 6: Seismic Displacement Chart – Liner / 80 ft Column  
West Hawaii Sanitary Landfill  
Waikoloa, Hawaii**

**Geosyntec**<sup>®</sup>  
consultants

engineered solutions. integrated.

**Project No.: WG1339-01**

**Date: March 2012**

APR 12 2012



WASTE MANAGEMENT OF HAWAII, INC.  
92-460 Farrington Highway  
Kapolei, Hawaii 96707  
(808) 668-2985

*S*  
*Leone*

March 30, 2012

Steven Chang, P.E., Chief  
Solid & Hazardous Waste Branch  
Department of Health  
Environmental Management Division  
919 Ala Moana Blvd, Room 212  
Honolulu, Hawaii 96814

Subject: Response to Permit Renewal Application Comments  
Solid Waste Management Permit No. LF-0001-08  
West Hawaii Sanitary Landfill

Attention: Janice Fujimoto

Dear Ms. Fujimoto:

On behalf of the County of Hawaii (County), Waste Management of Hawaii, Inc. (WMH) provides our follow up response to your comment letter dated March 15, 2012 relative to our permit renewal application for the West Hawaii Sanitary Landfill. Your comments are listed below followed by the individual response.

- 1. Provide an updated site plan, showing the location of the other proposed County operations at the site.**

**Response to Item 1:**

The County is in the process of updating the site plan depicting proposed operations at this location.

- 2. Provide a summary of design specifications and as-built construction information for Cells 1-7.**

**Response to Item 2:**

This information is found on Figure 1 of the March 12, 2012 Master Plan Report by Geosyntec Consultants submitted to SHWB on March 20, 2012.

- 3. Submit an interim closure plan to address areas where waste has been filled to final grades in portions of Cells 1-8 (approximately 30.7 acres), as shown in correspondence dated May 13, 2010.**

### **Response to Item 3:**

On March 14, 2012, WMH submitted the Master Plan Report for West Hawaii that shows the proposed revised base liner grades as well as the proposed revised final waste grades for West Hawaii Sanitary Landfill. Drawing 5 in the report shows that we are proposing to amend the final grades in the area you have referenced in the correspondence dated May 13, 2010. Therefore, we wish to continue filling waste in this area provided these proposed final grades are adopted into the new operating permit.

- 4. Your original 1993 application indicates that the landfill design and construction is in accordance with Special Permit No. SP91-379. The most recent P-5 Zoning Clearance Form, approved by the County of Hawaii Planning Department, does not make reference to any land use or zoning-related permits. Please clarify whether any land use permits apply to the facility and whether your facility is in compliance with such permits.**

### **Response to Item 4:**

Hawaii County is reviewing the P-5 Zoning Clearance Form to determine if other land use permits are required.

### **5. Slope Stability Analysis**

- a. Based on our review of past CQA reports, Cells 1-7 were constructed with smooth-smooth geomembrane, while Cells 8+ were constructed with single-sided textured geomembrane. The slope stability analyses for Cells 9A Remainder and 10A Partial, prepared by Geosyntec dated June 4, 2010, assumed that all previously constructed cells, in particular, Cells 1 and 2, were constructed with the same materials as Cells 8A Remainder and 9A. Submit a revised analysis to reflect actual materials used in the construction.**

#### **Response to item 5.a:**

Geosyntec Consultants will provide an updated analysis based on the data provided in the March 12, 2012 Master Plan Report by Geosyntec.

- b. Provide the basis for determining the Fn values used in each slope stability analysis. For example, in Cell 2, the Fn value is listed as Fn=1, for the analysis of Cell 10A (remainder) and 11A (partial), but is listed as Fn=3 for the analysis of Cell 9A (remainder) and 10A (partial).**

#### **Response to item 5.b:**

We are reviewing data relative to the various Fn values used in our calculations, and will provide a response once this evaluation is complete.

- c. Please note that future submissions should clearly identify the basis for parameters used in the evaluations.**

#### **Response to item 5.c:**

Agreed.

6. **Groundwater Monitoring Plan.** The Solid Waste Section also received correspondence from Geosyntec Consultants, dated February 28, 2012, responding to questions raised by the SHWB. We have performed a cursory review and request further justification for the elimination of nitrogen-ammonia and other detection monitoring parameters with a leachate/groundwater ratio > 100. Please note that we are continuing to review your submission and may provide additional comments.

**Response to Item 6:**

Geosyntec will provide additional justification for elimination of nitrogen-ammonia parameters as requested.

7. **Please also provide copies of CQA Reports for Cells 3-East, Cell 4, and Cell 5A.**

**Response to Item 7:**

These reports are being reproduced and will be submitted.

