Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)

City and County of Honolulu, Hawai'i

September 2012

Department of Environmental Services
Refuse Division
City and County of Honolulu

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Section 1 – Executive Summary

1.1 Introduction

This report summarizes the efforts of the volunteer Mayor's Advisory Committee on Landfill Site Selection (Committee) to identify and rank potential landfill sites for consideration by the City and County of Honolulu (City). The guidance provided by the Committee will be used by the City as it moves forward with technical studies and analyses, including the preparation of an Environmental Impact Statement (EIS) for a new landfill site.

1.2 Need for a New Landfill Site

The provision of solid waste landfill capacity is a critical infrastructure element provided by the City to its citizens and is vital to the management of solid waste on O'ahu. A landfill is necessary for the disposal of non-combustible municipal solid waste (MSW), construction and demolition (C&D) waste, Honolulu Program of Waste Energy Recovery (H-POWER) related ash and residue, and other non-recyclable waste. A landfill is also necessary to provide a critical backup disposal site when H-POWER and other diversion facilities are unable to accept waste for processing (e.g., during periods of maintenance or repair).

The Mayor convened this Committee of volunteers pursuant to an amendment of the City's Special Use Permit granted by the State Land Use Commission (LUC) which extended the use of the Waimānalo Gulch Sanitary Landfill (WGSL) until July 2012. Condition No. 4 of the LUC decision required that the City begin to identify and develop one or more new landfill sites that shall either replace or supplement the existing WGSL.

In compliance with the LUC Condition No. 4, the City instructed the Committee that they were not to consider WGSL in their deliberations as the current WGSL could not supplement or replace itself. The City also related to the Committee that: (1) it is the City's intent to pursue the use of the WGSL until it reaches its full capacity; (2) that the sites the Committee will evaluate and rank will be considered for future use; and, (3) that the Committee's identification of landfill sites should include the provision for accepting MSW, C&D waste, and ash and residue from H-POWER.

1.3 Mayor's Landfill Site Selection Committee

The Mayor appointed a 12–member volunteer committee composed of citizens representing various communities and expertise on O'ahu. Three committee members left the Committee over the course of deliberations for personal reasons. The City decided to not replace the three members who resigned based on the number of meetings already held and the complexity of the issues covered. The final Committee of nine members provided experience and expertise from a broad range of backgrounds that included: public and community interests; State and City government; environmental and health sciences; legal and business professions; and others.

The Committee was directed by the City to undertake the following:

(1) Review a list of landfill sites identified by the City in prior studies and to select the appropriate potential sites that should be subject to further evaluation using the Committee's community-based criteria. The Committee was tasked with developing its criteria with the assistance of the Facilitator and Consultant team;

(2) Identify potential new landfill sites for consideration;

(3) Identify and develop community-based criteria that are considered most important from a community's perspective in the siting of a new landfill; and

(4) Produce a report on the results of its findings including a ranked list of sites for consideration by the City based on the application of the Committee's criteria. The

community-based nature of the criteria were those that the Committee felt would not receive the same level of attention and weight as they would in mandated technical evaluations such as cost analyses, topographic and geotechnical studies, historical and cultural sites assessments, and surveys of flora and fauna, among others that will be performed by the City in subsequent steps culminating in the preparation of an EIS.

The Committee deliberated over the course of 10 meetings between January 2011 and April 2012.

As a result of its deliberations the Committee decided to reconsider the initial list of alternative landfill sites provided by the City and requested that the consultants further investigate land uses and sites not previously considered. The outcome of this investigation is described below.

1.4 The Site Identification Process

The process of identifying landfill sites began with an inventory of approximately 43 potential landfill sites identified by the Department of Environmental Services (ENV) from the City's previous studies and investigations starting from approximately 1980. When the consultants began to evaluate these sites with exclusionary criteria such as runway airspace and others noted below it was clear there would be far fewer viable sites than suggested by the initial size of the list. The consultant discovered that many of the sites originally identified had been subsequently placed into residential development. Therefore, the majority of the 43 identified sites were no longer available for landfill use. During this period, the Committee was also asked to recommend potential new sites for consideration and inclusion in its report at this early stage of the process.

The evaluation of the remaining sites was subject to a two-step process. In the first step, the sites were evaluated against screening factors that would be used to identify sites for removal based on key attributes against which the site would no longer be considered viable. The screening factors that were used to evaluate the remaining sites included[1]:

- Protection of runway airspace
- Federal land ownership
- Conservation district designated land (any site with a Conservation district subzone other than the least restrictive General Subzone)
- Board of Water Supply (BWS) well capture zones
- Commission on Water Resource Management (CWRM) well sites
- Critical Habitats and Natural Area Reserve System (NARS) lands
- Impaired Water Bodies as designed by the Environmental Protection Agency (EPA) and Department of Health (DOH)
- Valued agricultural lands according to the Agricultural Lands of Importance to the State of Hawai'i (ALISH) and Land Study Bureau (LSB) classification systems
- Parcel contains at least one structure as noted on aerial maps (this was later removed)
- Sites located above residential subdivisions or developments (this was later removed)

[1] The screening factor, Sites located above residential subdivisions or developments was added after the Committee decided to redirect the effort to identify sites inside of the UIC/No Pass line. This screening factor was subsequently removed by the Committee during the process.

The second step involved the application of the Committee's community-based criteria. Before this step was taken the Committee noted a number of points including:

(1) The majority of the remaining sites evaluated are located outside of the Underground Injection Control (UIC)/No Pass line.

The Committee deliberated on this matter and decided it would be more encompassing to include for assessment potential landfill sites located within the UIC line and No Pass line. In its deliberations, the Committee understood City Council Resolution 03-09, Establishing A City Policy That Municipal Solid Waste Landfills Should Not Be Located Over The City's Underground Drinking Water Sources, which at that time was an important part of the City's practice to not site landfills within the UIC/No Pass line. However, the Committee also noted a landfill that is located outside an existing potable water well capture zone and that is properly designed, engineered, and operated in accordance with environmental regulatory controls and safeguards, should not adversely affect groundwater that serves a potable water system.

(2) Only one federal site, part of the Bellows Air Force Base (AFB), was identified[2].

The Committee deliberated on this matter with some committee members noting that in order to increase the number of potential sites, lands that are owned by the federal government, with the exception of lands that are known to be actively used by the military, should be included for consideration. The Committee's rationale for this inclusion was: (A) every option for the identification of potential sites should be considered. Without specifically requesting the use of federal land, there would be no way of verifying that such use would not be possible; and, (B) federal lands should still be explored because there are processes available through Congressional action that can make possible the use of non-active military lands.

(3) The City recommended that any site under consideration should be greater than 100 acres.

A 100-acre minimum site size was recommended to the Committee by the City and was originally agreed upon. However, after further deliberation the Committee felt that sites between 90 and 100 acres should also be considered to ensure that all locations that could be potentially usable are addressed. Potential sites of between 90 and 100 acres were thereafter included as a part of the site identification process.

The City considered the issues above involving the Committee's desire to include land within the UIC/No Pass line, federal lands, and the minimum site size, and determined that the Committee must be allowed to conduct its own deliberating process without undue influence.

The Committee also noted during its deliberations that the siting of a landfill is a difficult exercise and that effort should be taken to develop the most extensive list of sites possible within the various federal and state constraints. The Committee therefore expanded the list of sites that would be assessed recognizing that some of the screening factors such as those identified above should be reassessed.

This resulted in a major shift from an evaluation of the remaining sites previously identified to an evaluation of new potential landfill sites. The consultant team thereafter reevaluated the island of O'ahu utilizing a Geographic Information System (GIS) based approach. This resulted in the identification of new sites that were subjected to the same analyses as the original sites. In undertaking the GIS-based analysis the consultants noted the following:

[2] This site was later removed from consideration due to a response from the Marine Corps Base Hawai'i on February 9, 2011, indicating that the site was needed to support training requirements.

(1) A GIS-based analysis is not a substitute for a more formal evaluation of a landfill that would be performed by the City in an EIS. The undertaking of an EIS level of assessment and evaluation must be performed for the proper identification of any landfill site prior to it being developed; and

(2) A GIS-based analysis involves a desktop level of study[3]. Investigative fieldwork is not usually involved and was not performed in this instance. The analysis was based on the use of existing data available in the public domain (i.e., the State of Hawaii GIS Website and other public GIS sources), or was obtained by consulting directly with the agencies and parties with responsibility and knowledge in specific technical fields. These included the BWS, CWRM, and the DOH.

The GIS-based analysis evaluated land parcels on the island of O'ahu including locations within the UIC/No Pass line, federal lands, and sites both greater than 100 acres and between 90 and 100 acres in size. These groups were split into four analysis groups for discussion (See **Attachment B**). Approximately 465 potential sites were identified as follows:

- Group 1: 97 parcels of 100+ acres in size outside the UIC/No Pass line
- Group 2: 337 parcels of 100+ acres in size inside the UIC/No Pass line (not consistent with City policy)
- Group 3: 13 parcels of 90 to 100 acres in size outside the UIC Line and No Pass line
- Group 4: 18 parcels of 90 to 100 acres in size inside the UIC Line and No Pass line (not consistent with City policy)

After applying the screening factors described above to the 465 potential sites, 11 sites remained for further application of the Committee's community-based criteria as shown in **Table 1-1**:

Table 1-1 – List of Sites for Application of Community-Based Criteria

Site Name (Alphabetic Order)	Within UIC/ No Pass Line*	TMK[4]	Parcel Acreage	Land Ownership
Ameron Quarry	No	42015001	382	Private
Kāne'ohe by H-3	No	44012001	158	Private
Kapa'a Quarry Road	No	44011003	258	Private
Ke'eau	Yes	83001013	634	Private
Upland Hawai'i Kai	No	39010047	97	Private
Upland Kahuku 1	Yes	56008002	1,621	Federal
Upland Kahuku 2	Yes	57002001	1,529	Federal
Upland Lā'ie	Yes	55007001	2,231	Private
Upland Nānākuli 1[5]	Yes	85006011	882	Private
Upland Pupukea 1	Yes	61006001	2,177	Private
Upland Pupukea 2	Yes	61007001	1,672	Private

*Sites that intersect the UIC/No Pass Line are considered within the UIC/No Pass Line.

[3] A desktop study means that basic research will be performed using only existing data sources supplemented by consultation with experts in technical fields as applicable to the nature of the study. Fieldwork including the use of site surveys is not performed.
[4] The identities of the sites were not disclosed to the Committee members until after the application of the Committee's community-based criteria weights.
[5] At least one Committee member noted that the location of this site is in Wai'anae.

1.5 The Process of Applying the Committee's Community-Based Criteria

The Committee developed landfill siting criteria to supplement those mandated by state and federal government agencies. This enabled the comparison of key community-based considerations for a new landfill that were important to the Committee (e.g., proximity to residences, groundwater protection, and travel distances, etc.).

The Committee's criteria consisting of specific factors important to communities were applied to each of the sites by the consultant team. Working with the consultant team, the Committee arrived at a consensus as to how each of the community criteria was to be measured and evaluated. The Facilitator worked with the Committee to develop a series of weights that reflected the relative importance of each of the 19 criteria. Weight values were assigned to make it clear which criteria were more important than others from 1 to 19. The 19 community-based criteria and their scaled weights are shown in **Table 1-2**:

Table 1-2 – Community-Based Criteria and Weighting

No.	Criterion Name	Weights
1	Landfill Capacity	2.50
2	Location Relative to Educational Institutions, Health Care Facilities, or Parks and Recreation Facilities	9.85
3	Location Relative to Residential Concentrations	10.00
4	Location Relative to Visitor Accommodations	4.00
5	Location Relative to Local or Visitor Commercial Facilities	4.00
6	Effect on Established Public View Planes	2.50
7	Wind Direction Relative to Landfill Site	4.00
8	Effect on Local Roads and Traffic in Residential Neighborhoods	9.55
9	Wear and Tear on Highways and Roadways Caused by Landfill Related Traffic	1.00
10	Location Relative to Identified Community Disamenities	9.25
11	Location Relative to H-POWER	8.65
12	Effect of Precipitation on Landfill Operations	9.25
13	Landfill Development, Operation and Closure Cost	7.00
14	Land Use Displacement Cost	2.50
15	Potential for Solid Waste-Related Land Uses	1.00
16	Location Relative to Wetlands and Natural Area Reserve System Land	4.00
17	Location Relative to Listed Threatened and Endangered Species	2.50
18	Location of Surface Water Resources	8.95
19	Location of Archaeological and Culturally Significant Resources	1.00

A "dual blind" process was followed in which only the Facilitator knew both the location of the potential landfill sites and the results of the Committee's criteria weighting. Specifically:

The consultants only knew (1) the locations of the potential landfill sites under examination and (2) the raw scores that would be assigned to the criteria. The Committee did not.

The Committee knew the weights assigned to the 19 criteria they developed and did not know the locations of the landfill sites the weights would be applied.

On Friday, April 20, 2012, the Committee and the consultant team met to disclose the information each of them had known but purposefully had not shared. The intent was to preserve the integrity of the landfill siting analysis by keeping the results from being unduly influenced by issues or concerns regarding a landfill sited in a particular community (i.e., Not In My Back Yard (NIMBY) influences).

During the process of applying the criterion weights at the Committee's meeting of April 20th, an error was made. As a result of the error, the Preliminary Site Scores produced and released at the

meeting were incorrect. QA/QC procedures conducted over the weekend discovered the error and steps were taken to inform the Committee and the City and to convene a press conference to inform the public. The data error was corrected, and, at the City's request, all data in the Site Evaluation System were re-verified. On Wednesday, April 25, a corrected set of Final Site Scores was issued. The correct Final Site Scores is presented in the next section of this Report.

1.6 Committee Findings and Recommendations

The ranking of potential landfill sites identified through the Committee's process is listed below. The site locations are provided in **Figure 6-1** of this report.

Table 1-3 – Final List of Ranked Sites

Rank	Site Name (Ranked Order)	Within UIC/ No Pass Line	TMK	Parcel Acreage	Estimated Capacity (Yrs.)	Land Ownership
1	Upland Kahuku 2	Yes	57002001	1,529	>30	Federal
2	Upland Kahuku 1	Yes	56008002	1,621	25-30	Federal
3	Upland Pupukea 2	Yes	61007001	1,672	25-30	Private
4	Upland Pupukea 1	Yes	61006001	2,177	25-30	Private
5	Ameron Quarry	No	42015001	382	>30	Private
6	Upland Nānākuli 1[6]	Yes	85006011	882	>30	Private
7	Upland Lāʻie	Yes	55007001	2,231	20-25	Private
8	Keʻeau	Yes	83001013	634	25-30	Private
9	Kāneʻohe by H-3	No	44012001	158	15-20	Private
10	Upland Hawaiʻi Kai	No	39010047	97	10-15	Private
11	Kapaʻa Quarry Road	No	44011003	258	15-20	Private

The Committee offers the following findings and recommendations to its list of ranked sites:

(1) The sites identified through this process include alternative landfill sites within the UIC line/No Pass line. The Committee recognizes its identification of potential landfill sites does not conform to existing City policy as expressed in Council Resolution 03-09. However, the Committee notes the following points:

- It chose to proceed in this manner as a result of careful consideration realizing the acute shortage of remaining land on Oʻahu that is available for landfilling;
- A landfill that is located outside an existing potable water well capture zone and that is properly designed, engineered, and operated in accordance with environmental regulatory controls and safeguards should not adversely affect groundwater that serves a potable water system. Alternative landfill sites should therefore be investigated in locations not previously considered by the City; and,
- The list of original sites the Committee was asked to consider needed to be expanded on the basis that, without a change in how landfill siting is considered, the City would continue to be limited to the same list of alternative locations previously identified.

(2) The Committee also believed since land available for a landfill is limited on Oʻahu, that they should direct the Consultant to look at federal lands not known to be in active military use. These sites were added to the analysis.

(3) The Committee's process involved the identification of alternative landfill sites by the Consultant using a GIS-based system supplemented by interviews with regulatory agencies. This desktop level of study was conducted making every effort to use or obtain current

[6] At least one Committee member noted that the location of this site is in Waiʻanae.

information. However, the ranking of potential landfill sites and the findings and recommendations of this report should not be misconstrued as the final analysis that should be performed. The City must exercise due diligence by verifying the Committee's work and findings by conducting further studies as would customarily be performed in technical studies and analyses, including the preparation of an EIS for a new landfill site.

1.7 Other Recommendations

The Committee notes that it decided to expand the list of potential sites to those located within the UIC line/No Pass line as established by the DOH and BWS. The addition of these sites resulted in multiple ranked lists and included those that meet City Council Policy and those that do not, and those that meet the 100 acre minimum and those between 90 to 100 acres in size.

The Committee strongly recommends the City move aggressively to develop alternative technologies to landfilling, and continue to strengthen its waste stream diversion and recycling efforts.

The Committee also recommends that in planning, designing and selecting an operator for the next landfill site, that the City adopt a philosophy that everything that goes into the landfill may be of value and could provide a potential revenue stream for the City and operator in the future. It is also strongly recommend that this thinking be applied to the existing site with the current operator. This would require the operator to adequately map where things are disposed of such that if value can be derived from items in the future, they can be recovered.

