HONOLULU WATERFRONT MASTER PLAN

PRE-FINAL REPORT

JANUARY 1989

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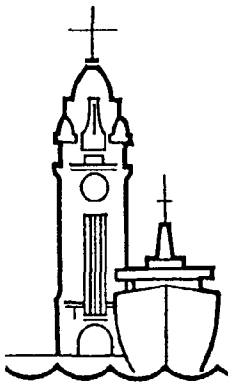

Prepared for: The Office of State Planning,
State of Hawaii

Prepared by: Helber, Hastert & Kimura, Planners
and R.M. Towill Corporation, a Joint Venture

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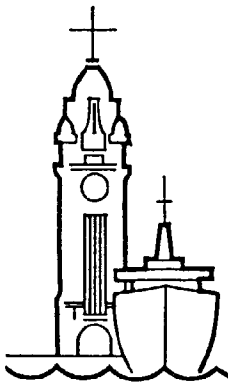


1.0 INTRODUCTION

Previous planning for the Honolulu waterfront has generally been functionally related, often fragmented within separate jurisdictional areas of responsibility. Because of the wide range of land and water uses and the complexity of the management framework associated with the waterfront, past plans and proposals for the waterfront area have lacked a comprehensive and integrated vision for the future of this significant public resource.

To overcome these deficiencies, and to promote a comprehensive, functionally integrated vision for the waterfront, the Governor's Office of State Planning (OSP) was directed to prepare a master plan for the entire Honolulu waterfront.

The Master Plan Report documents the overall planning process, provides a comprehensive description of the planning area, and identifies short and long range development plans for the Honolulu Waterfront. The plan also addresses fiscal implications, recommendations for changes to the present management framework necessary to implement the master plan and major environmental consequences of plan implementation. This Pre-Final Report of the Honolulu Waterfront Master Plan will be submitted for review by the 1989 Legislature. The Final Report will be prepared in June 1989 and will incorporate additions and changes generated during the Legislative session.

1.1 PURPOSE

The Honolulu Waterfront Master Plan represents a comprehensive, long range vision for the Honolulu waterfront. It recognizes the importance of the Port of Honolulu as the lifeline of state-wide commerce and, at the same time, provides for the recreational, cultural and economic needs of a growing population. The

plan directly addresses the major planning issues concerning public access and use of the waterfront, long-term integrity of commercial maritime operations, plan implementation, relocation needs, and financial feasibility.

The purpose of the Plan is three-fold:

- to identify and articulate a long-range vision for the Honolulu Waterfront that is fiscally responsible but also innovative, challenging and responsive to the current and future needs of Hawaii's residents;
- to assure a logical, orderly and achievable phasing of improvements in a manner that minimizes social, environmental and economic disruption.
- to maximize public benefits associated with the improvement of the significant state-owned lands located within the waterfront planning area.

1.2 REPORT OUTLINE

This Pre-Final Report consists of a number of major elements which, collectively, represent the approach, direction and substance of the Waterfront Master Plan. Chapter 1 presents an introduction of the Plan, including a review of the overall planning process. Chapter 2 provides a description of the planning area and includes a review of the relevant history and major plans and proposals made for the area in the recent past. Chapter 3 presents the conceptual plans and includes a discussion of the overall waterfront goals for the waterfront and development program, a discussion of the overall themes/vision which both unify the waterfront and provide for diversity and interest, and a description of the recommended short- (5-10 year) and long-range (20-40 year) development plans.

Chapter 4 presents a review of the major project costs, public revenue projections, public financing alternatives and an assesment of the overall public costs and benefits of the recommended improvements. Chapter 5 provides an analysis of management framework alternatives and includes a recommended framework to implement the master plan. Finally, Chapter 6 presents a preliminary environmental assessment of the master plan recommendations.

1.3 THE PLANNING PROCESS

This section begins with a review of the major events which shaped and focused public attention on the waterfront, leading up to the 1988 Legislative appropriation of funds to prepare the Honolulu Waterfront Master Plan. The scope of work and timetable for plan preparation is then reviewed, followed by a more detailed discussion of the three major work elements.

1.3.1 Background

The Honolulu Waterfront plays a very special role in the State of Hawaii and particularly, Honolulu. Located in the center of the City, the waterfront contains Honolulu Harbor, the heart of the state-wide harbor system, and the major center of commerce and maritime activities. Moreover, the waterfront provides the potential to accommodate expanding recreational and cultural needs of Honolulu's residents as well as areas for future urban growth.

1987 Legislative Session. The 1987 State Legislature recognized the substantial potential of the Honolulu Waterfront to serve the future needs of Hawaii's residents. Act 355, SLH, 1987, in part stated: "The legislature finds that the waterfront of Honolulu is a vital sector of the city with great potential to serve the economic, maritime and recreational needs of the state."

Waterfront Charette. In September 1987, Governor Waihee launched a "waterfront reawakening" effort declaring that the time had come to enjoy again the waterfront as a people-oriented gathering place. Announcing that the "area is ripe for change," the Office of State Planning (OSP) was charged with the task of organizing the development of a coordinated master plan for the Honolulu Waterfront. In cooperation with the Hawaii Community Development Authority (HCDA), OSP embarked on a preliminary effort aimed at generating ideas and community dialogue on how best to develop the urban waterfront. Public policy makers, leaders from the business and financial community, environmental and community organizations were brought together in a series of meetings to share

their thoughts and concerns on the subject. Based on this input, volunteer design teams from the Hawaii Society of the American Institute of Architects and the Hawaii Chapters of the American Planning Association and the American Society of Landscape Architects engaged themselves in an intensive three-day brainstorming process known in the design community as a "Charette." This well-publicized event resulted in the creation of three alternative visions for the waterfront, each with a separate emphasis on commercial, residential and recreation/cultural possibilities. These bold design concepts served to stir public awareness of the tremendous opportunities and latent potential of the Honolulu Waterfront.

Governor's State of the State Address. In January 1988, the Governor, in his State of the State address to the opening session of the Legislature, appealed to the Legislators to hold "unreasonable expectations" - to assume a more aggressive role as "investor, participant and catalyst in creating a social environment which would best nurture the vision of a Pacific community entering the twenty-first century." With regard to the Honolulu Waterfront, the Governor specifically urged the Legislators to: 1) purchase the Kapalama Military Reservation from the Federal government to open new lands for maritime businesses; 2) appropriate monies to make the Barbers Point harbor a fully operational harbor; 3) appropriate monies to clean up Keehi Lagoon; and 4) fund a coordinated area-wide plan and development program for the waterfront. Senate President Richard Wong and Speaker of the House Daniel Kihano also included the revitalization of the Honolulu Waterfront in their legislative agendas.

Waterfront Redevelopment Work Group. Also in January, a committee of legislators appointed by the House Majority Caucus (Waterfront Redevelopment Work Group) submitted its report to the Majority Caucus. The report documented the process by which the members went about their investigation and highlighted a number of key concerns/issues which would need to be addressed in a comprehensive waterfront planning effort. The Work Group recognized that the preservation of commercial maritime activities within Honolulu Harbor "is essential to the economic well being of the islands." The report further identified the need for "a comprehensive planning vision" and the need to investigate al-

ternative management frameworks for the waterfront to simplify what it termed a "complex bureaucratic pattern" of jurisdictional controls within the waterfront area.

1988 Legislative Session. With strong Administrative and Legislative consensus on the significance of the waterfront as a vital public resource, the 1988 Legislature provided the Office of State Planning with necessary funds to prepare a comprehensive master plan and long-range development program for the Honolulu Waterfront.

1.3.2 Organization, Scope of Work and Timetable

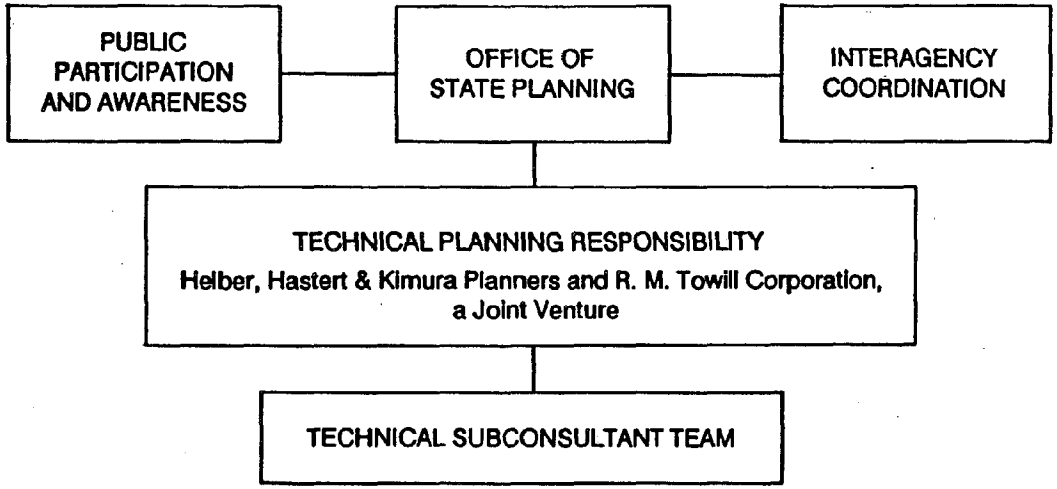
a. Organization

As discussed above, the 1988 Legislature vested the Governor's Office of State Planning (OSP) with the responsibility of preparing a comprehensive master plan for the development and improvement of the entire 1,550 acre, six mile coastal stretch of the Honolulu Waterfront from the Ala Wai Yacht Harbor to the Honolulu International Airport. As an initial step in fulfilling its mandate, OSP prepared a preliminary work program and one-year timetable for completion of the master plan. The work program envisioned three discrete but inseparable elements: 1) technical planning studies and master plan preparation; 2) public participation and awareness and, 3) interagency coordination.