**Environmental Impact Statement**

The SHWB also reviewed the Final Environmental Impact Statement for the West Hawaii Landfill, dated October 1991. According to the EIS (Section 2.3), the landfill was expected to be in operation for about 25 years until 2015, with a 4 to 1 refuse to cover ratio, 25 percent buffer area, landfill depth of 30 feet, and final slopes that should not exceed 4 to 1. Since some of these assumptions have changed since the final EIS, the SHWB requests that the county determine whether an updated EIS is warranted for the site.

**Response:**

Hawaii County is reviewing this request and will provide an opinion once their evaluation is complete.

**Alternate Base Elevations**

The SHWB is providing a final opportunity for Waste Management of Hawaii, Inc. (WMH) to proposed alternate base elevations for future cells under this permit review period. As discussed in our meetings with WMH, we expect the engineering plans and associated information for this proposal must be submitted by March 13, 2012. If we do not receive updated information within this time period, we will proceed to process the previously submitted application. New engineering plans for the alternate base elevations may be submitted as a proposed modification, or with the renewal permit application. At a minimum this request shall include:

1. New engineering concept drawings, including base elevations and sump locations.
2. The drawings shall contain enough detail and information to determine compliance with regulations. Considerations that will be evaluated include, but

**are not limited to, seismic stability; leachate collection and removal to ensure less than 30 centimeters of head on the liner system, pint of compliance evaluation; storm water management; sump construction; anchor trenches; etc.**

**Response to items 1 & 2:**

The requested drawings were sent to the SHWB thru correspondence dated March 20, 2012.

- 3. Any associated updates to the groundwater monitoring plan.**
- 4. Evaluation of whether this proposed change triggers an Environmental Assessment/Environment Impact Statement, or other land use related permits.**
- 5. New Attachment P5, Zoning Clearance Form.**
- 6. New Attachment P6, Property Owner Approval Form.**
- 7. Updates to Attachment P2, Public Interest Statement, and relevant portions of Attachment P-3, Operations Plan, addressing the new design capacity of the landfill.**

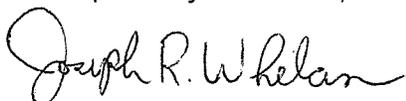
**Responses to comments 3 thru 7:**

Responses to comments 3 thru 7 will be provided once WMH and the County have obtained preliminary approval of the submitted engineering concept drawings, and Hawaii County has concluded their evaluation of the need for other updated documents, such as the EIS.

WMH appreciates the opportunity to address any concerns the SHWB may have regarding the permit renewal application. Due to the complex nature of the responses required by many of the requests contained within your March 15, 2012 comment letter, WMH and the County hereby request a sixty (60) day extension in order to provide a more detailed and complete response.

Please contact me at (808) 668-2985 if you have any questions or require further clarification.

Respectfully submitted,



Joseph R. Whelan  
General Manager  
Waste Management of Hawaii

Cc: Gregory Goodale, P.E., Hawaii County Refuse Chief  
Mike Kaha, WHSL District Manager  
WMH - File

28 February 2012

Janice Fujimoto [janice.fujimoto@doh.hawaii.gov](mailto:janice.fujimoto@doh.hawaii.gov)  
DOH-SHWB  
919 Ala Moana Blvd., Room 212  
Honolulu, HI 96814

**Subject: Response to DOH Comments and Addendum to the 2007 Groundwater and Leachate Monitoring Plan for West Hawaii Sanitary Landfill Waikoloa, Hawaii**

Dear Janice:

This letter addresses your comments and questions that you discussed by phone with Waste Management on January 31, 2012 regarding the 2007 Groundwater and Leachate Monitoring Plan for the West Hawaii Sanitary Landfill. Each comment or question is paraphrased in italics below.

- 1) *Page 16 of the Monitoring Plan (Section 3.2.2) states that “adsorption of metals onto negatively charged clay mineral or organic matter is an important limiting process with respect to metals mobility in this environment.” We understand that DOH questioned if this statement is pertinent to the Site setting because relatively little alteration to clay minerals would be expected for the very young basalt flows.*

We agree that extensive alteration to clay minerals is not expected for the young basalts beneath the Site and thus adsorption of dissolved metals to clays is not as important as it would be for groundwater in a setting with more clay minerals. However, the objective of the discussion in Section 3.2.2 of the 2007 Monitoring Plan and the Guidance Document is to identify effective monitoring parameters to identify potential leachate impacts to groundwater. Accordingly, if insufficient contrast exists between leachate and groundwater exists for a specific parameter, then that parameter is eliminated from further consideration for detection monitoring. For purposes of this plan, however, the parameters that exhibit insufficient contrast are eliminated from statistical analysis, but many of these parameters are still recommended for monitoring as supplemental geochemical parameters.

