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DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793
August 22, 1994

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QUALITY
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AUG 26 AM 5:59
RECORD

Mr. Brian J.J. Choy
Office of Environmental Quality Control
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

Dear Mr. Choy:

SUBJECT: Lahaina Wastewater Pump Station 3 and Related Improvements TMK: 4-5-21:3, 7, 11 and 4-5-30:15, 16, 137, 138, 139, Lahaina, Maui, Hawaii

In accordance with the requirements of Chapter 343, Hawaii Revised Statutes, and Chapter 200 of Title 11, Administrative Rules, a Final Environmental Assessment (EA) has been prepared for the subject project.

Notice of availability of the Draft EA for the project was published in the July 8, 1994 OEQC Bulletin. Comments received during the public comment period as well as our responses have been included in the Final EA. Comments were also received after the conclusion of the 30-day comment period. These comments as well as our responses have also been included in the Final EA.

As the proposing agency, we are forwarding herewith one (1) copy of the OEQC Bulletin Publication Form, and four (4) copies of the Final EA. We have determined that there will be no significant impacts as a result of the project and, therefore, are filing the Final EA as a negative declaration. We respectfully request that the notice of Final EA be published in the OEQC Bulletin.

Very truly yours,

GEORGE N. KAYA
Director of Public Works and Waste Management

DT:ym(WM95029d)
c: Milton Arakawa, Munekiyo & Arakawa, Inc.

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1994-09-08-MA-PEA-Lahaina Wastewater SEP - 8 1994
Pump Station 3

**Final
Environmental Assessment**

**Lahaina Wastewater Pump
Station 3 and Related
Improvements**

Prepared for

County of Maui, Dept. of Public
Works and Waste Management

August 1994



***Final
Environmental Assessment***

***Lahaina Wastewater Pump
Station 3 and Related
Improvements***

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County of Maui, Dept. of Public
Works and Waste Management

August 1994



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Preface

The County of Maui, Department of Public Works and Waste Management, proposes to construct wastewater pump station, force main and gravity line improvements located in Lahaina, Maui, Hawaii. Pursuant to Chapter 343, Hawaii Revised Statutes, and Chapter 200, of Title 11, Administrative Rules, Environmental Impact Statement Rules, this Final Environmental Assessment documents the project's technical characteristics and environmental impacts, and advances findings and conclusions relative to the significance of the project.

Summary

Proposing Agency and Landowner

The proposing agency for the project is the County of Maui, Department of Public Works and Waste Management. The landowners of the affected properties are the State of Hawaii, County of Maui, and Pioneer Mill Company, Ltd.

Contact Person

For further information, contact Dave Taylor, County of Maui, Department of Public Works and Waste Management, Wastewater Reclamation Division, 200 South High Street, Wailuku, Maui, Hawaii, 96793, or at telephone number (808)243-7417.

Property Location

The site of the proposed Lahaina Wastewater Pump Station 3 is within the 2.252 acre Wahikuli Terrace Park. Existing Lahaina Wastewater Pump Station 9 is located on a separate 870 square foot parcel at the southwest corner of the park. To the north, east, and south, the park abuts the Wahikuli Terrace residential subdivision. To the west or makai of Wahikuli Terrace Park, there is an approximately 30-foot wide right-of-way which is intended to be used for Malo Street improvements. Then there is land of varying width owned by the State of Hawaii on which a revocable permit was issued to Railroads of Hawaii for a railroad right-of-way. Pioneer Mill Company, Ltd. owns an approximately 20-foot wide sliver of land which abuts Honoapiilani Highway. Makai of Honoapiilani Highway lies the Kapunakea Subdivision.

Force main and gravity line improvements are proposed within the Honoapiilani Highway right-of-way, from Wahikuli Terrace Park to the existing Lahaina Wastewater Pump Station 3 located in the southern portion of the Wahikuli State Wayside Park parcel. To the east or mauka of the highway lies Wahikuli House Lots. The Wahikuli Terrace Subdivision lies further to the south. On the makai side of the highway, there is the area of the Kapunakea Subdivision and the Chart House Restaurant. Front Street intersects Honoapiilani Highway adjacent to the Chart House. Moving north along the highway, the Wahikuli State Wayside Park forms a sliver of land makai of the highway.

A 20-inch force main is proposed which extends from Honoapiilani Highway to the new Housing Finance and Development Corporation (HFDC) off-site 27-inch gravity line. This force main segment is located on lands owned by the State of Hawaii. To the north are lands currently planted in sugar cane. To the east and south are lands which were formerly in sugar cane cultivation. These lands, currently vacant, are proposed for the HFDC's Villages of Leialii Project. Further south, there is the existing Lahaina Civic Center. On the makai side of the highway lies the Wahikuli State Wayside Park.

Proposed Action

1. Lahaina Wastewater Pump Station 3

Existing Lahaina Wastewater Pump Station 3 is proposed to be abandoned. The interior of the existing pump station is proposed to be gutted. However, the above-grade structure will not be altered and could be used for alternative purposes such as equipment storage by the County. Existing below-grade improvements are proposed to be filled with sand or concrete. Existing Lahaina Wastewater Pump Station 9 is proposed to be demolished.

A new Lahaina Wastewater Pump Station 3 is proposed to be constructed in Wahikuli Terrace Park. This includes a single story pump building approximately 62 feet by 28 feet in area. It is anticipated that the pump building would contain rough split face concrete masonry block walls with a wooden hip roof and a small gable. A below-grade wet well is located adjacent to the pump building. Other accessory improvements within the pump building include a motor control room, emergency power generator room, variable drive pumps, wet well level sensors, flow meters, and odor control equipment. The site also contains an above-ground emergency diesel fuel tank and a forced air system tower odor scrubber. The site would be secured by 6-foot high perimeter fencing with landscaping and hedges. Malo Street is proposed to be improved to provide driveway access for purposes of maintaining and servicing Lahaina Wastewater Pump Station 3.

2. Lahaina Wastewater Pump Station 3 Force Main

A 20-inch force main is proposed to be constructed from the new Lahaina Wastewater Pump Station 3 in Wahikuli Terrace Park to the old Wastewater Pump Station 3. The new force main joins an existing 20-inch force main within the Honoapiilani Highway right-of-way which extends to the Kaanapali area. A new 20-inch force main is proposed to link with the existing force main north of the Lahaina Civic Center site extending mauka to link with the new off-site gravity line to be built in connection with the Villages of Leialii Project by the HFDC. The existing force main segment from the Civic Center to the Kaanapali area is proposed as a back-up. A valve is proposed to be installed which directs flows either through the new mauka force main segment or the existing force main segment extending to the Kaanapali area. The HFDC off-site gravity line, which is not part of the scope of this project, is proposed to extend northward to the new Lahaina Wastewater Pump Station 1 which will be located on the Lahaina Wastewater Reclamation Facility parcel.

3. **Lahaina Wastewater Pump Station 3 Gravity Line Improvements**

Gravity line improvements are also proposed. Wastewater flowing northwest via an existing 27-inch gravity line within the Honoapiilani Highway right-of-way is proposed to be intercepted near Wahikuli Terrace Park. From the 27-inch line, flows would be transported to the new Lahaina Wastewater Pump Station 3 by a new 30-inch gravity line. The existing 27-inch gravity line from Wahikuli Terrace Park to the existing Wastewater Pump Station 3 is proposed to be abandoned. An existing 12-inch gravity line which extends south from the Villages of Leialii Project to the existing Wastewater Pump Station 3, is proposed to be extended to the new Wastewater Pump Station 3. Line size is anticipated to be a maximum of 18 inches. It is anticipated that the new 20-inch force main and gravity line extension would utilize the same trench as the abandoned 27-inch gravity line.

4. **Lahaina Wastewater Pump Station 1**

The existing Lahaina Wastewater Pump Station 1 is proposed to be abandoned with a new Wastewater Pump Station 1 being built on the Lahaina Wastewater Reclamation Facility parcel. The interior of the existing wastewater pump station is proposed to be gutted. The existing above-grade structure will remain and could be used for alternative purposes such as equipment storage. Existing below-grade improvements are proposed to be filled with sand or concrete. Although part of the scope of this project, the replacement of Lahaina Wastewater Pump Station 1 is proposed to be exempt from the environmental review process in accordance with Section 11-200-8, Hawaii Administrative Rules. The action falls under exemption class #2 which is noted as follows:

"Replacement or reconstruction of existing structures and facilities where the new structure will be located generally on the same site and will have substantially the same purpose, capacity, density, height and dimensions as the structure replaced."

Findings and Conclusions

The proposed replacement of Lahaina Wastewater Pump Station 3, force main and gravity line improvements would increase reliability, flexibility, and safety of the wastewater transmission system, reduce risk of tsunami and flooding damage, and increase pumping capacity.

The project will involve temporary impacts involved with construction activities. Site work for the project does not involve a broad expanse of land area so dust from construction activities is not anticipated to have a significant impact. Subsurface excavation for wet well, force main and gravity line construction will involve construction

noise impacts. The construction of force main and gravity line improvements within the Honoapiilani Highway right-of-way will be coordinated with the State Department of Transportation. Nighttime construction activities within the highway may be required in order to minimize daytime traffic impacts. The remainder of the project will be constructed during normal daylight hours. Construction noise impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site. To the extent possible, construction activities generating high noise levels will be performed during the daylight hours. Should night work be necessary, muffled construction equipment and vehicles, plus the location of heavy truck staging areas and portable generators away from residences and other noise sensitive receptors will also be pursued.

Dewatering discharges from the construction of the wet well, force mains and gravity lines will be routed to the closest County or other acceptable drainage system in compliance with all applicable Federal, State, and County regulations.

From a long-term perspective, the project is not anticipated to cause adverse environmental impacts. The project is located on lands designated as areas of minimal flooding. There are no rare, endangered or threatened species of flora or fauna at the project sites. A forced air system tower scrubber is proposed to be located at Wastewater Pump Station 3 to aid in minimizing odors. After completion of construction, normal operating conditions at Wastewater Pump Station 3 should generate less noise than traffic along Honoapiilani Highway as well as the sugar cane train which utilizes the railroad right-of-way adjacent to the highway. The wastewater pump station structure should not adversely impact scenic and open space resources.

There are no surface archaeological materials present at the sites. Archaeological monitoring will occur during excavation and subsurface work associated with the project. However, if subsurface deposits are found to consist of fill, or of previously disturbed matrix, periodic inspections are proposed to be scheduled, but archaeological monitoring would not be continuous.

A final monitoring plan shall be submitted to the State of Hawaii Historic Preservation Division for review upon completion of the project.

The location of Wastewater Pump Station 3 in Wahikuli Terrace Park is not anticipated to adversely affect property values in the vicinity. Existing Wastewater Pump Station 9 has been located within the park for a number of years. Wastewater Pump Station 3 will be engineered to control and minimize odor as well as blend aesthetically with the character of the existing neighborhood.

Since the Wastewater Pump Station 3 site will occupy approximately 12,140 square feet of land within Wahikuli Terrace Park, discussions are being held with the Department of Parks and Recreation regarding the extent of improvements placed within the park. New basketball courts as well as the installation of irrigation equipment for the park are being proposed.

Fencing, landscaping and other site improvements related to Wastewater Pump Station 3 will not affect existing drainage patterns. Additional drainage improvements are not required at the project site. Storm runoff from the proposed project will have no adverse effects upon adjacent and downstream properties.

No additional County personnel are required as a result of the proposed improvements. In this regard, the project is not considered significant in terms of its impacts to public services and other infrastructure systems.

In light of the foregoing findings, it is concluded that the proposed action will not result in any significant impacts.

Chapter 1

Project Overview

I. PROJECT OVERVIEW

The County of Maui, Department of Public Works and Waste Management (DPWWM) proposes wastewater pump station, force main and gravity line improvements at Lahaina, Maui, Hawaii. The project involves transmission system improvements from Wahikuli to the Lahaina Wastewater Reclamation Facility.

A. BACKGROUND

The proposed project involves improvements to a portion of the tributary sewer system which transports wastewater to the Lahaina Wastewater Reclamation Facility. The system provides wastewater collection, treatment, and disposal for the West Maui region from Lahaina to Kapalua.

In Lahaina Town, most of the sewer system was constructed over 35 years ago. Raw wastewater was collected and pumped to the Ala Moana Wastewater Pump Station located near Mala Wharf. The wastewater was then discharged through a 1,500-foot long outfall into the Pacific Ocean.

Upon its completion, raw wastewater was routed to the Lahaina Wastewater Reclamation Facility for processing. The facility is located in Honokowai near the intersection of Lower Honoapiilani Road and Honoapiilani Highway. Design work for the plant started in 1972. The initial phase of the plant was designed to handle 3.2 million gallons per day (mgd).

In 1982, an agreement was reached between the County and Amfac/JMB Hawaii, Inc. to build a 3.5 mgd expansion to the Lahaina facility. Completed in 1985, this increased the plant design capacity to 6.7 mgd.

Expansion of the Lahaina facility is currently underway to increase capacity to 9.0 mgd.

The collection system has two (2) components, the Lahaina side to the south of the Lahaina Wastewater Reclamation Facility, and the Napili side to the north.

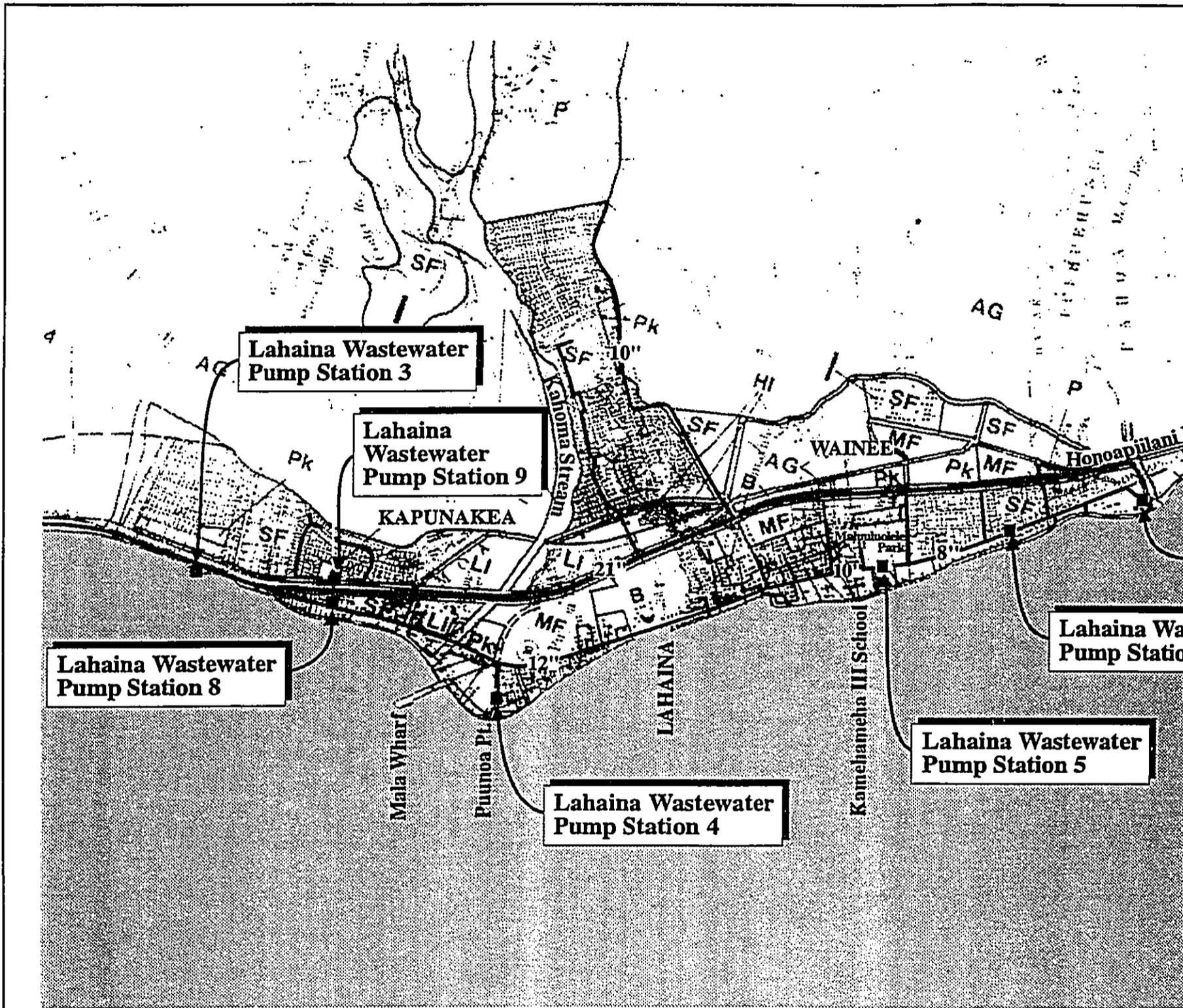
On the Lahaina side, there are twelve (12) wastewater pump stations with 30,000 feet of gravity sewer lines and 11,000 feet of force main. See Figure 1 and Figure 2. Lahaina Wastewater Pump Stations 1 through 4 are similar in design. These are buried, factory-built, steel stations which were installed concurrently with the first phase of the wastewater reclamation facility. Lahaina Wastewater Pump Stations 5 through 9 were part of the older Lahaina system. Kaanapali Wastewater Pump Stations 1, 2 and 3 were originally constructed by Amfac and subsequently dedicated to the County after completion of the first phase of the Lahaina Wastewater Reclamation Facility. The Kaanapali Wastewater Pump Stations are also part of the Lahaina system.

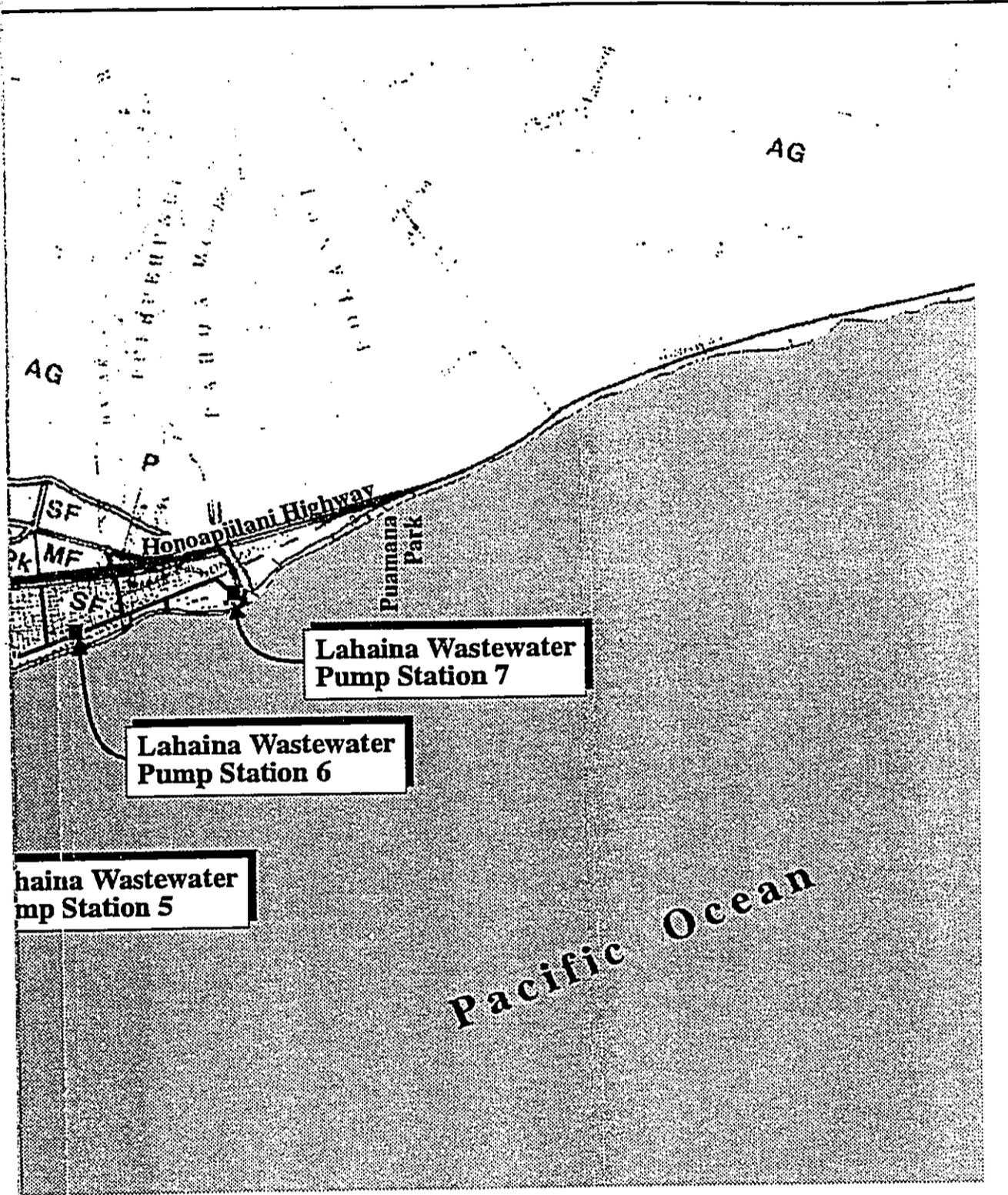
On the Napili side, the collection system consists of six (6) wastewater pump stations, 21,000 feet of gravity main and 10,000 feet of force main. Refer to Figure 2 and see Figure 3. Napili Wastewater Pump Stations 1 through 6 are buried, factory-built steel stations which became operational in 1986. The Kapalua system became operational in 1987.

B. PROPOSED ACTION

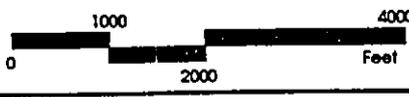
1. Lahaina Wastewater Pump Station 3

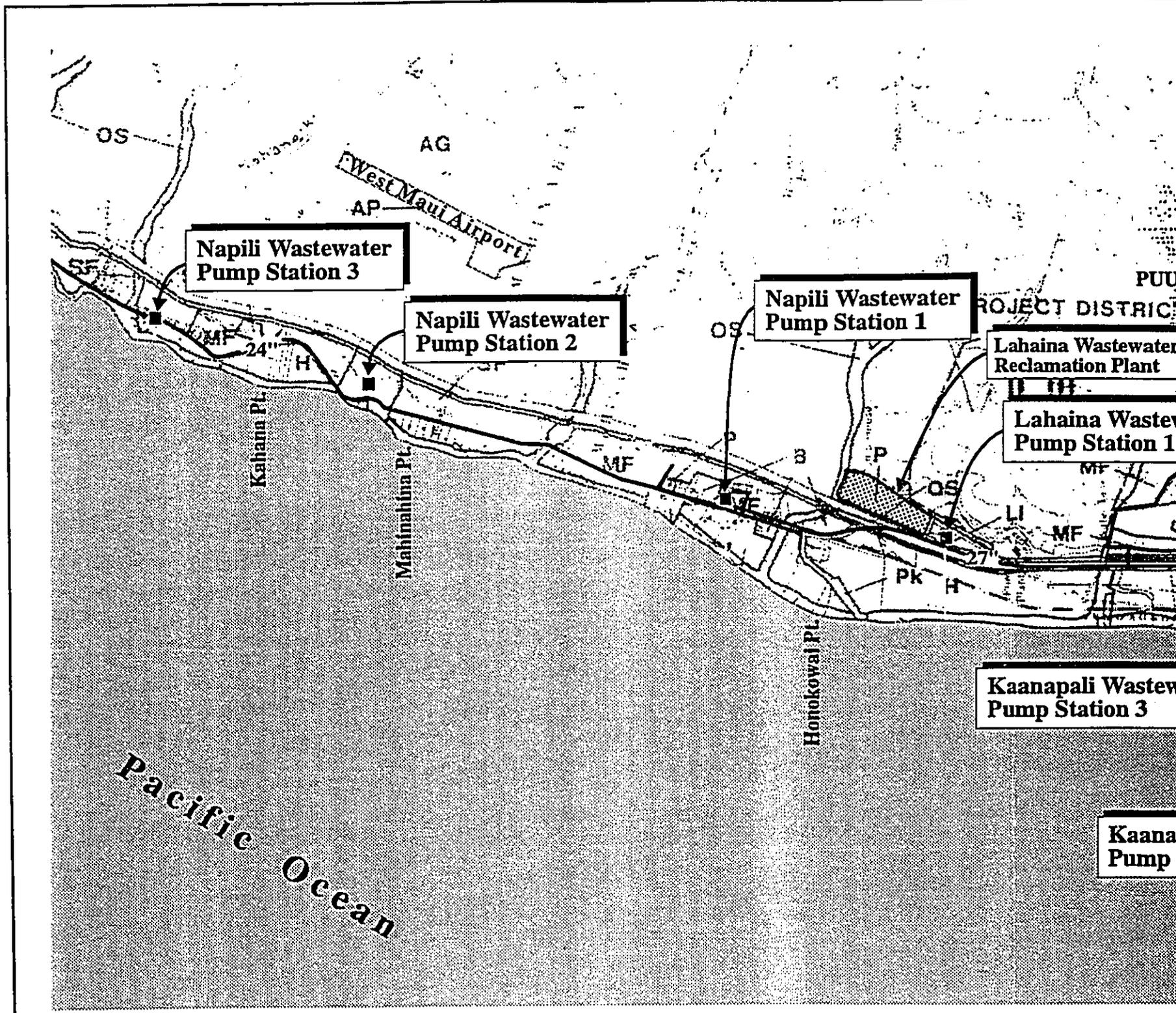
Existing Lahaina Wastewater Pump Station 3, which is located on the makai side of Honoapiilani Highway, between Wahikuli Road and the Civic Center, is proposed to be abandoned. Refer to





**Pump Station 3
Improvements
System (Lahaina)**





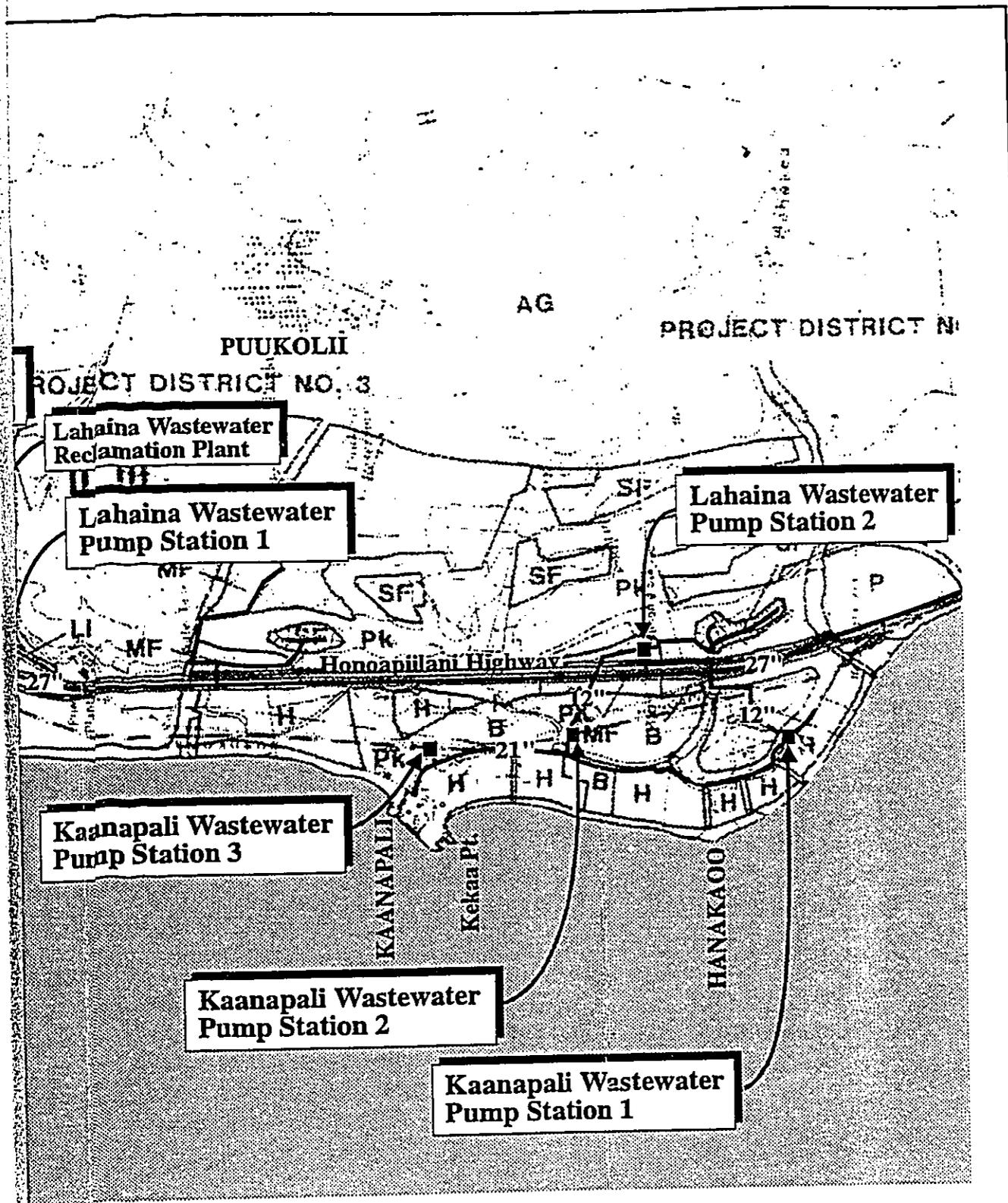
Source: Wilson Okamoto & Associates, Inc.

Figure 2

Lahaina Wastewater Pump Station
and Related Improvements
Existing Sewer System (Kaanapali)

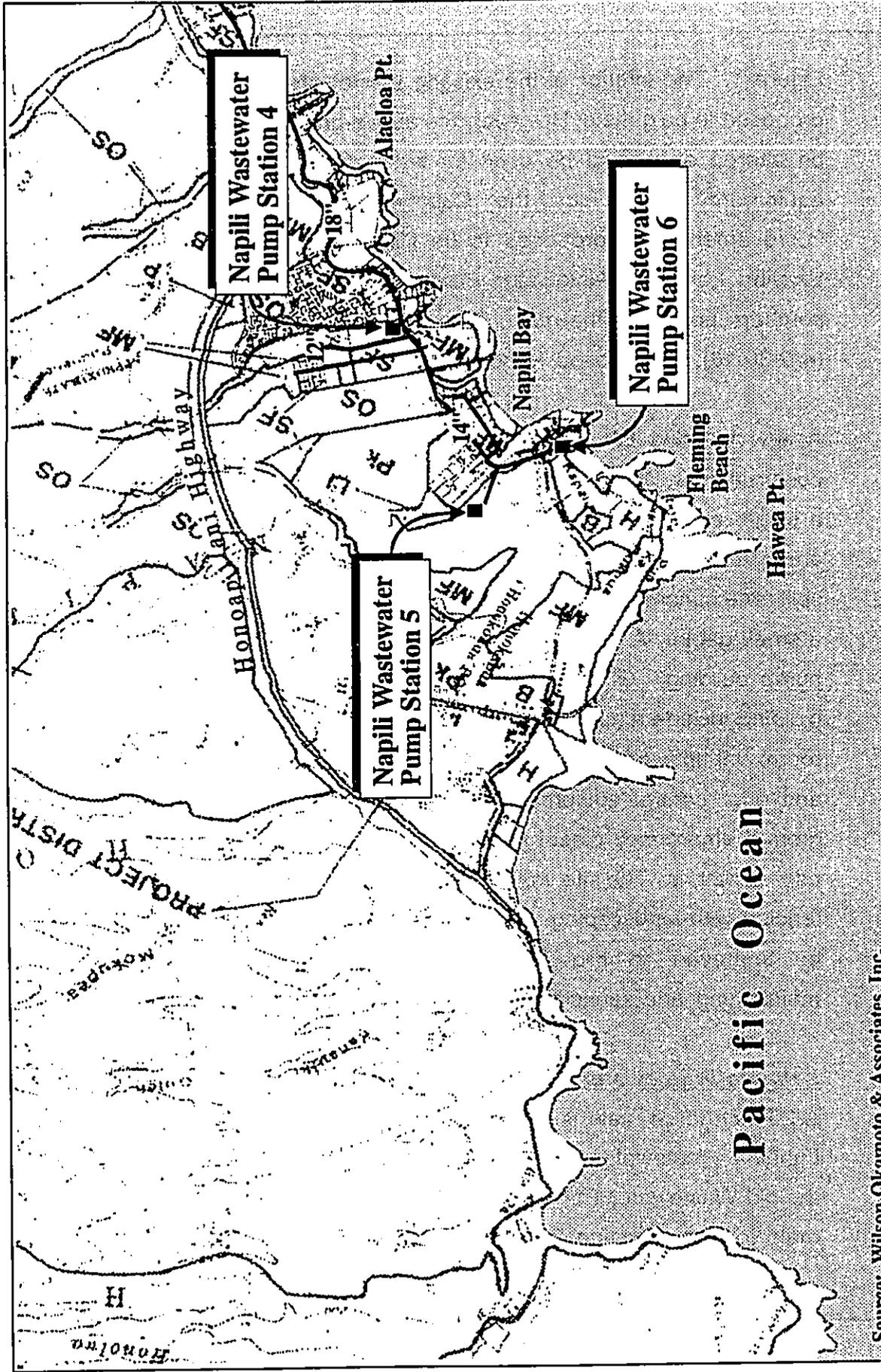


Prepared for: County of Maui, Dept. of Public Works and Waste Management



**Pump Station 3
Improvements
Plan (Kaanapali)**





Source: Wilson Okamoto & Associates, Inc.