In May 1988, OSP retained the Honolulu-based planning and engineering firms of Helber, Hastert and Kimura, Planners and R.M. Towill Corporation as a Joint Venture charged with conducting the necessary technical planning studies and preparation of the master plan (Figure 1). To accomplish this, the Joint Venture assembled a technical planning team comprised of planners, engineers, harbor planners, environmental scientists, sociologists, economists and legal experts. Each specialty was charged with identifying constraints, opportunities and impacts within its respective area of specialization. OSP retained the role of overall project manager assuming direct responsibility for the formulation and management of the public participation and awareness programs and the inter-

agency task force, comprised of key representatives of major State, Federal and County agencies with jurisdiction within the waterfront planning area.

FIGURE: 1
ORGANIZATION CHART



b. Technical Planning Studies and Master Plan Preparation.

In collaboration with OSP, the Joint Venture prepared a detailed scope of work and timetable to complete the Waterfront Master Plan. The scope contained eleven major steps summarized below.

Step 1 Inventory of Existing Conditions

- Define Study Parameters
- Assemble Physical and Socio-Economic Base Data

- Review Existing Regulatory Policies, Controls and Other Legal Issues/Concerns
- Review Existing Development Proposals
- Summarize Existing Conditions, Issues, Opportunities and Constraints

Step 2 Technical Studies and Analysis

- Identify Subareas for Special Studies and AnalysisInitiate Demand/Capacity Studies
- Investigate Potential Implementation/Financing Approaches

Step 3 Development Program

- Prepare Development Program

Step 4 Planning Concepts and Conceptual Framework

- Prepare Planning Concepts
- Prepare the Conceptual Framework

Step 5 Evaluation

- Prepare Environmental Assessment of Impacts
- Conduct Preliminary Benefit/Cost Assessment
- Refine Planning Concepts

Step 6 Implementation Strategies

- Prepare Development Schedule
- Prepare Development Cost Estimates
- Develop Financing Strategy/Program

- Develop Management Framework

Step 7 Preliminary Plan and Priority Projects

- Prepare Preliminary Plan Report

Step 8 Recommended Plan

- Prepare Pre-Final Master Plan Reports and Briefing Material

Step 9 Review and Approval

- Governor's Approval
- Legislative Review

Step 10 Final Plan

- Prepare Final Master Plan
- Prepare Final HCDA Kakaako Plan and Rules Amendments

Step 11 HCDA Requirements

- Inventory, Technical Studies and Analysis
- Prepare Kakaako Waterfront Plan
- Prepare Supplemental Environmental Impact Statement
- Formulation of Implementation Rules/Guidelines
- Coordination and Documentation

An important element of the scope of work (Step 2: Technical Studies and Analysis) is the detailed assessment of commercial maritime operations within the Honolulu, Kewalo and Barbers Point Harbors. The internationally recognized harbor planning firm of Moffatt and Nichol, Engineers of Long Beach, California was retained by the Joint Venture to conduct this investigation. Step 11, HCDA

Requirements, is also an important aspect of the scope of work, involving close coordination with the Hawaii Community Development Authority in the preparation of the Kakaako Waterfront Plan (a subarea of the Honolulu Waterfront Master Plan), a supplemental environmental impact statement for the HCDA Makai Area, and revised HCDA Rules/Guidelines for this subarea.

c. Public Participation and Awareness

As discussed previously, the OSP/HCDA Waterfront Charette process conducted in late 1987 focused public attention on the central waterfront area. A series of ten workshop sessions involving over 200 key representatives of government, business and community groups was conducted to identify problems, issues and opportunities for the future of the Honolulu Waterfront. With input from these groups and subsequent research and evaluation, OSP developed an "interactive planning process" to facilitate dialogue on community issues related to waterfront renewal and development. The primary objectives of the interactive process are:

- To offer affected interests an opportunity to constructively contribute to the plan development process.
- To foster agreement on planning direction and implementation strategies where possible and to acknowledge differences as appropriate.
- To forge a collaborative relationship among government agencies, elected officials, community groups and private interests in support of the plan's implementation.

The major elements of the public participation and awareness program designed by OSP consist of: 1) focus group meetings, 2) newsletters, 3) outreach and community presentations, 4) workshops, and 5) public information meetings. The publication of a Preliminary Report (discussed below) was also a major component of the participation/awareness program as it provided a substantive vehicle for public review of the progress and direction of the master planning process. The participation/awareness program has involved a significant cross section of the community in an informed dialogue focused on identifying the

needs, aspirations and concerns of the greater community. The sentiments expressed by the community in the various forums have been documented in a recently published Public Participation Report and incorporated into the overall goals discussed in Section 2.1, and have helped to shape and refine the various proposals set forth in the master plan.

A Preliminary Report of the Honolulu Waterfront Master Plan was released in November 1988 to provide, at the earliest practicable time, sufficient information on the approach, direction, preliminary findings and conceptual plans of the waterfront planning effort and to allow for substantive review and comment by policy makers, public agencies, community groups and organizations and the public at large.

Comments received from reviewers of the Preliminary Report were incorporated into the ongoing evaluation process, leading up to the preparation of this Pre-Final Master Plan Report. Following the close of the 1989 Legislative Session, all subsequent comments and suggestions for plan modifications will be evaluated and, where appropriate, incorporated into the Final Master Plan to be published in June 1989.

d. Interagency Task Force

Vitally important to the success of the comprehensive planning process is the involvement of all affected agencies having jurisdiction within the Waterfront area. Accordingly, OSP has assembled an Interagency Task Force, comprised of key representatives from Federal, State and County agencies including: the U.S. Army Corps of Engineers, the Hawaii Community Development Authority and State Departments of Transportation, Business and Economic Development, Land and Natural Resources and the City and County of Honolulu. The task force meets on a regular basis to discuss the progress of the Master Plan. The close coordination offered by the interagency task force approach facilitates information flow between the planning team and the various agencies. The accumulated expertise of the agency representatives provides a valuable resource/input into the plan formulation process. At the same time, the regular dissemination of draft work products allows for the respective agencies to as-

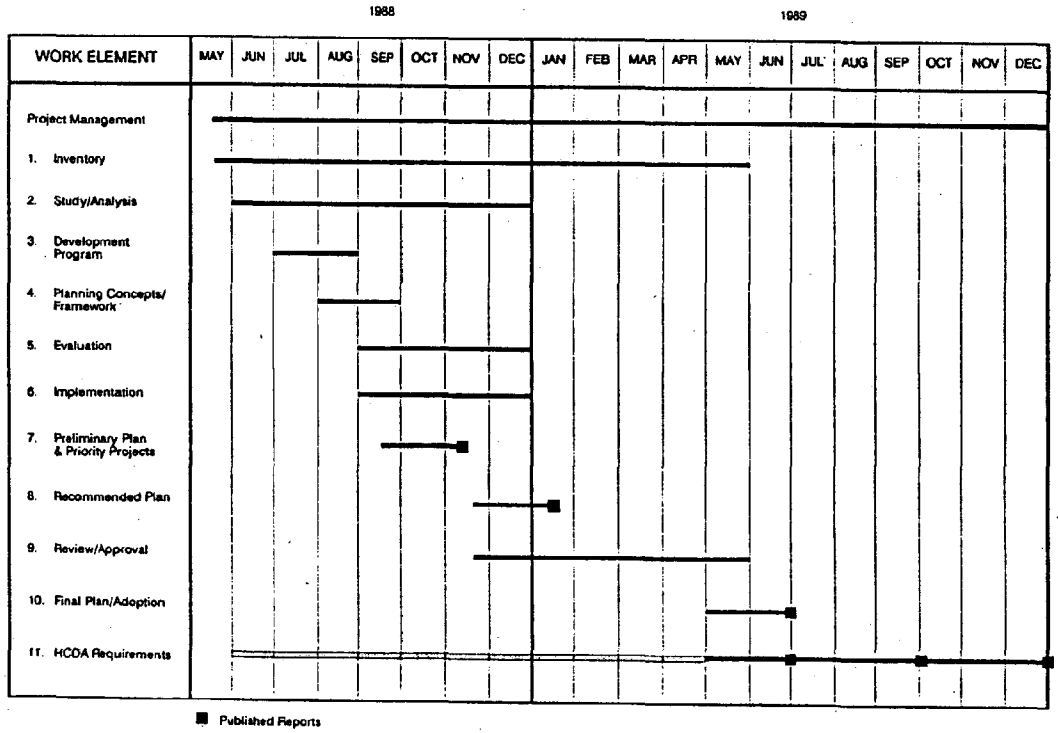
sess overall direction of the planning process and, where appropriate, adjust or fine tune programs in anticipation of the Final Plan.

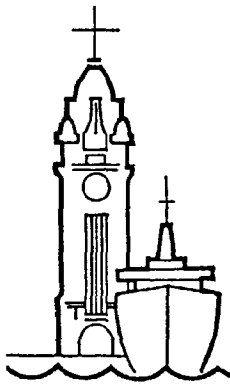
e. Timetable

The project schedule for the technical planning studies, master plan preparation, and HCDA work is presented in Figure 2. Major reporting deadlines (indicated with a box) include the previously submitted Preliminary Plan in November 1988, submittal of this Pre-Final report in January and the Final Master Plan at the end of June 1989.

