Volume 2 of 3

Final Environmental Impact Statement
Prepared in Accordance with Chapter 343, Hawaii Revised Statutes and Title 11, Chapter 200, Hawaii Administrative Rules

Appendices Waimānalo Gulch Sanitary Landfill Lateral Expansion

Waimānalo Gulch, Oʻahu, Hawaiʻi
TMKs: (1) 9-2-003: 072 and 073

October 2008

City and County of Honolulu
Department of Environmental Services
1000 Uluohia Street, 3rd Floor
Kapolei, Hawaiʻi 96707

R. M. TOWILL CORPORATION
SINCE 1930
2024 North King Street, Suite 200
Honolulu, Hawaii 96819-3494

1-21149-00

EXHIBIT "3"

Volume 2 of 3

Draft Environmental Impact Statement

Appendices
Waimānalo Gulch Sanitary Landfill Lateral Expansion

Waimānalo Gulch, O‘ahu, Hawai‘i
TMKs: (1) 9-2-003: 072 and 073

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Prepared Pursuant to
Chapter 343, Hawai‘i Revised Statutes, and
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Prepared for:
City and County of Honolulu
Department of Environmental Services
Kapolei, Hawai‘i 96707

Prepared by:
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2024 North King Street, Suite 200
Honolulu, Hawai‘i 96819-3494

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Appendix A

Notice of Violation, January 31, 2006, and
Settlement Agreement, December 7, 2007,
State Department of Health

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EMD/SHWB

January 31, 2006

S0203JR

CERTIFIED MAIL NO. 7005 1160 0003 8275 9819
RETURN RECEIPT REQUESTED

Mr. Paul Burns, Vice President/General Manager
Waste Management of Hawaii, Inc.
92-460 Farrington Highway
Kapolei, Hawaii 96707

CERTIFIED MAIL NO. 7005 1160 0003 8275 9758
RETURN RECEIPT REQUESTED

Mr. Eric Takamura, Director
Department of Environmental Services
City and County of Honolulu
1000 Uluohia Street
Kapolei, Hawaii 96707

Dear Messrs. Burns and Takamura:

SUBJECT: NOTICE OF VIOLATION/ORDER

Under the authority of section 342H-7 of the Hawaii Revised Statutes, you are hereby notified that we are issuing a Notice of Violation (NOV) and Order for the implementation of corrective actions regarding state solid waste noncompliance issues. The documents are enclosed.

Pursuant to section 342H-7, any order issued shall become final, and the penalty imposed under this chapter shall become due and payable twenty (20) calendar days after the notice of penalty is served, unless the person or persons named therein request a hearing before the Director of Health. The request for a hearing must be made in writing, no later than twenty (20) calendar days after the NOV and Order are served. Furthermore, if the penalty is not paid to the Department of Health within thirty (30) calendar days after it becomes due and payable, the Director may institute a civil action in the name of the State to recover the civil penalty, which shall be a government realization.

Please direct all inquiries concerning this matter to Steven Y.K. Chang, P.E., Chief, Solid and Hazardous Waste Branch, Department of Health, 919 Ala Moana Boulevard, Room 212, Honolulu, Hawaii 96814.

Sincerely,

Linda Rosen

LAURENCE K. LAU
Deputy Director for Environmental Health

Enclosures

c: Kathleen Ho, Deputy Attorney General
Thomas P. Rack, Hearings Officer (NOV, Order)

IN THE DEPARTMENT OF HEALTH

STATE OF HAWAII

DEPARTMENT OF HEALTH, STATE OF HAWAII,	) DOCKET NO. 05-SHW-SWS-004
COMPLAINANT,	)
vs.	)
WASTE MANAGEMENT OF HAWAII, INC. AND CITY and COUNTY OF HONOLULU;	) NOTICE AND FINDING OF VIOLATION
RESPONDENTS.	)

NOTICE AND FINDING OF VIOLATION

A. INTRODUCTION

1. This is an administrative enforcement action instituted pursuant to §342H-7 of the Hawaii Revised Statutes ("HRS"), and the Department of Health's Solid Waste Management Control Rules, Chapter 11-58.1, Hawaii Administrative Rules ("HAR"). Complainant is the Department of Health ("DOH"), Solid Waste Section ("SWS"). RESPONDENTS are Waste Management of Hawaii, Inc. (WMH) and City and County of Honolulu ("RESPONDENTS").

2. At all times pertinent hereto, RESPONDENTS owned, operated, controlled, or managed a solid waste disposal facility at the Waimanalo Gulch Sanitary Landfill ("facility") located at 92-460 Farrington Highway, Kapolei, Hawaii.

3. On the basis of information obtained during the course of investigation, SWS has determined that RESPONDENTS have violated HRS 342H, HAR 11-58.1, and RESPONDENTS' solid waste management permit.

B. JURISDICTION

4. HRS §342H-7 authorizes DOH to issue orders assessing a penalty for any past or current violation of HRS chapter 342H, the rules adopted thereunder, or any term or condition of a permit issued pursuant to the chapter, and to require compliance

immediately or within a specified time.

5. RESPONDENTS are a "person" as defined in HRS §342H-1.

6. At all relevant times pertinent hereto, RESPONDENTS held a Solid Waste Management Permit ("permit"), Permit Number LF-0054-02, which was issued on May 15, 2003 and expires on April 30, 2008.

C. STATEMENT OF FACTS

COUNT I

(Exceedence of Permitted Grades)

7. Paragraphs 1 through 6 above are incorporated herein by this reference as if they were set forth here in their entirety.

8. On January 26, 2005, during a meeting between WMH and DOH, WMH stated that they overfilled areas in the ash monofill and MSW cells. WMH provided a drawing documenting the overfill areas to DOH. The drawing was based on an aerial survey conducted in January 7, 2005.

9. In a letter dated February 3, 2005, WMH states "approximately 100,000 tons of ash delivered from the H-Power facility has been placed above the current permitted grades of the ash monofill". The February 3, 2005 letter further states that the placement of ash occurred during 2004.

10. In WMH's Annual Operating Report (AOR) for 2004, dated February 20, 2005, WMH states that for the period between July 1, 2003 and June 30, 2004, the landfill received 96,239 tons of H-Power ash. The AOR further states that based on the January 15, 2004 topography, there is no remaining airspace in the ash monofill.

11. With a submission dated February 22, 2005, WMH provided DOH an isopach drawing dated February 2005, showing 2005 topography and master plan final grades. WMH noted that 139,485 cubic yards of ash and 129,240 cubic yards of MSW were placed beyond the permitted grades.

12. In a letter dated March 29, 2005, WMH stated, "Ash placement above the approved 2002 grades in the ash disposal cell was initially noted following the aerial flyover conducted in January 2004. Identification of an overfill condition in the MSW cell areas was noted following the flyover conducted in January 2005."

13. In a letter dated December 17, 2004 and during a meeting between WMH and DOH on January 26, 2005, DOH stated concern over the stability of the landfill for grades greater than the current design, as the factor of safety of the design grades is

1.5. During the January 26, 2005 meeting and in a February 7, 2005 letter, DOH requested that additional stability analysis be conducted to evaluate the overfill areas.

14. In a letter dated February 21, 2005, WMH's engineering consultant, GeoSyntec Consultants (GeoSyntec), states that the static stability analysis of the landfill with the overfill areas identified in their January 2005 survey, resulted in a factor of safety ranging between 1.3 and 1.8.

15. In a letter dated February 16, 2005, Waste Management proposed the construction of a stability berm along the downstream toe of the ash monofill. WMH stated "*This berm would be design to increase the factor of safety along Section 11 to a minimum of 1.5 and,* would *allow waste to be placed to grades approximately the same as those in the original 1989 design.*"

16. Solid Waste Management Permit Number LF-0054-02, Special Conditions III, Item 9 provides:

> *The waste fill height of this landfill shall not exceed 510 feet above mean sea level and shall be in accordance with the document entitled "14.9-Acre Master Plan Fill Grades" dated September 2002 by GeoSyntec Consultants submitted with the Lateral Expansion application dated September 27, 2002, or any other subsequent submission approved by the Department.*

17. Since the issuance of the solid waste permit, the Department did not approve any changes to the landfill grades.

18. Based on the tonnage estimate of placed ash exceeding design grades and WMH's statement that ash placement above the approved 2002 grades was noted after a January 2004 flyover, the RESPONDENTS placed at least one years' worth of ash over the permitted grades and exceeded design grades for over a year.

19. RESPONDENTS placed ash and MSW above grades presented in the 14.9-Acre master Plan Fill Grades, in violation of Solid Waste Management Permit Number LF-0054-02, Special Conditions III, Item 9.

COUNT II

(Failure to Submit Annual Operating Reports in a Timely Manner)

20. Paragraphs 1 through 19 above are incorporated herein by this reference as if they were set forth here in their entirety.

21. Solid Waste Management Permit Number LF-0054-02, Special Conditions III, Item 2 provides:

The permittee shall submit an Annual Operating Report (AOR), using July 1 to June 30 as the reporting period. The AOR shall be submitted by July 31 of each year unless otherwise specified under Item 3 of this section....

22. Solid Waste Management Permit Number LF-0054-02, Special Conditions III, Item 3 provides:

The Annual Operating Report shall include the following information...

a. *Quantities of filled airspace for the present year, past filled airspace and remaining airspace in both cubic yards and years shall be provided...*
b. *On or before July 31 of each year, the permittee shall submit an annual topographic survey of the site as prepared by a land surveyor registered in the State of Hawaii. This survey shall clearly show the horizontal and vertical dimensions of the landfilled area;*
c. *A Sequencing Plan, including a drawing, identifying the cell areas to be filled in the coming year including identification of the wet weather areas. The cell areas and wet weather area capacity shall be provided using an appropriate unit of measure; and*
d. *Final fill areas, intermediate fill areas, and future unused fill areas shall be identified for the projected year.*

23. On July 24, 2003, WMH submitted their 2003 AOR. The AOR did not contain the required information for filled airspace for that year, past filled airspace and remaining airspace in cubic yards and years. The 2003 AOR was also missing the annual topographic survey, a sequencing plan for the coming year and a summary plan identifying filled areas, intermediate fill areas that can still accept waste and future unused fill areas. These items are consistent with the requirements of Special Conditions III, Item 3.

24. On December 22, 2004, WMH requested a 30-day extension for the submission of their 2004 AOR, which was due July 31, 2004.

25. In February 7, 2005, DOH issued a warning letter stating the deficiencies of the 2003 AOR and the non-submission of the 2004 AOR.

26. On February 23, 2005, DOH received the missing documentation required of the 2003 AOR and the 2004 AOR from WMH dated February 22, 2005, which utilized aerial topographies dated March 24, 2003 and January 15, 2004, respectively. In the February 22, 2005 incident report, WMH states:

Second, under separate cover, we are providing you with a copy of the 2004 Annual Operating Report (AOR) as required in the permit. Oral notification was provided in July 2004 to Mr. Gary Siu of the DOH that this report would be delayed due to information required from the annual topographic survey.

Additionally written notification of the delay was provided to Mr. Siu in December 2004. These aerial flyovers of the landfill have been scheduled during January of each year for the benefit of reporting to the City and County of Honolulu. Steps will be taken to prevent recurrence by our commitment to reschedule all future aerial flyovers in June of each calendar year to coincide with the timing of the AOR.

Third, under separate cover, a completed 2003 AOR is being provided to you with the information that was required in the February 7 letter. This information was incomplete due to our misunderstanding of the new requirements in the permit, which was issued May 15, 2003.

27. By the late submission of the required information, RESPONDENTS were in violation of Solid Waste Management Permit Number LF-0054-02, Special Conditions III, Items 2 and/or 3.

COUNT III

(Failure to place daily cover on the active face of MSW landfill)

28. Paragraphs 1 through 27 above are incorporated herein by this reference as if they were set forth here in their entirety.

29. HAR 11-58 .1-15(b)(1) provides:

> *Cover Material requirements. The owners or operators of all MSWLF units must cover disposed solid waste with six inches of earthen material at the end of each operating day, or at more frequent intervals if necessary, to control disease vector, fires, odors, blowing litter, and scavenging.*

30. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIA, 2 provides:

> ***Daily Cover Material*** *shall be a minimum of six inches of earthen material or an alternative in accordance to HAR 11-58.1-15(b). Request for the use of an alternative daily cover (ADC) as cover shall be submitted to the Director of the Department of Health at the address listed in Item 2 of Special Conditions III.*
>
> *Request for the use of an alternative daily cover (ADC) shall consist of a written request for the approval of a demonstration period whereby an evaluation and demonstration shall be made that the ADC and its thickness control disease vectors, fires, odors, blowing litter, and scavenging without presenting a threat to human health and the*

environment. The use of alternative cover materials is limited to daily cover use only. The written request shall evaluate the potential ADC as to its specific characteristics and its appropriate use at the facility. Demonstration period are to be in increments of six months. The demonstration period or the approved use of an ADC may be rescinded or cancelled by either the Department of Health or the Operator at anytime without cause.

31. Solid Waste Management Permit Number LF-0054-02, Special Condition III, Item 11 provides:

> *A revised written Operating Plan shall be prepared and filed with the Department, no later than 90 days after receipt of this permit. The permittee shall implement the plan upon submission to the Department; however, the Department may require revisions to the written plan as a condition of approval...*

32. The Facility's Operating Plan, dated July 2004, Section 5.8.1, Daily Cover states:

> *The active MSW disposal area is covered at the end of each day with a minimum of 6 inches of daily cover soil. In areas where additional waste will not be placed for a period of 30 days or more, intermediate cover consisting of a minimum of 12 inches of soil is placed over the waste, and graded to promote surface water drainage. When additional waste is to be placed over such areas, the upper part of the intermediate cover soil may be scraped off for subsequent reuse.*

33. On January 28, 2005, the DOH inspectors noticed inadequate soil cover adjacent to the workface area (previous day's workface) in Cell E-1, showing excessive flagging (less than 6 inch of cover with trash protrusion) and without the required six inches of soil cover. The dozers/compactor were working on the current day's workface and away from the area that was showing flagging and no attempt were made to cover the exposed flagging.

34. On February 8, 2005, due to the lack of soil cover, flagging was noticed again in an area away from the workface of Cell E-1. Mr. Cassulo, the facility manager was notified of the noncompliance issue.

35. On February 9, 2005, the DOH inspectors continued to notice flagging on the east side of MSW E-1 due to lack of soil cover.

36. On February 17, 2005, the DOH inspectors observed less than 6-inches of soil cover and exposed trash (flagging) on MSW Cell E-1, on an area of the cell that the facility had completed a week before.

37. On February 17, 2005, a large portion of MSW Cell E-1 top deck was observed with heavy flagging due to lack of soil cover.

38. On February 24, 2005, the DOH-inspectors observed a former cell area previously filled with solid waste from the week before with exposed trash (flagging). The front slope of the MSW Cell E-1 was also observed with heavy flagging again due to inadequate soil cover.

39. On March 11, 2005, a large area of the top deck was observed with heavy flagging and exposed MSW.

40. On March 15, 2005, stockpile of soil cover within the workface area was observed, however, some areas of the top deck of MSW Cell E-1 was observed with exposed MSW and flagging.

41. On March 22, 2005, the inspectors observed some flagging fronting the slope of MSW Cell E-1.

42. On March 30, 2005, the inspectors observed the front slope of MSW Cell E-1 with exposed MSW and heavy flagging due to inadequate soil cover.

43. On April 6, 2005, the east top deck of MSW Cell E-1 was noticed with exposed bags of MSW without soil cover, and the front slope of the cell not covered with soil for days as observed from previous inspections.

44. On April 6, 2005, the inspectors observed exposed MSW and flagging on an area located adjacent to the active workface area.

45. On April 11, 2005, the inspectors observed an entire cell from the day before located at the north area of MSW Cell E-1 not covered with soil. The dozer operator was noticed still trying to cover the large cell of exposed MSW with soil cover. Heavy flagging and plastic bags of MSW were also noted fronting the slopes of MSW Cell E-1.

46. On April 15, 2005, at 9:00 A.M. the DOH inspector observed a portion of MSW from the previous day was not properly covered. Due to gusty wind the litter fences were loaded with litter and some flagging was also noted due to inadequate soil cover.

47. On April 20, 2005, at 6:20 P.M. the facility has stopped accepting waste for the day and a few trucks were observed delivering soil to the workface area for daily cover. At 7:00 P.M. the DOH inspectors observed the operators haul in tarps onto the workface to be used to cover part of the workface due to lack of soil cover. The use of tarps was not approved by DOH to be used as alternative daily cover (ADC) for the facility. At 7:45 P.M. the operators had stopped working and left for the night without covering a major part of the workface area. Mr. David Fuiava of WMH was asked about

completing the cell with daily cover and he said "call it a day, will use another plan tomorrow."

48. On April 21, 2005, at 6:45 P.M. the operators had stopped work for the evening and the DOH inspectors noticed heavy flagging throughout the cell. The DOH inspectors also noted uncovered and partially covered MSW within the cell area. The unauthorized use of the tarp for alternative daily cover was still in place from the previous day.

49. On April 22, 2005, the DOH inspectors continued to observed heavy flagging on the front slopes and the northeast side of MSW Cell E-1. The workface center top deck area of MSW Cell E-1 had exposed MSW and heavy flagging due to inadequate soil cover. The inspectors noticed the ADC tarp was still in placed from previous days.

50. On April 25, 2005, at 4:40 P.M. the DOH inspectors observed the landfill equipment operators working the MSW at workface area. The workface area was observed with large amount of MSW not covered with soil at 6:42 P.M. At 6:49 P.M. the operators parked their equipment and left for the evening without covering the MSW for the day. The Environmental Compliance Officer was asked if the operators were done for the day and he said that he had no control of the operators. The DOH inspectors walked the top deck of MSW Cell E-1 and observed large amount of MSW not covered with soil, including the side slopes of the cell.

51. On April 26, 2005, at 5:20 P.M. the DOH inspectors noted a large MSW area on the northeast corner of MSW Cell E-1 from the night before that had not been covered with soil. Heavy flagging was also noted throughout the top deck of MSW Cell E-1 and along the east banks of the cell. The inspectors observed the operators trying to cover the workface area with soil until 7:30 P.M. and the operators had to stop work due to darkness. Inadequate soil was observed throughout the workface and with some exposed MSW.

52. On April 27, 2005, at 6:30 P.M. heavy flagging and exposed MSW was observed at the center portion of MSW Cell E-1 and the MSW was not covered with adequate soil at the end of the day. The northeast side of MSW Cell E-1 continues to be observed with heavy flagging due to inadequate amount of soil cover for the past two weeks.

53. On April 28, 2005 at 6:55 P.M. the DOH inspectors observed the northeast corner of the workface (an old workface from the previous day) with heavy flagging and exposed MSW. The south slopes of MSW Cell E-1 fronting Koolina Resort continues to be observed with exposed MSW and heavy flagging.

54. On May 1, 2005, the DOH inspectors observed an inactive area of MSW Cell E-1 fronting Koolina Resort with exposed MSW. At the end of the day (5:10 P.M.) the inspectors observed a large MSW drop off area of the active workface in MSW Cell E-1 & E-2 with large amounts of exposed MSW and without the required daily soil cover.

Soil cover was available at the MSW Cell-10 storage area, but the facility had insufficient personnel on Sunday to cover the cell at the end of the day. The northeast corner of MSW Cell E-1 and top deck has exposed MSW and has not been covered with soil for the past week. Heavy flagging and exposed MSW on the front slope fronting Koolina Resort continues to be uncovered with daily soil cover.

55. On May 3, 2005, the DOH inspector continued to observe the sloped area of MSW Cell E-1 fronting Koolina Resort with exposed MSW and heavy flagging. The workface area for MSW Cell E-2 was inadequately covered with soil and heavy flagging was noted. At the end of the day (6:30P.M.) the active workface area was inadequately covered with soil. The northeast corner of MSW Cell E-1 and top deck had exposed MSW and has not been covered with soil for the past few weeks.

56. On May 6, 2005, at 5:00P.M. the DOH inspectors observed facility operator park the equipment and drive away for the day. The inspectors observed heavy flagging and exposed MSW without adequate soil cover at the MSW Cell E-2 workface.

57. On May 9, 2005, at 6:20 P.M., DOH inspectors observed exposed MSW and heavy flagging on a large area of MSW Cell E-2 workface without adequate soil cover.

58. On May 19, 2005, the DOH inspectors continue to notice the bottom slope of MSW Cell E-1 fronting Koolina Resort with exposed MSW and heavy flagging.

59. The issue was reported to the Environmental Compliance Officer and Operation Manager on May 19, 2005; however, no action was taken to correct the problem.

60. On May 25, 2005, the DOH inspectors observed exposed MSW and heavy flagging on the recently completed northeast end of MSW Cell E-1, due to inadequate soil cover. Ms. Gordy, the Environmental Manager, was notified of the issue and was present during the inspection.

61. On June 3, 2005, the south slopes of MSW Cell E-1 fronting Koolina Resort continues to be observed with exposed MSW and heavy flagging. Mr. Cassulo said that WMH is leveling high spots within MSW Cell E-1 and once completed the area will be covered with intermediate soil.

62. On June 9, 2005, the inspectors observed large amounts of exposed MSW on a closed cell fronting MSW Cell E-2.

63. The RESPONDENTS failed to provide six inches of daily soil cover at the end of day on the aforementioned dates.

64. RESPONDENTS did not receive prior written approval from the Director of Health to use alternative daily cover.

65. RESPONDENTS violated HAR 11-58 .1-15(b)(1) and Solid Waste Management Permit Special Permit Condition IIIA, Item 2 on 27 separate occasions.

COUNT IV

(Failure to place intermediate cover material on the ash monofill)

66. Paragraphs 1 through 65 above are incorporated herein by this reference as if they were set forth here in their entirety.

66. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIB, Item 2 provides:

> *Intermediate cover is required for the MSW ash monofill to control fugitive dust, if the ash is exposed for more than seven days. A minimum of 6 inches of earthen material shall be used for cover except where cover cannot be reasonable or safely applied. In those areas an alternative dust control cover shall be used with the approval of the Department.*

67. The Facility's Operating Plan, dated July 2004, Section 5.9.2. Cover provides:
Intermediate soil cover is placed over areas that are not being actively worked and are exposed for more than 7 days without receiving additional ash. Intermediate cover consists of soil compacted to a minimum thickness of six inches and graded to promote runoff of surface water.

68. Aerial photographs of the landfill facility dated 1-3-00, 1-6-01, 3-24-03, 2-13-04, and 1-7-05, as reviewed by a DOH inspector at WMH's office, shows that the percentage of intermediate soil cover on the monofill varies from year to year.

69. On January 28, 2005, the DOH inspectors noticed large inactive cell areas of the ash monofill without intermediate soil cover. DOH inspectors voiced their concern to the facility manager Mr. Joe Hernandez, on the requirement for the ash monofill intermediate cover and were told that the facility plans to regrade the ash monofill sometime soon.

70. On February 9, 2005, DOH inspectors observed a WMH worker operating a grader and leveling/regrading the overfilled ash monofill on Ash Cells 5 & 6. The inspectors observed exposed ash monofill cells 5, 6, 7, & 8 without the required seven-day intermediate cover. Some soil stockpiles were noticed stored on the top deck of the ash monofill, but was not at that time being used as cover material. The re-grading of the ash monofill was observed to create significant fugitive dust without any mitigation controls.

71. On February 9, 2005, DOH inspectors noted the active ash disposal cell 3 area with large stockpiles of ash without the required seven day intermediate cover and DOH

voiced their concerns to Mr. Cassulo for the required intermediate cover. Mr. Cassulo said that they could not cover the ash because the ash is wet and takes a while to dry. He also mentioned that he does not interpret the permit condition requiring the ash to be covered every seven days. Mr. Cassulo also stated that they are cutting the ash piles to reduce the overfilled ash areas (cells 5 & 6) and WMH plans to have it completed by the following week.

72. On February 17, 2005, DOH inspectors observed the grader operator partially covering part of the top deck of ash monofill of cells 4 & 5 with intermediate soil cover.

73. On February 24, 2005, DOH inspectors observed the ash monofill top deck partially covered with intermediate soil cover, however, the side slope of the ash monofill had no intermediate cover. At the time of inspection, no equipment was observed working on the ash monofill area.

74. On February 24, 2005, the DOH inspectors observed two separate ash workface areas without soil cover. The entire side slope areas of the ash monofill landfill area are not covered with intermediate soil cover.

75. On March 11, 2005, a major part of the ash monofill landfill area continues to be without the required soil cover. Most of the side slope is not covered with soil.

76. On March 15, 2005, intermediate soil cover was noted on the top deck the ash monofill area, however, the side slopes have not been covered with soil. The entire ash monofill in Cell 5 has not yet been covered with intermediate soil.

77. On March 22, 2005, DOH inspectors noted that the side slopes of the ash monofill cells 6 & 7 were still not covered with intermediate soil.

78. On March 30, 2005, the DOH inspectors observed the side slopes of the ash monofill area without intermediate soil cover. The active ash monofill area was not being covered with the required soil cover every seven days.

79. On April 6, 2005, a former active ash monofill lift located on the northeast corner of ash cell 4 was observed without the required intermediate soil cover.

80. On April 11, 2005, the DOH inspectors continue to observe the side slopes of the ash monofill area without the required intermediate soil cover.

81. On April 15, 2005 to June 28, 2005, the DOH inspectors continue to observe the ash monofill side slopes and other areas of the ash monofill without the required intermediate soil cover.

82. On May 12, 2005, DOH continues to observe the active workface with stockpiles of ash from H-Power and without the required intermediate cover. H-Power facility was

closed for their annual maintenance on April 13, 2005 for about a month. WMH did not place the required soil cover on the active workface area during this entire period.

83. On June 29, 2005, DOH continued to observe ash monofill cell 3 areas without the required soil cover. The inspectors observed WMH equipment placing intermediate cover and grading the side slope of the ash monofill cells 6 & 7.

84. On July 27, 2005, the inspector observed the top deck and side slopes of the ash monofill landfill completely covered with intermediate soil and meeting regulatory requirements.

85. RESPONDENTS have failed to place intermediate cover on the ash monofill and have violated the facility's permit Special Conditions IIIB, Item 2 and facility's Operations Plan Section 4.9.2 for at least 153 days.

COUNT V

(Exceedance of leachate head on the liner in ash monofill)

86. Paragraphs 1 through 85 above are incorporated herein by this reference as if they were set forth here in their entirety.

87. HAR 11-58.1-14(b) provides:

> *The design shall either:*
> *(1) Ensure that the concentration values listed in Table 1, which is incorporated by reference, or Hawaii Administrative Rules, title 11, chapter 20, whichever is more stringent, will not be exceeded in the uppermost aquifer at the relevant point of compliance, as specified by the director under subsection (e); or*
> *(2) Include a composite liner as described in subsection (c) and a leachate collection system that is designed and constructed to maintain less than a thirty-centimeter depth of leachate over the liner.*

88. **RESPONDENTS** chose to meet HAR 11-58.1-14(b)(1). WMH submitted *Point of Compliance (POC)* documents dated, May 25, 1993 to demonstrate that the proposed `alternative liner and leachate collection system are designed to meet HAR 11-58.1-14(b)(1). The assumptions made in *POC* documents dated, May 25, 1993 was that leachate head on the liner will not exceed 30 centimeters.

89. The facility has three separate leachate collection systems that feed into three separate sumps. The ash monofill leachate sump is located at the south end of the ash monofill. The MSW leachate sump that services the primary section of the MSW landfill is located at the south end of MSW Cell 4B and is referred to Sump 4B. Leachate sump E-1 is located at the southern end of MSW Cell E-1, and services only the lateral

MSW expansion cells.

90. Based on as-built drawings contained in the Ash Cell 8 CQA report prepared by A-Mehr, Inc. and dated October 8, 1998, the depth of the ash monofill sump is approximately 6 feet deep. Therefore the maximum depth of leachate allowed in the sump as to provide no more than 12 inches (30 centimeters) of leachate on the liner system is approximately 7 feet. In a letter dated August 6, 1999, A-Mehr, Inc., further states that they recommend a maximum leachate level of 5 feet be maintained within the sump.

91. On March 11, 2005, the DOH inspectors requested a copy of the leachate log maintained at the facility for the three-leachate sumps that are located within the facility. Mr. Joe Hernandez of WMH provided the log to the inspectors and the log shows that the last time the ash monofill leachate sump was measure was back in October 28, 2003.

92. On March 11, 2005, the DOH inspectors located the ash monofill leachate sump at the south end of Ash Cell 8 and measured the leachate inside the sump. The leachate depth was measured with the facility's pre-marked six-foot solid rod attached to a rope and inserted into the vertical manhole sump. The homemade measuring device was lowered into the bottom of the manhole and next to the PVC pipeline used to pump the leachate out of the sump. Leachate measurements collected from the sump indicated 14 feet 2 inches of leachate inside the sump, or approximately 8.2 feet of leachate on the liner system.

93. On March 15, 2005, the DOH inspectors measured the leachate sump using the same six-foot solid rod and attached rope. Again, the homemade measurement device was lowered inside the sump. The device was removed, placed on the ground and measured with a tape measure. The rope was used because it showed a wet mark with an indication of the amount of liquid inside the sump. The inspectors recorded a measurement of 22 feet 8 inches of leachate inside the sump, or approximately 16 feet 8 inches of head on the liner system.

94. From March 16, 2005 to June 16, 2005 leachate was observed by DOH to be seeping and ponding at the bottom slopes outside of the lined cell areas fronting ash cell 8 and MSW cell E-1.

95. On March 22, 2005, the DOH inspectors visited the site and measured the leachate sump manhole utilizing the same pipe and rope. The inspectors recorded a measurement of 22 feet 3 inches of leachate inside the ash monofill sump, or approximately 16.3 feet of leachate head on the liner system. The water truck was parked near the sump and the fill pipe was connected to the water truck. No leachate was being pumped into the water truck at that time.

96. In a letter dated June 22, 2005, WMH provided leachate logs for the ash sump,

which indicated that leachate level of 22 feet was measured on February 9, 2005.

97. Sometime between July 15, 2005 and July 22, 2005, the leachate head on the liner system was lower to below the maximum head allowance of 30 centimeters.

98. RESPONDENTS have exceeded the maximum leachate head allowance of 12 inches or 30 centimeters on the ash monofill liner for at least 156 days, in conflict with their POC, dated May 25, 1993 and in violation of HAR 11-58.1-14(b)(1).

COUNT VI

(Exceedance of leachate head on liner in MSW Cell E-1 sump)

99. Paragraphs 1 through 98 above are incorporated herein by this reference as if they were set forth here in their entirety.

100. In WMH's letter dated June 22, 2005, they state that MSW Cell E-1 leachate sump was initially installed in November 2003.

101. Based on a design drawing of the E-1 sump, dated August 22, 2003, and provided by WMH, the depth of the sump is 3 feet. Therefore the maximum depth of leachate allowed in the sump as to provide no more than 12 inches (30 centimeters) of leachate on the liner system is 4 feet.

102. On March 11, 2005, the DOH inspectors requested a copy of the leachate log maintained at the facility for the three-leachate sumps that are located within the facility. Mr. Joe Hernandez of WMH could not produce a leachate log for MSW Cell E-1 sump.

103. On March 22, 2005, the DOH inspectors measured the hose attached to the pump leading to the bottom of MSW Cell E-1. The inspectors measured the hose and determine that the hose length is 80 feet long to the bottom of the sump. The inspectors pulled out 30 feet of hose from the lateral leachate line when the pump reached air and stopped pumping leachate. Based on the angle of the leachate riser (2:1) and the measured length of leachate in the pipe, DOH calculated that the vertical depth of the leachate in the sump is approximately 10.4 feet, or 7.4 feet on the liner.

104. On April 11, 2005, the inspectors observed a large puddle of leachate ponding at the bottom slope of MSW Cell 4-B. The leachate was seeping from the bottom slope of MSW Cell E-1.

105. On April 15, 2005, DOH inspector observed test holes at the bottom slope of MSW Cell E-1 filled with leachate. The test holes were about five foot in depth and contained approximately three feet of leachate.

106. In a letter dated June 22, 2005, WMH provided a leachate log for the E-1 Sump,

which lists 74 feet of leachate measured on April 29, 2005 and May 26, 2005.

107. Sometime between July 22, 2005 and August 1, 2005, WMH reported that leachate head no longer exceeds 30 centimeters on the liner system.

108. RESPONDENTS have exceeded the maximum leachate head allowance of 12 inches or 30 centimeters on the MSW E-cell liner for at least 123 days, in conflict with their POC, dated May 23, 1993 and in violation of HAR 11-58.1-14(b)(1).

COUNT VII

(Failure to Measure Leachate Levels and to Maintain Records on Leachate Levels in Cell 4B Sump)

109. Paragraphs 1 through 108 above are incorporated herein by this reference as if they were set forth here in their entirety.

110. Solid Waste Management Permit Number LF-0054-02, Special Condition III, Item 6 provides:

> *The permittee shall implement the final Groundwater and Leachate Monitoring Plan dated October 7, 1995, and revised in June 1997.*

111. The facility's Groundwater and Leachate Monitoring Plan dated October 7, 1995 and revised in June 1997, states in Section 4.2 *Leachate Monitoring:*

> *For the MSW landfill, the sump which is located in cell 4B, is checked monthly for any traces of liquids. Monitoring is done manually through the use of a steel tape which is lowered down the leachate extraction riser. If liquids are detected at any time during the monthly checks, monitoring frequency is increased to weekly until it is determined that liquid levels have stabilized or evacuation of liquids is required.*

112. Solid Waste Management Permit Number LF-0054-02, General Conditions I, Item 9b and 9c provides:

> a. *The permittee shall retain at the facility or other location designated by this permit, records of all monitoring information...copies of all reports required by this permit, and records of all data use to complete the application for this permit. The time period of retention shall be a minimum five (5) years unless otherwise specified by the Director. The groundwater, leachate, and air monitoring data must be maintained through the closure and post-closure periods.*
> b. *Records of monitoring information shall include:*

- *The dates, exact place, and time of sampling or measurements;*
- *The person responsible for performing the sampling or measurements;*
- *The date(s) analyses were performed;*
- *The person responsible for performing the analyses;*
- *Analytical techniques or methods used; and*
- *Results of such analyses.*

113. On March 11, 2005, the DOH inspectors requested a copy of the leachate log maintained at the facility for the three-leachate sumps that are located within the facility. Mr. Joe Hernandez provided the log to the inspectors and the log shows that the leachate sump in MSW Cell 4-B has not been measured since May 2003.

114. In a letter dated June 22, 2005, WMH provided another copy of the leachate log, which indicated that the leachate level in MSW Cell 4B could not be measured since June 2003, due to "lost measuring unit". The log continues to document the inability to measure until October 2003.

115. In the letter dated June 22, 2005, WMH stated that the 4-B sump has been inaccessible during the 2003-2005 time period due to a blockage of the riser by equipment used to take water level readings. The riser has recently been cleared of the obstruction, however, as of August 15, 2005, no leachate level measurements have been taken since May 2003.

116. RESPONDENTS have violated Solid Waste Management Permit Number LF-0054-02, Special Condition III, Item 6 and General Conditions I, Items 9b and 9c, and their Groundwater and Leachate Monitoring Plan, for not measuring leachate levels and/or maintaining records from at least June 2003 to July 2005.

COUNT VIII

(Failure to Measure Leachate Levels and to Maintain Records on Leachate Levels in the Ash Monofill Sump)

117. Paragraphs 1 through 116 above are incorporated herein by this reference as if they were set forth here in their entirety.

118. Solid Waste Management Permit Number LF-0054-02, Special Condition III, Item 6 provides:

> *The permittee shall implement the final Groundwater and Leachate Monitoring Plan dated October 7, 1995, and revised in June 1997.*

119. The facility's Groundwater and Leachate Monitoring Plan dated October 7, 2005

and revised in June 1997, states in Section 4.2 *Leachate Monitoring:*

> *For the ash landfill, the leachate monitoring and sump evacuation procedures are similar to MSW landfill. In the existing operating area of the ash landfill, a manhole serves as the leachate collection system sump (ash cell 1). This sump is also monitored monthly, as well as following significant rainfall events, by lowering a steel tape to the bottom and checking liquid level.*

120. On March 11, 2005, the DOH inspectors requested a copy of the leachate log maintained at the facility for the three-leachate sumps that are located within the facility. Mr. Joe Hernandez provided the log to the inspectors and the log shows that the leachate sump in the ash monofill has not been measured since October 2003.

121. In a letter dated June 22, 2005, WMH provided another copy of the leachate log, which indicated that the leachate level in the ash monofill was not measured between October 28, 2003 and February 9, 2005.

122. RESPONDENTS have violated Solid Waste Management Permit Number LF-0054-02, Special Condition III, Item 6 and General Conditions I, Items 9b and 9c, and their Groundwater and Leachate Monitoring Plan, for not measuring leachate levels and/or maintaining records from at least November 2003 to January 2005.

COUNT IX

(Failure to notify DOH of noncompliance on equipment blockage in MSW Cell 4-B leachate lateral line and inability to measure leachate levels)

123. Paragraphs 1 through 122 above are incorporated herein by this reference as if they were set forth here in their entirety.

124. On March 11, 2005, inspectors were told by Joe Hernandez and based on leachate logs provided that the leachate sump in MSW Cell 4-B has not been measured since May 2003. No written notification was submitted to the department.

125. The facility claims that a "Lizard" (a device with wheels used to lower measuring equipment inside the lateral pipe) was stuck inside the lateral leachate pipe and blocked the line, thus WMH was unable to properly measure or pump the leachate.

126. Solid Waste Management Permit Number LF-0054-02, General Conditions I, Item 5 provide:

> *If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in the permit, the permittee shall notify the Department orally within 24 hours followed by a written incident report within seven days of the oral notification. The written incident report shall contain the*

following information:

a. *A description of and the cause of noncompliance;*
b. *The period of noncompliance, including exact dates and times, or, if not corrected, the anticipated time the noncompliance is expected to continue; and*
c. *Steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.*

The permittee shall be responsible for any and all damages, which may result and may be subject to enforcement action by the Department for penalties or revocation of this permit.

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

The reporting requirements of General Condition I, Condition 5 does not apply if the following conditions are met:

a. *Failure to comply will not create an immediate and significant risk to health, safety, or the environment;*
b. *The permittee is using its best efforts to comply; and*
c. *The permittee will be able to comply within 30 days.*
d. *With the exception that all incidents of fire or releases/spills over 25 gallons shall be reported.*

127. In the letter dated June 22, 2005, WMH stated that the 4-B sump has been inaccessible during the 2003-2005 time period due to a blockage of the riser by equipment used to take water level readings. The riser has recently been cleared of the obstruction, however, as of August 15, 2005, no leachate level measurements have been taken since June 2003.

128. On or about May 20, 2005, WMH was able to retrieve the "lizard" from the lateral leachate pipe. As of August 15, the facility has not measured leachate level and has not removed the leachate from the lateral sump.

129. RESPONDENTS have violated Solid Waste Management Permit Number LF-0054-02, *General Conditions I, Item 5 by* not notifying DOH of the problem and failure to provide a written notification.

COUNT X

(Failure to Notify DOH of Noncompliance in a Timely Manner on the Exceedences of Permit Grades and Submission of the AORs)

130. Paragraphs 1 through 129 above are incorporated herein by this reference as if they were set forth here in their entirety.

131. On January 26, 2005, during a meeting between DOH and WMH, WMH notified DOH of the exceedence of waste above permitted grades.

132. On February 7, 2005, DOH issued a warning letter stating oral notification on noncompliance issues (exceedence of permitted grades, and failure to submit AOR information) has not been provided in a timely manner, that an incident report has not been submitted, in violation of General Conditions I, Item 5.