The Committee feels that whatever site is ultimately chosen the City must consider "Host Community Benefits." The details of a benefits package should be negotiated with the affected community.

1.8 Committee Minority Report

One Committee member filed a Minority Report which was understood as the desire to modify the measurement of Criterion 8, Effect on Local Roads and Traffic in Residential Neighborhoods, to include the total distances refuse vehicles must travel to a landfill instead of limiting the analysis to the effect on local roads within residential neighborhoods.

It is recommended that this analysis be performed as the City proceeds with its next steps toward the technical evaluation of the alternative sites. The key findings of the Committee including revisiting the purpose and intent of Criterion 8, should therefore be performed as a verification step, with the results incorporated into the final decision making process.

1.9 Concluding Remark

With these findings and recommendations, the Committee anticipates the City will move forward with technical studies and analyses, including an EIS, to evaluate in detail the benefits and constraints of each site to determine the preferred alternative for a new landfill capable of serving all the communities of O'ahu.

Section 2 – Introduction

2.1 Acknowledgement of Mayor

The Mayor's Advisory Committee on Landfill Site Selection (Committee) expresses thanks to Mayor Peter Carlisle for his support and for allowing this Committee to perform the difficult task of identifying potential new landfill sites not previously considered. This Committee further objectively evaluated and ranked alternative landfill sites based on the application of criteria it developed from a community-based perspective understanding that while the selection of a landfill will serve and benefit all the communities of O'ahu, that no community desires a landfill in their back yard.

The Committee appreciates the Mayor's selection of members from the community with experience and expertise from a broad range of backgrounds. The skill sets represented by this Committee are from state and city government, and the private sector, representing disciplines that range from the environmental and health sciences; the legal, regulatory, and policy aspects of land use planning; business professions; and government and community-based groups and organizations.

The Committee believes this diversity of backgrounds and skills combined to provide an understanding of landfill planning that is an improvement over a committee comprised of only technical or only community-based experts. The Committee achieved a balance between the two and provided thoughtful points of view that are a part of this Report.

The Committee looks forward to the City's next steps in performing its due diligence to validate the pertinent information as used herein to identify potential new landfill sites, and using the results of the Committee's community-based criteria as a part of the City's site selection process for a new landfill.

2.2 Need for a New Landfill Site

The provision of solid waste landfill capacity is a critical infrastructure element provided by the City to its citizens and is vital to the management of solid waste on O'ahu. A landfill is necessary for the disposal of non-combustible municipal solid waste (MSW), construction and demolition (C&D) waste, Honolulu Program of Waste Energy Recovery (H-POWER) related ash and residue, and other non-recyclable waste. Although the City will continue to develop and advance waste recycling and reduction to reduce the need for a landfill, all alternative processes involve the generation of waste by-products that cannot be further reused, recycled, or otherwise combusted. For these forms of waste, a solid waste landfill remains at this time the most viable alternative for the handling of refuse that is available to the City.

A landfill is also necessary to provide a critical backup disposal site when H-POWER and other diversion facilities are unable to accept waste for processing such as during periods of maintenance or repair.

This volunteer Committee was convened by the Mayor pursuant to an amendment of the City's Special Use Permit granted by the State Land Use Commission (LUC) which extended the use of the Waimānalo Gulch Sanitary Landfill (WGSL) until July 2012. Condition No. 4 of the LUC decision required that the City begin to identify and develop one or more new landfill sites that shall either replace or supplement the existing WGSL.

The City instructed the Committee, in compliance with LUC Condition No. 4, that they were not to consider WGSL in their deliberations as the current WGSL could not supplement or replace itself. The City related to the Committee: (1) the Committee's identification of landfill sites should include the provision for accepting MSW, C&D waste, and ash and residue from H-POWER; (2) the City's intention is to utilize WGSL until its full capacity is reached. An

important reason for this is that the City's considers land to be a precious resource. Should a landfill site not be utilized to its full potential and capacity, it would represent an inefficient use of the land and public treasury, since it would prematurely require the use of a new landfill site and involve major new capital expenditures for development; and (3) the sites the Committee will evaluate and rank will considered for future use by the City as it proceeds with its site selection and EIS process.

2.3 Advisory Committee's Instructions

The Committee was directed to provide recommendations to the City by undertaking the following:

(1) Review a list of landfill sites identified by the City in prior studies and select the appropriate potential site or sites that should be subject to further evaluation using the Committee's community-based criteria.

The Committee was assisted by R. M. Towill Corporation (RMTC) who was selected by the City to assist with this process. All Committee meetings will be facilitated and Committee members will be asked to: attend meetings of the Committee; review information provided about landfill siting requirements (federal, state and City & County of Honolulu); and to ask questions and work through processes that will assist with identifying the optimal site(s) for a landfill.

(2) Identify potential new landfill sites that should be further considered for the disposal of non-combustible MSW, C&D waste, and H-POWER related ash and residue;

(3) Identify and develop community-based criteria that are considered most important from a community's perspective in the siting of a new landfill; and

(4) Produce a report on the results of its findings including a ranked list of sites for consideration by the City based on the application of the community-based criteria.

The community-based nature of the criteria are those that the Committee felt might not receive the same level of attention and weight as they might in mandated technical evaluations such as topographic, geotechnical, and engineering studies, cost analyses, historical and cultural site assessments, and surveys of flora and fauna, among others that will be performed by the City in subsequent steps culminating in the preparation of an EIS.

The Committee was reminded that its role is advisory and that the final decision will rest with the Administration and City Council. Once this decision is made the final siting process will require public hearings and environmental and land use processes that are outside of the Committee's role of providing advisory recommendations.

Committee members were asked to raise issues and questions based on their own background and expertise, as well as those of the communities they live in. They were encouraged to share the information discussed at meetings with others. Committee members were asked to listen with an open mind and to honestly put issues of concern on the table with the intent of working through these issues in a collaborative problem solving manner.

2.4 Members of the Mayor's Advisory Committee

The Mayor appointed a 12–member volunteer committee composed of citizens representing various communities and expertise on O'ahu. The intent in selecting the members of the Committee was twofold:

(1) The first intent was to select individuals with a background in community involvement and who could bring to the table an understanding of issues and concerns that would be most important from a community's point of view.

(2) The second intent was to ensure that the majority of the Committee's members could understand the technical issues and complexities involved in the siting of a new landfill, including but not limited to environmental and legal issues. It was noted that the overall makeup of a previous committee had been lacking in this kind of experience based on the need for a technical support committee to assist them with their deliberations. The present Committee is designed to balance community and technical needs.

During the Committee's deliberations three committee members resigned for personal reasons. The City decided to not replace these members based on the number of meetings already held and the complexity of the issues covered. This resulted in a final Committee comprised of nine members.

All Committee members selected to serve possess experience and expertise from a broad range of backgrounds that included public and community interests; State and City government; environmental and health sciences; legal and business professions; and others.

Members of the Mayor's Advisory Committee on Landfill Site Selection:

David Z. Arakawa, Esq. – Executive Director, Land Use Research Foundation, and former City Prosecutor, City and County of Honolulu

Thomas E. Arizumi – Former Division Head, Environmental Management Division, State Department of Health

John Goody – Former Urban Planner, Belt Collins Hawai‘i, Ltd., and Colonel, U. S. Marine Corps

Joseph W. Lapilio, III – Principal, Naki' I Ku and Community Consultant

Tesha H. Mālama – Kalaeloa Director of Planning, Hawai‘i Community Development Authority

Janice Marsters, Ph.D. – Senior Environmental Scientist, Kennedy Jencks

Richard Poirier – Former Planning Program Manager, Office of State Planning, Office of the Governor, and State Department of Business, Economic Development & Tourism

Chuck Prentiss, Ph.D. – Former Executive Secretary, Honolulu Planning Commission, City and County of Honolulu

George West – Former Executive, Ameron Hawai‘i

The City and the Committee acknowledge the service of the former members who were unable to complete their term:

Bruce Anderson, Ph.D. – Former Director, State Department of Health

David Cooper, Ph.D. – President and CEO, The Hāna Group

John DeSoto – Former Honolulu City Councilman

Section 3 – Committee Purpose and Process

3.1 Purpose of Committee

The purpose of this Committee is to provide a Report to the City identifying a list of ranked potential landfill sites for further evaluation as the City moves forward with the preparation of an EIS for its next landfill site. Consideration for the use of WGSL, as noted, is not a part of the Committee's charge because it is the City's intention to pursue the use of the WGSL until it reaches full capacity. The EIS process will include further technical studies and evaluations that will support the City's identification of its preferred alternative landfill site.

The Committee is asked to consider single, solid waste landfill sites that can accept three principal refuse streams: MSW, C&D waste, and H-POWER related ash & residue. The use of separate landfills for certain types of solid waste are not considered viable because of: (a) economies of scale that can be achieved from a single facility to handle all three waste streams; (b) the potential for significantly greater environmental impacts if multiple sites are used to handle separate waste streams; and (c) significant costs associated with developing a site for each waste stream.

The Committee's identification of ranked landfill sites is based on the use of community-based criteria developed by this Committee. The results of this process are documented in this Report and will facilitate the accomplishment of Condition No. 4 of the approved State Special Use Permit, requiring the City to begin to identify and develop one or more new landfill sites that shall either replace or supplement the existing WGSL.

3.2 Major Policy Constraints Considered by the Committee

In addition to the requirements of State Special Use Permit, Condition No. 4, the Committee evaluated existing land use policies to identify constraints to its deliberations. These included:

(1) Resolution 03-09, FD 1, Establishing a City Policy That Municipal Solid Waste Landfills Should Not be Located Over the City's Underground Drinking Water Sources. Adopted by Honolulu City Council, April 16, 2003. (See **Attachment A**)

This policy applies to the use of the Underground Injection Control (UIC) Line to protect O'ahu's groundwater by precluding the siting of landfills mauka of the line. This policy is implemented by the State of Hawai'i Department of Health (DOH) in order to safeguard potable groundwater from subsurface wastewater disposal.

(2) The Groundwater Protection Zone (GPZ) or No Pass Line identified by the BWS, City & County of Honolulu, is also referenced in Resolution 03-09, FD1, and is similar to the UIC Line. The No Pass Line is similar in that the purpose of the line is to prevent and thereby preclude the potential for sources of contamination from entering O'ahu's groundwater supply. In the instance of the No Pass Line, the policy includes existing well sites and well capture zones[1], and aquifer systems for general drinking water supply protection.

The rationale for the inclusion of the UIC and No Pass Line where landfills should not be sited is based on the generation of landfill associated leachate. The operation of an engineered landfill includes the use of a liner system that is designed to handle surface rainfall allowing only a small portion to percolate through the landfill liner membrane. The water that percolates through the landfill seeps to a sump designed at the base of the liner system. The water collected at the sump is referred to as leachate. The level and chemical makeup of the leachate is monitored by the landfill operator and as required, is removed for processing and/or disposal.

[1] A Well Capture Zone is used to demarcate the immediate area surrounding a well site where potential pollution producing activities such as operating a landfill, should not be located.

While Resolution 03-09, FD 1, is intended to reduce potentially contaminating activities from landfills within the UIC and No Pass Line, there are some slight differences in geographic coverage. In general, however, both lines are within close proximity to one another and intersect in most instances.

The Committee considered Resolution 03-09, FD 1, and the UIC and No Pass Line at length during the course of its deliberations and believes that with proper engineering and design, that a landfill can be safely constructed and operated mauka of the UIC and No Pass Line.

3.3 Overview of the Committee's Process

The process utilized by the Committee was initially intended to follow a timeframe that included approximately seven meetings over an approximately six month period comprised of the following:

(1) Meeting No. 1
- Introduction and description of objectives, ground rules and administration
- Defining solid waste and description of City's Solid Waste Management System

(2) Meeting No. 2
- Site visit to WGSL, H-POWER, and other solid waste facilities
- Relationship of facilities to the City's Solid Waste Management System

(3) Meeting No. 3
- Review landfill engineering necessary to the siting of a landfill: Present siting requirements from Federal, State, and City & County of Honolulu
- Previous alternative landfill sites considered by the City
- Request Committee's identification of additional sites for consideration and obtain Committee's preliminary siting criteria

(4) Meeting No. 4
- Request additional community-based siting criteria from Committee
- Consultant's description of process for developing measurable criteria to score and rank landfill sites

(5) Meeting No. 5
- Review alternative LF sites under consideration and apply RCRA Subtitle D and State/City & County of Honolulu siting criteria. Provide results to Committee.
- Distribute Draft Landfill Siting Evaluation Sheets to Committee and review landfill evaluation process. Review how data is measured and scored in the data sheets. Revise as required based on Committee's input.
- Discuss and obtain Committee's weighting of the criteria

(6) Meeting No. 6
- Present results of the analysis
- Reveal sites selected by the Committee and discuss
- Discuss content of the Report to the Mayor with Committee
- Consultant directed to prepare the Committee's Draft Report to the Mayor.

(7) Meeting No. 7
- Discuss Draft Report to the Mayor with Committee. Revise as required and prepare Final Report.
- Submit the Committee's Report to the Mayor and conclude the Committee's role.

The process was modified by the Committee in order to expand the evaluation of potential landfill sites and to allow the Consultant Team sufficient time to complete the additional research and data collection that was requested. This resulted in the Committee deliberating and convening

10 meetings between January 2011 and April 2012. A record of the Committee's meetings is in **Attachment B**.

It is important to note that although the process was modified the general steps required to complete the evaluation had not changed. A summary of these steps included:

(1) Identify potential landfill sites for further study, including potential new sites not previously considered. The product is a list of potential landfill sites for further evaluation.

(2) Apply preliminary siting criteria based on federal and state regulatory requirements, and other preliminary siting criteria identified by the Committee in order to filter the list of sites to those that would be evaluated using the Committee's community-based criteria. The product is a list of sites remaining after the application of the preliminary siting criteria.

(3) Develop community-based criteria and a scoring and weighting system to rank the sites. The products of the scoring system included: the community-based criteria and method for scoring each of the criteria (performed by Consultant); and a series of weights to reflect the relative importance of each criterion relative to other criterion (performed by the Committee and Facilitator).

(4) Perform research and data collection on each potential landfill site and assign scores to each of the criterion. The product will be the community-based criteria scores for each potential landfill site that is evaluated.

(5) Apply the criteria weights to arrive at the final site scores and document the Committee's recommendations including minority reports that can be prepared by any of the Committee members for inclusion in its Final Report.

Section 4 – Identification of Potential Landfill Sites

4.1 Introduction

This section describes the Committee's identification of potential landfill sites for further study, including potential new sites not previously considered.

4.2 Prior Landfill Siting Studies

The identification of sites selected for evaluation is based on prior studies commissioned by the City. ENV and the Consultant assembled the list of potential sites for evaluation by the Committee from the following City sources:

(1) Inventory of Potential Sanitary and Demolition Landfill Sites, August 1977.

(2) Supplement to Inventory of Potential Sanitary and Demolition Landfill Sites, November 1979.

(3) Revised Environmental Impact Statement for Leeward Sanitary Landfill at Waimanalo Gulch Site and Ohikilolo Site, 1984.

(4) Final Supplemental Environmental Impact Statement for the Waimānalo Gulch Sanitary Landfill Expansion, 2002.

(5) Final Environmental Impact Statement for the Waimānalo Gulch Sanitary Landfill Lateral Expansion, 2008.

4.3 Sites Preliminarily Identified for Evaluation

The list of sites identified for evaluation included 43 locations distributed throughout the island of O'ahu. These sites are identified in **Table 4-1** and shown in **Figure 4-1**.

Table 4-1 – Initial List of Potential Landfill Sites on O'ahu

No.	Site Name	Tax Map Key	Size
1	Auloa	4-2-14: por 001	55
2	Ameron Quarry	4-2-15: 001	391
3	Barbers Point	9-1-16: 018, portion 001	15
4	Bellows	4-1-15: portion 001	173
5	Diamond Head Crater	3-1-42: portion 006	115
6	'Ewa No. 1	9-1-17	-
7	'Ewa No. 2	9-1-10	-
8	Hālawa A	9-9-10: 008, 009, portion 010 & 026	40
9	Hālawa B	9-9-10: 027, portion 010	60
10	He'eia Kai	4-6	-
11	He'eia Uka	4-6-14: 001	163
12	Honouliuli	9-1-17: portion 004	22
13	Ka'a'awa	5-1	150
14	Kaena	6-9-01: portion 003, 033 & 034	40
15	Kahalu'u	4-7	-
16	Kahe	9-2-03: portion 027	200
17	Kalāheo (landfill reuse)	4-2-15: portion 001 & 006	134
18	Kaloi	9-2-02: portion 1; 9-2-3: portion 002; 9-2-04: portion 005	400
19	Kapa'a No. 1	4-4-14: portion 002	60
20	Kaukonahua	7-1	34

No.	Site Name	Tax Map Key	Size
21	Keʻekeʻe	6-9-01: portion 003 & 004, 6-9-03: portion 002	40
22	Koko Crater	3-9-12: portion 001	140
23	Kunia A	9-4-04: portion 004	150
24	Kunia B	9-4-03: portion 019	190
25	Māʻili	8-7-10: portion 003	200
26	Makaiwa	9-2-03: portion 002	338
27	Makakilo Quarry	9-2-03: 082	175
28	Makua	8-1-01, 8-2-01	600
29	Mililani	9-5	34
30	Nānākuli A	8-7-09: 001 & 003 and 8-7-21: 026	179
31	Nānākuli B	8-7-09: portions 001 & 007	432
32	Ohikilolo	8-3-01: 013	706
33	Olomana	4-2	-
34	Poamoho	7-1	5
35	Punaluʻu	5-3	200
36	Sand Island	1-5-41	150
37	Waiahole	4-8	60
38	Waiʻanae Expansion	8-5-03 and 06	140
39	Waiheʻe	4-7	61
40	Waikane	4-8	200
41	Waimānalo North	4-1-08: 013	171
42	Waimānalo South	4-1	355
43	Waipiʻo	9-3-02	60

The Committee was asked to review the sites and to recommend potential new sites to add to the list. Initially, there were no new sites recommended by the Committee.