Figure 3 Lahaina Wastewater Pump Station 3 and Related Improvements Existing Sewer System (Napili)



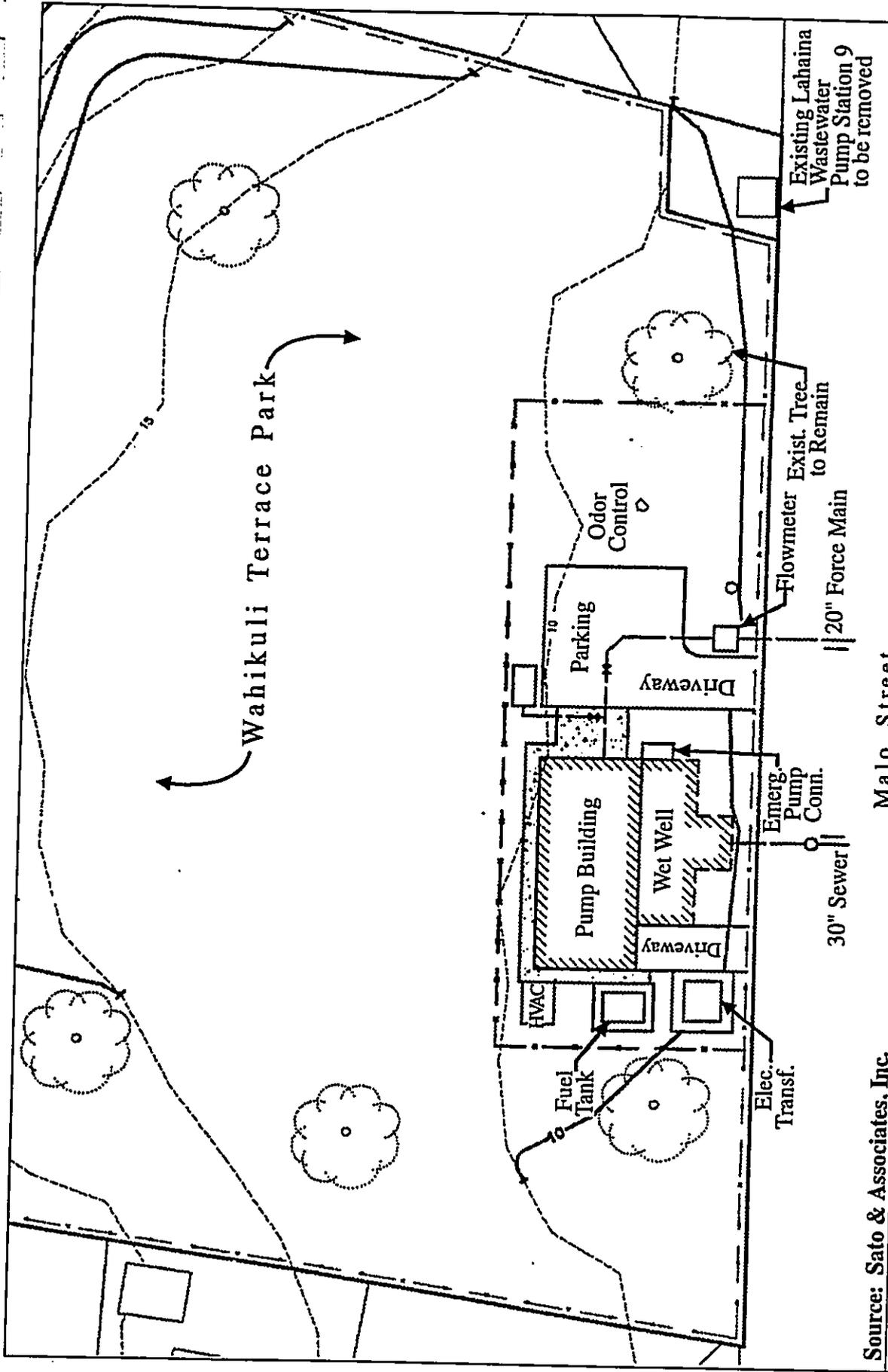
Prepared for: County of Maui, Dept. of Public Works and Waste Management

Figure 1. The interior of the existing wastewater pump station is proposed to be gutted. However, the above-grade structure will not be altered and could be used for alternative purposes such as equipment storage by the County. Existing below-grade improvements are proposed to be filled with sand or concrete. Existing Lahaina Wastewater Pump Station 9, located near the southern portion of the makai boundary of Wahikuli Terrace Park (4-5-30:16), is proposed to be demolished.

A new Lahaina Wastewater Pump Station 3 is proposed to be constructed in Wahikuli Terrace Park. See Figure 4. This includes a single story pump building approximately 62 feet by 28 feet in area. It is anticipated that the pump building would contain rough split face concrete masonry block walls with a wooden hip roof and a small gable. A below-grade wet well is located adjacent to the pump building. Other accessory improvements within the pump building include a motor control room, emergency power generator room, variable drive pumps, wet well level sensors, flow meters, and odor control equipment. The site also contains an above-ground emergency diesel fuel tank and a forced air system tower odor scrubber. The site would be secured by 6-foot high perimeter fencing with landscaping and hedges. Malo Street is proposed to be improved to provide driveway access for purposes of maintaining and servicing Lahaina Wastewater Pump Station 3.

2. **Lahaina Wastewater Pump Station 3 Force Main**

A 20-inch force main is proposed to be constructed from the new Lahaina Wastewater Pump Station 3 in Wahikuli Terrace Park to the old Wastewater Pump Station 3. See Figure 5. The new force main joins an existing 20-inch force main within the Honoapiilani



Source: Sato & Associates, Inc.

Figure 4 Lahaina Wastewater Pump Station 3
and Related Improvements
Wastewater Pump Station 3 Site Plan



Prepared for: County of Maui, Dept. of Public Works and Waste Management



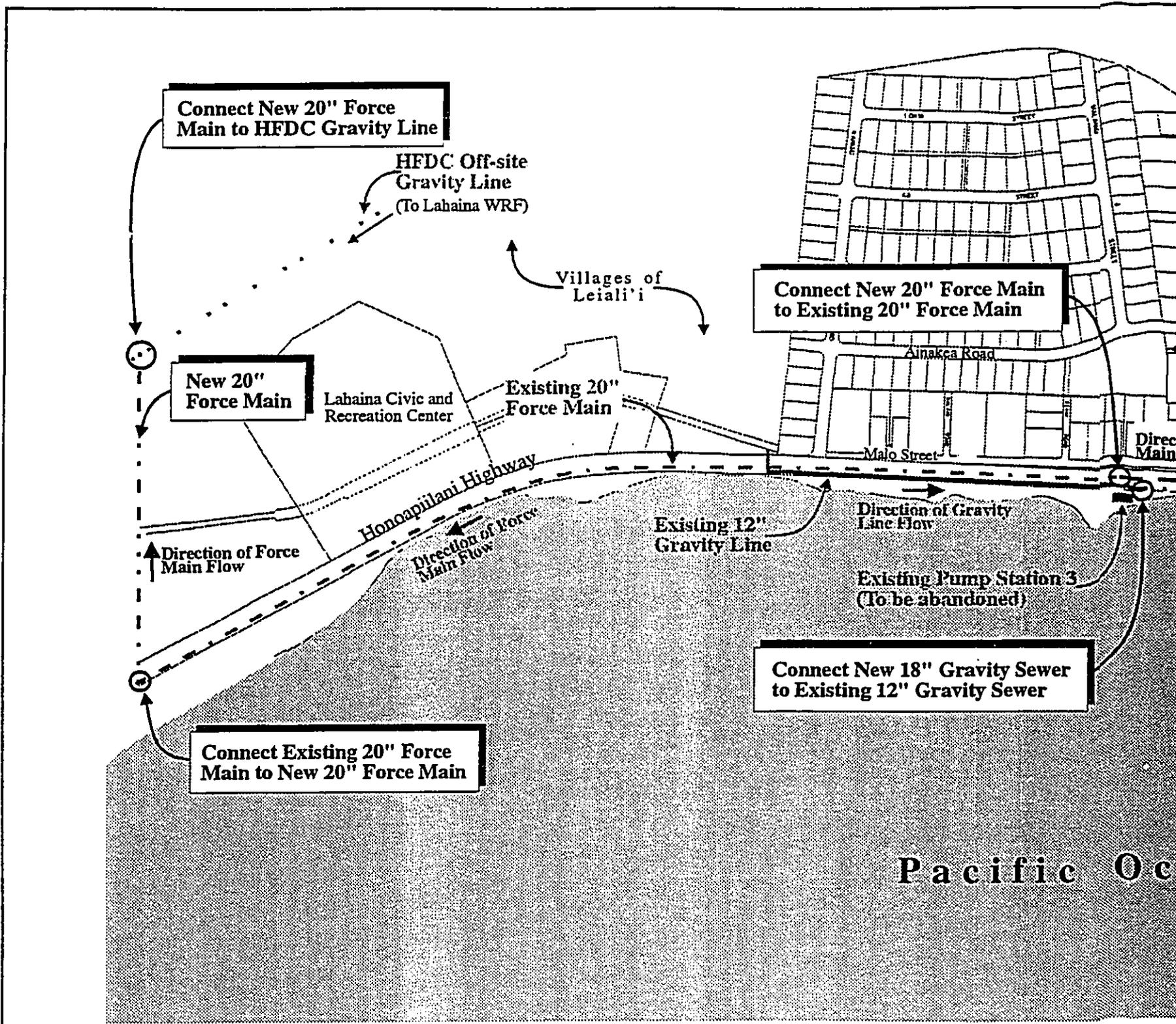
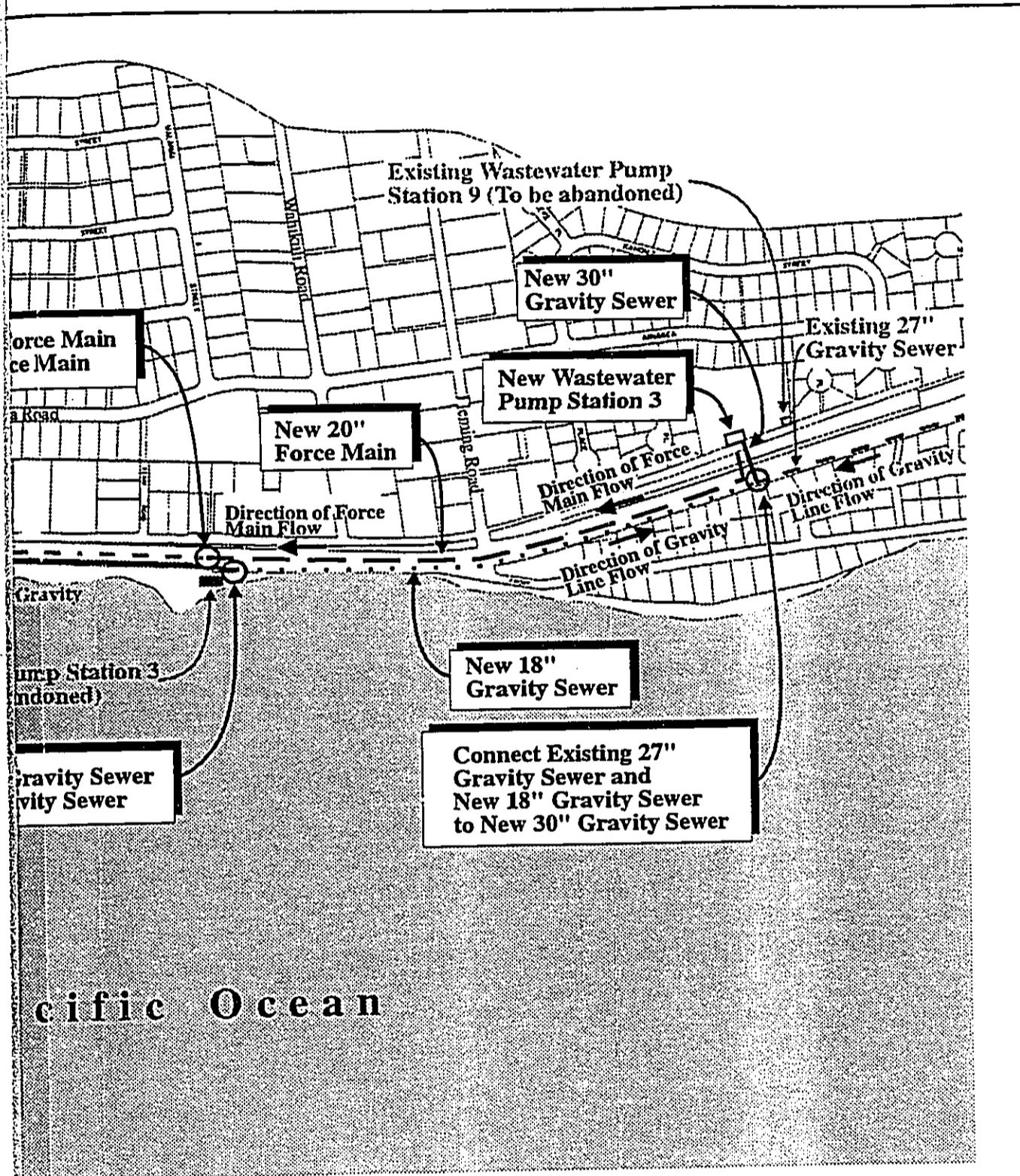


Figure 5

Lahaina Wastewater Pump Station
and Related Improvements
Proposed Sewer System



Prepared for: County of Maui, Dept. of Public Works and Waste Management



Wastewater Pump Station 3
 and Improvements
 Sewer System



NOT TO SCALE

Highway right-of-way which extends to the Kaanapali area. A new 20-inch force main is proposed to link with the existing 20-inch force main north of the Lahaina Civic Center site, extending mauka to link with the new off-site gravity line to be built in connection with the Villages of Leialii Project by the Housing Finance and Development Corporation (HFDC). Refer to Figure 5. The existing force main segment from the Civic Center to the Kaanapali area is proposed as a back-up. A valve is proposed to be installed which directs flows either through the new mauka force main segment or the existing force main segment extending to the Kaanapali area. The HFDC off-site gravity line, which is not part of the scope of this project, is proposed to extend northward to the new Lahaina Wastewater Pump Station 1 which is located on the Lahaina Wastewater Reclamation Facility parcel.

3. **Lahaina Wastewater Pump Station 3 Sewer Line Improvements**

Gravity line improvements are also proposed. Wastewater flowing northwest via an existing 27-inch gravity line within the Honoapiilani Highway right-of-way is proposed to be intercepted near Wahikuli Terrace Park. Refer to Figure 5. From the 27-inch line, flows would be transported to the new Lahaina Wastewater Pump Station 3 by a new 30-inch gravity line. The existing 27-inch gravity line from Wahikuli Terrace Park to the existing Wastewater Pump Station 3 is proposed to be abandoned. An existing 12-inch gravity line which extends south from the Villages of Leialii Project to the existing Wastewater Pump Station 3, is proposed to be extended to the new Wastewater Pump Station 3. The extension of this gravity line to the new Wastewater Pump Station 3 would be via an 18-inch pipe. It is anticipated that the new 20-inch force main and

gravity line extension would utilize the same trench as the abandoned 27-inch gravity line.

4. **Lahaina Wastewater Pump Station 1**

The existing Lahaina Wastewater Pump Station 1 is proposed to be abandoned with a new Wastewater Pump Station 1 being built on the Lahaina Wastewater Reclamation Facility parcel. The interior of the existing wastewater pump station is proposed to be gutted. The existing above-grade structure will remain and could be used for alternative purposes such as equipment storage. Existing below-grade improvements are proposed to be filled with sand or concrete. Although part of the scope of this project, the replacement of Lahaina Wastewater Pump Station 1 has been determined to be exempt from the environmental review process in accordance with Section 11-200-8, Hawaii Administrative Rules. The action falls under exemption class #2 which is noted as follows:

"Replacement or reconstruction of existing structures and facilities where the new structure will be located generally on the same site and will have substantially the same purpose, capacity, density, height and dimensions as the structure replaced."

C. **PROJECT NEED**

The proposed improvements represent an upgrade to the Lahaina wastewater transmission system. Maintenance and repair of the existing components are increasing in frequency and cost. The improvements replace aging and outdated equipment which increases the reliability of the system.

The existing Wastewater Pump Stations 3 and 9 are extremely crowded and difficult to upgrade and enlarge. Safety is also a factor since the entrance and exit for servicing of the wastewater pump station is through a long and narrow vertical tube.

The existing Lahaina Wastewater Pump Station 9 collects wastewater from neighboring Wahikuli Terrace and pumps the wastewater to the existing 27-inch sewer line within the Honoapiilani Highway right-of-way. This wastewater pump station suffers the same design deficiencies as existing Wastewater Pump Station 3, except that Wastewater Pump Station 9 is more antiquated.

The abandonment of the existing Lahaina Wastewater Pump Station 3 decreases the risk of flooding and tsunami damage to the system. Located makai of Honoapiilani Highway, this existing wastewater pump station abuts Flood Zone V12, areas of 100-year coastal flood with velocity (wave action) with a base flood elevation of nine (9) feet above mean sea level. It is noted that during Hurricane Iniki, wave action did reach the station. There are also long-term concerns such as the shifting of the shoreline which could cause damage to the structure. The abandonment of the existing wastewater pump station ultimately reduces the threat of spills and leaks in the system, as well as reduces the frequency of maintenance and repair.

The proposed improvements also provide additional pumping capacity which is necessary to serve ongoing development as well as existing unsewered areas. New Lahaina Wastewater Pump Station 3 will have the pumping capacity to accommodate nearby unsewered areas such as the Civic Center and Wahikuli House Lots.

The proposed improvements also include the connection to the HFDC off-site gravity sewer. By utilizing this gravity line, the wastewater would bypass Lahaina Wastewater Pump Station 2. This would allow wastewater to be pumped one less time. Since wastewater is frequently held in a wastewater pump station for a period of time before being pumped, the bypass reduces malodorous conditions enroute to the Lahaina Wastewater Reclamation Facility.

In the event that the force main or mauka portions of the HFDC off-site sewer are inoperable, then the existing force main to Lahaina Wastewater Pump Station 2 could be used as an emergency transmission line. This provides additional flexibility in the functioning of the system.

D. CONSTRUCTION SCHEDULE AND PROJECT COST

The total cost of all improvements is estimated to be \$12.8 million. Assuming all applicable permits are obtained, construction is projected to start in early 1995 and last approximately 18 months.

Chapter II

Environmental Setting

II. ENVIRONMENTAL SETTING

A. PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

The proposed Lahaina Wastewater Pump Station 3 is located within the 2.252 acre Wahikuli Terrace Park (TMK 4-5-30:16). Existing Lahaina Wastewater Pump Station 9 is located on a separate 870 square foot parcel at the southwest corner of the park (TMK 4-5-30:15). To the north, east, and south, the park abuts the Wahikuli Terrace residential subdivision. To the west or makai of Wahikuli Terrace Park, there is an approximately 30-foot wide right-of-way owned by the County of Maui which is intended to be used for Malo Street improvements. Then there is land of varying width owned by the State of Hawaii on which a revocable permit was issued to Railroads of Hawaii for a railroad right-of-way. Pioneer Mill Company, Ltd. owns an approximately 20-foot wide sliver of land which abuts Honoapiilani Highway. Makai of Honoapiilani Highway lies the Kapunakea Subdivision.

Force main and sewer line improvements are proposed within the Honoapiilani Highway right-of-way, from Wahikuli Terrace Park to the existing Lahaina Wastewater Pump Station 3 located in the southern portion of the Wahikuli State Wayside Park parcel. To the east or mauka of the highway lies Wahikuli House Lots. The Wahikuli Terrace Subdivision lies further to the south. On the makai side of the highway lies the Kapunakea Subdivision and the Chart House Restaurant. Front Street intersects Honoapiilani Highway adjacent to the Chart House. Moving north along the highway, the Wahikuli State Wayside Park forms a sliver of land makai of the highway.

A 20-inch force main is proposed which extends from Honoapiilani Highway to the new HFDC off-site gravity line. This force main segment is located on lands owned by the State of Hawaii. To the north are lands currently planted in sugar cane. To the east and south are lands which were formerly in sugar cane cultivation. These lands, currently vacant, are proposed for the HFDC's Villages of Leialii Project. Further south, there is the existing Lahaina Civic Center. On the makai side of the highway lies the Wahikuli State Wayside Park.

2. Climate

Like most areas of Hawaii, Lahaina's climate is relatively uniform year-round. Lahaina's tropical latitude, its position relative to storm tracts and the Pacific anticyclone, and the surrounding ocean combine to produce this stable climate.

Average temperatures in Lahaina range between 60 degrees and 88 degrees Fahrenheit. August is historically the warmest month, while January and February are the coolest.

Rainfall at Lahaina is highly seasonal, with most precipitation occurring between the months of October and April. Situated on the leeward side of the West Maui Mountains, this region receives most of its rainfall in late afternoon and early evening, after seabreezes take moisture upslope during the day. Precipitation data collected at the Wahikuli Station (#364) show that on an average January is the wettest month, while June is the driest. The average annual total is 18.5 inches (Environmental Impact Study Corp., 1979).

The winds in the Lahaina area are also seasonal, although northeasterly tradewinds are predominant. Wind patterns also vary on a daily basis, with tradewinds generally being stronger in the afternoon. In the absence of the trades and of nearby storms, winds may become light and variable. Diurnal heating and cooling of the islands gives rise to onshore sea breezes during the day and offshore land breezes at night.

3. **Topography and Soils**

In the area of the existing Lahaina Wastewater Pump Station 9 and proposed Wastewater Pump Station 3, the topography of Wahikuli Terrace Park is nearly flat at approximately 10 feet above mean sea level. Most of the park area is relatively flat. However, near the mauka boundary of the park, land slopes upward at a gradient of approximately 30 percent where the park abuts residential lots of Wahikuli Terrace.

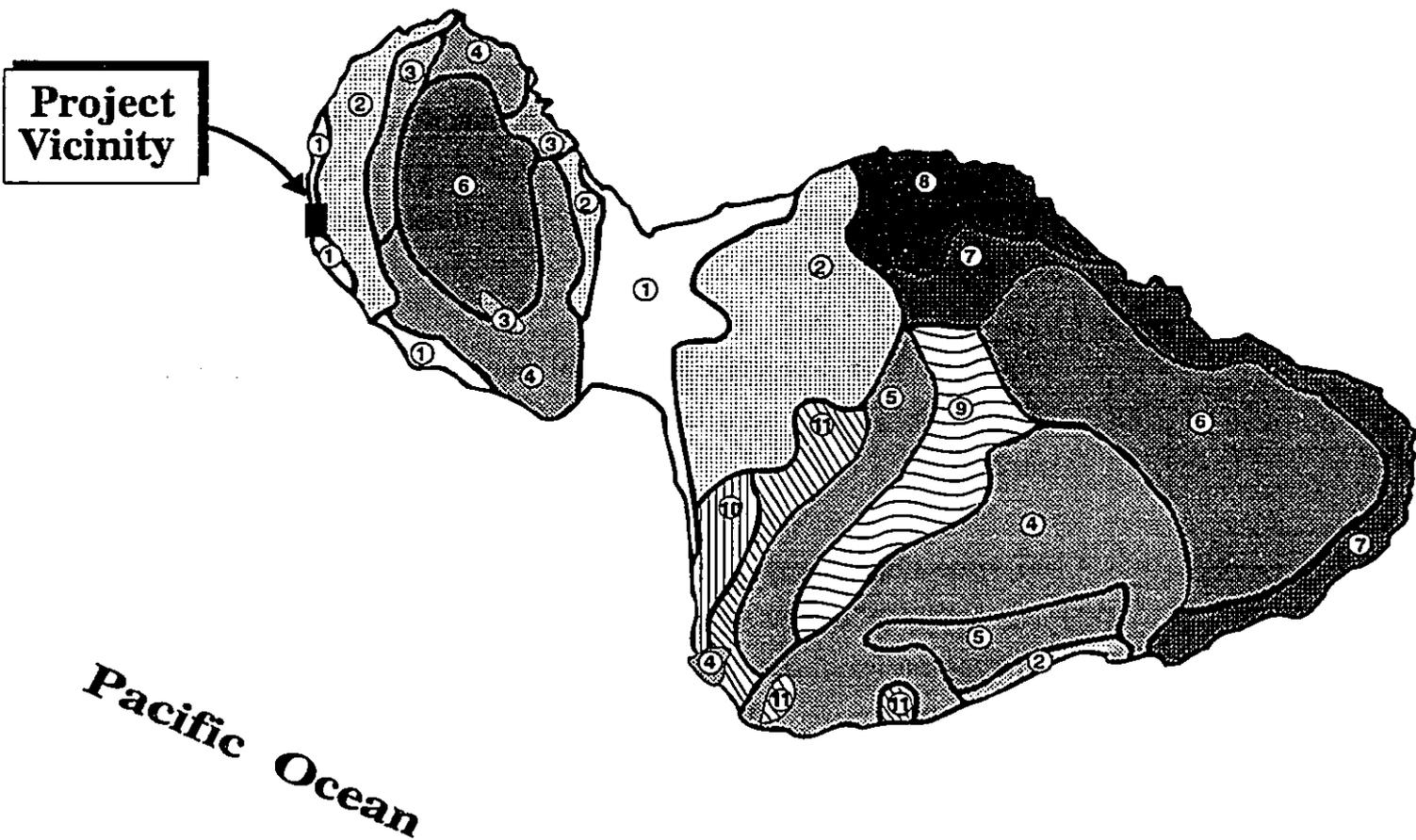
Force main and sewer line improvements within the Honoapiilani Highway right-of-way are located near sea level on relatively flat lands.

The force main segment north of the Civic Center extends from Honoapiilani Highway near sea level to approximately 120 feet above sea level. Land is gently sloping with an average gradient of 7 percent.

Underlying the various segments of the project are soils belonging to the Pulehu-Ewa-Jaucas soil association and the Waiakoa-Keahua-Molokai association. See Figure 6.

LEGEND

- | | |
|--|--|
| <ul style="list-style-type: none"> ① Pulchu-Ewa-Jaucas association ② Waiakon-Keahua-Molokai association ③ Honolua-Olelo association ④ Rock land-Rough mountainous land association ⑤ Puu Pa-Kula-Pane association ⑥ Hydrandepts-Tropaquods association | <ul style="list-style-type: none"> ⑦ Hana-Makaalae-Kailua association ⑧ Pauwela-Haiku association ⑨ Laumaia-Kaipoi-Olinda association ⑩ Keawakapu-Makena association ⑪ Kamaole-Oanapuka association |
|--|--|



Map Source: USDA Soil Conservation Service

**Figure 6 Lahaina Wastewater Pump Station 3
and Related Improvements
Soil Association Map**



Prepared for: County of Maui, Dept. of Public Works and Waste Management

NOT TO SCALE

Soils of the Pulehu-Ewa-Jaucas association are deep, nearly level to moderately sloping, well drained and excessively drained that have a moderately fine textured to course textured subsoil or underlying material. These soils are located on alluvial fans and in basins.

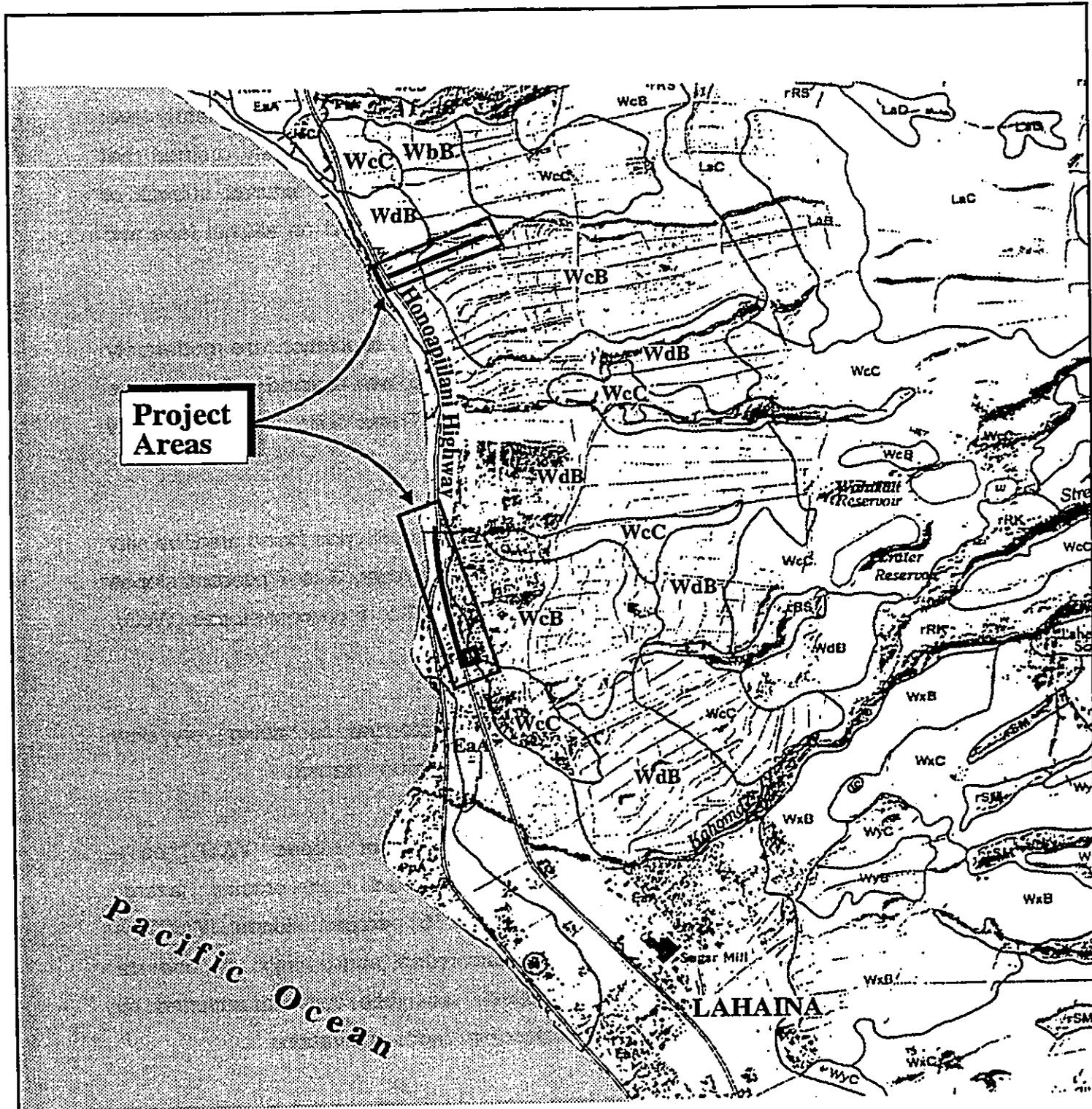
Soils of the Waiakoa-Keahua-Molokai association are moderately deep, nearly level to moderately steep, well-drained soils that have a moderately fine textured subsoil. These soils are found on low uplands.

At Wahikuli Terrace Park, the specific soil types found are Ewa silty clay loam (EaA), Wahikuli stony silty clay, 3 to 7 percent slopes (WcB), and Wahikuli stony silty clay, 7 to 15 percent slopes (WcC). See Figure 7.

Ewa silty clay loam (EaA) is characterized as having very slow runoff with a no more than slight erosion hazard.

Wahikuli stony silty clay, 3 to 7 percent slopes (WcB) has a moderate permeability, slow runoff, and slight erosion hazard. Wahikuli stony silty clay, 7 to 15 percent slopes (WcC) is characterized by slow to medium runoff, and a slight to moderate erosion hazard. Both Wahikuli soil types are characterized by enough stones on the surface to hinder cultivation.

Force main and sewer line improvements within the Honoapiilani Highway right-of-way are located on soils characterized as Ewa silty clay loam (EaA) and Wahikuli very stony silty clay, 3 to 7 percent slopes (WdB).



Source: U.S. Soil Conservation Service

Figure 7 Lahaina Wastewater Pump Station 3 and Related Improvements Soil Classifications



Prepared for: County of Maui, Dept. of Public
Works and Waste Management



Wahikuli very stony silty clay, 3 to 7 percent slopes (WdB) is similar to Wahikuli stony silty clay, 3 to 7 percent slopes (WcC), except that as much as 3 percent of the surface is covered with stones.

The force main segment north of the Civic Center contains Wahikuli stony silty clay, 3 to 7 percent slopes (WcB) and Wahikuli very stony silty clay, 3 to 7 percent slopes (WdB).

4. **Flood and Tsunami Zone**

According to the Flood Insurance Rate Maps issued by the Federal Emergency Management Agency, the site of the new Lahaina Wastewater Pump Station 3 and the existing Wastewater Pump Station 9 are located in Zone C, areas of minimal flooding. See Figure 8. Force main and sewer line improvements within the Honoapiilani Highway right-of-way, as well as the force main segment north of the Civic Center, are also located in Zone C.

5. **Flora and Fauna**

Vegetation within Wahikuli Terrace Park consists of introduced species such as monkeypod trees, plumeria, and various grasses and weeds. A drainage channel, adjacent to the makai boundary of the park, contains exotic vegetation such as castor bean, koa haole and various grasses and weeds. Parallel to Honoapiilani Highway, there are kiawe trees to the north of the park, while a row of palm trees are located to the south. The force main segment north of the Civic Center is located within a former sugar cane field. Sugar cane remnants are present along with a variety of exotic grasses and weeds.

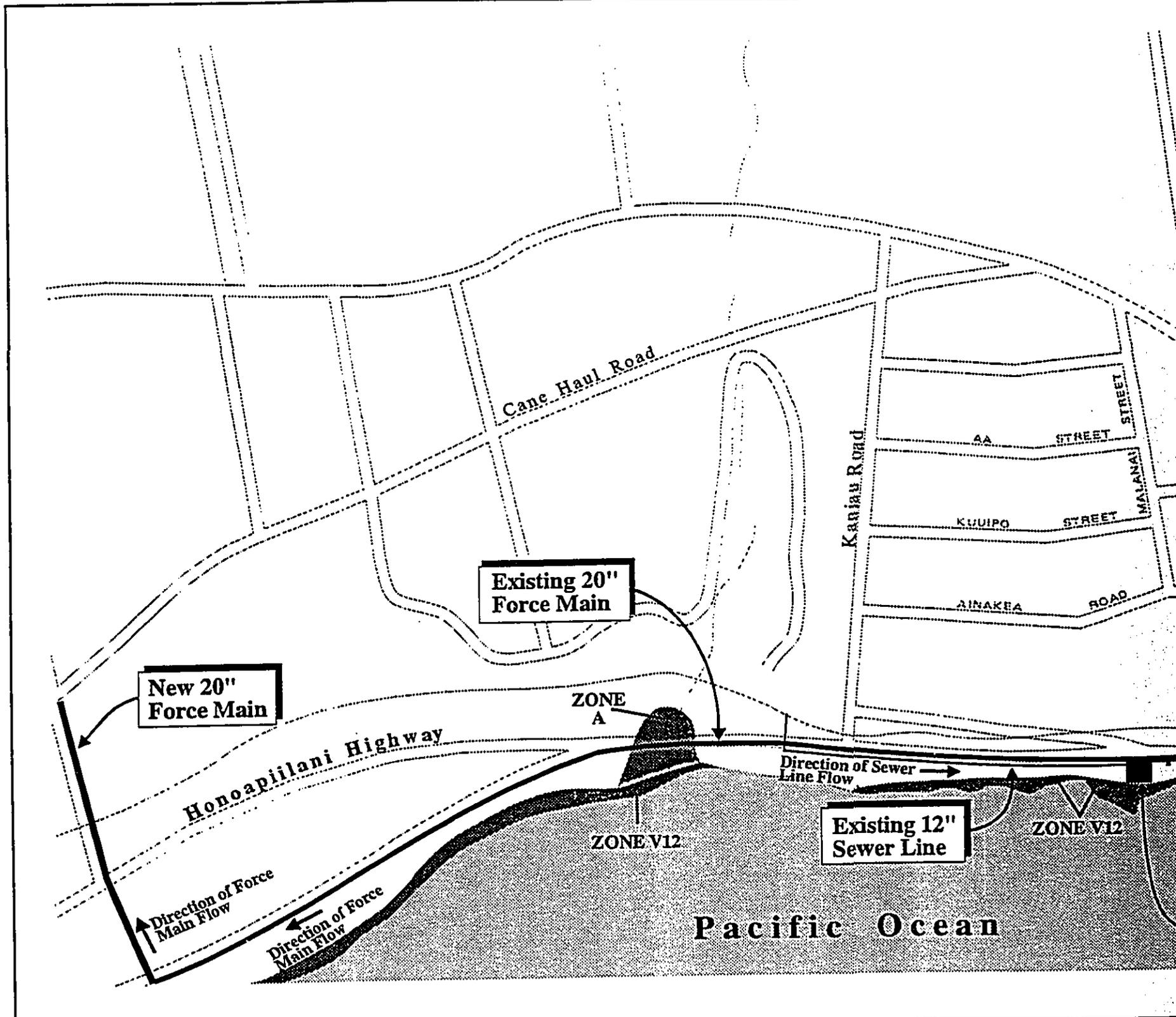
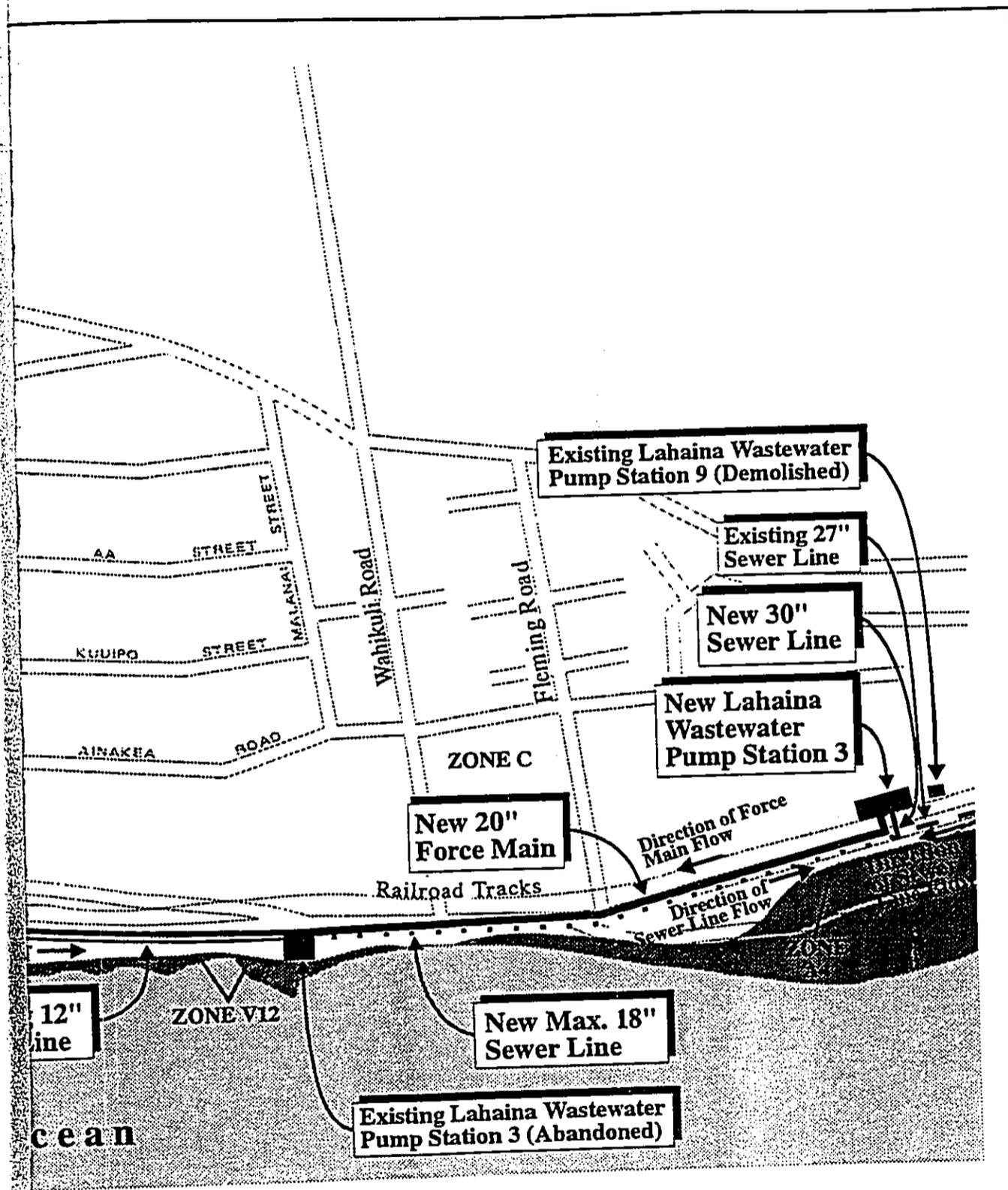


Figure 8

Lahaina Wastewater Pump Station
and Related Improvements
Flood Insurance Rate Map



Prepared for: County of Maui, Dept. of Public Works and Waste Management



Lahaina Wastewater Pump Station 3
 Improvements
 Service Rate Map



Fauna and avifauna found within the sites are also characteristic of urban areas of Lahaina. Fauna typically found in the vicinity include mongoose, rats, dogs, and cats. Avifauna typically include mynas, several types of doves, and house sparrows.