133. Solid waste Management Permit Number LF-0054-02, General Conditions I, Item 5 provide:

> *If for any reasons, the permittee does not comply with or will be unable to comply with any condition or limitation specified in the permit, the permittee shall notify the Department orally within 24 hours followed by a written incident report within seven days of the oral notification. The written incident report shall contain the following information:*
>
> *a. A description of an the cause of noncompliance;*
> *b. The period of noncompliance, including exact dates and times, or, if not corrected, the anticipated time the noncompliance is expected to continue; and*
> *c. Steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.*
>
> *The permittee shall be responsible for any and all damages, which may result and may be subject to enforcement action by the Department for penalties or revocation of this permit.*
>
> *The use of an electronic facsimile device (FAX) for use in notification is acceptable. Any data transmission or detailed explanations transmitted shall be accompanied by regular mail submissions. Failure to notify in accordance to this requirement may initiate enforcement action.*
>
> *The reporting requirements of General Condition I, Condition 5 does not apply if the following conditions are met:*
> *a. Failure to comply will not create an immediate and significant risk to health, safety, or the environment;*
> *b. The permittee is using its best efforts to comply; and*
> *c. The permittee will be able to comply within 30 days.*
> *d. With the exception that all incidents of fire or releases/spills over 25 gallons*

shall be reported.

134. On February 3, 2005, WMH submitted a written incident report, notifying the DOH of the exceedences. The incident report did not include all of the requirements specified in General Condition I, Item 5.

135. On February 22, 2005, WMH submitted another incident report, reiterating the written notification on the exceedences on the permitted grades and providing additional information in an attempt to meet the requirements of General Condition I, Item 5.

136. In the February 22, 2005 incident report, WMH states:

Second, under separate cover, we are providing you with a copy of the 2004 Annual Operating Report (AOR) as required in the permit. Oral notification was provided in July 2004 to Mr. Gary Siu of the DOH that this report would be delayed due to information required from the annual topographic survey/ Additional written notification of the delay was provided to Mr. Siu in December 2004. These aerial flyovers of the landfill have been scheduled during January of each year for the benefit of reporting to the City and County of Honolulu. Steps will be taken to prevent recurrence by our commitment to reschedule all future aerial flyovers in June of each calendar year to coincide with the timing of the AOR.

Third, under separate cover, a completed 2003 AOR is being provided to you with the information that was required in the February 7 letter. This information was incomplete due to our misunderstanding of the new requirements in the permit, which was issued May 15, 2003.

137. On February 22, 2005, WMH submitted a revised 2003 AOR dated February 20, 2005 and the 2004 AOR dated February 20, 2005. The AORs utilized aerial topographies dated March 24, 2003 and January 15, 2004, respectively.

138. In a letter dated March 29, 2005, WMH states "Ash placement above the approved 2002 grades in the ash disposal cells was noted following the flyover conducted in January 2004."

139. RESPONDENTS were in violation of Solid Waste Management Permit Number LF-0054-02, General Conditions I, Item 5 for notifying the DOH over a year after WMH first noted permitted grade exceedences, and providing written notification on the delay of the 2004 AORs over 4 months after the date the document was due.

COUNT XI

(Unauthorized storage of material on the ash monofill)

140. Paragraphs 1 through 139 above are incorporated herein by this reference as if they were set forth here in their entirety.

141. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIB, Item 5 provides:

> *No storage of material is allowed on the MSW ash landfill area.*

142. The Facility's Operating Plan, dated July 2004, Section 5.9.5. Use of Filled Areas provides:

> *Developed or filled areas of the ash monofill will not be used for other activities. Specifically, they will not be used for storage of green waste, tires, white goods or unacceptable wastes removed from the MSW landfill. The only use that may be made of ash monofill areas is for temporary soil stockpiling, provided the affected ash monofill area has received intermediate soil cover.*

143. On January 28, February 8, 9, 17 and 24, 2005, the inspectors noticed a large stockpile of rocks mixed with dirt located on portions of MSW ash Cell 4/5 and MSW Cell 5 and 4B.

144. From around March 2005, the rock stockpile started to be moved and used in the construction of the stability berm fronting the ash monofill.

145. In a letter dated March 29, 2005, WMH stated that the placement of the rock stockpile from the construction of MSW Cell E-1 occurred in July 2003.

146. RESPONDENTS stockpiled rocks mixed with soil on the MSW ash landfill area in violation of facility's permit Special Conditions IIIB, Item 5 and facility's Operations Plan Section 5.9.5.

COUNT XII

(Failure to manage and ban the acceptance of special waste)

147. Paragraphs 1 through 146 above are incorporated herein by this reference as if they were set forth here in their entirety.

148. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIA, states that the items under Special Conditions IIIA, are to be included in the Operating Plan and implemented accordingly as specified in Special Condition III, Item 11.

149. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIA,

Item 14 provides:

> ***Adequate Storage Procedures*** *for green waste, scrap vehicles, tires, and white goods shall be included in a written plan with record keeping to prevent vector and pollution problems. Bulk green waste, scrap vehicles, tires and white goods may not be disposed of at any solid waste facility in accordance with 11-58.1-65(b) and (c).*

150. HAR 11-58.1-65 Special solid waste controls. Subsection (c) provides:

> *Scrap automobiles, white goods, and tires. Scrap automobiles may not be accepted at disposal facilities permitted under these rules. White goods and motor vehicle tires may not be accepted at disposal facilities permitted under these rules after June 30, 1994. A plan must be developed by the operator of solid waste disposal facility and included in the facility operations plan to implement this ban.*

151. The Facility's Operating Plan, dated July 2004, Section 5.7, Storage and Disposition of Non-Disposable Waste states:

> *WGSLF does not accept for disposal the following categories of waste which are prohibited for disposal by Hawaii solid waste regulations:*
>
> •Tires
>
> *Tires are placed in a roll-off bin and stored until a full container is accumulated, at which time they are transported to an approved tire recycler. The bin is covered with a tarp to keep rain out and prevent vectors from using the tires.*

152. The inspectors at no time observed a roll-off bin to store the tires as stated in the facility's Operating Plan. As of July 27, 2005, the inspectors have not observed a roll-off bin for used tire storage on site.

153. During DOH's February 9, 2005 inspection, the inspectors witnessed the operator bury two whole tires at the workface of the facility. At no time did the dozer operator attempt to push the tires on the side for later recovery. The operator instead covered the tires with solid waste and continued to compact the trash at the workface. The observation of the tire burial was observed from the top of MSW Cell 1.

154. On February 17, 2005, DOH inspectors observed four whole tires on the side slopes of MSW Cell E-1. A few of the tires were partially buried with soil. The facility's Environmental Coordinator was notified of the noncompliance issue.

155. On March 11, 2005, the Inspectors noted that the tires observed on the side slope of MSW Cell-1 had not been removed from the February 17, 2005 visit.

156. On May 1, 2005, the inspectors observed the compactor operator at the workface bury a whole tire.

157. On May 1, 2005, an inactive area fronting MSW E-1 was observed by the inspectors with three whole tires partially buried with soil and MSW. The operator was alerted of the buried tires and said that he will remove the tires the next day.

158. On May 1, 2005, after the operators were done for the day, the inspectors walked the workface area and observed a whole tire buried in the soil.

159. On May 19, 2005, the inspectors observed a whole tire on the active workface of MSW Cell E-1 (northeast corner). A short time later, the inspectors observed the dozer operator cover the used tire with MSW.

160. On six separate occasions, the RESPONDENTS have improperly buried whole tires at the facility, in violation of HAR 11-58.1-65(c), Special Condition IIIA, Item 14, and facility's Operating Plan, Section 4.7.

COUNT XIII

(Failure to maintain records and record location of asbestos disposal at the landfill)

161. Paragraphs 1 through 160 above are incorporated herein by this reference as if they were set forth here in their entirety.

162. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIA, Item 9 provides:

Asbestos Disposal, a written plan with recordkeeping shall be prepared to ensure that the disposal of asbestos waste is in accordance to current NESAHP (National Emission Standards for Hazardous Air Pollutants) regulations, 40 CFR 61.

163. The Facility's Operating Plan, dated July 2004, Section 5.6.2. Special Waste Procedures states:

> *Asbestos*
> *Special procedures applicable to asbestos waste are detailed in the Asbestos Disposal Plan. This plan contains measures to ensure that the requirements of 40 CFR 61.154 (National Emission Standards) are met at WGLF. After complying with all special waste acceptance procedures, asbestos waste transporters are allowed entry to the site at a pre-schedule time. After inspection of the load to ensure it meets all*

packaging requirements, the transporter proceeds to a prepared disposal trench, and discharges the load. All asbestos waste is covered with MSW and 6 inches of daily cover. Documentation of the date, time, names of the waste generator and transporter and location within the site where the waste was disposed are placed in the site's permanent operating records.

164. Facility's Operating Plan, dated July 2004, Section 8.13 Asbestos Disposal records states:

> *WGSLF is required by permit to maintain a record of each load of asbestos waste disposed at the site. Information to be recorded includes the type of waste, source and location, preferably by GPS or survey coordinates, of its disposal location in the landfill. Asbestos disposal records may be incorporated in the records of the hazardous waste exclusion or special waste screening programs.*

165. In a letter dated May 23, 2005, DOH requested WMH to provide special waste disposal logs, and disposal locations for the asbestos received at the facility for the past two years.

166. In a letter dated June 22, 2005, WMH provided copies of the daily logs on the disposal of accepted asbestos waste for the past two years. WMH claims that they have been unable to locate records on the disposal locations for asbestos waste at the landfill for the last two years.

167. As of July 27, 2005, WMH does not have records to provide to DOH showing disposal locations for the asbestos waste disposed at the landfill.

168. The RESPONDENTS failed to record and maintain records regarding the location of asbestos disposal in violation of Special Conditions III, Item 11 and the facility's operating plan.

COUNT XIV

(Failure to cover a dead animal)

169. Paragraphs 1 through 168 above are incorporated herein by this reference as if they were set forth here in their entirety.

170. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIA, Item 10 provides:

> ***Dead Animals and Offal,*** *shall be addressed by a written plan requiring a minimum of two feet of soil, solid waste or other approved cover material*

and be compacted before the end of the workday.

171. The Facility's Operating Plan, dated July 2004, Section 5.6.2, provides:

- *Specialized procedures will be used to manage the categories of special waste described in this section:*

  Dead Animals and Offal
  Dead animals and offal (hides, intestines, and other waste from slaughtered animals) is not subject to special waste acceptance procedures, but will be identified by the transporter at the scale house. Loads known to contain dead animals or offal, and such wastes discovered incidental to other loads after dumping at the active face, will be placed in an area where they can be covered with additional solid waste immediately after being placed. Wherever possible, this will be accomplished by excavating it in the solid waste at the working face, placing the animal waste in it, and filling back in with MSW. Any areas that have received animal waste will be covered with daily cover soil at the end of the working day.

172. On February 17, 2005, the inspectors noticed along the bottom of MSW Cell E-1, a partially covered dead animal away from the landfill's workface area. The distance from the workface area to the dead animal was over 300 feet away.

173. On February 17, 2005, Mr. Hernandez was advised of the dead animal located at the bottom of MSW Cell E-1.

174. On March 15, 2005, Mr. David Fuiava informed the inspectors that the dead animal was discovered four days after acceptance and subsequently buried.

175. RESPONDENTS failed to properly handle a dead animal at the facility by not covering the dead animal with soil or waste immediately, which has resulted in violations of the facility's permit special conditions and facility's Operating Plan.

COUNT XV

(Failure to Submit Annual Surface Water Management Plan)

176. Paragraphs 1 through 175 above are incorporated herein by this reference as if they were set forth here in their entirety.

177. Solid Waste Management Permit Number LF-0054-02, Special Condition III, Item 11h provides:

The Surface Water Management Plan shall be updated annually and filed with

the Department by no later than September 1 of each year. It shall contain the following information:

(1) Report of an annual inspection of surface water management features and facilities, together with a description of required maintenance and changes;

(2) Updated drawings showing current topography of the landfill, surface water drainage system modifications planned for the next year in response to waste filling;

(3) Engineering calculations documenting the capability of the surface water management system to comply with the run-on and run-off requirements listed under 3 (a) above; and

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

178. The Facility's Operating Plan, dated July 2004, Section 6.8.5 Annual Update of Surface water Management Plan, provides:

WGSL will prepare and submit to HDOH an annual update to the surface water management plan, by September 1 of each year. The annual surface water report will contain the following information:

- Results of an inspection of surface water management features and facilities, together with a description of recommended maintenance and changes;
- Updated drawings of the surface water management system;
- Engineering calculations confirming the capacity of the system;
- Any updates to the site's SPCC Plan

179. In a letter dated May 23, 2005, DOH requested the September 2003 and September 2004 annual updates as required by the permit.

180. In a letter dated June 22, 2005, WMH stated that they have not been able to locate the annual updates for 2003 and 2004.

181. To date, the DOH has not received the annual updates for 2003 and 2004. The facility has failed to comply with the facility's permit Special Conditions III, Item h Surface Water Management Plan and facility's Operations Plan Section 6.8.5, Annual Update of Surface Water Management Plan.

COUNT XVI

(Failure to control the generation of dust from vehicular traffic)

182. Paragraphs 1 through 181 above are incorporated herein by this reference as if

they were set forth here in their entirety.

183. Solid Waste Management Permit Number LF-0054-02, Special Condition III, Item 11 and 11m provides:

> *A revised written **Operating Plan** shall be prepared and filed with the Department, no later than 90 days after receipt of this permit. The permittee shall implement the plan upon submission to the Department; however, the Department may require revision to the written plan as a condition of approval. The revised **Operating Plan** shall include the following topics:*
>
> ***Mud and Dust Prevention Program,** a written plan for minimizing the tracking of mud onto public roads, or the generation of dust from vehicular traffic on site. The plan shall contain measures related to on-site road maintenance and cleaning, provision of a wet-weather disposal area, and an area for the wash-down of trucks or truck wheels prior to leaving the site. The possible methods include: rumble strips, drive-through tire wash, trash clean out pad, or wash pad.*

184. The Facility's Operating Plan, dated July 2004, Section 6.3 Mud and Dust states:

> *WGSLF personnel are responsible for preventing the emission of excessive dust from the facility. The site's water trucks are used during dry weather to spray water on access roads and other areas generating wind-blown dust. The volume of water and frequency of spraying is increased as needed during particularly dry and windy conditions.*

185. On February 9, 2005, DOH inspectors noticed the significant generation of dust from vehicular traffic ingress and egress down the road by MSW Cell 1 near the landfill's workface and surrounding area. DOH inspectors did not see a water truck being used to minimize the generation of fugitive dust during the two plus hours spent on site for the inspection. It takes approximately 15 minutes to fill the 5,000-gallon water truck and an additional 15 minutes to empty the truck of its contents. Inspectors outbriefed, Mr. Steve Cassulo, General Manager, of the noncompliance issues and said that the water truck was pumping leachate from manholes at the facility.

186. On February 17, 2005, DOH revisited the site and noticed heavy vehicular dust generation starting from the bottom road to the facility's workface area. The dirt areas near the workface and roads were observed to be very dry. The facility did not have a water truck in use at the site to spray for dust and to control dust problem.

187. On many site visits the DOH inspectors requested WMH to spray the main road leading into the landfill and near the workface area with water due to the heavy dust

generation from vehicular traffic or windy conditions at the site.

188. RESPONDENTS have violated Solid Waste Management Permit Special Condition III, Item 11 and Facility's Operating Plan Section Requirement 5.3 on at least two occasions.

COUNT XVII

(Failure to minimize free litter generation in the landfill)

189. Paragraphs 1 through 188 above are incorporated herein by this reference as if they were set forth here in their entirety.

190. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIA, Item 8 provides:

> ***Litter Control,*** *a written plan with record keeping shall be prepared to provide measures to minimize free litter in the landfill and prevent its occurrence beyond the property line of the facility. The plan shall contain, at a minimum, the following information:*
>
> a. *Design of portable litter screens, the number of screens available on the site, and a description of how they are to be deployed under various operating conditions;*
> b. *Design and location of permanent or semi-permanent litter screen fences;*
> c. *Special procedures to be followed during the period when the H-Power waste-to-energy plant shuts down and the volume of municipal solid waste increases above quantities; and*
> d. *Procedures for litter prevention and cleanup in the event of a major windstorm or other incident in which litter escapes the normal litter containment systems.*

191. The Facility's Operating Plan, dated July 2004, Section 6.4, Litter states:

> *WGSLF uses permanent litter fences, portable screens, and routine site cleanup operations to prevent wind-blown litter from leaving the landfill premises and creating nuisance conditions in the area. These litter control program elements are described below:*
>
> • *Portable litter screens, typically 12 feet and 20 feet wide, are located in downwind locations near the active MSW disposal area as the first line of defense against litter. The screens are relocated frequently as the active area moves across the site.*

• Approximately 600 lineal feet of 30-foot tall permanent litter fence is installed between the ash monofill and the MSW fill area, as the second line of defense.

• The chain link fence surrounding the lower elevation areas of the WGSLF property provide a final level of physical containment of any litter that leaves the active working area.

• Routine site cleanup and litter collection are the final elements of the litter control program. WGSLF personnel remove litter from portable screens and permanent fences on a daily basis, clean haul roads weekly, and pick up litter anywhere on the site at any time. In the event of a major wind storm that creates excessive litter, temporary personnel are brought in on as as-needed basis to collect litter, both on and off the WGSLF property as needed. Additional personnel are also made available as needed during the period when the H-Power plant shuts down and MSW volume increases above normal levels.

• Information will be included in the site's daily operating log to document unusual litter problems or control activities, including instances when temporary personnel are used to collect or control litter on or off-site.

Daily records are kept of litter control activities, and maintained in the site's operating record.

192. The Facility's Operating Plan, dated July 2004, Section 8.12, Litter Control Records states:

> *A daily record will be kept of litter control activities, and maintained in the operating record. The log will contain information on the wind conditions each day, the number of litter control personnel on site, and the volume of litter collected.*

193. On February 17, 2005, DOH visited the facility and from the top of MSW Cell 1, a large accumulation of blown litter was observed on the permanent perimeter litter fence and portable screens. At the time of inspection the wind velocity was 15 to 18 MPH from a northeasterly direction.

194. The DOH inspectors also observed other areas of the landfill beyond the litter fences to include the front area of workface, side slopes of MSW Cell E-1 and the road leading to the top of the landfill with litter accumulation and wind blown litter. At no time did the inspectors observe anyone picking up litter at the facility. However, documents provided by the facility, shows that two temporary personnel were on site picking up

litter. One individual worked from 7:30 A.M. to 11:30 A.M. and the other litter picker worked from 7:00 A.M. to 3:30 P.M. The facility does not keep a log indicating the number of personnel utilized on a daily basis and the number of bags collected by the temporary help.

195. On February 24, 2005, DOH visited the site and observed litter downgradient of the workface and on an area by MSW Cell 1. The inspectors did observed a temporary litter picker collecting litter near the mobile fences. On the north side bottom slope of MSW Cell E-1, two temporary litter pickers were observed collecting litter. The amount of litter observed by the inspectors at the facility and the number of temporary litter pickers observed collecting the litter were not sufficient to collect the amount of litter for the day at the facility.

196. On March 15, 2005, the inspectors observed large amount of scattered litter accumulated along the east side of the perimeter property fence adjacent to MSW Cell E-1 and outside of the property boundaries. No litter pickers were observed in the immediate area.

197. The facility failed to deploy or relocate portable litter fences downwind as the active workface area moves on seventeen occasions from January 28 to May 1, 2005.

198. On April 15, 2005, wind conditions were between 18 to 25 mph. The inspectors observed large accumulation of litter on the primary and secondary litter fences down gradient of the workface area. Four litter pickers were observed along the primary litter fences collecting litter, but due to the large open area of the workface (pancake fill) the litter plan was ineffective.

199. On April 20 to 22, 2005, the inspectors observed large amount of litter throughout the landfill. The facility failed to implement the require litter control plan because of the amount of MSW present and uncovered at the landfill workface area.

200. On April 25 to 28, 2005, the inspectors observed the same situation as described above with the same results, lack of daily cover generating litter.

201. On May 1, 3, 6, and 8, 2005, the inspectors continue to observed large amounts of scattered litter throughout the MSW landfill area due to lack of soil cover.

202. On May 9, 12, 15, and 19, 2005, the inspectors continue to observed accumulation of litter throughout the MSW landfill areas due to lack of soil cover.

203. On June 9, 2005, the inspectors observed large accumulation of litter along primary and secondary litter fences at the southwest area of MSW Cell E-1.

204. On June 24, 2005, the inspectors observed the southeast end slope of MSW Cell E-1 with large accumulation of litter due to lack of soil cover. WMH was advised of

the problem and they acknowledge the litter/flagging problem and management plans to dressed-up the area soon.

205. RESPONDENTS failed to implement its litter control program effectively, due to either lack or improper placement of litter fences and documentation of litter control efforts, which has resulted in violations of the facility's permit special conditions.

COUNT XVIII

(Failure to monitor explosive gases and maintains monitoring records)

206. Paragraphs 1 through 205 above are incorporated herein by this reference as if they were set forth here in their entirety.

207. HAR Section 11-58.1-15(d)(1) and (2) provides:

> *(d) Explosive gases control.*
> *(1) Owners and operators of all MSWLF units must ensure that:*
> *(A) The concentration of methane gas generated by the facility does not exceed twenty-five per cent of the lower explosive limit for methane in facility structures (excluding gas control or recovery system components); and*
> *(B) The concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary.*
> *(2) Owners or operators of all MSWLF units must implement a routine methane monitoring program to ensure that the standards of paragraph (1) are met.*
> *(A) The type and frequency of monitoring must be determined based on the following factors:*
> *(i) Soil conditions;*
> *(ii) The hydrogeologic conditions surrounding the facility;*
> *(iii) The hydraulic conditions surrounding the facility; and*
> *(iv) The location of facility structures and property boundaries.*
> (B) *The minimum frequency of monitoring shall be quarterly.*

208. Solid Waste Management Permit Number LF-0054-02, Special Condition IIIA, Item 7 provides:

> ***Explosive Gases Control**, which shall include a written plan with recordkeeping for a routine methane gas monitoring program in accordance to HAR 11-58.1-15(d). The plan shall include a minimum*

monitoring frequency of once per month.

209. The Facility's Operating Plan, dated July 2004, Section 6.6, Explosives Gas states:

> *Methane gas is produced by anaerobic decomposition of organic components of solid waste. WGSLF implements a Site Specific Gas Monitoring Plan to ensure that methane gas does not cause safety or environmental problems. Specifically, the program must demonstrate with the requirements of HAR 11-58.1-18(d) that concentrations of methane do not exceed 25% of the lower explosive limits in facility structures, or 100% of the lower explosives limits at the property boundary. The lower explosive limit for methane is 5% by volume (50,000 ppm)*
>
> *Methane monitors are installed in the landfill office building and in the maintenance to measure explosive gas levels continuously and provide an alarm if levels reach 10,000 ppm (20% of the lower explosive limit). This program ensures that explosives gas levels in building are below the 25% limits set forth in HAR 11-58.1-18(d).*
>
> *Monitoring is conducted on a monthly basis to ensure compliance with HAR 11-58.1-18(d)(1)(B), which specifies that the concentration of methane gas at the property boundary shall not exceed the lower explosive limit. Under this program, barhole monitoring is conducted along the perimeter of the site, measuring methane concentrations to depths of about 3 feet.*
>
> *A monthly summary of gas monitoring results is placed in the operating record.*
>
> *To date, minimal methane has been detected at WGSLF. Should this change in the future, a landfill gas collection and treatment system will be developed to minimize potential gas migration problems.*

210. In a letter dated May 23, 2005, DOH requested all reports on all explosive gas monitoring data collected in accordance with explosive gas requirements in permit, LF0054-02 and HAR 11-58.1 from 2003.

211. In a letter dated June 22, 2005, WMH provided explosive gas monitoring data for 2005, but could not find data collected for prior years.

212. RESPONDENTS failed to monitor for explosive gases in 2003 and 2004, in violation 11-58.1-15(d), Special Conditions III Item 11 and Special Conditions IIIA Item 7, General Conditions I Item 9, and the facility's Operating Plan.

D. FINDINGS

On the basis of the provisions of Jurisdiction and Statement of Facts cited above, it is hereby found and determined that:

213. RESPONDENTS are therefore subject to the provisions of sections 342H-7 *Enforcement*, 342H-9 *Penalties*, 342H-10 *Administrative Penalties*, and 342H-11 *Injunctive Relief*, HRS, including penalties not to exceed $10,000 for each day of each violation.

DATED: Honolulu, Hawaii JAN 3 1 2006.

DEPARTMENT OF HEALTH
STATE OF HAWAII

LAURENCE K. LAU
Deputy Director for Environmental Health

APPROVED AS TO FORM:

KATHLEEN S.Y. HO
Deputy Attorney General

IN THE DEPARTMENT OF HEALTH

STATE OF HAWAII

DEPARTMENT OF HEALTH, STATE OF HAWAII,	)	DOCKET NO.05-SHW-SWS-004 Waimanalo Gulch Sanitary Landfill
	)	
	)	(Solid waste management rules and Permit Conditions)
COMPLAINANT,	)	
vs.	)	
	)	ORDER
WASTE MANAGEMENT OF HAWAII, INC. AND CITY AND COUNTY OF HONOLULU	)	
RESPONDENTS	)	

ORDER

Pursuant to chapter 342H, Hawaii Revised Statutes, the Department of Health's Solid Waste Management Control rules, and the attached Notice and Finding of Violation made this day in Docket No. 05-SHW-SWS-004, Waste Management of Hawaii, Inc. and City and County of Honolulu, Department of Environmental Services, hereinafter "RESPONDENTS," are hereby ordered to:

1. Immediately implement a full-time spotter for the hazardous waste and special waste-screening program as defined in the facility permit conditions. The spotter shall stop any unauthorized solid waste disposal

such as, whole tires, white goods, and lead acid batteries. Spotter and equipment operators shall be considered separate positions.

2. Continue to develop, revise and implement a revised groundwater monitoring plan that was developed to expand monitoring coverage for the entire landfill, and seepage areas, as requested in our letter dated July 27, 2005 to Mr. Paul Burns of Waste Management of Hawaii, Inc. The development, revision and implementation of a revised groundwater monitoring plan shall follow the proposed timeline presented with your Tidal Study Results and Groundwater Monitoring Well Network, prepared by EarthTech and dated December 15, 2005.

3. Remove the storage of all materials from the ash monofill and MSW landfill area with the exception of cover material. All stockpiled soil materials, except continuously operated stockpiles of less than one-week capacity, shall have stormwater/erosion controls and shall not exceed permit grades. Stockpiled soil materials shall not impede surface water drainage paths to conveyance channels. Only stockpiled soil materials for use as daily or intermediate cover are allowed on the active portion of the landfill, with a maximum capacity of 3 months and in not more than two stockpiles.

4. Place daily cover on the active MSW workface at the end of each workday. Submit daily-cover-verification photographs of the active MSW work area at noon and at the end of the workday. The photographs shall be identified with date and time of photograph, cell number, and name of responsible person taking the photo. The photographs taken on the same day shall be taken from the same perspective.

5. Operate only one workface in the ash monofill at any given time. In accordance with Solid Waste Management Permit Number LF-0054-02, Special Conditions IIIB, Item 1e, fresh MSW ash material may be used as daily cover material for the ash monofill provided that Special Conditions IIIB, Items 1a, b, c and d are met and such usage is limited to the active area where MSW ash is being placed on a daily basis. If this condition cannot be met, then fresh MSW ash may not be used and daily soil cover shall be place. If fresh MSW ash is used as daily cover, intermediate cover shall be placed over the MSW ash at least every 7 days to control fugitive dust. Submit daily/intermediate cover verification photographs of the active MSW ash workface at noon and at the end of the workday. The photographs shall be identified with the date and time of photograph, cell number and name of responsible person taking the photo. The

photographs taken on each workface and cell shall be taken from the same perspective.

6. Within thirty (30) days of this order becoming final, complete or submit the following items to the department for review and approval:

   a. A plan and time schedule for the construction of the MSW leachate manhole in MSW Cell 4B. The RESPONDENTS shall implement the plan in accordance with the approved time schedule. The leachate manhole shall be constructed to allow for automated and manual measurements of leachate head on the liner system, and automated pumping of leachate. The overflow of leachate generated in the MSW cell into the ash cell is not acceptable.

      Upon the completion of the leachate manhole construction in MSW Cell 4B, revise the "Groundwater and Leachate Monitoring Plan," dated October 7, 1997, to reflect depths and locations of all leachate sumps to include present and all new or future leachate sumps within the site including E cell lateral expansion and ash monofill leachate drain line in the ash buttress. The revised plan should include diagrams (blueprints) for any new or future leachate sumps location and provide validation of all diagrams.

   b. Install and maintain grade survey control markers to delineate the boundaries and elevations of the ash monofill and MSW landfill areas, including the delineation of overfilled areas. Submit updated drawings with grades, and height of the control markers on a quarterly basis.

   c. A plan and time schedule for the correction of the overfill areas of the ash monofill and MSW landfill to meet permit grades. The plan shall address waste capacity needs for the county until the expiration date of the landfill permit.

   d. A plan and time schedule for the management of county waste after the expiration date of the landfill. Should the City and County of Honolulu decide to continue operations at the Waimanalo Gulch Sanitary Landfill or at a different location, a complete solid waste management permit application shall be submitted at least one year prior to the current expiration date of Solid Waste Management Permit (LF-0054-02) for the Waimanalo Gulch Sanitary Landfill.

7. On a daily basis, maintain the following records. The daily records shall be summarized with monthly and annual totals. The records and copies of the records shall be made available to the department upon request.

   a. Tabulate records addressing the use of daily and intermediate soil cover material for the MSW workface, ratio of daily soil cover used to the amount of waste placement, dimensions of daily waste cell, tonnage of waste and volume of soil utilized as daily for the completed MSW cells, and the volume of intermediate soil cover utilized.

   b. Tabulate records addressing the use of daily and intermediate soil cover material for the ash monofill, ratio of daily cover to ash, dimensions of the ash cell on a daily basis, tonnage of ash received, and volume of soil utilized as daily and intermediate cover for completed ash cells.

   c. Tabulate records relating to daily tonnage, personnel/position and equipment utilization records. Identify days in which personnel/position and/or equipment was not available. Identify personnel that will place/manage litter fences, direct surface water, and leachate management.

8. On a quarterly basis complete and submit the following documents to the department:

   a. Reports on landfill operations based on annual operating report requirements. The reports shall include an updated isopach drawing comparing current fill elevations with permitted grades.

   b. Leachate management reports that include, daily to weekly leachate head measurements for all leachate sumps within the facility, monthly manual reading verification, quantity of leachate removed, disposition of leachate, leachate constituent analyses, and name of the individual responsible for the collection and data recording.

   c. Records addressing the use of intermediate soil cover on the active portion of the landfill for addressing erosion, stormwater water management and traffic. The intermediate cover shall be maintained to ensure a twelve-inch cover.

d. Monthly methane gas monitoring data collected from perimeter and enclosed structures. Results that exceed regulatory limits or show increasing trend should be accompanied with an explanation and type of corrective actions to mitigate the problem. The RESPONDENTS shall mitigate the situation to ensure concentrations below regulatory levels.

e. Inspect and maintain the surface water management systems, and maintain records of the inspection and any repairs. The surface water run-on controls shall maintain paths to the surface water basin and eliminate water ponding against landfill edges. The run-off controls shall direct surface water away from active workface, maintain paths including on-site silt control to surface water collection system and siltation basin, and eliminate stormwater ponding within the landfill. These records do not need to automatically be submitted to the department, however, the records and copies of the records shall be made available to the department upon request

9. Within ninety (90) days of the order becoming final, RESPONDENTS shall submit the following plans to the Department of Health for review and approval. The plans shall be implemented in accordance with the approved time schedule.

a. A plan and time schedule to repair the top decks and side slopes of the ash monofill and MSW landfill areas to ensure an appropriate cover thickness (12-inch intermediate cover).

b. A plan and time schedule on how the facility will manage the disposal of asbestos and maintain disposal location information to ensure that present and future asbestos material can be located/avoided in the future. Provide 30-day advance written notification to DOH on any future drilling/excavation through waste, including any future installation of gas collection wells. The notification shall include excavation/drilling plans and locations.

c. A plan and time schedule describing how the facility will keep litter to a minimum by minimizing cell geometry, the placement of primary and secondary litter fences, wind influencing barriers and litter pickers. Records documenting litter collection such as, amount of litter collected, number of litter pickers utilized each day,

wind velocity, and speed shall be maintained and made available for department review. In addition, the workface area and litter fences shall be free of litter at the end of the workday.

d. A plan to manage waste in an event of a natural disaster (i.e. seismic event) such that the Waimanalo Gulch Sanitary landfill and ash monofill are not able to accept waste. The alternative shall provide for MSW and ash disposal, with a minimum five-year capacity, to allow for repairs / new site developments. The alternate site must be approved in accordance with Hawaii Administrative Rules Chapter 11-58.1 and meet DOH Solid Waste Management Permit requirements.

10. The duration of the activities specified in this order shall be continued as applicable until the issuance of a modified or renewed solid waste permit that would otherwise supercede Solid Waste Management Permit LF-0054-02.

11. Send to the Director of Health, within ten (10) days after this order becomes final, a certified check payable to the State of Hawaii in the amount of two million seven hundred sixty nine thousand six hundred sixteen dollars ($2,769,616).

Paragraphs 1 to 11 of this Order and the Notice and Finding of Violation shall become final and effective twenty (20) days after receipt, unless the RESPONDENTS submit a written request to the Director for a hearing pursuant to section 342H-7, H.R.S. before the twenty (20) days are up. If a hearing on paragraphs 1 to 10 of this Order and the Notice and Finding of Violation is requested, it will be held in conjunction with the hearing on the penalty imposed by paragraph 11 of this Order.

If a hearing is requested, it will be held on a date, time, and place to be specified later. The hearing will be conducted in accordance with Chapter 91, H.R.S. and the Rules of Practice and Procedure of the Department of Health; the hearing will address the issues raised by the Notice and Finding of Violation and Order in this case. If a hearing is requested, RESPONDENTS must attend a pre-hearing conference scheduled for March 7, 2006, at 10:00am in Room 200, 1250 Punchbowl Street, Honolulu, Hawaii. At the pre-hearing conference, the date(s) of the hearing as well as other pertinent deadlines will be determined.

If you have special needs due to a disability that will aid you in participating in the hearing or pre-hearing conference, please contact the Hearings Officer at (808)

586-4409 (voice) or through the Telecommunications Relay Service (711), at least ten (10) working days before the hearing or pre-hearing conference date.

Parties may present evidence and argument on any issue raised by any paragraph in the Notice and Finding of Violation or Order or otherwise raised by this case. Parties may examine and cross-examine witnesses and present exhibits.

Parties may be represented by legal counsel at their own expense. An individual may appear on his own behalf, or a member of a partnership may represent the partnership, or an officer or authorized employee of a corporation or trust or association may represent the corporation, trust, or association.

After such hearing, this Order shall be affirmed, modified, or rescinded by the Director.

Please direct the written request for a hearing, if any, and all inquiries concerning this case to:

Steven Y.K. Chang, P.E., Chief
Solid and Hazardous Waste Branch
State Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801
Telephone: (808)586-4226

Failure to comply with this Order may subject the RESPONDENTS to additional penalties of $1,000 a day and measures under chapter 342H, H.R.S. and the rules adopted thereunder.

DATED: Honolulu, Hawaii JAN 31 2006

DEPARTMENT OF HEALTH
STATE OF HAWAII

LAURENCE K. LAU
Deputy Director for Environmental Health

APPROVED AS TO FORM:

KATHLEEN S.Y. HO
Deputy Attorney General

IN THE DEPARTMENT OF HEALTH

STATE OF HAWAII

Department of Health, State of Hawaii,	)	DOCKET NO. 05-SHW-SWS-004
Complainant,	)	
vs.	)	**SETTLEMENT AGREEMENT**
Waste Management of Hawaii, Inc. And City and County of Honolulu,	)	
Respondents.	)	

SETTLEMENT AGREEMENT

This is a Settlement Agreement ("Agreement") between the Solid Waste Section, Department of Health, State of Hawaii ("DOH"), and Waste Management of Hawaii, Inc. ("WMH") and the City and County of Honolulu, hereinafter referred to as "RESPONDENTS", to set forth RESPONDENTS' responsibilities relating to the payment of penalties and injunctive relief.

I. PRELIMINARY STATEMENT

1. On or about January 31, 2006, COMPLAINANT DOH, filed an eighteen count, Notice and Finding of Violation and Order in Docket No. 05-SHS-SWS-004 ("NFV") for certain permit violations concerning the operations and management of the Waimanalo Gulch Sanitary Landfill (the "Landfill") which is owned, operated and/or controlled by RESPONDENTS. The NFV is incorporated by reference and made a part of the settlement of this case.

2. Pursuant to HRS sections 342H-9 and 342H-10, the DOH NFV assessed a total penalty of $ 2,769,616.00 against RESPONDENTS. Shortly thereafter, to correct an error in calculating the penalty amount, DOH reduced the assessed penalty to $2,445,130.00.

3. The DOH and RESPONDENTS have agreed to conclude this enforcement action by entering into this Agreement.

II. WAIVER OF RIGHTS

4. RESPONDENTS hereby agree to waive any rights RESPONDENTS may have to a hearing on any issue relating to the factual allegations or legal conclusions set forth in the NFV.

5. RESPONDENTS admit and agree that the DOH has jurisdiction to enter into this Agreement and to enforce its terms. Further, RESPONDENTS agree that the DOH has jurisdiction and authority to compel compliance with the terms and conditions of this Agreement in an enforcement proceeding and be bound by the laws and rules of the State of Hawai'i.

III. PARTIES BOUND

6. This Agreement shall apply to and be binding upon the DOH and RESPONDENTS. RESPONDENTS agree to carry out all actions required of RESPONDENTS by this Agreement. The signatories to this Agreement certify that they are authorized to execute and legally bind the parties they represent to this Agreement. RESPONDENTS shall give notice of this Agreement to any successors in interest prior to transfer of ownership of the Landfill or of the contractor operating the Landfill. No change in ownership or corporate status of RESPONDENTS or of the Landfill shall alter RESPONDENTS' responsibilities under this Agreement without written consent by the DOH.

IV. CORRECTIVE ACTIONS AND COMPLIANCE REQUIREMENTS

7. RESPONDENTS agree to act in accordance with the Hawaii Revised Statutes, the Hawaii Administrative Rules, the conditions of their solid waste management permit and this Agreement.

7.1. RESPONDENTS shall make every practicable effort to screen waste and prevent disposal of any unacceptable waste, including but not limited to, whole tires, white goods, and lead-acid batteries, from entering and being disposed at the Landfill.

7.2. RESPONDENTS shall implement the Groundwater and Leachate Monitoring Plan dated August 2007, and any approved subsequent submissions. Groundwater and leachate samples from each monitoring well and leachate sump shall be collected and analyzed on a quarterly basis, or as required or otherwise approved by the DOH.

a. Groundwater samples shall be analyzed for constituents listed in 40 CFR 258, Appendix I, major cations and anions (Mg, Na, Ca, K, Cl, CO3, SO4, HCO3), major leachate indicators (TDS, TOC, total alkalinity, nitrogen-ammonia, Cl, and Fe), COD, nitrate-N, bromide, and field measurements (electrical conductance, pH, temperature, turbidity, and groundwater surface elevation), or as required or otherwise approved by the DOH.

b. Groundwater samples from newly installed wells shall also be analyzed for the following constituents in the first quarterly monitoring event: constituents listed in 40 CFR 258, Appendix II, major cations and anions (Mg, Na, Ca, K, Cl, CO3, SO4, HCO3), major leachate indicators (TDS, TOC, total alkalinity, nitrogen-ammonia, Cl, Fe), COD, nitrate-N, bromide, and field measurements (electrical conductance, pH, temperature, turbidity, and groundwater surface elevation), or as required or otherwise approved by the DOH.

c. Leachate samples shall be analyzed for constituents listed in 40 CFR 258, Appendix II, major cations and anions (Mg, Na, Ca, K, Cl, CO3, SO4, HCO3), major leachate indicators (TDS, TOC, total alkalinity, nitrogen-ammonia, Cl, Fe), COD, nitrate-N, bromide, and field measurements (electrical conductance, pH, temperature, and turbidity), or as required or otherwise approved by the DOH.