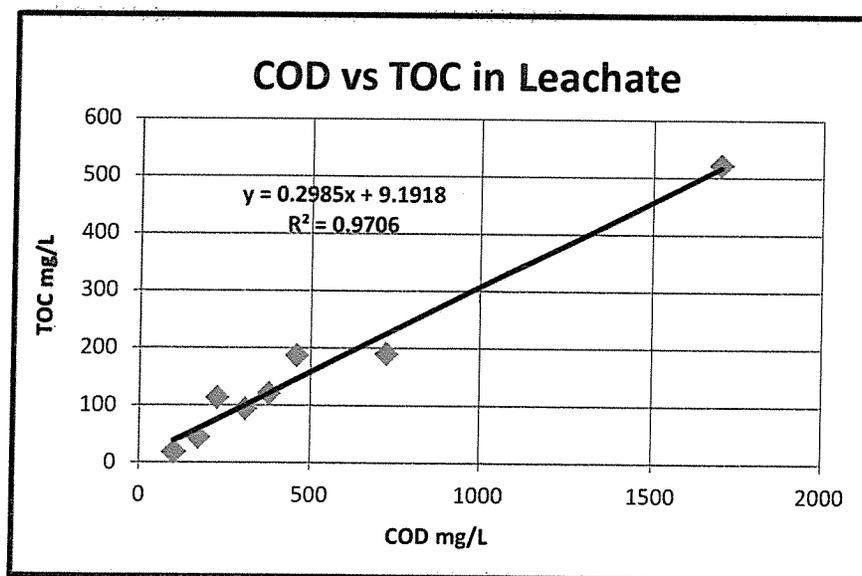
That said, our point about trace metal adsorption onto clay minerals is a general statement and as the basalt weathers, more and more clay mineral development in fractures will occur. Basalt is highly reactive relative to many rocks and the olivine and volcanic glass can alter "quickly" to

clay<sup>1</sup>. Moreover, young reactive basalt may contribute more trace metals to groundwater than a release from the landfill.

Thus, as discussed in Section 3.2.2 of the 2007 Monitoring Plan and presented in Table 3-2, the major metal potassium is identified as a detection monitoring parameter because of the favorable contrast in leachate and groundwater and stability in groundwater.

- 2) *Page 17 of the Monitoring Plan (Section 3.2.2): Chemical oxygen demand (COD) was not selected because it essentially provides the same information as TOC: both COD and TOC are gross-scale measures of the organic carbon content of water and a strong positive statistical correlation between TOC and COD is evident in site leachate.*

As described in Section 3.2.2 of the 2007 Monitoring Plan, both TOC (Total Organic Carbon) and COD (Chemical Oxygen Demand) exhibit leachate/groundwater contrasts to make them possible candidates as detection monitoring parameters. However, only TOC was selected for detection monitoring because on a gross scale, TOC and COD are both indicators of the presence of organic carbon compounds in water. Moreover, the graph below of TOC and COD data for leachate at the landfill, shows a strong correlation between the two parameters: regression coefficient (R<sup>2</sup>) value of 0.97. This indicates that TOC concentrations reliably reflect COD concentration (and vice versa). Accordingly only one of these compounds needs to be monitored. We selected TOC over COD because there was significantly more TOC data in the site's groundwater monitoring database thus allowing more robust statistical evaluation of future data.



<sup>1</sup> Nesbitt and Wilson, 1992, Recent chemical weathering of basalts, Am. Journal of Science, vol. 292, p. 740-777.

3) *The 2007 Monitoring Plan needs to be stamped by a certified hydrogeologist.*

This letter, which is submitted as a response to comments and an addendum to the 2007 Monitoring Plan, is stamped by a certified hydrogeologist. Subsequent documents regarding groundwater and leachate monitoring will also be stamped by a certified hydrogeologist. Should the DOH wishes to have a replacement cover page for the 2007 Monitoring Plan, that can be accommodated as well.

4) *Stiff Diagrams or Piper Plots should be included in every monitoring report.*

As requested, Stiff Diagrams or Piper Plots of detection monitoring parameters will provided with subsequent monitoring reports.

5) *Initial Groundwater Characterization Parameters for Newly Installed Monitoring Wells.*

As discussed, detection monitoring parameters, supplemental monitoring parameters, Subtitle D Appendix II, 17 dissolved and total trace metals shall be collected for eight quarters to establish baseline conditions at newly installed monitoring wells. In addition cyanide, total sulfide, semi-volatile organic compounds, pesticides, herbicides, and PCBs shall be analyzed once following installation of the monitoring well for initial groundwater characterization. Table 3-2 has been updated accordingly and is provided as an attachment to this letter.