6. *Air Quality*

There are no point sources of airborne emissions in the immediate vicinity of the project sites. The air quality of the Lahaina region is considered good with existing airborne pollutants attributed primarily to automobile exhaust from the region's roadways. Another source of airborne emissions may include smoke from the sugar cane burning which occurs in the region. This source is intermittent, however, and prevailing tradewinds quickly disperse particulates which are generated.

Regarding odors, the presence of sulfate-reducing bacteria and organic matter in nearly all wastewater, creates the potential for hydrogen sulfide production. Because bacterial reduction of non-odorous sulfate to odorous sulfide can only occur in an anaerobic environment, it usually occurs in submerged sewer lines and force mains. Sulfide reduction will typically begin to occur in force mains with detention times longer than twenty (20) minutes. The bacteria form a slime layer on the force main walls converting sulfate to sulfide. The sulfides will remain in solution as long as the pipe is flowing full. However, as soon as turbulence and air are available, such as the discharge into a gravity line or manhole, hydrogen sulfide gas will be released into the sewer atmosphere. Subsequently, the gas will escape through manhole covers and vents causing nuisance odors.

Three (3) manholes in the vicinity of the project are located near the Wahikuli, Kapunakea, and Ala Moana residential areas. These all receive force main discharges with detention times ranging from ten (10) minutes to an hour. Odors can be perceived by residents in several surrounding communities. See Appendix A.

7. **Noise Characteristics**

Existing background ambient noise levels within the project area are controlled by traffic along Honoapiilani Highway. At proposed Lahaina Wastewater Pump Station 3, average background ambient noise along the highway ranges between 65 to 70 dBA, with short-term maximum noise levels of 80 to 85 dBA occurring during passes of heavy truck traffic. During the nighttime hours of 10:00 p.m. to 7:00 a.m., average background ambient noise levels decrease to approximately 45 dBA, with intermittent traffic along Honoapiilani Highway being the dominant noise source. See Appendix B.

8. **Scenic and Open Space Resources**

The new Wastewater Pump Station 3 within Wahikuli Terrace Park is proposed to be a single story structure similar in scale to the existing residences which border the park. It is also lower in elevation than most of the surrounding residences and would not have a significant impact upon scenic resources. The wastewater pump station structure is located mauka of Honoapiilani Highway and would not obstruct any views from the coastal highway.

In order to minimize possible odor impacts, the wastewater pump station structure is located near the makai boundary of the park.

Other segments of the project subject to environmental review are located below-grade and have no effect upon scenic and open space resources.

9. **Archaeological/Historical Resources**

The area of the proposed Wastewater Pump Station 3 has been previously cleared for Wahikuli Terrace Park. Areas of the existing drainage swale and railroad right-of-way makai of the park have also been previously altered. The force main segment north of the Civic Center is located within a former sugar cane field which was cleared, graded and planted.

The project sites are located outside of the County of Maui's Lahaina Historic District Nos. 1 and 2.

The sites are located outside of the Lahaina National Historic Landmark, which is listed on the National Register of Historic Places.

B. **SOCIO-ECONOMIC ENVIRONMENT**

1. **Regional Setting**

The majority of lands in West Maui are either State designated "Conservation" or "Agricultural". Generally, "Conservation" lands occupy the higher elevations, while the "Agricultural" district spans the foothills of the West Maui Mountains.

"Urban" designated lands occupy the lower elevations along the coast and include the communities of Kahana-Napili-Kapalua and Kaanapali. These resort communities include several hotels and visitor-oriented condominiums. Lahaina, meanwhile, is more typical

of a residential community. Single family, business, light industrial and agricultural zones prevail in this part of West Maui.

Sugar cane and pineapple fields occupy much of the land in the area. Pioneer Mill, a major regional employer, cultivates approximately 6,800 acres in sugar cane. Maui Land and Pineapple Company's pineapple fields are found along the slopes of the West Maui Mountains north of Kaanapali.

2. Population

The resident population of the Lahaina Community Plan region has demonstrated a substantial increase over the last two (2) decades. Population gains were especially evident in the 1970's as the rapidly developing visitor industry attracted many new residents. The current population of the Lahaina District is estimated at 14,574. A projection of the resident population for the years 2000 and 2010 are 18,555 and 22,633, respectively (Community Resources, Inc., 1992).

Growth at the County level exhibits a similar pattern. The County's 1980 resident population of 71,000 has since grown to the present 100,000. The estimated County population in 2010 is 145,200 (DBED, 1990).

3. Economy

The economy of Maui is heavily dependent upon the visitor industry. In 1991, for example, total visitor expenditures equalled \$2.4 billion (First Hawaiian Bank Research Department, 1992). The dependency on the visitor industry is especially evident in West Maui, which is one of the State's major resort destination

areas. Major hotels in this region include the Hyatt Regency Maui (816 rooms), Westin Maui (761 rooms), Maui Marriott Resort (720 rooms) and the Kapalua Bay Hotel & Villas (344 rooms).

West Maui's visitor orientation is reflected in the character of Lahaina Town, which serves as a center for visitor-related retail outlets, as well as visitor-related activities.

In addition to the visitor industry, agriculture is established as a vital component of the West Maui economy. Sugar operations, in West Maui are managed by the Pioneer Mill Co., Ltd. (PMCo). In 1988, PMCo produced 47,500 tons or 16.2 percent of Maui's total, and employed more than 300 people (Maui News Supplement, 1990).

Maui Land and Pineapple Company's fields remain an important component of the region's agricultural base. Maui Land and Pineapple Company has entered the fresh fruit market, air shipping pineapples to the mainland in an effort to diversify its operations.

C. PUBLIC SERVICES

1. Police and Fire Protection

The project site is within the Lahaina Police Station service area, which services all of the Lahaina district. The Lahaina Station is located in the Lahaina Civic Center complex at Wahikuli, and was built in the early 1970s. The Lahaina Patrol includes 52 full-time personnel, consisting of one (1) captain, two (2) lieutenants, seven (7) sergeants, and 34 police officers. The remaining eight (8) personnel consist of public safety aides and administrative support

staff (Telephone conversation with Greg Takahashi, Maui Police Department, December 1993).

Fire prevention, suppression and protection services for the Lahaina District is provided by the Lahaina Fire Station, also located in the Lahaina Civic Center, and the Napili Fire Station, located in Napili. The Lahaina Fire Station includes an engine and a ladder company, and is staffed by 27 full-time personnel. The Napili Fire Station consists of an engine company including 15 full-time firefighting personnel (Telephone conversation with Elden Chang, Maui Fire Department, December 1993).

2. Medical Facilities

The only major medical facility on the island is Maui Memorial Hospital, located approximately twenty (20) miles from Lahaina, midway between Wailuku and Kahului. The 145-bed facility provides general, acute, and emergency care services.

In addition, regular hours are offered by private practices in Lahaina, which include the Maui Medical Group, Lahaina Physicians, West Maui Healthcare Center, and Kaiser Permanente Lahaina Clinic.

3. Recreational Facilities

West Maui is served by numerous recreational facilities offering diverse opportunities for the region's residents. There are several County parks and State beach parks in West Maui. Approximately one-third of the County parks are situated along the shoreline and are excellent swimming, diving, and snorkeling areas.

In addition, Kaanapali and Kapalua Resorts operate world-class golf courses which are available for public use.

Recreational facilities in close proximity to the property include the Wahikuli Terrace Park, Wahikuli State Wayside Park, Lahaina Recreation Center, Puamana Park, and Launiupoko State Wayside Park. Wahikuli Terrace Park and the Lahaina Recreation Center provide play fields for organized athletic activities, while Wahikuli Park, Puamana Park and Launiupoko Park provide opportunities for swimming, picnicking and related shoreline activities. Mala Wharf is located approximately 0.5 mile south of the proposed Wastewater Pump Station 3 site.

4. **Educational Facilities**

The West Maui area is served by four (4) public schools operated by the State of Hawaii, Department of Education (1993 enrollment in parentheses): Lahainaluna High School (779); Lahaina Intermediate School (552); King Kamehameha III Elementary School (819); and Princess Nahienaena Elementary School (471). The region is also served by privately operated pre-elementary and elementary schools.

D. **INFRASTRUCTURE**

1. **Roadway System**

Honoapiilani Highway (State Highway 30) is the main roadway serving the West Maui region. This highway is the only link between West Maui and the rest of the Island (although a substandard segment of highway extends around the north coast of the Island to Waihee, providing limited access).

Front Street, which intersects with Honoapiilani Highway in the vicinity of the project, is a two-way, two-lane County roadway. This provides vehicular access to the commercial core of Lahaina Town.

Other local roadways in the vicinity are Fleming Road, Wahikuli Road and Kaniau Road which provides access within the Wahikuli Terrace Subdivision and Wahikuli House Lots as well as linkage to Honoapiilani Highway.

Access to the new Lahaina Wastewater Pump Station 3 and existing Wastewater Pump Station 9 is provided from Malo Street which extends parallel to Honoapiilani Highway.

2. Water Systems

The West Maui region is served by the County's Department of Water Supply water system. The County water system services the coastal areas from Luniupoko to Kaanapali and from Honokowai to Napili. Three (3) surface sources and eight (8) wells are used to supply the County domestic system.

The property is located within the County's Lahaina-Alaeloa Water System. An existing 8-inch cast iron line on Honoapiilani Highway provides service to the existing Lahaina Wastewater Pump Station 3, the new Wastewater Pump Station 3 and the existing Wastewater Pump Station 9.

3. Drainage

Runoff within Wahikuli Terrace Park currently sheet flows from east to west. An existing drainage channel is located to the west of the park. See Appendix C.

4. **Solid Waste Disposal**

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste collected by County crews is disposed at the County's 55-acre Central Maui Landfill, located four (4) miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies.

5. **Electrical and Telephone**

Electrical and telephone service to the West Maui region is provided by Maui Electric Company and Hawaiian Telephone Company, respectively.

Chapter III

***Relationship to Land Use
Plans, Policies and Controls***

III. RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS

A. STATE LAND USE DISTRICTS

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four (4) major land use districts in which all lands in the State are placed. These districts are designated "Urban", "Rural", "Agricultural", and "Conservation".

The new Lahaina Wastewater Pump Station 3, existing Wastewater Pump Station 9, and force main and gravity line improvements extending from new Wastewater Pump Station 3 and within the Honoapiilani Highway right-of-way are located within the Urban District. Most of the force main segment north of the Lahaina Civic Center is located in the Agricultural District. Based on the preliminary alignment, the makai portions of the force main within the Honoapiilani Highway right-of-way, are located within the Conservation District. The applicant will work with the Department of Land and Natural Resources to achieve compliance with Conservation District provisions. See Figure 9.

B. GENERAL PLAN OF THE COUNTY OF MAUI

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the Maui County Charter, "The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the development of the County and the social, economic and environmental effects of such development and set forth the desired sequence, patterns and characteristics of future development."

The proposed project is consistent with the following General Plan provision:

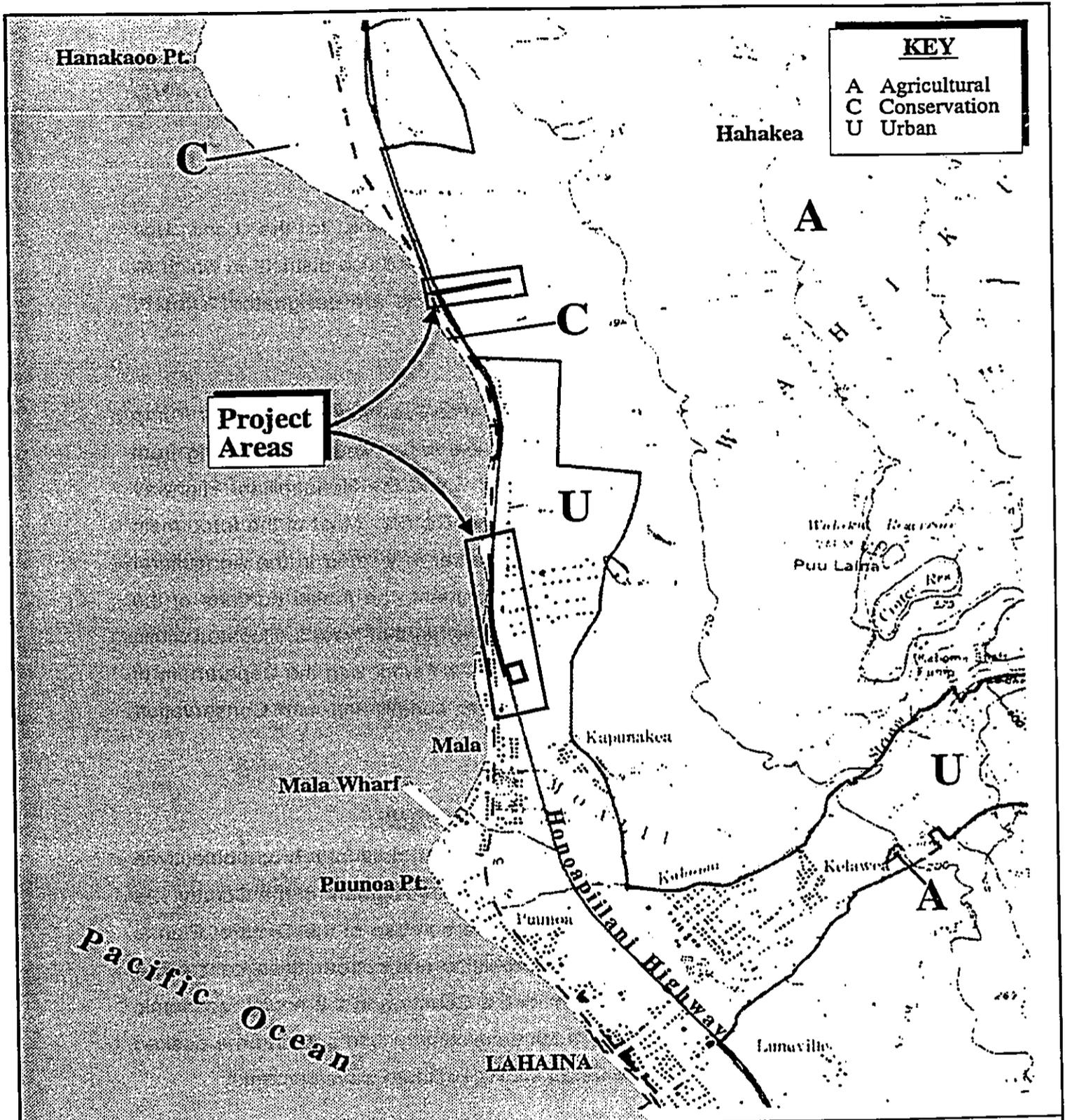


Figure 9 Lahaina Wastewater Pump Station 3 and Related Improvements State Land Use District Designations



Prepared for: County of Maui, Dept. of Public Works and Waste Management



Objective:

To provide efficient, safe and environmentally sound systems for the disposal and reuse of liquid and solid wastes.

C. LAHAINA COMMUNITY PLAN

Nine (9) community plan regions have been established in Maui County. Each region's growth and development is guided by a Community Plan, which contains objectives and policies drafted in accordance with the County General Plan. The purpose of the Community Plan is to outline a relatively detailed agenda for carrying out these objectives.

The proposed project falls within the jurisdiction of the Lahaina Community Plan. The proposed project would facilitate implementation of the Lahaina Community Plan by addressing the objective to "coordinate improvements to existing sewage transmission lines and the central treatment plant to meet the needs of future population growth."

The Lahaina Community Plan sets forth detailed land use in the region. The new Lahaina Wastewater Pump Station 3, and force main and gravity line improvements from the wastewater pump station to the Honoapiilani Highway right-of-way, are located on lands designated as "Park". See Figure 10. Thus, the "Park" designation includes Wahikuli Terrace Park as well as land designated for Malo Street, the railroad right-of-way and other land up to Honoapiilani Highway. The new wastewater pump station upgrades existing Wastewater Pump Station 9 which is currently located within Wahikuli Terrace Park and is compatible with park use. Force main and gravity line improvements would be located below-grade and should not affect existing use of the property in the long term.

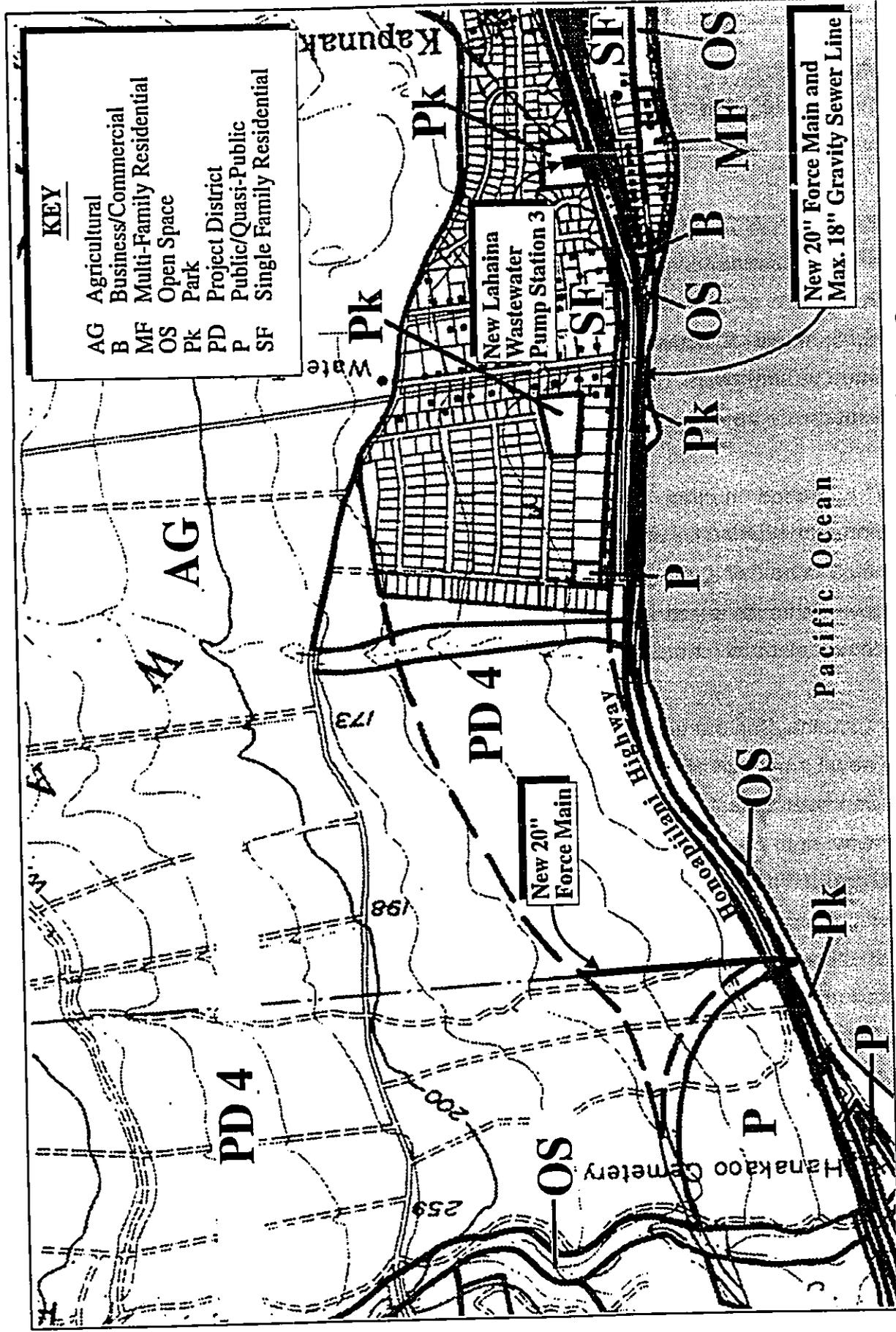


Figure 10 Lahaina Wastewater Pump Station 3
and Related Improvements

Lahaina Community Plan Land Use Designations



Prepared for: County of Maui, Dept. of Public Works and Waste Management

The segment of Honoapiilani Highway from new Wastewater Pump Station 3 to old Wastewater Pump Station 3 is not designated as a specific land use category in the Lahaina Community Plan. The segment of force main improvements located north of the Civic Center is located within Project District 4 which includes the Civic Center and additional areas for expansion. The force main and gravity line improvements are not contrary to the existing community plan designations.

D. ZONING

The new Lahaina Wastewater Pump Station 3, as well as force main and gravity line improvements from the wastewater pump station to the Honoapiilani Highway right-of-way, are located on lands zoned as R-1 Residential District. Under Section 19.08.020 of the Maui County Code pertaining to permitted uses within the Residential District, the wastewater pump station, force main and gravity line would be permitted uses under "buildings or premises used by the Federal, State or County governments for public purposes".

The segment of Honoapiilani Highway between new Wastewater Pump Station 3 to old Wastewater Pump Station 3 is not zoned. The force main segment north of the Civic Center is within the Interim District. These improvements are not incompatible with the zoning.

E. SPECIAL MANAGEMENT AREA

A portion of the force main and gravity line improvements within the Honoapiilani Highway right-of-way near existing Wastewater Pump Station 3, as well as a portion of force main improvements north of the Civic Center, are within the County of Maui Special Management Area (SMA).

However, the improvements proposed within the SMA will be located entirely underground and are in keeping with Special Management Area provisions.

Chapter IV

Potential Impacts and Mitigating Measures

IV. POTENTIAL IMPACTS AND MITIGATING MEASURES

A. IMPACTS TO THE PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

Proposed Lahaina Wastewater Pump Station 3 within Wahikuli Terrace Park abuts single family residential uses toward the north, east and south. The wastewater pump station is proposed to be located along the central portion of the west property line, as far away from the existing residences as possible. Moreover, the single story wastewater pump station is situated at a lower elevation than most of the adjacent residences thereby minimizing its visual impact. The use of the new building is also similar to the Wastewater Pump Station 9 which has existed in the park for approximately 35 years. Lahaina Wastewater Pump Station 3 is not anticipated to adversely impact surrounding properties.

Force main and sewer line improvements within Honoapiilani Highway right-of-way as well as force main improvements north of the Civic Center will be constructed underground and should have no impact upon surrounding uses.

2. Flood and Tsunami Hazard

Land on which the project is proposed to be built is designated as Zone C, areas of minimal flooding.

3. Flora and Fauna

There are no significant habitats or rare, endangered or threatened species of flora and fauna located on the project site. The proposed improvements are not considered a significant adverse impact upon these environmental features.

4. **Air Quality**

Air quality parameters in the immediate vicinity of the project are anticipated to be affected by short-term construction activities. However, since site work is not substantial, dust generated from construction activities is not expected to adversely affect surrounding properties. While a new Wastewater Pump Station 3 structure is proposed within Wahikuli Terrace Park, a significant portion of the construction work involves installation of equipment within the structure.

On a long-term basis, the project will not generate adverse air quality conditions.

Regarding odor, the access structure at Wastewater Pump Station 3 and hatches to the wet wells will be sealed as part of the wet well construction, thereby reducing odor impacts. Moreover, equipment and design of the wet wells are also anticipated to minimize turbulence within the wet well which aids in keeping odors confined within the wet well.

An additional air treatment system is also proposed to be installed at Wastewater Pump Station 3. A forced air system tower scrubber would treat odors emanating from the wet well. Odors which could potentially migrate down the gravity line and be released at other manholes would be minimized by the forced air system. Moreover, the forced air system vents and treats hydrogen sulfide gas. If not vented, sulfuric acid is formed which eventually causes deterioration of concrete and metal structures.

Another potential problem area is the HFDC connector manhole, the connecting point between the 20-inch force main north of the Civic Center and the HFDC gravity line. A receiving structure which minimizes turbulence at the force main-gravity line connection is being contemplated. This would minimize release of odors.

The feasibility of implementing other system-wide improvements such as relocation of existing mist scrubbers, various odor source controls, and additional injection points are being evaluated.

5: **Noise Impacts**

As with air quality, there are anticipated to be short-term construction-related impacts pertaining to the building of the wastewater pump station structure, as well as force main and gravity line construction.

The construction of Wastewater Pump Station 3, its force main and sewer line connections up to Honoapiilani Highway, and the force main segment north of the Civic Center will be done during normal daylight hours. However, construction scheduling within the Honoapiilani Highway right-of-way is dependent on whether nighttime construction activities will be required by the State Department of Transportation in order to minimize daytime traffic impacts.

Noise impacts during the period of construction are unavoidable due to the relatively short distances between existing noise sensitive structures and the construction sites, the necessity to perform heavy construction work on-site (i.e., breaking of

pavement, excavating trenches, driving sheet piles, and backfilling), and the presence of naturally ventilated structures in the project area. Inside these naturally ventilated establishments, construction noise levels are predicted to exceed 70 dBA during periods when construction activity is within 100 feet of the establishments. Partial or total closure of ventilation openings may be temporarily necessary to conduct phone conversations in these naturally ventilated establishments. Within air conditioned spaces, construction noise impacts are expected to be minimal. Construction noise impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site. See Appendix B.

To the extent possible, the noisier site preparation construction activities (grading, trenching, pile driving, etc.) will be performed during the daylight hours. Should night work be necessary, the use of muffled construction equipment and vehicles, plus the location of heavy truck staging areas and portable generators or compressors away from residences and other noise sensitive receptors will also be pursued.

The construction of the new wet well at Wastewater Pump Station 3 may involve some noise impacts from dewatering operations for wet well construction. Should a diesel fuel generator be utilized, housing which encloses the generator would be installed to mitigate noise impacts. An electric source may be used to power the dewatering pump depending on the extent of required dewatering. Although the use of electricity would result in more quiet operation, its capability is also limited relative to a diesel generator.

Curfews on excessively noisy construction activities during the nighttime hours, weekends and holidays will be pursued to minimize noise impacts upon residences, since home occupancy rates are generally higher during these periods.

In the long-term, normal operating conditions at the wastewater pump station are not anticipated to adversely impact ambient noise conditions. The pumps and motors will be located underground within the wastewater pump station structure. Noise generation from intermittent use of the variable speed pumps should be less than traffic noise levels along Honoapiilani Highway.

A diesel generator will be located within the wastewater pump station structure to provide emergency power in the event of a disruption of supply of electrical power. Noise attenuation measures are anticipated to be provided within the generator room. These diesel generators are tested for an hour each week during normal daylight hours to retain the generators in working order. The on-site above-ground diesel fuel tank provides a 72-hour fuel supply.

6. Scenic and Open Space Resources

The proposed Lahaina Wastewater Pump Station 3 is proposed to be approximately 18 feet in height. Exterior walls are anticipated to be rough split face concrete masonry block. Roofing material is anticipated to be wood. It is expected that earth tone colors for the structure will be used. An odor scrubber tower is approximately three (3) feet in diameter and approximately seven (7) feet in height with an additional approximately four (4) foot-high exhaust stack. The wastewater pump station site is expected to be secured

by an approximately 6 foot high fence. The above-ground diesel fuel tank will be lower than the height of the surrounding fence. Landscaping in the form of hedges will be planted around the fencing to provide visual relief as well as additional security for the wastewater pump station site.

It is noted that views from homes located on the mauka boundaries of Wahikuli Terrace Park will not be blocked by the wastewater pump station. The wastewater pump station is proposed to be located at approximately the 10 foot contour. With an 18 foot structure, the top of the wastewater pump station reaches 28 feet above mean sea level. The ground level of existing residences bordering the mauka portion of Wahikuli Terrace Park are located at approximately the 40 foot contour.

The proposed improvements will not have a significant impact on coastal and scenic open space resources.

7. **Archaeological/Historical Resources**

The sites have been in urban and agricultural use for a number of years. There are no surface archaeological materials present on the sites. The surface has been altered during original clearing and construction of Wahikuli Terrace Park. The surface of Malo Street, the railroad right-of-way, and Honoapiilani Highway have been previously altered as well. Force main improvements north of the Civic Center are located on lands which were graded and cleared for sugar cane cultivation.

The State Historic Preservation Office concurs that there are no known historic sites present on the surface within the wastewater

pump station site or along the highway shoulder. They report that no information is available regarding the presence or absence of subsurface cultural deposits or other types of buried archaeological features within the project areas.

The proposed project is not anticipated to have adverse impacts upon archaeological resources. Archaeological monitoring will occur during excavation and subsurface work associated with the project. However, if subsurface deposits are found to consist of fill, or of previously disturbed matrix, periodic inspections are proposed to be scheduled, but archaeological monitoring would not be continuous.

A final monitoring plan shall be submitted to the State of Hawaii Historic Preservation Division for review upon completion of the project.

B. IMPACTS TO COMMUNITY SETTING

1. Population and Local Economy

The proposed improvements will improve reliability and increase the capacity of the transmission system to permit the handling of wastewater flows.

The proposed improvements will help to preserve the long-term economic vitality of the region by ensuring the integrity of the wastewater transmission system. Additionally, improved facilities for wastewater reclamation will promote the public health and welfare of the residents of the Lahaina District.

Property values of homes adjacent to Wahikuli Terrace Park should not be affected by the proposed project. The existing Wastewater Pump Station 9 has been located at the southwest corner of the park. This outdated wastewater pump station was part of the original system built approximately 35 years ago and is proposed to be demolished. Wastewater Pump Station 3 will be located near the central portion of the west or makai boundary line of the park as far away from existing residences as practicable. Moreover, Wastewater Pump Station 3 will contain updated equipment to control and minimize odor and noise as well as blend aesthetically with the design of the existing neighborhood.

2. Public Services

The proposed improvements will not require any additional persons to handle operations and maintenance. Thus, the employment-related impacts of the project upon public service needs, such as police and fire protection, medical facilities and schools are considered negligible.

It is noted that the above-ground diesel fuel tank at Wastewater Pump Station 3 will be a double containment tank which meets all applicable Fire Code requirements.

3. Recreational Facilities

Construction of new Wastewater Pump Station 3 within Wahikuli Terrace Park will occur near the central portion of the makai border of the park. Construction activities will be localized around the wastewater pump station site and should not affect the remainder of the park.

Discussions are being held with the Department of Parks and Recreation regarding the extent of improvements to be placed within the park. New basketball courts as well as the installation of irrigation equipment for the park are being proposed. The proposed wastewater pump station is not anticipated to have a significant impact upon recreational resources.

4: Transportation

There will be short term construction related impacts, primarily during construction of force main and sewer line improvements within the Honoapiilani Highway right-of-way. During construction work periods within the highway, one (1) traffic lane will be out of service to excavate and install the improvements. During non-construction periods, all existing traffic lanes will be in service.

Because of the stony nature of the soil in the vicinity, it is estimated that approximately 40 to 50 feet of trenching can be excavated per 8-hour day. The extent of trenching required between new Wastewater Pump Station 3 and old Wastewater Pump Station 3 is approximately 2,200 feet. The time of construction between new Wastewater Pump Station 3 and old Wastewater Pump Station 3 is thus estimated between 44 and 55 working days.

Regarding traffic operations under normal conditions, the improved four (4) lane section of Honoapiilani Highway from Lahaina to Kaanapali provide for adequate traffic operations with little or no delays. The traffic signal systems from Lahainaluna Road to Fleming Road/Front Street are interconnected and their operations are coordinated by a master traffic signal controller located at the Papalaua Street intersection. For example, the Honoapiilani

Highway/Front Street/Fleming Road intersection operates at Level of Service (LOS) "B" during the morning peak hour of traffic and at LOS "C" during the evening peak hour of traffic. A 24-hour traffic count at the Honoapiilani Highway/Front Street/Fleming Road intersection is 7,860 vehicles. (Austin, Tsutsumi & Associates, Inc., May 1991).

The Department of Public Works and Waste Management will be working with the State Department of Transportation (DOT) in exploring applicable hours of construction, including off-peak hour construction as well as night construction. Honoapiilani Highway is a State highway and the DOT's concurrence is needed on this matter.

5. Drainage

In reference to short-term construction-related impacts, a new below-grade wet well is being constructed as part of Wastewater Pump Station 3. Force main and sewer line improvements also occur near sea level. The excavation for these improvements will involve dewatering during the period of construction of these improvements. Proper construction methods will be implemented during the dewatering process to comply with all applicable Federal, State and County requirements.