7.3. RESPONDENTS shall place a minimum of 6-inches of daily cover on the active MSW workface at the end of each workday, and shall leave no exposed waste. RESPONDENTS shall implement a Daily Cover Monitoring Verification Program as follows:

a. RESPONDENTS shall take digital photos of the active workface at the middle and end of each weekday (Monday through Friday), from the same perspective, to document the placement and thickness of daily cover. Digital photo records shall be maintained at the facility and submitted to the DOH via email by 12:00 noon on the next business day, with cell location information. RESPONDENTS and DOH will work cooperatively to determine the best perspective for the photos.

b. RESPONDENTS shall record the following quantitative items on a daily basis:
   i. Volume of waste disposed,
   ii. Cell geometry, and
   iii. Volume and type of daily cover used.

7.4. RESPONDENTS shall apply at least six inches of soil cover over exposed ash (not inclusive of alternative daily cover of fresh ash) every seven (7) days, or more frequently as required by the DOH. RESPONDENTS shall implement a Weekly Cover Monitoring Verification Program as follows:

a. RESPONDENTS shall take digital photos of the active ash workface on a weekly basis, prior to the placement of the weekly cover and after the weekly cover has been placed. Digital photo records shall be maintained at the facility and submitted to the DOH via email by 12:00 noon on the next business day following the day on which weekly cover was placed, with cell location information. RESPONDENTS and DOH will work cooperatively to determine the best perspective for the photos.

b. RESPONDENTS shall record the following quantitative items on a weekly basis:
   i. Volume of waste ash disposed,
   ii. Cell geometry, and
   iii. Volume of soil cover used.

7.5. RESPONDENTS shall cover all inactive ash and MSW areas with intermediate cover. Inactive areas are areas that do not receive waste (ash or MSW) within a 30-day period. RESPONDENTS shall also cover any area receiving vehicular traffic with intermediate cover, regardless of the time period since last receiving waste. Intermediate cover shall be a minimum of 12 inches of earthen material (may include six inches of soil daily cover). Particle size shall be adequate to minimize infiltration and direct stormwater to collection systems.

7.6. RESPONDENTS shall submit an application to the DOH for a permit modification to increase the maximum final grades of the ash monofill.

7.7. RESPONDENTS shall maintain the MSW leachate collection sump (4B-cell sump) leachate discharge riser and associated pumps and instrumentation. The sump leachate discharge riser shall be constructed in accordance with design drawing titled, *Sump 4B Riser* Replacement, by Sanborn, Head and Associates, Inc., dated July 26, 2007, and approved subsequent submissions. RESPONDENTS shall submit a written report, within 30 days of the Effective Date or receipt of a revised solid waste permit, whichever is earlier, documenting installation of the 4-B cell sump leachate discharge riser and associated equipment. The report shall be prepared by or approved by a professional engineer licensed in the State of Hawaii, and at a minimum, shall include the following:

a. Description of procedures for the installation of the 4-B cell sump leachate discharge riser and associated equipment,

b. Identification of any deviations from the written installation instructions, the reason for the deviations, and assessment of any effects on the usability of the sump or human health and the environment.

c. Discussion of observations (visual, meter readings, etc.) noted during installation of the leachate discharge riser system, including the presence of charred waste and observations related to the sump location, gravel depth, and liner system. Photo documentation shall also be provided.

d. Survey and as-built drawings documenting the location and construction details of the newly installed 4B-cell sump leachate discharge system.

e. Description of associated appurtenances associated with the sump leachate discharge riser. A copy of the manufacturer's specifications for any pumps and control and measuring devices shall also be provided.

f. Specify the sump depth, top of riser and compliance levels associated with the sump in feet above mean sea level (msl).

g. Certification that the sump leachate discharge riser, and associated appurtenances, were installed in accordance with the design and shall provide adequate means of complying with the leachate management provisions of HAR 11-58.1, the operations plan, and the revised solid waste permit.

7.8. Leachate Monitoring and Recordkeeping.

a. RESPONDENTS shall use automated monitoring systems to monitor leachate levels in all sumps and storage tanks. The automated systems shall include an alarm system to alert RESPONDENTS to anomalous conditions in the sumps or storage tanks.

b. RESPONDENTS shall maintain a log of the status of the leachate collection systems, and record in the log at least three times per week the date, level of leachate in each sump, volume of leachate in each tank, and associated pump rates.

c. RESPONDENTS shall take manual measurements of leachate levels in the ash sump and 4B sump, at least once per month. RESPONDENTS shall take manual measurements of leachate levels in the E1 sump on an annual basis. If manual measurements are inconsistent with automated readings or other problems are identified with the system, the DOH may increase the frequency of manual measurements.

7.9. RESPONDENTS shall remove leachate from the Landfill via each of the leachate sumps, in a manner that maintains a maximum depth of 30 centimeters (12 inches) of leachate above any part of the liner in the cell, outside the sump area.

7.10. Within thirty (30) days of the Effective Date, RESPONDENTS shall install and maintain grade survey control markers to delineate the boundaries and elevations of the ash monofill and MSW landfill areas in sufficient number to ensure compliance with permitted grades.

7.11. RESPONDENTS shall implement the Asbestos Management and Disposal Plan, as provided in the Site Operations Manual. Compliance with the plan does not preclude compliance with other applicable statutes, regulations, and rules. RESPONDENTS shall document the quantity, type, and location of asbestos disposed of in the MSW landfill. Disposal locations shall be recorded with GPS coordinates. RESPONDENTS shall maintain records on the amount and location of asbestos disposal.

7.12 RESPONDENTS shall implement the Interim Perimeter Gas Monitoring Plan dated December 2006, and approved subsequent submissions, until

implementation of the permanent Perimeter Gas Monitoring Plan required by Section 7.13. The gas monitoring program shall also be conducted in accordance with HAR 11-58.1-15(d) and these conditions.

a. RESPONDENTS shall monitor the concentration at depths that will minimize the infiltration of and dilution from atmospheric air.

b. RESPONDENTS shall minimize the amount of time that the probe is open prior to recording the gas concentrations.

c. The interim plan results shall all include the duration of time that the probe was open prior to recording the concentration, length of PVC piping extending above ground surface, and length of tubing inserted at each well.

7.13 RESPONDENTS shall implement the Perimeter Gas Monitoring Plan dated October 2007, and approved subsequent submissions, within six (6) months of the Effective Date or receipt of a revised solid waste permit, whichever is earlier. The gas monitoring program shall also be conducted in accordance with HAR 11-58.1-15(d) and these conditions.

a. The well shall not be vented, or opened prior to measuring the gas concentration.

b. RESPONDENTS shall install permanent gas monitoring probes within four (4) months of the Effective Date, or receipt of a modified solid waste permit, whichever is earlier, and provide documentation of installation within sixty (60) days of completion. Documentation shall include, but is not limited to, geologic logs of each probe location, surveyed locations and elevations of probes, and as-built drawings of each monitoring probe.

7.14 RESPONDENTS shall monitor the concentration of gases, including oxygen, methane, carbon dioxide, and hydrogen. RESPONDENTS shall monitor the concentration of gases in facility structures, including temporary structures, and at the property boundary on a monthly basis, or other frequency as approved by the DOH. If an exceedance is identified, RESPONDENTS may conduct a verification monitoring event, provided that the verification monitoring is conducted within one (1) hour of the initially detected exceedance. If exceedances or other anomalous conditions are identified, the DOH may increase the frequency of monitoring events.

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

b. The concentration of methane gas shall not exceed the LEL for methane at the facility property boundary.

c. The concentration of hydrogen gas shall not exceed 25% of the LEL for hydrogen in facility structures.

d. The concentration of hydrogen gas shall not exceed the LEL for hydrogen at the facility property boundary.

7.15 RESPONDENTS shall submit a report with results within 45 days of each monitoring event. The results shall include the date and time, gas concentrations by volume, barometric pressure, site conditions, name of personnel conducting the monitoring, description of equipment and calibration results, description of monitoring procedure, and identification of any procedures or observations outside of normal conditions.

If verification monitoring performed within one (1) hour of the initial exceedance shows concentrations below the limits in Section 7.14, RESPONDENTS shall place results in the operating record and send written notification of the exceedance and verification monitoring results to the DOH within seven (7) days.

7.16 If combustible gas concentrations exceed the limits in Section 7.14, and verification monitoring is not performed within one (1) hour of the initial exceedance or verification monitoring confirms the initial exceedance, RESPONDENTS shall perform the following.

a. Immediately take all necessary steps to ensure protection of human health;

b. Immediately notify the DOH of the exceedance;

c. Within three (3) days of detection, place in the operating record and submit to the DOH, the type of gas, gas levels detected and a description of the steps taken to protect human health; and

d. Within sixty (60) days of detection, prepare and implement a remediation plan for the combustible gas releases, place a copy of the plan in the operating record, provide a copy of the plan to the DOH, and notify the DOH that the plan has been implemented.

e. Within thirty (30) days after the remediation plan has been completed, submit a report to the DOH documenting the actions taken, additional monitoring results, and plans to prevent future recurrences.

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

7.17 This Article IV and its compliance requirements shall be effective until issuance of a revised solid waste permit for continued operations, if such a

permit is issued, or until closure for the Landfill, if such a permit is not issued. Thereafter, these requirements shall terminate except for the compliance date set forth in Section 7.13(b) and the Landfill shall be subject to the requirements set forth any revised solid waste permit, or in any permits, statutes, rules, or regulations governing closure.

V. PAYMENTS AND CONSIDERATION FOR SETTLEMENT

8. Civil Penalty Amount. RESPONDENTS shall pay a civil penalty in the amount of ONE MILLION FIVE HUNDRED THOUSAND DOLLARS ($1,500,000). RESPONDENTS may, in their discretion, satisfy this civil penalty through either of the following two options:

8.1. Cash Payment. Within THIRTY (30) days after the Effective Date of this Agreement, RESPONDENTS shall deliver payment in the amount of ONE MILLION FIVE HUNDRED THOUSAND DOLLARS ($1,500,000) to the DOH at the following address:

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

8.2. Cash Payment and Supplemental Projects. Within THIRTY (30) days after the Effective Date of this Agreement, RESPONDENTS shall notify the DOH of RESPONDENTS' election to satisfy the civil penalty through a combination of a cash payment to the DOH and Supplemental Environmental Projects, as described below. If RESPONDENTS elect this option, RESPONDENTS shall satisfy a, b and c as indicated below:

a. Within THIRTY (30) days after the Effective Date of this Agreement, RESPONDENTS shall deliver payment in the amount of FIVE HUNDRED TWENTY THOUSAND DOLLARS ($520,000) to the DOH at the address set forth in Section 8.1 above;

b. RESPONDENTS shall pay the amount of SIX HUNDRED THIRTY-SEVEN THOUSAND FIVE HUNDRED DOLLARS ($637,500) in the following manner;

(1) to the DOH, for deposit into a fund be established by order of the Hearings Officer in Docket No. 05-SHW-SWS-004 in an account established within the State of Hawaii Department of Accounting and General Services ("DAGS"). This fund shall be known as a Supplemental Environmental Project ("SEP") Fund and the amounts in the SEP Fund shall be used to fund environmentally beneficial projects to benefit Leeward communities located near the

landfill, or other communities or residents of Oahu, as selected by the DOH or any other State agency designated by the DOH after consultation with the Leeward communities located near the Landfill. RESPONDENTS shall deliver the funds to the DOH at the address stated in Section 8.1 above within THIRTY (30) days after receiving notice from the DOH that the SEP Fund has been established by DAGS, and that such funds are to be deposited. RESPONDENTS shall not participate in the selection of projects funded by the SEP Fund. If the DOH elects to hire a Supplemental Environmental Coordinator, the sum of $ 100,000.00, or such lesser amount as DOH may designated, from the SEP fund shall be used by the DOH to hire a Supplemental Environmental Coordinator to oversee the SEPs that will be selected by the DOH; or

(2) to environmentally beneficial projects selected by the DOH within 30 days of notification;

(3) or to a combination of (1) and (2), as determined by DOH.

If any funds paid in accordance with Section 8.2(b), remain unexpended for environmentally beneficial projects, those monies shall be paid to the DOH at the address listed in Section 8.1 at the discretion of DOH;

c. RESPONDENTS shall satisfy the balance of the penalty amount ($342,500) by designing, engineering, permitting, and constructing at an estimated cost of at least FOUR HUNDRED FIFTY THOUSAND DOLLARS ($450,000) a community drop off center (the "Drop-Off Center") to be located at the Landfill for use by local residents to drop-off solid waste and recyclables in the vicinity of the current scalehouse and administrative building. The design of the Drop-Off Center shall be approved by the DOH. The purpose of the Drop-Off Center is to allow members of the public to conveniently and safely deliver solid waste and/or recyclables to the Landfill for disposal and/or recycling without entering areas of the Landfill with active landfilling operations. If the actual cost to design, engineer, permit, and construct the Drop-Off Center does not exceed $450,000, then RESPONDENTS shall pay the difference to the DOH at the address set forth in Section 8.1 above.

Notwithstanding any other provision in this Agreement, if RESPONDENTS elect to satisfy the civil penalty amount through this option, RESPONDENTS shall be obligated to design, engineer, permit, and construct the Drop-Off Center only when the Landfill is issued all final permits and approvals required for the expansion of the Landfill and continuation of Landfill disposal operations. If RESPONDENTS are not

able to permit or construct the Drop-Off Center consistent with this Agreement and in spite of their reasonable efforts, then in lieu thereof, RESPONDENTS shall pay to the DOH the amount of FOUR HUNDRED THOUSAND DOLLARS ($400,000) at the address set forth in Section 8.1 above.

VI. RELEASES

9. Upon payment of the amounts set forth in Section V (PAYMENTS AND CONSIDERATION FOR SETTLEMENT), any and all violations and claims alleged or which could have been alleged by the DOH in the NFV shall be discharged, dismissed, waived and released as against RESPONDENTS, their respective directors, officers, employees, servants, agents, (former directors, officers, employees, servants and agents), assigns, attorneys, administrators, insurers, subsidiaries, affiliates and/or related entities.

VII. STIPULATED PENALTIES AND ENFORCEMENT

10. Failure by RESPONDENTS to pay the amounts in Section V (PAYMENTS AND CONSIDERATION FOR SETTLEMENT), shall obligate RESPONDENTS to pay a stipulated penalty of $1,000 per day for each day that such failure continues.

11. RESPONDENTS shall pay any stipulated penalties within seven (7) days of demand as set forth in Section VIII (Form of Payment).

12. If RESPONDENTS breach the terms of Section IV (CORRECTIVE ACTION AND COMPLIANCE REQUIREMENTS) prior to the termination of those requirements, RESPONDENTS agree to be subject to the penalties set forth in section 342H-9(a), Hawaii Revised Statutes for such breaches. RESPONDENTS reserve their rights to argue all legal and factual defenses under the law, except for any argument that penalties for such breaches may not be imposed pursuant to that section, any such arguments being contractually waived herein, in consideration of and for this Settlement Agreement. Further RESPONDENTS agree that for the purposes of said section 342H-9(a), any breach of the terms of Section IV (CORRECTIVE ACTION AND COMPLIANCE REQUIREMENTS) shall be considered breaches of a permit and/or variance issued pursuant to Chapter 342H, Hawaii Revised Statutes.

13. The provisions of this section shall not be construed to limit any other remedies, including but not limited to institution of proceedings for civil or criminal liability, available to DOH for violations of this Agreement future violations of the permit, or for violations of any other provision of law.

VIII. FORM OF PAYMENT

14. The amounts payable under Sections V (PAYMENTS AND CONSIDERATION FOR SETTLEMENT and VII (STIPULATED PENALTIES AND ENFORCEMENT) shall

be paid by cashier's check, payable to the State of Hawaii, and shall be delivered to the DOH as set forth in Section XI (NOTIFICATION).

IX. DELAYS OR IMPEDIMENTS TO COMPLIANCE

15. RESPONDENTS shall notify the DOH orally, as soon as feasible, and in writing within ten (10) calendar days of any delay or anticipated delay which does or may affect compliance with this Agreement. The notice shall describe in detail the anticipated length of the delay, the precise cause(s) of the delay, the measures taken and to be taken by RESPONDENTS to prevent or minimize the delay, the timetable by which those measures will be implemented, and the expected effect on the environment of the delay. RESPONDENTS shall take all reasonable measures to avoid or minimize any such delay.

16. The burden of proving that any delay is caused by circumstances entirely beyond the control of RESPONDENTS shall rest with RESPONDENTS.

X. ENTRY AND INSPECTION

17. Any authorized representative of the DOH, upon presentation of credentials, may enter upon the Landfill premises and/or inspect the Landfill records of RESPONDENTS at any time for the purpose of monitoring compliance with the provisions of this Agreement. This provision shall not be deemed to limit any authority the DOH otherwise has to enter and inspect.

XI. NOTIFICATION

18. Whenever, under the terms of this Agreement, a notice, report, or payment is required to be given by one party to another, such notice, report, or payment shall be directed to the individuals specified below, at the addresses given, unless a party gives notice in writing to the other parties that another individual has been designated to receive such communications:

Steven Y.K. Chang, P.E., Chief
Solid and Hazardous Waste Branch
Environmental Management Division
Hawaii State Department of Health
919 Ala Moana Blvd., Room 212
Honolulu, Hawaii 96814
Telephone: (808) 586-4226
Telefax: (808) 586-7509

Department of Environmental Services
City and County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, Hawaii 96707
Telephone: (808) 768-3486
Telefax: (808) 768-3487

Director of Operations
Waste Management of Hawaii, Inc.
Waimanalo Gulch Landfill
92-460 Farrington Hwy.
Kapolei, HI 96707
Telephone: (808) 668-2985
Telefax: (808) 668-1366

General Counsel, Western Group
Western Group Legal Department
7025 North Scottsdale Road, Suite 200
Scottsdale, AZ 85253
Telephone: (480) 624-8400
Telefax: (480) 951-5280

XII. AUTHORITY OF SIGNATORIES

19. Each undersigned representative or a party to this Agreement certifies that he or she has full authority to enter into the terms of this Agreement and legally to bind the party which he or she represents.

20. Compliance with this Agreement does not relieve RESPONDENTS' responsibility to comply with all other applicable laws and regulations.

XIII. NO ADMISSION OF LIABILITY

21.The parties acknowledge that neither this Agreement, nor the fact of settlement, nor the civil penalty and settlement payments, nor the settlement proceeds are, may be construed as, may be deemed evidence of, or may be used at any time as an admission, concession, presumption, or inference of fault, wrongdoing or liability of any party. The Agreement is to be construed strictly as a compromise and settlement of all the alleged violations in NFV for the purpose of ending past and present controversies, litigation of the contested case, and expenses.

XIV. ENTIRE AGREEMENT

22. This Agreement sets forth the entire agreement between the parties with respect to this matter.

XV. EFFECTIVE DATE

23. This Agreement shall become effective as soon as it has been signed by all the parties (the "Effective Date").

XVI. MODIFICATIONS

24. This Agreement shall not be modified except in writing, signed by all the parties.

XVII. TERMINATION

25. RESPONDENTS must demonstrate to the DOH's satisfaction that RESPONDENTS have made the payment required by Sections 8.1 or 8.2 (as appropriate) of this Agreement, and implemented the corrective actions and compliance requirements of Section IV (until those requirements are governed by a revised solid waste permit, as provided for in Section 7.17 of this Agreement. Within thirty (30) working days after such a showing by RESPONDENTS, the DOH shall issue a letter to RESPONDENTS certifying satisfactory compliance, which shall terminate this Agreement.

XVIII. EFFECT

26. This Agreement constitutes the final agreement between the parties and the settlement of Docket No. 05-SHW-SWS-004; and concludes the contested case proceedings which shall be dismissed with prejudice upon execution of this Agreement.

XIX. FEES AND COSTS

27. Each party shall bear its own costs and attorneys' fees.

XX. GOVERNING LAW

28. This Agreement shall be enforceable under, and interpreted according to the laws of the State of Hawaii.

XXI. SEVERABILITY OF UNLAWFUL PROVISIONS

29. Should any provision of this Agreement be declared or be determined by any court to be illegal or invalid, the validity of the remaining parts, terms, or provisions shall not be affected thereby and said illegal or invalid part, term, or provision shall be deemed not to be a part of this Agreement.

XXII. COUNTERPART/FACSIMILE SIGNATURES

30. This Agreement may be executed in two or more counterparts or by facsimile, and any set of the counterparts or facsimile that are collectively executed by the Parties hereto shall be sufficient proof of this Agreement.

Dated:Honolulu, Hawaii DEC - 7 2007

DEPARTMENT OF HEALTH
STATE OF HAWAII

LAURENCE K. LAU
Deputy Director for Environmental Health

APPROVED AS TO FORM:

KATHLEEN S.Y. HO
Deputy Attorney General

WASTE MANAGEMENT OF HAWAII, INC,

ANDREW M. KENEFICK
Senior Legal Counsel
per Corporate Resolution (Dec. 6, 2007)

APPROVED AS TO FORM:

LORRAINE H. AKIBA
Attorney for Waste Management of Hawaii, Inc.

CITY AND COUNTY OF HONOLULU

DIRECTOR, DEPARTMENT OF
ENVIRONMENTAL SERVICES

APPROVED AS TO FORM:
AND LEGALITY:

Deputy Corporation Counsel

Department of Health, State of Hawaii vs. Waste Management, Inc. and City and County of Honolulu; Docket No. 05-SHW-SWS-004; Settlement Agreement

Appendix B

Finding and Notice of Violation, Docket No. R6-06-06
Environmental Protection Agency, April 5, 2006

United States
Environmental Protection
Agency

Regional Administrator
75 Hawthorne Street
San Francisco, CA 94105-3901

Region 9, Arizona, California
Hawaii, Nevada, Guam
American Samoa,
Northern Marianas Islands

EPA Environmental News

For Immediate Release: April 5, 2006
Contact: Dean Higuchi, 808-541-2711, higuchi.dean@epa.gov

EPA cites two Hawai'i landfills for clean air violations

Waimanalo Gulch on Oahu and West Hawai'i on the Big Island

HONOLULU – The U.S. Environmental Protection Agency recently announced that Waste Management of Hawaii, Inc., and island governments on Oahu and Hawai'i have violated the Clean Air Act at the Waimanalo Gulch landfill at Kapolei and West Hawai'i landfill at Waikaloa.

The violations pertain to the Waimanalo Gulch landfill at Kapolei on Oahu and West Hawai'i landfill at Waikaloa on the Big Island. The Waimanalo Gulch landfill is owned by the City and County of Honolulu, and the West Hawai'i landfill is owned by the County of Hawai'i. Both landfills are run and operated for the counties by Waste Management of Hawaii, Inc.

"Landfill owners and operators need to meet the planning, permitting and control requirements to comply with clean air rules," said Deborah Jordan, director for the EPA Pacific Southwest Region's Air Division. "The goal of our action is to ensure that Waste Management and the counties effectively control emissions from both landfills."

At the Waimanalo Gulch landfill, EPA inspectors found that the gas collection and control system was installed seven years late in August 2005, and does not meet requirements. At the West Hawaii landfill, Waste Management and the County of Hawai'i violated several reporting requirements. Both landfills have been required to comply with the clean air rules since March 1996.

The EPA is requiring Waste Management and the counties to get both landfills into compliance with clean air rules. Under the Clean Air Act, they could face fines of up to $32,500 per day, per violation. Staff from the Hawai'i Department of Health's Clean Air Branch provided assistance to the EPA's investigators.

Nonmethane landfill gas contains volatile organic compounds and hazardous air pollutants that can result in adverse effects to the respiratory system, cancer, and damage to the nervous system. Methane emissions contribute to global climate change and can result in fires or explosions when they accumulate in structures on or off the landfill site.

# # #

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

CERTIFIED MAIL NO. 7003 3110 0006 2000 8182
RETURN RECEIPT REQUESTED

Paul Burns
General Manager
Waste Management of Hawaii, Inc.
92-460 Farrington Highway
Kapolei, HI 96707

CERTIFIED MAIL NO. 7003 3110 0006 2000 8175
RETURN RECEIPT REQUESTED

Eric S. Takamura, P.E.
Director
Department of Environmental Services
City and County of Honolulu
1000 Uluohia St., Suite 308
Kapolei, HI 96707

In Reply: AIR-5
Refer To: Docket No. R9-2006-06

Dear Messrs. Burns and Takamura:

Enclosed is a copy of a Finding and Notice of Violation ("NOV") that the United States Environmental Protection Agency ("EPA") is issuing to Waste Management of Hawaii ("WMH") and the City and County of Honolulu ("CCH") pursuant to Section 113 (a) of the Clean Air Act (the "Act"), 42 U.S.C. § 7413 (a). The NOV is intended to notify WMH and CCH of EPA's finding that Waimanalo Gulch Solid Waste Landfill at Kapolei on Oahu (the "Landfill") has been and is in violation of the Act.

You should be aware that Section 113(a) of the Act provides that EPA may issue an Order requiring compliance, issue an Order assessing a civil administrative penalty, or commence a civil action seeking an injunction and/or a civil penalty. Furthermore, Section 113(c) of the Act provides for criminal penalties in certain cases.

Upon a finding of adequate evidence of a continuing violation, EPA may place the Landfill on the List of Violating Facilities. See Section 306 of the Act and the regulations promulgated in 40 C.F.R. Part 32. Such facility would be declared ineligible for participation in any federal contract, grant, loan, or subagreement thereunder.

If you wish to discuss the NOV, you may request a conference with EPA. The conference will afford WMH and CCH an opportunity to present information bearing on the finding of violation, the nature of the violation, any efforts you have taken to achieve compliance, and the steps you propose to take to achieve compliance.

Please contact Brian Riedel, Office of Regional Counsel, at (415) 972-3924, to request a conference. Such request should be made as soon as possible, but in any event no later than 10 business days after receipt of this letter. Thank you for your cooperation in this matter.

Sincerely,

Deborah Jordan
Director, Air Division

Enclosures

cc: Wilfred Nagamine, CAB, HSDOH

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

CERTIFIED MAIL NO. 7004 1160 0004 3168 5961
RETURN RECEIPT REQUESTED

Paul Burns
General Manager
Waste Management of Hawaii, Inc.
92-460 Farrington Highway
Kapolei, HI 96707

CERTIFIED MAIL NO. 7004 1160 0004 3168 5978
RETURN RECEIPT REQUESTED

Michael Dworsky
Division Head
Solid Waste
Department of Environmental Management
County of Hawaii
25 Aupuni Street, Room 214
Hilo, HI 96720

In Reply: AIR-5
Refer To: Docket No. R9-2006-07

Dear Messrs. Burns and Dworsky:

Enclosed is a copy of a Finding and Notice of Violation ("NOV") that the United States Environmental Protection Agency ("EPA") is issuing to Waste Management of Hawaii ("WMH") and the County of Hawaii ("CH") pursuant to Section 113 (a) of the Clean Air Act (the "Act"), 42 U.S.C. § 7413 (a). The NOV is intended to notify WMH and CH of EPA's finding that West Hawaii landfill at Waikaloa on the Big Island (the "Landfill") has been and is in violation of the Act.

You should be aware that Section 113(a) of the Act provides that EPA may issue an Order requiring compliance, issue an Order assessing a civil administrative penalty, or commence a civil action seeking an injunction and/or a civil penalty. Furthermore, Section 113(c) of the Act provides for criminal penalties in certain cases.

Upon a finding of adequate evidence of a continuing violation, EPA may place the Landfill on the List of Violating Facilities. See Section 306 of the Act and the regulations promulgated in 40 C.F.R. Part 32. Such facility would be declared ineligible for participation in any federal contract, grant, loan, or subagreement thereunder.

If you wish to discuss the NOV, you may request a conference with EPA. The conference will afford WMH and CH an opportunity to present information bearing on the finding of violation, the nature of the violation, any efforts you have taken to achieve compliance, and the steps you propose to take to achieve compliance.

Please contact Brian Riedel, Office of Regional Counsel, at (415) 972-3924, to request a conference. Such request should be made as soon as possible, but in any event no later than 10 business days after receipt of this letter. Thank you for your cooperation in this matter.

Sincerely,

Deborah Jordan
Director, Air Division

Enclosures

cc: Wilfred Nagamine, CAB, HSDOH

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

In the Matter of: Waste Management of Hawaii, Inc. 92-460 Farrington Highway Kapolei, Oahu, Hawaii 96707 County of Hawaii 25 Aupuni Street Hilo, Hawaii 96720 Proceeding under Section 113 of the Clean Air Act, 42 U.S.C. § 7413	Docket No. R9-06-07 Finding and Notice of Violation

This Finding and Notice of Violation ("NOV") is issued pursuant to the authority of Section 113 of the Clean Air Act, 42 U.S.C. §§ 7401-7671q (the "Act") to Waste Management of Hawaii, Inc. ("WMH") and the County of Hawaii ("CH") for violations of the Act at West Hawaii Sanitary Landfill ("West Hawaii Landfill" or "Landfill") located at 71-1111 Queen Kahumanu Hwy., Waikoloa, Hawaii. The authority of the Administrator of the United States Environmental Protection Agency ("EPA") to issue an NOV pursuant to Section 113(a) of the Act, 42 U.S.C. § 7413(a), has been delegated to the Regional Administrator, EPA Region IX, and redelegated to the Director, Air Division, EPA Region IX.

STATUTORY AND REGULATORY AUTHORITY

1. Section 111(b)(1)(A) of the Act, 42 U.S.C. § 7411(b)(1)(A), requires EPA to publish a list of

categories of stationary sources that emit or may emit any air pollutant. The list must include any categories of sources which are determined to cause, or significantly contribute to, air pollution which may be reasonably anticipated to endanger public health or welfare. "New source[s]" are defined as stationary sources, the construction or modification of which is commenced after the publication of the regulations or proposed regulations prescribing a standard of performance applicable to such source. 42 U.S.C. § 7411(a). These standards are known as New Source Performance Standards ("NSPS").

2. Section 111(e) of the Act, 42 U.S.C. § 7411(e), prohibits an owner or operator of a new source from operating that source in violation of an NSPS.

3. Pursuant to Section 111(b)(1)(A) of the Act, 42 U.S.C. § 7411(b)(1)(A), and at 40 C.F.R. § 60.16, EPA has identified municipal solid waste landfills as one category of stationary sources that cause, or contribute significantly to, air pollution that may reasonably be anticipated to endanger public health or welfare. EPA also promulgated the Standards of Performance for Municipal Solid Waste Landfills ("NSPS Subpart WWW" or "Subpart WWW"), at 40 C.F.R. Part 60, Subpart WWW, §§ 60.750 - 60.759, effective March 12, 1996.

4. NSPS Subpart WWW applies to each municipal solid waste landfill ("MSW landfill" or "landfill") that commenced

construction, reconstruction or modification on or after May 30, 1991.

5. Pursuant to NSPS Subpart WWW, each owner or operator of an MSW landfill having a design capacity $\geq$ 2.5 million megagrams ("Mg") and 2.5 million cubic meters ("m^3") must calculate its nonmethane organic compounds ("NMOC") emissions potential using procedures specified in 40 C.F.R. § 60.754 and report the results to EPA on an annual basis. *See* 40 C.F.R. §§ 60.752(b) and 60.757(b)(1).

6. The annual NMOC emission rate emission rate report must include all the data, calculations, sample reports and measurements used to estimate annual emissions. 40 C.F.R. § 60.757(b)(2).

7. If the calculated NMOC emissions $\geq$ 50 Mg/yr, the owner or operator must submit a gas collection and control design plan ("design plan") within 1 year, and install a gas collection and control system ("GCCS") within 30 months of the first report indicating emissions $\geq$ 50 Mg NMOC/yr, unless the landfill performs Tier 2 or 3 measurements that show NMOC emissions < 50 Mg/yr. *See* 40 C.F.R. §§ 60.752(b) and 60.757(c).

8. If the calculated NMOC emissions > 50 Mg/yr and the owner or operator elects to perform Tier 2 NMOC sampling and analysis pursuant to 40 C.F.R. § 60.754(a)(3), a revised NMOC emission rate report, with the recalculated emission rate, based on Tier 2 sampling and analysis, must be submitted to EPA within

180 days of the first calculated exceedance of 50 Mg/yr. *See* 40 C.F.R. § 60.757(c)(1).

9. On January 30, 2006, EPA delegated authority to implement and enforce NSPS Subpart WWW to the State of Hawaii, Department of Health.

10. Pursuant to Section 502(a) of the Act, sources subject to regulation under Section 111 of the Act (NSPS) must obtain an operating permit under Title V of the CAA, unless the source category is exempted by EPA.

11. Pursuant to 40 C.F.R. § 60.752(b), the owner or operator of an MSW landfill that is subject to NSPS Subpart WWW with a design capacity $\geq$ 2.5 million Mg and 2.5 million m^3 is subject to part 70 or 71 permitting requirements. *See also* 40 C.F.R. § 60.752(c).

12. Forty C.F.R. § 70.5(a)(1) requires a source applying for a part 70 permit for the first time to submit an application within 12 months after the source becomes subject to the part 70 permit program.

FINDING OF VIOLATION

13. The West Hawaii Landfill commenced construction on or after May 30, 1991.

14. Beginning March 12, 1996, the Landfill became subject to NSPS Subpart WWW.

15. On March 12, 1996, the Landfill had a design capacity that exceeded 2.5 million Mg and 2.5 million m^3.

16. On June 9, 1996, WMH submitted an Initial Design Capacity Report and Initial NMOC Emission Rate Report

(collectively, "Initial Report") for the Landfill to EPA pursuant to 40 C.F.R. §§ 60.757(a)(1), 60.757(a)(2) and 60.757(b).

17. In the Initial Report for the Landfill, submitted by WMH to EPA on June 9, 1996, Tier 1 calculations indicated that the NMOC emission rate < 50 Mg/yr.

18. WMH or CH was required to submit Annual NMOC Emission Rate Reports for 2001, 2002, 2003, 2004 and 2005 to EPA on an annual basis.

19. WMH and CH failed to submit Annual NMOC Emission Rate Reports for 2001, 2002, 2003, 2004 and 2005 to EPA on an annual basis.

20. The failure of WMH and CH to submit Annual NMOC Emission Rate Reports for 2001, 2002, 2003, 2004 and 2005 to EPA on an annual basis constitutes five (5) violations of Section 111 of the Act and 40 C.F.R. § 60.757(b).

21. On August 8, 2005, WMH completed Tier 1 calculations for the Landfill that revealed an NMOC emission rate $\geq$ 50 Mg/yr in 2002.

22. WMH has elected to recalculate the NMOC emission rate for the Landfill pursuant to Tier 2 sampling and analysis, but, to date, has not submitted a revised NMOC emission rate report to EPA.

23. WMH and CH failed to submit a revised NMOC emission rate report based on Tier 2 sampling and analysis for the Landfill within 180 days of June 9, 2002, or by December 9, 2002.

24. WMH and CH also failed to submit a design plan for the Landfill to EPA with one year of June 9, 2002 or by June 9, 2003, and failed to install a GCCS within 30 months of June 9, 2002 or by December 9, 2004.

25. The failures of WMH and CH described in the preceding two paragraphs constitute a violation of Section 111 of the Act and 40 C.F.R. § 60.757(c).

26. Pursuant to 40 C.F.R. § 70.5(a)(1), WMH or CH was required to submit an application for a part 70 permit for the Landfill within 1 year of March 12, 1996, or by March 12, 1997.

27. On June 19, 2001, CH submitted its first part 70 permit application for the Landfill.

28. WMH and CH violated 40 C.F.R. § 70.5 by failing to submit the first part 70 permit application for the Landfill by March 12, 1997.

ENFORCEMENT

29. Section 113(a)(3) of the Act provides that whenever EPA finds that any person has violated, or is in violation of, any requirement or prohibition of, *inter alia*, subchapter I or V of the Act, including, but not limited to, any requirement or prohibition of any rule promulgated under Sections 111 or 502 of the Act, EPA may,

- issue an administrative penalty order pursuant to Section 113(d) for civil administrative penalties of up to $ 32,500 per day of violation, or

- issue an order requiring such person to comply with such requirement or prohibition, or
- bring a civil action pursuant to Section 113(b) for injunctive relief and/or civil penalties of not more than $ 32,500 per day for each violation.

42 U.S.C. § 7413(a)(3), as amended by Pub. L. 104-134. Furthermore, for any person who knowingly violates a requirement or prohibition of Sections 111 or 502 of the Act, Section 113(c) provides for criminal penalties or imprisonment, or both. In addition, under Section 306(a), the regulations promulgated thereunder (40 C.F.R. Part 32), and Executive Order 11738, facilities to be used in federal contracts, grants, and loans must be in full compliance with the Act and all regulations promulgated pursuant to it. Violation of the Act may result in the subject facility being declared ineligible for participation in any federal contract, grant, or loan.

PENALTY ASSESSMENT CRITERIA

Section 113(e)(1) of the Act states that the Administrator or a court, as appropriate, shall, in determining the amount of any penalty to be assessed, take into consideration (in addition to such other factors as justice may require) the size of the business, the economic impact of the penalty on the business, the violator's full compliance history and good faith efforts to comply, the duration of the violation as established by any credible evidence (including evidence other than the applicable test

method), payment by the violator of penalties previously assessed for the same violation, the economic benefit of noncompliance, and the seriousness of the violation. Section 113(e)(2) of the Act allows the Administrator or a court to assess a penalty for each day of violation.

OPPORTUNITY FOR CONFERENCE

WMH and/or CH may, upon request, confer with EPA. The conference will enable WMH and/or CH to present evidence bearing on the finding of violation, the nature of the violation, and any efforts it may have taken or proposes to take to achieve compliance. WMH and/or CH may be represented by counsel. A request for a conference must be made within ten (10) working days of receipt of this NOV. The request for a conference or other inquiries concerning the NOV should be made in writing to:

Brian P. Riedel (ORC-2)
Office of Regional Counsel
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105
(415) 972-3924
facsimile (415) 947-3570

4-4-06
Date

Deborah Jordan
Director, Air Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

In the Matter of:	Docket No. R9-06-06
Waste Management of Hawaii, Inc. 92-460 Farrington Highway Kapolei, Hawaii 96707	Finding and Notice of Violation
City and County of Honolulu 1000 Uluohia Street, Suite 308 Kapolei, Hawaii 96707	
Proceeding under Section 113 of the Clean Air Act, 42 U.S.C. § 7413	

This Finding and Notice of Violation ("NOV") is issued pursuant to the authority of Section 113 of the Clean Air Act, 42 U.S.C. §§ 7401-7671q (the "Act") to Waste Management of Hawaii, Inc. ("WMH") and the City and County of Honolulu ("CCH") for violations of the Act at Waimanalo Gulch Municipal Solid Waste Landfill ("Waimanalo Gulch Landfill" or "Landfill") located at 92-460 Farrington Highway, Kapolei, Oahu, Hawaii. The authority of the Administrator of the United States Environmental Protection Agency ("EPA") to issue an NOV pursuant to Section 113(a) of the Act, 42 U.S.C. § 7413(a), has been delegated to the Regional Administrator, EPA Region IX, and redelegated to the Director, Air Division, EPA Region IX.

STATUTORY AND REGULATORY AUTHORITY

1. Section 111(b)(1)(A) of the Act, 42 U.S.C.

§ 7411(b)(1)(A), requires EPA to publish a list of categories of stationary sources that emit or may emit any air pollutant. The list must include any categories of sources which are determined to cause, or significantly contribute to, air pollution which may be reasonably anticipated to endanger public health or welfare. "New source[s]" are defined as stationary sources, the construction or modification of which is commenced after the publication of the regulations or proposed regulations prescribing a standard of performance applicable to such source. 42 U.S.C. § 7411(a). These standards are known as New Source Performance Standards ("NSPS").