FIGURE: 2

PROJECT SCHEDULE





2.0 DESCRIPTION OF THE PLANNING AREA

This Chapter presents a detailed description of the waterfront planning area. Section 2.1 provides an overview of the planning area. Section 2.2 details existing conditions within nine subareas, including an analysis of land tenure, encumbrance of State lands, and opportunities and constraints within the individual areas. Section 2.3 evaluates the condition of regional infrastructure systems such as water, wastewater and drainage. Section 2.4 provides an overview of the present jurisdictional controls that govern uses and activities in the planning area. Section 2.5 presents a discussion of the area's history, beginning with the origins of Honolulu Harbor and continuing through the various phases that have brought major changes and advancements to the planning area. Lastly, Section 2.6 discusses other major plans that have been produced for various areas within the waterfront.

2.1 OVERVIEW

The planning area for the Honolulu Waterfront Master Plan (Figure 3) stretches from the Magic Island/Ala Moana Park in the east to Keehi Lagoon in the west, and includes the nearshore waters lying roughly mauka of a line from Magic Island to the Reef Runway. The planning area is bounded by Nimitz Highway, Ala Moana Boulevard and Lagoon Drive on the mauka side. Barbers Point Harbor in Ewa is also included within the planning scope because of its important functional relationship with the commercial maritime operations of Honolulu Harbor.

The planning area encompasses a total land area of approximately 1,550 acres (not including Barbers Point Harbor) and stretches along nearly six lineal miles of coastline. Of the total acreage, the State owns nearly 76 percent, while 13 percent is owned privately, 11 percent is owned by the Federal government and

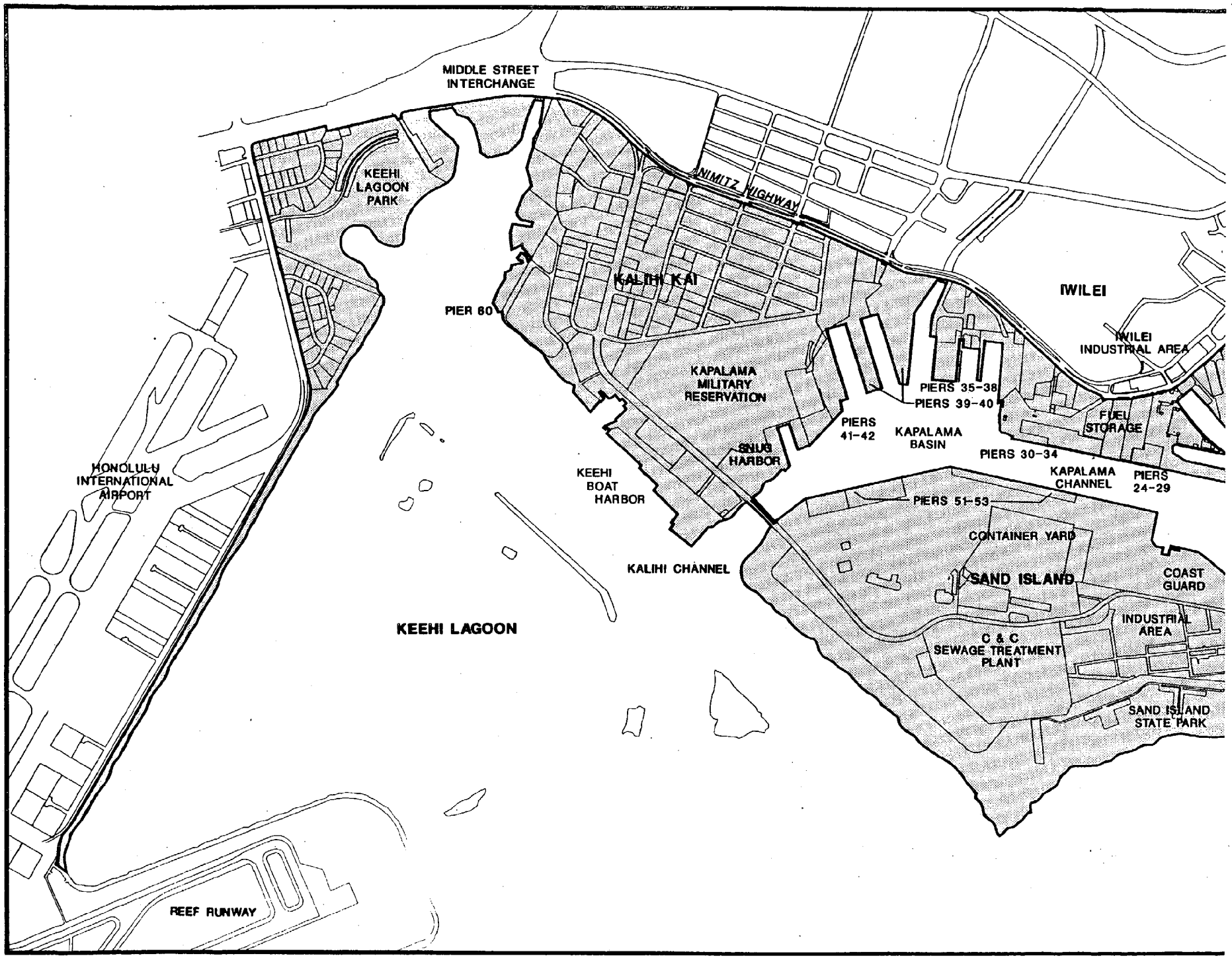
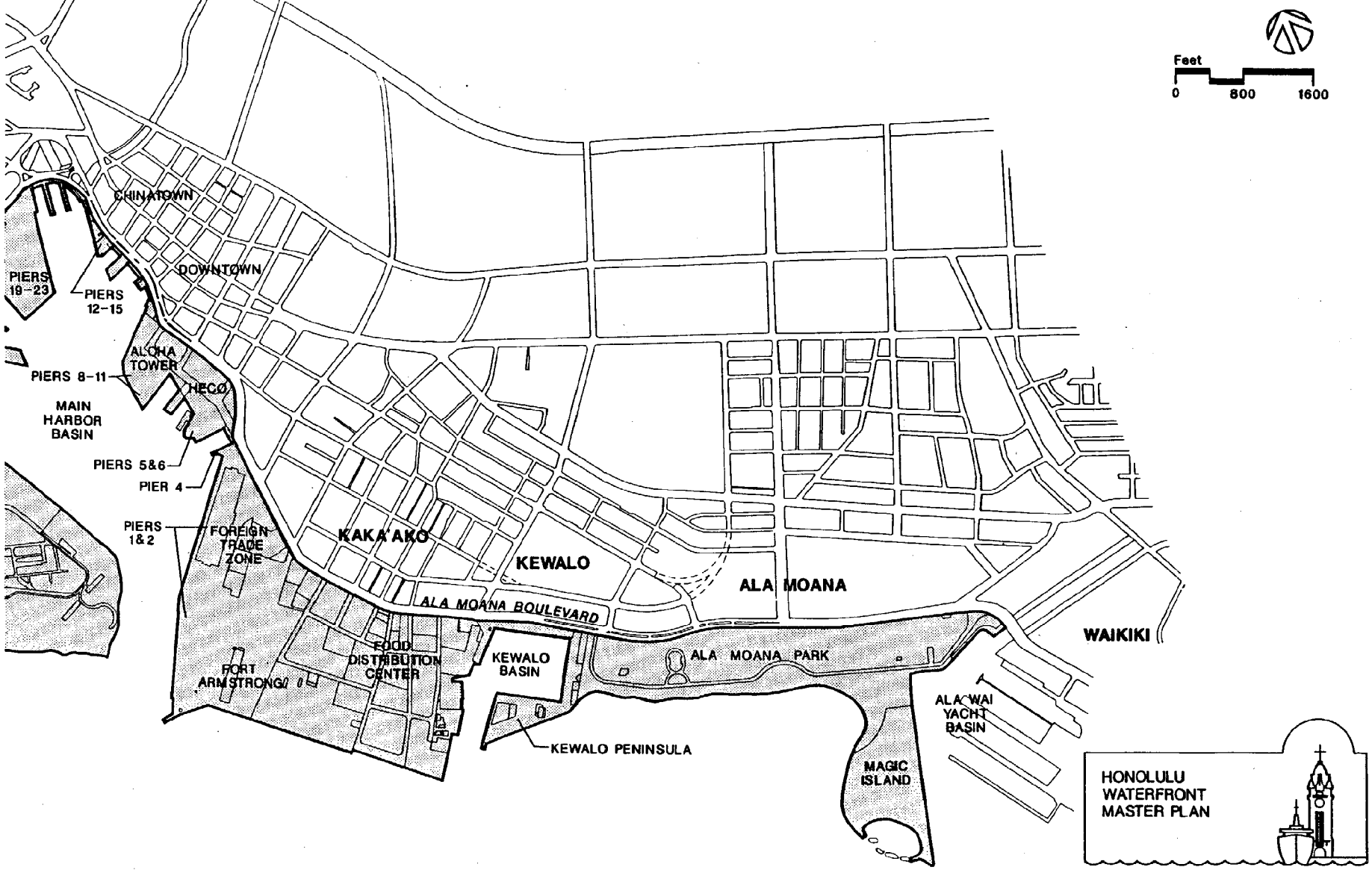

MIDDLE STREET INTERCHANGE
KEEHI LAGOON PARK
NIMITZ HIGHWAY
KALIHI KAI
IWILEI
PIER 60
IWILEI INDUSTRIAL AREA
KAPALAMA MILITARY RESERVATION
PIERS 35-38
PIERS 39-40
PIERS 41-42
KAPALAMA BASIN
FUEL STORAGE
SNUG HARBOR
PIERS 30-34
KAPALAMA CHANNEL
PIERS 24-29
HONOLULU INTERNATIONAL AIRPORT
KEEHI BOAT HARBOR
PIERS 51-53
CONTAINER YARD
KALIHI CHANNEL
SAND ISLAND
COAST GUARD
INDUSTRIAL AREA
KEEHI LAGOON
C & C SEWAGE TREATMENT PLANT
SAND ISLAND STATE PARK
REEF RUNWAY