Construction methods to minimize the extent of dewatering will also be explored. For example, in the construction of the wastewater pump station wet well, the Cofferdam technique may be used. This involves placing metal sheathing along the sides of the wet well construction site with a layer of cement placed at the bottom of the

site. This would eliminate or minimize the need for dewatering while construction of the wet well proceeds.

It is anticipated that the construction period would be minimized to the maximum extent possible in order to mitigate any possible impacts. When completed, the improvements will increase reliability, capacity and efficiency of the transmission system.

The existing drainage channel makai of Wahikuli Terrace Park will require realignment to allow for vehicle access to the wastewater pump station. The capacity of the existing drainage channel will remain the same and existing drainage patterns will be maintained.

Fencing, landscaping and other site improvements related to the proposed wastewater pump station will not affect the existing drainage patterns. The project will not significantly increase drainage flows in the area and, therefore, will not require additional drainage improvements at the project site. Storm runoff from the proposed project will have no adverse effects upon adjacent and downstream properties.

6. Wastewater

While the proposed improvements would upgrade the transmission system, the increased reliability and capacity of the system also lessens the likelihood of spills occurring in the vicinity.

In the event that a spill should occur, it is highly unlikely that it will occur in Wahikuli Terrace Park or at other portions of the project. There are a number of sewer manholes at lower elevations than the proposed improvements. Should there be a backup of

wastewater in the system, spills would occur at openings in the system at the lowest possible elevation. The proposed project is not expected to affect possible spill locations.

7. Impacts to Other Infrastructural Systems

The proposed improvements will not have any significant impact on water or solid waste disposal systems. With no additional employees anticipated as a result of the proposed improvements, and maintenance expected to decrease with the new equipment in place, the proposed project's impacts upon other infrastructure systems is expected to be negligible.

Chapter V

Summary of Adverse Environmental Effects Which Cannot Be Avoided

V. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed construction of the project will result in unavoidable construction-related impacts as described in Chapter IV of this report. These include construction noise impacts from excavation, construction and dewatering.

Should night construction be required by the State Department of Transportation for construction within the Honoapiilani Highway right-of-way, then temporary construction noise may affect neighboring properties more severely. Should normal daylight construction be allowed, there may be temporary adverse traffic impacts from construction of the force main and sewer line improvements occurring within the Honoapiilani Highway right-of-way. During construction, one (1) lane is required to be closed.

There are no anticipated significant long-term adverse environmental effects as a result of the project.

Chapter VI

Alternatives to the Proposed Action

VI. ALTERNATIVES TO THE PROPOSED ACTION

There were several alternatives considered to address the needs of the Lahaina Wastewater Transmission System.

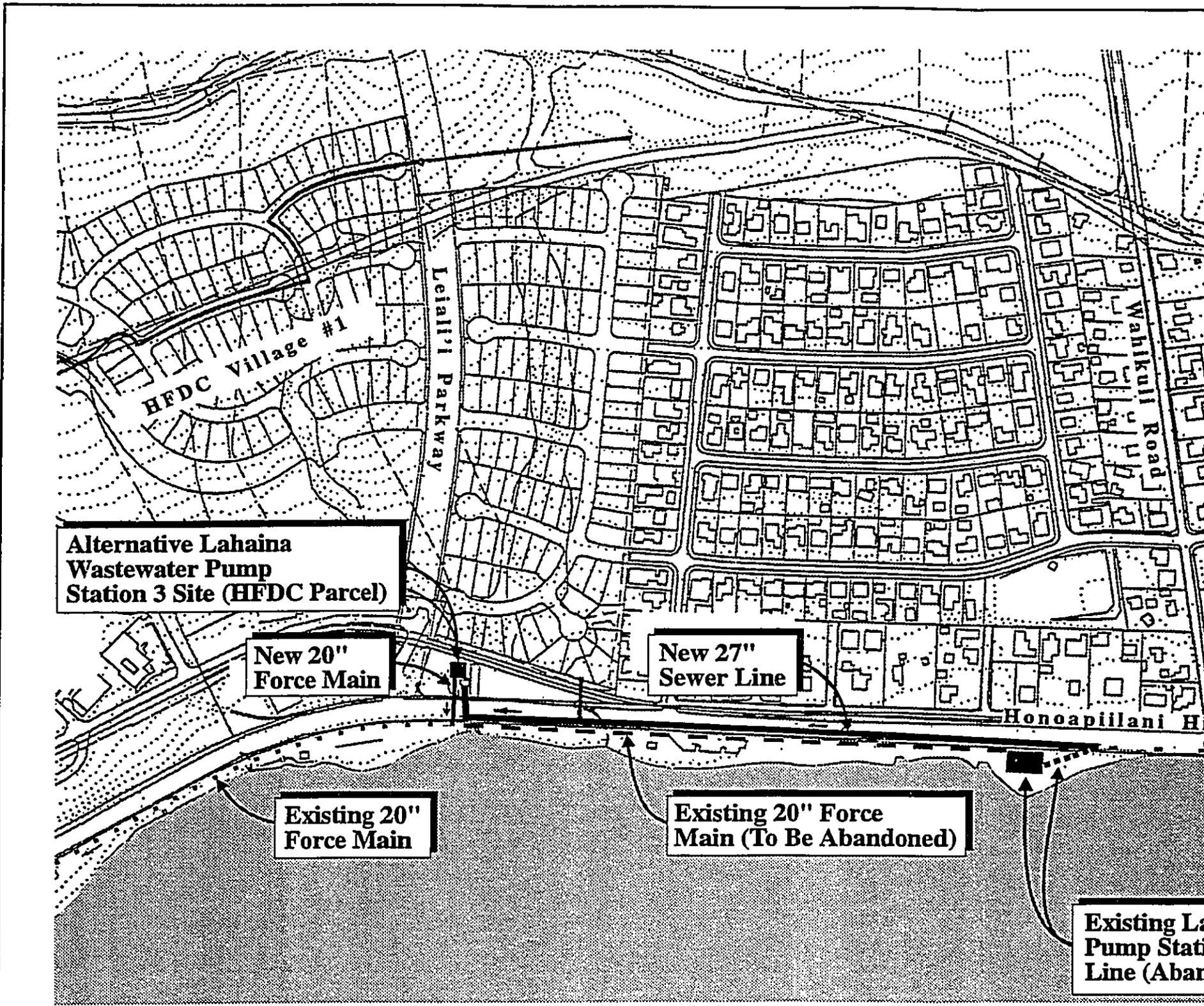
ON-SITE REPLACEMENT OF EXISTING WASTEWATER PUMP STATION 3

This alternative involved building a new wastewater pump station adjacent to the existing Wastewater Pump Station 3. One (1) possible advantage of this alternative is the minimization of work within the Honoapiilani Highway right-of-way.

However, a significant disadvantage of this alternative location concerns its close proximity to the ocean and possible damage by wave action. The new wastewater pump station would be located on a portion of the small peninsula which is designated Zone V12, an area of 100-year flood which is subject to wave action. Thus, a wastewater pump station at this location may be subject to increased risk of flooding and tsunami damage. The long-term impacts of shoreline erosion are also a significant concern since the existing Wastewater Pump Station 3 site is a shoreline lot. This site poses increased possibilities for frequent maintenance and repair, as well as possible structural damage resulting in environmental damage from spills and leaks.

USE OF HFDC PARCEL FOR WASTEWATER PUMP STATION 3

This alternative involved the abandonment of existing Wastewater Pump Station 3 and demolition of Wastewater Pump Station 9. Instead of locating the new Wastewater Pump Station 3 in Wahikuli Terrace Park, a parcel owned by the Housing Finance and Development Corporation (HFDC) south of the Civic Center (TMK 4-5-21:15) was considered. See Figure 11. The 27-inch gravity line from existing Wastewater Pump Station 9 to existing Wastewater Pump Station 3 would need to be upgraded. Slip-lining was considered as a method of repairing the existing sewer line. This involves the insertion of a plastic lining



Source: Sato & Associates, Inc.

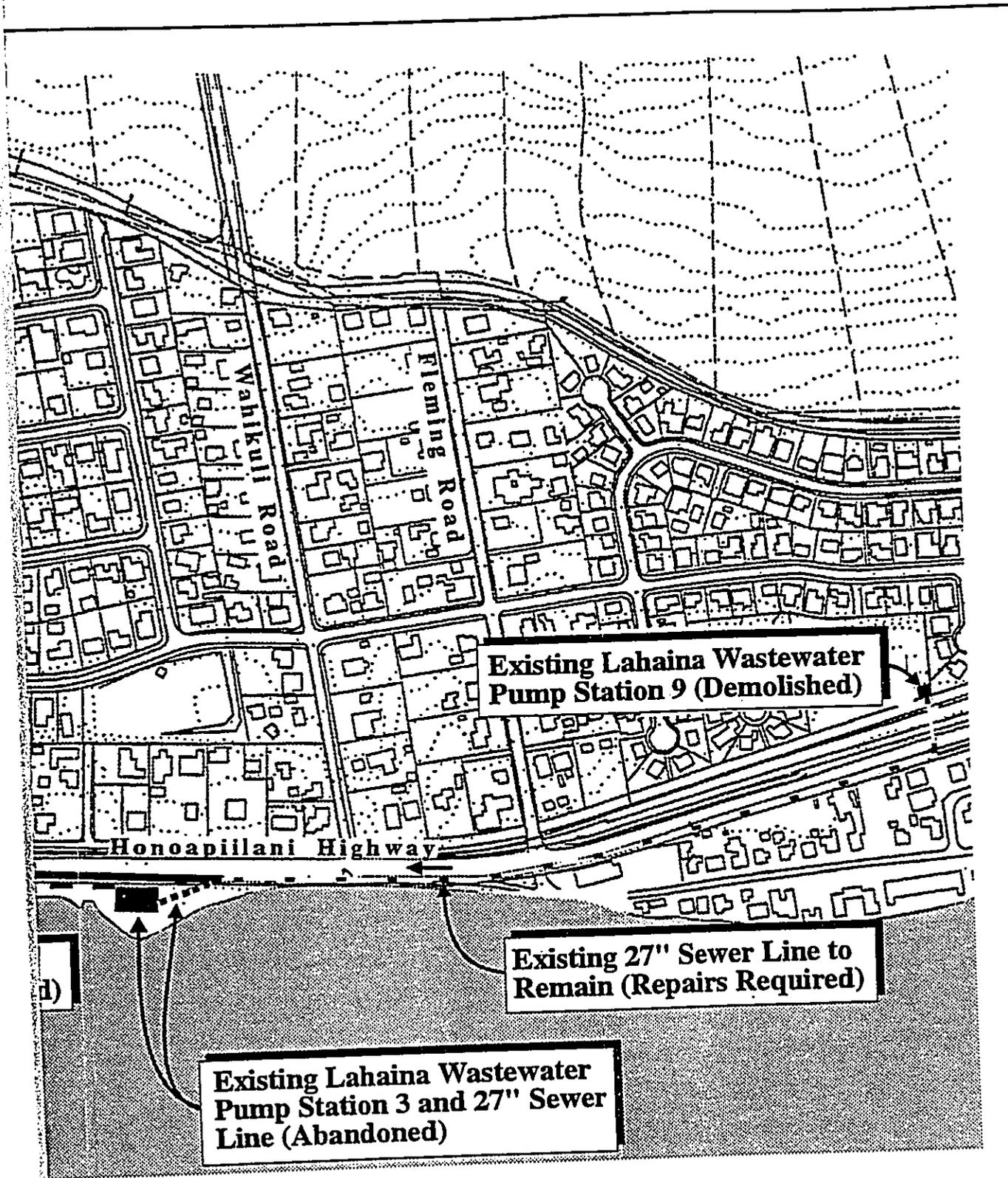
Figure 11



Lahaina Wastewater Pump Station 3 and Related Improvements

Illustration of Alternative Use of HFDC Parcel for Wastewater Pump Station 3

Prepared for: County of Maui, Dept. of Public Works and Waste Management



Pump Station 3
 Improvements
 Alternative Use of HFDC
 for Pump Station 3



into the existing pipe which is then heated to form a new interior. Slip-lining can be done through existing manholes and would not require excavation.

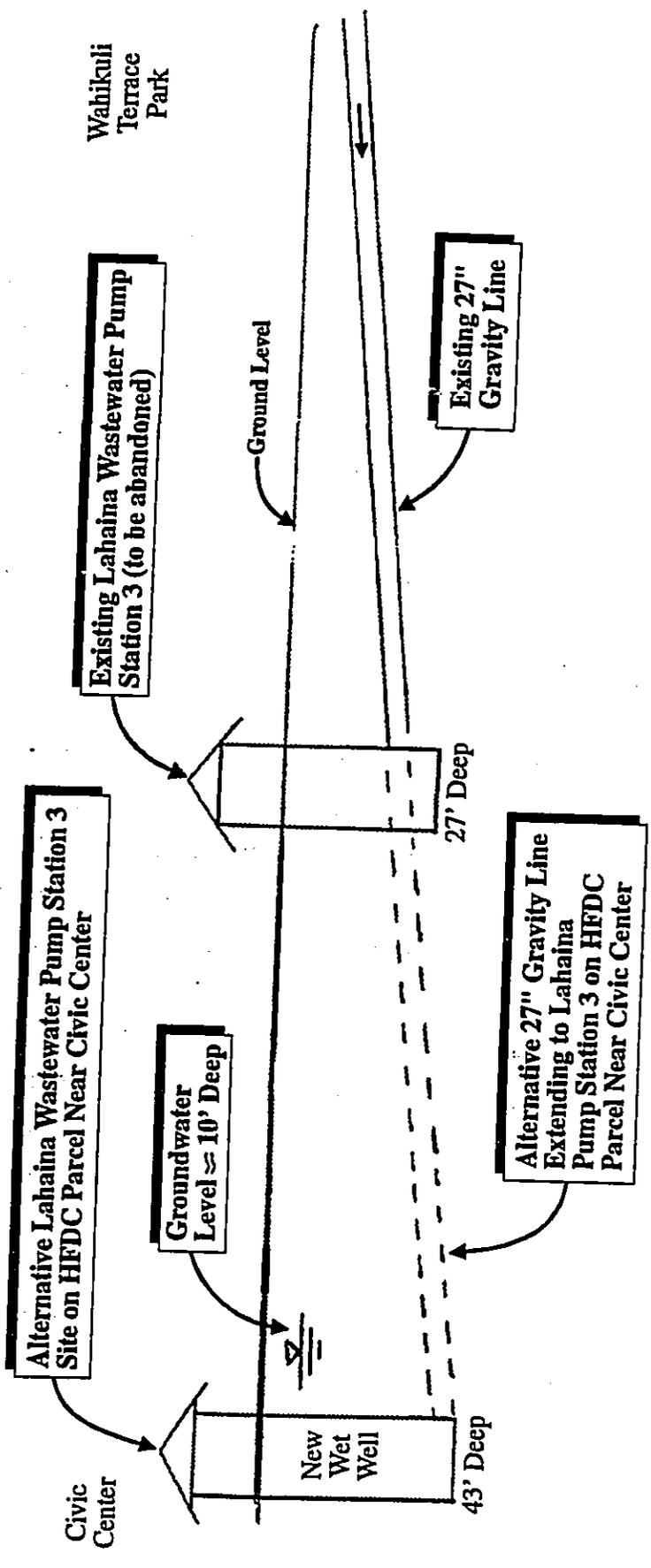
A new 27-inch sewer line from existing Wastewater Pump Station 3 to the new Wastewater Pump Station 3 located on the HFDC parcel is also needed as part of this alternative. This involves construction within the Honoapiilani Highway right-of-way which results in noise and traffic disruptions. Excavation and construction of the gravity line are anticipated to result in temporary noise impacts. During periods of construction, one (1) lane of traffic must be closed to facilitate work on the gravity line.

The new 27-inch sewer line involves excavation of approximately 2,300 feet within the highway. The existing 20-inch force main from existing Wastewater Pump Station 3 to the HFDC parcel is proposed to be abandoned.

Since force main flows are being pumped up slope, construction can occur at a relatively shallow depth. However, because the gravity sewer line must slope gradually lower from existing Wastewater Pump Station 3 to the HFDC parcel, construction within the highway right-of-way is anticipated to take place at a significant depth with a significant degree of difficulty. Should Wastewater Pump Station 3 be located at the HFDC parcel, the wet well must be located approximately 43 feet below-grade. See Figure 12. The water table is located approximately 10 feet below-grade. Any excavation and construction deeper than 10 feet below-grade for the wet well and gravity sewer line would take place in water. Moreover, subsurface conditions in this area indicated that it is quite rocky which adds to the complexity of construction.

It is estimated that construction could proceed at a rate of 20 to 25 feet of trenching per day. Work within the highway right-of-way could then be accomplished between 92 to 115 working days. Assuming 22 working days per

NOTE: If new site were located further North, slope of extension line would force New Wet Well to be deeper, increasing cost and construction difficulty.



Source: County of Maui, Dept. of Public Works and Waste Management

Figure 12

Lahaina Wastewater Pump Station 3

and Related Improvements

Schematic Diagram Illustrating Location of Wastewater Pump Station 3 on HFDC Parcel to Depth/Constructibility



Prepared for: County of Maui, Dept. of Public Works and Waste Management

NOT TO SCALE

month, construction times would range from 4.4 months to 5.2 months. In addition to increased lengths of time relating to noise and traffic impacts, it should be noted that deeper subsurface excavation involves additional quantities and increased time for dewatering.

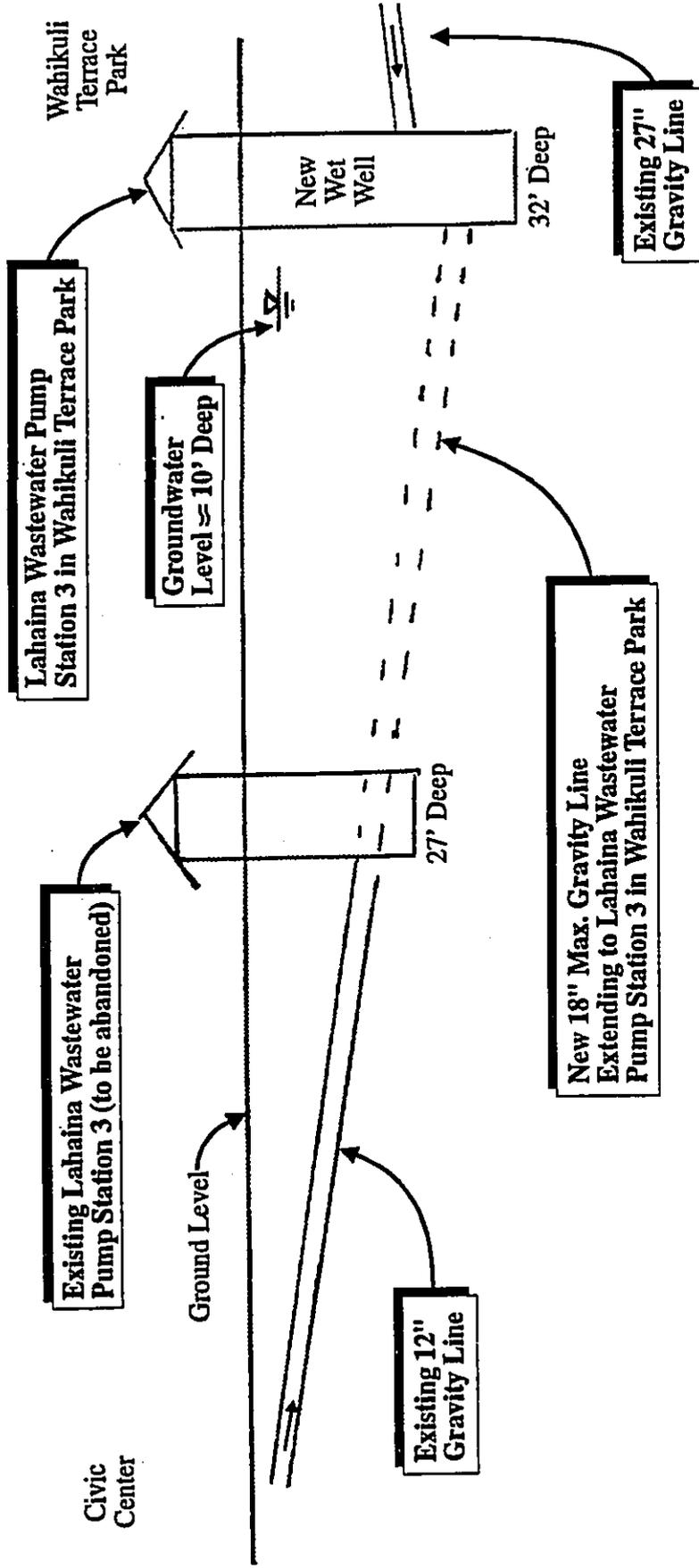
In comparison, the proposed Wastewater Pump Station 3 in Wahikuli Terrace Park involves an extension of an 18-inch gravity sewer line within the Honoapiilani Highway right-of-way from the existing Wastewater Pump Station 3 to the new Wastewater Pump Station 3. The slope of the 18-inch line requires that the wastewater pump station wet well be placed at 32 feet below-grade. See Figure 13. Construction time for the 18-inch sewer line is estimated between 44 to 55 working days. This translates to approximately 2.0 to 2.5 months.

Another primary disadvantage of utilizing the HFDC parcel involves cost. This alternative includes the purchase of the wastewater pump station land from the State of Hawaii which adds cost and time to the project. A conservative estimate of the additional cost of this alternative is \$800,000.00 more than the proposed alternative of placing Wastewater Pump Station 3 within Wahikuli Terrace Park. If unforeseen subsurface conditions arise, then the cost differential could be higher.

USE OF PRIVATE PARCEL FOR WASTEWATER PUMP STATION 3

Another alternative considered the location of Wastewater Pump Station 3 to a privately owned parcel across Honoapiilani Highway from the existing Wastewater Pump Station 3. This would have the advantage of minimizing construction work within the Honoapiilani Highway right-of-way. This alternative involved only 300 feet of new pipeline across the highway. The 27-inch sewer line from existing Wastewater Pump Station 9 to existing Wastewater Pump Station 3 would need to be upgraded. Slip-lining was envisioned as the method

NOTE: If new site were located further south, slope of extension line would force New Wet Well to be deeper, increasing cost and construction difficulty.



Source: County of Maui, Dept. of Public Works and Waste Management

Figure 13 Lahaina Wastewater Pump Station 3

and Related Improvements

Schematic Diagram Illustrating Location of Wastewater Pump Station 3 in Wahikuli Terrace Park to Depth/Constructibility



Prepared for: County of Maui, Dept. of Public Works and Waste Management

NOT TO SCALE

to repair and upgrade the existing line.

This alternative involves negotiating with one or more private owners regarding the sale of their property. It is an existing residential neighborhood so dislocation of existing residents may be considered a significant disadvantage of this alternative. Moreover, the size of the lots are in keeping with the residential nature of the area ranging from approximately 10,000 square feet up to one (1) acre. A wastewater pump station in this location would also involve more severe construction noise and dust impacts upon neighboring properties.

NO ACTION ALTERNATIVE

The no action alternative would involve further deterioration of the transmission system in this area. Wastewater Pump Stations 3 and 9 are aging, and difficult to repair and expand. The existing Wastewater Pump Station 3 has insufficient capacity to accommodate future wastewater transmission needs. Although public monies could be spent to incrementally upgrade existing Wastewater Pump Station 3, the antiquated wastewater pump station design does not allow for the increase in capacity needed to service future growth in the area.

Service to these stations also constitutes an increased risk to public works employees because access to underground pumps and equipment is through a long narrow vertical tube. Should an injury occur underground, access to the injured person is difficult. Thus, safety is a paramount concern.

The no action alternative provides increased risk of flood and tsunami damage to existing Wastewater Pump Station 3. This alternative also lessens the possibility that the Wahikuli House Lots could connect to the County sewer system. These homes are currently using cesspools or septic tanks to address wastewater needs.

Chapter VII

Irreversible and Irretrievable Commitments of Resources

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The existing Wahikuli Terrace Park is 2.252 acres in size. The proposed project will result in the loss of approximately 12,140 square feet of land for wastewater pump station use within Wahikuli Terrace Park. While the loss of this land is an irretrievable commitment of park land, the return of the land area of Wastewater Pump Station 9 to park will partially offset the loss. Park improvements such as new basketball courts and the installation of irrigation equipment for the park are also being proposed.

Chapter VIII

Findings and Conclusions

VIII. FINDINGS AND CONCLUSIONS

The proposed replacement of Lahaina Wastewater Pump Station 3, force main and gravity line improvements would increase reliability, flexibility, and safety of the wastewater transmission system, reduce risk of tsunami and flooding damage, and increase pumping capacity.

The project will involve temporary impacts involved with construction activities. Site work for the project does not involve a broad expanse of land area so dust from construction activities is not anticipated to have a significant impact. Subsurface excavation for wet well, force main and gravity line construction will involve construction noise impacts. The construction of force main and gravity line improvements within the Honoapiilani Highway right-of-way will be coordinated with the State Department of Transportation. Nighttime construction activities within the highway may be required in order to minimize daytime traffic impacts. The remainder of the project will be constructed during normal daylight hours. Construction noise impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site. To the extent possible, noisier construction activities will be performed during the daylight hours. Should night work be necessary, then muffled construction equipment and vehicles plus the location of heavy truck staging areas and portable generators away from residences and other noise sensitive receptors will also be pursued.

Dewatering discharges from the construction of the wet well, force main and sewer line will be routed to the closest County or other acceptable drainage system in compliance with all applicable Federal, State, and County regulations.

From a long-term perspective, the project is not anticipated to cause adverse environmental impacts. The project is located on lands designated as areas of minimal flooding. There are no rare, endangered or threatened species of flora

or fauna at the project sites. A forced air system tower scrubber is proposed to be located at Wastewater Pump Station 3 to aid in minimizing odors. After completion of construction, normal operating conditions at Wastewater Pump Station 3 should generate less noise than traffic along Honoapiilani Highway, as well as the sugar cane train which utilizes the railroad right-of-way adjacent to the highway. The wastewater pump station structure should not adversely impact scenic and open space resources.

There are no surface archaeological materials present at the sites. Archaeological monitoring will occur during excavation and subsurface work associated with the project. However, if subsurface deposits are found to consist of fill, or of previously disturbed matrix, periodic inspections are proposed to be scheduled, but archaeological monitoring would not be continuous.

A final monitoring plan shall be submitted to the State of Hawaii Historic Preservation Division for review upon completion of the project.

The location of Wastewater Pump Station 3 in Wahikuli Terrace Park should not adversely affect property values in the vicinity. Existing Wastewater Pump Station 9 has been located within the park for a number of years. Wastewater Pump Station 3 also contains updated equipment to control and minimize odor as well as blend aesthetically with the design of the existing neighborhood.

Although the Wastewater Pump Station 3 site will occupy approximately 12,140 square feet of land within Wahikuli Terrace Park, discussions are being held with the Department of Parks and Recreation regarding the extent of improvements placed within the park. A reconfiguration of the existing ball field, basketball courts and/or playground equipment are being contemplated.

Fencing, landscaping and other site improvements related to Wastewater Pump Station 3 will not affect existing drainage. Additional drainage improvements are not required at the project site. Storm runoff from the proposed project will have no adverse effects upon adjacent and downstream properties.

No additional County personnel are required as a result of the proposed improvements. In this regard, the project is not considered significant in terms of its impacts to public services and other infrastructure systems.

In light of the foregoing findings, it is concluded that the proposed action will not result in any significant impacts.

Chapter IX

***Agencies and Individuals Contacted
Prior to Publication of the Draft
Environmental Assessment and
Comments Received***

IX. AGENCIES AND INDIVIDUALS CONTACTED PRIOR TO PUBLICATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT AND COMMENTS RECEIVED¹

1. U.S. Army Corps of Engineers
Pacific Ocean Division
Building 230
Fort Shafter, Hawaii 96858
2. Dr. John Lewin, Director
Department of Health
State of Hawaii
1250 Punchbowl Street
Honolulu, Hawaii 96813
3. David Nakagawa, Chief
Sanitarian
Department of Health
54 High Street
Wailuku, Hawaii 96793
4. Keith Ahue, Chairman
Department of Land and Natural
Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813
5. Ms. Theresa Donham
State of Hawaii
State Historic Preservation
Office
1325 L. Main Street, #108
Wailuku, Hawaii 96793
6. Mr. Robert Siarot
Highways Division
Department of
Transportation
650 Palapala Drive
Kahului, Hawaii 96732
7. Brian Miskae, Director
Department of Planning
250 South High Street
Wailuku, Hawaii 96793
8. Charmaine Tavares, Director
Department of Parks and
Recreation
1580-C Kaahumanu Avenue
Kahului, Hawaii 96732
9. Ralph Nagamine, Director
Land Use and Codes
Administration
Department of Public Works and
Waste Management
250 South High Street
Wailuku, Hawaii 96793
10. Mr. Lloyd Lee
Engineering Department
Department of Public Works and
Waste Management
200 South High Street
Wailuku, Hawaii 96793
11. West Maui Taxpayers
Association
P. O. Box 10338
Lahaina, Hawaii 96761
12. Listed Owners of TMK 4-5-30
(Wahikuli Terrace)
13. Listed Owners of TMK 4-5-13

¹ There were a total of four meetings held with representatives of the County of Maui and various members of the community. On July 14, 1993, an informal meeting was held with the Mayor's West Maui Advisory Committee. A community meeting was held at the Lahaina Civic Center on October 19, 1993. Neighboring owners or lessees of record were notified in addition to press releases issued on October 11, 1993. An informal gathering of neighbors was held on March 14, 1994. Finally, a community meeting was held on May 17, 1994 at the Lahaina Civic Center. Neighboring owners or lessees of record were notified in addition to press releases issued on May 3, 1994.



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

94 MAR 30 07:47

March 25 10 1994

Planning Division
COUNTY OF MAUI
PUBLIC WORKS

WASTEWATER
REGULATION DIVISION

WWRD
EASSIE
RON
TRACY
PEDRO
MIKE
DAVE
DAN
STEVE
GPS
ALMA
YVONNE
CHERRIE

INFO
ACTION
DRAFT RESPONSE
SEE ME
COMMENTS
FILE
COPY

WORKS
DIRECTOR
DEP. DIR.
PERS.
STAFF OF
LUCA
CWW ASCL
SOLID W.
ENGR.
HWY.
SCTY.

By _____ Date 3/30

Mr. George N. Kaya, Director
Department of Public Works and Waste Management
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Kaya:

Thank you for the opportunity to review and comment on the Project Summary Report for the Replacement of the Lahaina Wastewater Pump Stations 1 and 3 in Lahaina, Maui (TMK 4-4-2: 29 and 4-5-30: 16). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. Based on the information provided, a DA permit is not required; however, future coordination with our Operations Division will be necessary if the force mains or gravity lines cross streams, drainage ditches or other waters of the United States. Please contact them for further information at 438-9258 and refer to file number NP94-053.

b. According to the enclosed Federal Emergency Management Agency's Flood Insurance Rate Maps, panels 150003-0153B and 150003-0161B (both dated June 1, 1981), the project sites are located in the following flood hazard areas:

(1) Station Number 1: This site is located in Zone C (areas of minimal flooding); Zone B (areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one foot or where the contributing drainage area is less than one square mile; or, areas protected by levees from the base flood); and, Zone A8 (areas of the 100-year flood with a base flood elevation of 37 feet above mean sea level).

(2) Station Number 3: The majority of this site is located in Zone C (areas of minimal flooding) with a small portion of the force main near Kaniau Road in Zone A (areas of the 100-year flood).

Should you require additional information regarding the flood hazard designations, please contact Ms. Jessie Dobinchick of our Planning Division at 438-7008.