A two-step process was used to evaluate the sites. In the first step, the sites were evaluated against screening factors that would be used to identify sites for removal based on exclusionary criteria against which the site would no longer be considered viable. The screening factors were defined as those that would immediately remove a potential site from further consideration because of an exclusionary environmental feature of the site given its location.

When the Consultants began to evaluate the sites with the exclusionary criteria noted below, it was clear there would be far fewer viable sites than suggested by the initial size of the list. The Consultant indicated that many of the sites originally identified had been subsequently placed into residential and related development. Therefore, the majority of the 43 identified sites were no longer available for landfill use.

The screening factors used to preliminarily evaluate the sites included the following[1]:

- Protection of runway airspace – This is based on the Resource Conservation Recovery Act (RCRA), Subtitle D[2]. (See **Figure 4-2**)

[1] The screening factor, Sites located above residential subdivisions or developments was added after the Committee decided to redirect the effort to identify sites inside of the UIC/No Pass line. This screening factor was subsequently removed by the Committee during the process.

[2] 40 Code of Federal Regulations (CFR), Part 258, governing the development, operation and closure of landfills. This regulation is designed to ensure protection against bird-aircraft strike hazards within 10,000 feet of the end of any airport runway used by turbojet aircraft.

- Federal land ownership – This is based on the City's past experience with the difficulty of acquiring Federal land for its facilities including the rejection of prior requests for the use of land for landfilling. (See **Figure 4-3**)
- State Conservation District designated land (any site with a Conservation District subzone other than the least restrictive General Subzone) – This is based on the potential for use of land within the General Subzone based on the presence of certain existing industrial facilities such as the Ameron Quarry. The subzones considered to be non-viable included protective, limited, resource, general and special. Omitting the special subzone, the four subzones are arranged in a hierarchy of environmental sensitivity, ranging from the most environmentally sensitive (protective) to the least sensitive (general). The special subzone is applied in special cases specifically to allow a unique land use on a specific site. Each subzone has a unique set of identified land uses.[3] (See **Figure 4-4**)
- Board of Water Supply (BWS) well capture zones[4] (CZ) – This is based on the delineation of BWS wells used for domestic water supply and the CZ area surrounding wells that could be susceptible to contamination from sources such as MSW landfills[5]. The areas utilized included the 2 and 10 year CZs representing the period of time that would elapse from when a hazardous constituent was detected in the CZ to when it would begin to appear in the well water. Wells developed by BWS after 2004, when the Hawai'i Source Water Assessment Program Report was completed, were developed with the assistance of the BWS to develop planning bubbles to represent the CZs. (See **Figure 4-5**)
- Commission on Water Resource Management (CWRM) well sites – This is based on the identified wells under management of the CWRM. All well locations and a 1,000 foot buffer where utilized to define the area subject to protection[6]. (See **Figure 4-5**)
- Critical Habitats and Natural Area Reserve System (NARS) lands – This includes designated critical habitats identified by the U. S. Fish and Wildlife Service, and NARS lands designated by the State Department of Land and Natural Resources (DLNR). In addition, certain species such as *Elepaio*, are sensitive to a phenomenon called habitat fragmentation. Habitat corridors were developed using riparian stream data to allow for the movement of this species from one habitat area to another. An approximate buffer of 100 meters was used and lands intersecting the buffers were utilized. (See **Figure 4-6**)
- Impaired Water Bodies – This includes streams and other water bodies as designed by the Environmental Protection Agency (EPA) and Department of Health (DOH) (See **Figure 4-5**)
- Valued agricultural lands according to the Agricultural Lands of Importance to the State of Hawai'i (ALISH) (See **Figure 4-7**) and Land Study Bureau (LSB) (See **Figure 4-8**) classification systems – This includes highly rated agricultural lands as designated under both systems. Lands classified as Prime, Unique, or Other Important Agricultural Lands under the ALISH or classified as A or B under the LSB were included as a screen.

[3] http://hawaii.gov/dlnr/occl/frequently-asked-questions-1.
[4] Information on detailed locations of well capture zones are considered confidential by the State Department of Health but were obtained for use by the Department of Environmental Services during the analytical phase of the project. Disclosure of the specific well capture zone boundaries were therefore not disclosed to the Committee members.
[5] Hawai'i Source Water Assessment Program Report (SWAP), 2004.
[6] Based on discussion with W. Roy Hardy, P.E., Chief, Regulation Branch, CWRM.

- Parcel contains at least one structure as noted on aerial maps – This was removed by the Committee based on the difficulty of determining the specific use of structures as identified using aerial maps and web-based imagery from Google Maps and Geographic Information System sources. In many cases the structures could not be defined as to uses, e.g., dwellings or sheds.
- Sites located above residential subdivisions or developments – This was removed by the Committee on the basis that a properly engineered landfill could be designed to remove the potential for adverse effects to downstream developments.

The second step was to develop and apply the Committee's community-based criteria to evaluate the sites. However, before this step was taken the Committee noted a number of points that included:

(1) The majority of the sites evaluated are located outside of the Underground Injection Control (UIC)/No Pass line. (See **Figure 4-9** and **Figure 4-10**)

The Committee deliberated on this matter and decided it would be more encompassing to include for assessment potential landfill sites located within the UIC line and No Pass line. In its deliberations, the Committee understood City Council Resolution 03-09, Establishing A City Policy That Municipal Solid Waste Landfills Should Not Be Located Over The City's Underground Drinking Water Sources, which at the time of its adoption in the 1990s, was an important part of the City's practice to not site landfills within the UIC/No Pass line. However, the Committee noted that a landfill that is located outside an existing potable water well capture zone and that is properly designed, engineered, and operated in accordance with environmental regulatory controls and safeguards, should not adversely affect groundwater that serves a potable water system.

(2) Only one federal site, part of the Bellows Air Force Base (AFB), was identified[7].

The Committee deliberated on this matter with some committee members noting that in order to increase the number of potential sites, lands that are owned by the federal government, with the exception of lands that are known to be actively used by the military, should be included for consideration. The Committee's rationale for this inclusion was: (a) every option for the identification of potential sites should be made. Without specifically requesting the use of federal land, there would be no way of verifying that such use would not be possible; and, (b) federal lands should still be explored because there are processes available through Congressional action that can make possible the use of non-active military lands.

(3) The City recommended that any site under consideration should be greater than 100 acres.

A 100-acre minimum site size was recommended to the Committee by the City and was originally agreed upon. However, after discussion and further consideration the Committee felt that sites between 90 and 100 acres should also be considered to ensure that all locations that could be potentially usable are addressed.

The City considered the Committee's desire to include land within the UIC/No Pass line, federal lands, and landfill sites of between 90 and 100-acres, which would be less than the City's preferred 100-acre or greater landfill site size. The City determined that the Committee must be allowed to conduct its own deliberating process without undue influence from the City and thereafter allowed the Committee's process to continue.

The Committee also noted during this discussion that the siting of a landfill is a difficult exercise and that effort should be taken to develop the most extensive list of potential sites possible within

[7] This site was later removed from consideration due to a response from the Marine Corps Base Hawai'i on February 9, 2011, indicating that the site was needed to support military training requirements.

the various constraints of federal and state regulations. The Committee thereafter asked that the Consultants expand the list of potential site for evaluation recognizing that some of the screening factors identified above would be reassessed.

4.4 Geographic Information System (GIS) Based Evaluation of Potential Sites

The Consultants recommended the use of a GIS-based evaluation system based on the capacity to evaluate the entirety of the island of O'ahu using readily available information resources maintained by State of Hawai'i and City and County of Honolulu government agencies.

This recommendation, however, does involve a major difference in methodology between how the City's list of potential landfill sites was developed, and identifying new sites using a GIS-based analysis:

(1) The City's list of potential landfill sites was developed from studies undertaken over the course of several years, and reflected the then existing development and land use information that was available. A GIS-based analysis would have more current data, including the location of existing development and environmental features. Further, although the GIS-based approach would include more current data, some of the information from the City's prior studies was obtained from field work; a level of investigation that could not be accomplished given the time and resources available to the Committee and Consultants.

The Consultants note that while field work would not be applied as a part of the GIS analysis, the City would in the future undertake technical and other studies to support a future EIS for the next landfill site. Ultimately, the selection of the preferred landfill site would therefore be subject to the necessary and required level of study and analysis to support a well-considered site.

(2) Although there were initially a number of sites identified in the City's list, all of the areas previously evaluated should be subject to re-evaluation using GIS and the Committee's screening factors. This would be a reasonable and key means of ensuring that the use of the screening factors, developed in discussions with the Committee, would be consistently applied to all of the sites under evaluation, i.e., sites 100-acres or more, and sites of between 90 and 100-acres.

The Consultants thereafter proceeded with the re-evaluation of the island of O'ahu based on the issues above, to expand the list of potential sites. The following modifications were made to the list of screening factors identified above:

- Land within the UIC/No Pass Line – This constraint, as previously applied to exclude potential landfill sites within the UIC/No Pass Line, was now removed. All parcels within the UIC/No Pass Line would be subject to evaluation.
- Area – This constraint, as previously applied, requiring that potential landfill sites should be 100 acres or more in size, was now removed. The area of the parcels subject to evaluation would include sites 100-acres or more in size, and sites of between 90 and 100-acres.

  It is noted that this would include a recalculation of the area after application of the other GIS-based screening factors to ascertain the land area available. As an example, if a parcel initially had 98 acres and was partially affected by Conservation District land other than in the General Subzone, with the result that only 89 acres remained, the site would be considered non-viable. However, if a site had 90 or more acres remaining it would be considered viable for further analysis.
- Federal Land – Parcels owned by the federal government, as previously evaluated, will be considered for further evaluation if the lands are not known to be used for active military operations.

- Landfill Site Life of Less Than 15 Years – This was the final screening factor applied and represents the minimum period of time the City considers a landfill to be viable for development. Measurement of this variable is complex and includes many factors such as topography, area, drainage, and site configuration. If a site was determined to have less than 15 years of useful life, it was screened from further analysis.

4.5 Constraints Associated with Use of GIS

This Report of the Committee differs from prior studies evaluating alternative sites for a new landfill in its use of a GIS-based analysis representing the first known attempt to holistically analyze the entire island of O'ahu to identify land suitable for landfilling. The use of a GIS-based system, however, should be used with the following understanding:

(1) A GIS-based analysis is not a substitute for a more formal evaluation of a landfill that would be performed by the City in an EIS. The undertaking of an EIS level of assessment and evaluation must be performed for the proper identification of any landfill site prior to it being developed; and

(2) A GIS-based analysis involves a desktop level of study meaning that basic research will be performed using only existing data sources supplemented by consultation with experts in other technical fields as applicable to the nature of the study. Fieldwork including site surveys and detailed investigations are not usually performed.

Existing available GIS-based data collected for this project were obtained from the public domain from the State of Hawai'i GIS Website, City and County of Honolulu, and other public GIS sources. Specific types of additional data that required consulting directly with government agencies included:

- Honolulu Board of Water Supply – Collection of data for well locations and well capture zones
- Commission on Water Resource Management – Collection of data for well locations and the establishment of an acceptable buffer zone surrounding the wells
- State Department of Health, Safe Drinking Water and Groundwater Protection – Collection of data and interpretation of state law concerning groundwater protection

4.6 Results of the GIS-Based Analysis

The GIS-based analysis evaluated land parcels on the island of O'ahu including locations within the UIC/No Pass line, federal lands, and sites both greater than 100 acres and between 90 and 100 acres in size. These parcels were split into four analysis groups for discussion. (See **Figure 4-11**) Approximately 465 potential sites were identified as follows:

	Site Acreage	
UIC/No Pass Zone	100+	90-100
Inside	337	18
Outside	97	13

- Group 1: 97 parcels of 100+ acres in size outside the UIC/No Pass line
- Group 2: 337 parcels of 100+ acres in size inside the UIC/No Pass line (not consistent with City policy)
- Group 3: 13 parcels of 90 to 100 acres in size outside the UIC Line and No Pass line
- Group 4: 18 parcels of 90 to 100 acres in size inside the UIC Line and No Pass line (not consistent with City policy)

After applying the Committee's screening factors, a list of 11 sites were identified for application of the Committee's community-based criteria, as referenced in **Table 4-2**. The locations of these sites are shown

in **Figure 6-1**, and detail is provided in **Attachment C**, showing the parcels comprising each of the groups 1 through 4.

Table 4-2 – List of Sites for Application of Community-Based Criteria

	Site Name (Alphabetic Order)	Within UIC/ No Pass Line*	TMK[8]	Parcel Acreage	Land Ownership
1.	Ameron Quarry	No	42015001	382	Private
2.	Kāneʻohe by H-3	No	44012001	158	Private
3.	Kapaʻa Quarry Road	No	44011003	258	Private
4.	Keʻeau	Yes	83001013	634	Private
5.	Upland Hawaiʻi Kai	No	39010047	97	Private
6.	Upland Kahuku 1	Yes	56008002	1,621	Federal
7.	Upland Kahuku 2	Yes	57002001	1,529	Federal
8.	Upland Lāʻie	Yes	55007001	2,231	Private
9.	Upland Nānākuli 1[9]	Yes	85006011	882	Private
10.	Upland Pupukea 1	Yes	61006001	2,177	Private
11.	Upland Pupukea 2	Yes	61007001	1,672	Private

*Sites that intersect the UIC/No Pass Line are considered within the UIC/No Pass Line.

[8] The identities of the sites were not disclosed to the Committee members until after the application of the Committee's community-based criteria weights.
[9] At least one Committee member noted that the location of this site is in Waiʻanae.

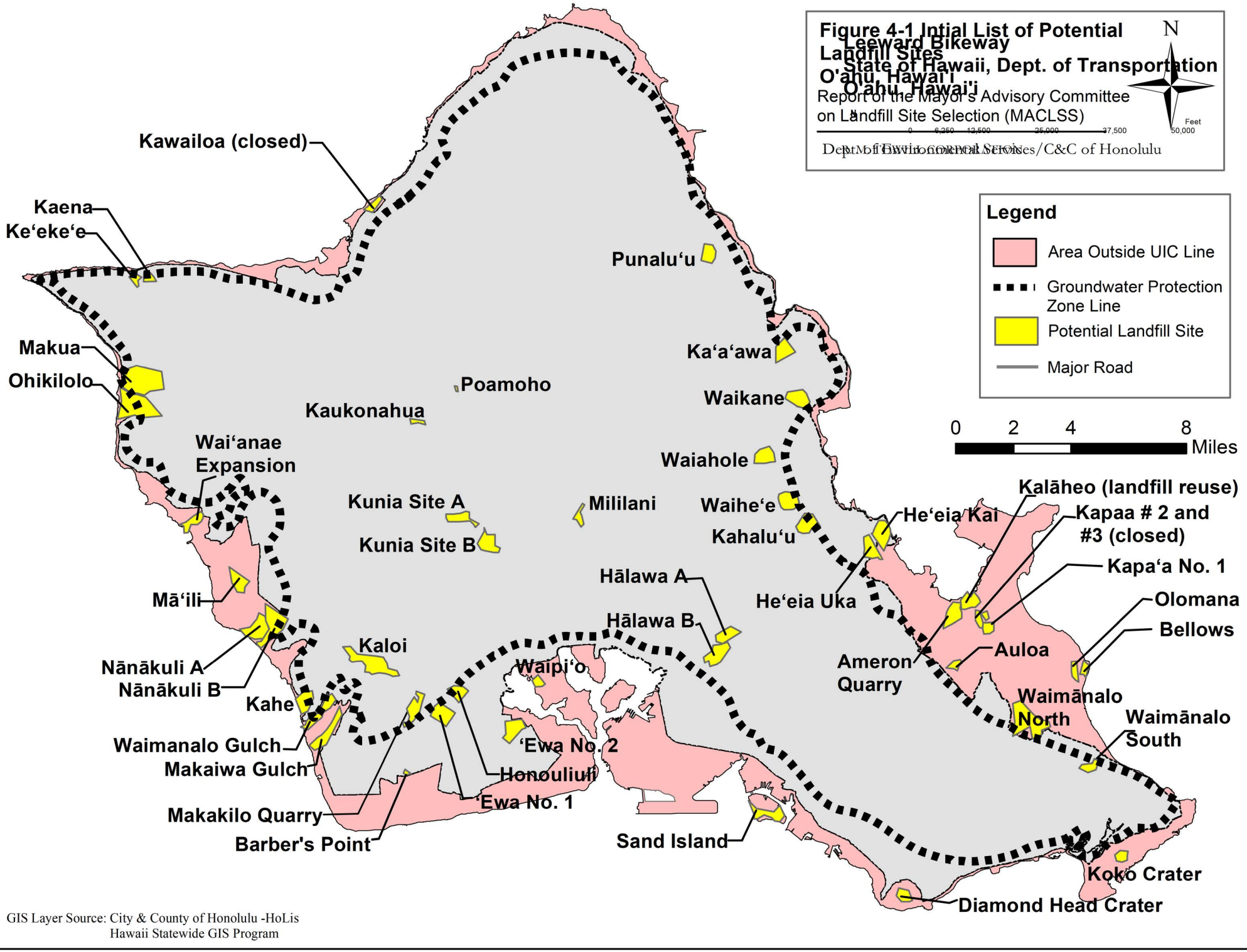


Figure 4-1 Intial List of Potential Landfill Sites
O'ahu, Hawai'i
Leeward Bikeway
State of Hawaii, Dept. of Transportation
O'ahu, Hawai'i
Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
0 6,250 12,500 25,000 37,500 Feet 50,000
Legend
Area Outside UIC Line
Groundwater Protection Zone Line
Potential Landfill Site
Major Road
0 2 4 8 Miles
Kawailoa (closed)
Kaena
Ke'eke'e
Punalu'u
Makua
Ohikilolo
Ka'a'awa
Poamoho
Waikane
Kaukonahua
Wai'anae Expansion
Waiahole
Kunia Site A
Mililani
Waihe'e
Kalāheo (landfill reuse)
He'eia Kai
Kapaa # 2 and #3 (closed)
Kunia Site B
Kahalu'u
Kapa'a No. 1
Hālawa A
He'eia Uka
Olomana
Mā'ili
Hālawa B
Bellows
Kaloi
Auloa
Nānākuli A
Waipi'o
Ameron Quarry
Nānākuli B
Waimānalo North
Kahe
Waimānalo South
Waimanalo Gulch
'Ewa No. 2
Makaiwa Gulch
Honouliuli
'Ewa No. 1
Makakilo Quarry
Sand Island
Barber's Point
Koko Crater
Diamond Head Crater
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program