FIGURE: 3

HONOLULU WATERFRONT PLANNING AREA



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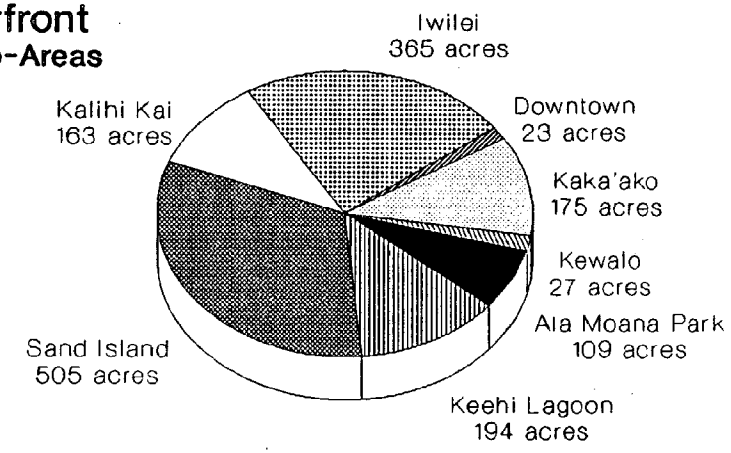
one percent by the City and County of Honolulu. The value of land within the planning area is over $2 billion. The value of improvements on the land is almost $250 million, of which 43 percent is on State-owned property.

For inventory, evaluation and planning purposes, the planning area was subdivided into subareas. Subarea boundaries were established based on functional and geographical relationships. The figure below indicates the relative size of individual subareas (excluding Barbers Point Harbor) within the waterfront. As indicated in the figure, these areas range from a high of 505 acres in the Sand Island subarea, to a low of 23 acres in the Downtown subarea.

Honolulu Waterfront
Relative Size of Sub-Areas

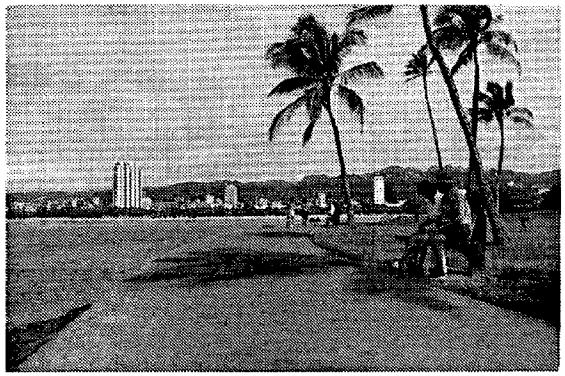


Although the planning area is technically defined as lying within a specific area, it is recognized that many factors, physical, social and economic, transcend the planning boundaries. To be sure, although certain patterns of land tenure, specific parcels of land, facilities and uses lie within the planning area, many aspects (infrastructure, circulation and open space systems, concepts of neighborhood and mauka-makai linkages to name a few) do not necessarily respect planning boundaries. In recognition of the importance of this reality, the plan-

ning approach has been to use the area boundary as a point of reference or focus rather than an absolute limit.

2.2 DESCRIPTION OF SUBAREAS

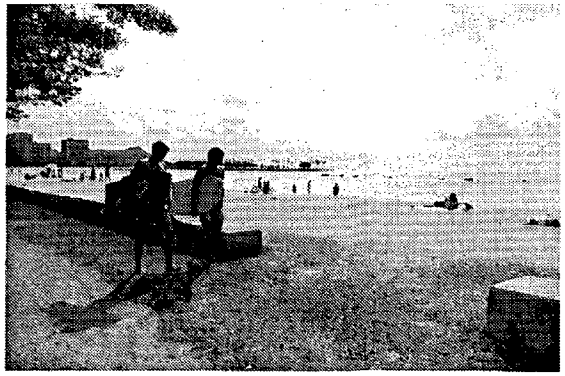
This section presents a detailed discussion of nine individual subareas within the overall waterfront study area. These areas include Ala Moana, Kewalo, Kaka'ako, Downtown, Iwilei/Kapalama, Kalihi Kai, Sand Island, Keehi Lagoon and Barbers Point. The overview of each area gives information covering existing land and water uses, land ownership and the existing lease encumbrances of State lands. This discussion is followed by a review of the major planning opportunities and constraints within each subarea. This information presents an overview of beneficial and adverse characteristics (e.g., physical features) or conditions (e.g., environmental, social) within the individual subareas that can hopefully be maintained and enhanced or mitigated by the implementation of waterfront planning recommendations.



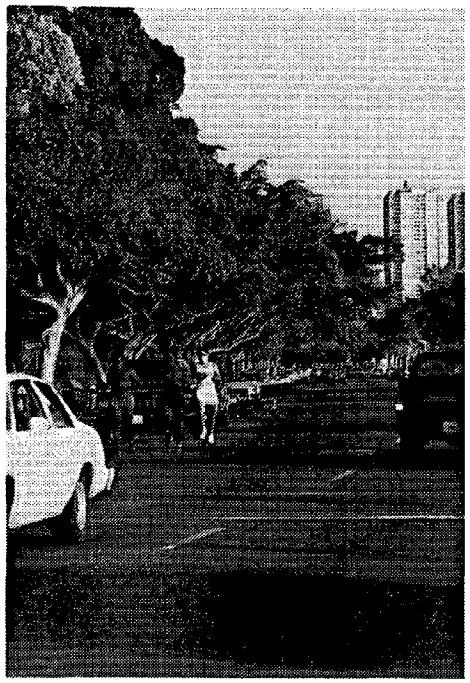
2.2.1 Ala Moana

1. Subarea Overview

Description of Boundaries. The Ala Moana subarea is at the eastern most edge of the planning area. It is bounded by the Ala Wai Canal at the Diamond Head end, and by facilities at Kewalo Basin on the Ewa end.



Existing Land and Water Uses. The Ala Moana subarea consists of a total of 109 acres, with major uses including the Ala Moana and Magic Island Parks. The major attraction of Ala Moana Park is its beach and the access it provides to nearshore recreation activities. The water channel running parallel to the shoreline is popular with long-distance swimmers and canoeing enthusiasts. The water area beyond the coral reef is a popular fishing and surfing area. Magic Island is a twenty five year old landfilled area providing additional parking, open park land and beach area.



Land Ownership. The entire Ala Moana subarea is owned by the State. Jurisdiction and operational control of Ala Moana Park have been granted to the City and County by Executive Order. The State still maintains and controls the use of Magic Island, although this area may also be granted to the City in the near future.

Encumbrance of State Lands. Two food service concessionaire stands in Ala Moana Park are the only encumbrances on this area of public land.

2. Opportunities and Constraints

Opportunities:

- The area contains over 100 acres of beachfront property in central Honolulu with views extending from Diamond Head to the east to Makakilo in the west.
- Nearshore waters provide a major water recreational resource for surfing, swimming, fishing and canoeing enthusiasts.
- The area is used extensively by residents of Honolulu.

Constraints:

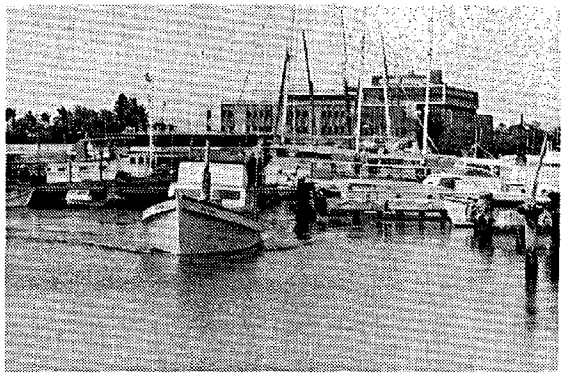
- Existing ocean circulation conditions periodically create poor water quality conditions along the Ala Moana Beach Park.
- Existing heavy use of the parks, particularly on week-ends, generates traffic congestion and limited parking.

2.2.2 Kewalo Basin

1. Subarea Overview

Description of Boundaries. Kewalo Basin is bounded on the Diamond Head (eastern) side by Ala Moana Park. Ahui Street, located on the Kakaako Peninsula, marks the Ewa (western) boundary of the subarea. An important physical feature of the basin is the landfilled Kewalo Peninsula which shelters the harbor

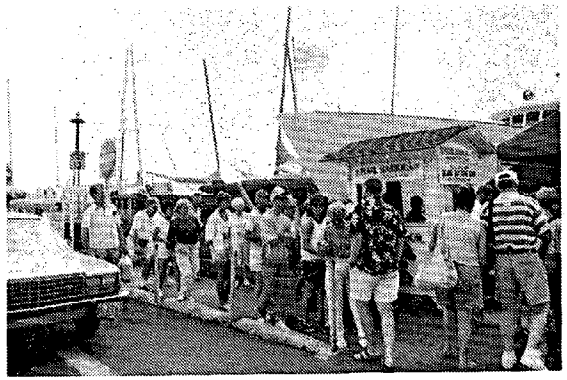
from open ocean disturbances and marks the makai boundary of the subarea. The subarea fronts on Ala Moana Boulevard, makai of Victoria Ward Estate's Ward Warehouse.