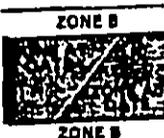
Sincerely,


Ray H. Jyo, P.E.
Director of Engineering

Enclosure

DOCUMENT CAPTURED AS RECEIVED

100-Year Flood Boundary
 500-Year Flood Boundary
 Zone Designations* With
 Date of Identification
 12/2/74
 100-Year Flood Boundary
 500-Year Flood Boundary
 Base Flood Elevation Line
 with Elevation in Feet**
 Base Flood Elevation in Feet
 Where Uniform Within Zones**
 Elevation Reference Mark
 Contour Interval
 *Referenced to the National Geodetic Vertical Datum of 1929



EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
VI-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
AOB	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Map not shaded)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazard.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
VI-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

PANEL 161 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
150003 0161 R

EFFECTIVE DATE:
JUNE 1, 1981

federal emergency management agency
federal insurance administration

CUSTOMER

DOCUMENT CAPTURED AS RECEIVED

KEY TO MAP

100-Year Flood Boundary	ZONE B
100-Year Flood Boundary	ZONE A1 DATE
Zone Designations With Date of Issuance i.e., 12/21/74	ZONE A2 DATE
100-Year Flood Boundary	ZONE B
100-Year Flood Boundary	ZONE B
Base Flood Elevation Line With Elevation in Feet**	673
Base Flood Elevation in Feet Where Uniform Within Zone**	18L 8871
Elevation Reference Mark	RM 72
Charting Note	M 20

** Referenced to the National Geodetic Vertical Datum of 1929

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A1	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
A2	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A20	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A20	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile or areas protected by levees from the base flood. (Medium shading)
C	Areas of minor flooding. (No shading)
D	Areas of undetermined, but possible, flood hazard.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V20	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MAUI COUNTY, HAWAII

PANEL 153 OF 400

(SEE MAP INDEX FOR PANELS NOT PRINTED)

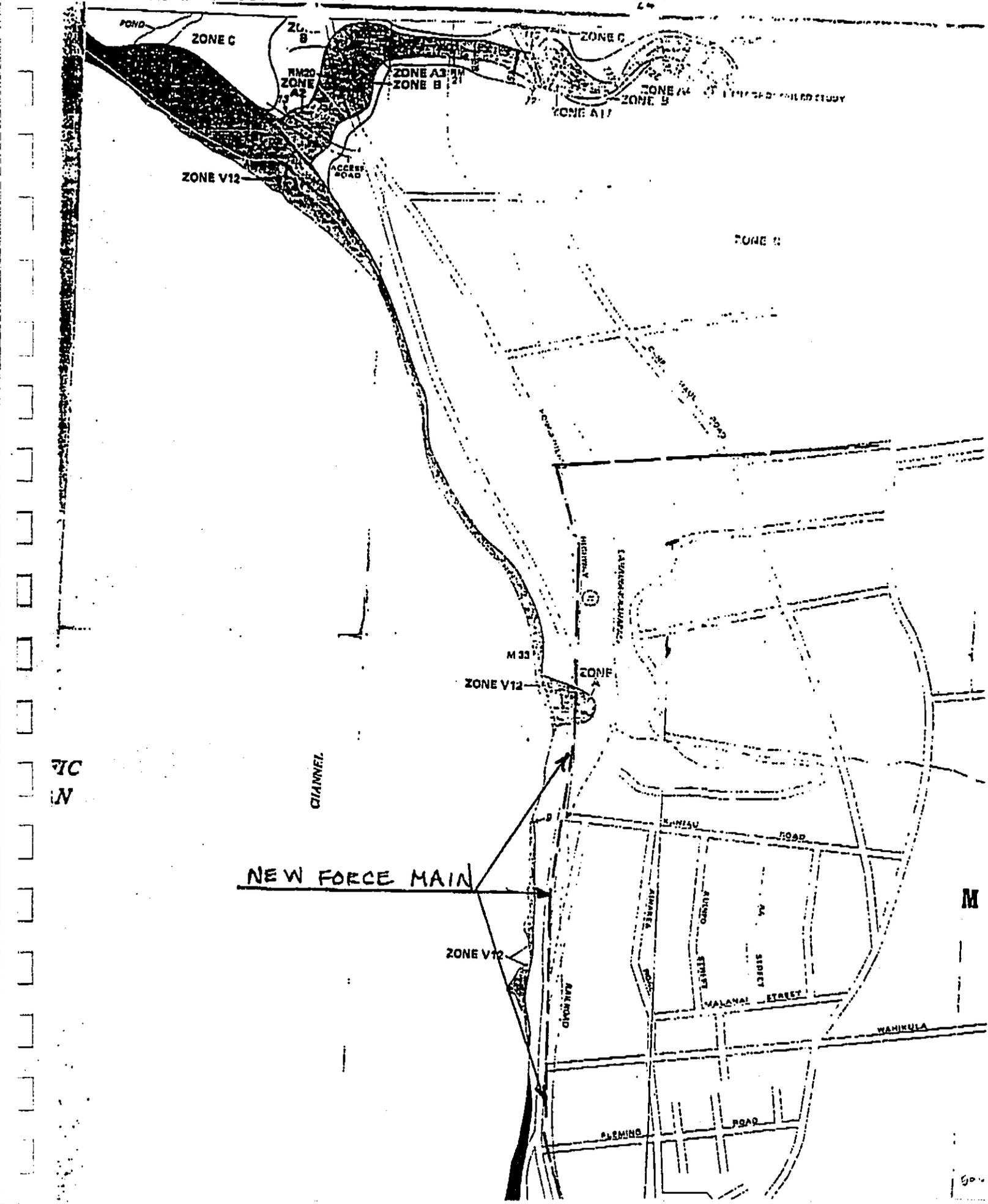
COMMUNITY-PANEL NUMBER
150003 0153 B

EFFECTIVE DATE:

JUNE 1, 1981



federal emergency management agency
federal insurance administration

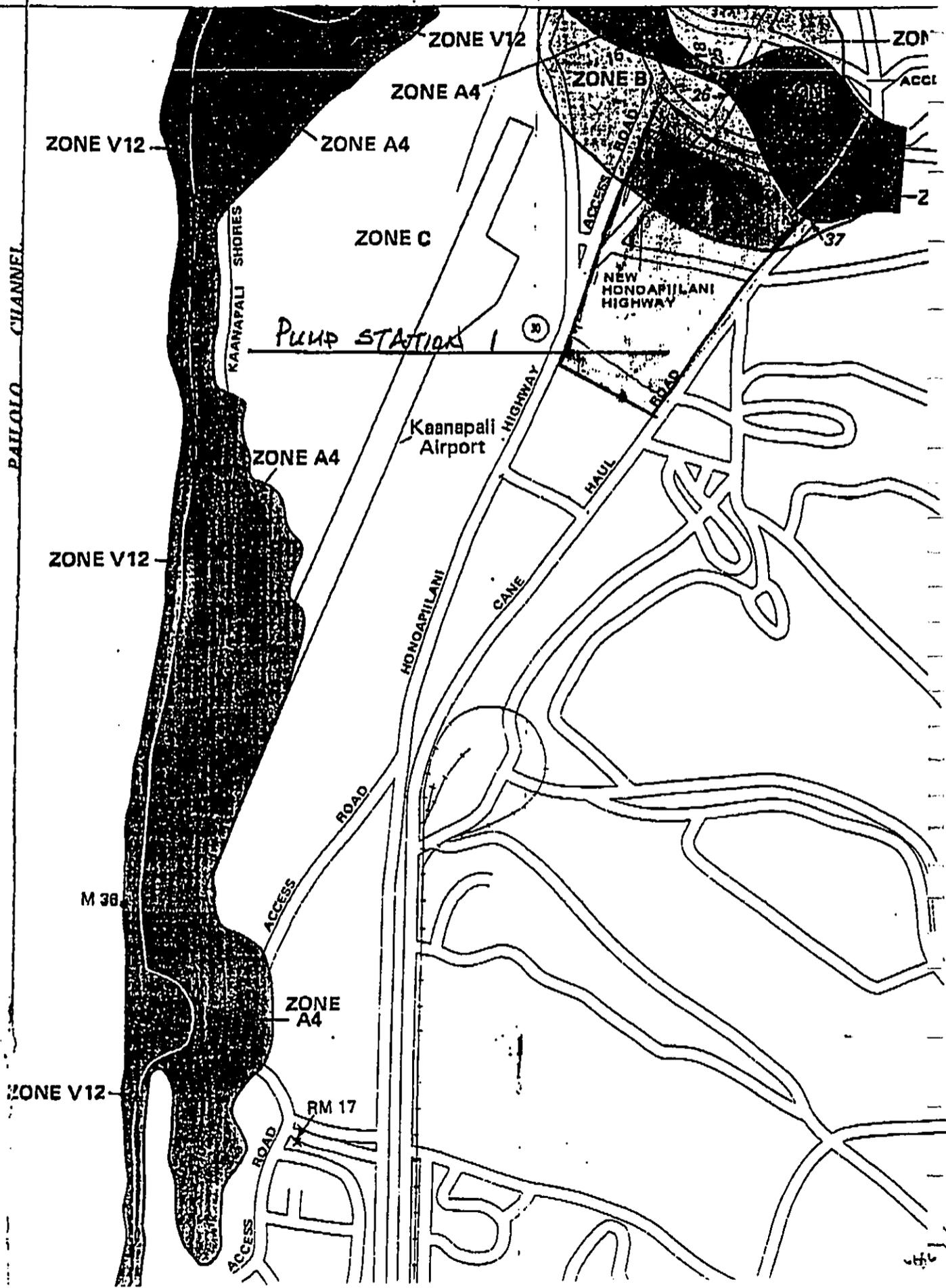


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Mr. G. Kaya

- 2 -

File No.: 94-557

Please feel free to call Steve Tagawa at our Office of Conservation and Environmental Affairs, at 587-0377, should you have any questions.

Very truly yours,


KEITH W. AHOE

cc: County of Maui Planning Dept.

JOHN WAHEE
GOVERNOR OF HAWAII



KETH ARIE, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

JOHN P. KEPPELER II
DONA L. HANAKA

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES OF MAUI
PUBLIC WORKS

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES CONSERVATION AND ENVIRONMENTAL AFFAIRS CONSERVATION AND RESOURCES ENFORCEMENT CONVEYANCES FORESTRY AND WILDLIFE HISTORIC PRESERVATION DIVISION LAND MANAGEMENT STATE PARKS WATER AND LAND DEVELOPMENT

94 MAY 17 P2:34

May 11, 1994

Mr. George N. Kaya, Director
County of Maui Department of
Public Works and Waste Management
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Kaya:

SUBJECT: County of Maui, Historic Preservation Review of the
Lahaina Wastewater Pump Stations 1 and 3
Replacement, and Sewer Line Improvements,
Wahikuli, Lahaina, Maui
TMK: 4-5-30: 16; 4-5-13; 4-5-14; By 4-5-21 Date 5/17

DEPT OF PUBLIC WORKS	Log	Info	File	Sec. Me	Comments	Copy	File
LOGS	<input checked="" type="checkbox"/>						
DOC. NO. 9804	<input checked="" type="checkbox"/>						
FERS	<input type="checkbox"/>						
STAFF CE	<input type="checkbox"/>						
LUCA	<input type="checkbox"/>						
WW RECL.	<input checked="" type="checkbox"/>						
SOLID W.	<input type="checkbox"/>						
ENCL.	<input type="checkbox"/>						
HW/S.	<input type="checkbox"/>						
SECY.	<input type="checkbox"/>						

Thank you for the opportunity to review this proposed Public Works project. We received from your office selected pages from a draft environmental assessment for the project, which contains a description of the proposed action.

The proposed project includes construction of two new pump stations, a new 20-inch force main, and sewer line improvements. One of the new pump stations (#1) is to be located within the existing Lahaina Wastewater Treatment Plant at Honokawai. Pump station #3 will be located in the Wahikuli Terrace Park. The force main and sewer line improvements are located within the Honoapiilani Highway right-of-way.

There are no known historic sites present on the surface within the proposed pump station sites or along the highway shoulder. We have no information at this time regarding the presence or absence of subsurface cultural deposits or other types of buried archaeological features within the project areas. This information should be provided in the environmental assessment. Any archaeological reports completed for this project should be attached to the environmental assessment, and may be submitted to the Historic Preservation Division for review prior to completion of the environmental assessment.

Mr. George Kaya
Page 2

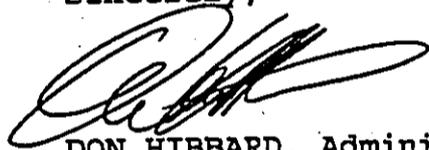
If the areas to be impacted are currently not accessible for archaeological testing, then the applicant should state that archaeological monitoring will occur during excavation of sewer line and force main trenches and during any trenching associated with the pump stations.

If the subsurface deposits along Honoapiilani Highway or in the areas of the pump stations are found to consist of fill, or of previously disturbed matrix, the archaeological monitoring need not be continuous for the duration of the project. Periodic inspections should, however, be scheduled. A final monitoring report should be submitted to the Historic Preservation Division for review at the completion of the project.

Additional comments will be forthcoming after we have reviewed the completed draft environmental assessment.

If you have any questions, please contact Ms. Theresa K. Donham at 243-5169.

Sincerely,



DON HIBBARD, Administrator

KD:jen

c: Roger Evans, OCEA (File No.94-557)

LINDA CROCKETT LINGLE
Mayor

GEORGE N. KAYA
Director

CHARLES JENCKS
Deputy Director

AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI

DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT COUNTY OF MAUI
LAND USE AND CODES ADMINISTRATION PUBLIC WORKS
250 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

MAY 24 1994

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

DAVID WISSMAR, P.E.
Solid Waste Division

YASUHIRO HASHIRO, P.E.
Highways Division

MAY 17 1994

May 17, 1994

5/18
DNK
MEMO TO: George N. Kaya, Public Works & Waste Management Director
F R O M: Ralph Nagamine, Land Use and Codes Administrator *RN*
SUBJECT: Replacement of Lahaina Wastewater Pump Stations 1 and 3
Lahaina, HI

The divisions reviewed the subject application and have the following comments:

1. Comments from the Engineering Division:

- a. We offer no objection to the subject property at this time.
- b. That drainage reports and soil erosion reports are required to be submitted for each site for our review and comments.

The applicant is requested to contact the Engineering Division at 243-7745 for additional information.

2. Comments from the Wastewater Reclamation Division:

This division has reviewed this submittal and has no comments at this time.

3. Comments from the Solid Waste Division:

This division has reviewed this submittal and has no comments at this time.



Chapter X

***Comments Received During Public
Review Period and Agency Responses***

JIM BRUCE 1367 Alnakea St. Lahaina, Maui 96761

George Kaya -
Director of Public works -
243-7845

94 JUL 28 A9:01

Mr. Kaya:

COUNTY OF MAUI
PUBLIC WORKS

	Info	Adm	Plan	Eng	Comm	Copy	File
PUBLIC WORKS							
DIRECTOR							
DEP. DIR.							
PERS.							
STAFF CE							
LUCA							
WW RECL.							
SOLID W.							
ENGR.							
HWYS.							
SECTY.							

Alternative Plan for Pump #3 (Junction of Force main & sewer line A)
By _____ Date _____

Put it at Kahoma Stream and the Highway (Call XX). No one lives within a good quarter of a mile. Existing sewers from all areas can be fed to it with little problems or disruption to Hwy Traffic. Waihikuli Subdivision - cross road to Olona Pump - to Mala - which pumps up to A today. All of Lahainaluna runs there by gravity. "XX" takes one small crossing of the Highway and is in a pressure line to the new gravity line mauka of the Civic Center.

Your environmental assessment statement doesn't want to disrupt the highway, Doesn't want to be in a Tsunami Zone. Doesn't want to dig to deep, so as to spill things into the ocean, WHICH ALTERNATIVE SITE "XX" TAKES CARE OF. YOU WILL NOT HAVE ALL THESE MAJOR LINES THRU the brakish water table at sea level. The little land owners and residents around Waihikuli Terrace Park have their backs to the Kukai Hale, and you, your staff, and your bosses seem to have your minds made up, whereas you can find a better, safer, environmentally correct solution. We don't have a fancy neighborhood, but we choose the noise of the railroad, the cane fields, the canehaul road and Honoapiilani Hwy to live next to. We are asking that you Mr. Kaya find a solution for your engineers to work on, and a positive long range solution to present to the Mayor and County Counsel. Dumping a major Lahaina Sewer Pump station in the middle of a low cost housing (Waihikuli Terrace) community and a much older Baldwin Packer residential area (Mala Camp) and taking away from a little community Park is NOT the best Idea..

I have enclosed some copies of the Petition that the neighborhood got together and signed. When I get copies oof them all I will send them to you. We hope you respect the little community problems.

Dave Taylor quoted last night that no one has commented on the Environmental assessment Statement and that is because, nothing has changed to date talking to him and we are all trying to figure how to get you to consider our side. Islandwide pressure, statewide pressure, nationwide pressure, legal pressure. We all hope that just plain deductive reasoning with a little empathy and common sense would get you working for us.

MAHALO FOR YOUR TIME !!!! JIM BRUCE

P.S. YOUR GREAT PLANNING STAFF HAVE MAKE A LITTLE BASEBALL DIAMOND NEXT TO A JUNGLE GYM AND SWING FOR YOUNG PEOPLE OF 6 TO 15 INTO A PLANNED LIGHTED BASKETBALL COURT WITH IRRIGATION. Different group of kids don't you think.

JOHN WAIKIE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3370
HONOLULU, HAWAII 96801

In reply, please refer to:

August 8, 1994

George Kaya, Director
Department of Public Works
County of Maui
200 South High St.
Wailuku, HI 96793

Dear George:

Thank you for the opportunity to review the draft Environmental Assessment for Lahaina Wastewater Pump Station 3.

I have reviewed the EA and agree with the major conclusions that construction noise and traffic impacts during construction are the major unavoidable impacts of this project.

Once the pump station is operational, odors could be a potential problem at the pump station and nearby manholes. I understand that the County now implements odor control measures at the Lahaina system and will modify these efforts to address any concerns in the vicinity of the new Pump Station 3. Other than this controllable problem, the pump station is unlikely to cause environmental problems or present a nuisance to nearby residents.

Because the coastal waters of Lahaina are classified by the Department of Health as "impaired" due to frequent exceedences of water quality standards for nutrients and turbidity, I recommend that the final EA discuss impacts to coastal water quality. Soil erosion and dewatering during construction could result in discharge of sediment-laden water to the shore. How will these impacts be minimized?

I commend the Wastewater Reclamation Division for their efforts to improve Lahaina's wastewater collection and treatment system. Relocation of Pump Station 3 is badly needed to reduce the risk of damage to Lahaina's wastewater system by storms, erosion, and salt water. Replacement of old and unreliable pump station equipment with new equipment should reduce the occurrence of sewage spills and improve the integrity of the collection system. These improvements are needed to protect the public health of residents and to maintain the economic viability of West Maui.

Sincerely,

Wendy I. Wiltse, Ph.D.
West Maui Watershed Coordinator

P. GOMEZ

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3875 L. HWY #301

LAHAINA HI 96761

Mr. George Kaya
Director
Public Works
200 South High St.
Wailuku, Maui 96793

PLEASE KOKUA!!!!

DEAR MR. KAYA:

I live in Lahaina and am VERY CONCERNED AND AGAINST your choice of Wahikuli Terrace Park for Pump Station #3. Please find a safer, ecologically better and less obtrusive location for this major Pumping facility for the Lahaina sewer system.

Mahalo, Paul D. Gomez

Additional Concerns _____

Name PAUL D. GOMEZ

Address 3875 L. HWY

#301 LAHAINA

Phone 669-0128

George Kaya
 Maui County Public Works
 County Building
 200 S. High St
 Wailuku HI 96793

RECEIVED

August 7, 1994

AUG 11 AM 9:34

94 AUG 10 P2:12

WASTEWATER RECLAMATION TESTIMONY

PUBLIC WORKS

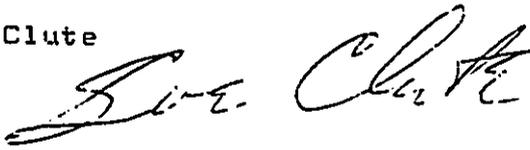
DEPT OF PUBLIC WORKS	Info	Action	Copy	See Me	Comment	Copy	File
DIRECTOR	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
DEP. DIR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PERS.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
STATE OE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LUCA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WW RECL.	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
PARK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ENGR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLANNING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Regarding the moving of the sewage pump to Wahikuli Terrace Park

I agree an environmental impact statement is needed, before considering the placement of a sewage pump in a residential area. I oppose the sewage dump in the close proximity of the Wahikuli residents for the following reasons.

1. There is a long history of sewage spills in the area. Spills have occurred when sewage pumps were installed, repaired and maintained. Estimate the number of times this pump will have to be maintained and repaired over 10-20-30 years shows a high risk of contaminated soil, and contaminated dust created. This dust will be breathed by the residents and park users and cause various illnesses. Between the time of the spill and clean-up, there is time for bacteria and viruses to spread.
2. E. coli bacteria can be contacted by park users from the raw sewage in the soil. The reason why treated effluent is not used on pineapple, is for fear of spreading viruses. The risk is greater for humans and animals to be exposed to raw sewage, spilled on soil.
3. Pets and stray animals can contact viruses from the contaminated soil and spread disease.
4. What will be used for disinfectant purposes? The chlorine bleach presently used, has been linked to breast cancer.
5. The odor of spilled sewage can cause nausea, headaches, and lack of appetite.
6. The cost of a well functioning, adequate odor control device can be very expensive. I have smelled noxious odors from the Lahaina Wastewater Reclamation Plant ie: sewage treatment plant, that were not adequately controlled, while the odor control devices were in place.
7. As a public health matter, placing a sewage pump in close proximity to a residential area is risky. People of all ages and health conditions live there, and generations of families will live there. Placing their health at risk for the next 10-20- 30 years, due to known raw sewage overflows is inexcusable.

Eve Clute



EVE CLUTE * P.O. BOX 11634 * LAHAINA HI 96761 * 667-5058 PH/FAX

11 / 1
 [Handwritten initials]

LINDA CROCKETT LINGLE
Mayor
GEORGE N. KAYA
Director
CHARLES JENCKS
Deputy Director
AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT

200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

August 22, 1994

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration
EASSIE MILLER, P.E.
Wastewater Reclamation Division
LLOYD P.C.W. LEE, P.E.
Engineering Division
DAVID WISSMAR, P.E.
Solid Waste Division
BRIAN HASHIRO, P.E.
Highways Division

Mr. Jim Bruce
1367 Ainakea Street
Lahaina, Hawaii 96761

Dear Mr. Bruce:

SUBJECT: Draft Environmental Assessment for Lahaina Pump Station 3 and Related Improvements

Thank you for your letter received on July 28, 1994 pertaining to the subject project. We would like to provide the following response to your comments.

Regarding your suggestion of an alternate pump station site near Kahoma Stream instead of the proposed site at Wahikuli Terrace Park, it is noted that a Kahoma Stream pump station would not allow connection from the State of Hawaii's Villages of Leialii Project or the Wahikuli House Lots. Another pump station would be required near the Lahaina Civic Center in order to handle flows from these areas. Thus, the Kahoma alternative would involve the additional cost of a second pump station.

A pump station at the Kahoma site also would require a relatively deep wet well which adds to the cost and complexity of construction. For the additional public funds required to implement this alternative, there is no corresponding increase in the quality and efficiency of the wastewater transmission system as a whole.

For your information and review, we have included a departmental memorandum which summarizes the evaluation of three alternative sites for a new Pump Station 3. We hope that this provides further clarification into our rationale for the selection of the Wahikuli Terrace Park site.

Mr. Jim Bruce
August 22, 1994
Page 2

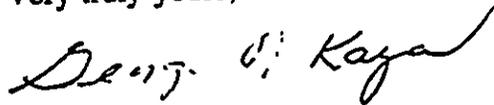
Regarding your comments on recreation, we realize that the proposed Pump Station 3 will require a portion of land currently utilized as a baseball field. However, we are proposing the provision of a basketball court as well as the installation of irrigation equipment which will provide recreational and open space amenities for the immediate neighborhood.

We acknowledge receipt of the copies of petitions which were earlier submitted to the Department at its May 17, 1994 informational meeting at Lahaina Civic Center. Comments raised in the petition include concerns relating to odor, chemicals, noise, aesthetics, park space, and drainage. Since these issues were raised during the preparation of the Draft Environmental Assessment (EA), we have discussed and addressed these issues in the Draft EA document.

Alternative pump station sites close to Blackie's Boat Yard, close to the drainage ditch next to the Cannery Shopping Center, and the main Post Office site were also suggested in the petition. The sites close to Blackie's Boat Yard and the drainage ditch next to the Cannery Shopping Center are located in close proximity to the Kahoma Stream alternative site discussed earlier. Thus, these sites have the same characteristics as the Kahoma alternative. Regarding a site next to the main post office site at the Civic Center, this alternative site has the same characteristics as an adjacent parcel considered for a pump station site which is owned by the Housing Finance and Development Corporation (TMK: 4-5-21:15). Generally, a pump station near the Civic Center involves construction of relatively deep gravity lines and wet wells. This involves longer construction time periods, additional cost, and a higher degree of construction complexity. In addition, the State of Hawaii owns the land. Thus, the site needs to be purchased from the State. The pros and cons of this site were discussed in more detail within the Draft EA.

While we can understand your concern regarding the location of a new Pump Station 3 within Wahikuli Terrace Park, we would like to assure you that our Department will take every precaution to minimize or eliminate any adverse impact upon the neighboring community. Your input into the Environmental Assessment process is sincerely appreciated. If you have any questions, please feel free to call Dave Taylor at the Wastewater Reclamation Division at 243-7417.

Very truly yours,



GEORGE N. KAYA
Department of Public Works and Waste
Management

DT:ym(WM95029e)
/c: Milton Arakawa, Munekiyo & Arakawa, Inc.

LINDA CROCKETT LINGLE
Mayor

GEORGE H. KAYA
Director

CHARLES JENCKS
Deputy Director

AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administrator

EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

DAVID WISSMAR, P.E.
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

August 22, 1994

Ms. Christine Hoerl
P.O. Box 1024
Lahaina, Hawaii 96761

Dear Ms. Hoerl:

SUBJECT: Draft Environmental Assessment for Lahaina Pump Station 3 and Related Improvements

Thank you for your letter of July 29, 1994 pertaining to the subject project. We would like to provide the following response to your comments.

Regarding your concern for your son's home on Ainakea Street, we would like to state that the new Pump Station 3 in Wahikuli Terrace Park should not adversely affect property values in the area. As you know, Pump Station 9 has been located within the park for a significant period of time. It was part of the original wastewater collection system built approximately 20 years ago and contains aging and outdated equipment. We are proposing to demolish Pump Station 9 as part of this project. The new Pump Station 3 will upgrade equipment which will result in the increased reliability of the wastewater transmission system while minimizing nuisance impacts such as odor and noise. We believe that the new pump station will be designed to be visually compatible with the neighborhood. Proposed park improvements should also have a positive aesthetic impact. While we can understand your apprehension, we believe that the project will have a beneficial impact upon the neighborhood and community as a whole.

For your information and review, we have included a departmental memorandum which summarizes the evaluation of three alternative sites for a new Pump Station 3. We hope that this provides further clarification into our rationale for the selection of Wahikuli Terrace Park site.

Ms. Christine Hoerl
August 22, 1994
Page 2

Your input into the Environmental Assessment process is sincerely appreciated. If you have any questions, please feel free to call Dave Taylor at the Wastewater Reclamation Division at 243-7417.

Very truly yours,



GEORGE N. KAYA
Director of Public Works and Waste Management

DT:ym(WM95029b)
/c: Milton Arakawa, Munekiyo & Arakawa, Inc.

LINDA CROCKETT LINGLE
Mayor

GEORGE N. KAYA
Director

CHARLES JENCKS
Deputy Director

AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT

200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793
August 22, 1994

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

DAVID WISSMAR, P.E.
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

Wendy I. Wiltse, Ph.D.
West Maui Watershed Coordinator
State Department of Health
1830 Honoapiilani Highway
Lahaina, Hawaii 96761

Dear Dr. Wiltse:

SUBJECT: Draft Environmental Assessment for Lahaina Pump Station 3 and Related Improvements

Thank you for your letter of August 8, 1994 pertaining to the subject project. We would like to provide the following response to your comments.

Regarding your concerns on soil erosion and dewatering during construction, it is noted that the responsibility of compliance with applicable Federal, State and County rules will lie with the contractor doing the construction. We will include this provision in the contract specifications. While methods of construction are not specified to the contractor, it is noted that differing construction techniques may have an effect on the extent of dewatering. For example, a possible method of construction for the wet well is the Cofferdam technique which could minimize or eliminate dewatering. This involves placing metal sheathing along the sides of the wet well construction site with a layer of cement placed at the bottom of the site.

Your input into the Environmental Assessment process is sincerely appreciated. If you have any questions, please feel free to call Dave Taylor at the Wastewater Reclamation Division at 243-7417.

Very truly yours,

GEORGE N. KAYA
Director of Public Works
& Waste Management

DT:ym(WM95029a)
/c: Milton Arakawa, Munekiyo & Arakawa, Inc.

LINDA CROCKETT LINGLE
Mayor

GEORGE N. KAYA
Director

CHARLES JENCKS
Deputy Director

AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

DAVID WISSMAR, P.E.
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

August 22, 1994

Mr. Robert B. Hartman
Whaler's Locker
P.O. Box 842
Lahaina, Hawaii 96767

Dear Mr. Hartman:

SUBJECT: Draft Environmental Assessment for Lahaina Pump Station 3 and Related Improvements

Thank you for your letter of August 8, 1994 pertaining to the subject project. We would like to provide the following response to your comments.

While we can understand your concern regarding the location of a new Pump Station 3 within Wahikuli Terrace Park, we would like to assure you that the Department will make a concerted effort to minimize or eliminate any undesirable impact upon the neighboring community. The new Pump Station 3 will provide updated equipment which will result in the increased reliability of the wastewater transmission system while minimizing nuisance impacts such as odor and noise. A forced air system scrubber system will be constructed to treat odors. Also, the noise from the variable speed pumps which will be installed at the pump station should be less than traffic noise levels along Honoapiilani Highway. We believe that the design of the new pump station will be compatible with the neighborhood. While a portion of the existing baseball field is required for the project, proposed park improvements in the form of a basketball court and irrigation equipment will provide and enhance recreational and open space amenities for the immediate neighborhood.

For your information and review, we have included a departmental memorandum which summarizes the evaluation of three (3) alternative sites for a new Pump Station 3. We hope that this provides further clarification into our rationale for the selection of the Wahikuli Terrace Park site.

Mr. Robert Hartman
August 22, 1994
Page 2

Your input into the Environmental Assessment process is sincerely appreciated. If you have any questions, please feel free to call Dave Taylor of the Wastewater Reclamation Division at 243-7417.

Very truly yours,



GEORGE N. KAYA
Director of Public Works and Waste Management

DT:ym(WM95029g)
✓c: Milton Arakawa, Munekiyo & Arakawa, Inc.

LINDA CROCKETT LINGLE
Mayor

GEORGE N. KAYA
Director

CHARLES JENCKS
Deputy Director

AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT

200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793
August 3, 1994

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

DAVID WISSMAR, P.E.
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

Departmental Memorandum
attached to letters
addressed to Jim Bruce,
Christine Hoerl, and
Robert Hartman.

MEMO TO: FILE

F R O M: George N. Kaya, Director of Public Works and Waste Management

SUBJECT: REPLACEMENT OF LAHAINA PUMP STATION NO. 3
COMPARISON OF ALTERNATE SITES

The County of Maui, Department of Public Works and Waste Management is currently proceeding with a project to replace Lahaina Wastewater Pump Station No. 3. The existing pump station is located makai of Honoapiilani Highway approximately halfway between the Chart House and the Civic Center. This facility is being replaced to allow increased system capacity and greater reliability. The present pump station's close proximity to the ocean makes it subject to storm, tsunami and erosion damage. The Department has evaluated three sites mauka of the highway and has investigated the possibility of constructing the new station at the present site. The number of alternative schemes available were limited because of land availability and the need for the new site to be located relatively close to the existing pump station. Each alternative was evaluated on the basis of factors such as long and short term impacts to residents, land availability, traffic and community impacts during construction, cost, operations and maintenance needs and reliability. A plan showing the locations of the four schemes is attached.

The existing pump station is the only site not located near existing or future residences. Because the existing site is located on the shoreline, however, it is a poor choice. In the long term, the County will probably be forced to move it. The structure will have a 50+ year lifetime. It seems likely that within that time span, storm, erosion or tsunami considerations will force the station to be relocated. Rebuilding the station at the present site is not a viable long term solution, and will only delay the inevitable relocation of the facility. The Department feels that locating essential public facilities on the shoreline should be avoided whenever possible.

Memo to file
August 3, 1994
Page 2

As the other three feasible locations are in residential areas, the Department would need to implement the same types of odor and noise mitigation measures at each site. The Department feels that any new pump station located in a residential area must be designed to minimize disturbances to the surrounding residents or future residents as much as possible.

Site B, located across the highway from the existing station is too small for construction and operation of the facility. There would be almost no buffer zone between the station and the existing residences. Construction and dewatering activities would not be practical as there is not enough room to operate construction, dewatering and groundwater filtering equipment. The land is privately owned and the County would have to purchase or condemn the property. This site would be a poor choice.

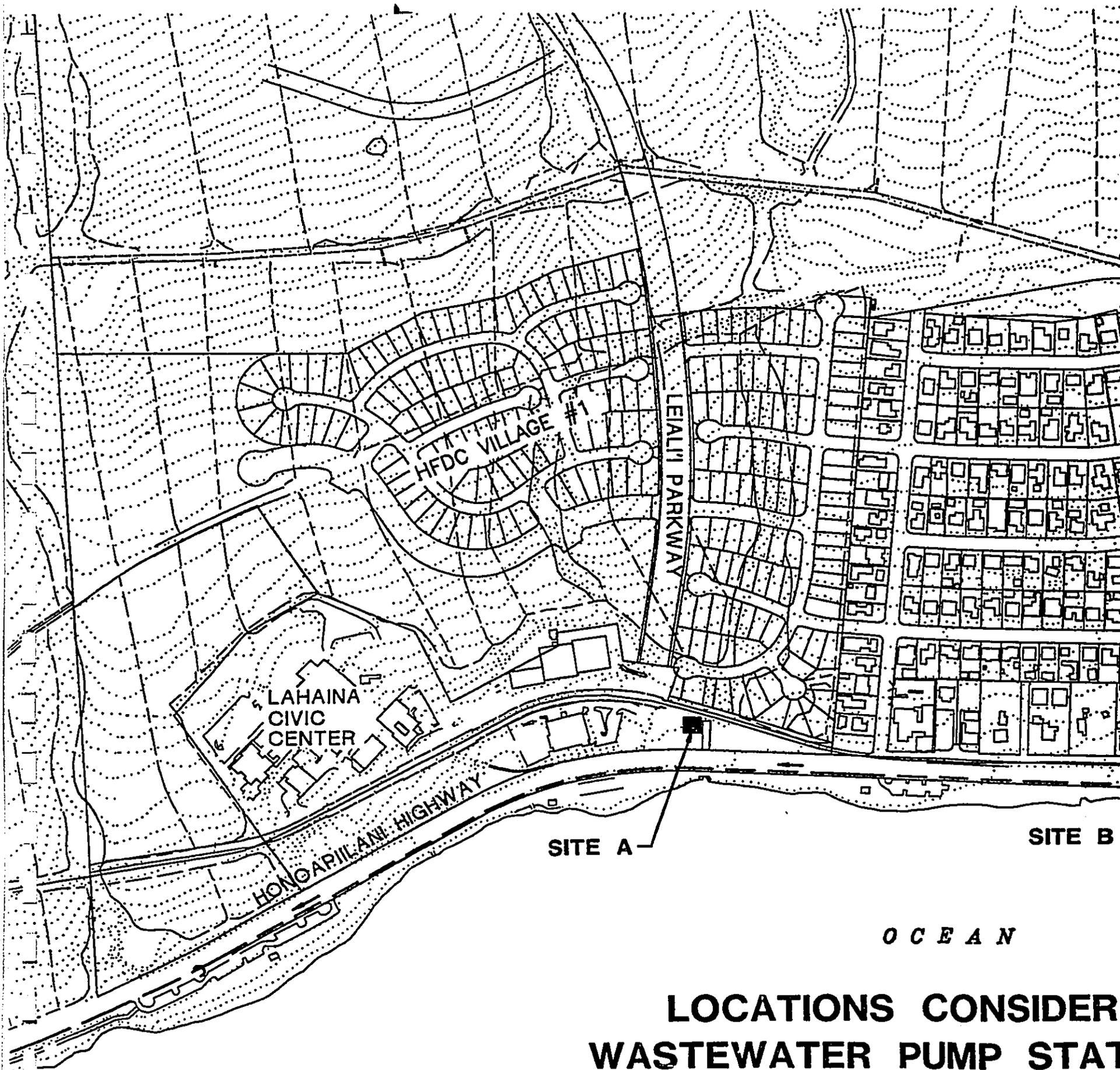
The last two sites available are the location near the new HFDC development (Site A) and the location in Wahikuli Terrace Park (Site C). Residents would have roughly the same buffer zone separating them from the station in each case. The advantage of the HFDC site is that it will probably never be developed and park space would not be removed. Unfortunately, there are a number of serious disadvantages with this site. The State of Hawaii, which owns the land, is not in favor of utilizing the parcel for a pump station. Furthermore, construction of the facility at the HFDC site would cost at least 1 - 2 million dollars more than at the Wahikuli Park site. The cost difference is largely due to the necessary extension of the 27" gravity line in Honoapiilani Highway from the existing station to the HFDC site. This line would require extremely deep (up to 30') trenching in the hard rock and extensive dewatering and desilting operations. The work would occur in the highway causing major traffic disruptions for at least 6-9 months. The Department is aware of at least one underground stream in the area. If more are found while trying to trench, the costs will escalate and the length of time working in the highway will increase. Construction problems related to this site could easily cause highway construction to be lengthened to one year with a cost increase of a million dollars or more. Attempting the off site construction necessary to connect the existing sewer system with a new station at the HFDC site would be extremely risky financially as well as from a constructibility and traffic impact perspective. The parcel itself is a good site for the pump station, but the difficulties involved with the construction of the required off site improvements are so severe that this option as a whole is not a good choice.

Memo to file
August 3, 1994
Page 3

The only site left is the Wahikuli Park site. It is not a perfect choice but it is the best of our options. Constructibility is best, cost is lowest and traffic impacts during construction will be minimal. Highway work will be kept to 2 - 3 months. There will be proximate neighbors to the pump station but due to the size of the area an 80 to 100-foot buffer zone will be created between the facility and the residences. The major disadvantage is that park space will be lost and baseball will no longer be played in the park. It is now used by a group of little league players for practice during the season. On the other hand, park improvements including a new irrigation system, grassing, and additions of basketball and playground equipment will allow a greater number of people to make use of the park.