2. Section 111(e) of the Act, 42 U.S.C. § 7411(e), prohibits an owner or operator of a new source from operating that source in violation of an NSPS.

3. Pursuant to Section 111(b)(1)(A) of the Act, 42 U.S.C. § 7411(b)(1)(A), and at 40 C.F.R. § 60.16, EPA has identified municipal solid waste ("MSW") landfills as one category of stationary sources that cause, or contribute significantly to, air pollution that may reasonably be anticipated to endanger public health or welfare. EPA also promulgated the Standards of Performance for Municipal Solid Waste Landfills ("NSPS Subpart WWW" or "Subpart WWW"), at 40 C.F.R. Part 60, Subpart WWW, §§ 60.750 - 60.759, effective March 12, 1996.

4. NSPS Subpart WWW applies to each MSW landfill that

commenced construction, reconstruction or modification on or after May 30, 1991.

5. Pursuant to NSPS Subpart WWW, each owner or operator of an MSW landfill having a design capacity $\geq$ 2.5 million megagrams ("Mg") and 2.5 million cubic meters ("m^3") must calculate its nonmethane organic compounds ("NMOC") emissions potential using the Tier 1 calculations at 40 C.F.R. § 60.754 and report the results to EPA. If this report indicates NMOC emissions $\geq$ 50 Mg/yr, the owner or operator must submit a collection and control design plan ("design plan"), prepared by a professional engineer, to EPA within 1 year, and install a gas collection and control system ("GCCS") within 30 months of the first report indicating emissions $\geq$ 50 Mg NMOC/yr, unless the landfill performs Tier 2 or 3 measurements that show NMOC emissions < 50 Mg/yr. *See* 40 C.F.R. §§ 60.752(b) and 60.757(c).

6. A GCCS installed in accordance with 40 C.F.R. § 60.752(b)(2) must meet the design and operation requirements of 40 C.F.R. §§ 60.752(b)(2)(ii) and 60.752(b)(2)(iii).

7. On January 30, 2006, EPA delegated authority to implement and enforce NSPS Subpart WWW to the State of Hawaii, Department of Health.

FINDING OF VIOLATION

8. The Waimanalo Gulch Landfill is owned by CCH and operated by WMH.

9. The Waimanalo Gulch Landfill commenced modification after May 30, 1991.

10. Beginning March 12, 1996, the Landfill became subject to NSPS Subpart WWW.

11. On March 12, 1996, the Landfill had a design capacity $\geq$ 2.5 million Mg and 2.5 million m^3.

12. On June 9, 1996, WMH submitted an Initial Design Capacity Report and Initial NMOC Emission Rate Report (collectively, "Initial Report") for the Landfill to EPA pursuant to 40 C.F.R. §§ 60.757(a)(1), 60.757(a)(2) and 60.757(b).

13. The Initial Report for the Landfill, submitted by WMH to EPA on June 9, 1996, is the first report in which the Landfill had an NMOC emission rate $\geq$ 50 Mg/yr.

14. WMH or CCH was required to either submit a design plan to EPA within 1 year of June 9, 1996, or by June 9, 1997, or perform Tier 2 measurements that show NMOC emissions < 50 Mg/yr and report such results to EPA by December 9, 1996.

15. WMH and CCH failed to submit a design plan to EPA by June 9, 1997.

16. WMH and CCH failed to submit Tier 2 results to EPA by December 9, 1996.

17. WMH and CCH violated Section 111 of the Act, 40 C.F.R. §§ 60.752(b)(2)(i) and 60.757(c) by failing to submit a design plan to EPA by June 9, 1997 or submit Tier 2 recalculations to EPA by December 9, 1996.

18. WMH or CCH was required to install a GCCS for the

Landfill within 30 months of June 9, 1996, or by December 9, 1998.

19. WMH and CCH failed to install a GCCS for the Landfill by December 9, 1998.

20. WMH and CCH violated Section 111 of the Act and 40 C.F.R. § 60.752(b)(2)(ii) by failing to install a GCCS for the Landfill by December 9, 1998.

21. On August 1, 2005, full operation of a GCCS for the Landfill began. However, the GCCS has not complied with, and does not comply with, the design and operation requirements of 40 C.F.R. § 60.752(b)(2). Therefore, WMH and CCH have been in violation, and are considered to be in violation, until WMH and/or CCH establishes continuous compliance with 40 C.F.R. § 60.752(b)(2).

ENFORCEMENT

22. Section 113(a)(3) of the Act provides that whenever EPA finds that any person has violated, or is in violation of, any requirement or prohibition of, *inter alia*, subchapter I or V of the Act, including, but not limited to, any requirement or prohibition of any rule promulgated under Sections 111 or 502 of the Act, EPA may,

- issue an administrative penalty order pursuant to Section 113(d) for civil administrative penalties of up to $ 32,500 per day of violation, or
- issue an order requiring such person to comply with such requirement or prohibition, or

- bring a civil action pursuant to Section 113(b) for injunctive relief and/or civil penalties of not more than $ 32,500 per day for each violation.

42 U.S.C. § 7413(a)(3), as amended by Pub. L. 104-134. Furthermore, for any person who knowingly violates a requirement or prohibition of Sections 111 or 502 of the Act, Section 113(c) provides for criminal penalties or imprisonment, or both. In addition, under Section 306(a), the regulations promulgated thereunder (40 C.F.R. Part 32), and Executive Order 11738, facilities to be used in federal contracts, grants, and loans must be in full compliance with the Act and all regulations promulgated pursuant to it. Violation of the Act may result in the subject facility being declared ineligible for participation in any federal contract, grant, or loan.

PENALTY ASSESSMENT CRITERIA

Section 113(e)(1) of the Act states that the Administrator or a court, as appropriate, shall, in determining the amount of any penalty to be assessed, take into consideration (in addition to such other factors as justice may require) the size of the business, the economic impact of the penalty on the business, the violator's full compliance history and good faith efforts to comply, the duration of the violation as established by any credible evidence (including evidence other than the applicable test method), payment by the violator of penalties previously assessed for the same violation, the economic benefit of

noncompliance, and the seriousness of the violation. Section 113(e)(2) of the Act allows the Administrator or a court to assess a penalty for each day of violation. For purposes of determining the number of days of violation, where EPA makes a prima facie showing that the conduct or events giving rise to this violation are likely to have continued or recurred past the date of this NOV, the days of violation shall be presumed to include the date of this NOV and each and every day thereafter until the defendant or respondent establishes that continuous compliance has been achieved, except to the extent that the defendant or respondent can prove by the preponderance of the evidence that there were intervening days during which no violation occurred or that the violation was not continuing in nature.

OPPORTUNITY FOR CONFERENCE

WMH and/or CCH may, upon request, confer with EPA. The conference will enable WMH and/or CCH to present evidence bearing on the finding of violation, the nature of the violation, and any efforts it may have taken or proposes to take to achieve compliance. WMH and/or CCH may be represented by counsel. A request for a conference must be made within ten (10) working days of receipt of this NOV. The request for a conference or other inquiries

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concerning the NOV should be made in writing to:

Brian P. Riedel (ORC-2)
Office of Regional Counsel
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105
(415) 972-3924
facsimile (415) 947-3570

4-4-06
Date

Deborah Jordan
Director, Air Division

Appendix C

EIS Public Scoping Conducted for the Proposed Expansion of the Waimānalo Gulch Sanitary Landfill, October 2006

Appendix C
EIS Public Scoping

Waimānalo Gulch Sanitary Landfill Lateral Expansion
Waimānalo Gulch, Oahu, Hawaii

October 2006

City & County of Honolulu
Department of Environmental Services
1000 Uluohia Street, 3rd Floor
Kapolei, Hawai'i 96707

R. M. TOWILL CORPORATION
SINCE 1930
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

1-19777-01

Appendix C

EIS Public Scoping

Waimanalo Gulch Sanitary Landfill Lateral Expansion EIS
Waimānalo Gulch, O'ahu, Hawai'i
TMKs: (1) 9-2-003: 072 and 073

October 2006

Prepared for:
City & County of Honolulu
Department of Environmental Services
Kapolei, Hawaii 96707

Prepared by:
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawai'i 96817

Environmental Impact Statement (EIS)
Public Scoping Summary

1. Background

The Department of Environmental Services (ENV) held a series of four EIS Community Scoping Meetings between July 10 and August 10, 2006 to obtain input on issues that islandwide communities feel should be addressed in the preparation of the EIS for the expansion of the Waimanalo Gulch Sanitary Landfill. Waimanalo Gulch is located close to the boundaries of the Nanakuli and Ewa regions of Oahu but is used islandwide by all Oahu communities for the disposal of municipal refuse. The series of public scoping meetings were therefore convened to obtain input from the communities closest to the landfill, as well as other communities that are important users of the facility. The meetings were held on the following dates and at the following locations:

Mtg. No. 1	July 10, 2006	Nanakuli High and Intermediate School 98-980 Nanakuli Avenue Waianae, Hawaii 96792
Mtg. No. 2	July 11, 2006	Benjamin Parker Elementary School 45-259 Waikalua Road Kaneohe, Hawaii 96744
Mtg. No. 3	July 27, 2006	Mission Memorial Auditorium 550 South King Street Honolulu, Hawaii 96813
Mtg. No. 4	August 10, 2006[1]	Kapolei Hale 1000 Uluohia Street Kapolei, Hawaii 96707

[1]The date for this meeting was changed from a previous date on July 26th that conflicted with the scheduling of Neighborhood Board No. 34, Makakilo/Kapolei.

2. EIS Public Scoping Meeting Agenda

Each of the four public scoping sessions was conducted by a meeting facilitator who explained that the purpose of the meetings are to obtain community input on environmental issues that the public feels should be addressed in the preparation of the project EIS. The agenda used for the meetings included:

A. An overview of the purpose of the meeting;
B. Remarks by the Department of Environmental Services (ENV) concerning the need for the project and important events that have transpired since the last EIS for the expansion of Waimanalo Gulch was approved in 2003;
C. A session during the meeting when the community provides comments on issues or subject areas that they feel should be addressed in the EIS;
D. A session summarizing the input provided by the community during the last 15-30 minutes of the meeting; and
E. Adjournment and "Thank You" to audience for attendance.

3. List of Participants and Summary of Issues and Concerns Raised

A record of each of the four meetings is attached and includes the date of the meeting, the sign-in list of meeting attendees, and written comments that were received by the close of the EIS Public Scoping comment period on August 30, 2006.

4. Summary of Issues by Topic Area

A combined summary list incorporating comments received from the four meetings are attached. Bulleted comments that are in bold are those received in writing that do not duplicate what was already provided by the community.

Meeting No. 1

Nanakuli High and Intermediate School

Monday, July 10, 2006

Public Scoping Meeting for Preparation of EIS
Waimanalo Gulch Sanitary Landfill Expansion
July 10 11, 2006
Nanakuli High and Intermediate School/Benjamin Parker Elementary School

	NAME	Address	Phone No.	E-mail Address
1	Bud Ebel EBEL	84-854 FRICKE ST	696-8106	bud96792@hotmail.com
2	Lee Munson	Ko Olina	924-2345	lmunsonusa@aol.
3	Mary Josue	89-407 Mokiawe St.	668-1473	lady hawaii 1st @ hawaii.rr.com
4	Romeo Monces	Ko Olina Kai	671-2890	romeo@royalhawaiianresort.com
5	Harry Basso	89-246 PUNAWAI	668 5417	
6	Nina Fisher	89-639 Nanakuli		
7	Uhna Kinilau	"		
8	Hanalei Aipoalani	89-308 Mokiawe St.	351-3989	haipoalani@yahoo.com
9	CLARA BATONGBACAL	87-140 Helelua St #2		cbatongbac01@hawaiiantel.net
10	RALPH F. HARRIS	92-1527-H Aliinui Dr	440-8999	Ralph.Harris@Koolina...
11	TODD APO	92-1184 OLANI ST	680-7660	TAPO@HONOLULU.GOV
12	Cynthia K.L. Rezentes	87-149 Maipela St.	696-0131	rezentesc@aol.com
13	Kamaki Kanahele	89-237 Kenwali	696-1515	
14	Agnes Cope	" "	" "	
15	Ken Williams	92-1480 Aliinui	671 2512	ken@koolina.com
16	Carolyn Holmes	84-192 Kepue	695 5069	Carolyn@wisconsultingllc.com
17	Mapuana Tector	85-832 Old Gov Rd	696 7812	Mapuana@Hawaii.edu
18	Kahilama Naomi	89-416 Nanakuli Ave	668-1039	
19	Kahikina Michael P.	"	"	
20	Terrie Spotkaeff	PO Box 1888 Waianae 96792	306 4164	tspotkaeff@AOL.com

Public Scoping Meeting for Preparation of EIS
Waimanalo Gulch Sanitary Landfill Expansion
July 10-11, 2006
Nanakuli High and Intermediate School/Benjamin Parker Elementary School

	NAME	Address	Phone No.	E-mail Address
1	Johnnie-Mae L. Perry	Waianae	—	—
2	Herb. Hew Len	86-313 Hakimo	Waianae	
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COMMENT FORM

Waimanalo Gulch Sanitary Landfill Expansion
Public Scoping Meeting for Environmental Impact Statement (EIS)
July 10-11, 2006

Your comments are important and appreciated. Please use this form to make your comments regarding issues or concerns pertinent to the preparation of the EIS for this project. All comments should be received by **August 10, 2006. Please send to:**

Department of Environmental Services, Refuse Division
City & County of Honolulu
1000 Uluohia Street, Suite 212, Kapolei, Hawaii 96707

It is very frustrating to have been involved in mtgs. of city council hearings & testimony for several years now and then to gear up for battle again ??
The community has said "No More Landfill!" When will the City get the message - No Landfill - Yes JDI Plasma Arc Gasification!!! Stop thinking about the money - think & look at our community, our families health & safety - How about designating landfills for East / Windward & Central Oahu - We always take everybody's opala - Seriously, JDI can eliminate alot of this "opala mea" plus renewable energy for who? Us, the people - Address our health, safety concerns stop looking at the money, give us a chance - look at "JDI plasma arc gasification"! People take time to voice their concern - Are you all hearing them?? STOP Landfills!!

Name: Naomi Kahikina

Address: 89-416 Nanakuli Ave

Telephone: 668-1033 Fax:

COMMENT FORM

Waimanalo Gulch Sanitary Landfill Expansion
Public Scoping Meeting for Environmental Impact Statement (EIS)
July 10-11, 2006

Your comments are important and appreciated. Please use this form to make your comments regarding issues or concerns pertinent to the preparation of the EIS for this project. All comments should be received by **August 10, 2006. Please send to:**

Department of Environmental Services, Refuse Division
City & County of Honolulu
1000 Uluohia Street, Suite 212, Kapolei, Hawaii 96707

Waimanalo Gulch Issues:

- Health concerns
  1. Unknown effects to the land, water + air
  2. Who is liable is people get sick or hurt? City? Private?
  3. Community has right to sue?

- Community Benefits:
  1. What community benefits? Who defines?
  2. Who and how selection to committee is done?
  3. Not living up to agreement with community in closure.

- Alternative Processing:
  1. Plasma Arc Gasification
     Jacoby Inc.

Name: Representative Michael P. Kahikina

Address: 89-416 Nanakuli Ave.

Telephone: 668-1033 Fax: 586-8469

Meeting No. 2

Benjamin Parker Elementary School

Tuesday, July 11, 2006

Public Scoping Meeting for Preparation of EIS
Waimanalo Gulch Sanitary Landfill Expansion
July 10-11, 2006
Nanakuli High and Intermediate School/Benjamin Parker Elementary School

	NAME	Address	Phone No.	E-mail Address
1	Shirley Foley	3926 Aho Kaaaka St.	780-7774	foleyhawaii@aol.com
2	Sonia W. Yick	email - jsonigwy@aol.com		
3	Bill Sager	bsager@lavanet		
4	Ron Boyle	47-128 Pulama Rd Kaneohe 96744	239 5621	boylerc@rr.hawaii
5	Ken Williams	92-1480 Aiinui	671252	ken@kookina.com
6	STANN REIZISS	KAILUA PO Box 1517	230-8199	REIZISS@CCHawaii.com
7	Lucy Gay	86-088 Farrington Hwy	696-6378	lucy@hawaii.edu
8	SUSAN BACA	47459 HUI IWA	3921416	SUEBACA@HOTMAIL
9	Andrew Malahoff	503 S. King St.	527-5813	amalahoff@honolulu.gov
10	Wilma Kinilau	85-639 Nanakuli Ave		
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COMMENT FORM

Waimanalo Gulch Sanitary Landfill Expansion
Public Scoping Meeting for Environmental Impact Statement (EIS)
July 10-11, 2006

Your comments are important and appreciated. Please use this form to make your comments regarding issues or concerns pertinent to the preparation of the EIS for this project. All comments should be received by **August 10, 2006. Please send to:**

Department of Environmental Services, Refuse Division
City & County of Honolulu
1000 Uluohia Street, Suite 212, Kapolei, Hawaii 96707

I support the full use of ~~#~~ the Waimanalo Site before any other site is considered. Any thing else would be a terrible waste of money & resources.

Incorporate a comprehensive waste management program to minimize waste stream which needs to be land filled. Include analysis in EIS.

Address problem of fire burning deep into land fill & being impossible to put out.

Address issue of vegetation to be used when land fill is closed. Impact of hydromulch

Name: Bill Sager

Address: 44-211 Mikida Dr, Kaneohe, HI 96744

Telephone: 235-0757 Fax: bsager@lava.net

Meeting No. 3

Mission Memorial Auditorium

Thursday, July 27, 2006

Public Scoping Meeting for Preparation of EIS
Waimanalo Gulch Sanitary Landfill Expansion
July 27 - August 10, 2006
Mission Memorial Auditorium/Kapolei Hale

	NAME	Address	Phone No.	E-mail Address
1	Paul Herran	1301 Lusitana St. #611	383-8829	pherran@honolulu.gov
2	Jim Corcoran	1171 Luna'Aiino Pl Kailua	263-3093	corcoran@lava.net
3	Roy Soon	39 Makaweli St.	396-5613	
4	Rod Ohira	Honolulu Advertiser		
5	Todd Apo	530 S. King	5477001	
6	Robert Kaialau III	565 Kokea St. D-7 Hon 96817	3069787	—
7	Randy Ching	#818 1560 Kanunu St	942-0145	oahurandy@yahoo.com
8	Cynthia K.L. Rezentes	87-149 Maipela St. 96792	696-0131	rezentesc@aol.com
9	Uluwe Kaulaw	89-639 Nanakuli Ave.		
10	Kyle Kajihiro	2426 Oahu Ave	988 6266	kkajihiro@afsc.org
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Meeting No. 4

Kapolei Hale

Thursday, August 10, 2006

Public Scoping Meeting for Preparation of EIS
Waimanalo Gulch Sanitary Landfill Expansion
July 27 - August 10, 2006
Mission Memorial Auditorium/Kapolei Hale

	NAME	Address	Phone No.	E-mail Address
1	BRAD EBEL	84-854 FRICKE ST.		696-8169 clue1 96792@hotmail.com
2	James Kayhi	89-796 [illegible]	668-9912	
3	Cameron Nekota	1917 Colburn St.	358-2792	Cameron@hawaii.edu
4	Mike Freitas	92-1489 Hoalii	391-3702	MikeFAloha@Yahoo.COM
5	Ralph Harris	92-1527-H Aliinui	679-0085	Ralph.Harris@Koolina.Com
6	Ken Williams	92-1480 Aliinui	671 2512	ken@koolina.com
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Public Scoping Meeting for Preparation of EIS
Waimanalo Gulch Sanitary Landfill Expansion
July 27 - August 10, 2006
Mission Memorial Auditorium/Kapolei Hale

	NAME	Address	Phone No.	E-mail Address
1	ROBERT H. KAIALAU	545 Kokea St. Hon Hi 96817	808 306 9787	—
2	David Leong	1338 Kawelokast Pc	3516714	
3	ROBERT STRATTON	87-207 WAIOLU	265-2784	
4	BRYAN HA'O		732-9751	
5	CHUCK & JENNIFER BENEKE	92-958 PANANA ST #27	672-8087	nobene8@aol.com
6	Michael Kalulung	89-416 Nanakuli Ave Nanakuli, Hi 96792	668-1033	mkalilun@bgch.com
7	GREGORY FUJITA	92-608 MALAHUNA LP KAPOLEI, HI 96707	682-4889	fujitag@msn.com
8	Beverly [illegible]	590 Farrington Hwy Kapolei, HI 96707	[illegible]	
9	Lee Munson	"	"	
10	Kuulei Jolonino	92-769 Paakai St. Kapolei 96707	682-3002 (h) 542-0628 (c)	Kuulaij@aol.com
11	STEVE KELLY	1001 KAMOKILA #255 KAPOLEI 96707	674-3289	stevek@kapolei.com
12	Cynthia K. L. Rezentes	87-149 Maipela St. Waianae Hi 96792	696-0131	rezentesc@aol.com
13	Pat Chardon	92-968 KAAIOHE ST KAPOLEI	693-6020	
14	Lorraine Martinez			
15	Todd Apo	530 S. King St Hon 96813	547-7001	TAPO@HONOLULU.GOV

Public Scoping Meeting for Preparation of EIS
Waimanalo Gulch Sanitary Landfill Expansion
July 27 - August 10, 2006
Mission Memorial Auditorium/Kapolei Hale

	NAME	Address	Phone No.	E-mail Address
1	Maeda Timsar	Kapolei Neighborhood Board		
2	C Mann DeLaCruz	Villages of Kapolei Board		
3	Michael J. Pan Antonio	Nanakuli AF		
4	Robert Webster	91-174 Hanua St. Kapolei	682-0201	
5	Lehua Kinilau	89-639 Nanakuli		
6	Colleen Hanabusa	[illegible]		
7	Hanale Aipoalani	Nanakuli, HI		
8	Nalani Aipoalani-Tiatia	Heleiua		
9	Todd Upton	91-1067 Makakuna	561-3802	
10	Kelli Upton	↓	↓	
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Bud Ebel Republican Candidate For The 45th District House Representatives

The Landfill ! - Just a short time ago the C&C of Honolulu was under the threat of huge fines (perhaps millions of dollars) for the operation and illegal continued use of the Waimanalo Gulch landfill by the EPA, State of Hawaii and some private watchdog groups threatening legal action.

First lets get it straight ! The government will never pay a dime in fines ! Only the tax payers have that privilege.

The latest proposal is an offer by the Waste Management Co. to take over operation of the gulch from the C&C of Honolulu which has by some miracle found room for 15 years of trash storage at the site.

Needless to say the residents of the west coast are a bit perturbed.

I am fully cognizant of the fact that trash removal services are the responsibility of the county.

However as a candidate for the 45th district State House the questions about the landfill are unavoidable and must be addressed.

My Solution

Legislation being passed requiring each council district to be responsible for the trash from their district being buried in their district. If the residents of the Districts will not consent to a landfill in their district it may be buried in the Waimanalo gulch at an additional tipping charge. These charges must be of sufficient rate as to (A) encourage each district to be responsible for their trash or (B) be adequate enough for the residents of the 1st district to accept the trash from any other districts. These monies would be used for the sole benefit of the legal residents of the 1st district and only them. They could be used to offset property taxes, utility charges or many other lawful use as provided by law.
The most important safeguard would be strict accounting and keeping these monies out of the hands of any but the legal beneficiaries.

Respectfully submitted for discussion. Bud Ebel republican candidate 45th house district

Robert H Kaialau III
565 Kokea Street, Suite D7 ❖ Honolulu, HI 96817
(808) 306-9787 ❖ robert@fightdrugs.us

10 August 2006

City and County of Honolulu
Department of Environmental Services – Refuse Division
1000 Uluohia Street, Suite 212
Kapolei, HI 96707

RE: **Waimanalo Gulch Sanitary Landfill Expansion – EIS Public Scoping Meeting**

I am Robert H Kaialau III, and I am testifying in opposition to the proposed expansion and permit extension for the Waimanalo Gulch Sanitary Landfill.

On Friday, February 3, 2006 the Honolulu Star Bulletin reported on the $2.8 million dollar fine imposed by the State Department of Health on the City and County of Honolulu and its landfill operator Waste Management, Inc. for permit violations at the Waimanalo Gulch Sanitary Landfill. To date, the public has yet to be advised of the final disposition of those fines. Have they been paid? How have the violations cited in the order been addressed?

The information provided in the Star Bulletin article validated long-held concerns by the community. In addition to the multiple environmental, health and safety threats attributable to the existing landfill – the management company contracted to operate the landfill, is unable to properly and consistently adhere to the requirements of the state issued DOH Solid Waste and LUC Special Use permits.

Mayor Hannemann's veto of Bill 37, CD 2 presented a list of "indisputable facts". Of these, the assertion that 1) the City cannot have a new landfill in operation by May 1, 2008 and 2) for the *foreseeable* future, the City "needs" a landfill on island are both inaccurate and misleading.

Before any approval of the requested permits are considered, the City and County of Honolulu's administration must be required to demonstrate the following:

1. The timely completion of the long delayed Integrated Solid Waste Management Plan, which was to have been completed and submitted to the Honolulu City Council for review and approval in 2003.
2. The issuance of a "Request for Proposals" notice and initiation of the review process for the consideration of alternative MSW processing technologies by October 2006 as stated by Director Takamura at the last City Council Public Works committee meeting held on July 27, 2006 .
3. The presentation of a plan to the Honolulu City Council for the execution of a long overdue comprehensive and mandatory island-wide Recycling program by December 2006.
4. A detailed, comprehensive closure plan for the existing Waimanalo Gulch landfill site irrespective of the proposed closure date. The plan must include details on required permits for closure, the identification of the authorizing government agencies and the listing of required monitoring activities after the closure process is complete.

In closing, it is my desire to provide the decision making body reviewing the proposed application with an additional perspective and a few requirement considerations regarding the existing landfill.

Thank you for this opportunity to provide my testimony.

Sincerely,

Robert H. Kaialau III

Robert H Kaialau, III

Additional Letters Received

Wm. Anderson and Sara Barnes
92-1001 Aliinui Drive
Kapolei, HI 96707

City & County of Honolulu
Department of Environmental Services, Refuse Division
1000 Uluohia Street, Suite 212
Kapolei, Hawaii 96707

Re: Waimanalo Gulch Landfill Hearing

Dear City and County Leaders:

As residents of Kai Lani at Ko Olina, we are writing to urge that you not expand the landfill at Waimanalo Gulch either temporarily or permanently. Indeed, we urge you to close the landfill as you originally promised.

We are subject to excessive dust, blowing plastic bags and garbage, increased truck traffic and noise on the highway, and at times, sickening smells due to the landfills current location and activities.

We understand the need to have landfills. As a Texas friend of mine said recently: "Everyone wants to have their trash picked up, but nobody wants to have it put down." And so, on a positive note, we think that there are three things that need to be done to address the trash/garbage problem.

1. Immediately start easy-to-use, comprehensive recycling programs throughout the island. After all, this is an island and our land and resources are even more precious here than on continental places in the world. Glass, plastic, metal and newspapers should all go into one bin and be picked up and sorted for recycling.
2. Start innovative programs to encourage us all to use less and re-use what we have. Get the business community involved in this effort. (For example: How many shoppers throw out their plastic grocery store bags? How many return them for recycling? How reuse them several times before they do any of the above? How many use cloth bags instead? Couldn't Safeway do some inexpensive consciousness raising about this?) The city and county of Honolulu and its business community could and should become a national and international leader in this area.
3. With the latest innovative technology in mind, open a new landfill at another site on another part of the island. Start over the right way. We know that this is a political challenge, but done right, it will help to teach us all – on all sides of the island - to be better stewards of the land; educate us in the latest landfill technologies; and say to the people of the Wai'anae Coast that you value this area and do not see it - or its people - as a place of garbage.

Wm. Anderson and Sara Barnes
92-1001 Aliinui Drive
Kapolei, HI 96707

We urge you to honor your previous commitment to close the landfill. We urge you not to expand it, either temporarily or permanently. We urge you to exert your leadership in being good stewards of the land and give us easy-to-accomplish incentives to re-use and recycle.

In order to remain economically viable, Honolulu must grow, but it must grow in a sustainable way. Thank you for your service to us all and for considering these comments.

Sincerely,

Wm. Anderson and Sara Barnes

DEPARTMENT OF ENVIRONMENTAL SERVICES

CITY AND COUNTY OF HONOLULU

1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707
TELELPHONE: (808) 692-5159 • FAX: (808) 692-5113 • WEBSITE: http://www.co.honolulu.gov

MUFI HANNEMANN
MAYOR

ERIC S. TAKAMURA, Ph.D., P.E.
DIRECTOR

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

IN REPLY REFER TO:
RA 06-046

August 16, 2006

Mr. William Anderson and Ms. Sara Barnes
92-1001 Aliinui Drive
Kapolei, Hawaii 96707

Dear Mr. Anderson and Ms. Barnes:

Thank you for your letter regarding the Waimanalo Gulch Sanitary Landfill.

We appreciate your understanding of the need for landfills as part of our integrated solid waste management program. Our goal is to significantly reduce the volume of waste going to landfill. Over the past years our H-POWER facility has been the primary operation to meet this goal. We intend to further expand our waste-to-energy capability.

The collection of residential and commercial separated green waste for delivery and recycling to compost is another major diversion from landfill undertaking. Our sludge composting program will soon become operational. This material will also be diverted. Other materials under consideration for diversion include e-waste, mattresses, and carpet, which may better be recycled on the mainland.

As you know, we are preparing the EIS for the Waimanalo Gulch Sanitary Landfill. The community scoping meetings are part of the process and your letter will be forwarded for inclusion in the comments. We also have initiated a landfill oversight advisory committee to assist us in assuring that Waste Management Inc. continues to improve their operations.

We are proceeding in a deliberate and professional manner to manage our solid waste. Your input is again appreciated.

Sincerely,

k

Dr. Eric S. Takamura, P.E.
Director

cc: RM Towill w/attachment

MAKAIWA HILLS LLC

James Campbell Building, Suite 250
1001 Kamokila Boulevard
Kapolei, Hawaii 96707
Tel 808 674-3541 / Fax 808 674-3111

August 29, 2006

City & County of Honolulu
Department of Environmental Services, Refuse Division
1000 Uluohia Street, Suite 212
Kapolei, Hawaii 96707.

To Whom It May Concern:

Subject: Comments on Proposed Waimanalo Gulch Landfill Expansion EIS

Makaiwa Hills, LLC is the fee owner of approximately 1,700 acres of property located on the eastern boundary of the Waimanalo Gulch Sanitary Landfill ("Waimanalo Gulch"). It has come to our attention that certain blasting and grading activity has been occurring, and is planned as part of the proposed expansion, along the shared property line between Waimanalo Gulch and Makaiwa Hills. We are concerned that this type of activity could threaten the structural integrity of Makaiwa Hills, LLC property. Based on the foregoing, we request the Environmental Impact Statement ("EIS") address the following issues:

- Structural integrity of the slope along the shared property line.
- Appropriate blasting and grading setbacks from the shared property line.
- Proposed operations near the shared property line and line of sight to these operations.
- Proposed access points for any expansion of Waimanalo Gulch near the shared property line.
- The eventual height of Waimanalo Gulch along the shared property line.
- The distance from the top of slope that is being manufactured as part of the landfill to the shared property line.

Thank you for the opportunity to comment on the proposed EIS.

Sincerely,

Steve Kelly, AICP
Manager
Entitlements and Infrastructure

26034500\K10005

DEPARTMENT OF ENVIRONMENTAL SERVICES

CITY AND COUNTY OF HONOLULU

1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707
TELELPHONE: (808) 692-5159 • FAX: (808) 692-5113 • WEBSITE: http://www.co.honolulu.gov

MUFI HANNEMANN
MAYOR

ERIC S. TAKAMURA, Ph.D., P.E.
DIRECTOR

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

IN REPLY REFER TO:
RA 06-068

October 16, 2006

Mr. Steve Kelly, AICP
Manager
Entitlements and Infrastructure
Makaiwa Hills LLC
James Campbell Building, Suite 250
1001 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Kelly:

Thank you. We received your written comments. We will incorporate the issues determined to be relevant within the environmental impact statement process.

Sincerely,

Eric S. Takamura

Dr. Eric S. Takamura, P.E.
Director

cc: Brian Takeda- RM Towill
Paul Herran-COR

COMMENT FORM

Waimanalo Gulch Sanitary Landfill Expansion
Public Scoping Meeting for Environmental Impact Statement (EIS)
July 27 - August 10, 2006

Your comments are important and appreciated. Please use this form to make your comments regarding issues or concerns pertinent to the preparation of the EIS for this project. All comments should be received by **August 30, 2006. Please send to:**

Department of Environmental Services, Refuse Division
City & County of Honolulu
1000 Uluohia Street, Suite 212, Kapolei, Hawaii 96707

Name: Cynthia K L Rezents

Address: 87-149 Maipoa St. Waianae 96792

Telephone: 696-0131 Fax: 696-0131
497-1432 (c)

Cynthia K.L. Rezentes
87-149 Maipela Street
Wai`anae, HI 96792-3154
(808) 696-0131
Email: Rezentesc@aol.com

August 29, 2006

Eric Takamura, Director
Department of Environmental Services, Refuse Division
City & County of Honolulu
1000 Uluohia Street, Suite 212
Kapolei, Hawaii 96707

RE: Comments Submitted for Environmental Impact Statement Public Scoping for the Proposed Waimanalo Gulch Sanitary Landfill Expansion

Dear Director Takamura:

Thank you for the opportunity to submit public scoping comments regarding the proposed Waimanalo Gulch Sanitary Landfill Expansion Environmental Impact Statement.

I continue to oppose the continuing operation of Waimanalo Gulch Sanitary Landfill beyond the agreed upon date of closure by the City and County of Honolulu in 2003 and as ordered by the State Land Use Commission. This should be the primary position of all concerned with actions taken to fulfill those commitments.

As many of us are aware, the City and County of Honolulu is at a critical point in time in making decisions as to how our municipal solid waste should be managed for future generations. It is imperative that we, as an island community, pursue the best solution for the long-term health and well being of all of the residents of O`ahu. It is with this in mind that I submit the following comments for consideration of inclusion in the proposed Draft Environmental Impact Statement (EIS) for the Waimanalo Gulch Sanitary Landfill (WGSL) to be released in the near future.

1. The EIS needs to address the State Land Use Commission Decision and Order which calls for the closure of the WGSL in May 2008 (which implies no further waste will be accepted at WGSL). This was the date presented by the previous City and County of Honolulu administration.

2. All previous violations as identified in "Department of Health, State of Hawaii v. Waste Management of Hawaii, Inc. and City and County of Honolulu" should be resolved and all challenges concluded prior to the drafting of an EIS for the expansion of WGSL. (In fact, no new permits or permit modifications should be allowed until the violations are addressed and resolved.) Each of the eighteen counts brought against Waste Management of Hawaii, Inc. (WMI) and the City and County of Honolulu (C&C) should be identified and a current status provided within the proposed EIS. Each of the following counts (Taken directly from the Notice and Finding of Violation – Docket No. 05-SHW-SWS-004) should be addressed:
    a. Exceedence of Permitted Grades
    b. Failure to Submit Annual Operating Reports in a Timely Manner
    c. Failure to place daily cover on the active faces of MSW landfill
    d. Failure to place intermediate cover material on the ash monofill
    e. Exceedance of leachate head on the liner in the ash monofill

f. Exceedance of leachate head on the liner in MSW Cell E-1 sump
g. Failure to Measure Leachate and to Maintain Records on Leachate Levels in Cell 4B Sump
h. Failure to Measure Leachate Levels and to Maintain Records on Leachate Levels in the Ash Monofill Sump
i. Failure to notify DOH of noncompliance on equipment blockage in MSW Cell 4-B leachate lateral line and inability to measure leachate levels
j. Failure to Notify DOH of Noncompliance in a Timely Manner on the Exceedences of Permit Grades and Submission of the AORs
k. Unauthorized storage of material on the ash monofill
l. Failure to manage and ban the acceptance of special waste
m. Failure to maintain records and record location of asbestos disposal at the landfill
n. Failure to cover a dead animal
o. Failure to Submit Annual Surface Water Management Plan
p. Failure to control the generation of dust from vehicular traffic
q. Failure to minimize free litter generation at the landfill
r. Failure to monitor explosive gases and maintains monitoring records

3. The EIS should clearly define the current state of the WGSL footprint and airspace occupied. This information should include the fact that the permit modification to allow the expansion for the 14.9 acres (to keep the landfill open until 2008) actually redesigned fill slopes and caused portions of the landfill to exceed the fills limits for the ash monofill. The information will provide the baseline of the actual dimensions of the landfill from which the expansion may be measured.

4. The current permitted WGSL footprint and airspace allowances should be completed and a closure plan (including stabilization of the structure) for the current permitted footprint and airspace allowances should be part of the EIS. This closure should include 30-year monitoring as part of the closure plan. This will act to separate the current landfill and any future expansion. This separation of the landfill into two separate permitted footprints with independent safety and monitoring issues effectively should build in a factor of safety thereby not compounding and confusing any future issues or problems that may arise from continued filling contiguous to the current landfill which has received numerous counts of violations in the Notice and Finding of Violation, Docket No. 05-SHW-SWS-004.

5. An explanation needs to be provided as to the conflicting position of the 1984/1985 EIS which stated that only 57+/- of the 200 or so acres owned were feasible for utilization as a landfill due to the slope angles of the hillsides. What conditions have changed to allow additional expansion? Is the quarrying of the mountain the reason for additional volume being available for MSW and monofill ash waste deposits? Has the quarrying effects on the remaining mountain range been analyzed to assure stability of not only the landfill but also the surrounding area? Those calculations should be included in the EIS. Also to be included in the EIS is the design and analysis of material removed and it's impacts on the landfill design (primarily safety issues of stability), if quarrying is the manner in which additional volume is freed up for MSW and monofill waste receipt.

6. Considering the extensive list of violations the current WGSL has received, the EIS needs to clearly identify who is to enforce the conditions of the Planning Commission Approval, LUC Decision and Order, DOH permit and as importantly, who is responsible for adherence to conditions placed on any expansion of the landfill? There needs to be a section on what

guarantees the public have that violations will not occur in the future and what role the public has in providing information regarding violations observed.

7. One of the conditions of the permit was to allow for ridgeline and site views being maintained. Currently, the landfill exceeds the view plains with the approach from Wai`anae to Honolulu. What will be done to rectify that situation and guarantee that this will not happen in the future?

8. There should be clearly identified, separate (physically divided) municipal solid waste (MSW) and ash monofill cells for the expansion

9. There should be a clearly identified location for the disposal of asbestos that is not contained within a MSW or monofill cell. This is required considering the location of the asbestos that has been disposed of in the past cannot be identified with any level of confidence.

10. Considering the violation identifying not having enough or not providing time to complete soil cover as required on a daily basis, the EIS should reflect from where the soil cover will be procured. There should be records kept on when soil cover is received and when it is used via a daily tracking system. In addition, the hours of operation should reflect the time of last disposal versus completion of the day's activities to allow for the soil cover to be done daily.

11. With the new expansion area, there should be separate stormwater retention basins, leachate systems, and methane gas monitoring and collection systems to preclude confusion with current systems and recognized violations assigned to these systems. This would be consistent with closure of the current landfill and the establishment of a new landfill with separate construction analyses, stormwater retention basins, leachate systems, gas monitoring and collection systems, and any other requirements that would need to be followed for a separate landfill.

12. The chemical composition of the ash monofill should be identified and specific issues addressed, i.e. detection of heavy metals, dioxins, furans, etc. and the information should be shared with the public. There should be established an independent testing and recording system.

13. The EIS needs to clearly identify how fugitive trash (e.g. flying plastic bags) will end. This includes fugitive trash that settles on the land or in the near shore waters. What extra measures will be taken when HPOWER (a waste-to-energy generation facility) is down for maintenance and all MSW is diverted to WGSL? As you go further back into the gulch you approach known high wind areas. That information should be included as a factor in the plans provided for fugitive trash control.