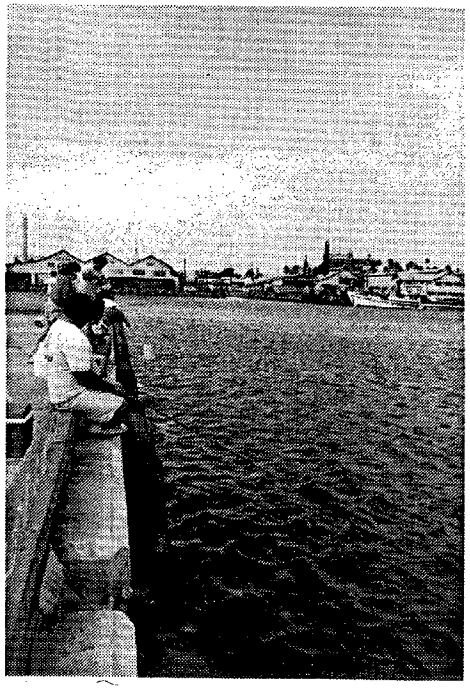
Existing Land and Water Uses. The Kewalo subarea contains 27 acres of land and 30 acres of water area which provides the primary berthing space for Oahu's commercial fishing fleet, cruise/excursion boats and charter fishing fleet. Water access into the harbor is through a 350-foot wide entrance channel between the Kewalo and Kaka'ako Peninsulas. The harbor area is surrounded by landside activities which support the maritime operations, marine research and commercial restaurant operations.

Maritime Commercial uses are the dominant activities within the area. Individual water uses include the following:

- The commercial fishing industry currently occupies about 75 percent of the total berths in the basin. For Oahu as a whole, the commercial fishing fleet varies greatly, but is estimated to be 200 boats strong. The type of boats found in Kewalo Basin can be identified according to their individual specialties and include aku boats (Skipjack Tuna), long-line tuna boats (Ahi or Yellow-Fin Tuna), boats which fish the Northwest Hawaiian Islands for bottom fish and lobster boats.
- Excursion boats, defined as harbor cruise boats, dinner cruise boats, sunset cruise boats, and dive boats, are located along the Ewa end of the harbor facing Ala Moana Boulevard. There are currently 11 excursion boats berthed in Kewalo Basin.
- Charter boats are defined as, "deep sea, sport fishing" vessels. These boats are also located along the harbor facing Ala Moana Boulevard at the Diamond Head corner. There are presently 21 berths in Kewalo Basin dedicated to charter boat operations.



Landside activities directly related to the commercial fishing industry include the fish auction facilities on Ahui Street, the tuna cannery and ice plant (currently only



the ice plant is in operation) and support services (i.e., net shed and fueling operations) along the area adjacent to Ala Moana Park. Additional Maritime Commercial uses include the marine dry dock and shipyard, SERVCO's McWayne Marine Supply and Services and offices for cruise and charter boat operations.

Marine Research facilities encompass approximately 2.75 acres of land in the subarea. Two facilities, the U.S. National Marine Fisheries Service (NMFS) and the University of Hawaii Marine Mammal Laboratory, are located on the Kewalo Peninsula. The Pacific Biomedical Research Center (PBRC), also a research operation of the University, is located at the makai end of Ahui Street adjacent to the Point Panic area.

Commercial/Office uses include three restaurants (John Dominis and Fisherman's Wharf on the Ewa edge of the basin and the Kewalo Restaurant on the Diamond Head edge of the basin) and the Army Air Force Exchange Service (AAFES) located at the corner of Ala Moana Boulevard and Ahui Street.

Land Ownership. The entire 27-acre subarea is owned by the State of Hawaii.

Encumbrance of State Lands. Long-term leases exist for most of the property along the Ewa edge of the Kewalo subarea. Existing uses and lease expiration dates are as follows: the University biomedical research center (2030), the John Dominis Restaurant (2042), the fish auction operation (2000), the drydock and shipyard facility (2021), the Hawaiian Tuna Packers cannery and ice plant (2027) and the Fisherman's Wharf Restaurant (1989).

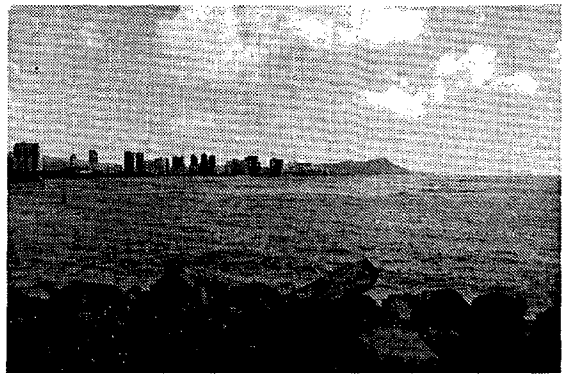
The only long-term encumbrance of State land existing along the Diamond Head edge of the basin involves the marine service station (dba Kewalo Marine) located near the entrance to the peninsula. The lease on this 7,500 square foot site expires in 2003. The lease for the Kewalo Ship's Galley Restaurant ends in 1992. The remainder of businesses (including the McWayne Marine operation)

are either on month-to-month revocable permits or on leases due to expire within the coming year (1989).

2. Opportunities and Constraints

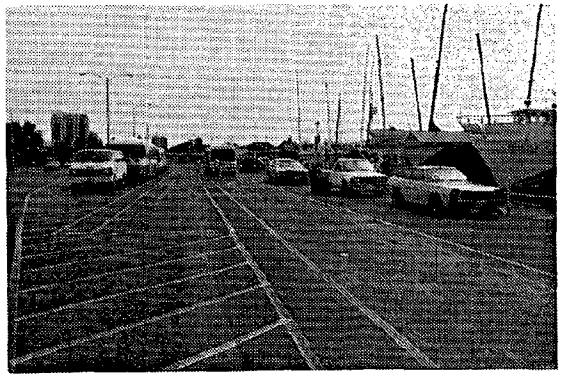
Opportunities:

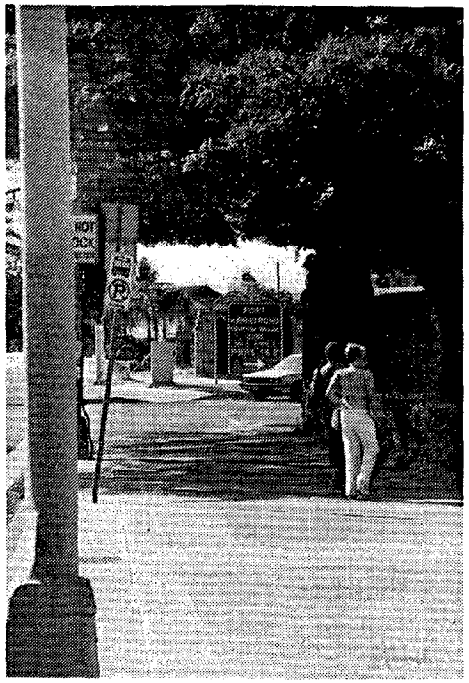
- Existing activities in the area, along with its centralized location near Ward Warehouse, Ala Moana Shopping Center, Waikiki, and Downtown, encourage development of activities for tourists and residents.
- Significant views of Ala Moana Park, Waikiki and Diamond Head exist from the Ewa edge of the area.
- There is the potential to extend Ala Moana Park into the Kewalo peninsula area providing for additional open space and pedestrian movement along the waterfront.
- The harbor is a focal point for the commercial fishing industry.
- The shallow reef area beyond the existing shoreline of the peninsula could be filled, providing for expansion of the overall harbor area.



Constraints:

- An overemphasis on vehicular access and circulation creates crowding in pedestrian areas.
- The entrance to the harbor at the intersection of Ala Moana Boulevard and Ward Avenue is a major bottleneck.
- A limited amount of land and water to satisfy competing needs between commercial fishing and visitor industry activities.
- Water, drainage and sewer lines are at capacity.
- Existing long-term leases on various parcels along Ahui Street limit planning flexibility.





- Existing structures along the Diamond Head edge create a physical and visual barrier totally separating Kewalo from the adjacent park.

2.2.3 Kaka'ako

1. Subarea Overview

Description of Boundaries. The Kaka'ako subarea lies between the Kewalo and Downtown subareas on a largely man-made peninsula. Ahui Street marks the Diamond Head boundary, while the pier frontage at Fort Armstrong (Piers 1 and 2), up to and including the Coast Guard's Pier 4 area, marks the Ewa boundary. This subarea is strategically located in central Honolulu near Downtown and the Capital District.

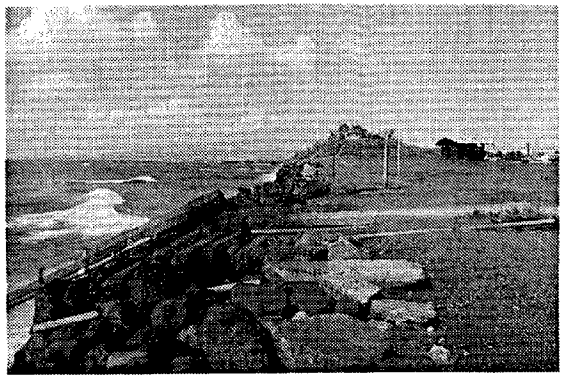
Existing Land and Water Uses. The Kaka'ako subarea consists of approximately 175 acres. Specific land uses in this area include maritime industrial, commercial, light industrial, marine research and public facilities. Each of these are discussed below.

Maritime Industrial uses occupy approximately 75 acres within the Fort Armstrong area at Piers 1 and 2. This area, once the primary container cargo facility on Oahu, is currently dedicated to maritime break-bulk and limited containerized cargo operations, ship maintenance operations and the Foreign Trade Zone warehouse and offices.