Sincerely,



Gordon Thrupp, PhD, PG, CHG  
Associate Hydrogeologist



Attachment: Updated Table 3-2

cc (by email)

Mark Verwiel, Director, Groundwater Protection Program, [mverwiel@wm.com](mailto:mverwiel@wm.com)

Justin H. Lottig, Environmental Protection Manager, [JLottig@wm.com](mailto:JLottig@wm.com)

**Table 3-2 Updated February 2012  
Detection Monitoring Program Parameters  
West Hawaii Sanitary Landfill  
Puuanahulu, North Kona, Hawaii**

|   | Frequency  | Locations                      |
|---|--|--------------------------------|
| <b>GROUNDWATER</b><br><b>Detection Monitoring Parameters</b><br>Volatile Organic Compounds (VOCs) -- EPA 8260B Parameters<br>Total Organic Carbon (TOC)<br>Dissolved Potassium<br>Bicarbonate Alkalinity  | Semi-Annual  | WHW-01, WHW-02, WHW-03, WHW-04 |
| <b>Supplemental Monitoring Parameters</b><br>Bromide<br>Chloride<br>Sulfate<br>Dissolved Calcium<br>Dissolved Magnesium<br>Dissolved Sodium<br>Total Dissolved Solids (TDS)   | Semi-Annual  | WHW-01, WHW-02, WHW-03, WHW-04 |
| <b>Initial Groundwater Characterization Parameters</b><br>(1) detection monitoring parameters, above<br>(2) supplemental geochemical parameters, above<br>(3) Subtitle D Appendix II parameters, below<br>17 "dissolved" and "total" trace metals: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Ni, Se, Ag, Tl, Sn, V, Zn<br>Cyanide, total<br>Total Sulfide<br>Semivolatile Organic Compounds<br>Pesticides<br>Herbicides<br>PCBs   | Quarterly<br>Quarterly<br>Quarterly<br>Quarterly<br>Once, upon installation<br>Once, upon installation<br>Once, upon installation<br>Once, upon installation<br>Once, upon installation<br>Once, upon installation | Newly Installed Wells          |
| <b>LEACHATE</b><br><b>Routine Leachate Monitoring Parameters</b><br>Alkalinity (includes total, bicarbonate, and carbonate)<br>Bromide<br>Chloride<br>Sulfate<br>Calcium, total<br>Magnesium, total<br>Potassium, total<br>Sodium, total<br>Total Dissolved Solids (TDS)<br>Total Organic Carbon (TOC)<br>VOCs (EPA Method 8260B analytes)  | Annually   | Sump-1, Sump-2                 |
| <b>Non-Routine Leachate Characterization Parameters</b><br>17 "total" trace metals: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Ni, Se, Ag, Tl, Sn, V, Zn<br>Cyanide, total<br>Total Sulfide<br>Semivolatile Organic Compounds<br>Pesticides<br>Herbicides<br>PCBs<br>Major cations and anions (covered by routine monitoring, above) – (Mg, Na, Ca, K, Cl, carbonate, sulfate, and bicarbonate)<br>Major leachate indicators (partially covered by routine monitoring, above) – (TDS, TOC, Total Alkalinity, Nitrogen-Ammonia, Cl, Fe)<br>Field measurements (performed in accordance with Sampling and Analysis procedures in Section 5.0) – (electrical conductance, pH, temperature, and turbidity) | Biennially   | Sump-1, Sump-2                 |

**WEST HAWAII SANITARY LANDFILL  
WASTE MANAGEMENT OF HAWAII, INC.**

**OPERATING PLAN**

***Solidification Pit for Liquid-Containing Wastes***

**APRIL 2007**

**INTRODUCTION**

Waste Management of Hawaii, Inc. (WMH) has prepared this updated Operating Plan for the solidification of wastes containing free-liquids at the West Hawaii Sanitary Landfill (WHSL). Wastes containing free liquids are not permitted for direct landfill disposal. The WHSL offers on-site liquid solidification services. All wastes managed within the solidification pit are non-hazardous and can include grease trap waste, waste liquids, food waste, and other solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial and agricultural operations as defined in Hawaii Administrative Rules (HAR) Title 11, Chapter 58.1. It is estimated that approximately 10 to 20 tons per day will be accepted for processing into the landfill.

**ACCEPTANCE OF LIQUIDS**

All wastes containing free liquids are considered a special waste under WMH's Special Waste Program, and are profiled on a *Generator's Waste Profile Sheet* (attached), and approved prior to acceptance at the WHSL to ensure environmental protection and compliance. All liquid-containing wastes must go through the process of solidification prior to disposal at the WHSL to determine compliance with State and Federal regulations. A free-liquids test (paint-filter test [Method 9095, in accordance with "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods]) will be conducted on an "as-needed" basis in order to ensure quality control of the final mixture. Basic visual inspection of the solidified waste will be conducted to ensure no free liquid is observed leaving the pit. A *Solidification Log* (attached) is used to track incoming liquid-containing wastes, tonnages, generators/haulers, and to verify solidification of the waste.

**TREATMENT/SOLIDIFICATION/DISPOSAL PROCEDURE**

The WHSL solidification pit is currently located in MSW Cell 3 above the existing composite liner. The pit may be relocated to another lined landfill cell at some time in the future to ensure that it is near the active working face. The solidification pit is constructed of half-inch steel plates, approximately 10 feet high, 15 feet wide, and 20 feet deep.