14. The EIS needs to define how dust control will be handled. During high wind days not only is fugitive trash a problem but high quantities of dust can be observed swirling above the site. This could create health problems with individuals downwind from the site and should be addressed as a plan on how this will be prevented and controlled in the future.

15. The EIS needs to provide data regarding how the current WGSL is affecting the near shore waters. This needs to include not just during arid times but also when there are significant rain events and what the stormwater runoff contains or how it will all be contained on the property.

16. The EIS needs to address traffic concerns:
    a. No trucks should be parked on Farrington Highway waiting for entrance into the facility
    b. Farrington Highway should not have mud and dirt dropped from exiting trucks (trucks should leave the facility clean)

c. Farrington Highway, fronting the facility, should be regularly cleaned of mud and dirt

17. There needs to be a commitment to maintain the route to WGSL in a clean condition (i.e. no roadside litter).

18. There should be identification of how the WGSL will be maintained facing Farrington Highway, landscaped to reflect surrounding areas, park-like upkeep, greenbelt, set backs, etc. What will this buffer look like to preclude visual impacts?

19. What specific controls will be put into place to address the odors emanating from the site? Will sewage sludge continue to be accepted, thereby adding to the odor concerns expressed in the past? Will it be pretreated or treated once received? A commitment should be made that if sewage sludge is received it will be given a high priority for immediate coverage to minimize the odor problems associated with this type of waste deposit and not wait until the end of the day final soil cover to be applied. The EIS should identify what will be contained in the odor plan and an outline should be listed.

20. There should be a section to specifically address the stability of the expansion. Static stability should discuss the safety factor with which the new expansion will be built and take into consideration and show the calculations used to provide the safety factor for construction (i.e. stability berm). What will be the safety factor (minimum is required to be 1.5 but should be greater, preferably 1.75-2.0).

    Deformation characteristics caused by an earthquake need to be discussed including potential liquefaction of the fill and subsequent consequences. Considering the August 28, 2006 earthquake experienced off the east coast of O`ahu at a magnitude between 3 and 4 on the Richter scale and the USGS position that we are in a seismically active region, this is no longer remote theory but a distinct possibility. How will that affect the overall safety factor applied to the structure's construction? There should be a higher safety factor applied to the proposed landfill expansion due to this seismic instability and not the minimum of 1.5 allowed by EPA. What are the alternatives to receiving MSW, monofill or other debris after an earthquake, if an analysis of the integrity of the liner system needs to be investigated? What are the alternatives if the liner system is compromised?

21. There has been a lack of urgency on the part of WMI to provide timely reports, how will that be addressed and how will the reports be made available to the public? I request that they be placed on the C&C webpage for the Environmental Services Division (www.opala.org) since they are public documents. There should be photos with a high resolution (perhaps 5M per photo) at the beginning, middle and end of the day to record the progress made during the depositing of MSW and monofill ash. These photos should be a part of the information made available to the public on the webpage. The C&C should also consider the potential of having a webcam on the operations of the site for recordation of the daily activities.

22. What are the impacts if leachate removal is required again in the future? In the past leachate was removed from WGSL and sent to the Wai`anae Wastewater Treatment Plant which discharges secondary treated water into the offshore waters. What kinds of affects could be expected on the offshore waters, flora or fauna considering leachate, at times contain heavy metals or other undesirable chemicals?

23. A full discussion on alternative methodologies for managing MSW and monofill ash needs to be included in this EIS. Currently, there are two for-profit projects being proposed in the Wai`anae

area to do composting on the organic portion of the MSW collected. The C&C needs to answer why if these projects are profitable for private enterprises, is the C&C not pursing these and other alternative technologies which have been presented, e.g. plasma arc/torch/gasification/vitrification?

24. What is the C&C's plans for recycling and reduction of the waste stream going into WGSL? Curbside recycling, green waste recycling, adding a third boiler to HPOWER, etc?

25. What role does this expansion play in the C&C's Solid Waste Management Plan and what does the plan state as to how the C&C will address landfills in the future considering a very limited number of sites which can qualify for receipt of MSW?

The items identified need to be addressed in addition to the standard requirements as an EIS is prepared. Some of the other standard requirements may include but are not limited to: archaeological impacts, cultural impacts, social impacts, traffic concerns, noise, odor, etc.

The proposed EIS for this expansion of WGSL needs to be as comprehensive as today's knowledge base allows us to have considering the consequences of the action proposed will continue to have effects on our residents for many years to come.

Sincerely,

Cynthia K.L. Rezentes

DEPARTMENT OF ENVIRONMENTAL SERVICES

CITY AND COUNTY OF HONOLULU

1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707
TELELPHONE: (808) 692-5159 • FAX: (808) 692-5113 • WEBSITE: http://www.co.honolulu.gov

MUFI HANNEMANN
MAYOR

ERIC S. TAKAMURA, Ph.D., P.E.
DIRECTOR

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

IN REPLY REFER TO:
RA 06-068

October 16, 2006

Ms. Cynthia K.L. Rezentes
87-149 Maipela Street
Waianae, Hawaii 96792

Dear Ms. Rezentes:

Thank you. We received your written comments. We will incorporate the issues determined to be relevant within the environmental impact statement process.

Sincerely,

Dr. Eric S. Takamura, P.E.
Director

cc: Brian Takeda- RM Towill
Paul Herran-COR

State Capitol
415 S. Beretania Street
Honolulu, HI 96813

Hawaii State Senate

Fax

To:	Wilma Namumnart	**From:**	Senator Colleen Hanabusa
Fax:	692-5402	**Pages:**	9, including cover
Phone:	692-5410	**Date:**	08/30/06
Re:	Comments for EIS preparation on expansion of WGSL	**CC:**	

- **Comments:** Submittal via fax.

The Senate
The Twenty-Third Legislature
of the
State of Hawaii

STATE CAPITOL
HONOLULU, HAWAII 96813

August 30, 2006

Department of Environmental Services, Refuse Division
City & County of Honolulu
1000 Uluohia Street, Suite 212
Kapolei, HI 96707

RE: Comments for EIS preparation on the Expansion of Waimanalo Gulch Sanitary Landfill

To the Department of Environmental Services, Refuse Division:

The following are my comments which will set forth issues and concerns pertinent to the preparation of an EIS for this project.

Standard To Be Met.

The EIS process is governed by HRS §343. An EIS is:

> §343-2 Definitions. As used in this chapter unless the context otherwise requires: . . .
>
> "Environmental impact statement" or "statement" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects.

The statute also sets forth what the Rules must contain, at minimum. HRS §343-6. The legal effect of administrative rules are well settled in this jurisdiction. Administrative Rules are to be followed and given the full effect of law. ***Williams v. Hawaii Medical Service Association,*** 71 Haw. 545, 549, 7984 P.2d 442, 444 (1990). The Supreme Court has clearly stated that arbitrary and

capricious application of the Rules will not be tolerated. ***Windward Marine Resorts v. Sullivan,*** 86 Haw. 171, 948 P.2d 592 (ICA 1997).

HAR §11-200-14 through 23 are the requirements in the preparation of Draft and Final Environmental Impact Statements. The "General Provisions" highlight the expectation of the EIS process.

I have grave concerns that you will comply with what is required of an EIS.

The following standard set in ***Life of the Land v. Ariyoshi,*** 59 Haw. 156, 164-165, 577 P.2d 1116 (1978) for a court to determine the sufficiency of an EIS:

> In making such a determination the court is guided by the "rule of reason," under which an EIS need not be exhaustive to the point of discussing all possible details bearing on the proposed action but will be upheld as adequate if it has been compiled in good faith and sets forth sufficient information to enable the decision-maker to consider fully the environmental factors involved and to make a reasoned decision after balancing the risks of harm to the environment against the benefits to be derived from the proposed action, as well as to make a reasoned choice between alternatives. County of Suffolk v. Secretary of Interior, 562 F.2d 1368, 1375 (2d Cir. 1977), cert. den., 434 U.S. 1064, 98 S. Ct. 1238, 55 L. Ed. 2d 764 (1978). [Emphasis added.]

The condition precedent to all EISs is that it be compiled in "good faith" and sets forth sufficient information. The past practice of the City has shown that EISs have not been compiled in good faith and nor does it provide sufficient information.

At the very minimum the City must take its past EISs and explain the discrepancies that have now been found and set forth whatever information it now relies upon to justify its change in position.

The best place to begin is with the discussion as to why we in the community have no rights to rely upon the representation of government that the WGSL will close. This is the position of the community that the WGSL should close.

What Was Represented As To The Closure.

At the outset, the City must explain why it has changed its position from an expansion of only 5 years to now an additional 15 years. I have heard comments from the City that there was never a "promise" to close the WGSL in 5 years; however, this is contrary to the statements made under oath to the Land Use Commission during their hearings on the conditional use permit as well as statements made in the Final Supplemental Environmental Impact Statement (FSEIS) for the 5 year expansion. The LUC was very clear in its questioning as to what the City intended to do. How does the City explain its statement under oath and the change in the FSEIS. A discussion should be had as to whether the City can be bound by its statements under oath like a person.

The EIS must address the following.

1. Waste Management's Contract

An EIS is "meaningless" if it is self-serving and rationalizes an outcome. The contract between Waste Management, Inc. and the City for the operation of WGSL was entered into in 1999 for 15 years. This was two years before the first Draft EIS in 2000; and three years before the FSEIS. At the very minimum, this shows the decision to expand WGSL was a done deal in 1999. Explain this contract and why the City entered into it in 1999. Also explain what was done after the City said the expansion would be for only 5 years. Was the contract amended?

2. Alternatives.

HRS §343-2 defines an EIS as one that discloses, among other items, the "alternatives to the action and their environmental effects."

HAR §11-200-17 addresses the requirement as to alternatives as follows:

> F. The draft EIS shall describe in a separate and distinct section alternatives which could attain the objectives of the action, regardless of cost, in sufficient detail to explain why they were rejected. The section shall include a rigorous exploration and objective evaluation of the environmental impacts of all such alternative actions. Particular attention shall be given to alternatives that might enhance environmental quality or avoid, reduce, or minimize some or all of the adverse environmental effects, costs, and risks. Examples of alternatives include: . . . (Emphasis added.)

Money is not the paramount criteria in arriving at a decision which is environmentally sound.

HAR §11-200-17 F. 5 states that "For any agency actions, the discussion of alternatives shall include, where relevant, those alternatives not within the existing authority of the agency." In ***Westlands Water District v. U.S. Dept. of Interior,*** 376 F.3d 853, 866 (9th Cir. 2004), the Ninth Circuit recently reaffirmed that alternatives must be rigorously explored and that "reasonable alternatives" include those not within the jurisdiction of the lead agency. ***Westlands, supra,*** at 868. The Ninth Circuit went on to say that "[t]he existence of a viable but unexamined alternative renders an environmental impact statement inadequate." ***Id.***, citing to ***Morongo Band of Mission Indians v. FAA,*** 161 F.3d 569, 575 (9th Cir. 1998).

3. Failure to Comply with the City's Ordinance.

Ordinance 9-1/1(a)(6)(b)(1) states that by the year 2000, at least 75 percent of the solid waste generated shall be recycled, reused, composted, or otherwise diverted from incineration or placement in the landfill. What is the status and what is the consequence of this non-compliance?

4. Sludge

A major source of "odor" for the landfill is sludge. What is the City's treatment of sludge and for what period of time will it continue to be dumped in the landfill.

5. Purpose and Need.

HAR §11-200-17 D requires the Draft SEIS to "contain a separate and distinct section that includes a statement of purpose and need for a proposed action." It is a similar provision under NEPA, which is looked upon to guide the discussion on alternatives. ***Westlands, supra,*** at 866. In ***Westlands,*** the Ninth Circuit looked to whether the preparers had "arbitrarily and capriciously" narrowed the scope of the statement, thereby affecting the discussion on the alternative.

There is an application for a private landfill pending and also the fact that the Department of Agriculture will now permit the transshipment of MSW. These points must be addressed in discussing any need of the expansion, especially in light of the prior statements that there will be no need for landfills in 5 years.

6. Excavation

The City must address the discrepancies in all the draft EISs along with the reports provided by RM Towill to the Blue Ribbon Commission which was tasked with siting the new landfill. The criteria was no excavation. RM Towill determined that WGSL had a life of 20 more years with the criteria. This is in direct conflict with other EISs also prepared by RM Towill. What does the City intend to do about this obvious misrepresentation? How does the City explain this discrepancy.

The extreme slope of WGSL for the proposed expansion and the newly constructed rock berm are related. What is the stability of the expansion? How much native soil will have to be removed? Where will it be removed to? Will the excavated materials be sold?

7. Stability of the Slope

In light of the concern over the stability of slope as evidenced by the construction of the rock berm wall, how will the community be assured about its stability? How is the integrity of the liner tested? Will the rock berm wall act as the retaining wall to justify and increase in the slope?

8. The Violations of the Existing Permit

The Notice and Finding of Violation ("Notice and Finding") and Order dated January 31, 2006, of the Department of Health ("DOH") as to the operations of WGSL must be addressed. The first point of discussion is why the City had no oversight and permitted these activities to go unchecked. These violations resulted in the largest fine in the history of the State of Hawai'i.

The following violations are the most critical and must be addressed, though all violations should be addressed:

1. Since 2003, the City has placed ash above the 2002 grades and exceeded the design grades for over a year from discovery in January 2004.
2. The control of leachate and the monitoring was discovered. The DOH found 16.3 feet of leachate on the liner and 22 feet and 3 inches in the sump area. More troubling is no monitoring has been conducted since October 26, 2003. This was attributed to the ash monofill landfill.
3. As for the MSW landfill, in April 2005 and May 2005, 74 feet of leachate was measured. This was in an area where the sump was installed in November, 2003 (MSW Cell E-1). There was a gross failure to monitor the leachate
4. The leachate level in the area of 4B was unavailable because no monitoring had taken place since May.
5. The removal of soil and its impact on stability. DOH has found that in January of 2005, they were notified of the fact that grades were exceeded. The City knew that the ash had exceeded the approved grades by January, 2004 as to the ash landfill

6. Disposal of asbestos is a major concern. DOH found that the City and its operator accepted asbestos at the landfill but do not have any logs as to where it has been buried.
7. Surface Water Management. There are no surface water management plans as required by the permit for the years 2003-2004.
8. DOH found a failure to control dust.
9. DOH found a failure to control litter.
10. DOH found that there has been no monitoring of methane gas at the landfill.

The DOH Order entered in this action demonstrates the seriousness of the violations and its agency's (including County's) responsibility to monitor. There are also additional violations that were not included in the DOH Order, such as the applicant's failure to submit a revised Closure and Post-Closure Plan no later than May 1, 2005, which was finally submitted on February 22, 2006 and the operators unauthorized night work preparing a new cell for receiving waste.

9. How the Public Trust Is Being Met

The recent Hokulia case makes clear the State's public trust for the waters of our State. How has this trust obligation been met?

10. Cumulative Effects

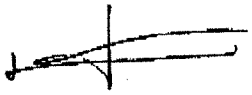
This EIS cannot merely address the proposed expansion. It must address the cumulative effects of the operation of WGSL since the 1980s in addition to the proposed expansion on the Coast, including the disposal of leachate off site at the Waianae Wastewater Treatment plant.

11. Environmental Justice

The EIS must address the concept of environmental justice and how the City's use of this landfill and others in the Waianae Coast affect the community.

These are concerns and issues which must be addressed in the EIS. It continues to remain my position that WGSL must close. I continue to be perplexed as to how the City can change its position without any sense of obligation of keeping its word to its people.

Sincerely,



Colleen Hanabusa
Senator, Twenty-First District

DEPARTMENT OF ENVIRONMENTAL SERVICES

CITY AND COUNTY OF HONOLULU

1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707
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MUFI HANNEMANN
MAYOR

ERIC S. TAKAMURA, Ph.D., P.E.
DIRECTOR

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

IN REPLY REFER TO:
RA 06-068

October 16, 2006

The Honorable Colleen Hanabusa
State Senate
State Capitol
Honolulu, Hawaii 96813

Dear Senator Hanabusa:

Thank you. We received your written comments. We will incorporate the issues determined to be relevant within the environmental impact statement process.

Sincerely,

Eric S. Takamura

Dr. Eric S. Takamura, P.E.
Director

cc: Brian Takeda- RM Towill
Paul Herran-COR

Summary of Issues by Topic Area

Combined Issues by Topic Area for Consideration:
Developed At EIS Scoping Meetings In Waianae, Kaneohe, Downtown Honolulu, and Kapolei Regarding The Expansion Of Waimanalo Gulch Sanitary Landfill

October 31, 2006

Note: Issues that are in **bold** are those that were received in writing by August 30, 2006, and are not duplicative of what was already stated by the community during the course of the meetings.

General

- The 2001 EIS should not be used as the basis for this EIS
- EIS needs to clearly illustrate what expansion is taking place
- Need to provide number of years of continuing operation as well as the number of acres the expansion will take
- Need to clarify the location, size of the area and what the current zoning is. Documents need to be very clear and specify the boundaries
- Need to look at mainland sewage sludge studies
- New ash area that is covered in EIS needs to be specified where and size
- Impact of other new proposed private sites such as Nanakuli B – do not need both
- Need to identify impacts to RFP process
- Need to consider federal draft rules for shipping of waste
- Need to look seriously at all sites available around the island
- Need to discuss worst case scenario contingencies including earthquake etc.
- Need to determine how the DEIS will tie-in to the City's comprehensive, Solid Waste Integrated Management Plan (SWIMP) update that the city is supposed to prepare
- There is a need to be aware that other areas of the island have hosted landfill sites in the past until their capacity was reached i.e. Aikahi, Kawaianui Marsh, Kapa`a Quarry etc. – they have not all been on the Leeward side
- The EIS needs to reflect the current status at the landfill not the preferred status
- There was a concern expressed about the ability of a local planning firm to be neutral on this issue with all the political pressure
- Need to include all Federal, state and local laws that affect landfill operations
- Need to address Waste Management's 1999 contract with Mayor Harris
- Need clarity between airspace and landfill
- Need to explain why the community should believe the City at this point and why promises have not been kept
- HPOWER has never failed an EPA test on its ash – need to know why DOH has not approved reuse for concrete etc.
- Need to deal with the reality that because of our tourist economy or per person generation of waste is 7 pounds per day instead of the national average of 4 pounds

- Need to consult the County of Hawai`i who has just completed review of 61 alternatives and chosen 3 proven technologies to address this same issue
- **EIS needs to comply with all EIS rules and statutes – including those that require "good faith"**
- **Must not just address expansion but cumulative impacts since the 1980s**

Closure of Landfill

- EIS needs to focus on closing of Waimanalo Gulch now or as soon as possible – should not just go for life of area but should have a plan to reduce waste stream as quickly as possible to provide for closing sooner rather than later
- Review all alternatives available to reduce the waste stream with the intent of closing the landfill as soon as possible
- Need to consider the fact that many landowners and developers were fully aware of the landfill's existence pre-development of their current homes and projects and moved in anyway
- Landowners in the area maintain that they were told the landfill would close in '08 when they bought and had depended on these representations in making their decisions
- Need for active recycling program that would cut down the need for a landfill; need for a sensible plan that would allow for the earliest possible closure of the landfill
- Need for finite planning – Hawai`i should be at the cutting edge and shouldn't worry about costs to keep it a paradise
- City must explain why we are here – other meetings have been held in the past which promised closure of the landfill by 08 and it is still open
- EIS needs to provide factual/historic information for the issue of the promised closure in 2008 and the issuance of an operating permit that required closure in '08
- **Need a comprehensive closure plan for the existing Waimanalo Gulch landfill site irrespective of the proposed closure date**
- **Need to address the State Land Use Commission Decision and Order calling for closure in 2008**
- **Need to address the conflicting position of the 1984/1985 EIS which stated that only 57+/- of the 200 or so acres owned were feasible for utilization as a landfill due to the slop angles of the hillsides.**
- **Close it and put it somewhere else on the island**

Environmental

- Need to explain what the relationship will be between the newly created topography of the expanded landfill, and the prevailing wind patterns of the area including any impact on ocean currents and near shore water temperatures as well as any impacts the new topography may have on adjacent landowners (including the slope integrity along shared property lines, and heights and distances along these lines)
- Need to review Hawaiian Electric Company's wind study and explain the logic of the increase in height of the landfill in light of the wind energy study

- Need an assessment of the static stability of the landfill both ash and solid waste areas including consideration of past history as well as the dynamic stability of the landfill recognizing the fact that we live in a seismically active area
- Need to address how much of the mountain land space is being shaved for the landfill and discuss blasting or grading setbacks that are necessary
- Need to address environmental impacts of potential hazards
- Need to understand how 20 years of further capacity will be provided without excavation as previously stated – if there is excavation need to address where the soil will go
- Need to review recent State of Hawai`i Supreme Court case (Hokulia) regarding State DOH responsibility for water quality in relation to how it is being affected by the landfill e.g. ocean run off
- If expansion moves forward, storm water retention basins, leachate and gas monitoring systems are needed
- Address future ash monofills
- Need to know chemical composition of ash
- The location of potential hazards such as asbestos within the landfill need to be identified
- **Address unknown effects to the land, water, and air**
- **Need to address odor issues – will the expansion take sludge and if so for how long**
- **How is the liner tested and how secure is it needs to be addressed**
- **The ability of the rock berm to handle the expansion needs to be discussed**
- **Needs to address the need for a surface water management plan**
- **Need fugitive trash plan designed to end this problem**

Infrastructure

- Impact to landfill when H-POWER is down is an issue
- Impact on highway; road blockages, etc.
- Maintenance issues along Farrington Highway with heavy truck use – standards for adequate maintenance of this highway
- Any new access points and their impacts on adjacent property owners

Economic Issues

- Economic impacts
- Costs of closing landfill
- Need a solution to address lost revenues to the city should the solid waste go to a private landfill – tipping fees

Explore Alternatives

- Need to look at all alternatives that are appearing (i.e., Plasma ARC gasification, etc.) and determine how these alternatives fit in with everything else that the City is doing – including how they can reduce the waste stream to allow for the earliest closing possible of the landfill
- Need to explore all viable alternatives

- Need to look at other places, especially Europe, and how they dispose of their waste, the kinds of incentives/taxes/sanctions they use to reshape people's attitudes at the curbside
- Expansion should be limited to a specific time and coupled with a plan to reduce the waste stream
- Need to address things that can be done to reduce the amount of waste that goes to the landfill – curbside recycling, alternative technologies, partnerships with the business community to promote recycling and reuse, etc. Need to get innovative and creative.
- Need to increase HPOWER and explore reuse of ash – HPOWER type facilities could be decentralized and built anywhere
- Need to address trans-shipping of waste
- Need to address providing a funding stream to address alternatives
- Need to speed up action on alternatives
- **Plasma Arc Gasification – Jacoby Inc.**
- **Need to address the implementation of the comprehensive and mandatory island-wide recycling program (proposed to be done by December 2006)**
- **Alternatives looked at must be explained including why they are rejected – the exploration must be rigorous**

Facilities Management

- Need to look at as a facilities management problem and apply technologies correctly (especially as pertains to smells and debris)
- The EIS should address the status of all violations and what has been done regarding violations – need to close violations prior to new EIS and permit
- Hours of operation need to be clear and adhered to – the community recently expressed concerns about night operations taking place and the impact of the lighting on houses and neighborhoods
- Need to address overfilling of landfill site
- Need to look at rubbish control and sludge issues
- Need a specific operational plan for soil cover
- **Explain the contracts between the city and Waste Management Inc and the timing of these contracts.**
- **There should be a clearly identified, separate (physically divided) MSW and ash monofill cells for the expansion**
- **A separate area should be identified for asbestos disposal**
- **A full discussion of all management techniques must be included**
- **Impact of expanded operations on adjacent property owners including line of sight issues**

Monitoring and Enforcement

- Need to provide for air quality monitoring, testing as it corresponds to traffic at the site, and along the route to/from the site
- Need to examine enforcement capability and capacity of DOH – including the lack of resources required for monitoring, enforcement, reporting, and accountability

- Major dirt and dust issues; monitoring doesn't work – need for more data collection
- Need to consider past problems with the landfill (i.e., EPA violations, leachate collection system) and be sure the DEIS identifies ways to assure that they do not happen again
- Need to address and explain the $2.8 million fine that has been imposed on the landfill by the Department of Health and assure that these types of practices/violations do not continue in the expansion
- Need to assure that a system is in place to hold the operator accountable
- Monitoring should be adequate so that after the fact permit modification should not happen – example the permit modification needed for the leachate sump pump system
- Need to monitor methane gas levels
- Need to have rigid standards and adequate monitoring to ensure the health and safety of the community
- Need regular monitoring by the Department of Environmental Services
- Need to address who will be responsible for enforcement of things in the EIS and what guarantees will be made in the EIS
- Need to include status of compliance with current permit – by modifying the permit, are we negating prior violations which should not be allowed
- **Need to assure timely reporting by the operator and public access to these reports – consider webcam on site for monitoring purposes**

Leachates

- Need to also address leachate and its impact to groundwater, runoff to ocean, subsidence and slippage resulting from seismic activity, methane fires, and EPA violations relating to gas collection systems
- Need to look back and forward – what has been/will be done to take care of leachate problems and make sure these do not reoccur in the future
- Need to address leachate pumped out to the sewer treatment plant and what happens to it and what is its effect on the final outflow water quality from the sewer treatment plant
- Need to discuss comprehensively the leachate management system – including possible failure of the geo-membrane lining system and how it will be taken care of

Environmental Justice

- Need to address "environmental justice" along the Leeward Coast and as it pertains to this landfill, including the multitude of existing private and proposed sites in the area

Health impacts

- Need to include discussion of potential health hazards
- Who is liable for the health costs to residents should the landfill cause health problems
- When considering expansion, need to discuss EPA finding regarding gas collection system issues
- Compensation to neighbors for health impacts
- Impact of multiple landfills, both public and private, on air quality needs to be addressed
- Higher standards are needed for dust and debris and possible impacts to health

Community issues

- The DEIS needs to deal with the lack of sensitivity to cultural sites and issues
- What communities will benefit - who will be selected and how will the compensation benefits committees be set up also needs to be addressed
- Need to include impact of non-closure of Waimanalo Gulch on for-profit businesses in the area or planning to locate in the area
- Smells, trash escape, floating dust, truck traffic and speeding, trash on road, visual blight all need to be addressed
- Landfill should not be going above the ridge lines, which can be seen from Waianae
- **One of the conditions of the permit was to allow for ridgeline and site views being maintained**
- **No trucks should be parked on Farrington Highway waiting for entrance to the facility**
- **Trucks should be cleaned when leaving facility so the there is no mud or dirt dropped on the highway**
- **Route along Farrington Highway should be kept clean of rubbish or dirt generated by the facility**
- **There should be identification of how the Waimanalo Gulch Sanitary Landfill will be maintained facing Farrington Highway, landscaped to reflect surrounding areas, park-like upkeep, greenbelt, setbacks, etc.**

Appendix D

Hydrologic Setting and Groundwater Monitoring
Waimānalo Gulch Sanitary Landfill, 2006

Hydrologic Setting and Groundwater Monitoring
Waimānalo Gulch Sanitary Landfill
Kahe Valley, Island of O‘ahu, Hawai‘i

Waste Management, Inc./Geosyntec Consultants, Inc.
December 2006

1. HYDROGEOLOGIC SETTING
1.1 Climate and Topography

WGSL is located in a region of Oahu that is relatively arid when compared to the rest of the island due to the “rain-shadow” effect of the Waianae Mountain Range. The average annual rainfall in the area is approximately 20 inches, while gauge stations in the nearby mountains experience significantly higher rainfall averages (Hokuloa gauge, elevation 2,200 feet above mean sea level, average annual rainfall 42 inches).

The regional topography near the WGSL is dominated by the moderate to steep Waianae Range, a northerly trending volcanic mountain complex that is characterized by narrow valleys separated by steeply sloping hills and ridges. The range extends northward from the site approximately 20 miles and is up to approximately 4 miles in width. The WGSL is located at the southern toe of this range in a typically steep and narrow valley (gulch). Elevations along the main mountain ridgeline range from about 1,000 to 3,600 feet msl. Elevations drop dramatically away from the main ridgeline. Lateral slopes along the Waianae Range are asymmetrical, with steeper slopes to the west. Typical slopes on the sides of the range drop some 2,600 feet over distances of two miles or less. Near the WGSL, the mountains of the Waianae Range transition to the low-lying coastal plains. Elevations abruptly diminish from 2,300 feet msl (Puu Manawahua) to sea level in a lateral distance of two miles in the WGSL vicinity (RUST, September 1993).

The WGSL is located in a relatively narrow gulch with a steeply sloping valley floor and sides. At the mouth of the gulch, the elevation of the valley floor is

approximately 50 feet msl and rises to 450 feet msl over a distance of 4,800 feet (up to an 18% slope). Relative elevations between the valley floor and the tops of the adjacent ridges range from about 60 feet to 240 feet. Waimanalo Gulch is approximately 1,000 feet wide from ridge to ridge at its widest point, and is about 500 feet wide at its narrowest point (near the confluence of the upstream tributaries). Site elevations vary from a low of about 70 feet msl in the southeast corner to a high of about 940 feet msl in the northern portion of the property.

1.2 Regional Geology

The island of Oahu represents the eroded remnants of two shield volcanoes, Waianae and Koolau. The Koolau volcano was active after the Waianae volcano became dormant, and its flows backed against the Waianae volcano shield to form the Schofield Plateau. After a long quiescent period during which erosion cut canyons several thousand feet deep, another series of lava flows, the Honolulu Volcanic Series, formed cinder and cones primarily along the southeastern portion of the island.

The Waianae Volcanic Series was formed during the Tertiary period and forms the majority of the Waianae Range. This series is divided into lower, middle and upper members. The lower member consists of sequenced lava flows and associated pyroclastic material up to 2,000 feet thick, which makes up the majority of the Waianae shield volcano. The rocks of this member are mostly thin-bedded pahoehoe that are locally intruded by dikes in the southwestern portion of the island (Takasaki, 1971).

The middle member of the Waianae Volcanic Series is in unconformable contact with the lower member and consists of rocks that accumulated in the caldera and, as such, are thick (on the order of 2,000 feet) and generally horizontally bedded (Macdonald, 1940). This member resembles the lower member but contains more a'a flows than in the lower member. The middle member also is

locally intruded by dikes in the southwestern portion of the island (Takasaki, 1971).

The upper member is about 2,300 feet thick, and is mostly massive a'a flows that issued from large cinder cones (Takasaki, 1971). Dikes also locally intrude the upper member in the southwestern portion of the island, but fewer dikes are present in the upper member than in the lower two members. The valleys of the Waianae Range typically contain moderately thick deposits of alluvium[1] and colluvium[2].

Erosion has removed most of the western slope of the Waianae shield and exposed the internal structure of the volcano. The shield was built by eruptions that took place along three rift zones. The two principal rift zones trended northwestward and southeastward from the summit, while a lesser one trends northeastward (Takasaki, 1971). A rift zone of an active volcano is characterized by parallel to subparallel fissures and a line of cinder and spatter cones. These features are absent in older, dormant volcanoes such as the Waianae volcano where rift zones are identified by erosion-exposed dike complexes (Takasaki, 1971). The dikes are generally basalts and diabases and are aphanitic or have only a small content of phenocrysts. The dikes typically have glassy chilled margins and show a gradual steady increase in grain size from rim to center. Near surface lava in Hawaii typically contains high numbers of cooling joints, vesicle partings, flow-unit boundaries, rubble layers and other planes of weakness (Walker, 1987). Dikes cutting near surface flows can be highly irregular in shape. Dikes are common in the western and southwestern Waianae Range. They are sparse in the less permeable, massive, thick-bedded flows of

[1] Sediments deposited by erosional processes, usually by streams, www.weather.gov/glossary/glossary.php.

[2] Rock and soil accumulated at the foot of a slope from gravitational forces, www.blm.gov/nhp/Commercial/SolidMineral/3809/deis/glossary.html.

the upper member and more numerous in the highly permeable, thin-bedded flows of the lower member of the Waianae Volcanic Series (Takasaki, 1971).

"Caprock", which consists primarily of alluvium, terrigenous and marine clays, and fossilized coral reef with associated calcareous detritus, overlies the volcanic sequences along much of the Oahu coastline. Portions of the caprock are important local coastal aquifers, such as in the Ewa Plain. However, much of caprock is less permeable than the sequences of volcanic rocks so it acts a confining unit above the volcanic aquifer sequence (Hufen et al, 1980; RUST, September 1993).

1.3 Regional Hydrogeology

On a regional scale, fresh groundwater in aquifers on Oahu is similar to other islands, and occurs as a lens floating above and displacing saline groundwater. Generally, the fresh water lens is thickest at the center of the island and thins toward the edges of the island at sea level (e.g. Hufen and others, 1980).

In the southeastern portion of the Waianae Range, the principal groundwater aquifer system is the middle and lower members of the Waianae Volcanic Series. The volcanic aquifers are recharged by infiltration of rainfall and surface runoff originating in the Waianae and Koolau Ranges. Flows of the upper member are largely above the water table and contain only a small perennial supply. Permeability of a volcanic aquifer is generally high due to presence of pahoehoe lava tubes and loose clinker zones and rubble between lava flows. However, permeability is highly variable on a local scale and the low-permeability dense interiors of a'a lava flows and cross-cutting near-vertical volcanic dikes can function as hydraulic barriers that locally partition groundwater both vertically and horizontally. Groundwater gradients in portions of the southern Waianae Range have been shown to be step-like rather than smooth due to the presence of dikes that act as barriers to groundwater flow (Takasaki, 1971; Hufen and others, 1980).

Groundwater generally flows from inland areas outward toward the coast. However, locally, discharge of groundwater to the sea is limited by low permeability “cap rock” that overlies the volcanics along much of the coast of Oahu. Locally, the caprock prevents the free discharge of groundwater to the ocean, and diverts groundwater flow parallel to the coastline toward areas without confining cap rock where the groundwater discharge to the sea is unimpeded.

Waimanalo Gulch is located in the Makaiwa Aquifer System as defined by the Commission on Water Resource Management (CWRM) Water Resource Protection Plan Volume II (George A. L. Yuen & Assoc., 1990). This aquifer has not been assigned a sustainable yield by CWRM, though it is adjacent to the Ewa-Kunia Aquifer System to the east and the Nanakuli Aquifer System to the northwest. The estimated sustainable yield of the Ewa-Kunia Aquifer System is 16 million gallons per day (mgd); while the Nanakuli Aquifer System is assigned one (1) mgd for sustainable yield.

Although no groundwater is developed in the Makaiwa Aquifer System and near Waimanalo Gulch, several monitoring wells and test holes have been drilled in the lower part of the valley and the neighboring Kahe Point area.

Present water levels encountered in the Ewa-Kunia Aquifer System, east of Waimanalo Gulch, are greater than 13 feet above msl. Near Makaiwa Gulch, just east of Waimanalo Gulch, a hydrologic discontinuity occurs where water levels drop to less than 6 feet above msl (see Stearns, 1940, p.36). U. S. Geological Survey test holes T-4 (2006-12) in the Ewa-Kunia Aquifer System and T-5 (2007-01) in the Makaiwa Aquifer System are only a mile apart and reflect the discontinuity (CWRM well database). **Figure 1, Well Location Map**, is a well location map that also depicts the approximate location of wells T-4 and T-5 and the boundary between the Ewa-Kunia and Makaiwa Aquifer systems. When originally drilled in 1938, the water levels for T-4 and T-5 were 17.0 feet and 6.5

feet above msl, respectively (Stearns, 1940). The last water level measurement for T-4 was 13.73 ft above msl (December 6, 2001, Honolulu Board of Water Supply measurement). Well T-5 was previously abandoned and sealed.

The Nanakuli Aquifer System, to the west of the Makaiwa Aquifer System, has only a few wells and test holes. One observation well of note was test hole T-15 (2307-01) described by Stearns (1940) and Mink (1978). This hole was drilled at an elevation of 479.6 ft above amsl. It penetrated 100 feet of talus and old alluvium before entering basalt. It was drilled to -9.0 feet above msl and had an initial water level of 2.6 feet above msl. According to Mink (1978), T-15 was used as an observation well until 1969. Regular monthly water levels were measured from 1940-1953 and ranged from 1.60 feet to 3.14 ft above msl. The average water level for the period of record was 2.0 feet above msl. Chlorides varied from 86 to 119 milligrams per liter (mg/L).

Hydraulic conductivities in dike-free basaltic lavas on Oahu typically range between 1,000 and 2,000 feet per day (ft/d). A value of 1,500 to 2,000 ft/d is commonly used in analytical and numerical groundwater models (Mink, 1980; Oki, 1997). The hydraulic gradient for dike-free lava flows is typically 1-foot per mile, which is the value found in the adjoining Ewa-Kunia Aquifer System.

For dike-impounded aquifers, the hydraulic conductivity depends upon dike spacing, their distribution and continuity, and depth of penetration into the aquifer. In an aquifer where there are more than 100 dikes per linear mile, or as used by Takasaki and others (1969) as constituting 5 percent or more of the country rock, the hydraulic conductivity is generally low (<1 percent), typically ranging between 1 and 100 ft/d. While in the marginal dike zone where dike occurrence is much less, the conductivity values typically range between 100 and 1,000 ft/d (Takasaki and Mink, 1982; Takasaki and Mink, 1985).

Wells, test holes, and monitoring observation wells were drilled in the lower valley as part of a regular monitoring program and for the proposed expansion plan.

Wells are sampled regularly and used to determine groundwater gradients. The wells listed below in **Table 1** are located near Makaiwa Gulch, Waimanalo Gulch, and Kahe Valley. Well data are from the CWRM database and data for the monitoring wells are provided by Waste Management of Hawaii, Inc.

Table 1: Wells in the Kahe Point/Waimānalo Gulch Sanitary Landfill Area

(Source: CWRM Well Database and Waste Management, Inc.)

Well No.	Old Name	Init. WL (ft amsl)	Init. Cl (mg/L)	Grnd El. (ft amsl)	Bot. Hole Elevation (ft. bmsl)	Casing Diameter (in.)	Length Screen Interval (ft)
2007-01*	T-5	5.5	484	80	-20	6	15
2107-01*	T-51	3.2	492	203	-7	4	11
2107-02	T-128	2.1	N/A	22	-182	N/A	N/A
2107-03	T-129	1.7	6750	28	-176	N/A	N/A
2107-04	T-130	5.8	362	62	-65	N/A	N/A
2107-05	T-131	1.9	3300	40	-51	N/A	N/A
2107-06	T-68	2.1	2410	58	-67	N/A	N/A
2107-07 (MW07)[a]		3.82	890	202.4**	-14.6	2	30
MW02 [a]		3.88	1400	73.82**	-8.8	2	15
MW03 [a]		3.84	1100	77.14**	-7.5	2	18
MW10		N/A	N/A			2	
MW11		N/A	N/A			2	

*sealed and/or lost

**top well head

a – data from Quarterly Monitoring Report for January –March 2006 at the WGSL

The wells shown in **Table 1** are located in lava flows defined by Stearns (1940) as “Lower and Middle Members” of the Waianae Volcanic Series. **Figure 1, Well Location Map** identifies the location of wells and also depicts the location of T-15.

The quality of groundwater in the volcanic aquifers is generally good, except where proximity to the ocean results in elevated salinity (Takasaki, 1971). Other sources of lower quality groundwater include leaching of hydrothermally altered volcanic rocks in the central vent area and of carbonate rocks above or adjacent to the volcanic aquifer (i.e., caprock; Takasaki, 1971). Total dissolved solids concentrations in wells to the northwest of the WGSL range from about 200 to about 2,000 mg/l. Chloride concentrations in these same wells range from about 10 to greater than 10,000 mg/l.

1.4 Site Geology

This section summarizes the results of studies related to site geology, hydrogeology, and geochemistry that have been performed at the WGSL since the early to mid 1990s.