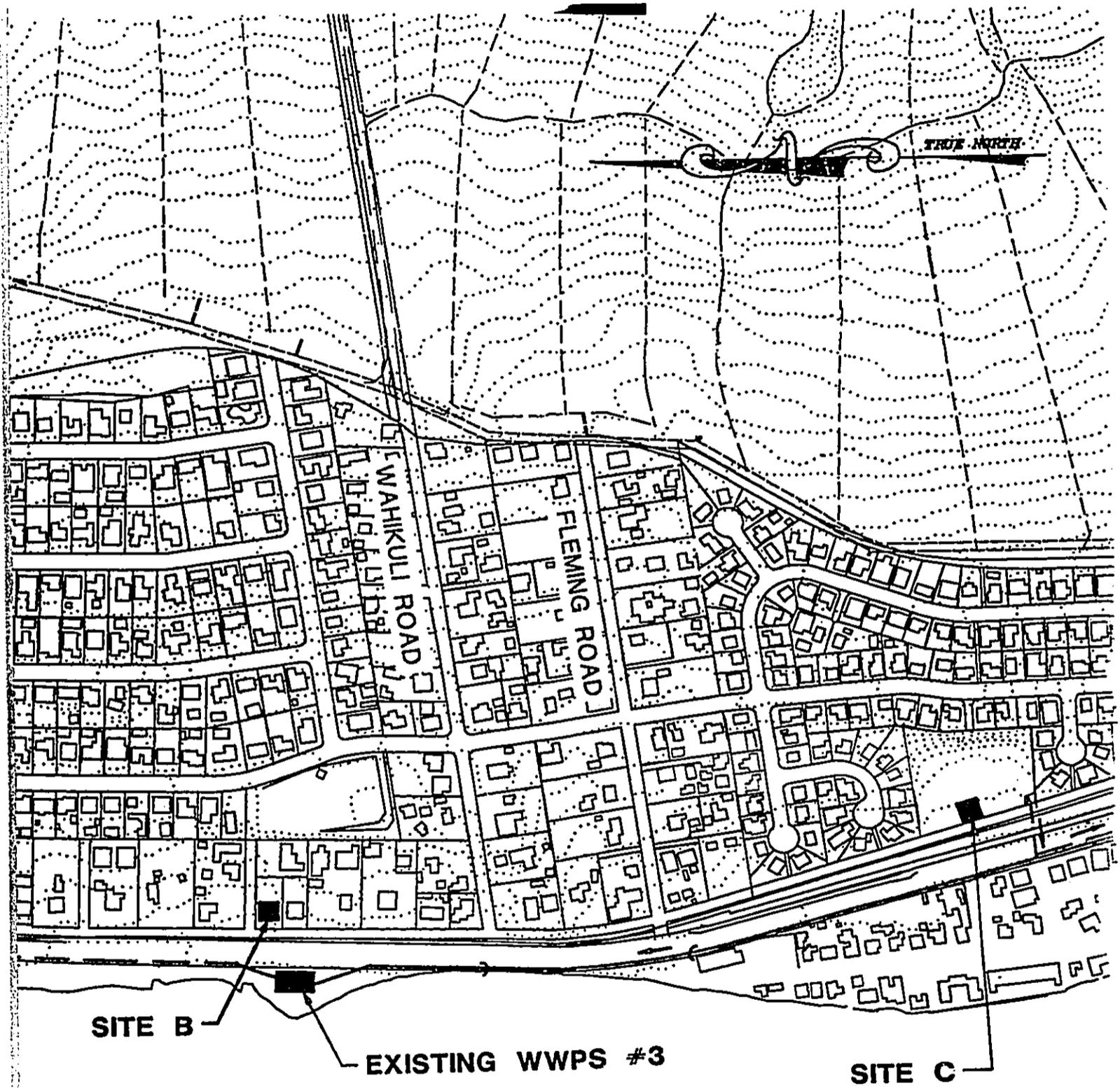
After looking at the advantages and disadvantages of the various sites, the Wahikuli Terrace Park site appears to be the best option. It is the choice that best balances long-term and short-term issues. Unfortunately, there is no perfect solution, and this option will provide the overall community the best project at the least cost and minimize local impacts as much as possible.

DT(dt94046)



**LOCATIONS CONSIDER
WASTEWATER PUMP STAT**

SCALE: 1" = 400'



A N

CONSIDERED FOR MP STATION NO. 3

1" = 400'

ATTACHMENT

LINDA CROCKETT LINGLE
Mayor
GEORGE N. KAYA
Director
CHARLES JENCKS
Deputy Director
AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration
EASSIE MILLER, P.E.
Wastewater Reclamation Division
LLOYD P.C.W. LEE, P.E.
Engineering Division
DAVID WISSMAR, P.E.
Solid Waste Division
BRIAN HASHIRO, P.E.
Highways Division

August 22, 1994

Mr. Paul O. Gomez
3875 Lower Honoapiilani Road, #A-301
Lahaina, Hawaii 96761

Dear Mr. Gomez:

SUBJECT: Draft Environmental Assessment for Lahaina Pump Station 3 and Related Improvements

Thank you for your postcard pertaining to the subject project. We would like to provide a response to your comments.

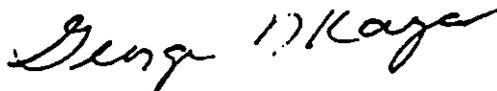
We would like to note that we have evaluated a number of alternative locations for a new pump station. However, land for a new pump station is not readily or easily available. Also, engineering considerations dictate that a new pump station be located fairly close to the existing Pump Station 3 which is makai of Honoapiilani Highway, approximately halfway between the Chart House and the Lahaina Civic Center. After evaluating long and short term impacts to residents, land availability, traffic and community impacts during construction, cost, operations and maintenance needs and reliability, the proposed site within Wahikuli Terrace Park was selected.

The new Pump Station 3 will provide updated equipment which will result in the increased reliability and safety of the wastewater transmission system while minimizing nuisance impacts such as odor and noise. A forced air system scrubber system will be constructed in order to treat odors. Also, the noise from the variable speed pumps which will be installed at the pump station should be less than traffic noise levels along Honoapiilani Highway. We believe that the design of the new pump station will be compatible with the neighborhood. While a portion of the existing baseball field is required for the project, proposed park improvements in the form of a basketball court and irrigation equipment will provide and enhance recreational and open space amenities for the immediate neighborhood.

Mr. Paul O. Gomez
August 22, 1994
Page 2

While we can understand your concern regarding the location of a new Pump Station 3 within Wahikuli Terrace Park, we would like to assure you that our Department will make a concerted effort to minimize or eliminate any undesirable impact upon the neighboring community. Your input into the Environmental Assessment process is sincerely appreciated. If you have any questions, please feel free to call Dave Taylor of the Wastewater Reclamation Division at 243-7417.

Very truly yours,



GEORGE N. KAYA
Director of Public Works and Waste
Management

DT:ym(WM95029f)
/c: Milton Arakawa, Munekiyo & Arakawa, Inc.



LINDA CROCKETT LINGLE
Mayor

GEORGE N. KAYA
Director

CHARLES JENCKS
Deputy Director

AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT

200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

August 22, 1994

RALPH NAGAMINE, L.S., P.E.
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EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

DAVID WISSMAR, P.E.
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

Ms. Eve Clute
P.O. Box 11634
Lahaina, Hawaii 96761

Dear Ms. Clute:

SUBJECT: Draft Environmental Assessment for Lahaina Pump Station 3 and Related Improvements

Thank you for your letter of August 7, 1994 pertaining to the subject project. Concerns noted in your letter focus on the incidence and effects of sewage spills as well as odor from the pump station. We would like to provide the following response to your comments.

Regarding the issue of sewage spills, we would like to assure you that the proposed Pump Station 3 in Wahikuli Terrace Park is being designed with state of the art technology and equipment which includes backup systems. This increases the reliability of the overall system and mitigates the likelihood of sewage spills.

The new pump station will be a significant improvement to the existing Pump Station 9 which is currently located in the park. Pump Station 9 was part of the original Lahaina sewer system installed approximately 20 years ago.

We would also like to note that any sewage spill caused by the failure of Pump Station 3 is not likely to occur within Wahikuli Terrace Park and thus, should not pose a health hazard to park users. There are a number of pump stations and sewer manholes at lower elevations than Pump Station 3. Should there be a backup of wastewater in the system, spills would occur at the lowest possible elevation.

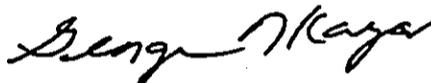
Regarding odor, we are installing a "packed tower" type of hydrogen sulfide scrubber at Pump Station 3 to address the issue of odor control. This system treats odors which would emanate from the pump station's wet well. Odors which could potentially migrate down the gravity line are also treated by this system.

Ms. Eve Clute
August 22, 1994
Page 2

We have evaluated a number of other alternative sites for Pump Station 3. After evaluating long and short term impacts to residents, land availability, traffic and community impacts during construction, cost, operations and maintenance needs and reliability, the proposed site within Wahikuli Terrace Park was selected. Other alternative sites involve significant disadvantages without a corresponding increase in the quality and efficiency of the wastewater transmission system as a whole.

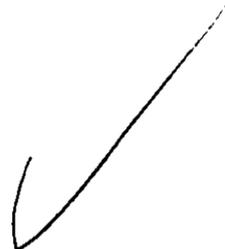
While we can understand and appreciate your concerns, we would like to assure you that our Department will make a concerted effort to minimize or eliminate any undesirable impact upon the neighboring community. Your input into the Environmental Assessment process is sincerely appreciated. If you have any questions, please feel free to call Dave Taylor of the Wastewater Reclamation Division at 243-7417.

Very truly yours,



GEORGE N. KAYA
Director of Public Works and Waste Management

DT:ym(WM95029c)
✓c: Milton Arakawa, Munekiyo & Arakawa, Inc.



Chapter XI

***Comments Received After
Public Comment Period and
Agency Responses***



George Kaya
Director
Dept. of Public Works &
Waste Management
200 S. High St.
Wailuku, HI 96793

Naomi Blair Stanton
1361 Ainakea Road
Lahaina, Maui, Hawaii 96761

Naomi Blair Stanton
1361 Anakea Road
Lahaina, Maui, Hawaii 96761

Dear Mr. Kaya:

8.7.94

As a concerned resident of Lahaina, I
again ask your consideration when you make
your final assessment of the planned reloca-
tion of Pump Station # 3 to Nahikuli Terrace
Park.

All along, we have opposed any effort by your
department to relocate the facility to our park. I
have attended public meetings, circulated flyers
to impacted residents, and have helped accumulate
signatures on a petition. I have written
Mayor Crockett-Lingle, and voiced my outrage in
the Lahaina News.

Taking away land that is intended for use
by the taxpayers is unethical. Our children
have limited safe areas to play in, and your
proposal is appalling. Removal of the area our
children now use as a baseball field (the
sport of choice), to be replaced by a
small basketball court is unsympathetic to
their play preferences. If we cannot save
our green open spaces, what hope do we

have for the future of our parks?
I understand that alternative sites
may cost more money and research. But
it seems viable options do exist,
and would be less impactful to our
citizens.

Do you have children? Do you enjoy
life outdoors? What would you do if
someone took away your open space, or
the only safe place in your neighborhood
for your children to play ... ?

Sincerely,

Naomi Stanton

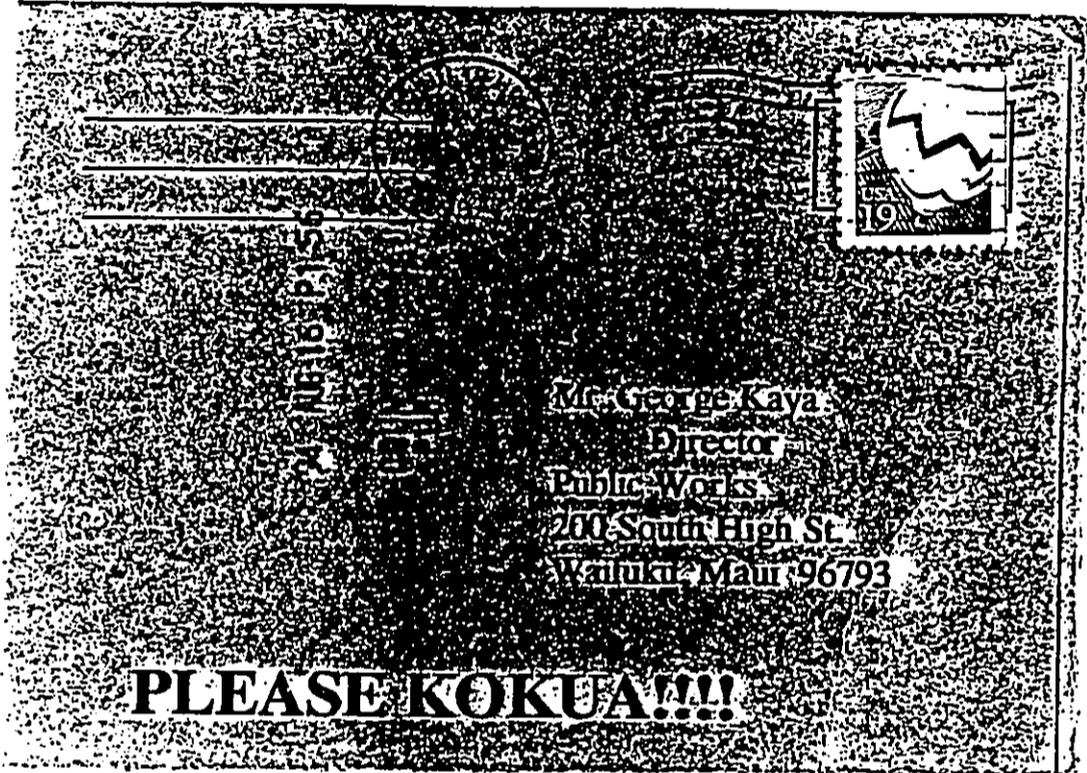
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Do you have children? Do you enjoy
life outdoors? What would you do if
someone took away your open space, or
the only safe place in your neighborhood
for your children to play ... ?

Sincerely,

Naomi Stanton

DOCUMENT CAPTURED AS RECEIVED



Mr. George Kaya
Director
Public Works
200 South High St.
Wailuku, Maui 96793

PLEASE KOKUA!!!

DEAR MR. KAYA:

I live in Lahaina and am VERY CONCERNED AND AGAINST your choice of Waiuku Terrace Park for Pump Station #3. Please find a safer, ecologically better and less obtrusive location for this major Pumping facility for the Lahaina sewer system.

Mahalo

Additional Concerns

Name

Address

City

State

Phone

William Adams

280 Front St

Wailuku, HI

96793-6261

Phone 661-3225

Preceding postcard was received from the following people:

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Marlene Aranaydo
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Gayle Atack-Sonazzo
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Lahaina, HI 96761

Erlinda Bagusto
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Lahaina, HI 96761

Kathy Bailey
212 Puapihi
Lahaina, HI 96761

Nicholaus A. Bailey
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Donald E. Bailey
212 Puapihi Street
Lahaina, HI 96761

Debi Barrett
P. O. Box 11955
Lahaina, HI 96761

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Lahaina, HI 96761

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Lahaina, HI 96761-1739

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Lahaina, HI 96761

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Darlene DeMello
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Gayle Eaton
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Lahaina Market Place
Lahaina, HI 96761

Lynn Flores
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Lahaina, HI 96761

Fay Flores
1375 Kahoma St.
Lahaina, HI 96761

Francine Flores
1375 Kahoma Street
Lahaina, HI 96761

Cinde Forrest
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Lahaina, HI 96761

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S. R. Stein
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Erik Stern
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Craig Story
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Lahaina, HI 96761

C. Swendseid
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Lahaina, HI 96761

Craig Swift
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Wailuku, HI 96793

Michael Teague
1600 Lokia St.
Lahaina, HI 96761

Ray Matthew Tiller
1350 Ainakea Street
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Lahaina, HI 96761

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Lahaina, HI 96761

Molly Zahorik
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LINDA CROCKETT LINGLE
Mayor
GEORGE N. KAYA
Director
CHARLES JENCKS
Deputy Director
AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

August 22, 1994

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration
EASSIE MILLER, P.E.
Wastewater Reclamation Division
LLOYD P.C.W. LEE, P.E.
Engineering Division
DAVID WISSMAR, P.E.
Solid Waste Division
BRIAN HASHIRO, P.E.
Highways Division

Ms. Naomi Blair Stanton
1361 Ainakea Road
Lahaina, Hawaii 96761

A copy of the Departmental memorandum included in Chapter X of this EA was also attached to the response to Naomi Blair Stanton.

Dear Ms. Stanton:

SUBJECT: Draft Environmental Assessment for Lahaina Pump Station 3 and Related Improvements

Thank you for your letter regarding the subject project. Although your letter was post-marked after the conclusion of the 30-day public review period of the Draft Environmental Assessment (EA), we would like to provide a response to your comments.

As you know, Pump Station 9 has been located within Wahikuli Terrace Park for a significant period of time. It was part of the original wastewater collection system built approximately 35 years ago and contains aging and outdated equipment. We are proposing to demolish Pump Station 9 as part of this project.

We would like to note that we have evaluated a number of alternative locations to replace existing Pump Station 3 which is located makai of Honoapiilani Highway approximately halfway between the Chart House and the Lahaina Civic Center. The existing site for Pump Station 3 is subject to flooding, tsunami and erosion constraints. Land for a new pump station is not readily or easily available. Also, engineering considerations dictate that a new pump station be located fairly close to the existing Pump Station 3. After evaluating long and short term impacts to residents, land availability, traffic and community impacts during construction, cost, operations and maintenance needs and reliability, the proposed site within Wahikuli Terrace Park was selected. Other alternative sites involve significant disadvantages without a corresponding increase in the quality and efficiency of the wastewater transmission system as a whole.

For your information and review, we have included a departmental memorandum which summarizes the evaluation of alternative sites for a new Pump Station 3. We hope that this provides further clarification into our rationale for the selection of the Wahikuli Terrace site.

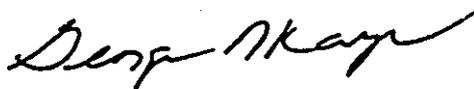
Ms. Naomi Stanton
August 22, 1994
Page 2

The new Pump Station 3 will provide updated equipment which will result in the increased reliability and safety of the wastewater transmission system while minimizing nuisance impacts such as odor and noise. A forced air system scrubber system will be constructed in order to treat odors. Also, the noise from the variable speed pumps which will be installed at the pump station should be less than traffic noise levels along Honoapiilani Highway. We believe that the design of the new pump station will be compatible with the neighborhood. While a portion of the existing baseball field is required for the project, proposed park improvements in the form of a basketball court and irrigation equipment will provide and enhance recreational and open space amenities for the immediate neighborhood.

While we can understand your concern regarding the location of a new Pump Station 3 within Wahikuli Terrace Park, we would like to assure you that our Department will make a concerted effort to minimize or eliminate any undesirable impact upon the neighboring community. Your input into the Environmental Assessment process is sincerely appreciated.

If you have any questions, please feel free to call Dave Taylor of the Wastewater Reclamation Division at 243-7417.

Very truly yours,



GEORGE N. KAYA
Director of Public Works
& Waste Management

DT:ym(WM95029)
/c: Milton Arakawa, Munekiyo & Arakawa, Inc.



General Response Letter to
people who sent postcards

LINDA CROCKETT LINGLE
Mayor

GEORGE N. KAYA
Director

CHARLES JENCKS
Deputy Director

AARON SHINMOTO, P.E.
Chief Staff Engineer



COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT

200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

August 24, 1994

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

DAVID WISSMAR, P.E.
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

Dear Resident:

SUBJECT: Draft Environmental Assessment for Lahaina Pump Station 3 and
Related Improvements

Thank you for your postcard regarding the subject project. Although your card was postmarked after the conclusion of the 30-day public review period of the Draft Environmental Assessment (EA), we would like to provide a response to your comments.

We would like to note that we have evaluated a number of alternative locations for a new pump station. However, land for a new pump station is not readily or easily available. Also, engineering considerations dictate that a new pump station be located fairly close to the existing Pump Station 3 which is makai of Honoapiilani Highway, approximately halfway between the Chart House and the Lahaina Civic Center. After evaluating long and short term impacts to residents, land availability, traffic and community impacts during construction, cost, operations and maintenance needs and reliability, the proposed site within Wahikuli Terrace Park was selected.

The new Pump Station 3 will provide updated equipment which will result in the increased reliability and safety of the wastewater transmission system while minimizing nuisance impacts such as odor and noise. A forced air system scrubber system will be constructed in order to treat odors. Also, the noise from the variable speed pumps which will be installed at the pump station should be less than traffic noise levels along Honoapiilani Highway. We believe that the design of the new pump station will be compatible with the neighborhood. While a portion of the existing baseball field is required for the project, proposed park improvements in the form of a basketball court and irrigation equipment will provide and enhance recreational and open space amenities for the immediate neighborhood.

August 24, 1994
Page 2

While we can understand your concern regarding the location of a new Pump Station 3 within Wahikuli Terrace Park, we would like to assure you that our Department will make a concerted effort to minimize or eliminate any undesirable impact upon the neighboring community. Your input into the Environmental Assessment process is sincerely appreciated. If you have any questions, please feel free to call Dave Taylor of the Wastewater Reclamation Division at 243-7417.

Very truly yours,



GEORGE N. KAYA
Director of Public Works and Waste
Management

DT:ym(WM95029h)

✓ c: Milton Arakawa, Munekiyo & Arakawa, Inc.

References

References

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Appendices

Appendix A

Odor Study

**LAHAINA WASTEWATER COLLECTION SYSTEM
ODOR CONTROL STUDY**

DRAFT

Prepared for

**SATO & ASSOCIATES, INC.
2115 Wells Street
Wailuku, HI 96826**

Prepared by

**PARAMETRIX, INC.
1164 Bishop Street
Suite 1600
Honolulu, HI 96813-2832**

June 1994

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1. INTRODUCTION

1.1 BACKGROUND

The Lahaina wastewater collection system services the Honokowai-Kaanapali area on the western coastline of Maui island. Control of sewage odors in this service area is of prime concern to Maui County since the area included residential and resort communities. Although the County has had a history of odor complaints from residents in the resort communities, the complaints have largely been eliminated in recent years. The County has instituted an intensive odor control program which consists of monthly caustic scouring in the collection system as well as continuous operation of air treatment systems at two pump stations closest to the treatment plant.

Much of the collection system piping servicing the Town of Lahaina is old and cracked, and may therefore be a source of salt water infiltration. The County is currently upgrading the collection system to repair old sewer lines and extend service to new areas. The upgrade will involve relocating and expanding two pump stations; PS-1 and PS-3. Of utmost importance to the County, is how the upgrades will impact the existing odor control system. Pump Station number 3 (PS-3) is particularly a concern since it will be relocated to a "sensitive" area adjacent to a ballfield and will have a forcemain discharging in the vicinity of a new residential area. The County wants to proceed with caution and insure that the collection system upgrades will not create additional nuisance odors.

1.2 PURPOSE

The purpose of this odor control study is to:

- Determine the potential odor impacts and the problem areas associated with the upgrades.
- Evaluate the feasibility of using the existing air treatment systems at new locations to mitigate potential odor releases.
- Recommend additional air treatment systems, if needed, to control potential odor problem areas.
- Investigate caustic scouring and alternative chemicals for preventing odor generation in the upgraded collection system.

2. EXISTING FACILITIES

2.1 CAUSE OF ODORS

The presence of sulfate-reducing bacteria and organic matter in nearly all wastewater creates the potential for hydrogen sulfide production. This is especially true in Hawaii where warm wastewater temperatures prevail. The warmer temperatures lead to increased bacterial activity and oxygen-deficient wastewaters. There is also an abundant supply of sulfate in the wastewater, not only from organic matter, but also from brackish water infiltration (since seawater contains large amounts of sulfate).

Because bacterial reduction of non-odorous sulfate to odorous sulfide can only occur in an anaerobic environment, it usually occurs in submerged sewers and forcemains. Sulfide reduction will typically begin to occur in forcemains with detention times longer than 20 minutes.¹ The bacteria form a slime layer on the force main walls converting sulfate to sulfide. The sulfides will remain in solution as long as the pipe is flowing full. However, as soon as turbulence and air are available, such as the discharge into a gravity line or manhole, hydrogen sulfide gas will be released into the sewer atmosphere. Subsequently, the gas will escape through manhole covers and vents causing nuisance odors.

If not vented, the hydrogen sulfide gas will form corrosive sulfuric acid on the pipe walls eventually causing deterioration of concrete and metal structures. Significant corrosion has been evidenced in portions of the gravity line downstream of Pump Station No. 2 even though this pipe is relatively new (installed in 1980) compared to other pipes in the collection system.

Although many different types of odorous compounds may exist in wastewaters, the most offensive is hydrogen sulfide because of its characteristic "rotten-egg" odor at very low concentrations. Odor control strategies aimed at removing hydrogen sulfide will also remove other less prevalent sewage-related odors.

2.2 EXISTING ODOR POTENTIAL

2.2.1 Wastewater Characteristics

Wastewater characteristics will greatly influence the amount of sulfide generation in the collection system. During 1985 a monitoring program was conducted (Kaanapali Odor Study)

¹ "Manual of Practice 8, Wastewater Treatment Plant Design," Water Pollution Control Federation, 1977.

in the Lahaina Collection System and the results are presented in the "Kaanapali Odor Study."² The wastewater characteristics identified during this study are summarized in Table 1. The following section discusses how these characteristics relate to potential odor generation.

Table 1. Summary of existing wastewater characteristics.

Pump Station	Average Flow (mgd)	Dissolved Sulfides (mg/l)	Chlorides (mg/l)	pH	Temp. (deg C)	ORP (mv)
PS-1	3.0	BDL - 0.9	500 - 675	6.9 - 7.5	27 - 29	-305 to -110
PS-2	3.0	0.2 - 5.0	525 - 750	6.1 - 7.3	27 - 29	-311 to -141
PS-3	2.0	BDL - 0.6	725 - 1,250	6.2 - 7.9	27 - 28	-295 to -84

NOTES:

- Values derived from 1985 Kaanapali Odor Study. Conditions measured before implementation of caustic scouring program.
- BDL = Below Detection Limit
- ORP = Oxidation Reduction Potential

Dissolved Sulfides: The highest concentrations of aqueous sulfides occur at PS-2. This is due to the long forcemain from PS-3 which discharges before PS-2. The County performed sulfide monitoring at PS-2 in August 1987. Results indicated that dissolved sulfides were lowest (approximately 1.5 mg/l) in the morning before 10 am, and were highest (above 4 mg/l) during the evening from 12 midnight until 6 am. This type of diurnal variation is very typical of forcemain systems where wastewater flows correlate with sulfide levels; sulfides are lowest in the morning when flows are greatest due to high water demand and sulfides are highest in the evening when flows are reduced because water demand had subsided. The smaller wastewater flows create even longer detention times in the sewers allowing septic conditions to worsen, thus generating more sulfide. Although PS-2 has the highest sulfide levels, all of the pump stations show a potential for odor problems. Past experience indicates that odor problems in a collection system typically develop when wastewater sulfide concentrations exceed 0.5 mg/l.

Chlorides: Saltwater infiltration can enhance hydrogen sulfide production because it contains large amounts of sulfates, the precursor to sulfides. The presence of saltwater infiltration into the Lahaina collection system is evident by the high chloride levels.

² "Kaanapali Odor Study," M&E Pacific, Inc., September 1985.

Wastewater pH: The presence of hydrogen sulfide gas in wastewater is highly dependent on pH. Sulfide ions in wastewater exist primarily as dissolved sulfide or as hydrogen sulfide gas. The dominant state is dependent on pH. A pH increase will cause a shift towards more dissolved sulfides. A pH decrease will cause a shift towards more hydrogen sulfide gas. At a wastewater pH of 7, approximately 50% of the sulfides present will be in the form of hydrogen sulfide gas. At a pH of 6 however, approximately 90% of the sulfides present will be in the form of hydrogen sulfide gas. Therefore, decreases in pH below 7, as often occurs in the Lahaina collection system, will result in a higher potential for odor releases.

Temperature: Temperature effects both the solubility and generation of sulfides in wastewater. Higher wastewater temperatures are more conducive to sulfide generation and release of hydrogen sulfide gas. The average temperature of wastewater on the mainland normally ranges from 10 to 30 degrees celsius depending on the geographic location. The average wastewater temperature in the Lahaina collection system is 28 degrees celsius which is highly favorable for sulfide generation. The activity of sulfide producing bacteria doubles for every 10 degree increase in temperature up to 30 degrees celsius, at which point activity begins to slow down. Also, at the higher temperatures the solubility of hydrogen sulfide in wastewater decreases so that more of the gas comes out of solution and enters the atmosphere where it can create odor and corrosion problems.

Oxidation Reduction Potential (ORP): Oxidation reduction potential (ORP) is a general measure of the relative concentrations of oxidants and reductants in a system. High positive ORP values indicate minimal anaerobic activity, while low ORP values indicate high anaerobic activity. Generally ORP values below -100, as measured in the Lahaina sewer lines, indicate maximum efficiency for anaerobic activity.

2.2.2 Travel Times

Long wastewater travel times correspond to higher sulfide levels, especially in forcemains where no air is available in the sewer. When detention exceeds 20 minutes in an anaerobic environment, sulfide production will begin. Table 2 indicates the existing and future forcemain system and the corresponding travel times. For the existing collection system, the longest forcemain travel time is 82 minutes and occurs between PS-3 and PS-2. This is also where the highest dissolved sulfide levels have been recorded (at the PS-2 wet well). Additionally, odor complaints were worst in this area prior to installing the PS-2 scrubber and implementing a caustic scouring program in the upstream lines.

With the exception of the PS-9 forcemain, all forcemains in the system currently have travel times exceeding 20 minutes, thus creating a high potential for septicity and odors. The future collection system should actually reduce the potential for odor generation in the sewer lines. The primary modification will be the new forcemain from PS-3 to the HFDC interceptor. This will result in a new travel time of 25 minutes in the PS-3 forcemain compared to the existing

travel time of 82 minutes. Although the degree of sulfide generation will be reduced, anaerobic conditions will still exist in the new forcemain and it will require controls to prevent odor releases at the forcemain discharge point.

2.2.3 Hydrogen Sulfide Monitoring

Hydrogen sulfide is an important indicator of wastewater odor impacts since it is always present in air when aqueous sulfides are found in solution. As well as having a characteristic unpleasant (rotten-egg) odor, it has a very low odor threshold; typical levels of detection range from 10 to 20 parts per billion (ppb). In addition to its low level of perception, hydrogen sulfide is also heavier than air and tends to stay close to ground level collecting in low lying areas where it can concentrate and be more readily perceived.

Table 3 summarizes hydrogen sulfide monitoring conducted by the County in 1993. Caustic scouring of the sewer lines was implemented in April and was very effective in reducing hydrogen sulfide concentrations. It is very difficult to determine at what discharge concentration residents will begin to complain of odors since the level of perception is dependent on several variables such as prevailing wind conditions, rate of hydrogen sulfide release, residents exposure (whether they are indoors or outside), etc. Hydrogen sulfide concentrations below 10 ppm may eliminate complaints in one location, while at another location concentrations may need to be below 1 ppm for the perception to go away. Odor control systems are typically installed in a phased approach until the proper level of control is attained and no more complaints occur. For example, with the existing collection system, scrubbers at PS-1 and PS-2 alone were insufficient; the second phase of the County's odor control program was to implement a monthly caustic scouring program.

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Table 2. Summary of collection system flows and travel times.

Sewer Line Section	Type of Line	Length (feet)	Average Flow (mgd)	Average Travel Time (minutes)
EXISTING COLLECTION SYSTEM				
PS-1 to Lahaina WWRF	26" FM	1,500	3.0	20
PS-2 to PS-1	27" GL	6,000	3.0	85
	20" FM	3,000	3.0	23
KA-2 to PS-2	12" FM	1,600	0.5	27
KA-1 to PS-2	12" FM	2,500	0.5	46
PS-3 to PS-2	27" GL	2,000	2.0	43
	20" FM	7,000	2.0	82
PS-8 to 27" line	10" FM	1,200	0.2	35
PS-9 to 27" line	8" FM	300	0.1	11
PS-4 to 27" line	14" FM	2,000	0.4	57
PS-5 to PS-8	12" GL	7,000	0.2	295
	10" FM	2,000	0.2	58
Lahaina sewer line	18-27" GL	>10,000	1.1	>172
FUTURE COLLECTION SYSTEM				
PS-1 to Lahaina WWRF	Two 20" FM	1,500	12.0	4
PS-2 to PS-1	36" GL	6,000	3.0	152
	20" FM	3,000	3.0	23
PS-3 to HFDC line	20" FM	4,000	3.75	25
HFDC sewer line	24-30" GL	<18,000	5.25	>115

NOTE: FM indicates forcemain; GL indicates gravity line.

Table 3. Summary of hydrogen sulfide monitoring program.

Monitoring Location	Date	Atmospheric H ₂ S Concentrations (ppm)			
		Before Caustic Addition		After Caustic Addition	
		Range	Average	Range	Average
Hyatt Regency Manhole	Feb. 1993	169 - 323	258	-	-
	Apr. 1993	33 - 159	103	0 - 48	12
PS-2 Scrubber Exhaust	Feb. 1993	2 - 5	3	-	-
	Apr. 1993	2 - 12	5	0 - 1	<1
PS-3 Wet Well	Feb. 1993	29 - 72	43	-	-
	Apr. 1993	4 - 49	23	2 - 8	4
PS-4 Wet Well	Feb. 1993	68 - 156	104	-	-
	Apr. 1993	18 - 110	62	3 - 30	17

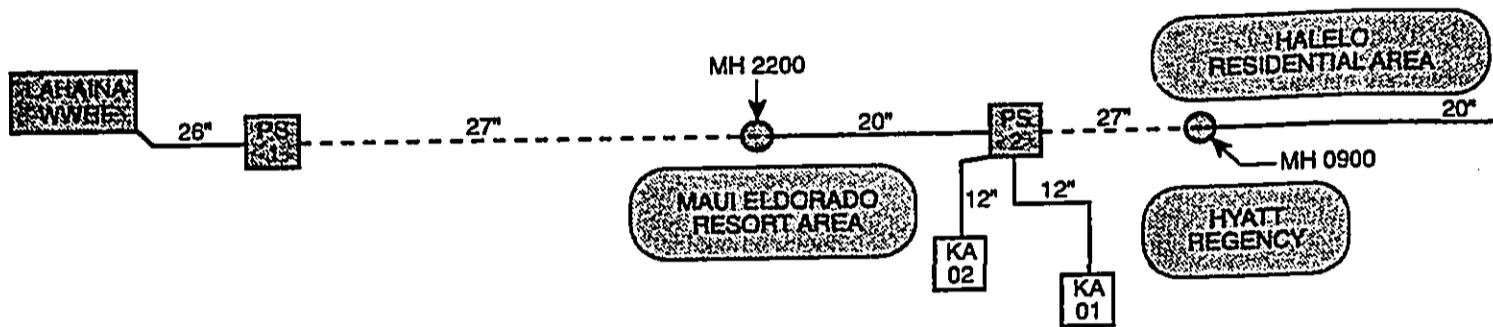
NOTE: Values measured by County during 1993 monitoring program. Caustic treatment involved adding 150 gallons of 50% NaOH at PS-5 and 300 gallons of 50% NaOH at PS-3.

(whether they are indoors or outside), etc. Hydrogen sulfide concentrations below 10 ppm may eliminate complaints in one location, while at another location concentrations may need to be below 1 ppm for the perception to go away. Odor control systems are typically installed in a phased approach until the proper level of control is attained and no more complaints occur. For example, with the existing collection system, scrubbers at PS-1 and PS-2 alone were insufficient; the second phase of the County's odor control program was to implement a monthly caustic scouring program.