An initial layer of absorbent material (typically sand) is placed in the solidification pit prior to the discharge of a waste load, which results in better solidification of wastes. Non-hazardous liquids and/or semi-solids are off-loaded into the prepared pit. Additional absorbent material is used as a bulking agent to absorb liquids. The materials are mixed together with an excavator or front-end loader. Once enough absorbent has been added to eliminate all free liquids, the material is excavated from the pit, loaded into a dump truck, and disposed at the active working face of the landfill.

## **DUST CONTROL**

The WHSL has developed a Dust Control Plan for site operations, which includes the solidification pit area. Water and/or leachate shall be sprayed whenever necessary to minimize or eliminate visible particulate emissions of fugitive dust in and around the solidification pit area. The Department of Health has approved the use of leachate for dust control purposes as long as it is applied over the lined area of the landfill. Intermediate cover has been placed in the area of the solidification pit.

## **ODOR CONTROL**

Small quantities of liquid wastes solidified at the WHSL do not generate noticeable odors. Larger volume of liquid-containing wastes can produce some odors, but the extent of impact occurs within a radius of 20 to 50 feet from the pit. Any wind-carried odors dissipate to a negligible detection beyond this radius of influence. To date, no odors have been detected beyond the landfill footprint. Odor monitoring will be conducted from the pit area to the down-wind landfill footprint to ensure odor migration is minimized. The solidification of the waste containing free-liquids is performed efficiently and safely in order to minimize any potential odor impact. The solidified waste is transferred to the active working face immediately after being processed.

## **VECTOR CONTROL**

Solidification operations are monitored as necessary for the presence of vectors. To date, the WHSL has not experienced vector problems. After a waste load is solidified and disposed at the active working face, the pit is cleaned out and filled with fresh absorbent, thus eliminating any potential vector attractants. If vectors are identified at the working face or solidification pit, a local exterminator will be contracted to control/eradicate the vectors.

## **STORM WATER CONTROL**

The WHSL has been granted an exemption from NPDES permit requirements, however, if run-on / run-off of water is observed, WHSL Operations personnel will berm affected areas to control flows. Slope grades are also maintained to control water flow.

# GENERATOR'S WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

Service Agreement on File?  YES  NO  
 Hazardous  Non-Hazardous  TSCA

Profile Number: WMI \_\_\_\_\_  
 Renewal Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

## A. Waste Generator Information

1. Generator Name: \_\_\_\_\_ 2. SIC Code: \_\_\_\_\_  
 3. Facility Street Address: \_\_\_\_\_ 4. Phone: \_\_\_\_\_  
 5. Facility City: \_\_\_\_\_ 6. State/Province: \_\_\_\_\_  
 7. Zip/Postal Code: \_\_\_\_\_ 8. Generator USEPA/Federal ID#: \_\_\_\_\_  
 9. County: \_\_\_\_\_ 10. State/Province ID#: \_\_\_\_\_  
 11. Customer Name: \_\_\_\_\_ 12. Customer Phone: \_\_\_\_\_  
 13. Customer Contact: \_\_\_\_\_ 14. Customer Fax: \_\_\_\_\_  
 15. Billing Address: \_\_\_\_\_  Same as above

## B. Waste Stream Information

1. Description  
 a. Name of Waste: \_\_\_\_\_  
 b. Process Generating Waste: \_\_\_\_\_

|          |                            |                                |                                 |           |                           |                                       |
|----------|----------------------------|--------------------------------|---------------------------------|-----------|---------------------------|---------------------------------------|
| c. Color | d. Strong odor (describe): | e. Physical State @ 70°F       |                                 | f. Layers | g. Free liquid range to % |                                       |
|          |                            | <input type="checkbox"/> Solid | <input type="checkbox"/> Liquid |           |                           | <input type="checkbox"/> Single Layer |
|          |                            | <input type="checkbox"/> Gas   | <input type="checkbox"/> Sludge |           |                           |                                       |
|          |                            | <input type="checkbox"/> Other |                                 |           | h. pH: Range to %         |                                       |

i. Liquid Flash Point:  <73°F  73-99°F  100-139°F  140-199°F  ≥200°F  Not applicable

j. Chemical Composition (List all constituents [including halogenated organics, debris, and UHCs] present in any concentration and submit representative analysis):

| Constituents | Concentration Range | Constituents | Concentration Range |
|--------------|---------------------|--------------|---------------------|
|              |                     |              |                     |
|              |                     |              |                     |
|              |                     |              |                     |