Commercial uses occupy much of the central portion of the subarea. Four blocks along Ala Moana Boulevard are privately owned, and are presently dominated by new and used car sales facilities. The Gold Bold Building is also located on private land. Makai of this area, between Ilalo and Kelikoi Streets, are 14 acres of State land presently used as a major food distribution center.

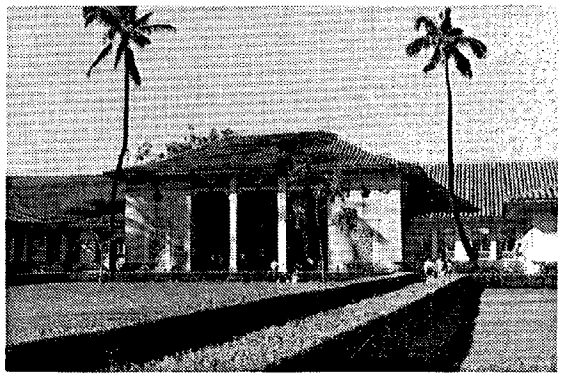
Recreational uses are limited to the 2.5-acre Point Panic Park operated by DLNR. Located at the Diamond Head makai corner of the peninsula, Point Panic is a

very popular site for body surfers and viewing vessel traffic in and out of Kewalo Basin.



Over 25 acres of the Kaka'ako subarea are utilized for Public Facility activities. Most of this land is occupied by the City and County of Honolulu's Board of Water Supply and the Department of Public Works for equipment and vehicle storage and maintenance and the Ala Moana Pump Station. The Department of Agriculture's Plant Quarantine Station, Weights and Measures Branch, and Medfly Project are located on about three acres adjacent to the food distribution center. Finally, the historic U.S. Immigration Station and the historic Ala Moana Sewage Pumping Station, along with the U.S. Coast Guard facility at Pier 4, are located along Ala Moana Boulevard in the Fort Armstrong area.

Marine Research activities located near the Point Panic area include the University of Hawaii Hyperbaric Treatment Center and Look Laboratory. The Hyperbaric Treatment Center provides treatment of people suffering decompression sickness (bends). Marine research at Look Laboratory includes the use of an area offshore for underwater studies on topics such as ocean mining.



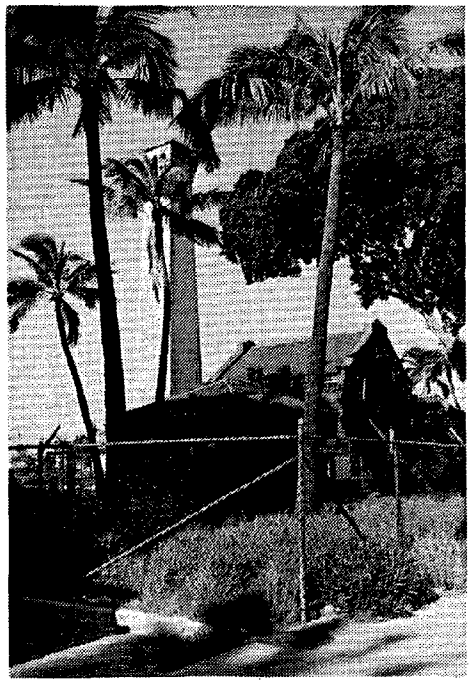
Lands makai of the food distribution center, occupying approximately nine acres, contain a tour bus storage and maintenance yard, an auto rust-proofing operation, and miscellaneous other Light Industrial land uses.

A large sanitary landfill area of approximately 14 acres is located along the shoreline in the central portion of the subarea. This site was a solid waste disposal area for the City from the 1950's to the early 1970's and includes wastes from the nearby municipal waste incinerator that was used during this period. The landfill is currently used as a temporary storage area for construction material.

Land Ownership. The State of Hawaii owns 159 acres of land in the Kaka'ako subarea. As noted above, four blocks fronting Ala Moana Boulevard, bounded by Koula, Keawe and Ilalo Streets, are privately owned by the B.P. Bishop Es-

tate. These lands total 10.7 acres. The Federal government owns 5.3 acres of land in the Fort Armstrong area, which includes the Immigration Station and the Coast Guard Pier 4 site.

Encumbrance of State Land. A sizable portion of State land in the area is encumbered by leases. The marine research activities are operating on a 65-year lease which expires in 2030. Two separate operations in the food distribution area have leases which expire in years 2029 and 2021. The existing bulk cargo operation at Fort Armstrong holds a lease on covered office and storage space until 1996. Remaining activities and operations are either on a one-year or month-to-month revocable permit.



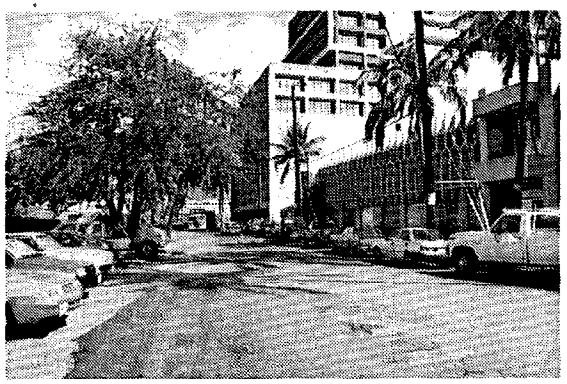
2. Opportunities and Constraints

Opportunities:

- The area's central location between Downtown and Ala Moana/Waikiki and the mauka Kaka'ako redevelopment area, encourages the development of new areas for public access and use of the waterfront.
- The area has over one mile of shoreline from Point Panic to Pier 4.
- The area includes a sizeable area of undeveloped and highly underutilized State land.
- Offshore waters include periodically-used surfing areas which could be made more accessible, provide exceptional water quality for marine research operations and contain a variety of fish life which makes the area a popular site for shoreline fishing.
- Significant views exist from the area towards Diamond Head and of the Honolulu Harbor area.
- The U.S. Immigration Station and Department of Health Building and the historic Ala Moana Sewage Pump Station are valuable historic structures.

Constraints:

- Existing long-term leases on various parcels, including the Food Distribution Center and Look Lab limit planning options.
- Lack of adequate infrastructure. Existing water, drainage and sewer lines are at capacity and the roadway system is in disrepair.
- Elevated noise exposure associated with aircraft flight patterns.
- Existing heavy traffic conditions on Ala Moana Boulevard will necessitate major improvements to the roadway system.
- Existing geological conditions (i.e., a buried alluvial stream channel) may require special construction methods.
- The old Kewalo sanitary landfill is known to include incinerator ash and will require investigation of possible health hazards.



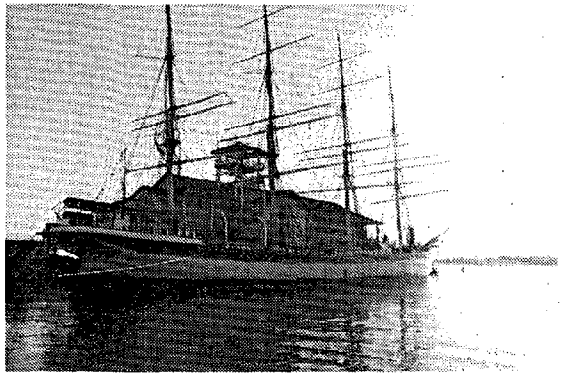
2.2.4 Downtown

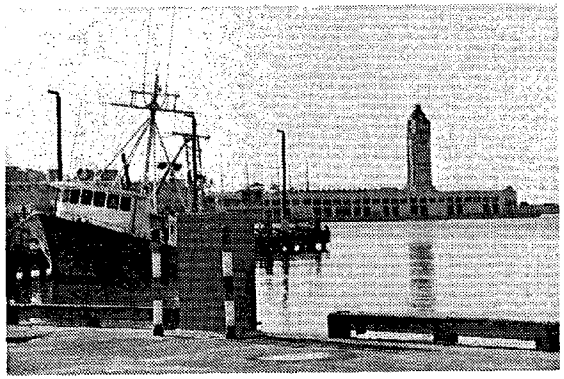
1. Subarea Overview

Description of Boundaries. The Downtown subarea (including the Chinatown waterfront area) is located at the foot of the central business district fronting Honolulu Harbor and extends from Pier 5 to Pier 18. Pier 5, located makai of the Federal building on Ala Moana Boulevard, is currently the berthing area for the Alii Kai dinner cruise vessel. Pier 18, located just Ewa of the mouth of Nuuanu Stream, is utilized by the commercial fishing industry and the Harbor Pilots boat.

Existing Land and Water Uses. The 23-acre Downtown subarea is dominated by maritime-related activities. These and other major elements within the area are summarized in the following discussion.

Maritime Commercial activities include passenger cruise ship operations, dinner cruises, and commercial fishing. The cruise ships operate at Piers 8 to 11 within the Aloha Tower complex. Two vessels, the S.S. Independence and S.S. Con-





stitution, have been operating weekly tours throughout the islands for several years. The two vessels currently handle about 80,000 passengers a year. In October 1988, the S.S Monterey resumed tours in Hawaii and is berthed at Pier 8.

Two dinner cruise ships, the Alii Kai and the Rella Mae, operate out of Honolulu Harbor. The Alii Kai is berthed at Pier 5, while the Rella Mae is presently berthed alongside the Hawaii Maritime Museum at Pier 7. The combined estimated number of passengers per year for these operations is over 500,000.

Commercial fishing boats are berthed at Piers 16 and 17. There is space available for about 15 to 20 boats. Pier 18 is also used as an unloading dock.