2.3 DESCRIPTION OF FACILITIES

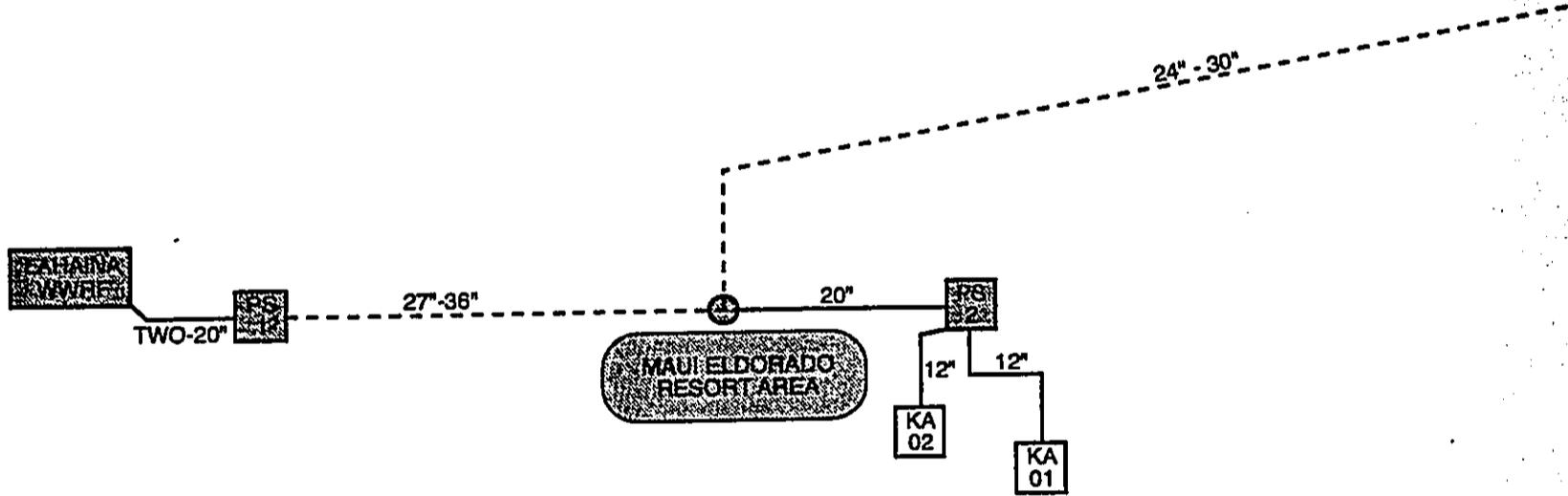
The existing Lahaina wastewater collection system being evaluated in this project consists of eight pumping stations, 25,000 feet of gravity sewers, and 21,000 feet of forcemains. Odor treatment scrubbers are located at pump stations 1 and 2. Figure 1 illustrates the collection system layout and indicates the existing odor/corrosion problem areas. These critical

EXISTING COLLECTION SYSTEM STATUS

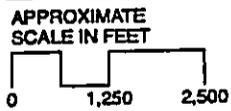


- Gravity Lines
- - - Forcemains
- ▨ Existing Potential Problem Areas
- Sensitive Odor Perception Areas

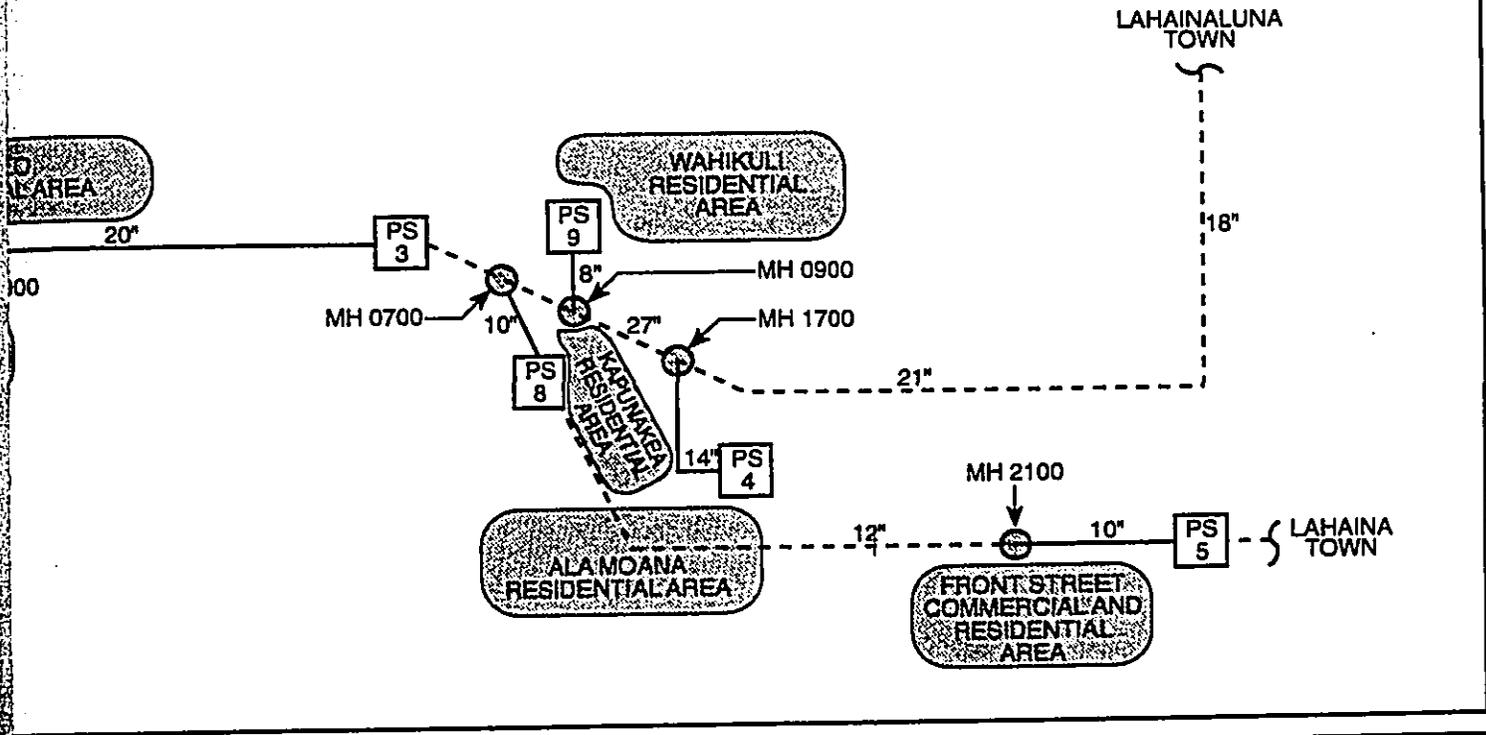
FUTURE COLLECTION SYSTEM STATUS



- Gravity Lines
- - - Forcemains
- ▨ Future Potential Problem Areas
- Sensitive Odor Perception Areas



COLLECTION SYSTEM STATUS



COLLECTION SYSTEM STATUS

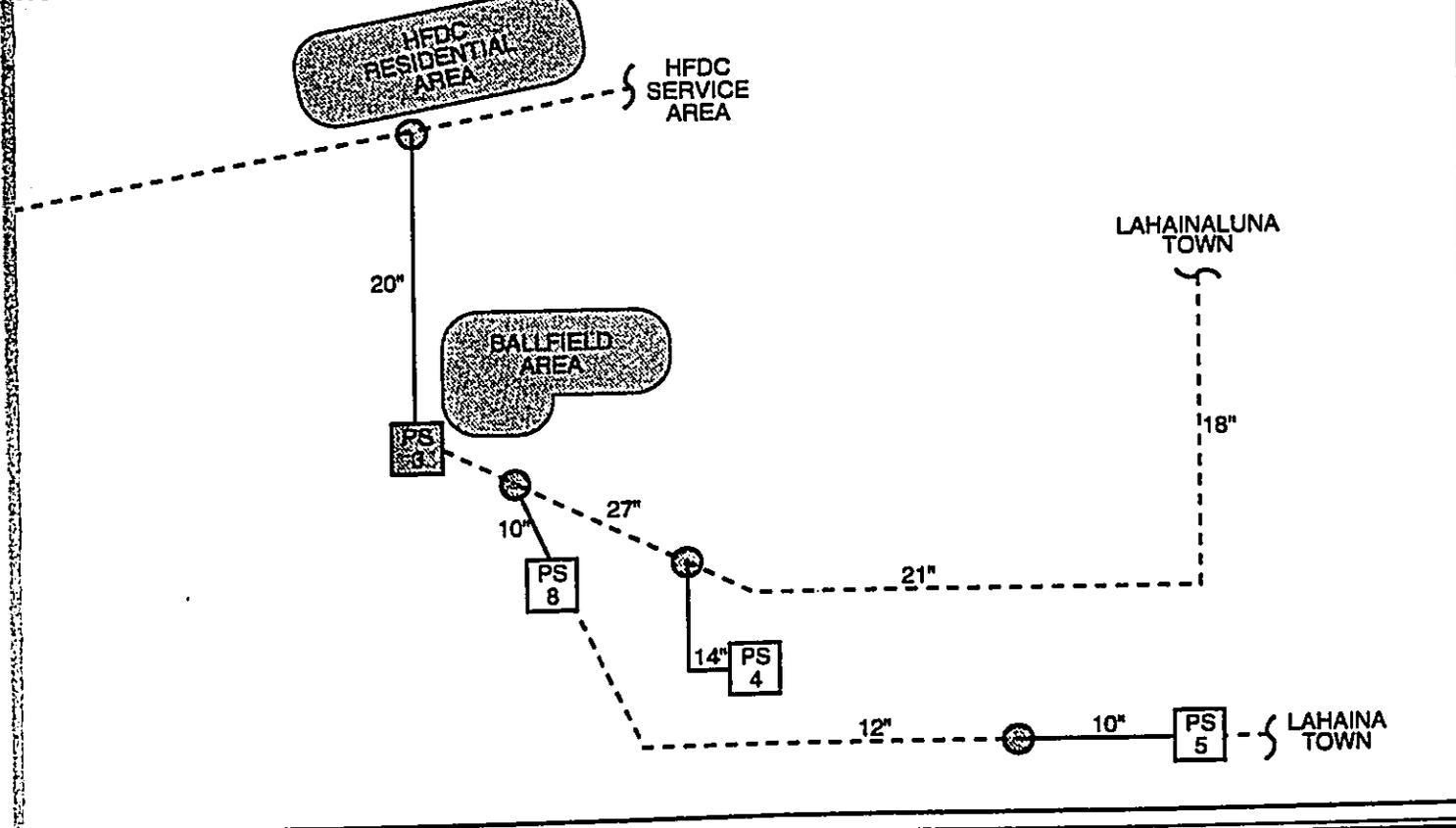


Figure 1. Lahaina Wastewater Collection System Odor Control Study

odor/corrosion areas occur at the junctions where forcemains become gravity sewers. At these junctions, high wastewater sulfide levels are exposed to air and turbulence, creating hydrogen sulfide gas. As seen in Figure 1 and summarized in Table 4, most of these critical odor release areas occur in the vicinity of residential and resort communities.

Table 4. Potential odor problem areas in existing collection system.

Collection System Location	Reason for being a potential odor release point.
Lahaina WWRF	Forcemain from PS-1 with an average detention time of 20 minutes.
PS-1	Any sulfides not released at MH 2200 will migrate downstream to PS-1.
MH 2200	Forcemain from PS-2 with an average detention time of 23 minutes. This manhole is in the Maui Eldorado Resort Area and can have a high perception by tourists.
PS-2	Two direct forcemain discharges with detention times of approximately 25-45 minutes. Also any sulfides not released at MH 0900 will migrate downstream to PS-2. This pump station is in the Kaanapoli Resort Area and can have a high perception by tourists.
MH 0900	Forcemain from PS-3 with an average detention time of 82 minutes. This manhole is in the Halelo Residential area and a resort area so it can be perceived by both residents and tourists.
MHs 0700, 0900, 1700	These manholes all receive forcemain discharges with detention times ranging from 10 minutes to an hour. They are located in the Wahikuli, Kapunakea, and Alamoana residential areas and can be perceived by residents in several surrounding communities.
MH 2100	Forcemain from PS-5 with an average detention of one hour. This manhole is located along Front Street in a residential and commercial area.

2.4 EXISTING ODOR CONTROL PROGRAM

Because the hydrogen sulfide release points, identified in Table 4, occur primarily in sensitive areas, controls are necessary to prevent nuisance odor complaints. The existing odor control facilities consist of:

- Caustic addition (approximately 300 gallons per month) at PS-5 to control sulfide releases at MHs 2100 and 0700.
- Caustic addition (approximately 300 gallons per month) at PS-3 to control sulfide releases at MH 0900, PS-2, MH 2200, and PS-1.

- Two-stage (caustic and sodium hypochlorite) mist scrubbers at PS-1 and PS-2 to control odor releases from the pump station wet wells and incoming gravity lines.

The only areas of the collection system which could potentially create nuisance odors and are currently not controlled are MH 1700 (from PS-4) and MH 0900 (from PS-9). The County has taken a two-pronged approach in dealing with its collection system odors; the program consists of both source controls and treatment controls. Source controls are accomplished by adding approximately 600 gallons of caustic soda to the sewer lines every 28 days. The caustic injection, which is added as a 50 percent solution, creates a high-pH slug of wastewater which acts as a disinfectant to kill the bacterial slime layer on the forcemain walls. Odor generation is inhibited for a few weeks until the slime layer begins to form again. In addition to the chemical dosing, the County has also installed two hypochlorite mist scrubbers to treat odorous air from PS-1 and PS-2. The scrubbers have a 1,190-cfm air treatment capacity which is greater than the capacity required to treat the pump station wet wells. Therefore, the scrubbers are also treating portions of the gravity lines coming into the pump stations. By withdrawing air from the wet wells and portions of the gravity lines, the scrubbers are preventing release of odors not only from the pump stations but also from parts of the upstream collection system.

3. FUTURE FACILITIES

3.1 DESCRIPTION OF FACILITIES

The upgraded collection system will involve relocating PS-1 and PS-3 and re-routing sewer lines. A new and longer forcemain will be added from PS-3 to a 30-inch gravity interceptor which will be part of the Housing Finance & Development Corporation (HFDC) off-site sewer. The existing 7000-foot long forcemain from PS-3 to PS-2 will be abandoned and the flow rate into PS-2 will be reduced to approximately one-third of the existing flow. Flows to PS-1 will be increased from an average 3 mgd to 12 mgd once the HFDC service area is connected to the system.

3.2 FUTURE ODOR POTENTIAL

The future collection system layout and identified potential problem areas is illustrated in Figure 1. In addition to the existing potential problem areas, the upgraded system will create two new potential problem areas:

- PS-3: This station will be relocated in the vicinity of a ballfield where odors could potentially be more readily perceived by residents recreating in the area.
- HFDC connector manhole: A new 4,000-foot long forcemain will discharge high sulfide levels into this turbulent junction box. The forcemain discharge will create a buildup of hydrogen sulfide gas which will tend to vent at the nearest manhole openings.

Whereas the previous forcemain discharge from PS-3 was being ventilated and controlled by the scrubber at PS-2, the new forcemain discharge cannot be controlled by scrubbers located at PS-2 or PS-1. The new collection system layout will include an incoming gravity sewer to PS-1 from the PS-3 forcemain discharge which will be 120,000 cubic feet in volume. This large volume of sewer would need to be ventilated at approximately 6000 cfm to provide a negative pressure needed to control odors from the forcemain discharge at the HFDC connector manhole.

A summary of the potential problem areas in the future collection system which will need to be controlled are presented in Table 5.

Table 6 gives a summary of the future wastewater flow and odor conditions based on extrapolation of existing monitoring data. These values will serve as the design parameters for future odor control facilities.

Table 5. Potential odor problem areas in future collection system.

Collection System Location	Reason for being a potential odor release point.
Lahaina WWRF	Forcemain from PS-1 carrying any residual upstream sulfide loads.
PS-1	Any sulfides not released at upstream resort area manhole or HFDC connector manhole will migrate downstream to PS-1.
Resort Area Manhole	Forcemain from PS-2 with an average detention time of 23 minutes. This manhole is in the Maui Eldorado Resort Area and could have a high perception by tourists.
PS-2	Two direct forcemain discharges with detention times of approximately 25-45 minutes. This pump station is in the Kaanapoli Resort Area and could have a high perception by tourists.
HFDC Connector Manhole	Forcemain from PS-3 with an average detention time of 25 minutes. This manhole will be in the HFDC residential and could be perceived by residents.
PS-3	This pump station has not been a significant problem in the past but it will now be relocated to a more populated area adjacent to a ballfield. Even small sulfide levels from the incoming gravity sewer could cause nuisance odors.
MHs 0700 and 1700	These manholes both receive forcemain discharges with detention times ranging from 30 minutes to an hour. They are located in the Waihikuli, Kapunakea, and Alamoana residential areas and could be perceived by residents in several surrounding communities.
MH 2100	Forcemain from PS-5 with an average detention of one hour. This manhole is located along Front Street in a residential and commercial area.

Table 6. Estimated future flow and odor conditions.

Location	Dissolved ¹ Sulfides (mg/L)	Atmospheric ² H ₂ S (ppm)	Average ³ Wastewater Flow (mgd)	Peak ⁴ Air Flow (cfm)
PS-1	0.6	60	12.0	2,000
Resort Area Manhole	2.0	200	1.0	400
PS-2	1.0	100	1.0	400
HFDC Connector Manhole	3.0	300	3.75	700
PS-3	0.3	30	3.75	700
PS-4	1.0	100	0.4	300
PS-5	0.1	10	0.2	160

NOTES:

- ¹ Estimated from past monitoring data correlated with similar travel times for future conditions.
- ² Based on predicted concentration assuming 10 ppm H₂S per 0.1 mg/l dissolved sulfide. This approximate correlation was observed in existing monitoring data. Concentrations assume no caustic scouring treatment.
- ³ Assumed design flows at PS-1 and PS-3, existing flows at other pump stations.
- ⁴ Peak air flows based on maximum pumping capacity.

4. EVALUATION OF ODOR CONTROL ALTERNATIVES

4.1 GENERAL STRATEGY

There are basically two methods for controlling sewage-related odors:

- **Source Controls:** These methods generally involve chemical addition to remove sulfides in the wastewater before they are released to the atmosphere creating nuisance odors. Chemicals can be added to control sulfides in several ways:
 - (1) Oxidants - Can be added at the beginning of sewer lines to prevent the wastewater from turning septic or anaerobic. Oxidants can also be added near the end of sewer lines to convert sulfides back to non-odorous sulfate compounds.
 - (2) Iron salts - Can be added to precipitate sulfides (as metal sulfides) which are stable and inert and cannot react with air to form hydrogen sulfide gas.
 - (3) Disinfectants - Can be added to kill the sulfide producing bacteria thus suppressing odor generation.
- **Treatment Controls:** These methods involve treating the odorous air after the sulfides have been released to the atmosphere. Chemical wet scrubbers and activated carbon units are the two types of systems available for treating odorous air.

The major disadvantage of air treatment controls is that they do not guarantee against corrosion in the collection system (pipes or pump stations), and they are more difficult to operate and maintain. However, source controls (chemical addition) alone are often insufficient to completely remove wastewater sulfides. If the wastewater sulfides are not completely removed, they can come out of solution as hydrogen sulfide gas thus releasing odors. Wastewater sulfide concentrations below 0.5 mg/l are still capable of creating atmospheric hydrogen sulfide levels in the part per million (ppm) range. This is especially true at locations where the wastewater enters a turbulent junction and the sulfides are stripped to the sewer pipe atmosphere. The gas will build up in the sewer and be released at any available openings, such as manhole covers. The average human detection threshold for hydrogen sulfide gas is only 20 parts per billion (ppb). Therefore, unless wastewater sulfides can chemically be removed to nearly undetectable levels, there will still exist a potential for odor release.

4.2 EVALUATION OF SOURCE CONTROLS

This evaluation includes assessment of oxidants, iron salts, and disinfectants for odor control in the existing collection system. The chemicals evaluated for this project have a long history of use in controlling sewer odors but their performance varies widely in response to wastewater characteristics. The chemicals selected for evaluation are discussed below.

4.2.1 Chemical Oxidizers

While numerous chemical oxidizers have been employed for sulfide control in wastewater collection systems, those known to be most effective are chlorine and hydrogen peroxide. These chemicals oxidize odorous molecules into more stable, odor-free molecules. Oxidizers attack sulfides after they are formed in the sewer lines and require continuous metering to be effective. Chlorine and hydrogen peroxide were selected for evaluation because they are both strong oxidizing agents and are available on the island of Maui.

Another oxidizer, nitrate salts was also evaluated. This chemical is a weak oxidizer and works differently to control odors. The nitrate salts provide anaerobic organisms with nitrate as a food supply instead of sulfate. The bacteria in forcemains have a higher affinity for nitrate and will therefore reduce nitrate to carbon dioxide and nitrogen gas instead of reducing the sulfates in the wastewater to sulfides. Instead of providing an aerobic environment as with most oxidants, nitrate salts provide an "anoxic" environment where degradation of the organics in wastewater continues but no hydrogen sulfide is created as a by-product. Sulfide generation will be prevented as long as a nitrate source is available.

4.2.2 Iron Salts

The reaction of dissolved sulfide with metal salts to form insoluble metal sulfides is another approach to preventing release of hydrogen sulfide to the air. Precipitation of the dissolved sulfides occurs instantly in wastewater streams and a color change normally accompanies this reaction. The wastewater will turn jet black upon addition of metal salts if sulfide is present. Iron salts remove sulfides after they are formed in the sewer line and require continuous metering to be effective. Iron salts also have a potential benefit besides odor control because they will help to remove phosphorus at the downstream wastewater treatment facility. Ferric chloride, ferrous sulfate, and ferrous chloride are the most common iron salts used for wastewater odor control applications. Ferrous sulfate was selected for this evaluation because it typically contains the least amount of impurities (other trace metals) and is most commonly available.

4.2.3 Caustic Scouring

Caustic soda (sodium hydroxide) has been used by the County and has been proven to be effective. It is often the most economical chemical control method for municipalities because it only requires intermittent addition. The chemical is added periodically to an upstream location in the collection system and will move along as a slug of disinfectant, killing bacteria in the slime layer of forcemain walls. Past experience has shown that raising the pH to 13 or greater for a 15 to 30 minute period will remove the sulfide-generating slime layer which forms along the interior of sewer walls. Typically the slime layer will redevelop in 2 days to 3 weeks, depending on the specific characteristics of the wastewater. In the Lahaina collection system, caustic scouring appears to be effective for almost a month.

4.2.4 Cost Comparison

A cost comparison of each chemical alternative is presented below in Table 7.

A summary of the chemical alternatives and their advantages/disadvantages is summarized below in Table 8.

Table 7. Comparison of chemical addition alternatives.

Chemical	Effective Dose ¹ (parts chemical per part sulfide)	Unit Cost ²	Monthly ³ Treatment Cost
Caustic Soda (50% Sodium Hydroxide)	100 gals/mgd of wastewater flow	\$2.5/gal	\$1,500
Chlorine (100% chlorine gas)	9 lbs/lb sulfide	\$0.50/lb	\$10,500
Hydrogen Peroxide (35% solution)	1 lb/lb sulfide	\$0.60/lb	\$1,350
Nitrate Salts (58% calcium nitrate solution)	1 gal/lb sulfide	\$7/gal	\$15,750
Iron Salts (100% ferrous sulfate salt)	2 lbs/lb sulfide	\$0.80/lb	\$3,600

NOTES:

¹ Based on experience in other collection systems as quoted in "EPA Design Manual, Control in Sanitary Systems and Treatment Plants" (1985).

² Quoted 1994 costs for Hawaii.

³ Treatment based on 3 mgd of flow and average sulfide concentration of 3 mg/l.

Table 8. Summary of chemical alternative advantages and disadvantages.

Chemical	Advantage	Disadvantage
Chlorine	No adverse impacts on downstream WWRF. Reaction is almost immediate.	Expensive because of large quantities required and continuous metering. Requires complicated feed system since most economical form would be chlorine gas in ton cylinders.
Hydrogen Peroxide	No adverse impacts on downstream WWRF.	Reaction requires 15 minutes minimum to remove sulfides. Requires continuous metering.
Nitrate Salts	May actually improve wastewater treatment capability by achieving some BOD removal in collection system before plant.	Expensive to acquire on island. Requires 2 hours of detention to be effective. Requires continuous metering.
Iron Salts	Enhances wastewater treatment performance by removing phosphorus.	Not readily available on island. Expensive if shipped from mainland. Requires continuous metering.
Caustic	Intermittent addition. Proven effectiveness in Maui.	Can have adverse impact on downstream WWRF. Price is expected to increase over next year due to shutdown of mercury cell plants which produce caustic as a by-product. Effectiveness is variable depending on time elapsed after dosing.

From the preliminary cost analysis, hydrogen peroxide appears to be a viable alternative for the County. Evaluation of the chemical alternatives was based on an assumed wastewater flow of 3 mgd and an average sulfide concentration of 3 mg/l. Actual chemical dosing quantities can vary substantially due to the site-specific nature of the Lahaina wastewater. The dosing rates for each chemical were based on past experience at other collections systems nationwide. Therefore, the presented costs can only serve as a general screening tool in determining which chemicals might be cost-effective. Actual dosing rates and costs would need to be determined through pilot testing on selected sewer lines.

4.3 EVALUATION OF TREATMENT CONTROLS

The purpose of this evaluation is to determine which areas in the collection system require air treatment controls, whether or not the existing mist scrubber can be utilized, and whether additional air treatment controls are required. The most sensitive areas, identified earlier in Table 6 as causing potential odor problems in the future, include the Lahaina WWRF, PS-1, Resort Area Manhole, PS-2, HFDC Connector Manhole, PS-3, Manhole 0700, Manhole 1700, and Manhole 2100. This evaluation assumes that manholes upstream of PS-3 (MHs 0700, 1700, and 2100) will be controlled by chemical addition in the upstream pump stations. Odor control at the WWRF is currently being implemented through activated carbon systems at the plant and is not the emphasis of this report. Therefore, this evaluation addresses air treatment at five key areas:

- PS-1
- Resort Area Manhole
- PS-2
- HFDC Connector Manhole
- PS-3

4.3.1 Re-use of Existing Air Treatment Equipment

A summary of the existing and future scrubber air treatment capability is shown in Table 9. PS-1 and PS-2 are currently achieving enough ventilation and treatment of the system to prevent odor complaints. A ventilation rate of 3-4 air changes per hour is normally sufficient for non-worker areas to maintain a negative pressure and control odor releases. For confined spaces which need to be accessible regularly to workers, 12 air changes per hour is required for health and safety concerns. Since the pump station wet wells in the Lahaina collection system are not worker accessible, 3 air changes per hour is sufficient. Currently, PS-1 and PS-2 and their incoming gravity lines are being ventilated at 3 or more air changes per hour. However, when the future system is constructed, the scrubber at PS-1 will be insufficient to control odors along the entire gravity line to the PS-3 discharge point. Additionally, the scrubber at PS-2 will provide more ventilation than is needed to control odors.

Table 9. Existing air treatment capability.

Pump Station	Volume of Wet Well and Incoming Gravity Sewer (cubic feet)	Ventilation Rate* (Number of air changes per hour)
Existing PS-1	25,000	3
Existing PS-2	10,000	7
Future PS-1	120,000	<1
Future PS-2	6,000	12

* Ventilation rate based on existing mist scrubbers at PS-1 and PS-2 with air flow rates of 1190 cfm.

Once the future collection system improvements are complete, the forcemain from PS-3 will discharge a higher sulfide load to the HFDC connector manhole than the two small forcemains (KA01 and KA02) will discharge to PS-2. As seen in Table 9, the existing 1190-cfm scrubber at PS-2 would result in 12 air changes per hour which is much more ventilation than should be required to control odors. Additionally, the new incoming gravity line from the HFDC service area to PS-1 cannot be ventilated properly with the existing 1190-cfm scrubber alone. Relocating the mist scrubber from PS-2 to the HFDC manhole would maximize usage of the existing systems by achieving 3 air changes per hour for a greater sewer volume. Leaving the mist scrubber at PS-2 would only allow for odor control at the pump station but nowhere else in the collection system. Moving the scrubber to the HFDC connector manhole will provide odor control for approximately 1 mile of gravity sewer at the point where the forcemain from PS-3 discharges.

4.3.2 Additional Air Treatment Systems

Relocating the existing two-stage mist scrubbers to the new PS-1 location and the HFDC connector manhole location will provide odor control at two of the five key areas identified earlier. To provide sufficient odor control in all potential problem areas, new air treatment facilities will be required at the remaining three locations:

- Resort Area Manhole
- PS-2
- PS-3

Four types of air treatment systems were evaluated for these three locations:

- Passive activated carbon system: A 28-inch carbon filter system requiring no blowers. Ventilation would occur by air being forced through the unit as the wet well or manhole fills and empties. Carbon replacement is dependent on the sulfide loading rate.
- Forced air activated carbon system: A 48-inch activated carbon system with a blower to provide approximately 3 air changes per hour within the ventilated sewer area. Carbon replacement is dependent on the sulfide loading rate.
- Single-stage packed tower scrubber: A 7-foot tall, 3-foot diameter packed tower with caustic feed to treat maximum incoming hydrogen sulfide levels of 50 ppm.
- Two-stage packed tower scrubber: Two 7-foot, 3-foot diameter towers in series, one with caustic feed and the second with sodium hypochlorite feed, to treat incoming hydrogen sulfide levels ranging from 50 - 150 ppm.

For each location, approximately 300 cfm of ventilation is required to provide adequate odor control, if the wetwell/manhole areas are to be kept under a negative pressure. The design incoming hydrogen sulfide levels are presented in Table 10 as determined earlier in Section 3.2.

Table 10. Air treatment design criteria.

Location of Air Treatment System	Hydrogen Sulfide Concentration without caustic scouring (ppm)	Hydrogen Sulfide Concentration with caustic scouring (ppm)
Resort Area Manhole	200	30
PS-2	100	20
PS-3	30	10

NOTE: Hydrogen sulfide concentration with caustic scouring estimated from existing monitoring program and reported effectiveness.

An evaluation of the four air treatment alternatives for each location are presented in Tables 11 - 13. Caustic scouring in the upstream collection system will be required if activated carbon systems are used at any of the locations. Otherwise the maintenance cost associated with replacement of spent carbon would be exorbitant. Selection of a single or two stage scrubber system depends on the incoming sulfide concentration and whether or not caustic scouring of the lines is performed.

Table 11. Air treatment alternatives for resort area manhole.

Alternative	Capital Cost (\$)	Operating Cost (\$/yr)	Present Worth Cost (\$)
28-inch passive carbon unit (with caustic treatment)	7,600	2,000	21,000
48-inch forced air carbon unit (with caustic treatment)	50,000	5,300	85,600
300-cfm single stage packed tower scrubber (with caustic treatment)	25,000	1,500	35,100
300-cfm two stage packed tower scrubber (without caustic treatment)	76,000	1,800	88,100

NOTE: Present worth based on 8% interest over 10 years. Equipment cost based on 1994 price quotes. Operating costs include carbon replacement for carbon units and caustic and/or hypochlorite costs for packed tower scrubbers.

Selection for Resort Area Manhole: The recommended alternative for this location is the single-stage scrubber in conjunction with additional caustic scouring at PS-2. The passive carbon unit is not recommended since this manhole is in a very sensitive area and a much higher degree of odor control will be achieved by a forced air system. Without a forced air system, odors could potentially migrate down the gravity line and be released at other manholes which do not have air treatment units. Additionally, passive treatment units do not mitigate corrosion.

Table 12. Air treatment alternatives for existing pump Station 2*.

Alternative	Capital Cost (\$)	Operating Cost (\$/yr)	Present Worth Cost (\$)
28-inch passive carbon unit (with caustic treatment)	7,600	1,300	15,300
48-inch forced air carbon unit (with caustic treatment)	50,000	4,000	76,800
300-cfm single stage packed tower scrubber (with caustic treatment)	25,000	1,500	35,100
300-cfm two stage packed tower scrubber (without caustic treatment)	76,000	1,800	88,100

* To replace existing odor control equipment recommended to be relocated to the HFDC connector manhole.

NOTE: Present worth based on 8% interest over 10 years. Equipment cost based on 1994 price quotes. Operating costs include carbon replacement for carbon units and caustic and/or hypochlorite costs for packed tower scrubbers.

Selection for Pump Station 2 Wet Well: The recommended alternative for this location is the two-stage scrubber. This pump station has two forcemains discharging into its wet well. Rather than constructing caustic storage/feed systems at both upstream pump stations (KA01 and KA02), we recommend installing a scrubber which is capable of treating higher sulfide loads at PS-2 and also installing a caustic feed system at PS-2 to reduce wastewater sulfides in the forcemain from PS-2 to the resort area manhole. The passive carbon unit is not recommended since this station is in a very sensitive area and a much higher degree of odor control will be achieved by a forced air system. Without a forced air system, corrosion of the pump station could be an ongoing problem.

Table 13. Air treatment alternatives for new pump Station 3.

Alternative	Capital Cost (\$)	Operating Cost (\$/yr)	Present Worth Cost (\$)
28-inch passive carbon unit (with caustic treatment)	7,600	3,000	27,700
48-inch forced air carbon unit (with caustic treatment)	50,000	2,000	63,400
300-cfm single stage packed tower scrubber (without caustic treatment)	25,000	1,500	35,100

NOTE: Present worth based on 8% interest over 10 years. Equipment cost based on 1994 price quotes. Operating costs include carbon replacement for carbon units and caustic and/or hypochlorite costs for packed tower scrubbers.

Selection for Pump Station 3 Wet Well: The recommended alternative for this location is the single-stage scrubber. This pump station has a gravity line discharging into its wet well and incoming hydrogen sulfide levels are not expected to exceed 50 ppm, especially if the caustic scouring program at PS-5 is continued. As with the other two locations, the passive carbon unit is not recommended since this station is in a very sensitive area and a much higher degree of odor control will be achieved by a forced air system. Without a forced air system, corrosion of the pump station could be a problem.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1

CONCLUSIONS

- Long detention times, warm wastewater temperatures, and saltwater infiltration all create a high potential for hydrogen sulfide generation in the Lahaina collection system forcemains.
- The most critical odor release areas are manholes and wet wells downstream of the forcemain discharges. For the future collection system, these areas have been identified as PS-1, PS-2, PS-3, the resort area manhole, and the HFDC connector manhole.
- Control of these potential odor release areas is important to prevent nuisance complaints from residents and tourists in the area.
- Although the concentration of wastewater sulfides could potentially be reduced in the future system due to shorter travel times in the forcemain from PS-3, the volume of sewer air to ventilate will be increased significantly by the addition of the HFDC gravity sewer.
- The existing mist scrubbers at PS-1 and PS-2 can be most effectively used if they are relocated to the new PS-1 location and the HFDC connector manhole location.
- A preliminary evaluation of alternative chemical addition methods for odor control in the Lahaina collection system indicates that continuous hydrogen peroxide addition could potentially be more effective and economical than intermittent caustic scouring.