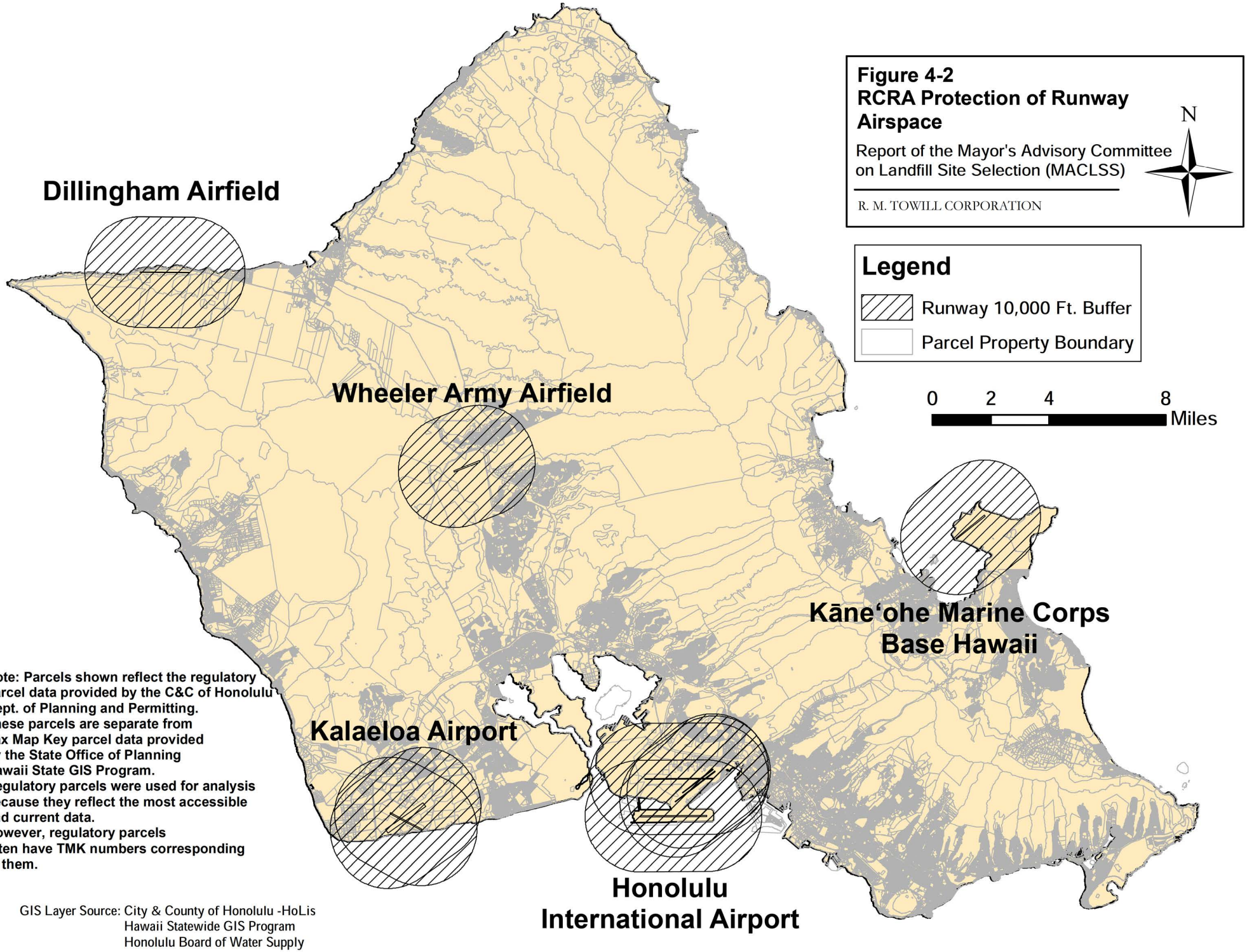
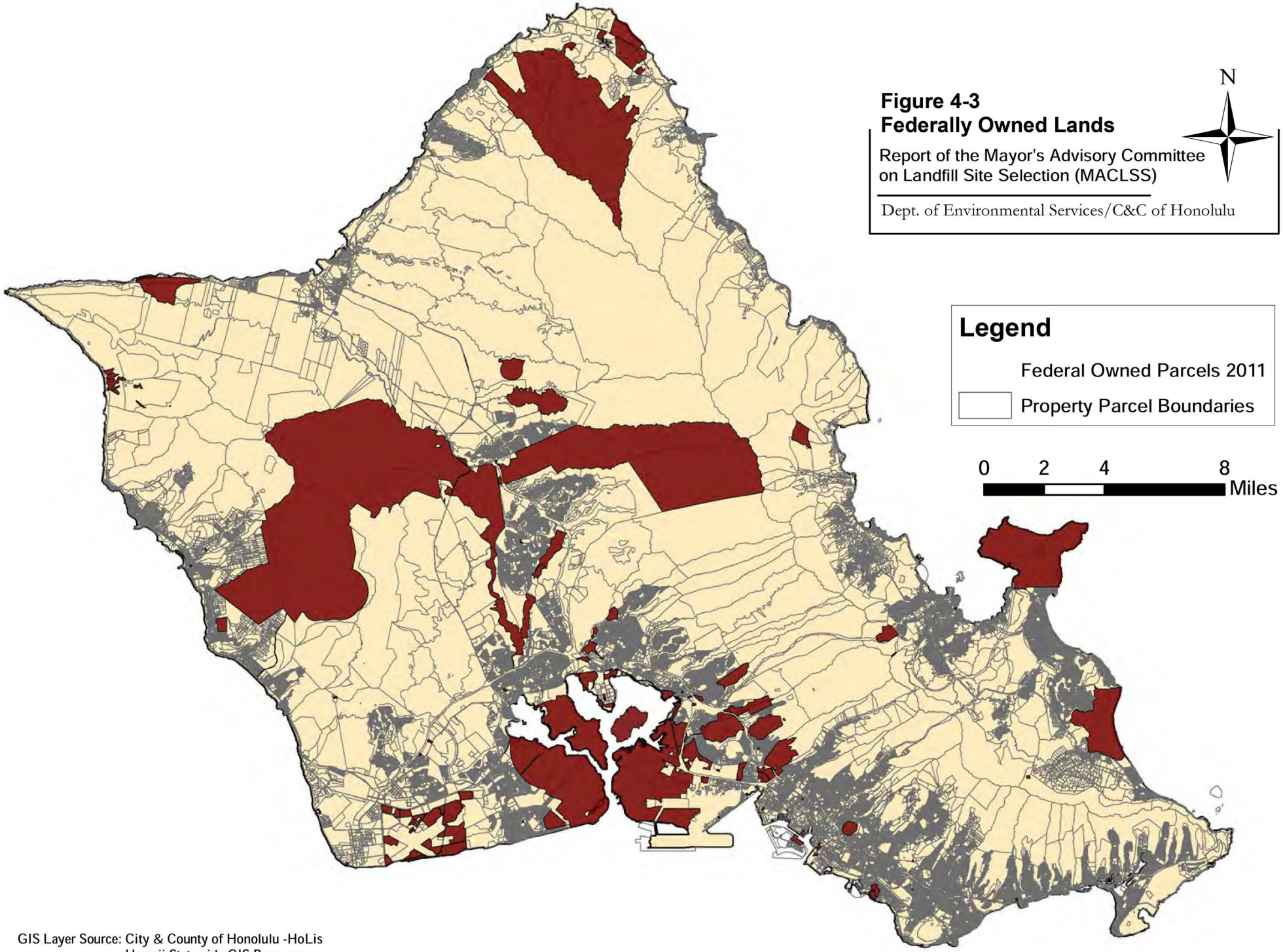


Figure 4-2
RCRA Protection of Runway Airspace
Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)
R. M. TOWILL CORPORATION
N
Legend
Runway 10,000 Ft. Buffer
Parcel Property Boundary
0 2 4 8
Miles
Dillingham Airfield
Wheeler Army Airfield
Kāneʻohe Marine Corps Base Hawaii
Kalaeloa Airport
Honolulu International Airport
Note: Parcels shown reflect the regulatory parcel data provided by the C&C of Honolulu Dept. of Planning and Permitting. These parcels are separate from Tax Map Key parcel data provided by the State Office of Planning Hawaii State GIS Program. Regulatory parcels were used for analysis because they reflect the most accessible and current data. However, regulatory parcels often have TMK numbers corresponding to them.
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program
Honolulu Board of Water Supply


N
Figure 4-3
Federally Owned Lands
Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
Legend
Federal Owned Parcels 2011
Property Parcel Boundaries
0 2 4 8
Miles
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program

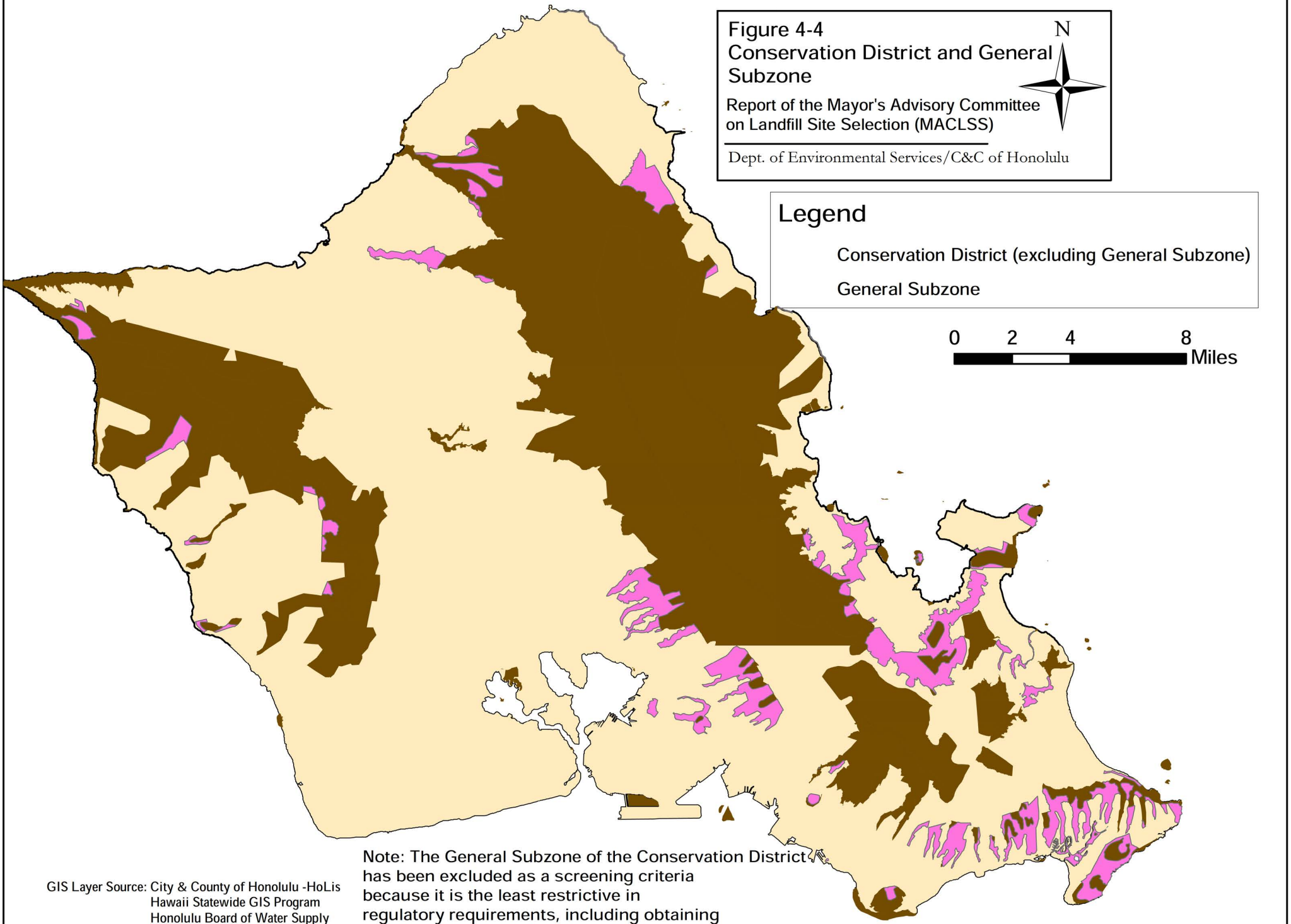


Figure 4-4
Conservation District and General Subzone
Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
Legend
Conservation District (excluding General Subzone)
General Subzone
0 2 4 8
Miles
Note: The General Subzone of the Conservation District has been excluded as a screening criteria because it is the least restrictive in regulatory requirements, including obtaining a conservation district use permit.
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program
Honolulu Board of Water Supply

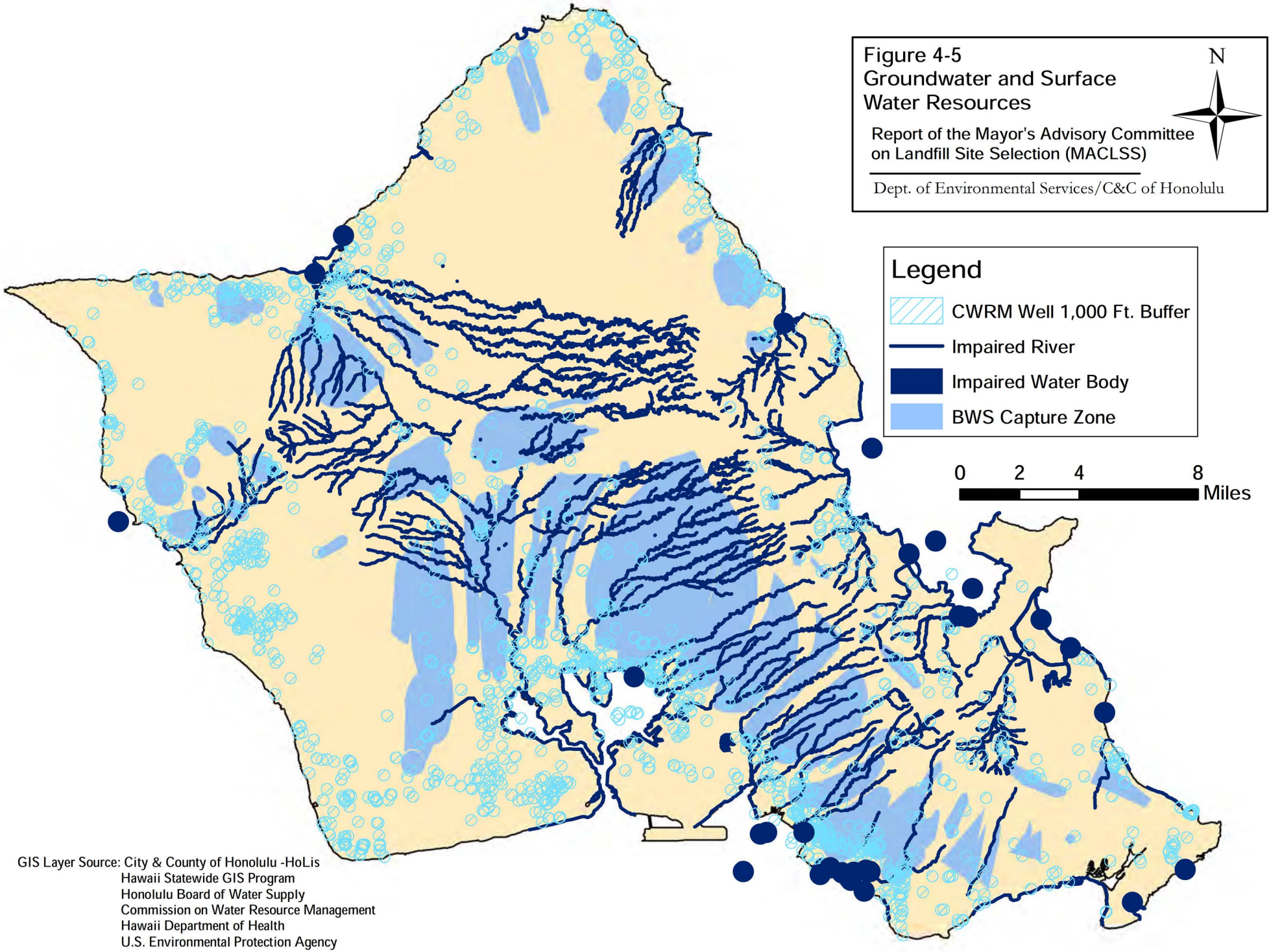


Figure 4-5
Groundwater and Surface
Water Resources
Report of the Mayor's Advisory Committee
on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
Legend
CWRM Well 1,000 Ft. Buffer
Impaired River
Impaired Water Body
BWS Capture Zone
0 2 4 8
Miles
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program
Honolulu Board of Water Supply
Commission on Water Resource Management
Hawaii Department of Health
U.S. Environmental Protection Agency