The sequence of volcanic rocks encountered in borings and exposed on slopes at the WGSL is the lower member of the Waianae Volcanic Series (e.g. TNWRE, August 7, 1993). The lava flows include both a'a and pahoehoe flows ranging from aphanitic to porphyritic. Coloring of the rock material varies from grey to reddish grey to red, and the texture varies widely from highly vesicular to dense and fine-grained.

Based on observations made during drilling and down-hole video logs of borings drilled in October 2006 for monitoring wells MW-10 and MW-11, lava flows range in thickness from 3 to 20 feet thick, and loose clinker zones between flows comprise approximately 20 percent of the volcanic sequence (Geosyntec, December 7, 2006).

U. S. Geological Survey (USGS) personnel identified a near-vertical dike striking between about 15 and 20 degrees west of north, located at the approximate midpoint of the WGSL property. Furthermore, dikes have been documented to exist through visual observation from site personnel during excavation activities.

Two dikes were documented during the construction of Cell E1 (A-Mehr Inc, 2003). In addition, recent geologic reconnaissance has confirmed the presence of dikes to the north of the site (Mink & Yuen and Knight Enterprises, 2006). The trends of the dikes are predominantly north/northwest, and when projected to the southwest, intersect portions of the northern and northeastern cells of the existing landfill. The approximate location of near vertical dikes in the vicinity of the WGSL that cross-cut the sequence of basaltic lava flows are shown on **Figure 2**.

1.5 Site Hydrogeology

Groundwater under the WGSL is present within the lower and middle members of the Waianae Volcanic Series that dips slightly towards the coast (southwest). In the vicinity of the lower portion of the WGSL, the water table occurs at an elevation of approximately 4 feet above msl and is very flat. As a consequence of the topographic relief, depth to groundwater at the five monitoring wells ranges from 55 to 200 feet. **Table 2** provides depths and screened interval information for the five monitoring wells.

Table 2: Monitoring Wells at WGSL

	Northing (feet)	Easting (feet)	MP Elevation (ft above MSL)	approximate casing stickup (ft above gs)	-------- screen -------- top (ft bgs)	bottom (ft bgs)	10/20/2006 depth to gw (ft below MP)	10/20/2006 gw elevation (ft above MSL)	11/20/2006 depth to gw (ft btoc**)	11/20/2006 gw elevation (ft above MSL)
MW-2	66,879.36	456,496.80	73.85	1.9	82.6	82.6	69.62	4.25	69.66	4.19
MW-3	67,383.32	456,311.18	77.18	1	84.6	84.6	72.94	4.26	73	4.18
MW-7	68,092.04	456,724.17	202.42	2.3	217	217	198.31	4.13	198.28	4.14
MW-10	67,186.53	457,050.04	123.48	0	135	135	119.11	4.37	119.14	4.34
MW-11	66,570.31	456,821.29	61.13	3.5	67	67	56.68	4.45	56.775	4.36

Notes:

All five monitoring wells are Schedule 40 PVC casing.

All five monitoring wells surveyed by Park Engineering 24 October 2006.

Surveyed MP (measuring point) is top of PVC casing (TOC).

Oct 20, 2006 depth to water at MW-2, MW-3, and MW-7 was measured from top of cap for pump assembly, which is 3/16 inch (0.0156 ft) above top TOC

**** Pump assemblies at MW-2, MW_3 & MW-7 were removed prior to 11/20/2006 measurments so depth to water was measured from TOC for all wells.**

Water levels in monitoring wells are tidally influenced. Water levels reported here do not include averaging or compensation for tidal influence.

The marine sediments of the Ewa Plain to the south and east form a low permeability caprock that inhibits groundwater discharge to the ocean south and east of the WGSL. However, the caprock is reported to be generally absent along the coast to the west and northwest of Waimanalo Gulch, in the area of the Kahe Park. The distribution of confining caprock is interpreted to control the westward flow of groundwater and unimpeded discharge to the sea west to northwest of the WGSL. Salinity measurements of ocean water along this stretch of coastline performed by the USGS and TNWRE in 1991 are consistent with major discharge of fresh groundwater in this area (RUST, September 1993, 1997; Earth Tech, 2006). **Figure 3** shows an aerial photo of the general vicinity of the WGSL with approximate groundwater elevations at wells. This data supports a general northwest direction of groundwater flow toward the Kahe Beach coastline.

In the upper portion of the WGSL, a few near-vertical, north-northwest trending basaltic dikes have been mapped that cross cut the sequence of lava flows. Additional investigation is in progress to evaluate the potential influence of the dikes on groundwater flow in the upper portion of the WGSL. However, as stated earlier, all the dikes are up-canyon from the existing leachate collection sumps, so even if the dikes are barriers to groundwater flow they do not influence monitoring of groundwater for detection of potential leaks from the existing leachate collection sumps within the existing landfill footprint.

1.5.1 Hydrogeochemistry

The inorganic geochemistry of groundwater beneath the WGSL is fairly complex, reflecting both the facility's coastal location and its proximity to the coastal cap rock. Groundwater monitoring wells at the WGSL are screened within a transitional groundwater zone in which there is mixing between freshwater and seawater. Groundwater from each of the WGSL monitoring wells is a sodium-magnesium-calcium-chloride (Na-Mg-Ca-Cl) type water which generally reflects this mixing of freshwater and seawater. Total dissolved solid (TDS) concentrations in Monitoring Wells 03M and 07 are consistently lower than TDS

concentrations in Monitoring Well 02M, a condition that is also consistent with the facility's position within the coastal transition zone. The relative percentage of dissolved calcium in groundwater from Monitoring Well 02M is slightly higher than that in groundwater from Monitoring Wells 07 and 03M. This is likely related to the fact that Monitoring Well 02M is located nearer the cap rock (primarily calcium carbonate) than are Monitoring Wells 07 and 03M.

The most comprehensive study of groundwater chemistry was conducted in 1992 (by the former Waste Management Environmental Monitoring Laboratory in Geneva, Illinois). The purpose of that study was to establish the degree of hydraulic continuity across the WGSL and to further establish if the groundwater on either side of the dikes was hydraulically connected. The results of the geochemical study were consistent with little to no barrier to lateral groundwater flow between the downgradient edge of the landfill and the ocean west of the WGSL. This is further corroborated through the results of the tidal study described above which show hydraulic continuity between all monitoring wells at the WGSL with the sea. This also is consistent with the concept of transition-zone groundwater (RUST, 1997).

2. GROUNDWATER MONITORING

2.1 Groundwater Monitoring Network

Detection monitoring wells installed for the WGSL were located using previous flow direction information to better target the primary points of leachate accumulation (leachate sumps). An appropriate groundwater detection monitoring network can be designed based on flow direction and velocity information.

Water levels in monitoring wells at the WGSL are tidally influenced. The results of a tidal study conducted in November 2006 (Geosyntec, 2006) indicate groundwater flow to the northwest in the immediate vicinity of the WGSL. Historical elevations in the HECO wells indicate a water table elevation

approximately 2-3 feet lower than the WGSL wells, suggesting a westerly groundwater flow direction on a local-regional scale.

The gradient calculated using the groundwater elevation data collected during the November 2006 tidal study is about 0.0003 foot/foot (approximately 1.5 feet/mile) to the northwest. This value is consistent with the hydraulic gradient for dike-free lava flows, typically about 1 foot per mile, and indicates that groundwater flow in the lower part of the WGSL is not significantly affected by dikes. Groundwater velocity is calculated using the equation V= Ki/n, where K = hydraulic conductivity, i = hydraulic gradient, and n = effective porosity. Hydraulic conductivities in basaltic lavas on Oahu typically range between 1,000 and 2,000 ft/d for dike-free lavas with a value of 1,500 to 2,000 ft/d commonly used in analytical and numerical groundwater models (Mink, 1980; Oki, 1997). Using a K value of 1,500 ft/day, a gradient of 0.0003 ft/ft, and an effective porosity of 0.20, the groundwater velocity is calculated to be approximately 2.3 ft/day.

The current groundwater monitoring network includes five monitoring wells around the toe of the WGSL (02M, 03M, 07, MW-10, and MW-11). Locations of the five monitoring wells are shown on **Figure 2**. Based on the calculated groundwater flow directions and velocity, the existing monitoring wells are sufficient for monitoring potential impacts to groundwater downgradient of the toe of the WGSL, and the ash monofill sump in cell 8. Monitoring well 07 is located west of the MSW Cell E-1 Sump and the MSW Cell 4B Sump. Based on a westerly flow direction, this well is downgradient of the sumps. Based on a northwesterly flow direction, this well is cross-gradient to down-gradient of the sumps. As discussed above in Section 1.5.1, Hydrogeochemistry, above, the apparent northwestward flow toward monitoring well 07 may be a consequence of local recharge associated with the surface water detention pond elevating water levels in monitoring wells 02M and 03M.

Results of the long-term monitoring of the WGSL monitoring wells (currently equipped with pressure transducers and data loggers) will be used to continue

assessment of fluctuations in groundwater flow direction and gradient to further evaluate if the current monitoring network is sufficient for long-term detection monitoring.

2.2 Groundwater Monitoring Parameters

Chapter 11-58.1, HAR, (1) requires that MSW landfills routinely monitor groundwater for the 15 metals and 47 volatile organic compounds (VOC) listed in Appendix I of Chapter 11-58.1. This is the same list of monitoring parameters contained in the Federal Subtitle D regulations (40 CFR Part 258, Appendix I) and, in addition to containing an excessively large number of parameters, also contains several parameters (i.e., the 15 metals) which are generally viewed as ineffective monitoring parameters because of their limited mobility in most subsurface environments. The EPA intended the Appendix I analytes to be default parameters for use in those states which have not yet obtained Subtitle D authorization. Through 40 CFR Part 258.54 (a)(1) and (2), the EPA has provided authorized states, such as Hawaii, the flexibility to approve alternative lists of site-specific monitoring parameters. This flexibility, specifically outlined in Chapter 11-58.1 subsections (1)(A) and (B), HAR, has been reflected in the development of previous groundwater monitoring programs for the WGSL (e.g., RUST, 1997).

Accordingly, the groundwater monitoring program describes the approach for selecting an updated alternative list of site-specific groundwater monitoring parameters for use during detection monitoring at the WGSL, and incorporates the approximate 10 years of additional monitoring data collected since the preparation of the previous WGSL groundwater monitoring program (RUST, 1997).

2.2.1 Site-Specific Detection Monitoring Selection Strategy

It is widely accepted that a combination of volatile organic compounds (VOCs) plus selected general water quality parameters will typically provide the most reliable monitoring parameters for most MSW landfills. VOCs in particular can be highly effective parameters for providing an early indication of a potential release from a landfill because they are: (1) rarely detected in background groundwater samples; (2) detected more frequently than any other class of organic compounds in solid waste landfill leachate (Cravy et al., 1990; Plumb, 1991); and (3) are analytically sensitive (i.e., they can be detected at extremely low concentrations); and (4) are relatively mobile in the groundwater system. Although commonly present in MSW landfill leachate, semi-volatile organic compounds (SVOCs), as a group, are significantly less mobile than VOCs in most subsurface environments and do not typically provide for substantial additional monitoring benefits.

The above strategy (i.e., VOCs in conjunction with a short list of water quality parameters) has been implemented as a part of previous WGSL groundwater monitoring programs (e.g., RUST, 1997) and is consistent with the monitoring parameter selection strategy outlined in the Guidance Document. This groundwater monitoring program for WGSL reaffirms this strategy but provides a re-evaluation of water quality monitoring parameters using updated groundwater and leachate monitoring data.

The VOCs listed in Appendix I of Subtitle D, which have been monitored in accordance with the previous WGSL monitoring program (RUST, 1997) will continue to be routinely monitored.

2.2.2 Water Quality Monitoring Parameters

Water quality monitoring parameters are those parameters that occur naturally in groundwater and for which a background concentration must be established in

order to provide an indication of a possible leachate release. For detection monitoring purposes, the use of the minimum number of effective water quality monitoring parameters is always the most effective approach over utilization of a very long list of monitoring parameters, such as the list of metals in Appendix I or a generic list of cations, anions, and other common parameters such as TDS. This is true because of the direct relationship between the number of statistical comparisons performed during each sampling event and the resulting false positive error rates. For example, if a given detection monitoring program consists of 5 wells each of which is sampled for 20 parameters (i.e., 100 statistical decisions per monitoring event), even using a very low error rate (e.g., 0.01, or 1%), it would yield one false positive result every sampling event. The larger the number of statistical decisions that are performed each sampling event, the higher (i.e., less conservative) the associated statistical limit must be in order to avoid excessively high false positive results.

The selection of a list of alternative monitoring parameters for the WGSL is based on actual site conditions and involves a detailed evaluation of available site-specific groundwater and leachate data which, at the WGSL, now contains extensive long-term data Geosyntec 2006). Using the strategies outlined in the State of Hawaii Guidance Document, the first step is to identify those water quality parameters whose concentration in leachate are significantly higher than in groundwater, in order to account for dilution and attenuation processes. The resulting list of potential monitoring parameters is then refined further by identifying and removing parameters that provide substantially redundant coverage (e.g., monitoring for both electrical conductivity and TDS). From the remaining parameters, those anticipated to provide the earliest and most reliable indication of a release are selected as detection monitoring parameters for statistical evaluation purposes. This determination is based on the relative mobility of the constituents, the detectability of each parameter using existing analytical methods, the likelihood of false positive results associated with each parameter, as well as any changes in the parameter that might be expected

during its migration through the unsaturated and saturated zones beneath the facility (e.g., due to changes in pH or redox conditions).

The Guidance Document suggests that potential detection monitoring parameters first be screened by calculating the concentration contrast between leachate and groundwater. As noted in the Guidance Document, a potentially effective monitoring parameter would exhibit a concentration in leachate at least 5 times greater than the upper background limit in groundwater. Note that a leachate-groundwater contrast of 5 times is considered highly conservative based on EPA guidance, which identifies typical useful leachate-groundwater contrast for potentially useful indicator parameters of at least 10 to 20 times (EPA, 1996). If insufficient contrast exists for a specific parameter (i.e., the leachate concentration is consistently at or below the background groundwater limit), then that parameter is eliminated from further consideration for detection monitoring.

Table 3 summarizes the leachate-groundwater concentration contrast values for various inorganic and water quality parameters for the WGSL. These values were calculated by dividing the background concentrations using statistical prediction limits for pooled data from groundwater monitoring wells 02M, 03M, and 07 into maximum leachate values in the WGSL database (through the first half of 2005). The groundwater data was pooled in order to provide sufficient data for statistical calculations and it is assumed that the data is representative of background conditions (i.e., no leachate impact). This is a reasonable assumption given that no inorganic leachate impact is indicated in the WGSL monitoring wells, as described in the routine monitoring reports. Furthermore, numerous monitoring parameters are viable due to the large contrast between concentrations of chemicals in leachate and groundwater at the WGSL facilitates.

Table 3: Leachate - Groundwater Concentrations Contrasts

Waimānalo Gulch Sanitary Landfill

Analyte of Interest	Leachate Pt. Exhibiting Max. Concentration of Analyte of Interest[1]	Date of Max. Leachate Concentration[1]	Maximum Leachate Concentration	Groundwater Background Concentration[2]	Units	Leachate/ Groundwater Ratio
Sulfide	All	5/6/2005	ND[3]	0.05	mg/L	NM[4]
Cyanide, total	ASHMH	12/15/1998	0.022	0.02	mg/L	1.1
Iron*	MSWLS2	12/20/2004	780	636	ug/L	1.2
Sulfate	ASHMH	5/6/2005	890	514	mg/L	1.7
Arsenic*	MSWLS2	12/20/2004	37	10.0	ug/L	3.7
Magnesium*	ASHMH	12/15/1998	3390	793.9048	mg/L	4.3
Beryllium*	MSWLS2	12/20/2004	26	5.0	ug/L	5.2
Alkalinity (as caco3)	MSW-LSE1	5/6/2005	1800	288	mg/L	6.3
Specific conductance field	ASHMH	12/15/2002	91000	13047.5	umhos/cm	7.0
Cobalt*	MSWLS2	12/20/2004	420	50.0	ug/L	8.4
Thallium*	ASHMH	12/29/1999	146	10.0	ug/L	15
Vanadium*	MSWLS2	12/20/2004	1000	50.0	ug/L	20
Chloride	ASHMH	12/26/2000	100000	4510	mg/L	22
Solids, total dissolved	ASHMH	12/14/2001	185000	7891.257	mg/L	23
Calcium*	ASHMH	12/26/2000	21400	816.558	mg/L	26
Nickel*	MSWLS2	12/20/2004	1700	51.2	ug/L	33
Selenium-dissolved	ASHMH	5/6/2005	180	5.0	ug/L	36
Chemical oxygen demand	ASHMH	12/20/2004	5900	160.4427	mg/L	37
Mercury*	ASHMH	12/20/2004	8.7	0.20	ug/L	44
Sodium*	ASHMH	12/20/2004	51000	1108.4675	mg/L	46
Barium*	ASHMH	12/15/1998	11700	200	ug/L	59
Nitrogen, total kjeldahl	ASHMH	4/3/1996	84.4	1.0	mg/L	84
Chromium*	MSWLS2	12/20/2004	1000	10.0	ug/L	100
Bromide	ASHMH	12/26/2000	2270	22.1772	mg/L	102
Lead*	ASHMH	12/20/2004	630	5.0	ug/L	126
Zinc*	MSWLS2	12/20/2004	2700	20.0	ug/L	135
Copper*	ASHMH	12/20/2004	4900	25.0	ug/L	196
Total organic carbon	ASHMH	12/20/2004	2300	7.3	mg/L	315
Potassium*	ASHMH	12/29/1999	17800	38.3028	mg/L	465
Cadmium*	ASHMH	12/20/2004	2400	5.0	ug/L	480
Manganese*	DET-POND	5/20/2005	31	0.0522	mg/L	594
Nitrogen, nitrate	DET-POND	4/27/2005	5880	7.52	mg/L	782
Nitrogen, ammonia	DET-POND	4/27/2005	646	0.24	mg/L	2692

Notes:

[1] based on data through the first half of 2005

[2] based on statistical prediction limit of background data set through the first half of 2005

[3] ND = analyte not detected in any leachate samples

[4] NM = ratio not meaningful because leachate data sets contain no detections of this parameter

* Note that contrast evaluation compares the "total" concentration of a metal in leachate to the "dissolved" concentration in groundwater

The contrast values shown on **Table 3** range over several orders of magnitude and can be categorized as follows:

Leachate/Groundwater = <10:

- Arsenic
- Beryllium
- Cyanide, total
- Magnesium
- Sulfate
- Barium
- Chloride
- Mercury
- Selenium
- Sodium
- Thallium
- Alkalinity
- Cobalt
- Iron
- Specific conductance field
- Leachate/Groundwater = 10 to 99:
- Calcium
- Chemical oxygen demand
- Nickel
- Nitrogen, total Kjeldahl
- Solids, total dissolved
- Vanadium

Leachate/Groundwater = 100 to 999:

- Bromide
- Chromium
- Lead
- Nitrogen, nitrate
- Zinc
- Cadmium
- Copper
- Manganese
- Potassium
- Total organic carbon

Leachate/Groundwater = >1000

- Nitrogen, ammonia

Because of groundwater flow conditions at the WGSL, the latter two groups with leachate-groundwater concentration contrasts on the order of 100 to 1,000 are of particular interest in the process of identifying potentially useful site detection monitoring parameters and are further evaluated below.

In the group with contrast values between 100 and 999, the trace metals cadmium, chromium, copper, lead, manganese, and zinc are eliminated from consideration due to mobility considerations. Several processes interact to influence the transport of metals in the leachate-soil-groundwater system,

including complexation reactions, oxidation/reduction processes, and reactions that result in the removal of metal ions from liquid such as adsorption and precipitation. It is widely recognized that, due to the positive charge of metal ion species, adsorption of metals onto negatively charged clay mineral or organic matter is an important limiting process with respect to metals mobility in this environment. A cation with greater valence state is adsorbed more strongly that a cation with a lower valence state and, for a given valence state, the cation with the smallest radius is adsorbed more strongly than a cation with a large radius. Trace metals, therefore, can be expected to be adsorbed more strongly than the major metals, such as sodium, potassium, calcium, and magnesium, all of which possess relatively large atomic radii and relatively low valence states. Based on these factors, cadmium, chromium, copper, lead, manganese, and zinc are unlikely to provide effective indication of a release from the waste management.

Additionally, bromide is excluded from further consideration due to its association with seawater, which is known to influence site groundwater chemistry (**Section 1.3**). Therefore, Total organic carbon (TOC), potassium, and nitrate as nitrogen are considered potentially effective indicators of site leachate. However, for detection monitoring purposes at the WGSL, chemical oxygen demand (COD) is selected as a replacement for TOC, in spite of its lower concentration contrast. 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. The WGSL's previous monitoring program incorporated COD as a detection monitoring parameter. Therefore, significantly more recent background data exist for COD in the WGSL database, thereby facilitating statistical analysis.

Ammonia-nitrogen exhibits a relatively large leachate-groundwater concentration contrast (approximately 2,700). Clearly, this parameter is highly concentrated in site leachate relative to groundwater. However, ammonia-nitrogen is most mobile under relatively strongly reducing and/or acidic conditions. Groundwater

conditions at WGSL are such that rapid oxidation and rapid neutral pH buffering can be expected. These effects would serve to limit the mobility of ammonia-nitrogen upon release to the groundwater system. Therefore, ammonia-nitrogen, in spite of its large contrast value, would be expected to be a less effective detection monitoring parameters than COD, potassium, and nitrate.

2.2.3 Supplemental Geochemical Parameters

In addition to the use of VOCs, COD, potassium, and nitrate as detection monitoring parameters, the WGSL also incorporates analysis of supplemental geochemical parameters into the routine monitoring program. These supplemental geochemical parameters augment the site-specific detection monitoring parameters such that the general chemical nature of groundwater can be further characterized and potential mechanisms affecting water quality (both natural and man-made) can be better understood and evaluated. The supplemental parameters will not be evaluated statistically. However, they can, on an as-needed basis, provide critical data for evaluating data reliability and potential changes in groundwater quality without affecting the site-wide false-positive statistical error rate. The following supplemental geochemical parameters are to be analyzed in conjunction with routine detection monitoring parameters during each monitoring event:

- Total Alkalinity (reported as bicarbonate and carbonate)
- Bromide
- Chloride
- Sulfate
- Dissolved Calcium, Magnesium, Potassium, Sodium
- Total Dissolved Solids

2.2.4 Summary of Site-specific Detection Monitoring and Supplemental Parameters

The updated detection monitoring parameters for use in detection monitoring at the WGSL are summarized in **Table 4**. Concentration limits using both statistical and non-statistical methods, as appropriate, will be established for each of the detection monitoring parameters (as described in Section 4.0). In addition to routine analysis of the detection monitoring parameters, the supplemental geochemical parameters listed in **Table 4** will also be analyzed during each routine monitoring event. These supplemental monitoring parameters are collected for geochemical informational purposes and are not subject to statistical analysis or other compliance-related evaluation.

As additional leachate data is generated throughout the course of landfill operations, the detection monitoring parameter list will be re-evaluated and updated as required. If parameters are added to the routine detection-monitoring list, background concentrations will be determined using appropriate statistical methods and added to the long-term monitoring program after the changes are approved by the DOH.

2.3 Groundwater Monitoring Schedule

Groundwater monitoring will be performed each quarter for recently installed wells MW-10 and MW-11 until a minimum of 8 background data sets are obtained to facilitate statistical evaluation (i.e., quarterly for a minimum of two years). Quarterly monitoring will continue at monitoring wells 02M, 03M, and 07 for two years. If appropriate and approved by DOH, and following statistical evaluation of two years of quarterly data from the five monitoring wells, the monitoring frequency will decrease from quarterly to semiannually.

Table 4: Detection Monitoring Parameters
Waimānalo Gulch Sanitary Landfill

Constituents	Frequency	Locations
GROUNDWATER **Detection Monitoring Parameters** Volatile Organic Compounds (VOCs) -- EPA 8260B Parameters Chemical Oxy. Demand; Potassium, dissolved; Nitrate-N	Quarterly	Wells: 02M, 03M, 07, MW-10 and MW-11
Supplemental Monitoring Parameters Total Alkalinity (reported as bicarbonate and carbonate) Bromide; Chloride; Sulfate; Dissolved Calcium; Dissolv. Magnesium; Dissolv. Sodium; Total Dissolv. Solids	Quarterly	Wells: 02M, 03M, 07, MW-10 and MW-11
Groundwater Characterization Parameters (1) detection monitoring parameters, above (2) supplemental geochemical parameters, above (3) Subtitle D Appendix II parameters, below 17 "dissolved" trace metals: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Ni, Se, Ag, Tl, Sn, V, Zn Cyanide, total; Total Sulfide; Semivolatile Organic Compounds; Pesticides; Herbicides; PCBs	Once, upon installation	MW-10 and MW-11 first event; any newly installed wells
LEACHATE **Routine Leachate Monitoring Parameters** Total Alkalinity (reported as bicarbonate and carbonate); Bromide; Chloride; Sulfate; Calcium, total; Magnesium, total; Potassium, total; Sodium, total; Total Dissolved Solids; Chemical Oxygen Demand; Nitrate-N; VOCs (EPA Method 8260B analytes)	Annually	Ash monofill (Cell 8 Sump), MSW Cell E-1 Sump, MW Cell 4B Sump
Non-Routine Leachate Characterization Parameters 17 "total" trace metals: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Ni, Se, Ag, Tl, Sn, V, Zn Cyanide, total; Total Sulfide; Semivolatile Organic Compounds; Pesticides; Herbicides; PCBs Major cations and anions (covered by routine monitoring, above) – (Mg, Na, Ca, K, Cl, carbonate, sulfate, and bicarbonate) Major leachate indicators (partially covered by routine monitoring, above) – (TDS, TOC, Total Alkalinity, Nitrogen–Ammonia, Cl, Fe) Field measurements (performed in accordance with Sampling and Analysis procedures in Section 5.0) – (electrical conductance, pH, temperature, and turbidity)	Biennially	Ash monofill (Cell 8 Sump), MSW Cell E-1 Sump, MW Cell 4B Sump, plus any newly sampled leachate locations

3. LEACHATE MONITORING

Leachate monitoring has been performed on a routine basis at the WGSL in accordance with the WGSL solid waste operating permit and with previous site monitoring programs (e.g., RUST 1997). Currently, monitoring is conducted pursuant to the Monitoring Plan, the *Groundwater, Surface Water, and Leachate Sampling Guide* (WMI 2000), and the DOH letter request (DOH 2005). Monitoring is conducted quarterly and reported along with groundwater monitoring (e.g. Earth Tech, 2006).

3.1 Leachate Monitoring System

Leachate samples will be routinely collected to augment the database of potential source information and to evaluate the suitability of site monitoring parameters. Sampling of the following leachate monitoring locations (see **Figure 1**) is proposed on an annual basis:

- Ash monofill (Cell 8 Sump)
- MSW Cell E-1 Sump
- MW Cell 4B Sump (pending DOH approval and installation)

3.2 Leachate Monitoring Parameters

Routine leachate monitoring parameters will consist of the same parameters used for groundwater detection monitoring and the supplemental geochemical parameters including:

- Total Alkalinity (reported as bicarbonate and carbonate)
- Bromide; Chloride; Sulfate
- Calcium, total
- Magnesium, total
- Potassium, total
- Sodium, total
- Total Dissolved Solids

- Chemical Oxygen Demand
- Nitrate-N
- VOCs (EPA Method 8260B analytes)

Note that leachate samples are not filtered and, therefore, the major cations are shown as “total” for leachate (as opposed to “dissolved” for groundwater).
In addition to the above routine parameters, leachate samples collected from new leachate locations, and leachate samples collected from existing locations every two years (biennial characterization) will be analyzed for the following Subtitle D Appendix I parameters and “leachate indicators”, per the Guidance Document:

- 17 trace metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Ni, Se, Ag, Tl, Sn, V, Zn) plus cyanide and sulfide
- Semivolatile Organic Compounds
- Pesticides
- Herbicides
- PCBs
- Major cations and anions (covered by routine monitoring, above) – (Mg, Na, Ca, K, Cl, CO3, SO4, HCO3)
- Major leachate indicators (partially covered by routine monitoring, above) – (TDS, TOC, Total Alkalinity, Nitrogen–Ammonia, Cl, Fe)
- Field measurements (performed in accordance with Sampling and Analysis procedures in Section 5.0) – (electrical conductivity, pH, temperature, and turbidity)

4. DATA EVALUATION METHODS

The following subsections describe the criteria by which groundwater data will be evaluated at the WGSL for detection monitoring purposes. These criteria represent a conservative approach to groundwater analysis and incorporate

state–of–the–practice statistical and other evaluation methodologies consistent with the Guidance Document.

4.1 Statistical Methodology for Evaluation of Inorganic Parameters

Consistent with the existing groundwater monitoring program at the WGSL, an intra-well monitoring strategy using Shewhart-CUSUM control charts will be used for routine detection monitoring. Shewhart-CUSUM control charts (Gibbons, 1992; Gibbons 1994) are particularly effective in this capacity because they are capable of detecting both sudden and gradual changes in groundwater chemistry. Combined Shewhart–CUSUM control charts will be constructed for each well where intra-well monitoring is performed to provide a statistical and visual tool for detecting trends and abrupt changes in inorganic groundwater chemistry. The combined Shewhart–CUSUM procedure assumes that the data are independent and normally distributed. The most important assumption is independence (Gibbons, 1994). Therefore, care should be taken to never sample wells more frequently than sample independence can be demonstrated based on site–specific hydrogeological factors. The assumption of normality is somewhat less of a concern because the data can usually be adequately transformed for most applications. Non-detects (NDs) can be replaced by one–half of the PQL without serious consequence, although this procedure should be applied only to constituents that are detected in at least 25% of all samples. For data sets with less than 25% detected values in the background data set, non-parametric prediction limits will be used in lieu of Shewhart-CUSUM control charts.

Intra-well monitoring is always the preferred approach for wells not already impacted by inorganic waste constituents because it eliminates the spatial component of chemistry variability from the statistical evaluation. No impact from inorganic waste constituents has been identified to date in WGSL groundwater. A statistically significant trend in sodium concentrations exhibited by well 03M, as reported in 2004 was demonstrated to be unrelated to impact from the facility (A-Mehr, 2004).

For intrawell comparisons, a minimum of eight background samples (i.e., from each well in the monitoring program) is required for parametric (i.e., Shewhart-CUSUM) tests and 13 background samples for nonparametric (i.e., Prediction Limit) tests. Additional discussion of intrawell monitoring can be found in Gibbons (1987a, 1987b, 1990, and 1994). Statistical evaluation of groundwater monitoring data will be performed using DUMPStat™ statistical modeling software, developed consistent with USEPA and ASTM guidance on groundwater monitoring at Subtitle D and Subtitle C facilities (Gibbons and Discerning Systems, 1994; www.discerningsystems.com).

4.2 Non-Statistical Methodology for Evaluation of VOCs

VOCs have been demonstrated to be effective indicators of a release from MSW landfills. However, because these compounds are rarely naturally detected in background groundwater samples, establishing monitor well–specific limits for VOCs is generally not an option. Therefore, a detection monitoring decision rule based on laboratory–specific practical quantitation limits (PQL) will be used to identify a statistically significant monitoring result with respect to VOCs.

It is generally accepted that when a landfill facility actually produces a leachate release to groundwater, multiple constituents contained in the leachate are associated with the source fluids and are subsequently detected by the groundwater monitoring program. A single constituent at very low concentration (i.e. below the PQL) typically is not the signature that is produced from an actual release. The calculation of laboratory–specific PQLs (Gibbons, et al., 1992) already incorporates a measure of the statistical uncertainty that is associated with the measurement process. Therefore, any VOC detected and verified at a concentration above the PQL would be statistically significant, and would therefore trigger assessment monitoring (or an alternative source demonstration if the detection is unrelated to a release from the landfill). This decision rule only

applies in cases where the constituent has rarely, or never, been detected in background samples.

PQLs assure that the quantitative value of the analyte is close to the measured value. Method detection limits (MDLs), on the other hand, indicate that the analyte is present in the sample with a specified degree of confidence (Gibbons et al., 1991). For analytes with estimated concentrations greater than the MDL but not the PQL, it can only be concluded that the true concentration is greater than zero; the actual concentration cannot be determined. The actual concentration of an analysis result between the PQL and the MDL (often referred to as a "trace" result or a "J-flagged" result) may actually be less than the MDL. Therefore, comparison of a detected concentration to a maximum contaminant level (MCL), or any other concentration limit, is not meaningful unless the concentration is greater than the PQL.

Although the use of VOC results reported between the MDL and PQL is not appropriate for use in the decision rule, such trace/J-flagged results can be used to guide further investigation in the event that long-term, repeatable trace/J-flagged results are observed, such as the recent case with WGSL well 07; in that case, repeatable trace detections of VOCs were the basis for initiating further study that resulted in the identification of a probable non-landfill source (GeoChem Applications, 2005).

4.3 Detection Verification Procedure

If groundwater analysis results have been collected, checked for quality assurance and quality control (QA/QC) consistency and are determined to be above the appropriate statistical level (i.e., the Shewhart-CUSUM control chart limit or non-parametric prediction limit for inorganic monitoring parameters, or the PQL for one or more VOCs), the results should be verified in accordance with the objectives of 40 CFR Part 258.53 and HAR Chapter 11-58.1.

Verification resampling is an integral part of the statistical methodology described by the USEPA's *Addendum to Interim Final Guidance Document – Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* (July 1992). Without verification resampling, much larger statistical limits would be required to achieve site–wide false positive rates of 5% or less. Furthermore, the resulting false negative rate would be greatly increased. For the WGSL groundwater detection monitoring program, the following procedure will be performed for each compound determined to initially be above its statistical limit. Note that only those compounds that initially exceed their statistical limit should be sampled for verification purposes; otherwise, an unacceptably high false-positive error rate can be expected (e.g., if PCE is the only compound detected during an EPA Method 8260B scan, then only PCE is targeted and reported by the laboratory during the retest).

Volatile Organic Compounds

If one or more VOCs is/are detected above statistical limit(s) (i.e., PQL), one immediate resample and analysis should be conducted. A statistical exceedance will be recorded and assessment monitoring initiated if any single VOC is measured above the PQL in the verification resample, or an alternative source demonstration may be performed if the exceedance is not anticipated to be associated with a release from the facility.

Inorganic Constituents

If one or more of the inorganic parameters are detected above their statistical limit (i.e., Shewhart–CUSUM control chart limit or non-parametric Prediction Limit), one verification resample will be collected at the next scheduled sampling event. A statistical exceedance will be recorded and assessment monitoring initiated if verification of an elevated parameter is confirmed for one discrete verification resample, or an alternative source demonstration performed if the exceedance is not a result of a release from the facility

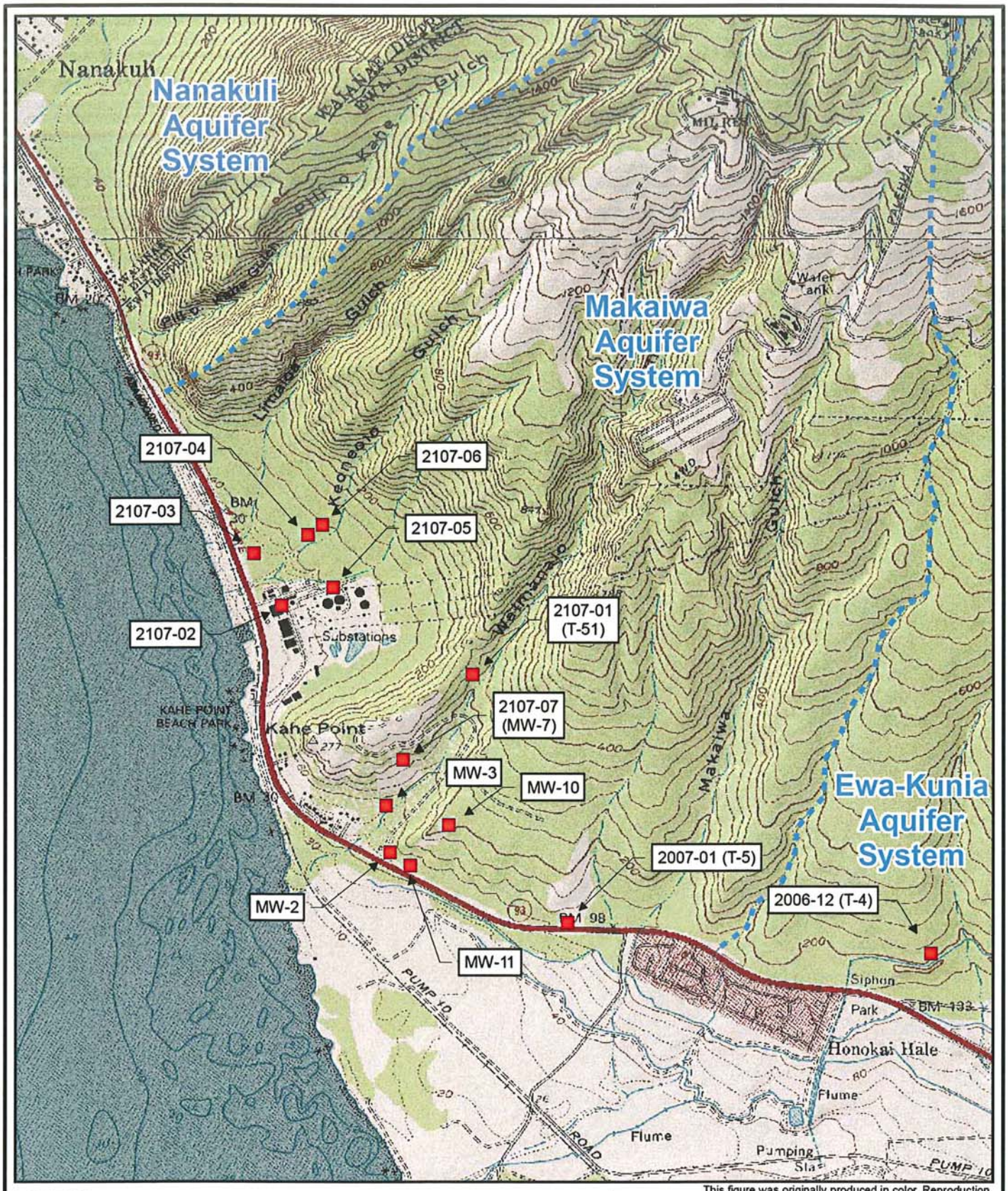
5. FIGURES

See attached figures referenced in this document:

Figure 1 - Well Location Map

Figure 2 - Near Vertical Dikes in the Vicinity of Waimānalo Gulch Sanitary Landfill

Figure 3 - Approximate Water Table Elevation, WGSL and Vicinity



LEGEND

- Monitoring Well Locations
- Major Aquifer Approximate Boundary

0 2000

Scale in Feet

This figure was originally produced in color. Reproduction in black and white may result in a loss of information.

DRAFT

Map Projection: GCS NAD 1983

Source: USGS

N

FIGURE 1

AREA AQUIFERS AND MONITORING WELLS

WAIMANALO GULCH SANITARY LANDILL

0637105805F02R01.mxd 11/14/07 | KBD

LEGEND

- EXISTING GROUND 10-FT CONTOUR (MSL)
- CELL BOUNDARY
- PROPERTY LINE
- 03M MONITORING WELLS (LOCATIONS APPROXIMATE)
- LEACHATE SUMP
- APPROXIMATE LOCATIONS OF REPORTED DIKES

400 200 0 400 800

SCALE IN FEET

NOTES:

1. EXISTING TOPOGRAPHY BASED ON 30 DECEMBER 2005 AND 29 DECEMBER 2001 AERIAL SURVEY PROVIDED BY OWNER USING LOCAL COORDINATE SYSTEM.