**TOTAL COMPOSITION MUST EQUAL OR EXCEED 100%**

k.  Oxidizer  Pyrophoric  Explosive  Radioactive  
 Carcinogen  Infectious  Shock Sensitive  Water Reactive

l. Does the waste represented by this profile contain any of the carcinogens which require OSHA Notification? (list in Section B.1.j) .....  YES  NO  
 m. Does the waste represented by this profile contain dioxins? (list in Section B.1.J) .....  YES  NO  
 n. Does the waste represented by this profile contain asbestos? .....  YES  NO  
 If yes .....  friable  non-friable  
 o. Does the waste represented by this profile contain benzene? .....  YES  NO  
 If yes, concentration \_\_\_\_\_ Ppm  
 Is the waste subject to the benzene waste operations NESHAP? .....  YES  NO  
 p. Is the waste subject to RCRA Subpart CC controls? .....  YES  NO  
 If yes, volatile organic concentration \_\_\_\_\_ ppm  
 q. Does the waste contain any Class I or Class II ozone-depleting substances? .....  YES  NO  
 r. Does the waste contain debris? (list in Section B.1.j) .....  YES  NO

2. Quantity of Waste  
 Estimated Volume \_\_\_\_\_  Tons  Yards  Drums  Other (specify) \_\_\_\_\_

3. Shipping Information  
 a. Packaging:  
 Bulk Solid; Type/Size: \_\_\_\_\_  Bulk Liquid; Type/Size: \_\_\_\_\_  
 Drum; Type; Size: \_\_\_\_\_  Other: \_\_\_\_\_  
 b. Shipping Frequency: Units \_\_\_\_\_ Per:  Mont  Quarter  Year  One time  Other \_\_\_\_\_  
 c. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If No, skip d, e, and f) .....  YES  NO

GENERAL WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

Profile Number: WMI \_\_\_\_\_

- d. Reportable Quantity (lbs; kgs.): \_\_\_\_\_
- e. Hazard Class/ID#: \_\_\_\_\_
- f. USDOT Shipping Name: \_\_\_\_\_
- g. Personal Protective Equipment Requirements: \_\_\_\_\_
- h. Transporter/Transfer Station: \_\_\_\_\_

**C. Generator's Certification (Please check appropriate responses, sign and date below.)**

1. Is this a USEPA hazardous waste (40 CFR Part 261)? If the answer is no, skip to 2.  YES  NO
  - a. If yes, identify ALL USEPA listed and characteristic waste code numbers (D, F, K, P, U) \_\_\_\_\_
  - b. If a characteristic hazardous waste, do underlying hazardous constituents (UHCs) apply? (If yes, list in Section B.1.j)  YES  NO
  - c. Does this waste contain debris? (If yes, list size and type in Chemical Composition - B.1.)  YES  NO
2. Is this a state hazardous waste \_\_\_\_\_ Identify ALL state hazardous waste codes \_\_\_\_\_  YES  NO
3. Is the waste from a CERCLA (40 CFR 300, Appendix B) or state mandated clean-up? \_\_\_\_\_ If yes, attach Record of Decision (ROD), 104/106 or 122 order or court order that governs site clean-up Activity. For state mandated clean-up, provide relevant documentation.  YES  NO
4. Does the waste represented by this waste profile sheet contain radioactive material, or is disposal Regulated by the Nuclear Regulatory Commission? \_\_\_\_\_  YES  NO
5. Does the waste represented by this waste profile sheet contain concentrations of Polychlorinated Biphenyls (PCBs) regulated by 40 CFR 761? (If yes, list in Chemical Composition - B.1.j) \_\_\_\_\_  YES  NO
  - a. If yes, were the PCBs imported into the U.S.? \_\_\_\_\_  YES  NO
6. Do the waste profile sheet and all attachments contain true and accurate descriptions of the waste Material, and has all relevant information within the possession of the Generator regarding known or Suspected hazards pertaining to the waste been disclosed to the Contractor? \_\_\_\_\_  YES  NO
7. Will all changes which occur in the character of the waste be identified by the Generator and disclosed to the Contractor prior to providing the waste to the Contractor? \_\_\_\_\_  YES  NO

Check here if a Certificate of Destruction or Disposal is required.

Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. I authorize WMI to obtain a sample from any waste shipment for purposes of recertification. If this certification is made by a broker, the undersigned signs as authorized agent of the generator and has confirmed the information contained in this Profile Sheet from information provided by the generator and additional information as it has determined to be reasonably necessary. If approved for management, Contractor has all the necessary permits and licenses for the waste that has been characterized and identified by this approved profile.