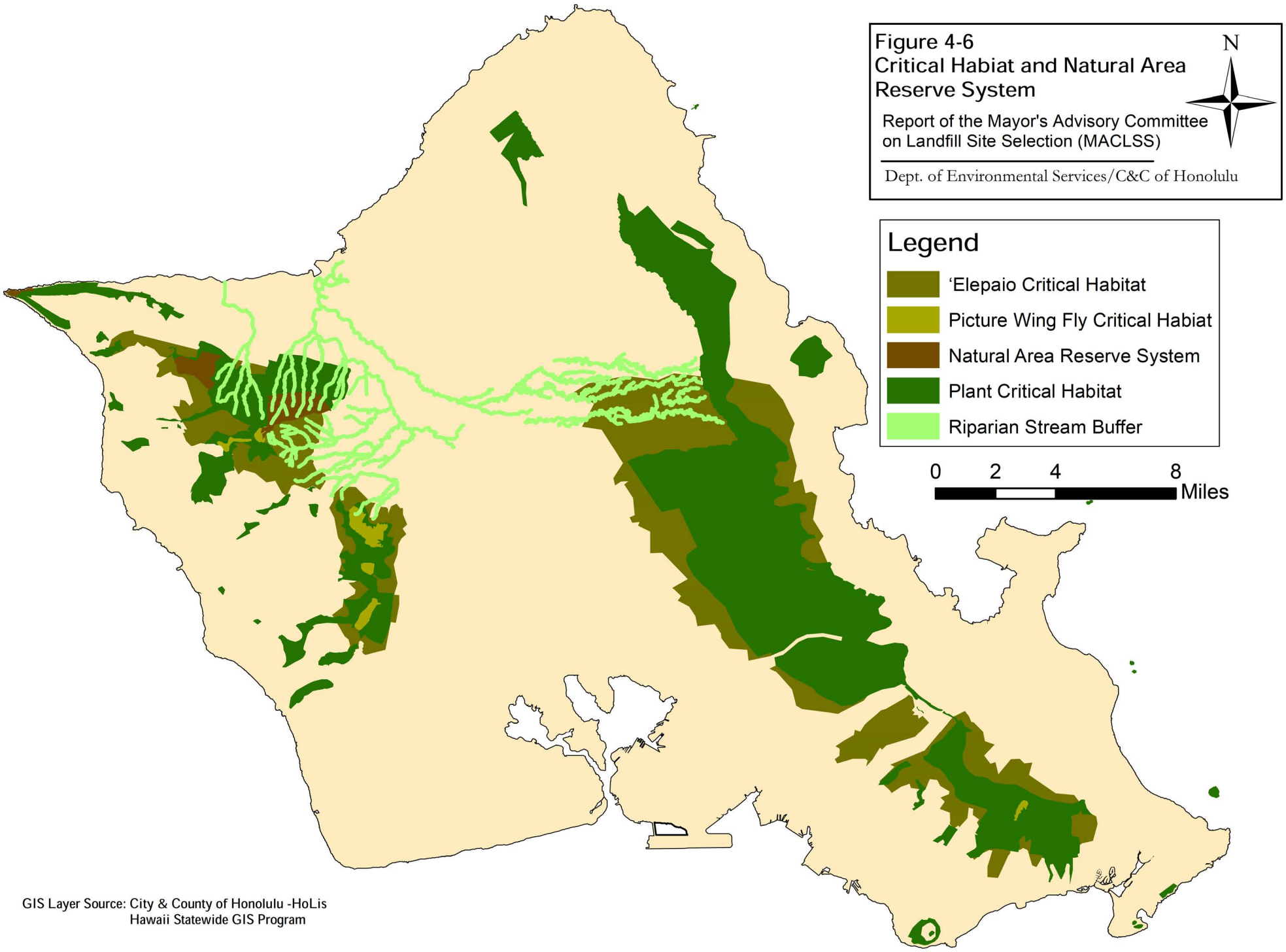


Figure 4-6
Critical Habiat and Natural Area Reserve System
Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
Legend
'Elepaio Critical Habitat
Picture Wing Fly Critical Habiat
Natural Area Reserve System
Plant Critical Habitat
Riparian Stream Buffer
0 2 4 8
Miles
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program

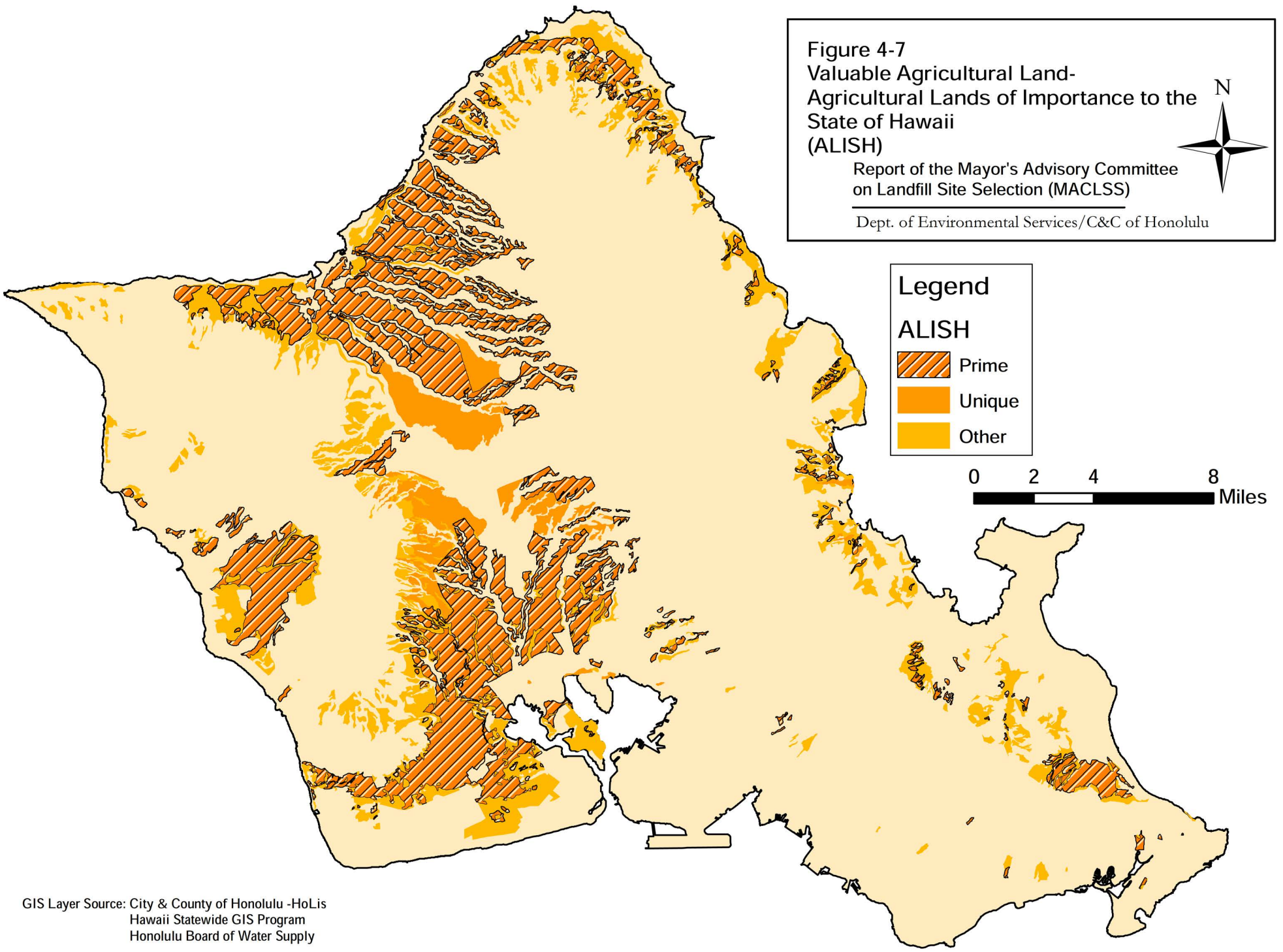


Figure 4-7
Valuable Agricultural Land-
Agricultural Lands of Importance to the
State of Hawaii
(ALISH)
Report of the Mayor's Advisory Committee
on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
Legend
ALISH
Prime
Unique
Other
0 2 4 8
Miles
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program
Honolulu Board of Water Supply

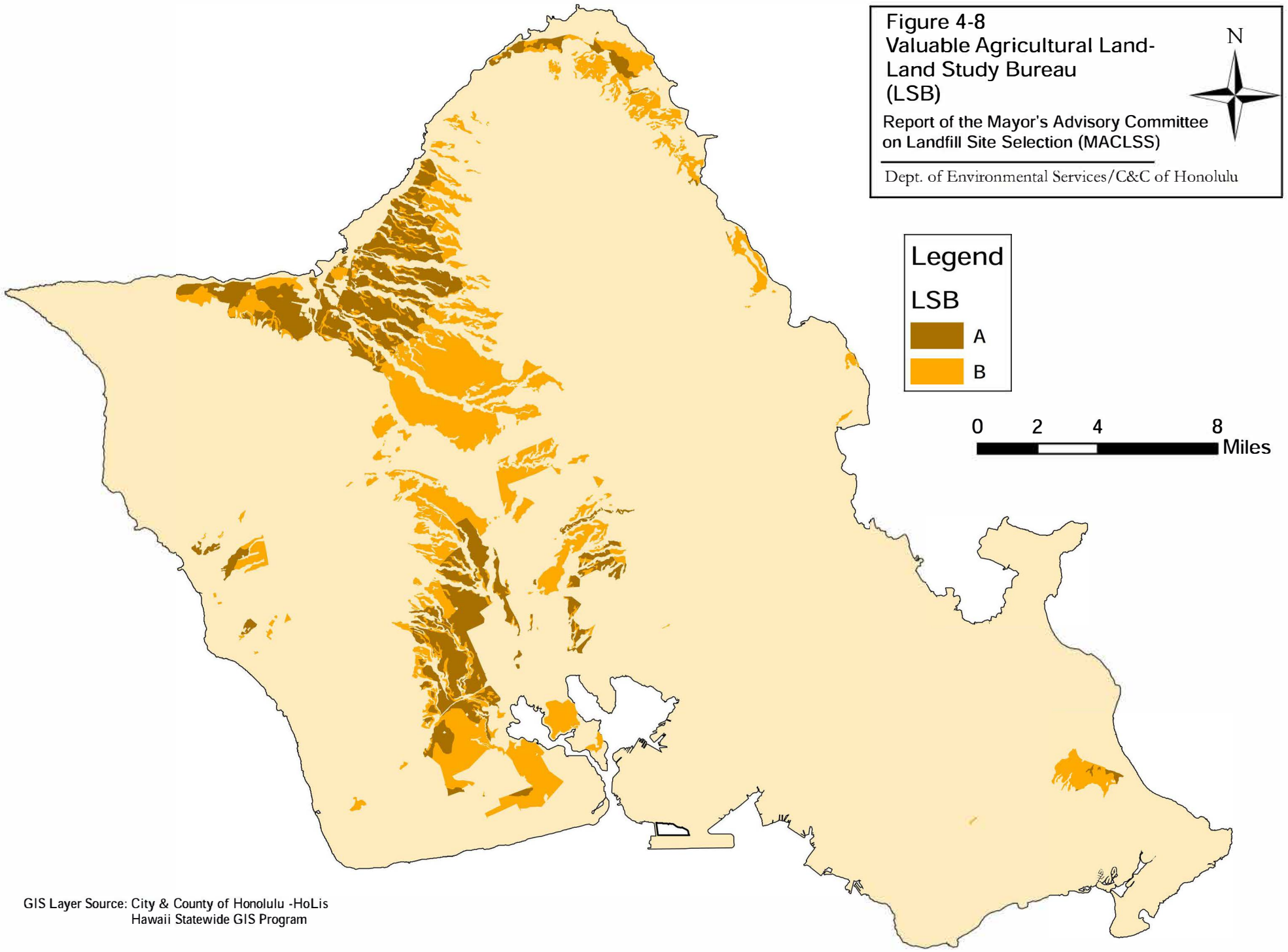


Figure 4-8
Valuable Agricultural Land-
Land Study Bureau
(LSB)
Report of the Mayor's Advisory Committee
on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
Legend
LSB
A
B
0
2
4
8
Miles
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program

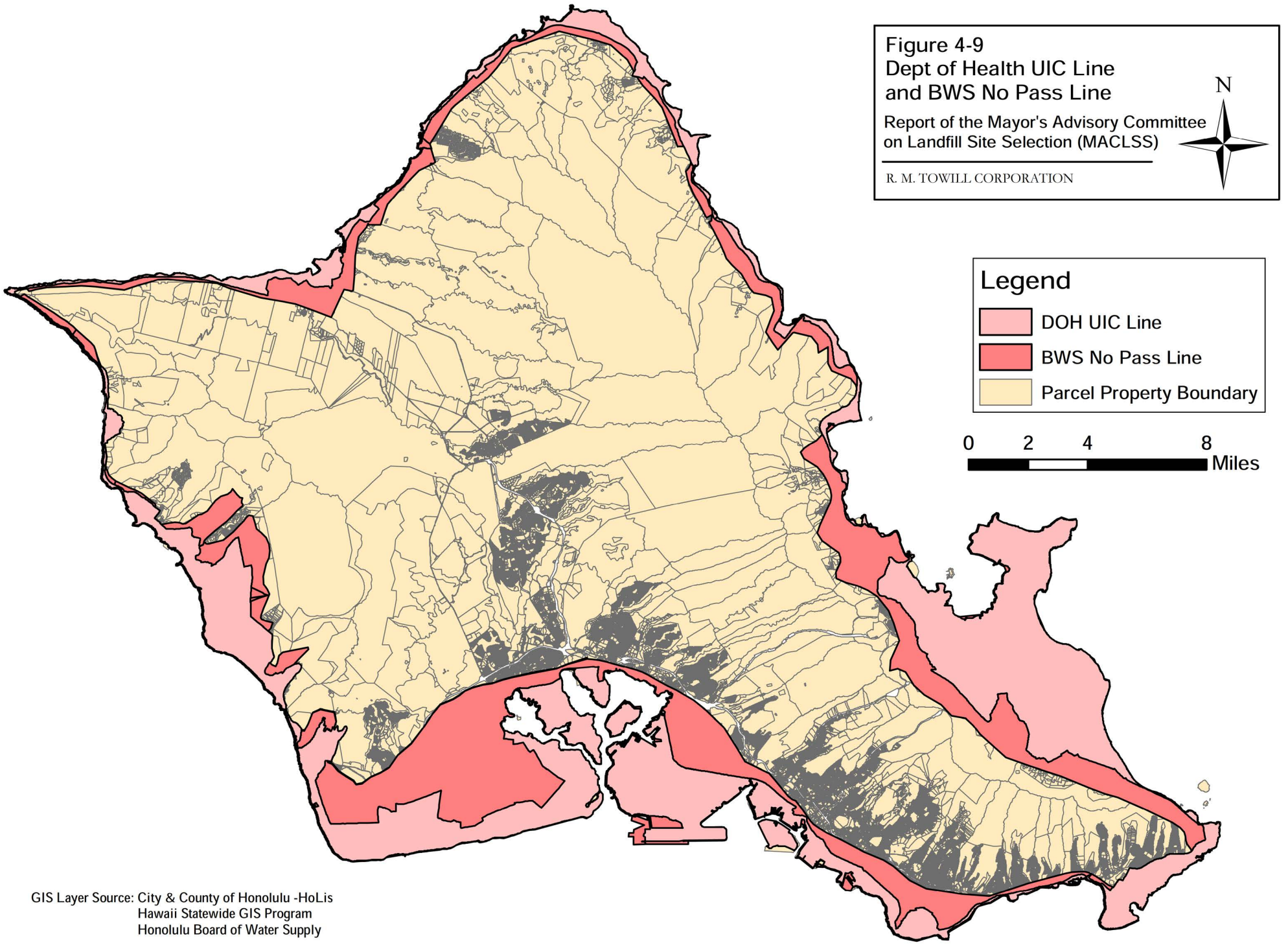


Figure 4-9
Dept of Health UIC Line
and BWS No Pass Line
Report of the Mayor's Advisory Committee
on Landfill Site Selection (MACLSS)
R. M. TOWILL CORPORATION
N
Legend
DOH UIC Line
BWS No Pass Line
Parcel Property Boundary
0 2 4 8
Miles
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program
Honolulu Board of Water Supply