2. LOCATIONS OF DIKES D1, D2, AND D3 ARE BASED ON HISTORICAL REPORTS (E.G. RUST, 1993, 1997; EARTH TECH, 2006A) BUT NO EVIDENCE OF REPORTED DIKES D1, D2, AND D3 IS VISIBLE IN THE SLIDE SLOPES OF WAIMANALO GULCH. LOCATIONS OF DIKES D3, D4, AND D5 ARE BASED ON RECENT GEOLOGIC RECONNAISSANCE MAPPING AND GPS COORDINATES (MINK & YUEN AND KNIGHT ENTERPRISES, 2006).

GeoSyntec Consultants

SITE PLAN

WAIMANALO GULCH LANDFILL
OAHU, HAWAII

FIGURE NO.	2
PROJECT NO.	WR0935
DATE:	DECEMBER 2006

P:\GIS\Waimanalo\AI\August2007\Figure 2 Site Plan with MWs.ai

Notes:
1. MSL - Mean Sea Level
2. Posted values are general water levels elevations (ft above MSL)

N

0 2000 ft
Scale Approximate

GeoSyntec Consultants

Approximate Water Table Elevation
WGSL and Vicinity
Kapolei, Oahu, Hawaii
DRAFT

Figure 3
WR0935
December 2006

P:\GIS\Waimanalo\AI/Figure 5 Site Aerial.ai

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Appendix E

Botanical Resources Report for Alternative Municipal Refuse Disposal Sites on the Island of O'ahu, 2007

Botanical resources report for alternative municipal refuse disposal sites on the Island of O'ahu[1]

February 20, 2007 *AECOS* Consultants No. 065

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INTRODUCTION

Although solid waste generated by the populace on the Island of O'ahu is increasingly diverted to various other forms of disposal, there remains today a need to landfill a portion of the waste stream. The need for a solid waste disposal site will likely be reduced in the future, but not eliminated. This report considers botanical resources extant at potential landfill sites as presented by the City & County of Honolulu. The purpose of this report is to establish which, if any of the proposed locations, support plants of special concern: either species that are listed by the state and federal governments under an endangered species program, or plant assemblages that are substantially native in their composition, and therefore represent intact or partially intact native communities capable of supporting biological resources unique to the Hawaiian Islands.

Five (5) potential landfill sites are investigated: Mā'ile Quarry, Nānākuli B, Waimanalo Gulch (lateral expansion), Makaīwa Gulch, and Kapa'a (Fig. 1). All but the last site are located on leeward O'ahu; Kapa'a is the Ameron quarry site on windward O'ahu (located between Kāne'ohe and Kailua).

With respect to the potential for any of the sites to support an assemblage of plants with significant native species representation, it must be realized that selection of potential sites was limited to those parts of the island *makai* (seaward) of the Underground Injection Control (UIC) and *makai* of the Groundwater Protection Zone (GPZ). The boundaries defining these two

[1] This report was prepared for R. M. Towill for inclusion in the EIS titled "Waimanalo Gulch Sanitary Landill Lateral Expansion EIS."

zones closely approximate each other and the zones occupy most of the interior of the Island of O'ahu. This requirement for placement of a waste landfill restricts such development to a rather narrow coastal belt around the Island. This coastal belt is mostly populated or otherwise developed and disturbed; with few exceptions, most disturbed by human activities, including those of the ancient Hawaiian population. Further, from an initial larger set of potential sites, some that were in more pristine areas (such as 'Ohikilolo Valley) were eliminated from consideration for both environmental and accessibility reasons. Thus the selection process has already moved significantly in a direction driven in part by factors that minimize adverse impacts on special botanical resources.

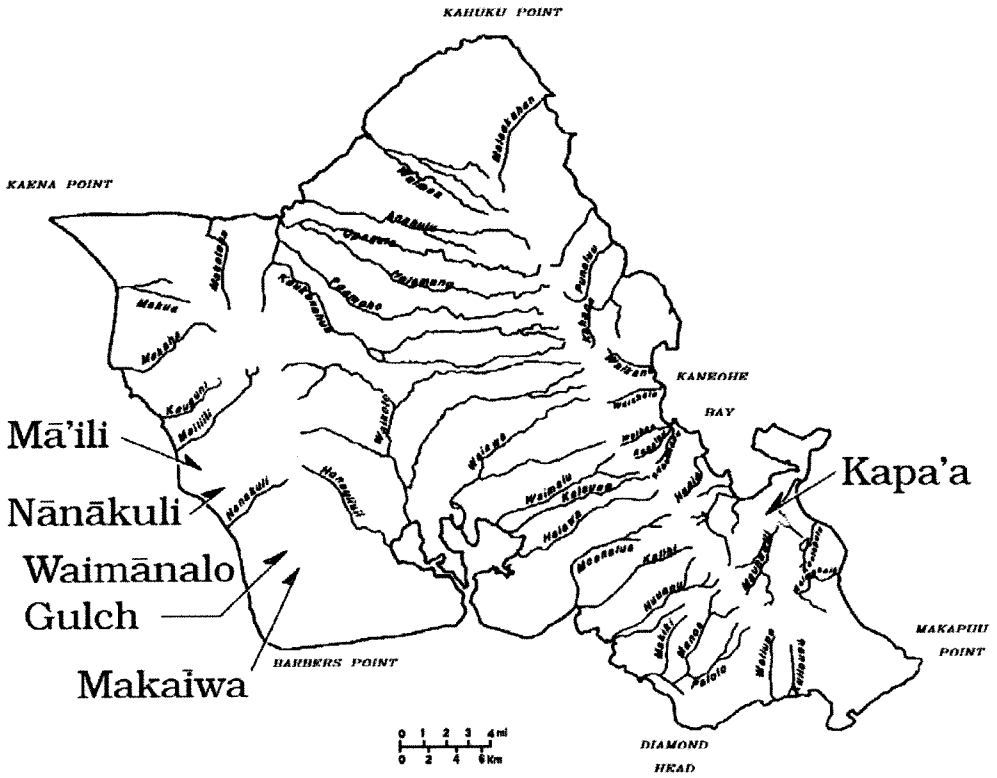

Figure 1. Map of O'ahu showing location of the five sites considered for solid waste landfills on the island.

METHODS

For various reasons, it was not possible to conduct surveys of the botanical resources found on each of the proposed landfill sites. Permission was granted, and a site survey conducted, in the Waimanalo Gulch Expansion Area, representing the alternative of expanding the present-day solid waste landfill site further back up into Waimanalo Gulch. For the other locations, botanical resources were assessed by means of consulting past reports, reviewing the Hawaii Natural Heritage Program (HNHP) data base, and visiting the area to establish the nature of the extant vegetation and the likelihood that valuable botanical resources would be present. Results of these approaches to establishing actual more likely botanical resources present are presented under the individual site descriptions that follow.

The botanical survey for the Waimanalo Gulch expansion area followed a standard protocol utilized for discovery-type surveys called a wandering pedestrian transect. In more basic terms, this amounts to a botanist hiking around the property in a manner that allows a visual survey of all of the various types of habitats present on the property. During the transect, each plant species is noted as it is encountered, material is collected where a field identification proves difficult, photographs are taken, and a sense of the relative abundance of each species on the property is developed.

As the survey progressed, 15 waypoints (intermittent position locations) were entered into a hand-held GPS unit (Garmin *eTrex* "Vista"®). These 15 positions were later downloaded into a computer mapping program (TOPO!®) and a map produced showing the general route of the survey.

The survey of the Waimanalo Gulch was conducted during the wet season (January 2007). Consequently, most of the plants encountered (including annuals) were growing well and were in flower, making positive field identifications relatively straight forward. Nonetheless, a one time survey cannot expect to list every plant species growing on a subject property. Some species are seasonal or opportunistic, while others might be present, but in such low numbers that they are simply not encountered. Every square foot of the land cannot reasonably be covered, and some areas—in this case dangerously steep portions of the gulch margins and high cliff faces—will not be accessed. The botanist attempts to reach all physiographic types characteristic of the property and reach plants appearing from a distance to be "unique". Steep but traversable portions of the gulch margins and smaller cliff faces serve as representative of the inaccessible habitats on the property.

SITE DESCRIPTIONS

This section of the report provides known information on the botanical resources of the five sites considered as potential landfill sites. The discussion of sites is arranged from west to east as shown in Fig.1.

MĀ'ILI

The Mā'ili Site (TMK: 8-7-10:003) is located in the Wai'anae District on leeward O'ahu. The approximately 200 ac (80+ ha) site presently supports an active limestone quarrying operation (Fig. 2). Although most of the site is clearly disturbed as quarry pits, material sorting and storage areas, access roads, or other ancillary operations as needed to support the quarry, some portions of the property do appear to retain a remnant *kiawe* forest. At least three separate quarry sites are present. The active quarry is the large central pit in Fig. 3. This pit has been expanded to the northwest through the buffel grass field seen in the satellite image since the image was obtained. Another pit, largely overgrown, appears in the satellite photo to the southeast. The original quarry pit is directly south, seen as an area of white soil with kiawe trees. Slurry lagoons lie along one side of this quarry pit.

The vegetation is largely ruderal in nature: consisting of plants adapted to disturbed ground. The assemblage would be mostly non-native in composition, although indigenous *'uhaloa* (*Waltheria indica*) and *'ilima* (*Sida fallax*) may be present as both respond well to land clearing. Less recently disturbed or undisturbed areas support either buffel grass (*Cenchrus ciliaris*) grassland or a *kiawe* forest with a buffel grass groundcover.

The adjacent Naval Radio Transmitting Facility (NRTF) was previously surveyed by Funk (Botanical Associates, 1984; Traverse Group, 1987) and more recently, Guinther and David (2003) surveyed the highly disturbed (by regular mowing) environment of the central part of NRTF across Pa'akea Road from Mā'ili Quarry. In general, there are a number of rare and/or listed species of plants found at much higher elevations of the Naval Reservation which extends to Kolekole Pass on the Wai'anae ridgeline, but few species of interest or concern have been found on the lowlands. Exceptions are a semi-aquatic fern called *'ili'ihi* (*Marsilea villosa*) and scattered occurrences of an endemic hibiscus, *ko`oloa ula* (*Abutilon menziesii*). The fern is discussed further on page 31; the hibiscus was noted in Guinther & David (2002) and later confirmed by Navy biologists (Julie Rivers, pers. comm.) This hibiscus, a listed species, is not expected to be present on the Mā'ili Site, although its presence cannot be ruled out

entirely, as the only reason it would not be present is the long-standing disturbance of most of the property.

No surveys of botanical resources at the Mā'ili Limestone Quarry are known to this author. The plant assemblages present is certainly dominated by non-natives. Native plants of interest or concern (for example, listed species) would be rare if present at all.

Figure 2. Pacific Aggregate (Mā'ili) Limestone Quarry. Quarry operations are mining an ancient limestone (reef) deposit, slowly removing the *kiawe* forest (background) on the northwest end of the property.

NĀNĀKULI

The Nānākuli (or "Nānākuli B" Site in some records of the site selection process; TMK: 8-7-9:001 & 8-7-21:026) is located in the Wai'anae District on leeward O'ahu. The site is presently undeveloped, but is adjacent to (and the land owned by) a private entity (PVT Land Co.) operating a landfill that accepts mostly construction debris. The PVT Landfill is located on the west side of Lualualei Naval Road across from the proposed Nānākuli Site,

which extends along the east side of that road to the vicinity of an old cement plant (Fig. 4 and 6).

Figure 3. Mā'ili Site (outlined in orange) is mostly a disturbed area supporting a limestone quarry operation. A *kiawe* forest is present in the southwest and northwest portions of the parcel. All of the upper corner in this satellite image is NRTF Lualualei where the grounds are regularly mowed to reduce fire hazard.

Figure 4. Much of the Nānākuli Site is low sloping grassland, here looking across the site towards the old cement plant and Lualualei Valley. The PVT Landfill is the hill across the Lualualei Naval Road (left of center).

The Nānākuli Site consists of gradually rising ground that becomes steeper to the east, eventually reaching a peak at 1890 ft (576 m) known as Pu'u Heleakalā. The lower, moderately sloped areas are colluvium: eroded material of basaltic origin moved by gravity and water flow downslope from the ridge. Above the colluvial slope (generally above 400 to 500 ft (120-150 m) the layers of basalt representing ancient lava flows form a characteristic cliff and ledge formation (Fig. 5).

The proposed landfill site was surveyed for botanical resources by *AECOS* Inc. in 1991 (Guinther & Miranda, 1992). Nearby lower slopes of Pu'u Heleakalā have also been surveyed for a proposed golf course just north of the Nānākuli site (Char, 1990a).

The vegetation of the site is mostly grassland. The dry conditions and occasional fires tend to favor exotic grasses over native grasses, shrubs, and trees. Scrutiny of the satellite image (Fig. 3) reveals a complex of fire roads cut into the steeper slopes to control the spread of fires that can

occur with unfortunate regularity on leeward O'ahu between about May and September of most years. Buffel grass dominates, and becomes self-preserving by increasing the intensity of fires that occur, itself capable of regrowing from basal stems when rains return (Hughes, Vitousek, and Tunison, 1991; Tix, undated, Latz, 1991). Native Hawaiian plants are not adapted to fire, and are gradually eliminated from areas subjected to repeated fires (Mueller-Dombois, 1981).

Figure 5. Alluvial pasture land (foreground), colluvial slope (middle ground with boulders and *kiawe* trees) and cliff and ledge habitats on Pu'u Heleakalā at and above the Nānākuli Site.

Table 1 is modified from Guinther & Miranda (1992) to reflect plants observed in a survey of the lands east of Lualualei Naval Road comprising the proposed Nānākuli Site (the complete survey report covered lands on both sides of the road as well as along Ulehawa Stream). The species list (flora) is fairly typical for this part of the Wai`anae coast. The only species of interest is *'ihiahialo'e* or coast sandalwood (*Santalum ellipticum*), an endemic species that does persist in areas invaded by exotics (Wagner, Herbst, and Sohmers, 1990) and Hawaiian cotton or *ma'o* (*Gossypium*

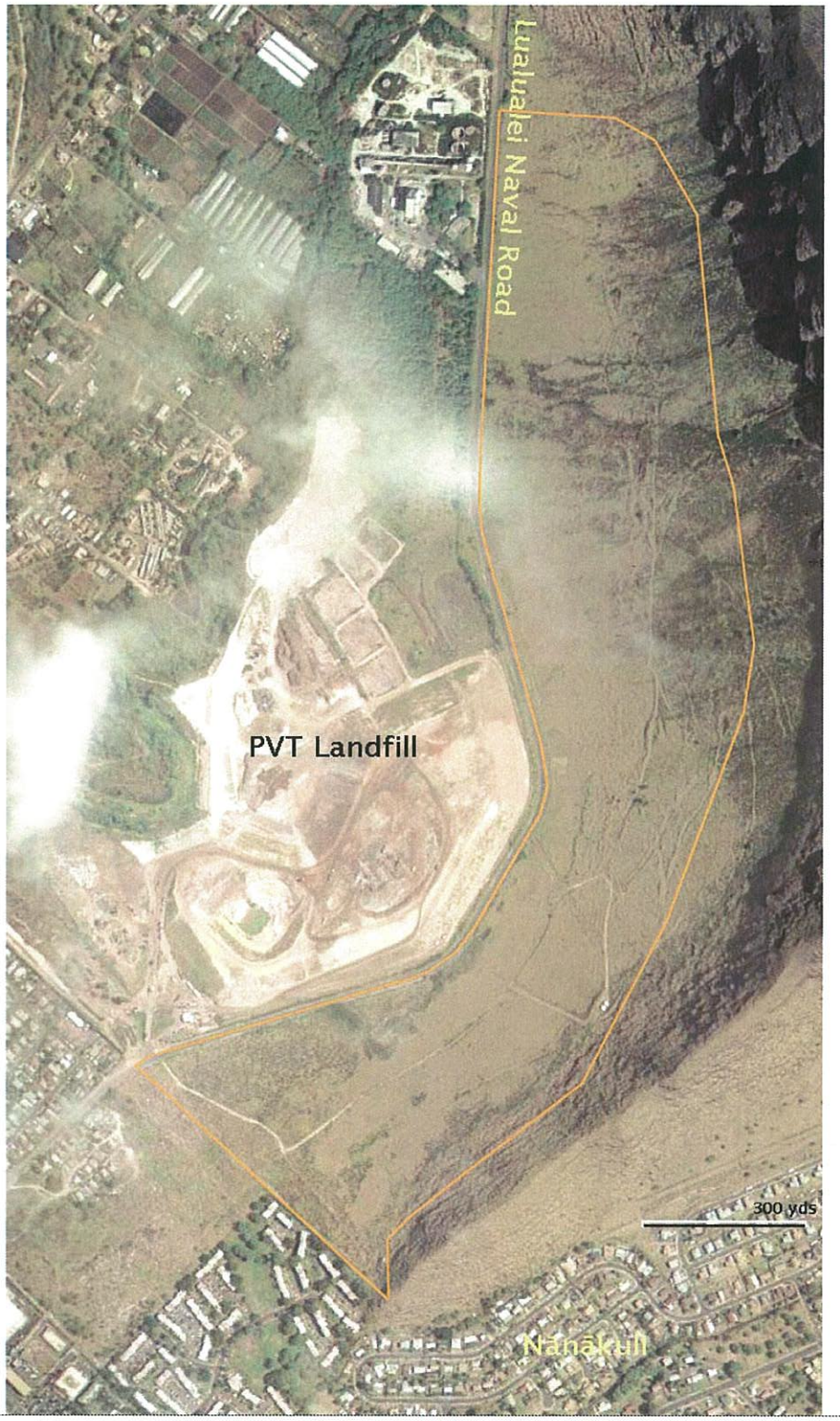

Figure 6. The Nānākuli Site (outlined in orange) lies on the east side of Lualualei Naval Road against a ridge of Pu'u Heleakalā (far right).

Table 1. Listing of plants (flora) for the Nānākuli Site, west O'ahu, Hawai'i from a survey conducted October and December, 1991 (Guinther & Miranda, 1992)

Species listed by family	Common name	Status	Abundance LOW	Abundance UPL	Notes
	FERNS				
POLYPODIACEAE					
indet.	---	Nat.		R	(2)
PTERIDACEAE					
Pteris sp.	?cliff brake	Nat.		R	
	FLOWERING PLANTS				
	DICOTYLEDONES				
AMARANTHACEAE					
Amaranthus spinosus L.	spiny amaranth	Nat.		R	
ASTERACEAE (COMPOSITAE)					
Bidens sp.	---	Nat.		U	
Emilia fosbergii Nicolson	*pualele*	Nat.		O	
Pluchia carolinensis (Jacq.) G. Don	sourbush	Nat.		U	
Sonchus oleraceus L.	sow thistle	Nat.		U	
Synedrella nodiflora (L.) Gaertn.	nodeweed	Nat.		R	
Verbesina enceliodes (Cav.) Benth. & Hook.	golden crown-beard	Nat.		U	
CACTACEAE					
Opuntia ficus-indica (L.) Mill.	*pānini*	Nat.		U	
CONVOLVULACEAE					
Ipomoea cairica (L.) Sweet	*koali 'ai*	**Ind.**		C	
Merremia aegyptia (L.) Urb.	hairy merremia	Nat.		C	
EUPHORBIACEAE					
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	Nat.		U	
FABACEAE					
Acacia farnesiana (L.) Willd.	*klu*	Nat.	U	O	
Desmanthus virgatus (L.) Willd.	virgate mimosa	Nat.	C		
Leucaena leucocephala (Lam.) deWit	*koa haole*	Nat.	A	A	
Indigofera suffruticosa Mill.	indigo	Nat.	R	U	
Macroptilium lathyroides (L.) Urb.	cow pea	Nat.		O	
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	*kiawe*	Nat.		O	
LAMIACEAE					
Hyptis pectinata (L.) Poit.	comb hyptis	Nat.		U	
MALVACEAE					
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	Nat.		R	
Abutilon incanum (Link) Sweet	*ma'o*	**Ind.**		O	(1)
Gossypium tomentosum Nutt. ex Seem.	*ma'o*	**End.**	U		
Malvastrum coromandelianum (L.) Garck	false mallow	Nat.		O	(1)

Table 1 (continued).

Species listed by family	Common name	Status	Abundance LOW	Abundance UPL	Notes
MALVACEAE (continued)					
Sida fallax Walp.	*`ilima*	**Ind.**	C	C	(1)
PASSIFLORACEAE					
Passiflora foetida L.	love-in-a-mist	Nat.		R	
PORTULACACEAE					
Portulaca oleracea L.	pigweed	Nat.		O	
Portulaca pilosa L.				O	
SANTALACEAE					
Santalum ellipticum Gaud.	*'iliahialo'e*	**End.**		R	
STERCULIACEAE					
Waltheria indica L.	*`uhaloa*	Nat..	A	A	(1)
VERBINACEAE					
Stachytarpheta jamaicensis (L.) Vahl.	Jamaican vervain	Nat.		U	
MONOCOTYLEDONES					
COMMELINACEAE					
Commelina benghalensis L.	hairy *honohono*	Nat.		O	
POACEAE					
Cenchrus ciliaris L.	buffelgrass	Nat.	AA	A	
Chloris barbata (L.) Sw.	swollen fingergrass	Nat.	P	R	
Melinus repens (Willd.) Zizka	Natal redtop	Nat.	R		
Panicum maximum Jacq.	Guinea grass	Nat.		C	

STATUS = distributional status for the Hawaiian Islands:
end. = endemic; native to Hawaii and found naturally nowhere else.
Ind. = indigenous; native to Hawaii, but not unique to the Hawaiian Islands.
nat. = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.

ABUNDANCE AREAS:
LOW – Grassland, to moderate slopes on colluvium.
UPL – Rocky tallus and cliffed areas

ABUNDANCE CODES:
Abundance codes used in 1991 have been modified here to fit more recent practice as reflected in Table 2, below.

NOTES:
(1) – locally abundant in disturbed areas (road and fire trail cuts).
(2) – only dried fronds presnt.

tomentosum). Neither one is a listed species, but both are increasingly uncommon on O'ahu due to steady development of dry, lowland environments for housing. In 1991, *ma'o* was far more abundant in this area on the west side of Lualualei Naval Road; being rather rare in the proposed landfill site. Char (1990a) reported a very similar flora for the adjacent property to the north, although with only one endemic plant present, the *wiliwili* (*Erythrina sandwicensis*) tree.

Although no part of the property is included in a designated critical habitat for an endangered species, the eastern property boundary lies west some 200 and 300 ft (60 to 90 m) of the O'ahu critical habitat Unit 15 boundary (USFWS, 2003). Unit 15 in this area incorporates the steepest parts of Pu'u Heleakalā; on the western slope incorporating elevations above 400 to 600 ft (120 to 180 m). This part of Unit 15 includes critical habitat for an endangered species of *'akoko* (*Chamaesyce kuwaleana*; see page 33).

WAIMĀNALO GULCH EXPANSION AREA

Waimānalo Gulch (TMK: 9-2-3:072 & 073) is located along the southern slopes of the Wai'anae Mountain. It is the last gulch above the 'Ewa Plain, traveling westward, before the Wai'anae coast, lying between Kahe Gulch on the west and an unnamed gulch (part of Makaīwa watershed) on the east. The Expansion Area comprises about 60.5 acres (24 ha) of the property above the existing municipal landfill (Fig. 7).

The v-shaped gulch is narrow and incised on the order of 200 ft (60 m) into the Wai'anae mountain. The gulch margins vary from steep to very steep (Fig. 8) and show the same alternating cliff and ledge structure so apparent on the dry, leeward parts of the island. Along the bottom of the gulch is an intermittent stream.

The Waimānalo Gulch Expansion Area was surveyed for this report. The general route taken by the biological team is indicated in Fig. 9 from the recorded waypoints as described under Methods, above, in this case transferred onto a satellite image after plotting on a topographic map. The actual route taken by the team was more convoluted than is shown on the map. The results of the floristic survey are summarized in Table 2: a listing of species observed and their relative abundances as recorded by the survey team.

The vegetation of the expansion area is fairly homogeneous, consisting of grassed slopes with scattered *kiawe* trees. In places, especially along the

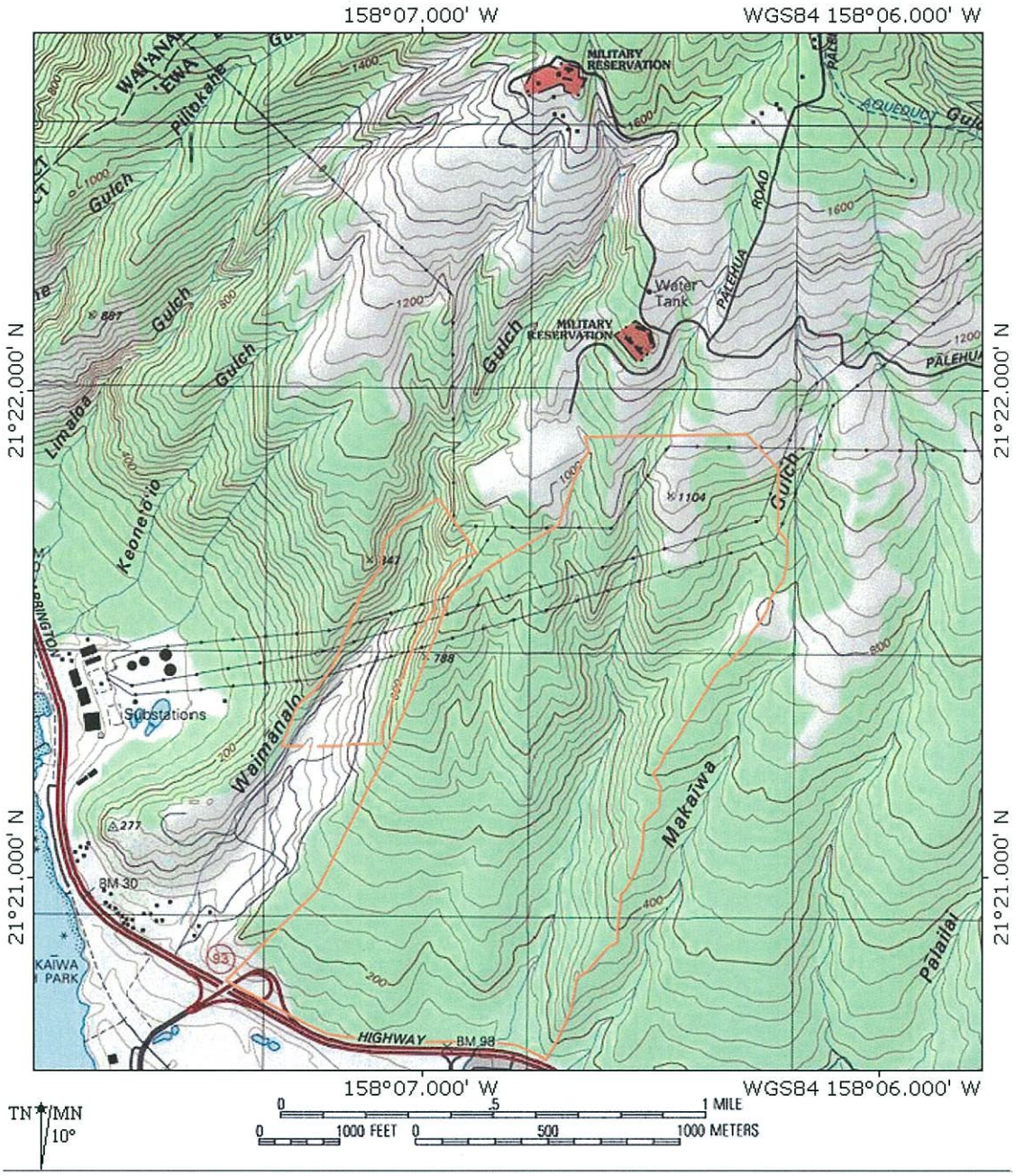

Figure 7. Topographic map showing the Waimānalo Gulch expansion area and Makaīwa Gulch parcel.

bottom and eastern slope of the gulch, the trees form an open forest grading to savannah. The grass is predominantly Guinea grass (*Panicum maximum*),although near the ridgelines, buffel grass (*Cenchrus ciliaris*) becomes the dominant species, and in one area along the top of the western

ridge, native pili grass (*Heteropogon contortus*) is abundant in large patches. *Kiawe*, *klu* (*Acacia farnesiana*), and *koa-haole* dominate the scrub-shrub and tree components of the vegetation, which are relatively sparse on the upper slopes particularly, and made more so by recent fires that have burned across portions of the property and destroyed many of the *kiawe* trees. Crude roads have been bulldozed into the gulch, and these are marked by a diverse assemblage of weedy plants (see Note 1 in Table 2).

Figure 8. Steep, rocky terrain typifies most of the Waimānalo Gulch Expansion Area. In the background (down slope) can be seen the upper end of grading operations at the existing municipal landfill

A total of 50 species were recorded from the proposed Expansion Area. Of these, only 6 species (12%) are indigenous species (plants native to Hawai`i, but found elsewhere as natives as well). Lowland sites on O'ahu typically have between 6 and 12% of the species present as natives. Thus, the percentage of natives in lower Waimānalo Gulch is better than might be expected, although not special. All of the species are widely encountered on leeward O'ahu; none is considered rare or threatened. The only unusual botanical resource encountered was several large patches of *pili* grass across a broad shoulder of the ridge between Waimānalo Gulch and Kahe

Gulch at the 600 ft (180 m) elevation. *Pili* grass may be locally abundant because there is no longer any grazing of cattle in this particular area.

Table 2. Listing of plants (flora) for the Waimanalo Gulch expansion area, west O'ahu, Hawai'i

Species listed by family	Common name	Status	Abundance	Notes
	FLOWERING PLANTS			
	DICOTYLEDONES			
AMARANTHACEAE				
Amaranthus spinosus L.	Spiny amaranth	Nat.	U	(1)
Amaranthus virdis L.	slender amaranth	Nat.	R	
ASCLEPIADACEAE				
Stapelia gigantea N.E. Brown	giant toad plant	Nat.	U	
ASTERACEAE (COMPOSITAE)				
Agerarum conyzoides L.	*maile honohono*	Nat.	U2	(1)
Bidens cynapiifolia Kunth	---	Nat.	R	
Emilia fosbergii Nicolson	*pualele*	Nat.	O2	(1)
Pluchia carolinensis (Jacq.) G. Don	sourbush	Nat.	U	
Sonchus oleraceus L.	sow thistle	Nat.	O2	
Tridax procumbens L.	coat buttons	Nat.	U3	(1)
Verbesina enceliodes (Cav.) Benth. & Hook.	golden crown-beard	Nat.	R	
CACTACEAE				
Opuntia ficus-indica (L.) Mill.	*pänini*	Nat.	R	
CHENOPODIACEAE				
Atriplex cf. *suberects* Verd.	saltbush	Nat.	R	
CONVOLVULACEAE				
Ipomoea obscura (L.) Ker-Gawl.	---	Nat.	U	
Merremia aegyptia (L.) Urb.	hairy merremia	Nat.	C	
CUCURBITACEAE				
Momordica charantia L.	balsam pear	Nat.	U	
EUPHORBIACEAE				
Chamaesyce hirta (L.) Millsp.	garden spurge	Nat.	O2	
Ricinus communis L.	castor bean	Nat.	U	
FABACEAE				
Acacia farnesiana (L.) Willd.	*klu*	Nat.	C	
Crotalaria incana L.	fuzzy rattlepod	Nat.	U	
Crotalaria pallida Aiton	smooth rattlepod	Nat.	O3	(1)
Desmanthus virgatus (L.) Willd.	virgate mimosa	Nat.	C	
Leucaena leucocephala (Lam.) deWit	*koa haole*	Nat.	C	
Indigofera suffruticosa Mill.	indigo	Nat.	U	
Macroptilium atropurpureum (DC) urb.	---	Nat.	C	(1)

Table 2 (continued).

Species listed by family	Common name	Status	Abundance	Notes
FABACEAE (continued)				
Macroptilium lathyroides (L.) Urb.	cow pea	Nat.	U	
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	*kiawe*	Nat.	O	(2)
LAMIACEAE				
Hyptis pectinata (L.) Poit.	comb hyptis	Nat.	R	(1)
Leonotis nepetifolia (L.) R. Br.	lion's ear	Nat.	A	(1)
MALVACEAE				
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	Nat.	O	
Abutilon incanum (Link) Sweet	*ma'o*	**Ind.**	C	
Malvastrum coromandelianum (L.) Garck	false mallow	Nat.	U	(1)
Sida fallax Walp.	*`ilima*	**Ind.**	O	
NYCTAGINACEAE				
Boerhavia acutifolia (Choisy) J.W. Moore	*alena*	**Ind.**	U	
PLUMBAGINACEAE				
Plumbago zeylanica Lam.	*'ilie'e*	**Ind.**	U	
PAPAVERACEAE				
Argemone sp.	prickly poppy	???	R	(3)
PASSIFLORACEAE				
Passiflora foetida L.	love-in-a-mist	Nat.	R	
PORTULACACEAE				
Portulaca oleracea L.	Pigweed	Nat.	U	
SOLANACEAE				
Nicandra physalodes (L.) Gaertn.	apple of Peru	Nat.	R	
Nicotiana glauca R.C. Graham	tree tobacco	Nat.	C	(1)
Solanum americanum Mill.	*pöpolo*	**Ind.**	R	
Solanum lycopersicum var. *cerasiforme* (Dunal) Spooner, G. Anderson,& Jansen	wild cherry tomato	Nat.	R	
STERCULIACEAE				
Waltheria indica L.	*`uhaloa*	Nat..	C	
VERBINACEAE				
Stachytarpheta jamaicensis (L.) Vahl.	Jamaican vervain	Nat.	R	
MONOCOTYLEDONES				
COMMELINACEAE				
Commelina benghalensis L.	hairy *honohono*	Nat.	R	
POACEAE				
Cenchrus ciliaris L.	buffelgrass	Nat.	AA	
Chloris barbata (L.) Sw.	swollen fingergrass	Nat.	U2	

Table 2 (continued).

Species listed by family	Common name	Status	Abundance	Notes
POACEAE (continued)				
Heteropogon contortus (L.) P. Beauv, ex Roem. & Schult.	*pili* grass	**Ind.**	U3	
Melinus repens (Willd.) Zizka	Natal redtop	Nat.	O2	
Panicum maximum Jacq.	Guinea grass	Nat.	AA	
Paspalum sp.			R1	(1)

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nat. = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.

ABUNDANCE AREAS:
Expansion Area is treated as one plant assemblage or association.

ABUNDANCE CODES:
R – Rare; seen in only one or perhaps two locations.
U – Uncommon; seen at most in several locations
O – Occasional; seen with some regularity
C – Common; observed numerous times during the survey
A – Abundant; found in large numbers; may be locally dominant.
AA - Very abundant; abundant and dominant; defining vegetation type.

Numbers following an occurrence rating indicate clusters within the survey area. The ratings above provide an estimate of the likelihood of encountering a species within the specified survey area; numbers modify this where abundance, as encountered, tends to be greater than the occurrence rating:
1 – several plants present
2 - many plants present
3 – locally abundant

NOTES:
(1) – Especially abundant in disturbed areas as along rough graded road into valley.
(2) – Previously more common, but many burned trunks now present.
(3) – Plant lacking flowers or fruit.

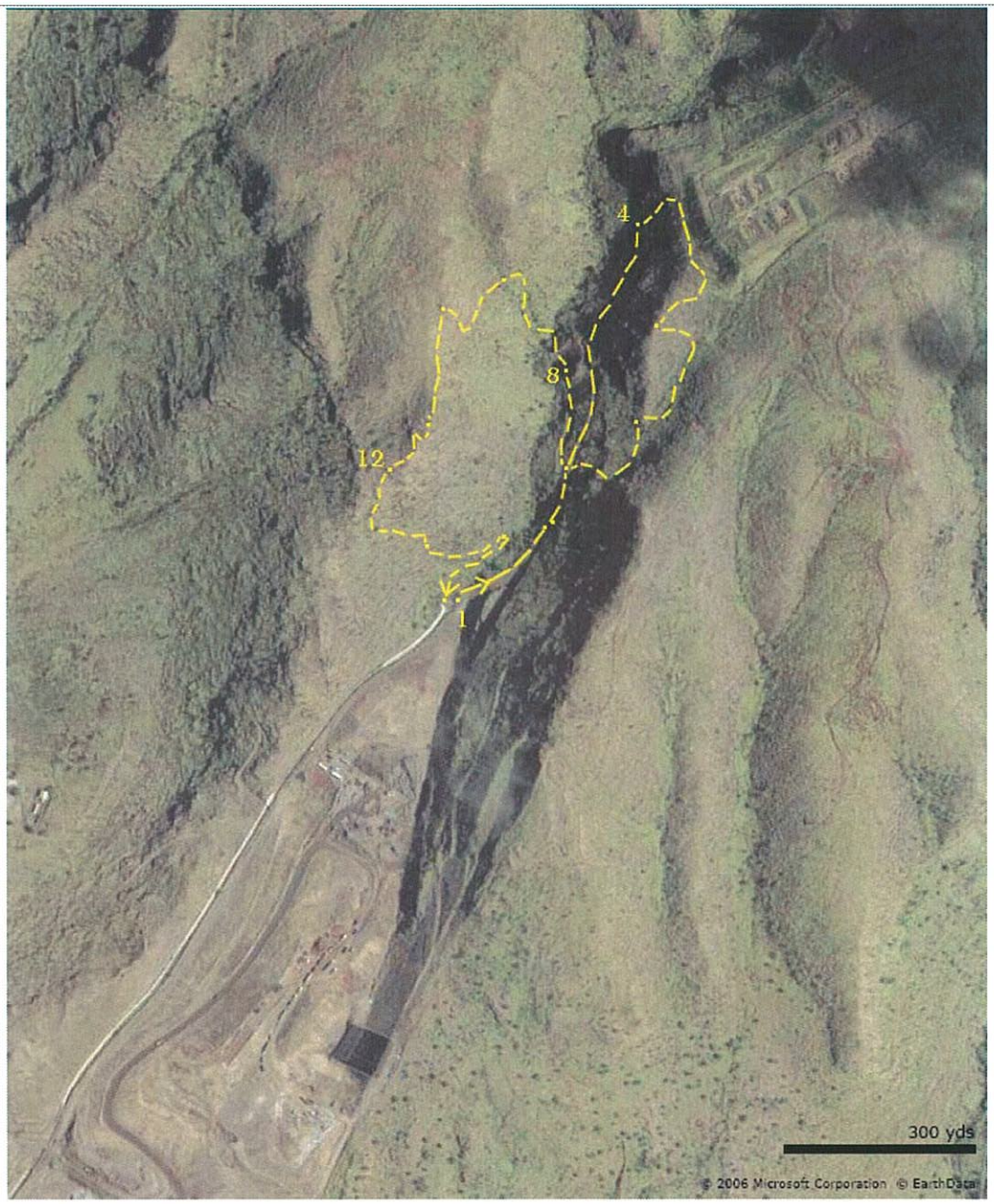

Figure 9. Satellite image of the Waimanalo Gulch landfill and proposed expansion area further upslope, showing general route taken during the botanical survey. Selected waypoints are numbered.

MAKAĪWA GULCH

Makaīwa Gulch (TMK: 9-2-3) is located along the southern slopes of the Wai'anae Mountain directly east of Waimanalo Gulch. The proposed site actually is a parcel encompassing two unnamed gulches between Makaīwa Gulch on the west and Waimanalo Gulch on the east (Fig. 7), within which a 338 ac (137 ha) area (essentially the eastern of the two unnamed gulches) was selected as an optional location for a municipal landfill. This gulch has generally less severe side slopes than nearby Waimānalo Gulch (Fig. 10).

Figure 10. The unnamed gulch (proposed landfill site) immediately west of Makaīwa Gulch photographed in the early morning.