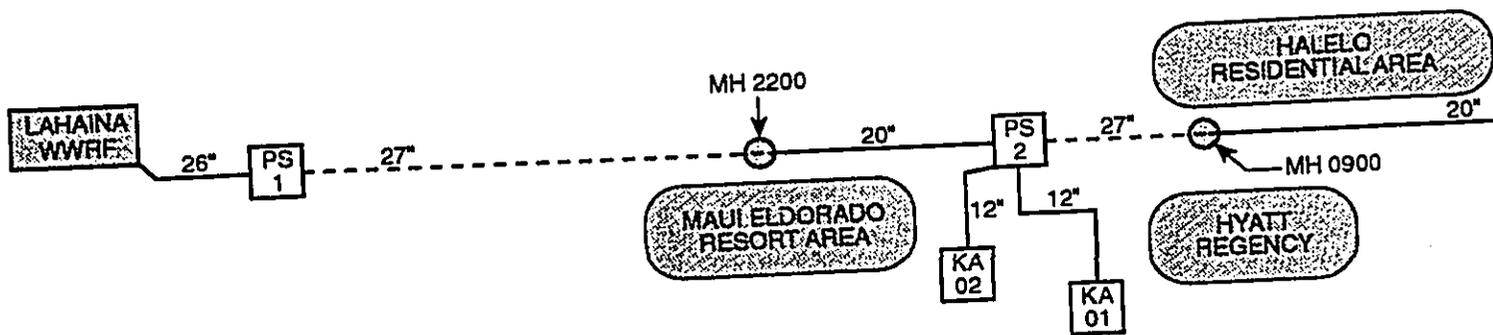
5.2 RECOMMENDATIONS

The location of existing and recommended future odor control facilities is illustrated in Figure 2. The recommended odor control equipment for the Lahaina wastewater collection system is presented in Table 14. A comparison of operating costs associated with the recommended system and existing system is given in Table 15. The recommended odor control program consists of three parts:

- Relocation of existing equipment: Relocating existing mist scrubbers to the new PS-1 and HFDC connector manhole.
- Installation of additional air treatment systems: Installation of a single-stage packed tower scrubber at PS-3 and at the resort area manhole. The single stage scrubber is illustrated in Figure 3. Installation of a two-stage packed tower scrubber at PS-2 as illustrated in Figure 4.
- Installation of additional caustic feed equipment: Installation of a 500-gallon caustic storage tank and feed system at PS-2 and PS-4 to control downstream sulfide levels and enhance air treatment effectiveness.

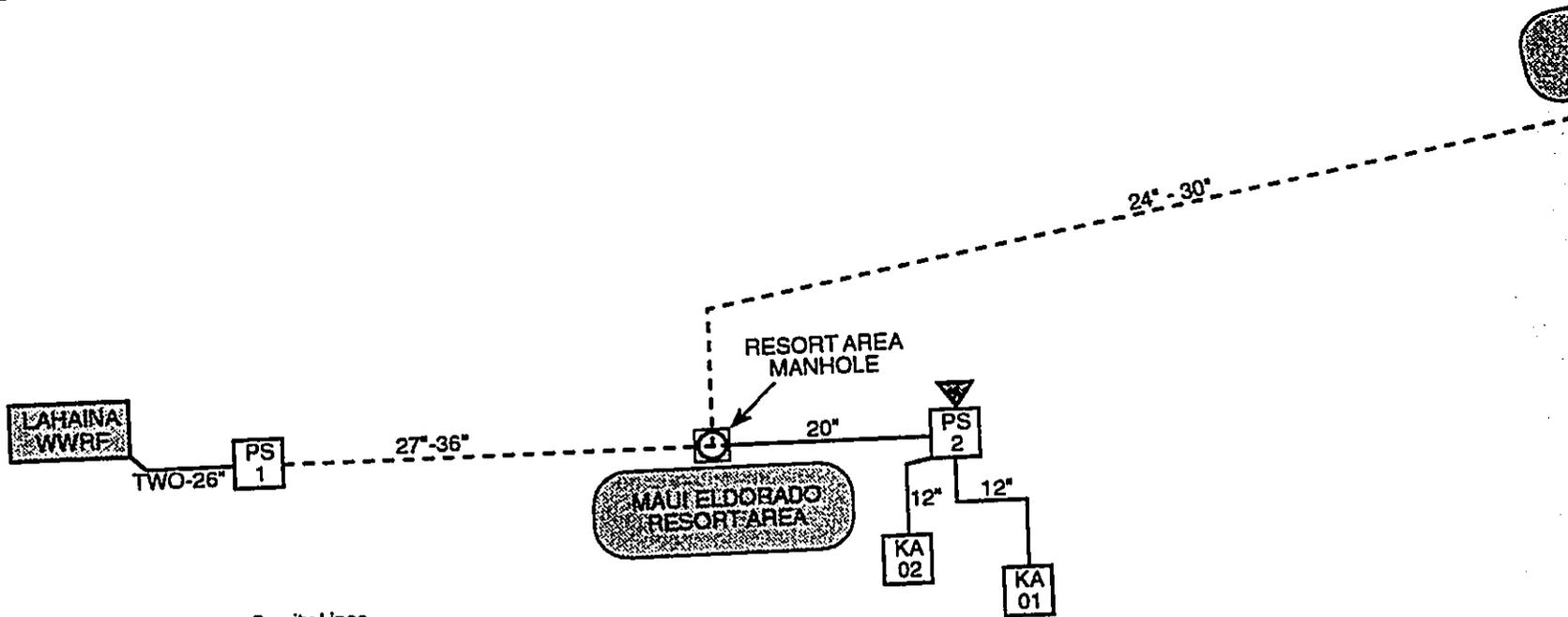
Additionally, we recommend that a pilot test program be conducted on one forcemain within the collection system to determine the effectiveness and cost of using hydrogen peroxide rather than caustic soda for sulfide removal. The pilot program should be conducted before expanding the caustic scouring program at PS-2 and PS-4. If hydrogen peroxide is found to be more effective and economical, then it should be implemented at PS-5, PS-4, PS-3, and PS-2.

EXISTING ODOR CONTROL FACILITIES

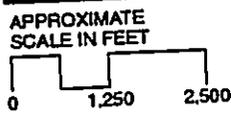


- Gravity Lines
- - - Forcemains
- Sensitive Odor Perception Areas
- ▭ Existing Air Treatment System
- ▲ Existing Caustic Feed System

FUTURE ODOR CONTROL FACILITIES



- Gravity Lines
- - - Forcemains
- Sensitive Odor Perception Areas
- ▭ Recommended Air Treatment System
- ▲ Recommended Caustic Feed System



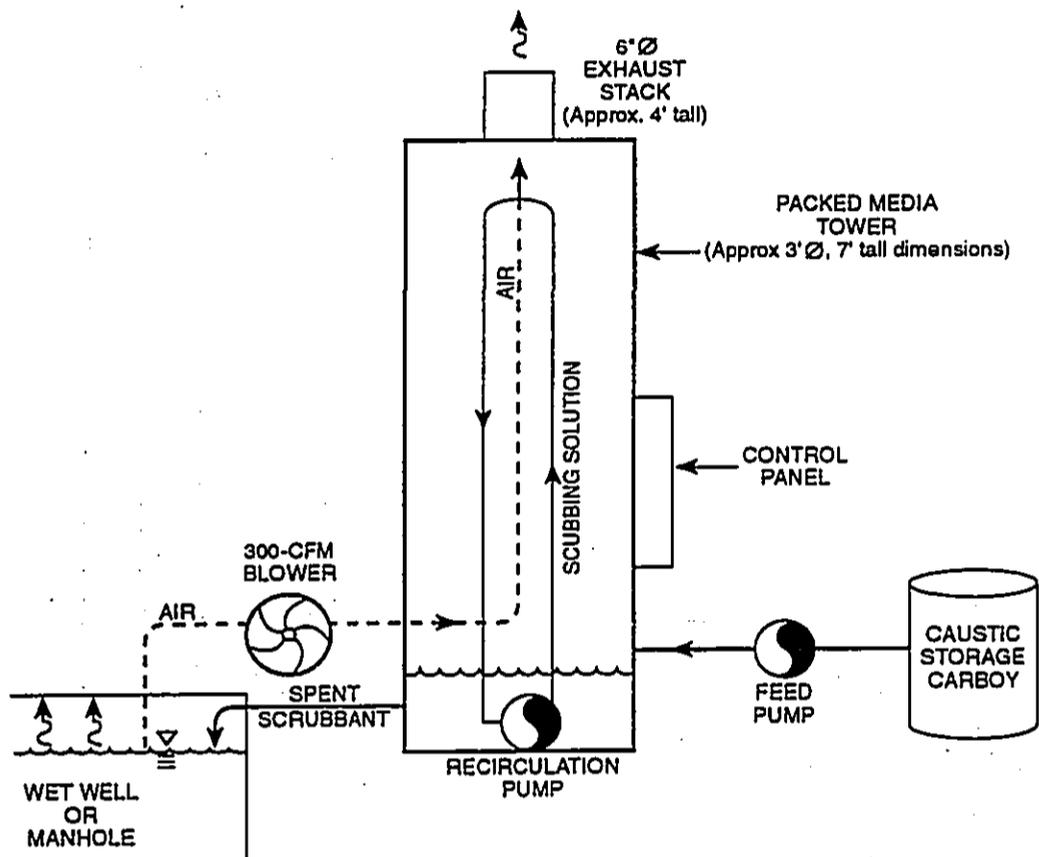


Figure 3.
Single-stage
Caustic Scrubber

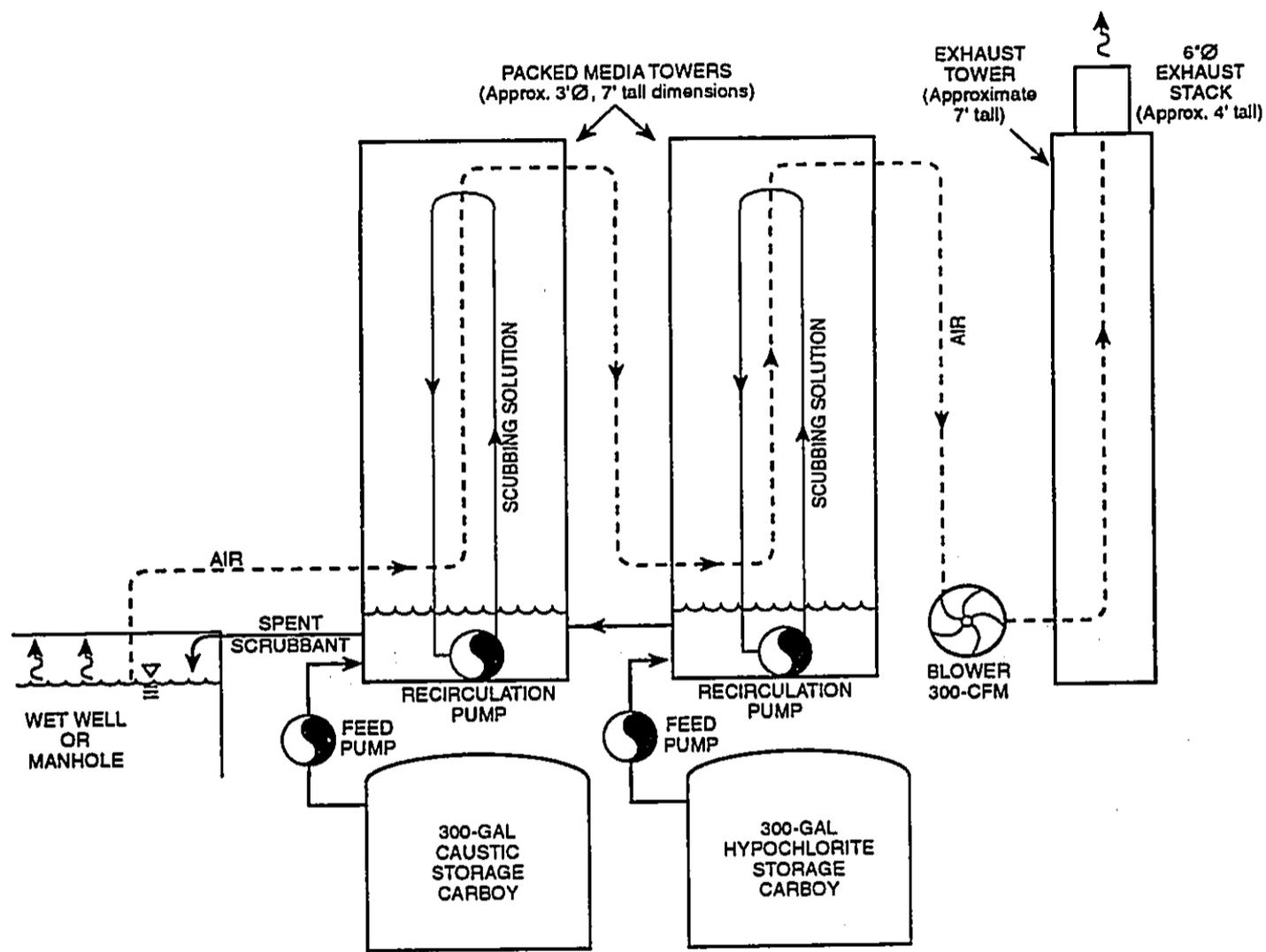


Figure 4.
Two-stage Caustic/Sodium
Hypochlorite Scubber

Table 14. Recommended odor control equipment.

Future Location	Recommended Equipment	Capital ¹ Cost (\$)	Operating ² Cost (\$/yr)	Present ³ Worth Cost (\$)
PS-1	Existing 1190-cfm two stage mist scrubber (relocated from old PS-1)	100,000 (To Relocate)	2,200	114,800
Resort Area Manhole	300-cfm single stage packed tower scrubber	25,000	1,500	35,100
PS-2	300-cfm two stage packed tower scrubber	76,000	1,800	138,300
	200 gal/month caustic feed system	10,000	6,000	
HFDC Connector Manhole	Existing 1190-cfm two stage mist scrubber (relocated from PS-2)	100,000 (To relocate)	2,200	114,800
PS-3	300-cfm single stage packed tower scrubber	25,000	1,500	100,500
	Existing 300-gal/month caustic feed system	5,000 (To relocate)	9,000	
PS-4	200-gal/month caustic feed system	10,000	6,000	50,300
PS-5	Existing 300-gal/month caustic feed system	-	9,000	60,400
TOTAL		\$351,000	\$39,200	\$614,200

- ¹ Equipment costs based on 1994 prices. Cost does not include land acquisition, water softening equipment, electrical supply or water supply. Cost for scrubbers includes control panel, concrete storage pad with spill containment, pH/ORP metering probes, air piping, and chemical storage tanks and feed system. Cost for caustic feed system includes 500-gal storage tank, concrete pad with spill containment, chemical metering pumps, and piping. Air and chemical ductwork assumes that scrubbers will be located within 30 feet of wetwell or manhole.
- ² Assumed operating cost for existing mist scrubbers of \$6/day (for chemicals and power); \$5/day for two-stage scrubber; \$4/day for single-stage scrubber.
- ³ Present worth based on 8% interest over 10 years.

Table 15. Comparison of existing and future annual operating costs.

Equipment Location	Existing Operating Cost (\$/year)	Future Operating Cost (\$/year)
PS-1	2,200	2,200
Resort Area Manhole	-	1,500
PS-2	2,200	7,800
HFDC Connector Manhole	-	2,200
PS-3	9,000	10,500
PS-4	-	6,000
PS-5	9,000	9,000
TOTAL	\$22,400	\$150,400

NOTES: Operating costs for existing mist scrubbers assumed as \$6/day; new single stage scrubbers \$4/day; new two stage scrubbers \$5/day. Caustic scouring costs based on 1994 unit price of \$2.5/gallon of 50% solution.

Appendix B

Noise Study

**STUDY OF POTENTIAL CONSTRUCTION
NOISE IMPACTS
LAHAINA WASTEWATER PUMP
STATIONS #1 AND #3
MAUI, HAWAII**

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APRIL 1994

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CHAPTER I. SUMMARY

Construction noise impact evaluations were performed in the immediate vicinity of the proposed Lahaina Wastewater Pump Stations #1 and #3 on the island of Maui. Potential noise impacts resulting from the construction of sewer lines between Stations #1 and #3 were also evaluated. Unavoidable noise impacts from the construction activities may occur at naturally ventilated structures near the job sites, and particularly if nighttime construction work is required to minimize traffic congestion during daytime hours. Possible noise mitigation measures include the use of quiet equipment and vehicles, and locating equipment staging areas and stationary equipment away from noise sensitive receptors.

CHAPTER II. PURPOSE AND METHODOLOGY

The purpose of this study was to provide an assessment of the potential construction noise impacts associated with the construction of the Lahaina Wastewater Pump Stations (WWPS) #1 and #3, as well as the force mains and gravity lines between Lahaina and Kaanapali on the island of Maui.

Calculations of average exterior and interior noise levels from construction activities were performed for typical air conditioned and naturally ventilated business establishments and residences in the immediate vicinity of the pump stations and wastewater pipe alignments. Predicted noise levels during construction activities were compared with existing exterior and interior noise criteria and regulations for the purpose of determining probable noise impact from both daytime and nighttime construction activities. Potential noise impacts from the construction activities were identified, and possible noise mitigation measures were described.

CHAPTER III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used to relate outdoor noise levels to land use compatibility, and to assess environmental noise in general is the Day-Night Average Sound Level (Ldn). A glossary of noise descriptors and acoustic terminology is contained in the APPENDIX. The Ldn descriptor represents a 24 hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dBA) prior to computing the 24 hour average by the Ldn descriptor. TABLE 1 presents current federal noise standards and acceptability criteria for residential land uses.

The State Department of Health (DOH) is preparing to apply noise level limits on the island of Maui. These limits currently apply only on the island of Oahu, but are planned to be enforced throughout the state by the time this project is under construction. For construction activities, DOH permit procedures would probably be required, and would be enforced whenever construction noise emissions exceed specified levels or cause complaints from neighboring residents. State Department of Health (DOH) noise regulations are expressed in maximum allowable property line noise limits rather than Ldn. These limits are 55 and 45 dBA for daytime and nighttime periods, respectively, in low density residential neighborhoods. For commercial and multifamily neighborhoods, these DOH limits are 60 and 50 dBA for the daytime and nighttime periods, respectively. Although they are not directly comparable to noise criteria expressed in Ldn, State DOH noise limits for residential, commercial, and industrial lands equate to approximately 55, 60, and 76 Ldn, respectively.

TABLE 1
EXTERIOR NOISE EXPOSURE CLASSIFICATION
(RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY-NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL ⁽¹⁾ STANDARD
Minimal Exposure	Not Exceeding 55 L _{dn}	Not Exceeding 55 L _{eq}	Unconditionally Acceptable
Moderate Exposure	Above 55 L _{dn} But Not Above 65 L _{dn}	Above 55 L _{eq} But Not Above 65 L _{eq}	Acceptable ⁽²⁾
Significant Exposure	Above 65 L _{dn} But Not Above 75 L _{dn}	Above 65 L _{eq} But Not Above 75 L _{eq}	Normally Unacceptable
Severe Exposure	Above 75 L _{dn}	Above 75 L _{eq}	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the L_{eq} instead of the L_{dn} descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 L_{eq}.

CHAPTER IV. EXISTING NOISE ENVIRONMENT

The existing background ambient noise levels within the project area are controlled by traffic along Honoapiilani Highway, and range from 65 to 70 Ldn at 50 FT distance from the highway centerline. At the proposed sites of WWPS #1 and #3, existing background ambient noise levels are approximately 60 to 65 Ldn. During the daytime hours, average background ambient noise along the highway range between 65 to 70 dBA, with short term maximum noise levels of 80 to 85 dBA occurring during passes of heavy truck traffic. During the nighttime hours of 10:00 PM to 7:00 AM, average background ambient noise levels decrease to approximately 45 dBA, with intermittent traffic along Honoapiilani Highway being the dominant noise source.

CHAPTER V. PREDICTED CONSTRUCTION NOISE LEVELS

TABLE 2 lists the range of noise levels of various types of construction equipment when measured at 50 FT distance from the equipment. FIGURE 1 presents the anticipated range of construction noise levels vs. distance from areas where heavy construction work is in progress. FIGURE 1 is useful for predicting exterior noise levels at short distances (within 100 FT) from the work when visual line of sight exists between the construction equipment and the receptor. Direct line-of-sight distances from the construction equipment to existing residential and commercial buildings will range from 50 FT to 200 FT, with corresponding average noise levels of 85 to 73 dBA (plus or minus 5 dBA). For receptors along a cross street, the construction noise level vs. distance curve of FIGURE 1 should be reduced by approximately 8 dBA when the work is occurring at the intersection with the cross street, and should be reduced by 15 dBA when work is occurring at least 100 FT from the intersection (and the visual line-of-sight is blocked by intervening buildings).

As indicated in TABLE 2, peak noise levels from pile driving may be as much as 15 dBA greater than noise levels from other non-impulsive (steady) construction noise sources. Although the pile driving can produce more intense noise levels, each pulse is of short individual duration (less than one second). Therefore, its impact on speech communication is not as severe as that of steady source of the same noise level.

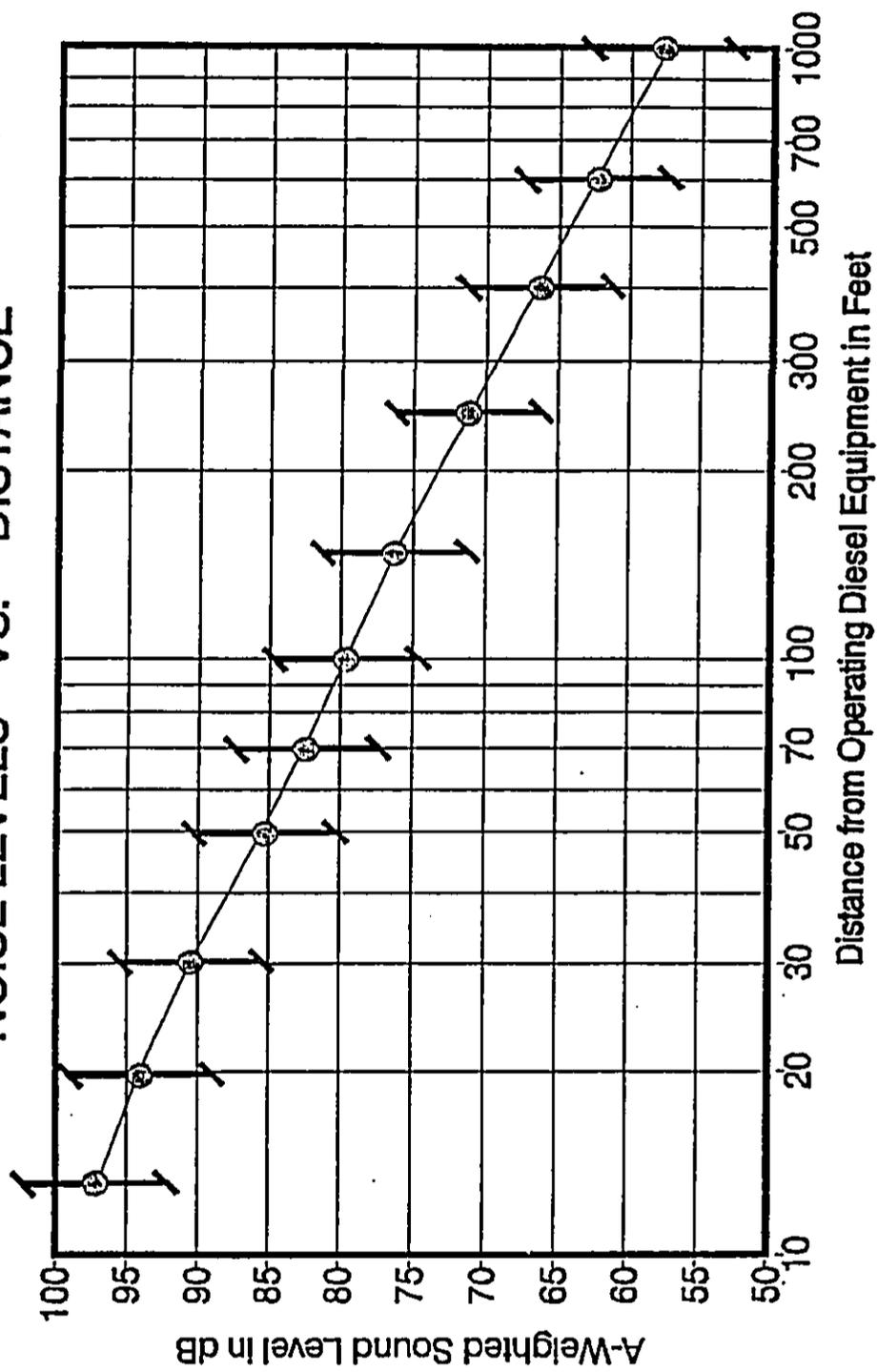
Severe noise impacts are not expected to occur inside air conditioned structures which are within 50 to 200 FT of the project construction sites. Inside naturally ventilated structures, interior noise levels (with windows or doors opened) are estimated to range between 63 to 75 dBA at 50 FT to 200 FT distances from the construction site. Closure of all doors and windows facing the construction site would generally reduce interior noise levels by an additional 5 to 10 dBA.

TABLE 2

RANGES OF A-WEIGHTED SOUND LEVELS OF
CONSTRUCTION EQUIPMENT AT 50 FEET DISTANCE

<u>EQUIPMENT</u>	<u>SOUND LEVELS MINIMUM / MAXIMUM</u>
Backhoes, Trencher	72 / 93
Compactors (rollers)	72 / 88
Compressors	68 / 87
Concrete Mixers	72 / 90
Front Loaders	72 / 96
Generators	70 / 82
Jackhammers and Drills	75 / 98
Pavers	82 / 92
Pile Drivers (peak levels)	89 / 105
Pumps	70 / 80
Saws	68 / 93
Scrapers, Graders	76 / 95
Tractors	73 / 95
Trucks	70 / 95
Vibrators	70 / 81

ANTICIPATED RANGE OF CONSTRUCTION
NOISE LEVELS VS. DISTANCE



CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE
1

CHAPTER VI. DISCUSSION OF POTENTIAL CONSTRUCTION NOISE IMPACTS

Short term noise impacts may occur during the construction of the Lahaina WWPS #1 and #3 Project. These impacts are unavoidable due to the relatively short distances between existing noise sensitive structures and the construction sites, the necessity to perform heavy construction work on site (breaking of pavement, excavating trenches, driving sheet piles, and backfilling), and the presence of naturally ventilated structures in the project area. Inside these naturally ventilated establishments, construction noise levels are predicted to exceed 70 dBA during periods when construction activity is within 100 FT of the establishments. Partial or total closure of ventilation openings may be temporarily necessary to conduct phone conversations in these naturally ventilated establishments. Within air conditioned spaces, construction noise impacts are expected to be minimal.

Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

CHAPTER VII. DISCUSSION OF POSSIBLE NOISE MITIGATION MEASURES

Mitigation of construction noise on Oahu is generally accomplished by enforcement of the State DOH noise regulations. Mitigation of construction noise has been accomplished by citing equipment with defective mufflers or silencers, and by limiting the hours of operation of excessively noisy equipment. The use of quiet construction equipment and vehicles should be encouraged for this project.

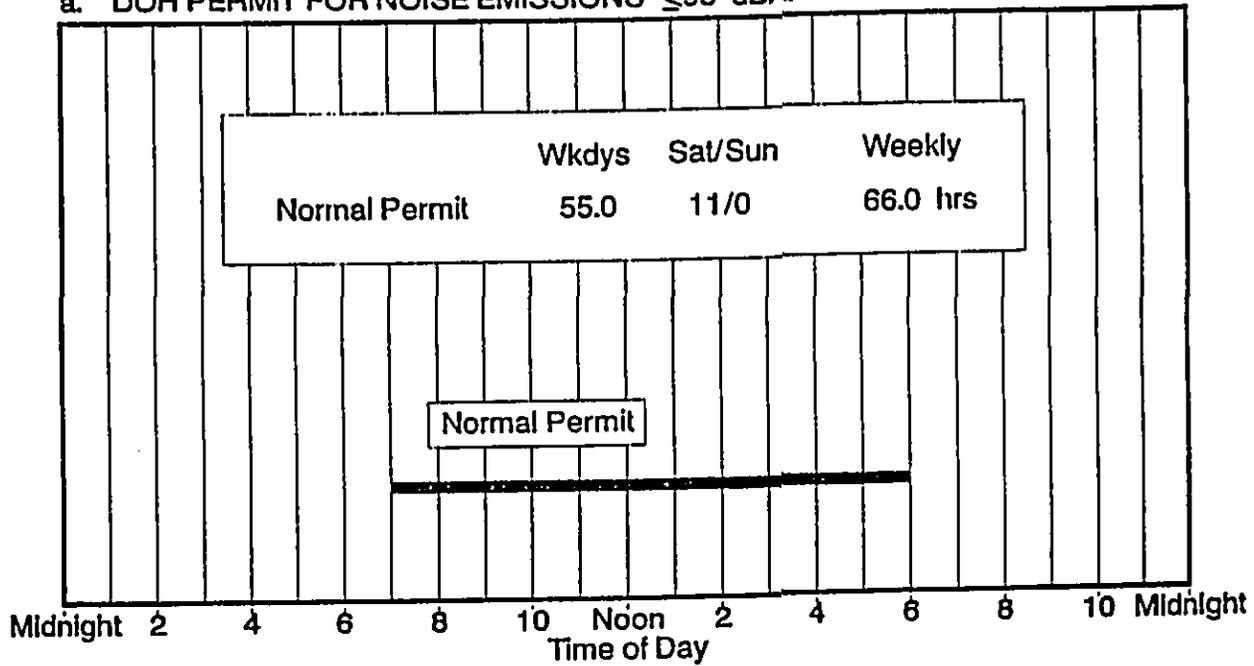
If possible, the noisier site preparation construction activities (grading, trenching, pile driving, etc.) should be performed during the daylight hours. If highway lane closures (to allow for construction of the sewer lines along Honoapiilani Highway) are not possible during the daylight hours, nighttime work may be necessary. The use of properly muffled construction equipment and vehicles, plus the siting of heavy truck staging areas and portable generators or compressors away from residences and other noise sensitive receptors are also recommended.

Curfews on excessively noisy construction activities during the nighttime hours, weekends, and on holidays are intended to minimize noise impacts on residences, since home occupancy rates are generally higher during these periods. The State Department of Health (DOH) currently regulates noise from construction activities on the island of Oahu under a permit system. Similar regulatory procedures are anticipated to be in force on Maui during the construction period of this project. Under current DOH permit procedures (see TABLE 3), noisy construction activities which exceed 95 dBA at the project boundary lines are restricted to hours between 9:00 AM and 5:30 PM, from Monday through Friday, and exclude certain holidays. These restrictions minimize construction noise impacts on residential noise sensitive receptors, and have generally been successfully applied. Use of the curfew system within the State Department of Health regulations relating to excessive construction noise will minimize construction noise

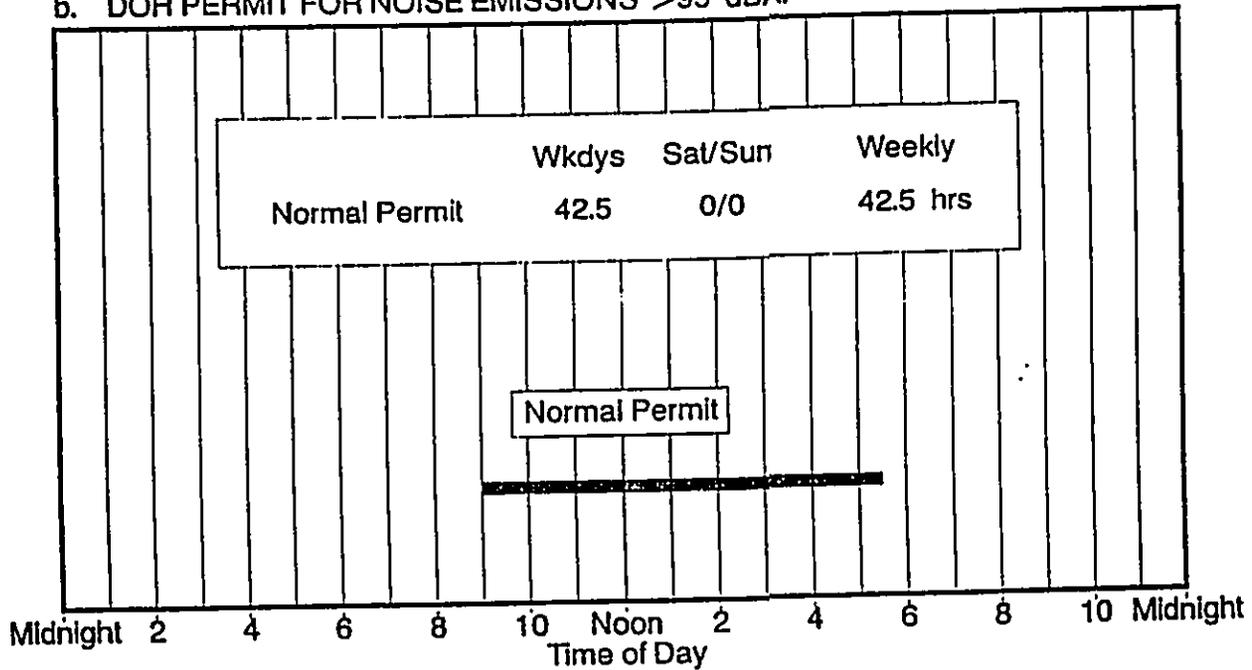
TABLE 3

AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

a. DOH PERMIT FOR NOISE EMISSIONS ≤ 95 dBA.



b. DOH PERMIT FOR NOISE EMISSIONS > 95 dBA.



impacts on nearby residences.

APPENDIX

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LA_{dn}.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

<u>TERM</u>	<u>SYMBOL</u>
1. A-Weighted Sound Level	L_A
2. A-Weighted Sound Power Level	L_{WA}
3. Maximum A-Weighted Sound Level	L_{max}
4. Peak A-Weighted Sound Level	L_{Apk}
5. Level Exceeded x% of the Time	L_x
6. Equivalent Sound Level	L_{eq}
7. Equivalent Sound Level over Time (T) ⁽¹⁾	$L_{eq}(T)$
8. Day Sound Level	L_d
9. Night Sound Level	L_n
10. Day-Night Sound Level	L_{dn}
11. Yearly Day-Night Sound Level	$L_{dn}(Y)$
12. Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq}(1)$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq}(WASH)$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78, NOISE REGULATION REPORTER.

APPENDIX (CONTINUED)

TABLE II
RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE ⁽¹⁾ A-WEIGHTING	OTHER ⁽²⁾ WEIGHTING	UNWEIGHTED
1. Sound (Pressure) Level ⁽³⁾	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level Over Time(T) ⁽⁴⁾	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average value over (non-time domain) set of observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level exceeded x% of the total set of (non-time domain) observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified as $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine.

Appendix C

Drainage Letter Report



Sato & Associates

Consulting Engineers

2115 Wells Street, Wailuku, Maui, HI 96793
OFFICES IN HONOLULU AND MAUI

Tel: (808) 244-9265
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APR 26 1994

April 25, 1994

Mr. Milton Arakawa
Munekiyo & Arakawa Inc.
183 Wells Street, Suite 3
Wailuku, Hawaii 96793

**SUBJECT: Waste Water Pump Station No. 03 Replacement
Environmental Assessment**

Dear Mr. Arakawa,

As part of our review of site conditions, we have studied the impact of the proposed project on existing drainage conditions at the project site. Our study area included the existing drainage channel just west of Wahikuli Terrace Park and the site of the proposed pump station within Wahikuli Terrace Park.

The existing drainage channel will require realignment to allow for vehicle access to the proposed pump station. The capacity of the existing drainage channel will remain the same and existing drainage patterns will be maintained.

Fencing, landscaping, and other site improvements related to the proposed pump station will not affect the existing drainage. The project will not significantly increase drainage flows in the area and will therefore not require additional drainage improvements at the project site. The proposed project will have no adverse effect by storm runoff to adjacent and downstream properties.

During construction, portions of the proposed pump station will be below the water table, and dewatering will be required. Proper construction methods will be implemented during the dewatering process to comply with Federal, State and County requirements. Applicable permits will be obtained.

Sincerely,

SATO & ASSOCIATES, INC.

BERT R. TOBA, P.E.
Vice President

BRT:dk
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