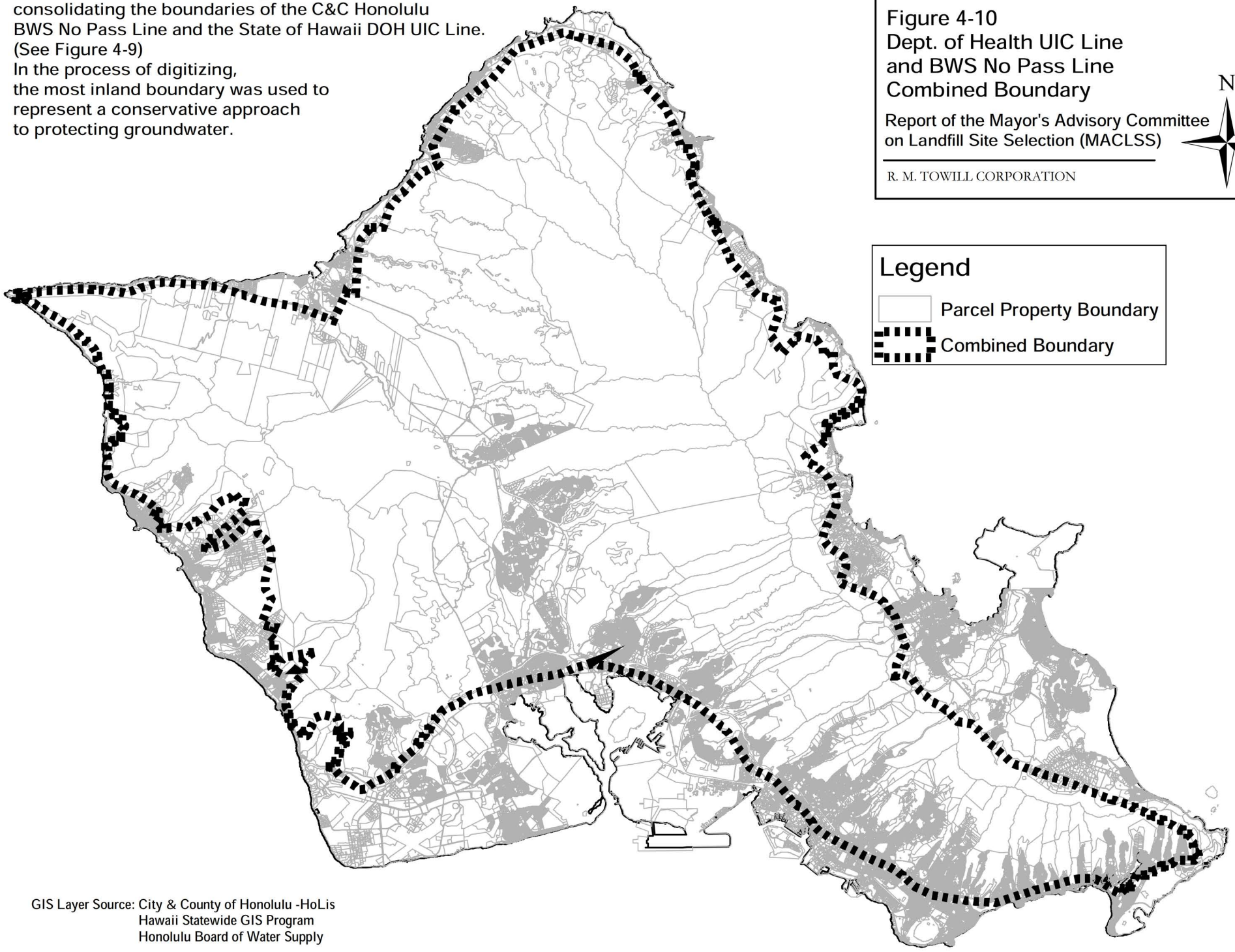
Note: The Combined Boundary is a result of consolidating the boundaries of the C&C Honolulu BWS No Pass Line and the State of Hawaii DOH UIC Line. (See Figure 4-9)
In the process of digitizing, the most inland boundary was used to represent a conservative approach to protecting groundwater.

Figure 4-10
Dept. of Health UIC Line and BWS No Pass Line Combined Boundary

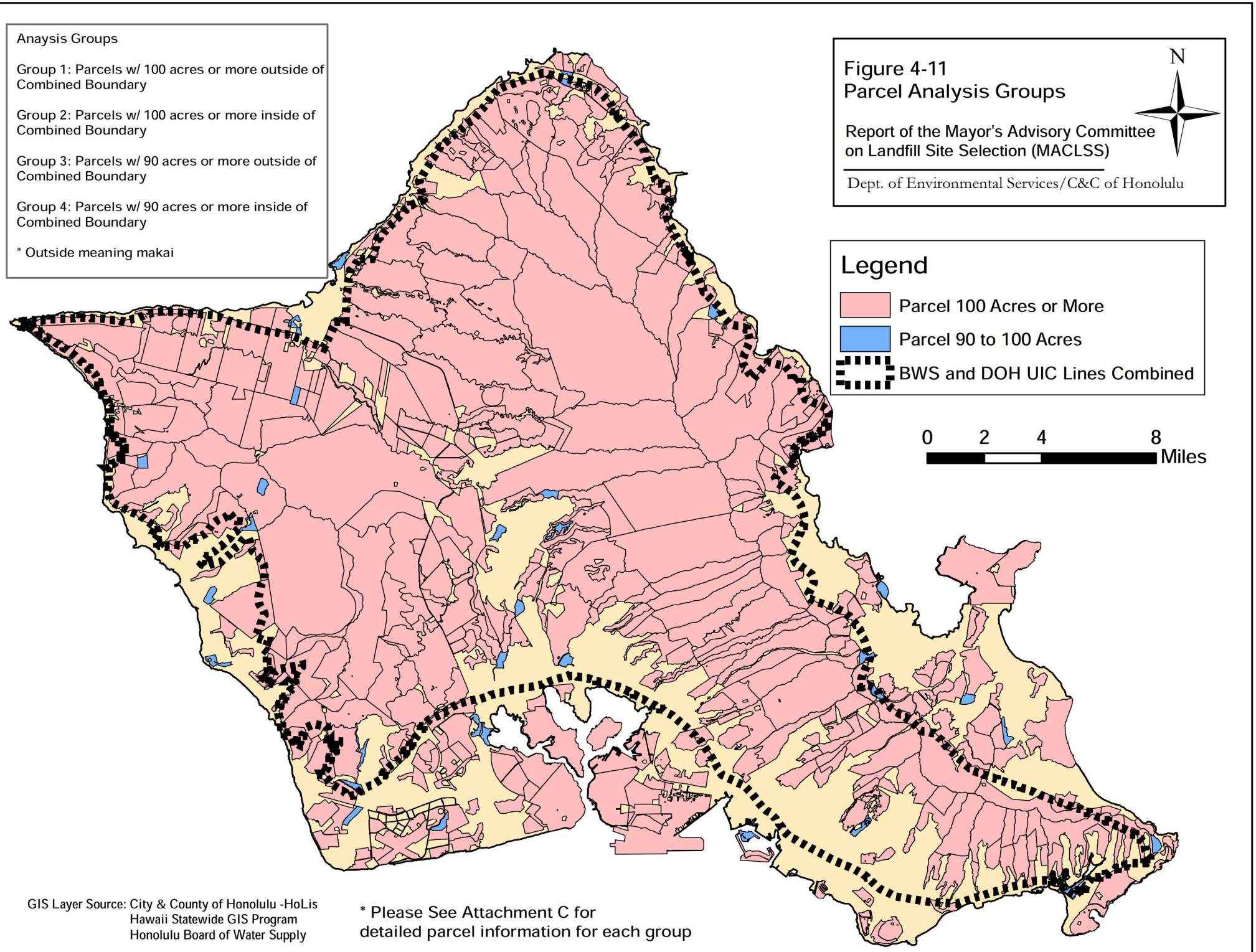
Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)

R. M. TOWILL CORPORATION

N



GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program
Honolulu Board of Water Supply


Anaysis Groups
Group 1: Parcels w/ 100 acres or more outside of Combined Boundary
Group 2: Parcels w/ 100 acres or more inside of Combined Boundary
Group 3: Parcels w/ 90 acres or more outside of Combined Boundary
Group 4: Parcels w/ 90 acres or more inside of Combined Boundary
* Outside meaning makai
Figure 4-11
Parcel Analysis Groups
Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
Legend
Parcel 100 Acres or More
Parcel 90 to 100 Acres
BWS and DOH UIC Lines Combined
0 2 4 8
Miles
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program
Honolulu Board of Water Supply
* Please See Attachment C for detailed parcel information for each group

Section 5 – The Committee's Community-Based Siting Criteria

5.1 Introduction

This section describes the design and implementation of the system used by the Committee to evaluate the list of potential landfill sites.

5.2 Methodology

The site evaluation system was developed in four steps:

(1) Developing the Committee's community-based siting criteria
(2) Developing the evaluation system
(3) Research and data collection to gather and enter data for each potential landfill site
(4) Development and application of the Committee's weighting for each criteria

Several of these steps were started simultaneously and all elements were coordinated to complete the evaluation.

5.2.1 Community-Based Site Evaluation Criteria

The Committee initiated its work by examining the site data compiled by the Consultants from the GIS-based site evaluation process. This resulted in 11 sites remaining for application of the Committee's community-based criteria.

An initial list of criteria was prepared based on Committee discussions where criteria were added, eliminated, combined, and reworded to reflect the intent of the Committee members. The Consultants revised and expanded the definitions used to describe the nature and scope of the criteria, added procedures for measurement, and noted potential data sources. The revised and enhanced list was discussed in subsequent meetings and revised again according to input from the Committee members. The final list of 19 criteria was approved by the Committee at its 5th meeting on May 12, 2012. The final site evaluation criteria list is provided in **Table 5-1**.

Table 5-1 – Final Site Evaluation Criteria

No.	Criterion Name
1	Landfill Capacity
2	Location Relative to Educational Institutions, Health Care Facilities, or Parks and Recreation Facilities
3	Location Relative to Residential Concentrations
4	Location Relative to Visitor Accommodations
5	Location Relative to Local or Visitor Commercial Facilities
6	Effect on Established Public View Planes
7	Wind Direction Relative to Landfill Site
8	Effect on Local Roads and Traffic in Residential Neighborhoods
9	Wear and Tear on Highways and Roadways Caused by Landfill Related Traffic
10	Location Relative to Identified Community Disamenities
11	Location Relative to H-POWER
12	Effect of Precipitation on Landfill Operations
13	Landfill Development, Operation and Closure Cost
14	Land Use Displacement Cost
15	Potential for Solid Waste-Related Land Uses
16	Location Relative to Wetlands and Natural Area Reserve System Land
17	Location Relative to Listed Threatened and Endangered Species
18	Location of Surface Water Resources
19	Location of Archaeological and Culturally Significant Resources

5.2.2 Landfill Site Evaluation System

The Committee's deliberations included directing the selection of a set of potential landfill sites, defining a set of evaluation criteria, and establishing criterion weights for use in the evaluation process. The Consultants gathered the data to measure the criteria for each site. The landfill site evaluation system brought together information on the potential sites, the evaluation criteria, criterion weights, and data, to generate a set of site scores that could be used to rank potential sites for a new O`ahu landfill.

The landfill site evaluation system consisted of a linked set of Microsoft Excel worksheets including: Data Sheets for each site; a Scoring Sheet to collect and score the data; and, a Ranking Sheet to display and rank sites according to the scores received for each of the sites.

Data Sheets

Data sheets were designed as shown in **Table 5-2**. One sheet was developed for each of the 19 criteria and included the data for each of the 11 sites identified by the Committee. All data sheets had the same format and included the following sections:

Definition: The title of the criterion and its meaning.

Rationale: The reason for including the criterion in the site evaluation system.

Measurement: The procedures used in the data collection, any transformations used, and a statement of the direction of measurement. Measurement direction assigned the lowest score to the criterion value that was least suited as a landfill site and the highest score to the value best suited for a landfill site. An example of how criteria were analyzed with existing data sources is shown in **Figure 5-1**.

Data Source: The documents or location of data used.

Data and Measurement Issues: Any problems encountered in data collection or caveats with respect to the quality or suitability of the data.

Calculation Detail: A table of data for each of the 11 sites. For each site the tables listed the site number and name, scoring details, the raw score, and scaled score. Summary data across all sits included the unit of measurement (miles, dollars, tons, etc.), the data range, a direction code (0 for low-to-high, 1 for high-to-low),the maximum value taken for any site, and notes.

The raw scores varied greatly for each criterion. Some, criterion such as #9, Wear and Tear on Highways and Roadways Caused by Landfill Related Traffic and #14, Displacement Cost had values measured in the hundreds of thousands, or hundreds of millions of dollars. Other criterion such as #3, Location relative to Residential Concentrations or #16, Location relative to Wetlands and Natural Area Reserve System Land, were measured in fractions of a mile. Ranges varied widely as well. Criterion #14, Displacement Cost ranged from zero to 509 million dollars and #5, Location Relative to Visitor Accommodations, ranged in value from 0.02 to 1.99.

These wide ranging values would act as self-weighting factors when the items are combined to form a site score, which in effect would defeat the purpose of the Committee's criterion weights. Therefore, each of the criterion raw scores was transformed to a scaled score with the same metric. Scaled scores ranged from 1 (least suited for a landfill site) to 10 (best suited for a landfill site). All other scores were scaled proportionally according to their raw data value. This procedure preserved the raw score ranking in the scaled score. Tied raw scores were tied in the scaled score and scaled scores were rounded to integers from 1 to 10.

Table 5-2 – Facsimile Data Sheet

Criterion 1: Landfill Capacity

Criterion Definition
Landfill capacity is the volume required to fill the landfill site at the future projected fill rates.

Rationale
A landfill site with a longer capacity is preferred over a site with less capacity. A minimum capacity of 15 years was established by the MACLS with input from ENV. It was decided that 15 years was the minimum life needed to justify the cost of acquiring, permitting, and constructing a new landfill. All of the sites evaluated during this project have estimated capacities greater than 15 years.

Measurement
Measurement was carried out in six steps: (1) a temporary site footprint was established at each site; (2) the usable landfill area was calculated as the total area of the footprint minus the area needed for landfill support facilities and other solid-waste related activities; (3) the total volume in cubic yards was estimated from the area of the top and bottom surfaces of the landfill and the distance between the surfaces; (4) the available volume of MSW that can be placed in the site was estimated as total volume minus the volume of soil and other materials needed for the liner, leachate, and gas controls, and for daily, intermediate, and final cover; (5) the available volume was converted to tons of MSW and H–POWER ash using the compacting factors that are being achieved at the WGSL; and (6) the capacity in tons was converted to capacity in years by estimating the amount of ash and MSW to be produced each year until the landfill capacity is reached. Capacity in years for each site (raw data) was then transformed to a ten-point scale with endpoints defined as shown below.

Point Value	Measure Assigned
1	The site with the least capacity needed to fill the landfill site.
10	The site with the greatest capacity needed to fill the landfill site.

Data Source
Honolulu Land Information System

Data and Measurement Issues
The landfill volume estimate is based on desktop review of the site so the volume should be expected to be refined with more detailed engineering.

Calculation Detail

Site Num.	Site Name	TMK	Landfill Capacity		
			Detail	Raw Score	Scaled Score
1	Site 1	00000001		00000001	#
2	Site 2	00000002		00000002	#
3	Site 3	00000003		00000003	#
4	Site 4	00000004		00000004	#
5	Site 5	00000005		00000005	#
6	Site 6	00000006		00000006	#
Raw score data is measured in:			Cubic Yards	Range:	-
Scale direction: 1 = normal scaled score; 0 = inverted scale score			0	Maximum:	-

Note: Normal scaled score is used when the raw data and the scaled score have the same direction, low to high. The higher score is preferred and thus the highest score is set at 10 and lowest score is set at 1. In cases where the lower score is preferred, the scale is inverted, i.e., the highest raw score is set at 1 and the lowest raw score is set at 10.