Because this land is part of the land-owners long-range plans for expansion of the Makakilo residential area (to be called Makaīwa Hills), various surveys have been undertaken on the property, including botanical surveys in 1990 (Char, 1990b) and 2005 (David and Guinther, 2006b). A flora listing from the latter survey (and including plants observed only in 1990) is provided herein as Table 3.

Table 3. Listing of plants (flora) for the Makaīwa Gulch Site on west O'ahu, Hawai'i (after David & Guinther, 2006 and Char, 1990b).

Species listed by family	Common name	Status	Abundance	Notes
	FERNS			
PTERIDACEAE				
Doryopteris decipiens (Hook.) J. Sm.	*kumuniu*	**End.**	--	(1)
	FLOWERING PLANTS			
	DICOTYLEDONES			
ACANTHACEAE				
Asystasia gangetica (L.) T. Anderson	Chinese violet	Nat.	U	
AIZOACEAE				
Trianthema portulacastrum L.	---	Nat.	O	
AMARANTHACEAE				
Achyranthes aspera L.	---	Nat.	--	(1)
Amaranthus spinosus L.	spiny amaranth	Nat.	--	(1)
Amaranthus viridis L.	slender amaranth	Nat.	U	
ANACARDIACEAE				
Schinus terebinthefolius Raddi	Christmasberry	Nat.	R	
ARALIACEAE				
Schefflera actinophylla (Endl.) Harms.	octopus tree	Nat.	--	(1)
ASCLEPIADACEAE				
Crypyostegia grandiflora (Roxb.) R.Br.	Indian rubber vine	Nat.	--	(1)
Stapelia gigantea N.E. Brown	carrion flower	Nat.	O	
ASTERACEAE (COMPOSITAE)				
Acanthospermum australe (Loefl.) Ktze.	spiny-bur	Nat.	--	(1)
Ageratum conyzoides L.	*maile hohono*	Nat.	R	
Ambrosia artemisiifolia L.	common ragweed	Nat.	--	(1)
Bidens cynapiifolia Kunth	---	Nat.	O	
Bidens pilosa L.	---	Nat.	--	(1)
Calyptocarpus vialis Less.	---	Nat.	O	
Conyza bonariensis (L.) Cronq.	horseweed	Nat.	R	
Eclipta prostrata (L.) L.	---	Nat.	R	
Emilia fosbergii Nicolson	*pualele*	Nat.	U	
Lactuca serriola L.	prickly lettuce	Nat.	--	(1)
Lipochaeta lobata (Gaud.) DC	*nehe*	**End.**	--	(1)
Pluchia carolinensis (Jacq.) G. Don	sourbush	Nat.	U	
Pluchea indica (L.) Less.	Indian fleabane	Nat.	--	(1)
Sonchus oleraceus L.	sow thistle	Nat.	R	
Tridax procumbens L.	coat buttons	Nat.	U	
Verbesina enceliodes (Cav.) Benth. & Hook.	golden crown-beard	Nat.	U	

Table 3 (continued).

Species listed by family	Common name	Status	Abundance	Notes
ASTERACEAE (continued)				
Vernonia cinerea var. *parviflora* (Reinw.) DC	little ironweed	Nat.	--	(1)
Xanthium strumarium L.	*kikiana,* cockleburr	Nat.	R	
BRASSICACEAE				
Lepidium virginicum L.	peppergrass	Nat.	--	(1)
CACTACEAE				
Opuntia ficus-indica (L.) Mill.	*panini*	Nat.	R	
CAPPARACEAE				
Cleome gynandra L.	wild spider flower	Nat.	R	
CHENOPODIACEAE				
Atriplex semibaccata R. Br.	Australian saltbush	Nat.	--	(1)
Atriplex suberecta Verd.	---	Nat.	O	
Chenopodium carinatum R. Br.	---	Nat.	U	
Chenopodium murale L.	*`aheahea*	Nat.	--	(1)
CLUSIACEAE				
Clusia rosea Jacq.	copey	Nat.	--	(1)
CONVOLVULACEAE				
Ipomoea cairica (L.) Sweet	*koali `ai*	**Ind.**	U	
Ipomoea obscura (L.) Ker-Gawl.	---	Nat.	O	
Merremia aegyptia (L.) Urb.	hairy merremia	Nat.	O	
CUCURBITACEAE				
Coccinia grandis (L.) Voigt.	scarlet-fruited gourd	Nat.	R	
Cucumis dipsaceus Ehrenb. ex Spach	teasel gourd	Nat.	--	(1)
Momordica charantia L.	balsam pear	Nat.	U	
EUPHORBIACEAE				
Chamaesyce hirta (L.) Millsp.	garden spurge	Nat.	U	
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	Nat.	--	(1)
Euphorbia heterophylla L.	*kaliko*	Nat.	U	
Phyllanthus debilis Klein ex Willd.	niruri	Nat.	--	(1)
Ricinus communis L.	castor bean	Nat.	U	
FABACEAE				
Acacia confusa Merr.	Formosan koa	Nat.	--	(1)
Acacia farnesiana (L.) Willd.	*klu*	Nat.	A	
Chamaecrista nictitans (L.) Moench.	*lauki*	Nat.	U	
Crotalaria incana L.	fuzzy rattlepod	Nat.	--	(1)
Crotalaria pallida Aiton	smooth rattlepod	Nat.	O	
Desmanthus pernambucanus (L.) Thellung	virgate mimosa	Nat.	U	
Desmodium tortuosum (Sw.) DC	Florida beggarweed	Nat.	--	(1)

Table 3 (continued).

Species listed by family	Common name	Status	Abundance	Notes
FABACEAE (continued)				
Indigofera suffruticosa Mill.	indigo	Nat.	--	(1)
Leucaena leucocephala (Lam.) deWit	*koa haole*	Nat.	C	
Macroptilium atropurpureum (DC) Urb.	---	Nat.	R	
Macroptilium lathyroides (L.) Urb.	cow pea	Nat.	U	
Mimosa pudica L.	sensitive plant	Nat.	--	(1)
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	*kiawe*	Nat.	A	
Senna surattensis (N.L. Burm.) H. Irwin & Barneby	*kolomana*	Nat.	R	
GENTIANACEAE				
Centaurium erythraea Raf.	bitter herb	Nat.	--	(1)
LAMIACEAE				
Hyptis pectinata (L.) Poit.	comb hyptis	Nat.	O	
Hyptis suaveolens (L.) Poit.	---	Nat.	--	(1)
Leonotis nepetifolia (L.) R. Br.	lion's ear	Nat.	U	
Ocimum basilicum L.	wild basal	Nat.	O	
MALVACEAE				
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	Nat.	R	
Abutilon incanum (Link) Sweet	hoary abutilon	**Ind.**	O	
Malva parviflora L.	cheese weed	Nat.	R	
Malvastrum coromandelianum (L.) Garck	false mallow	Nat.	U	
Sida ciliaris L.	---	Nat.	O	
Sida fallax Walp.	*`ilima*	**Ind.**	AA	
Sida rhombifolia L.	Cuba jute	Nat.	U	
Sida spinosa L.	prickly sida	Nat.	R	
MORACEAE				
Ficus microcarpa L. f.	Chinese banyan	Nat.	--	(1)
MYRTACEAE				
Eucalyptus sp.	gum tree	Nat.	--	(1)
Syzygium cumini (L.) Skeels	Java plum	Nat.	R	
NYCTAGINACEAE				
Boerhavia acutifolia (Choisy) J.W. Moore	*alena*	**Ind.**	O	
PAPAVERACEAE				
Argemone glauca (Nutt. ex Prain) Pope	*pua kala*	**End.**	--	(1)
PASSIFLORACEAE				
Passiflora foetida L.	running pop	Nat.	U	
Passiflora suberosa L.	*huehue-haole*	Nat.	--	(1)
PLUMBAGINACEAE				
Plumbago zeylanica L.	*'ilie'e*	**Ind.**	R	

Table 3 (continued).

Species listed by family	Common name	Status	Abundance	Notes
PORTULACACEAE				
Portulaca oleracea L.	pigweed	Nat.	U	
PROTEACEAE				
Grevillea robusta A. Cunn. ex R.Br.	silk oak	Nat.	R	
RUBIACEAE				
Hedyotis corymbosa (L.) Lam.	---	Nat.	R2	
Spermacoce assurgens Ruiz & Pav..	buttonweed	Nat.	R	
SAPINDACEAE				
Dodonaea viscosa Jacq.	*a'ali'i*	**Ind.**	--	(1)
SOLANACEAE				
Solanum lycopersicum var. *cerasiforme* (Dunal) Spooner, G. Anderson,& Jansen	wild cherry tomato	Nat.	--	(1)
Nicandra physalodes (L.) Gaertn.	apple of Peru	Nat.	--	(1)
Solanum americanum Mill.	*popolo*	**Ind.**	--	(1)
Solanum linnaeanum Hepper & P. Jaeger	apple-of-Sodom	Nat.	--	(1)
STERCULIACEAE				
Waltheria indica L.	*'uhaloa*	Nat..	C	
VERBENACEAE				
Lantana camara L.	lantana	Nat.	R	
Stachytarpheta australis Moldenke		Nat.	O	
Stachytarpheta cayennensis (Rich.) Vahl.	nettle-leaved vervain	Nat.	--	(1)
Stachytarpheta jamaicensis (L.) Vahl.	smooth vervain	Nat.	R	
Verbena littoralis Kunth	*oi*	Nat.	--	(1)
MONOCOTYLEDONES				
AGAVACEAE				
Agave sisalana Perrine	sisal	Nat.	R	
CYPERACEAE				
Cyperus rotundus L.	nutgrass	Nat.	--	(1)
COMMELINACEAE				
Commelina benghalensis L.	hairy honohono	Nat.	U	
POACEAE				
Bothriochloa pertusa (L.) A. Camus	pitted beardgrass	Nat.	A	
Brachiaria mutica (Forssk.) Stapf	California grass	Nat.	--	(1)
Cenchrus ciliaris L.	buffelgrass	Nat.	AA	
Chloris barbata (L.) Sw.	swollen fingergrass	Nat.	C	
Chloris radiata (L.) Sw.	radiate fingergrass	Nat.	--	(1)
Cynodon dactylon (L.) Pers.	Bermuda grass	Nat.	--	(1)
Digitaria ciliaris (Retz.) Koeler	crabgrass	Nat.	--	(1)

Table 3 (continued).

Species listed by family	Common name	Status	Abundance	Notes
POACEAE (continued)				
Digitaria insularis (L.) Mez. ex Ekman	sourgrass	Nat.	--	(1)
Digitaria setigera Roth	*kukaipua'a*	**Ind.**	--	(1)
Echinochloa colona (L.) Link	jungle-rice	Nat.	R	
Eleusine indica (L.) Gaertn.	beach wiregrass	Nat.		
Eragrostis cf. *tenella* (L.) R & S	lovegrass	Nat.	O	
Eragrostis sp.			U	
Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult.	*pili*, pili grass	**Ind.**	--	(1)
Melinus repens (Willd.) Zizka	Natal redtop	Nat.	O	
Panicum maximum Jacq.	Guinea grass	Nat.	AA	
Panicum maximum var. *trichoglume* Eyles ex Robyns	Guinea grass	Nat.	--	(1)
Paspalum sp.		Nat.	R	
Setaria verticillata (L.) P. Beauv.	bristly foxtail	Nat.	--	(1)
Sporobolus sp.	---	Nat.	U	

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R – Rare; seen in only one or perhaps two locations.
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O – Occasional; seen with some regularity
C – Common; observed numerous times during the survey
A – Abundant; found in large numbers; may be locally dominant.
AA - Very abundant; abundant and dominant; defining vegetation type.

NOTES:
(1) – Especially abundant in disturbed areas as along unpaved road into valley.
(2) – Prev iously more common, but many burned trunks now present.
(3) – Plant lacking flowers or fruit.

Char (1990b) divided the vegetation on the hillside (her survey covered a wider area) into two vegetation types: (1) Grassland/Shrubland and (2) Kiawe Forest. These vegetation types were somewhat reinterpreted by David & Guinther (2006). The higher elevation slopes of the parcel are dominated by a Grassland/Shrubland of mostly Guinea grass, but several other

prominent grass species are present as well: buffelgrass, pitted beardgrasss (*Bothriochloa pertusa*), and *Chloris* spp. (not in flower at the time of the survey). Common shrubs and large herbs include *klu* (*Acacia farnesiana*), *'ilima* (*Sida fallax*), wild basal (*Ocimum basilicum*), and *'uhaloa* (*Waltheria indica*). Near the upper boundary at Pālehua Road, several tree species (e.g., Christmasberry or *Schinus terebinthifolius*) are present that increase in abundance upslope, but are not present much below the road. *Kiawe* abundance, on the other hand, increases downslope, the trees forming copses scattered around the hills and open to closed forest stands along gulch bottoms. Further downslope is an open *kiawe* forest dominated by an understory of buffelgrass, characteristic of the natural vegetation of lower slopes on leeward O'ahu.

No ferns or fern allies were observed during the 2005 plant survey, although Char (1990) earlier reported *kumuniu* (*Doryopteris decipiens*), a native species. The vegetation is comprised of flowering plants which are overwhelmingly dominated by alien plant species, especially grasses. Of the total of 72 species of plants identified as present in 2006 by David & Guinther (2006), only five (6.9%) are known from the Hawaiian Islands before the arrival of James Cook in 1778. None of these five species is considered an endemic (that is, a species unique to the Hawaiian Islands). All five are indigenous species, and therefore not likely to be of concern for future listing as threatened or endangered under either Federal or State of Hawai'i endangered species statutes. One species, hoary abutilon (*Abutilon incanum*), common in the mid-to-lower elevations on the property, is considered to be somewhat rare on O'ahu. If we consider the abundance estimates for these six native species, all but three (*'Ilima* or *Sida fallax*, hoary abutilon or *Abutilon incanum*, and *'alena* or *Boerhavia acutifolia*) are rare or uncommon in the survey area. Thus, in terms of biomass, as well as number of species, native plants are a relatively minor component of the vegetation found on the site.

Where access by cattle is restricted (and perhaps moisture regime enhanced) in the steep gulch margins, Guinea grass is especially dense and grows to a large stature. On more gentle slopes accessed by grazing cattle, the grasses tend to be cropped and erosion can be a problem, although areas of dense buffelgrass are present where cattle have not recently grazed.

Of particular interest in considering the results of the two surveys conducted in and around the proposed landfill site at Makaīwa are three endemics recorded in 1990, but not seen in 2005. These are *kumuniu* (fern; *Doryopteris decipiens*), *nehe* (*Lipochaeta lobata*), and *pua kala* (*Argemone glauca*), none of which was observed in 2005. These species were noted

mostly from the upper part of the property (near Pālehua Road, presumably). *Kumuniu* is described as a relatively common fern in dry shrublands, grasslands, and forests (Palmer, 2003). A variety of *nehe* (*L. lobata* var. *leptophylla* is a listed species (Federal Register, 1991) and known only from a few locations between Kolekole Pass and Kānehoa (Lualaulei) on the Wai`anae Mountain. This plant grows on dry to mesic cliffs, ridges, and slopes between 840 and 3208 ft (256 to 978 m) elevations (Federal Register, 2003). The more common variety—*L. l.* var. *lobata*, presumably the variety observed by Char—is found near the coast from 0 to 1300 ft (0 to 400 m) on Ni'ihau, O'ahu, and West Maui (Wagner, Herbst, and Sohmer, 1990). *Pua kala* is common in leeward parts of all the islands.

Figure 11. A significant determinant of natural vegetation at the Makaīwa Gulch, Waimānalo Gulch, and Nānākuli proposed landfill sites are frequent fires. This view looking downslope into Makaīwa Gulch was taken on August 24, 2005 from Pālehua Road at the 1500 ft (460 m) elevation.

A significant factor in determining the nature of the flora at the Nānākuli, Waimanalo Gulch, and Makaīwa Gulch sites are dry season fires that sweep over grass-covered hillsides (Fig. 11, above). The origin of many fires in these areas in recent years has been arson, although an accident caused the smaller Makaīwa Mauka fire that burned lower Pālailai Gulch in 2005

and power line electrical arching was suspected in the Nānākuli fire of 2005 (Fujimori, 2005a,b). Modern landfills, such as the existing one in Waimanalo Gulch, do not burn garbage and are not a source of accidental wildfires.

KAPA'A GULCH

Kapa'a Gulch (TMK: 4-2-015:001) is located in the District of Ko'olaupoko on the windward side of O'ahu. The proposed landfill site is a presently active basalt rock quarry operated by Ameron International Inc encompassing 391 acres (158 ha). Neither maps of the site provided showing the property nor recent USGS topographic sheets (Kaneohe and Koko Head quadrangles dated 1998) reflect the true contours of this site, which today presents a deep pit with sheer walls cut back towards Mahinui Ridge (Fig. 12).

Figure 12. In this aerial photo of the Ameron Quarry at Kapa'a, north is roughly to the left and Mahinui Ridge runs along the bottom. The large road passing left to right near the top of the photograph is the H-3 Interstate (photo by Brian Daniel, September 20, 2002).

The proposed landfill would utilize the existing quarry, shown in Fig. 13. The quarry pit is massive, certainly the largest on O'ahu. Although plants are present along the ledges above each vertical step, these ledges are planted and maintained by Ameron. Given that a municipal landfill operation in Kapa'a Valley would likely utilize the existing pit without the need to expand over undisturbed ground, and soil cover would come from existing, adjacent overburden stock piles, impacts to vegetation would be minimal.

Figure 13. Ameron International quarry pit at Kapa'a. Only minimal vegetation grows in the pit area, proposed as landfill site.

Botanical resources within Kapa'a Valley were surveyed in 2002 (Oceanit, 2002; see also Guinther, undated). In general, where undisturbed, the valley is inhabited by a mesic forest dominated by *koa haole* on the upper slopes, grading into a more diverse forest of Java plum (*Syzigium cumini*) and monkeypod (*Samanea saman*) near the valley floor. The somewhat scrubby growth of *koa haole* on the higher slopes is increasingly invaded by fiddlewood (*Citharexylum caudatum*) all along the Oneawa Hills (Mahinui Ridge). The lower half of the valley is highly disturbed, although once contained an extension of Kawai Nui marsh on the valley floor. While some wetland still remains here, much of this area is now fill land.

Plant surveys along the ridgelines of Ulumawao, the upland forming the east side of Kapa'a Valley, have revealed several native species as present: 'ūlei (*Osteomeles anthyllidifolia*), 'ākia (*Wikstroemia oahuensis*), and 'ōhi'a lehua (*Metrosideros polymorpha*; Guinther and Montgomery, pers. comm.). The latter species is particularly interesting as this species occurs as a small copse of stunted shrubs (Fig. 14) on the northern side of the highest part of Ulumawao where the peak rises to 980 ft (m). These native species might also occur on the Mahinui ridgeline above the quarry.

Figure 14. Dr. S. Montgomery inspecting *'ōhi'a lehua* blossoms for insects near the top of Ulumawao in Kailua.

PLANT RESOURCES DISCUSSION

This section of the report covers various jurisdictional issues and data bases containing information relative to special botanical resources at or near the proposed landfill sites. In addition, plant species of interest or concern are discussed in more detail as each species is brought in from a record of interest.

USFWS CRITICAL HABITAT DESIGNATIONS

Critical habitat under the Endangered Species Act of 1973 (ESA) refers to specifically bounded areas thought to be important to the conservation and recovery process of species listed under the ESA. Although federal actions within a designated critical habitat area require consultation under Section 7 of the ESA, actions by other entities also come under this requirement if the action is funded or authorized by a federal agency. All entities are subject to provisions of the ESA when it comes to actions impacting on a listed species; critical habit involves actions occurring within a designated area, whether the listed species is present or not.

A total of 22,274 ha (55,040 ac) of land on O'ahu have been designated as critical habitat for 99 species of plants. The total number of separate areas (known as "units") on O'ahu representing designated habitats for these 99 species of plants is 36.

There are no critical habitat units in the vicinity of Waimanalo Gulch, Makaīwa Gulch, or Kapa'a Valley. Closest to any of these three sites is Unit 16, encompassing much of the south slopes of Nānākuli Valley between about 400 and 1500 ft (120 to 460 m), designated as critical habitat for *Isodendrion pyrifolium.*, a species last seen on O'ahu in 1870 (Wagner, Herbst, & Sohmer, 1990). The ridgeline representing the southernmost extent of Unit 16 is just over 1 mi (1.8 km) from the northwest ridgeline bounding the Waimanalo Gulch parcel. No part of any proposed site overlaps into a critical habitat unit (Federal Register, 2003). However, critical habitat units are close to the proposed Mā'ili and Nānākuli sites.

The proposed Mā'ili site is near Units 12, 13, and 14. Unit 12 encompasses Pāhe'ehe'e Ridge and Mauna Kūwale as designated for *Chamaesyce kuwaleana.* This unit is about 2 mi (3.2 km) north of the quarry at Mā'ili. Unit 13 is located at the westernmost corner of the Naval Radio Transmitting Facility (NRTF) at Lualualei near Ma'ili'ili Stream, only a short distance west of the Mā'ili site property boundary. Both Unit 13 and nearby Unit 14 are designated for the fern, *Marsilea villosa.* Unit 14 is

located just inside the southern boundary of the NRTF Lualualei approximately 0.5 mi (0.8 km) southeast of the Mā'ili quarry site.

The proposed Nānākuli Site is near Critical Habitat Units 14 and 15. As described above, Unit 14 is located just inside the southern boundary of the NRTF Lualualei—0.75 mi (1.2 km) northwest of the closest part of the proposed Nānākuli Site. Unit 15 covers an extensive area of the uplands surrounding Lualualei Valley above 500 ft (150 m). A portion of this designated unit is directly upslope of the Nānākuli Site, encompassing the upper slopes of Pu'u Heleakalā. Although 39 species of listed plants have some part of Unit 15 designated as critical habitat, only *Chamaesyce kuwaleana*, has critical habitat on Pu'u Heleakalā. The area proposed for the landfill lies mostly at the base of the western face of Pu'u Heleakalā between 60 and 120 ft (18 – 37 m) elevations (the 611 ac parcel extends up to about the 360 ft or 110 m elevation).

ENDANGERED SPECIES ACT LISTED SPECIES

The previous subsection described relationships between designated critical habitat areas on O'ahu and the five proposed landfill sites. Although no site is within any of the 36 designated critical habitat units on the Island, this fact does not preclude their being ESA listed species present on one or more of the sites. In the absence of recent site surveys for four of the five sites, endangered species presence or absence must be inferred from what is known about the sites and the distribution of those species likely to be present based upon historical data. Presumably, once a site is selected and before it is developed, a botanical survey would be undertaken, and the finding of a listed species would then subject the site development process to provisions of the Act.

A number of species are known from individual specimens or populations growing near to some of the proposed municipal landfill sites and these are discussed here.

Marsilea villosa or *'ili'ihi* is a small aquatic or semi-aquatic fern resembling a clover (Fig. 15). The fern requires periodic flooding and drying of the ground to complete its short life cycle, and thus is confined to shallow basins subjected to brief periods of flooding during the wet season. The following description is from the Recovery Plan for the *Marsilea villosa* as given by USFWS (undated):

> This fern requires periodic flooding for spore release and fertilization, then a decrease in water levels for the young plants to establish. It typically occurs in

shallow depressions in clay soil, or lithified sand dunes overlaid with alluvial clay. All reported populations occur at or below 500 feet (150 meters) elevation. While *M. villosa* can withstand minimal shading, it appears most vigorous growing in open areas.

Figure 15. The fern, *Marsilea villosa* or *'ili'ihi*, is an endangered species, here growing among grasses at O'ahu critical habitat Unit 15 on Naval Transmitting Facility property at Lualualei.

Five populations are known from three locations on O'ahu at Koko Head (2), Lualualei Naval Reservation (2), and Kealakipapa (near Makapu'u) (Palmer, 2003), although a USFWS website confusingly lists 6 locations to account for "three currently occur[ing populations] on O`ahu... (USFWS, undated).

It is possible that *'ili'ihi* could occur on the Mā'ili Site given the close proximity of known populations of this fern. Both populations are located

at topographically low points on the Base, and were perhaps more extensive before off base areas were developed. On the Base, periodic mowing of the areas appears to help maintain the populations against overgrowth by aggressive introduced species, thus extensive disturbance of the Mā'ili Site by quarrying operations cannot be cited as a reason to rule out the ferns presence there. Exclusion of grazing may be a factor in the preservation of the fern populations where they are presently found.

The author surveyed both the Nānākuli A and B sites in 1991 before the PVT landfill occupied most of the Nānākuli A site (Guinther & Miranda, 1992). *Marsilea villosa* was not recorded and no habitat suitable for this fern was observed on the Nānākuli A or B sites, the latter being mostly a sloped hillside (Fig. 5). Similarly, suitable habitat is not present at Waimanalo Gulch, Makaīwa Gulch, or Kapa'a sites.

Chamaesyce kuwaleana, is a species of *'akoko* listed as endangered (Federal Register, 1991). Critical habitat for this species has been designated in seven units. Unit 15 encompasses 454 ac (184 ha) of Pu'u Heleakalā and is thought to presently harbor 300 individual plants (USFWS, 2003). Unit 15 lies upslope of the Nānākuli site. The plant is a small shrub between 0.2 and 0.9 m (8 to 35 in) high, known only from "arid volcanic cliffs, 250 m [820 ft high], Wai'anae Mountains, and also known from one specimen from Mokumanu, Kāne'ohe, O'ahu" (Wagner, Herbst, and Sohmer, 1990).

HAWAII NATURAL HERITAGE DATABASE

The Hawaii Natural Heritage Program (HNHP) was accessed and maps showing data entries were reviewed covering the lands for at least 1 mile around each proposed site. The data base has no rare or listed species of native plants at or close to any of the five proposed landfill sites. Within a distance of 1.25 mile (2 km), the data base yields entries for some of the sites.

For the proposed Mā'ili Quarry Site, the *'ili'ihi* fern is shown occupying an area on NRTF Lualualei close to Mā'ili Stream. This is the same area designated as critical habitat for this species, and is something less than 0.5 mile from the closest edge of the quarry property. However, given the special habitat requirement of this species (see p. 31, above), more than proximity would be required for the species to be established on the Mā'ili Site.

Schiedea ligustrina is indicated as having been reported from near the peak (northeast slope) of Pu'u Heleakalā approximately 0.7 mi (1.2 km) from the Nānākuli Site. At nearly the same distance away, at Ulehawa Beach Park, two rare plant records are in the data base: *maiapilo* (*Capparis sandwichiana*) and *nehe* (*Lipochaeta lobata* var. *lobata*).

Schiedea ligustrina is an endemic shrub that grows "[s]cattered in dry forest to diverse mesic forest, often on cliffs, usually in shaded sites, (305)-640-730(-830) m, Pālehua to Pu'ulaua and Keawapilau Gulch, and Mokulē'ia, Wai'anae Mountains, O'ahu" (Wagner, Herbst, and Sohmer, 1990). *Schiedea ligustrina* is not a listed species. *Maiapilo* is uncommon on O'ahu, but also not a listed species.

Nehe (*Lipochaeta lobata*) is presently considered to be found in the wild as two distinguishable varieties (Wagner, erbst, and Sohmer, 1990). *Lipochaeta lobata* var. *leptophylla* is a listed variety (Federal Register, 1991); The few remaining plants of *L. l.* var. *leptophylla* are located above Lualualei Valley but the known elevation range of this variety is well above the properties proposed for landfill use. The lowland or coastal variety, *L. l.* var. *lobata* is not listed and not presently regarded for listing consideration.

Within roughly 1 mi (1.6 km) of the Waimānalo Gulch and Makaīwa Gulch properties, the data base indicates the now extirpated populations of *'Ewa 'akoko* (*Chamaesyce skottsbergii* var. *skottsbergii*) that once occupied land that is Barbers Point Deep Draft Harbor and associated dredge tailings. This endangered variety is no longer present in this area (David and Guinther, 2006), but is being maintained at several sites in Kalaeloa (former Barbers Point Naval Air Station).

CONCLUSIONS

The results of all botanical surveys and searches of pertinent sources of information indicate that there are no special concerns or legal constraints related to botanical resources on any of the proposed sites. Non-native or introduced species of plants clearly dominate the natural vegetation in all areas proposed for landfill use, and the remnants of native vegetation extant on or near these sites consists of generally sparse growth of a limited number of species that remain relatively common in all undeveloped lowlands around O'ahu. Although some rare native plants, and in a couple of cases, endangered species or varieties of plants, can be found within 2 km (1.2 mi) of a proposed landfill site, there is no reason to believe that the operation of a landfill at these sites would have any adverse impacts on such species.

Figure 16. Composite photo of the eastern side of Waimānalo Gulch showing the upper end of the permitted landfill area (right) with reshaping of the site underway.

The operation of a municipal solid waste landfill, by its very nature and in compliance with the most modern environmental requirements designed to minimize and contain offsite movement of pollutants, will require removal of the vegetation from the selected site. Figure 16 (above) shows the Waimānalo Gulch (existing City & County landfill) operation at the very beginning of setting up the cells into which refuse is permanently stored. Although for each site this may differ to some degree, this initial phase entails making cuts into hillsides to create room and obtain inert material for use as cover. Whatever botanical resources are present at the selected site will likely be completely removed, the only possible exceptions being

areas around the margins of a site where the terrain becomes too steep to alter. Following grading and use of the site for land-filling, surface stabilization practices will eventually include replacing the vegetation. An emphasis on utilizing appropriate native species could be followed.

It is generally the case that many rare native plants of interest (an exception is the fern, *'ili'ihi*) growing in the lowlands of O'ahu will be confined to steep gulch slopes and cliffs. In most cases, these habitats would tend not to be developed, although as Fig. 16 shows, steep gulch slopes could be incorporated into the overall reshaping of the site to a greater degree than might be the case for most other kinds of land development. At two of the proposed sites (Mā'ili Quarry and Kapa'a Quarry), the landfill would utilize existing, highly disturbed, quarry pits. The conclusion cannot be drawn that because steep, rocky gulch margins and cliff faces and ledges provide habitat for rare native plants, the two existing quarry sites (Mā'ili and Kapa'a) might then harbor special species. Rare plants occur in nearly inaccessible places because these places are not accessed by grazing cattle and, certainly in some cases, are protected from fires spreading over the landscape. The special plants hang on in these locations because the common sources of disturbance are minimized. Quarry walls and ledges are highly disturbed sites and not ideal habitat for rare native plants. These plants—in the absence of the many disturbances (including aggressive introduced species)—would populate areas today used for housing, recreation, and grazing.

This report provides information from the recent investigation of the Waimānalo Gulch site and data associated with prior investigations of the Nānākuli, Mā'ili, Makaīwa, and Kapa'a sites. There is no guarantee that some small number of specimens of a listed species might be present at one or another of the proposed sites that have not been subjected to a recent survey. Should one or more of these sites be selected for landfill use, additional botanical surveys should be conducted as deemed practical to better establish the conclusion of no adverse impacts on listed species. The desirability of doing such a future survey or surveys will depend upon habitat present at the site, proximity of the site to known populations of endangered species, and how recently and completely past botanical surveys covered the site. For assessment purposes, this report should suffice to cover any such concerns involving investigation of the Waimānalo Gulch site.

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Appendix F

Survey of the Avifaunal and Feral Mammals for the Proposed Waimānalo Gulch Landfill Expansion Project, O'ahu, 2007

SURVEY OF THE AVIFAUNA AND FERAL MAMMALS FOR THE PROPOSED WAIMANALO GULCH LANDFILL EXPANSION PROJECT, OAHU

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INTRODUCTION

The purpose of this report is to present the findings of a bird and mammal field survey, conducted on 26 September 2006 at Waimanalo Gulch, Leeward Oahu. This same area was previously surveyed (Bruner 1999). Data from the earlier study is also given in this report for comparison purposes, along with references to pertinent literature and unpublished reports since 1999.

The objectives of the field survey were to:

1- Document what bird and mammal species currently occur on the property.

2- Provide comparative data on the relative abundance of each species.

3- Determine the presence or likely occurrence of native or migratory birds, those that are listed as endangered or threatened.

4- Determine if the habitats on this site are comparable with that seen in 1999.

SITE DESCRIPTION

The proposed expansion area is located in a narrow "V" shaped valley with a dry stream bed that only contains water during flash flood events. Introduced vegetation continues to dominate the plant communities at this site. Many of the trees that were present in 1999 were burned in the August 2005 fire that ravaged this region. Most of the surviving trees are along the stream bed. Dry grass covers most of the site.

Weather during the survey was clear and warm. Winds were from the east at 10-15mph.

STUDY METHODS

The site was walked using the same access road as in 1999. I also continued on mauka from the end of the road to an old fence that crossed the valley. Field observations were made with the aid of binoculars and by listening for vocalizations.

All birds seen or heard were tallied. These data provide the basis for the relative abundance estimates given in Table One. Data from the 1999 survey are also given for comparison. Observations of feral mammals were limited to visual sightings. No attempts were made to trap mammals in order to obtain data on their relative abundance and distribution.

Scientific names of birds and mammals used in this report follow those given in Checklist of the Birds of Hawaii (Pyle 2002) and Mammal Species of the World (Honacki et al. 1982). These sources use names cited in the most current scientific literature.

RESULTS AND DISCUSSION

Resident Endemic (Native) Birds:

As was the case in 1999 no native land birds were recorded on the survey. The Hawaiian Owl or Pueo (*Asio flammeus sandwichensis*) is listed as endangered by the State of Hawaii on the island of Oahu. This species was not recorded on the survey but may forage in this area. Since 1999 I have observed Pueo in Leeward Oahu at locations only a few miles on either side of this property. Pueo hunt over grasslands as well as forests and nest on the ground in tall grass (Pratt et al. 1987, Hawaii Audubon Society 2005).

Migratory Indigenous (Native) Birds:

No migratory shorebirds were recorded on the survey. This area lacks suitable habitat for these species.

Resident Indigenous (Native) Seabirds:

No seabirds were observed. The White-tailed Tropicbird (*Phaethon lepturus*) can be seen soaring above valleys and over ridges on Oahu. This species is not endangered or threatened.

Resident (Native) Waterbirds:

The stream only contains water during flash floods. No waterbirds would be expected at this site.

Exotic (Introduced) Birds:

Only nine species of exotic birds were recorded during the course of the field survey compared with 13 species in 1999. The array of species was comparable to that observed on other surveys in similar habitat (Bruner 1989, 1990a, 1990b, 1992, 1993, 1996, 1999, 2000, 2001a, 2001b, 2002, 2003). Table One gives the relative abundance of each species recorded on the 1999 and 2006 survey. None of these species are listed as endangered or threatened.

Feral Mammals:

The only feral mammal observed was the Small Indian Mongoose (*Herpestes auropunctatus*). Two were seen in the stream bed. Rats (*rattus sp.*) and Mice (*Mus musculus*) were not seen but probably occur on this site. The endemic and endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) is rarely seen on Oahu (Tomich 1986, Kepler and Scott 1990). No bats were observed on the survey. This species is known to roost solitarily in trees and forages for flying insects (Jacobs 1993). They use a variety of habitats including native forests, ranchlands, ponds and bays as well as urban areas (Jacobs 1991, Reynolds et al. 1998).

CONCLUSIONS

The absence of native and migratory birds on this property is not unexpected given the elevation and available habitats. The Pueo (Hawaiian Owl) might forage on occasion in this region. All of the birds recorded in 1999 and on this survey were alien (non-native, introduced) species. The fact that there were fewer alien species and lower relative abundance on this 2006 survey may be due to the August 2005 fire which had a major impact on this habitat. Other factors may also account for the differences in bird populations between 1999 and 2006 (Williams 1987, Moulton 1990). In conclusion this site is not remarkable in either the array or number of birds and mammals. There are no unique habitats. Similar areas occur all along the leeward side of Oahu.

TABLE 1

Alien (introduced) species of birds recorded on and near the site of the proposed Waimanalo Gulch Landfill Expansion, Oahu during the 1999 and 2006 field surveys.
Relative abundance estimates are based on total numbers of birds recorded:
A = abundant (30-50); C = common (15-29); R = rare (1-4).
Species not recorded are indicated by a (-).

Common Name	**Scientific Name**	**Relative Abundance**	
		1999	**2006**
Cattle Egret	*Bubulcus ibis*	U	R
Erckel Francolin	*Francolinus erckelii*	R	-
Rock Dove	*Columba livia*	C	-
Spotted Dove	*Streptopelia chinensis*	A	C
Zebra Dove	*Geopelia striata*	C	U
Red-vented Bulbul	*Pycnonotus cafer*	A	R
Common Myna	*Acridotheres tristis*	A	U
Japanese White-eye	*Zosterops japonicus*	R	C
Northern Cardinal	*Cardinalis cardinalis*	R	R
House Finch	*Carpodacus mexicanus*	U	-
Common Waxbill	*Estrilda astrild*	A	C
Red Avadavat	*Amandava amandava*	-	R
Nutmeg Mannikin	*Lonchura punctulata*	U	-
Java Sparrow	*Padda oryzivora*	R	-

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REPORT OF POTENTIAL BIRDS AND MAMMALS AT FOUR PROPOSED ALTERNATIVE LANDFILL SITES ON OAHU

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INTRODUCTION

The purpose of this report is to provide a guideline of the potential birds and mammals that might be found on a field survey of each of the four proposed alternative landfill sites on Oahu. In addition, any potential problems associated with a landfill and native or migratory birds on or nearby the sites is noted.

MAILI SITE

Native Birds:

None would be expected on this site due to its location, lack of appropriate habitats and current land use.

Migratory Birds:

The potential species that might forage at this site, provided there is open habitat is the Pacific Golden-Plover or Kolea (*Pluvialis fulva*). This species often forages on lawns and fallow agricultural lands. It is not endangered or threatened. They spend the non-breeding season (August – April) in Hawaii and nest in western Alaska during June – July.

Alien (Non-native, Introduced) Birds:

Without actually surveying the site it is impossible to provide a complete and accurate accounting of alien birds on this site. Nevertheless some of the more common species likely to be found on or near this area include:

Spotted Dove (*Streptopelia chinensis)*

Zebra Dove (*Geopelia striata*)

Red-vented Bulbul (*Pycnonotus cafer*)

Common Myna (*Acridotheres tristis*)

House Finch (*Carpodacus mexicanus*)

Common Waxbill (*Estrilda astrild*)

NANAKULI B SITE

Native Birds:

The only native bird that might forage on or around this site is the Hawaiian Owl or Pueo (*Asio flammeus sandwichensis*). The Oahu population of this species is listed as endangered by the state of Hawaii. They forage over a variety of habitats included lands such as the Nanakuli B site and area up slope of this property. I have seen Pueo as

recently as three years ago in the general area of this proposed alternative landfill site. Pueo forage in a wide variety of natural and disturbed habitats.

Migratory Birds:

The only migrant that might be expected in large open spaces free of brush and high grass is the Pacific Golden-Plover or Kolea (*Pluvialis fulva*).

Alien (Non-native, Introduced) Birds:

The most likely common species are:

Spotted Dove (*Streptopelia chinensis*)

Zebra Dove (*Geopelia striata*)

Red-vented Bulbul (*Pycnonotus cafer*)

Common Myna (*Acridotheres tristis*)

Japanese White-eye (*Zosterops japonicus*)

House Finch (*carpodacus mexicanus*)

Common Waxbill (*Estrilda astrild*)

Game Birds such as Erckel Francolin (*Francollinus erckelii*) and Gray Francolin (*Francolinus pondicerianus*) may also occur in the steeper areas above the site.

MAKAIWA GULCH SITE

Native Birds:

Aside from the Pueo (Hawiian Owl) no native birds likely would be found at this site.

Migratory Birds:

The only migratory bird that could occur on the property is the Pacific Golden-Plover.

Alien (Non-native, Introduced) Birds:

This site is so similar in habitat, topography and elevation to the Waimanalo Gulch site that the list of alien species that probably occur on or near this area would coincide with that obtained in the 1999 and the current 2006 faunal field surveys of Waimanalo Gulch. The relative abundance of these species might vary a little between the two sites.