Certification Signature: \_\_\_\_\_ Title: \_\_\_\_\_

Name (Type or Print): \_\_\_\_\_ Company Name: \_\_\_\_\_ Date: \_\_\_\_\_

Check if additional information is attached. Indicate the number of attached pages \_\_\_\_\_

**D. WMI Management's Decision**

**FOR WMI USE ONLY**

1. Management Method  Landfill  Non-hazardous Solidification  Bioremediation  Incineration  
 Hazardous Stabilization  Other (Specify) \_\_\_\_\_
2. Proposed Ultimate Management Facility: \_\_\_\_\_
3. Precautions, Special Handling Procedures, or Limitation on Approval: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Special Waste Decision \_\_\_\_\_  Approved  Disapproved

Salesperson's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Division Approval Signature (Optional): \_\_\_\_\_ Date: \_\_\_\_\_

Special Waste Approvals Person Signature: \_\_\_\_\_ Date: \_\_\_\_\_



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Harding Lawson Associates  
July 27, 1994



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Mr. Ali Mehr  
RUST Environment & Infrastructure, Inc.  
18401 Von Karman Avenue, Suite 550  
Irvine, California 96715

**Response to Comments  
Point of Compliance Assessment  
West Hawaii Landfill  
Puuanahulu, Hawaii**

Dear Mr. Mehr:

As requested in the state of Hawaii's letter dated March 24, 1994, from Mr. John Harder concerning the Point of Compliance Assessment review, Harding Lawson Associates (HLA) herewith provides the following responses to comments contained in RUST's review which was transmitted on February 28, 1994 to the state of Hawaii.

Comment 1. "The WHSL Alternative Liner Evaluation discusses in detail, many points and presents data (input parameters) which do not affect the output of the steady state model. We recommend discussion of these points only to the extent that they emphasize conservatism of the steady state model process."

Response: As mentioned throughout RUST's review, various input parameters are conservative. Input values are either default values of the HELP model or values that represent site conditions. Specifically, the liner leakage fraction (0.01) is more conservative than would normally be used because the subgrade of the WHSL is coarse (3/4 inch) aggregate. Therefore, the liner potentially may have more, and larger, holes than if finer subgrade material were used.

As for the 5-year modeling period used in the HELP model, the closure plan and Cell Sequencing Plan specifies that each cell will receive intermediate cover as it reaches final grade. After two or three cells have intermediate cover, final cover will be placed. The estimated operating life of the cells that contribute leachate to one specific leachate collection sump is 25 to 50 years. Since the HELP runs were conservative in estimating the quantity of leachate percolation through the liner system due to chosen depth of refuse (approximately one-fourth of the total average depth of refuse in the landfill), we assumed that the additional refuse added to the modeled layer will compensate for the increase of moisture in the initial refuse layer. However, as requested, we have regenerated the HELP models for the open (50-year modeling period) and closed (30-year modeling period) conditions. The

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Mr. Ali Mehr  
RUST Environment & Infrastructure, Inc.  
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Harding Lawson Associates

results are similar to our original findings, such that a minimal quantity of leachate is estimated to percolate through the liner system (approximately 0.02 percent). The regenerated HELP model runs are enclosed with this letter.

Comment 2. "The model was used to calculate the final concentration of one specific chemical compound, methoxychlor, at the point of compliance. The model should be utilized to calculate a dilution attenuation factor (DAF). This factor can then be applied to several compounds at assumed or measured concentrations and subsequently compared to the MCL's presented in Table 1 of 40 CFR 258.40."

Response: The recommendation to use a dilution attenuation factor (DAF) is from EPA's Guidance Manual for Solid Waste Disposal Criteria. At the time of the assessment, the Guidance Manual was a draft manual and presented one way to evaluate the parameter concentrations at the point of compliance. It is a guidance document and not a prescribed method of evaluating/design solid waste facilities. The DAF generalizes many of the chemical and aquifer characteristics that are required by MULTIMED, and results in a factor that may not model the actual conditions at the point of compliance. HLA's approach, to which Waste Management of Hawaii, Inc. agreed, utilized chemical and site-specific parameters to assess the concentrations of a specific parameter. This approach, in our opinion, better represents actual conditions that are expected at the WHLF. However, our analysis did not address all of the parameters listed in Table 1 of 40 CFR 258.40; thus, an additional MULTIMED run was generated (and this used the DAF method described in the technical guidance manual), which is enclosed with this letter. A summary of the results is presented in the table below.