As an example, scaled scores for Criterion #2, Location Relative to Educational Institutions, Health Care Facilities, or Parks and Recreation Facilities were assigned as follows:

> The Upland Kahuku 2 site had the greatest raw score distance of 2.18 miles and was assigned the highest scaled score, 10.
>
> The Ameron Quarry site had the smallest distance of 0.2 miles and was assigned the lowest scaled score, 1.
>
> The Upland Nānākuli 1 site had a distance of 1.45 miles. For a raw score scale from .02 miles to 2.18 miles the proportionate equivalent on a ten-point scale is 6.7 rounded to 7.0.

The contents of the data sheets, including the scoring algorithm, were developed prior to submitting the sheets to the Committee for their review. They were delivered without data or site identification as shown in **Table 5-2**.

The data sheets for the 19 criteria for each of the eleven alternative landfill sites are presented in **Attachment D** of this report. The data sheets explain for each site the methodologies employed and the databases and other sources utilized as well as a summary of the raw and scaled scores for each criterion.

The scoring system presented in this report has the following characteristics:

- All raw scores are based on the most recent data available.
- Raw scores are based on objective data to the extent practicable.
- No scaled scores included the use of zeros.
- All criteria have scaled scores ranging from 1 to 10, with 1 indicating the least desirable site and 10 indicating the most desirable site, with reference to each respective criterion.

The choice of a single 1-10 scale for all criteria made the Committee's criteria weighting more meaningful, and the overall scoring more arithmetically robust. The use of a uniform scaled score range preserves the community value judgments inherent in the criteria weighting.

Scoring Sheet

A Scoring Sheet was prepared to record the individual criterion data and calculate the weighted combined scores for each site. The worksheet columns contain the site number and name, the combined score, and data for each of the 19 site selection evaluation criteria. Four sections of rows are used to gather the raw scores, scaled scores, criterion weights, and weighted scaled scores. Each section include all of the 11 sites.

Scoring Sheet cells are linked to corresponding cells in the data sheets. Raw and scaled score values are automatically transferred to the scoring sheet as they are entered or changed in the data sheets. Weighted scaled scores are the product of the scaled score and the criterion weight as was assigned by the Committee. Prior to the final calculation of scores, criterion weights were assigned a temporary value of one, making the weighted scaled scores equal to the scaled scores. The Committee was not allowed to review the scoring sheet during their deliberations because it contained the site list and the raw data. This is consistent with the intent of the dual blind process where the Committee members would not be allowed to know the locations of the sites until after the final scores are assigned.

The weighted criterion score for each site was calculated as the product of its criterion point value and the associated weight. The 19 weighted criterion scores for each site were then summed to calculate the Total Site Score. With the current scaled score ranges the total site scores have a minimum possible value of 19 (i.e., if all the criterion scaled scores for the site were 1) and a maximum possible value of 190 (if all the criterion scaled scores for the site were 10).

Ranking Sheet

The Ranking Sheet is a collection of the combined weighted scaled scores from the Scoring Sheet displayed on a single page. It was designed to simplify the presentation of detailed data in the scoring sheet and to allow sorting of the sites according to their final combined scores.

5.2.3 Data Gathering and Entry

When the format for the data sheets was completed and the sites subject to evaluation using the community-based criteria were identified, the project team began entering data to the datasheets. The work was completed by the Consultants, R. M. Towill Corporation, Pacific Waste Consulting Group, SMS Research & Marketing Services, Cultural Surveys Hawai'i, and AECOS Consultants, Inc.

A first step was to identify the TMK parcels on which the sites were located and to establish a landfill footprint for the site within the parcels. This exercise was necessary to estimate distances, establish roadways used for ingress and egress from and to the sites, and to estimate development costs, as required by the landfill site evaluation criteria.

The data was collected according to the procedures and from the sources noted in the data sheets. In a few cases, data were not available in the form specified in the data sheets and measurement procedures were modified to accomplish the task. All modifications or changes are noted in the data sheets.

The collected data were entered to the datasheets and automatically transferred to the Scoring Sheet. The final versions of the data sheets are provided in **Attachment C**.

5.2.4 Weighting Evaluation Scores

The landfill site evaluation system was designed and ready for use by the end of March 2012. The criterion weights were developed by the Committee in a separate process which was kept confidential from the Consultants in accordance with the dual blind procedure.

At a meeting of the Committee on Friday, April 20, 2012, the Committee's criterion weights were unveiled. The weights ranged from zero through six, with some criterion assigned fractional values. In order to simplify the system and to expand the distances between the weights, the weights were rescaled to a range from 1 to 10. The results of this process are shown in **Table 5-3**.

Table 5-3: Raw and Rescaled Criterion Weights

Site Selection Criterion		Weights	
No.	Criterion Name	Raw	Scaled
1	Landfill Capacity	1.0	2.50
2	Location Relative to Educational Institutions, Health Care Facilities, or Parks and Recreation Facilities	5.9	9.85
3	Location Relative to Residential Concentrations	6.0	10.00
4	Location Relative to Visitor Accommodations	2.0	4.00
5	Location Relative to Local or Visitor Commercial Facilities	2.0	4.00
6	Effect on Established Public View Planes	1.0	2.50
7	Wind Direction Relative to Landfill Site	2.0	4.00
8	Effect on Local Roads and Traffic in Residential Neighborhoods	5.7	9.55
9	Wear and Tear on Highways and Roadways Caused by Landfill Related Traffic	0.0	1.00
10	Location Relative to Identified Community Disamenities	5.5	9.25
11	Location Relative to H-POWER	5.1	8.65
12	Effect of Precipitation on Landfill Operations	5.5	9.25
13	Landfill Development, Operation and Closure Cost	4.0	7.00
14	Displacement Cost	1.0	2.50
15	Potential for Solid Waste-Related Land Uses	0.0	1.00

Site Selection Criterion		Weights	
No.	Criterion Name	Raw	Scaled
16	Location Relative to Wetlands and Natural Area Reserve System Land	2.0	4.00
17	Location Relative to Listed Threatened and Endangered Species	1.0	2.50
18	Surface Water Resources	5.3	8.95
19	Archaeological and Culturally Significant Resources	0.0	1.00

The Consultants entered the rescaled criterion weights to the Scoring Sheet. As the rescaled weights were entered the weighted scaled scores were automatically recalculated to reflect the Committee's assigned criterion values. The Preliminary Site Scores were automatically summed and collected in the Ranking Sheet. The Consultants sorted the results and presented the preliminary scores to the Committee at the meeting.

During the process of applying the criteria weights, a real time error occurred and on Wednesday, April 25th, the Committee members were notified and a press conference held to present to the news media and public the following:

(1) On Friday, April 20th during a meeting of the Committee a real time calculation of the ranking of potential landfill sites using the Committee's community criteria weights was performed. The result was a preliminary ranked list of potential landfill sites. As a normal part of Quality Assurance/Quality Control (QA/QC) procedures, the preliminary results underwent data review and evaluation over the course of that weekend.

(2) On Sunday, April 22nd, a data error was discovered. The error took place during an approximately 15 - 20 minute break when adjustments to the equations evaluating the data were being performed. Thus, the data error occurred in *real time*.

(3) On Monday, April 23rd, the City was informed of the error and advised that steps were being taken to verify the source of the error and that a new ranked list of sites would result. The City asked that a re-verification step be taken and to be notified when this was completed.

(4) By Tuesday, April 24th, the City was informed that the re-verification step was completed and the Committee members and press would be contacted regarding the corrected results.

Emphasized during the press conference of April 25 were two important points:

(1) The error occurred in real time and during the course of the Committee's meeting. This error was a data error only and does not affect the integrity of the Committee's process which has been carefully followed to date; and

(2) The work of the Committee is an important first step in evaluating sites using criteria intended to reflect the community's priorities in the siting of a landfill. The City's next steps will include the evaluation of sites with technical studies and analyses including the preparation of an EIS.

Section 6 – Results of Site Ranking and Committee Recommendations

6.1 Results of the Scoring Process

The final scoring data – raw and scaled criterion scores and weights for 11 sites and 19 site evaluation criteria are provided in **Table 6-1**. Summary scores are shown at the bottom of the table.

The possible summary scores for the system range from 101.5 to 1,015.0. The actual summary scores ranged from a low of 437.0 for the Kapa'a Quarry Road site to a high of 716.0 for the Upland Kahuku 2 site.

6.2 Site Ranking

The Landfill Site Evaluation System automatically transferred the Total Scores to the Ranking Sheet. The scores were transferred in order by site number and then sorted from the highest to the lowest value of the total scores for each potential landfill site. The results of the ranking are shown in **Table 6-2**.

The ranking and scores in Table 6-2 represent the ranked list of sites which was the desired outcome of the Committee's work. For each of the 11 sites identified by the Committee, data were applied according to each of the 19 site evaluation criteria they defined and was multiplied by the criterion weights they generated to calculate the final site score. The location of the scored sites are shown in **Figure 6-1**.

The ranked list of sites reflects community concerns that were identified and considered by the Committee. Although the Committee considered issues that would also concern site civil engineering, finance, geology and hydrogeology, and other disciplines that would be required for the technical evaluation of a municipal sanitary landfill, their work was not intended to replace or supersede such studies. Their work is intended to reflect public and community concerns and provides a set of sites ranked according to their suitability as determined by that concern. Many other studies and considerable additional work will be applied by the City prior to the selection of its final landfill site.

6.3 Committee Recommendations

(1) The sites identified through this process include seven out of 11 alternative landfill sites located within the UIC line/No Pass line (see **Table 1-3**). The Committee recognizes that these seven potential landfill sites do not conform to existing City policy as expressed in Council Resolution 03-09. However, the Committee notes the following points:

- It chose to continue with an evaluation of an expanded list of new landfill sites only after careful consideration. The Committee had extensive deliberation on the content of Resolution 03-09 and the difficulty of identifying a new landfill site on O'ahu given the acute shortage of remaining land that is available for landfilling, i.e., the City engaged in prior efforts that identified several potential landfill sites that over time were being slowly but systematically reduced in number with new land use and economic development.
- A landfill that is properly designed, engineered, and operated in accordance with environmental regulatory controls and safeguards should not adversely affect groundwater. Alternative landfill sites should therefore be investigated in locations not previously considered by the City, such as within the UIC and No Pass line; and,

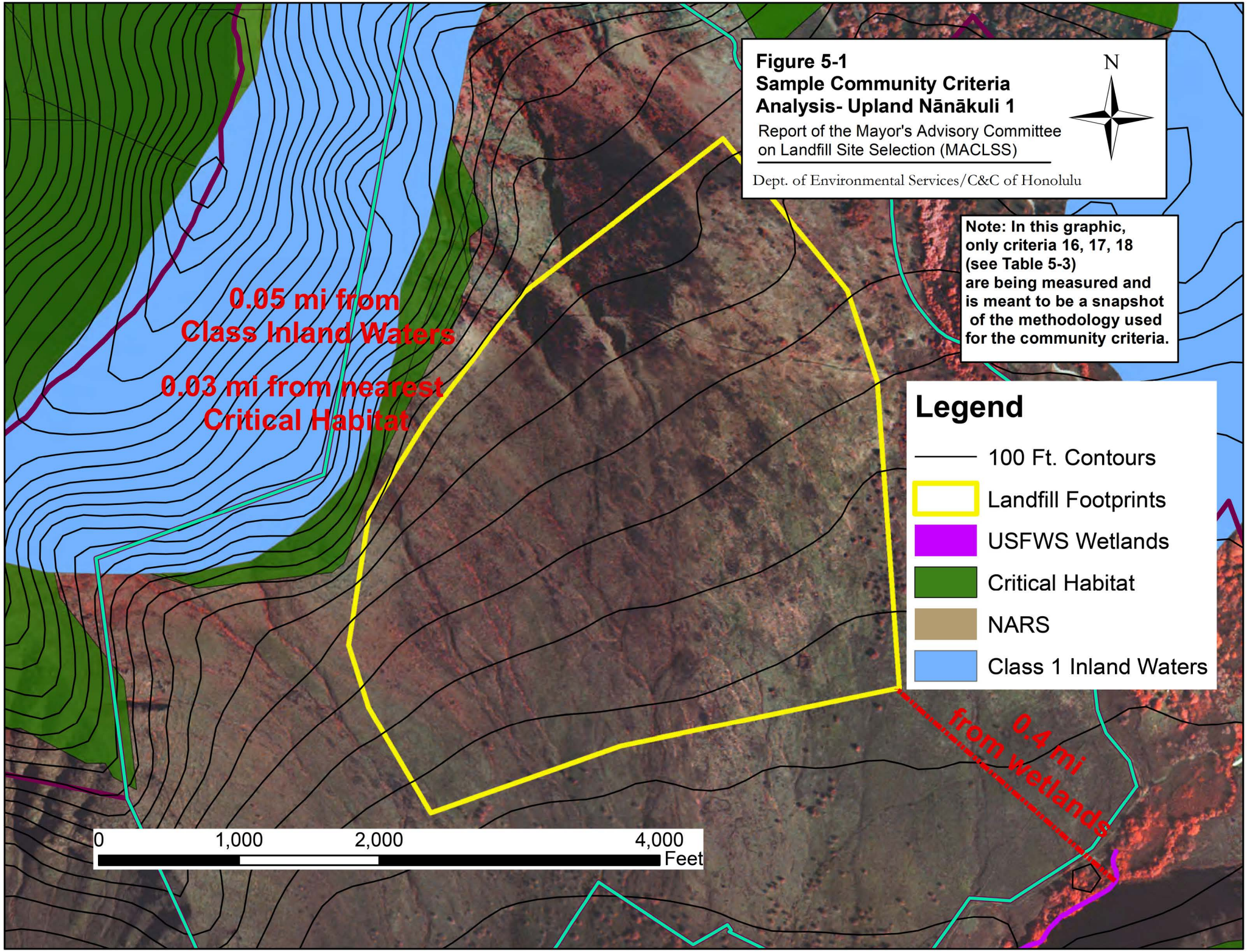


Figure 5-1
Sample Community Criteria
Analysis- Upland Nānākuli 1
Report of the Mayor's Advisory Committee
on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
Note: In this graphic,
only criteria 16, 17, 18
(see Table 5-3)
are being measured and
is meant to be a snapshot
of the methodology used
for the community criteria.
0.05 mi from
Class Inland Waters
0.03 mi from nearest
Critical Habitat
Legend
100 Ft. Contours
Landfill Footprints
USFWS Wetlands
Critical Habitat
NARS
Class 1 Inland Waters
0.4 mi
from wetlands
0
1,000
2,000
4,000
Feet

Table 6-1 – Community-Based Siting Criteria and Weighting Factors

	Criterion	Weight	Ameron Quarry		Upland Lā'ie		Upland Pupukea 1		Upland Pupukea 2		Kea'au		Upland Nānākuli	
			Scaled Score	Weighted Score	Scaled Score	Weighted Score	Scaled Score	Weighted Score	Scaled Score	Weighted Score	Scaled Score	Weighted Score	Scaled Score	Weighted Score
1	Landfill Capacity	2.50	5	2	5	2	5	2	5	2	5	2	25	10
2	Location Relative to Educational Institutions, Health Care Facilities, or Parks and Recreation Facilities	9.85	10	1	20	2	69	7	69	7	30	3	69	7
3	Location Relative to Residential Concentrations	10.00	20	2	20	2	40	4	40	4	20	2	20	2
4	Location Relative to Visitor Accommodations	4.00	4	1	16	4	4	1	24	6	4	1	4	1
5	Location Relative to Local or Visitor Commercial Facilities	4.00	8	2	4	1	4	1	28	7	4	1	28	7
6	Effect on Established Public View Planes	2.50	25	10	20	8	25	10	25	10	20	8	3	1
7	Wind Direction Relative to Landfill Site	4.00	32	8	32	8	32	8	40	10	8	2	8	2
8	Effect on Local Roads and Traffic in Residential Neighborhoods	9.55	96	10	86	9	96	10	96	10	96	10	10	1
9	Wear and Tear on Hwys and Roadways caused by Landfill Related Traffic	1.00	10	10	9	9	8	8	1	1	10	10	10	10
10	Location Relative to Identified Community Disamenities	9.25	37	4	93	10	93	10	93	10	93	10	93	10
11	Location Relative to H-POWER	8.65	52	6	9	1	43	5	43	5	78	9	87	10
12	Effect of Precipitation on Landfill Operations	9.25	74	8	93	10	74	8	74	8	37	4	46	5
13	Landfill Development, Operation and Closure Cost	7.00	56	8	49	7	49	7	49	7	42	6	70	10
14	Displacement Cost	2.50	3	1	25	10	25	10	25	10	25	10	25	10
15	Potential for Solid Waste-Related Land Uses	1.00	5	5	4	4	1	1	1	1	6	6	10	10
16	Location Relative to Wetlands and Natural Area Reserve System (NARS)	4.00	32	8	4	1	4	1	4	1	8	2	40	10
17	Location Relative to Listed Threatened and Endangered Species	2.50	13	5	5	2	8	3	10	4	3	1	3	1
18	Surface Water Resources	8.95	90	10	72	8	27	3	45	5	36	4	9	1
19	Archaeological and Culturally Significant Resources	1.00	10	10	1	1	10	10	10	10	10	10	10	10
	Site MACLSS Score			**111**		**99**		**109**		**118**		**101**		**118**