Maritime Industrial uses take place at the Pier 13 and 14 site. Activities in this location include tug and barge berthing and bunkering, auto parking and a newly constructed ice plant for servicing the commercial fishing industry.

A number of Public Facility uses are present in the subarea. The most prominent is the Hawaiian Electric Company (HECO) plant on Nimitz Highway. This facility is proposed to be phased out of operation by the mid-1990's. Just makai of the power plant at Pier 7 is the Hawaii Maritime Museum. This facility offers the public a variety of exhibits highlighting the maritime history of the Hawaiian Islands. It is also the permanent site for the Falls of Clyde and the Ho'kulea. Other public facility uses in the area include the Harbor Fireboat Station at Pier 15, and public parking at Piers 5 and 6, Irwin Park, and in the Aloha Tower complex.

Commercial/Office activities are largely located within the Aloha Tower area. All of the passenger and dinner cruise ship operations maintain offices there. Small retail shops which cater to tourists can also be found in the area.

Land Ownership. Other than the 3.4 acre parcel owned by HECO, all land within the Downtown subarea is owned by the State of Hawaii.

Lease Encumbrance of State Lands. State land within the Downtown subarea is currently encumbered by various operations with one-year revocable permits. The only exception to this is a lease to the operator of the Alii Kai dinner cruise ship. Covering 17,538 sq. ft. of submerged and fast land at Pier 5, this lease extends to the year 2005.

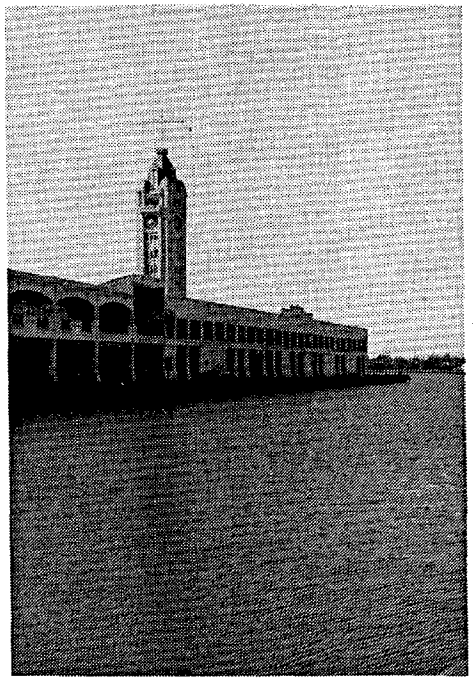
2. Opportunities and Constraints

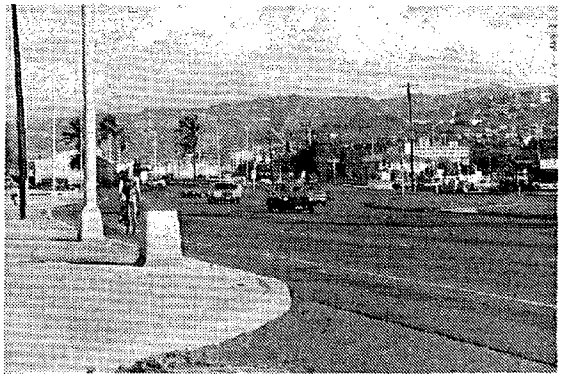
Opportunities:

- Location, visual characteristics and the historical significance and uses of the Aloha Tower area from Piers 8 to 11 create the potential for planning of the site as the centerpiece of the entire waterfront plan.
- The area is adjacent to the central business and financial districts of Honolulu with a daytime population estimated at 60,000.
- Except for the 3.4-acre HECO site on Nimitz Highway, the entire Downtown area is owned by the State. Current plans of HECO would end operation of the plant in Downtown in the mid 1990's, thereby opening up a prime development site.
- Recent opening of the Maritime Museum has initiated rejuvenation of the area.
- Piers 5 to 7 provide berthing for large dinner cruise ships which cannot be accommodated in Kewalo Basin.
- Piers 16 to 18 provide berthing for large commercial fishing ships which cannot be accommodated in Kewalo Basin.

Constraints:

- There is a limited amount of land in the area, with only the Aloha Tower site providing any sizeable land area.
- The bankrupt and vacant Oceania Floating Restaurant berthed at Pier 6 is presently a major liability which occupies a valuable pier.





- The overpass which services the second level at Aloha Tower obstructs views from the shoreline area.
- The Ala Moana Boulevard and Nimitz Highway corridor is a major physical barrier to attracting people into the area and to their enjoyment of accessing the water's edge.
- Various facilities within the Aloha Tower complex are old, in a state of disrepair and largely underutilized.
- Most of Pier 12 has been destroyed. The remaining portion of the pier fronting Nimitz Highway is in very poor condition.
- Present government regulations stress low building heights which can limit economic feasibility of development in the area.
- Water, drainage, and sewer lines are at capacity.

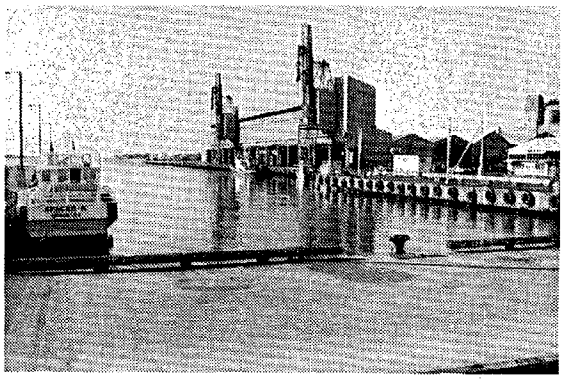
2.2.5. Iwilei/Kapalama

1. Subarea Overview

Description of Boundaries. The Iwilei/Kapalama subarea encompasses much of the highly industrialized maritime operations within Honolulu Harbor. The Diamond Head boundary of the subarea is at Pier 19, where the sugar gantry and neo-bulk handling operations are located. The subarea extends westward, ending at the Sand Island Access Road. Nimitz Highway serves as the mauka boundary from Pier 19 to Libby Street (Pier 40). Libby and Auiki Streets, which separate the Kapalama Military Reservation from the Kalihi Kai industrial area, mark the remainder of the mauka boundary.

Existing Land and Water Uses. The Iwilei/Kapalama subarea encompasses approximately 363 acres and is dominated by maritime industrial activities. This area is the central portion of the harbor and contains various land and water uses to form a maritime "marketplace." Additional activities include non-maritime related industrial uses, along with public facilities and military operations.

Maritime Industrial activities occur from one end of the subarea to the other. Beginning at Pier 19, uses include:



- Bulk cargo handling, tug boat berthing and maintenance, bulk sugar loading and storage, and maritime bunkering at Piers 19 to 21;
- Inter-island and overseas general cargo shipping at Piers 24 to 29, 31 to 33, 36, and 39 to 40;
- Bunker fuel storage in the Pier 30 area, vessel bunkering from Piers 29 to 34, and propane storage and transfer to Neighbor Islands at Pier 38;
- Bulk storage and transfer of cement and scrap metal at Piers 34 and 35;
- Additional berthing and support facilities for fishing boat operations at Piers 35 and 37; and
- Drydock and ship repair facilities at Pier 41.

A number of Industrial activities occur in the Iwilei/Kapalama subarea which have little or no relation to maritime harbor uses. The most prominent of these activities is the petroleum fuel storage and distribution operation in the area mauka of Piers 29 to 31. Beyond those facilities that are used for maritime fueling, much of the storage of fuel in this area is for distribution to gas stations throughout the general East Oahu area. Additional storage tanks in the area from Piers 32 to 38 are used for storing asphalt, chemicals, and jet fuel.

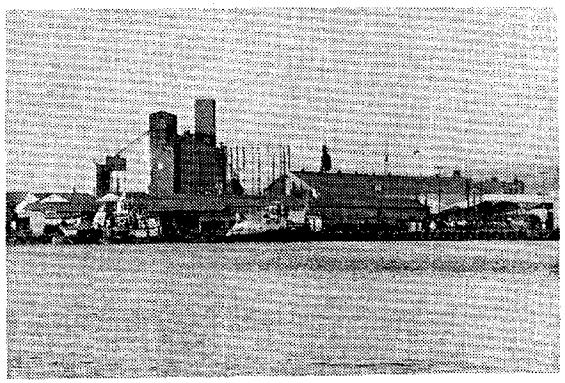
Another major industrial activity in the area involves milling operations at Piers 22 and 23. Raw grain is off-loaded at Pier 23 and stored in the large grain elevators nearby. Adjacent operations produce animal feed and flour, items which are produced for statewide distribution.

Other types of industrial uses in the area include freight forwarding and warehousing, food storage and distribution, and heavy equipment and truck rental.

Commercial lands within the subarea uses not related to maritime operations are located along Nimitz Highway in the area from Pier 32 to 35. Operations include retail auto parts sales, retail lumber goods, import/export of retail goods, and general office space.

The predominant Public Facility land use in the area is the 16-acres University of Hawaii Marine Expeditionary Center at Snug Harbor. This facility provides a home port area for University research vessels, as well as for research vessels from around the world. The U.S. Postal Service owns property along Sand Island Access Road for the purpose of repairing delivery vehicles. An additional public facility is a large sewage pump station along Nimitz Highway.

A sizeable Military component exists in the Iwilei/Kapalama subarea. The Kapalama Military Reservation is owned and operated by the U.S. Army and serves as a major storage and transfer center in the area from Pier 39 to the Sand Island Access Road.



Land Ownership. The Iwilei/Kapalama subarea consists of approximately 243 acres owned by the State, about 84 acres owned by the Federal government, with the remaining 36 acres being privately owned. A significant portion of the private land is owned and operated by petroleum companies.