| <b>Chemical</b>                    | <b>Estimated Leachate Concentration* (mg/l)</b> | <b>Predicted Concentration at POC (mg/l)</b> | <b>MCL (mg/l)</b> |
|------------------------------------|---|--|-------------------|
| Arsenic                            | 0.042   | $5 \times 10^{-7}$                           | 0.05              |
| Barium                             | 0.85  | $1 \times 10^{-5}$                           | 1.0               |
| Benzene                            | 0.22  | $3 \times 10^{-6}$                           | 0.005             |
| Cadmium                            | 0.022   | $3 \times 10^{-7}$                           | 0.01              |
| Carbon tetrachloride               | 0.20  | $2 \times 10^{-6}$                           | 0.005             |
| Chromium (hexavalent)              | 0.18  | $2 \times 10^{-6}$                           | 0.05              |
| 2,4-Dichlorophenoxy acetic acid    | 0.13  | $2 \times 10^{-6}$                           | 0.1               |
| 1,4-Dichlorobenzene                | 0.013   | $2 \times 10^{-7}$                           | 0.075             |
| 1,2-Dichloroethane                 | 1.8   | $2 \times 10^{-5}$                           | 0.005             |
| 1,1-Dichloroethylene               | NR  | N/P  | 0.007             |
| Endrin                             | 0.017   | $2 \times 10^{-7}$                           | 0.0002            |
| Flouride                           | NR  | N/P  | 4                 |
| Lindane                            | 0.00002   | $2 \times 10^{-10}$                          | 0.004             |
| Lead                               | 0.16  | $2 \times 10^{-6}$                           | 0.05              |
| Mercury                            | 0.0020  | $2 \times 10^{-8}$                           | 0.002             |
| Methoxychlor                       | NR  | N/P  | 0.1               |
| Nitrate                            | 1.9   | $2 \times 10^{-5}$                           | 10                |
| Selenium                           | 0.012   | $1 \times 10^{-7}$                           | 0.01              |
| Silver                             | 0.021   | $3 \times 10^{-7}$                           | 0.05              |
| Toxaphene                          | 0.001   | $1 \times 10^{-8}$                           | 0.005             |
| 1,1,1-Trichloromethane             | NR  | N/P  | 0.2               |
| Trichloroethylene                  | 0.19  | $2 \times 10^{-6}$                           | 0.005             |
| 2,4,5-Trichlorophenoxy acetic acid | NR  | N/P  | 0.01              |
| Vinyl Chloride                     | 0.036   | $4 \times 10^{-7}$                           | 0.002             |

\* U.S. EPA. 1988. *Summary of Data on Municipal Solid Waste Landfill Leachate Characteristics*. Draft Background Document. EPA/530-SW-88-038. July

DAF = Dilution Attenuation Factor =  $1.2 \times 10^{-5}$  (when multiplying) or  $8.0 \times 10^4$  (when dividing)  
 MCL = Maximum Contaminant Level  
 NR = Not Reported  
 POC = Point of Compliance

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As shown in the table, the estimated concentrations of the listed parameters do not exceed the maximum contaminant levels (MCLs) at the point of compliance.

Comment 3. "The relevant POC should be located a minimum (*sic*) of 150 meters from the landfill unit, For conservatism, consider an assumption that the POC is 1 meter downgradient from a potential release from the landfill unit."

Response: The distance from the middle of the landfill (where average concentrations will occur) to the property line (the property line is less than 150 meters away from the edge of the landfill unit) was used as the distance to the point of compliance. Although this approach may be less conservative, we believe that it is more realistic. However, since we regenerated the MULTIMED model (specifically in light of Comment 4), we also modified the distance to the point of compliance to be 90 meters (the property boundary is approximately 90 meters from the downgradient edge of the landfill boundary), providing a more conservative result.

Comment 4. "The groundwater recharge rate assumed in the MULTIMED model simulations is .92 meters per year. This far exceeds the annual precipitation rate of 15 inches. For conservatism this parameter should be neglected (0 recharge) in the model."

Response: The groundwater recharge rate of 0.92 meter per year was unfortunately miscalculated. The intended recharge rate was 0.27 meter per year. The MULTIMED model was regenerated using the appropriate value.

Comment 5. "In the West Hawaii Landfill Assessment, it is not clearly defined how the infiltration rates were derived. Although the selected values are conservative, clarification of their derivation is necessary."

Response: The leachate infiltration rate was taken from the HELP model output generated for the active landfill condition.

Comment 6. "In order to establish a measured level of confidence with the modelled results, an uncertainty or sensitivity analysis should be performed. This analysis should incorporate the models most critical parameters as discussed above."

Response: HLA performed four sensitivity simulations to evaluate final concentrations using an initial higher concentration of methoxychlor (approximately two orders of magnitude larger) or higher infiltration rates (approximately five

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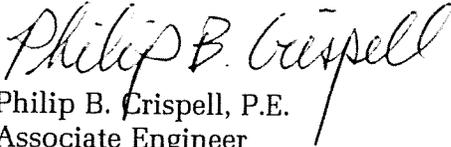
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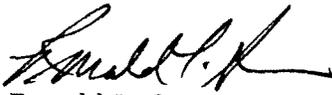
orders of magnitude larger). The results indicated that the predicted concentrations increased by two to five orders of magnitude, depending on the increase of the input parameter. To establish a measured level of confidence, 10 to 20 runs are required to develop a statistical sample base. However, a qualitative level of confidence can be established with the performed sensitivity simulations and the choice of conservative input values, which have been described by RUST as being conservative or very conservative in some instances.

If you have any questions or need additional information concerning the above responses, please call (808) 486-6099.

Sincerely yours,

**HARDING LAWSON ASSOCIATES**

  
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Enclosures: HELP  
MULTIMED

cc: Mr. John Harder/State DOH  
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