Table 6-1 – Community-Based Siting Criteria and Weighting Factors (Continued)

	Criterion	Weight	Upland Hawaii Kai		Kapa'a Quarry Road		Kāne'ohe by H3		Upland Kahuku 1		Upland Kahuku 2	
			Scaled Score	Weighted Score	Scaled Score	Weighted Score	Scaled Score	Weighted Score	Scaled Score	Weighted Score	Scaled Score	Weighted Score
1	Landfill Capacity	2.50	3	1	3	1	3	1	5	2	13	5
2	Location Relative to Educational Institutions, Health Care Facilities, or Parks and Recreation Facilities	9.85	20	2	10	1	10	1	79	8	99	10
3	Location Relative to Residential Concentrations	10.00	30	3	10	1	10	1	90	9	100	10
4	Location Relative to Visitor Accommodations	4.00	4	1	4	1	4	1	4	1	40	10
5	Location Relative to Local or Visitor Commercial Facilities	4.00	4	1	8	2	4	1	40	10	32	8
6	Effect on Established Public View Planes	2.50	13	5	8	3	15	6	25	10	13	5
7	Wind Direction Relative to Landfill Site	4.00	4	1	32	8	32	8	24	6	8	2
8	Effect on Local Roads and Traffic in Residential Neighborhoods	9.55	96	10	86	9	96	10	38	4	48	5
9	Wear and Tear on Hwys and Roadways caused by Landfill Related Traffic	1.00	10	10	9	9	9	9	7	7	7	7
10	Location Relative to Identified Community Disamenities	9.25	93	10	9	1	93	10	93	10	93	10
11	Location Relative to H-POWER	8.65	35	4	52	6	52	6	17	2	17	2
12	Effect of Precipitation on Landfill Operations	9.25	9	1	56	6	56	6	93	10	83	9
13	Landfill Development, Operation and Closure Cost	7.00	7	1	35	5	35	5	0	7	56	8
14	Displacement Cost	2.50	25	10	25	10	25	10	25	10	25	10
15	Potential for Solid Waste-Related Land Uses	1.00	1	1	7	7	1	1	8	8	6	6
16	Location Relative to Wetlands and Natural Area Reserve System (NARS)	4.00	24	6	32	8	28	7	4	1	4	1
17	Location Relative to Listed Threatened and Endangered Species	2.50	10	4	25	10	23	9	15	6	10	4
18	Surface Water Resources	8.95	45	5	18	2	9	1	81	9	63	7
19	Archaeological and Culturally Significant Resources	1.00	10	10	10	10	10	10	1	1	1	1
	Site MACLSS Score			**86**		**100**		**103**		**121**		**120**

- The list of original sites the Committee was asked to consider needed to be expanded on the basis that, without a change in how landfill siting is considered, the City would continue to be limited to the same list of alternative locations previously identified.

Table 6-2 – Site Rankings

Rank Order	Potential Landfill Site Number and Name	Score
1st	11. Upland Kahuku 2	716
2nd	10. Upland Kahuku 1	697
3rd	4. Upland Pupukea 2	681
4th	3. Upland Pupukea 1	616
5th	1. Ameron Quarry	580
6th	6. Upland Nānākuli 1	568
7th	2. Upland Lā'ie	565
8th	5. Kea'au	533
9th	9. Kāne'ohe by H3	512
10th	7. Upland Hawai'i Kai	440
11th	8. Kapa'a Quarry Road	437

(2) The Committee believes that since land available for a landfill is limited on O'ahu, that they should direct the Consultant to look at federal lands not known to be in active military use. These sites were added to the analysis.

(3) The Committee's process involved the identification of alternative landfill sites by the Consultant using a GIS-based system supplemented by interviews with regulatory agencies. This desktop level of study was therefore undertaken making every effort to utilize or obtain current information. Accordingly, the ranking of potential landfill sites presented herein and the findings and recommendations of this report should not be misconstrued as the final level of analysis that should be performed. The City must exercise due diligence by verifying the Committee's work and findings through the conduct of further studies as would customarily be performed in technical studies and analyses, including the preparation of an EIS, for a new landfill site.

6.4 Other Recommendations

The Committee during its deliberations, as previously indicated, decided to expand the list of potential sites to those located within the UIC line/No Pass line as established by the DOH and BWS. The addition of sites resulted in multiple ranked lists and included those that meet City Council Policy and those that do not, and those that meet the 100 acre minimum and those between 90 to 100 acres in size.

The Committee strongly recommends that the City move aggressively to develop alternative technologies to landfilling, and continue to strengthen its waste stream diversion and recycling efforts.

In planning, designing and choosing an operator for the next landfill site, the Committee recommends the City adopt a philosophy that everything that goes into the landfill may be of value and could provide a potential revenue stream for the operator and the City in the future. It is also strongly recommend that this thinking be applied to the existing site with the current operator. This would require the operator to adequately map where things are disposed of such that if value can be derived from items in the future, they can be recovered.

The Committee feels that whatever site is ultimately chosen the City must consider "Host Community Benefits." The details of a benefits package should be negotiated with the affected community.

6.5 Committee Minority Report

A Minority Report was filed by one member of the Committee. The content is provided in its entirety:

MINORITY REPORT
MAYOR'S ADVISORY COMMITTEE ON LANDFILL SITE SELECTION
DISSENTING ON TECHNICAL BASIS OF THE FINDINGS

May 4, 2012

The set of preferred sites generated by the MACLSS process does not accurately reflect the weighted criteria developed and approved by the committee. The problem is that the metric of an important criterion approved by the committee fails to properly measure the criterion of concern, as the committee-approved measurement fails to take into account state highways that travel through residential neighborhoods when calculating the score for the criterion. This omission needs to be corrected for the stated intent of the criterion to be accurately reflected in the prioritized list of sites. Of the 19 site selection criteria, #8, "Effect on Local Roads and Traffic in Residential Neighborhoods", was given the third highest criterion weighting, but the quantification of the characteristic upon which the weighting factor was applied excluded many miles of roads through residential areas. This lack of properly accounting for distance through residential areas has thwarted an honest comparison among sites and warped the outcome of an otherwise reasonable process. It can and should be corrected in considering the output of the committee.

The MACLSS has been meeting for over a year to consider criteria of importance in finding a suitable site for a new landfill, and to apply relative weights to those criteria. These deliberations were performed without reference to site identification to avoid the "not in my backyard" problem that besets the issue. Each candidate site, of which there were numerous throughout the island, was assigned a unique numerical attribute for each criterion by virtue of a related physical characteristic; these were developed and applied by the consultant team to score the site for that criterion relative to other sites. When the final criteria weightings were applied to these scorings at the April 20th meeting, the results were disclosed to the consultant team, public and MACLSS at the same time. Unfortunately, upon further examination an error in applying the weightings in real time was revealed, and a revised set of recommended sites was supplied to the committee and published on April 25th.

The revised site rankings were astounding, and seem to defy common sense. Measured from H-power, the source of over 2/3 of the waste to be deposited, the length of routes through residential neighborhoods appear to be maximized, rather than minimized. Criterion #8 was deemed by the committee third most important among 19 criteria, the intent of which was characterized by the following statement: "A potential landfill site that causes less traffic through residential neighborhoods is preferred over sites that generate larger amounts of traffic (longer trips) passing residential homes (houses passed)". The committee's approved measure, by excluding travel distance through residential areas along state numbered roadways, fails to account for many miles of hauling-distance through residential areas.

Why would such sites be preferred, that require daily hauling in excess of 60 truck loads (at 20 tons / load) over 44 miles, 14 miles of which is along a two lane road lined with residences and small businesses, and famous both for beautiful beaches and traffic congestion? The answer is that in applying the criterion measure for 'effects on roads and traffic in residential areas', these

14 miles of roadway were not counted because they are on a state, rather than a city road. I can assure you that residents living along a numbered state roadway of two lanes and 30 mph speed limit feel no differently about large trucks and traffic going through their neighborhood than do residents along a city owned two-lane road with a 30 mph speed limit. Both should be counted. In fairly and accurately characterizing sites for this criterion, the measurement algorithm needs to be changed to include all such roads other than freeways:

- *From the present method of quantifying "miles of roadway between the landfill site and the point at which refuse trucks leave state numbered roadway weighted by number of residential parcels along the road"*
- *To "the miles of roadways other than interstate or limited access freeways through or adjacent to residential, commercial and mixed use zoned districts that trucks must travel between the landfill site and point of origin".*

To put these neglected impacts in perspective, consider some facts and numbers from the 2008 EIS for Waimanalo Gulch Sanitary Landfill Lateral Expansion EIS. It should be noted that "Location Relative to H-Power" was a separate criterion explicitly considered by the committee (Criterion #11) weighted as 8th most important, and was measured as distance in miles regardless of type roads traveled.

Sources and Amount of Waste to the Landfill CY 2006

SOURCE	***CONTENT***	***ANNUAL TONS OF MATERIAL***	***TRUCK LOADS DAILY[1]***
H-power	*Ash*	*167,000*	*32*
H-power	*Diverted*	*154,000*	*30*
Transfer stations and convenience centers	*Non-combustible and other waste*	*184,000*	*35*
TOTAL:	*All Landfill Waste*	*505,000*	*97*

[1] *Estimated at 20 tons per load, annual loads equally distributed over 260 working days per year*

In the year 2019, by which time the third H-power unit is expected to be on line, it is projected that ash will constitute 250,000 tons a year, with diverted and non-combustible waste of 170,000 tons. This is the daily equivalent of 48 and 33 loads respectively.

Where would these loads have to travel?

Today, they are carried from H-power to Waimanalo Gulch Sanitary Landfill, a journey of approximately 6 miles. For H-power alone that is 372 truck miles daily, primarily along industrial roads or a 4-lane freeway.

To Kahuku, trucks from H-power would travel 44 miles, 14 of which would be along Kamehameha Highway, from Haleiwa to Kahuku, after passing through or around the town of Wahiawa. This is equivalent to 2,728 truck miles daily, of which over 868 truck miles would be on two-lane, primarily residential and mixed-use roadways. By 2019, this will increase to 3,564 truck miles daily. This is for travel one way; the trucks must also return, doubling the impact.

Kapa'a Transfer Station is the source of roughly 31,000 tons annually of non-combustible waste. The roughly 6 trucks daily from this site would travel 30 miles to Kahuku primarily along Kamehameha Highway, of which 26 miles would be on two-lane roads through primarily residential areas of Kaneohe, Kahaluu, Kaawa, Punaluu, Hauula, and Laie. This is equivalent to an additional 156 truck miles hauled on two lane roads through residential areas. One way.

In essence, by the inequitable application of Criterion #8, it is proposed that the travel miles through residential areas hauling waste ash, diverted and non-combustible solid waste, wastewater treatment sludge, and other products for disposal be increased from current levels

by a multiple of nearly 8 (775% by total truck miles). Although this measure was approved by the committee, I do not believe that it is true to the stated intent of the criterion.

It is too late now to return to the committee for reconsideration of such issues. However, in considering the output of the committee, the manner in which Criterion #8 was applied needs to be taken into account. The methodology did not accurately characterize miles of roads through residential areas along which waste trucks would have to proceed to reach the identified sites. This flaw can be corrected, and should be before considering any prioritization of sites identified by this process.

The contents of this minority report are my own opinions and do not represent the findings of the committee.

Respectfully submitted,
John B. Goody
Member of the MACLSS

The content of the minority report is understood as the desire to modify the measurement of Criterion 8, Effect on Local Roads and Traffic in Residential Neighborhoods, to include the total distances involved instead of limiting the analysis to the effect on local roads within residential neighborhoods.

It is recommended that this analysis be performed as the City proceeds with its next steps toward the technical evaluation of the alternative sites. The key findings of the Committee including revisiting the purpose and intent of Criterion 8, should therefore be performed as a verification step, with the results incorporated into the final decision making process.

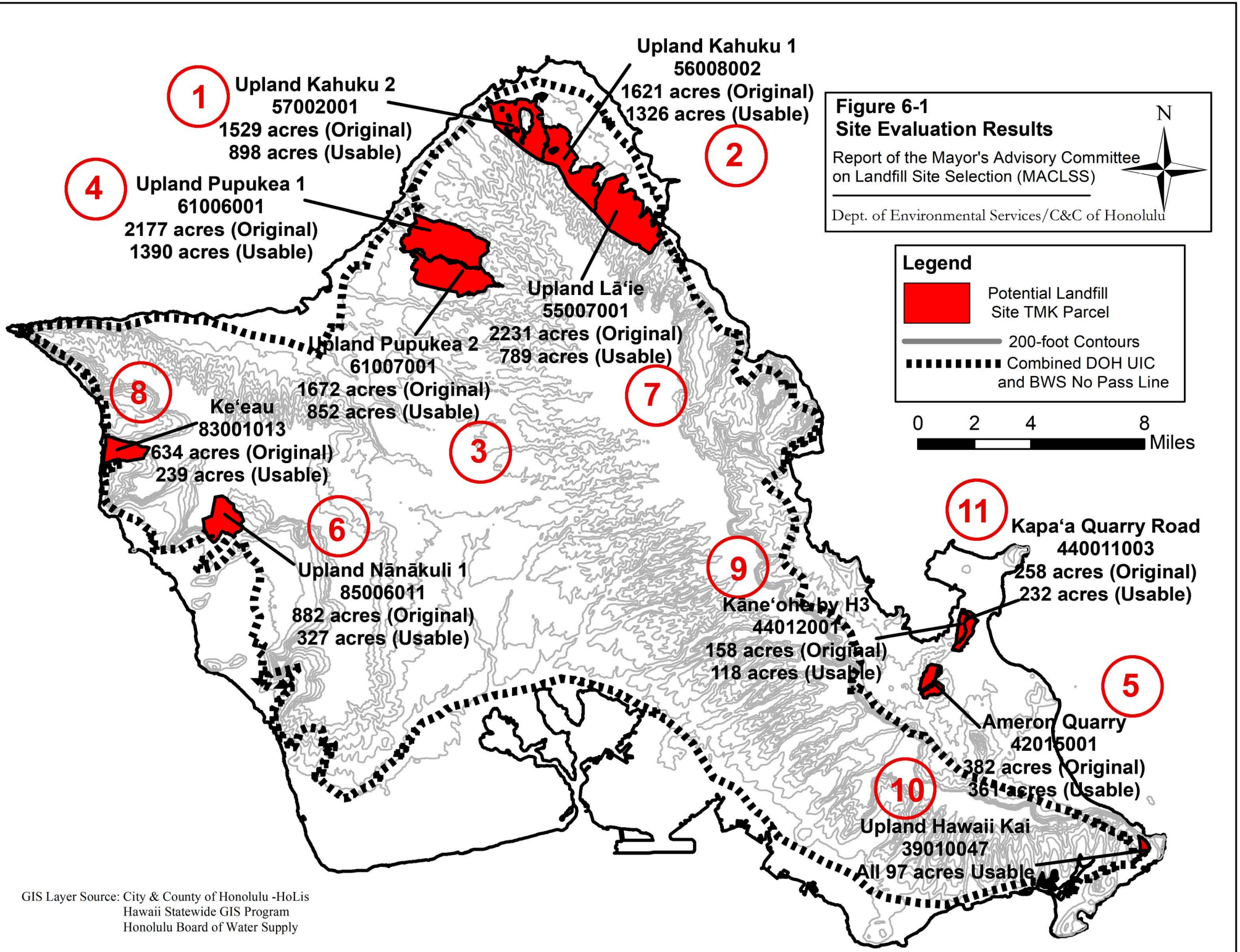


Figure 6-1
Site Evaluation Results
Report of the Mayor's Advisory Committee on Landfill Site Selection (MACLSS)
Dept. of Environmental Services/C&C of Honolulu
N
Legend
Potential Landfill Site TMK Parcel
200-foot Contours
Combined DOH UIC and BWS No Pass Line
0 2 4 8 Miles
1
Upland Kahuku 2
57002001
1529 acres (Original)
898 acres (Usable)
2
Upland Kahuku 1
56008002
1621 acres (Original)
1326 acres (Usable)
3
Upland Lā'ie
55007001
2231 acres (Original)
789 acres (Usable)
4
Upland Pupukea 1
61006001
2177 acres (Original)
1390 acres (Usable)
5
Ameron Quarry
42015001
382 acres (Original)
361 acres (Usable)
6
Upland Nānākuli 1
85006011
882 acres (Original)
327 acres (Usable)
7
Upland Pupukea 2
61007001
1672 acres (Original)
852 acres (Usable)
8
Ke'eau
83001013
634 acres (Original)
239 acres (Usable)
9
Kāne'ohe by H3
44012001
158 acres (Original)
118 acres (Usable)
10
Upland Hawaii Kai
39010047
All 97 acres Usable
11
Kapa'a Quarry Road
440011003
258 acres (Original)
232 acres (Usable)
GIS Layer Source: City & County of Honolulu -HoLis
Hawaii Statewide GIS Program
Honolulu Board of Water Supply