Encumbrance of State Lands. Activities which have a relatively long period remaining on existing leases include:

- The bulk sugar warehouse and loading operation located at Pier 19 (lease expires in 1999);
- The flour mill and general warehousing operation adjacent to Piers 22 and 23 (lease expires 2014);
- The animal feed grain manufacturing and grain storage operation at Pier 23 (lease expires 2003);
- Fuel storage and distribution facilities near Pier 29 (lease expires 1997);

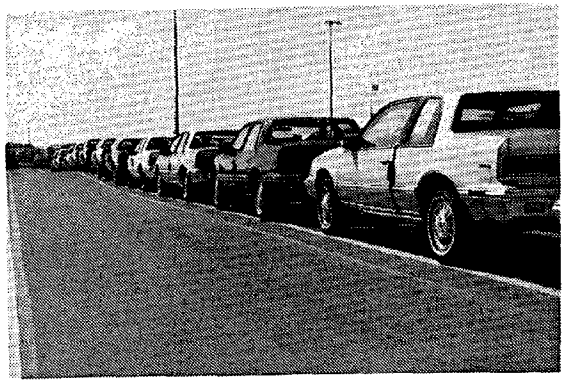
- A food storage and distribution operation mauka of Pier 32 (lease expires 2021);
- A marshalling yard operation at Pier 35 (lease expires 1996); and
- A general merchandise storage and shipping operation mauka of Pier 42 (lease expires 1994).

A sizable number of State parcels are also encumbered by pipeline and electrical line easements.

2. Opportunities and Constraints

Opportunities:

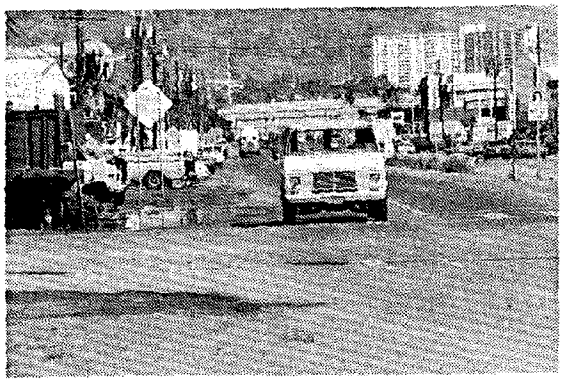
- The area includes a wide range of maritime activities (i.e., bunkering, shipyard, cargo storage, stevedoring services, lay berths, etc.) providing a "marketplace" environment.
- The area is a prime location for maritime transshipment, receiving, and shipping of goods because of its proximity adjacent to Honolulu Harbor and Nimitz Highway.
- The Federal government intends to sell its property at the Kapalama Military Reservation, an area which would be a valuable maritime resource if purchased by the State.



Constraints:

- Approximately one third of the land area is not owned by the State. A number of State properties are under long-term leases, thus limiting planning opportunities for the area.
- Petroleum facilities are perceived as a potential safety problem by many in the community.
- The interisland cargo operation at Piers 24 to 29 is badly constrained due to lack of space. Most structures and dock facilities in this area are of old design and badly in need of repair.

- Bunkering space along Piers 29 to 34 is limited and cannot always meet the demand for services.
- Pier 42 is undeveloped.
- Water and sewer lines are at capacity.

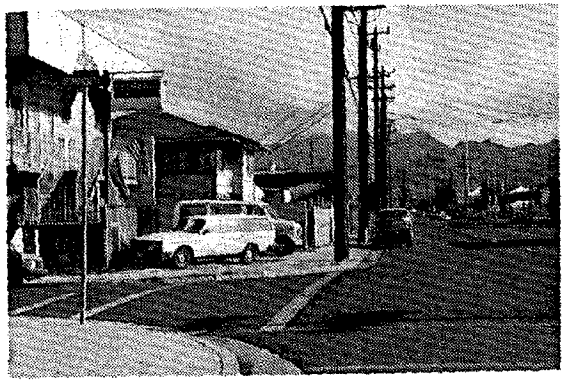


2.2.6 Kalihi Kai

1. Subarea Overview

Description of Boundaries. The Kalihi Kai subarea encompasses approximately 163 acres of industrial and residential land. The area is bounded by Nimitz Highway, Libby and Auiki Streets. The Ewa boundary is marked by the property boundary between State and private lands in the upper Keehi Lagoon area.

Existing Land and Water Uses. The Kalihi Kai subarea is the only area within the project boundaries which has no frontage on the waterfront. The primary type of land use in the area is industrial. Commercial and residential uses are also found in the area.

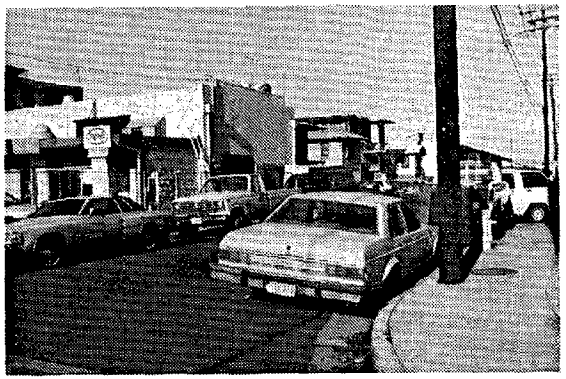


Industrial uses occupy approximately 122 acres of the total land area in Kalihi Kai. In the Ewa portion of the subarea, within blocks adjacent to the Sand Island Access Road, large parcels contain major wholesale, distribution and manufacturing operations. In the Diamond Head direction, where lots are generally much smaller in size, predominant industrial activities include auto repair shops, machine shops, light manufacturing and smaller-scale distribution operations.

Although the Kalihi Kai area has undergone a transformation from a residential to industrial area, Residential units are still located on a significant number of lots in the subarea. Most of these are in two- and three-story walk-up apartments, although some single-family residences still remain.

Commercial activities in the area include small grocery stores and restaurants and other operations that service residents and/or people who work in the area.

Land Ownership. The Kalihi Kai subarea is totally under private ownership.



2. Opportunities and Constraints

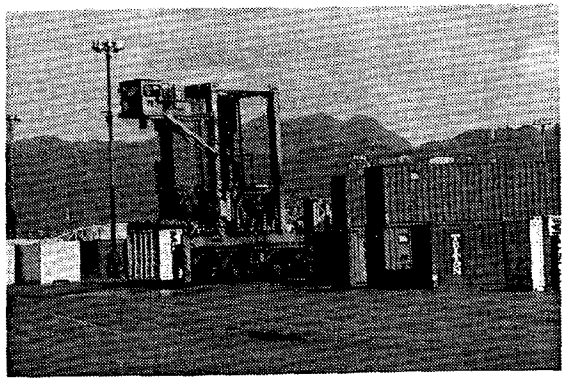
Opportunities:

- The area has been redeveloped as a light industrial activity center and has been designated Industrial on the City's Development Plan.
- The central Honolulu location provides an excellent area for distribution of goods.

Constraints:

- The area is impacted by noise from aircraft and industrial traffic.
- On-street parking creates congestion on many streets.
- Incompatibility of industrial and residential land uses is increasing.
- Water, drainage, and sewer lines are at capacity

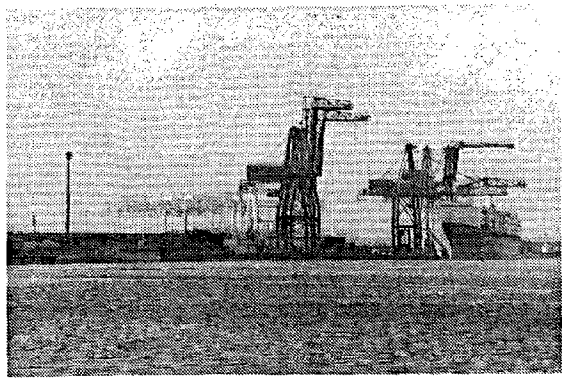
2.2.7. Sand Island



1. Subarea Overview

Description of Boundaries. Sand Island has been formed over the years as a result of dredging in Honolulu Harbor. The area, which currently totals 505 acres, is located makai of the Downtown and Iwilei/Kapalama subareas, and is bounded on the east by the entrance in Honolulu Harbor and on the west by Keehi Lagoon. The island is connected to Honolulu proper by a bridge on Sand Island Access Road (a second parallel bridge is presently under construction).

Existing Land and Water Uses. Activities within the Sand Island subarea include maritime industrial, light industrial, public facility and military uses.



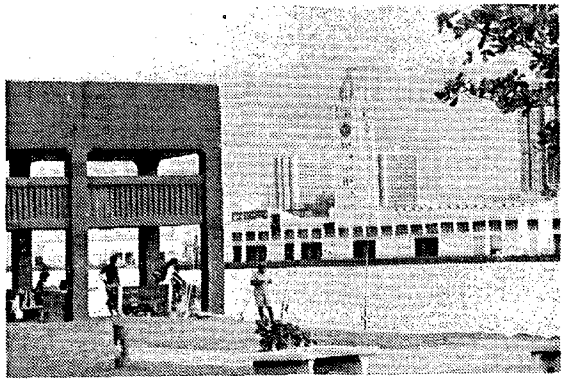
Maritime Industrial activities encompass the State's primary container cargo operations. Approximately 140 acres are devoted to the movement of cargo in the area fronting Piers 51 to 53.

Additional Industrial land uses which have little or no relationship to maritime activities are located in the central Sand Island area. Approximately 55 acres are used for trucking, general contracting, light manufacturing and storage.

The primary Public Facility use on Sand Island is the Sand Island State Park, which currently contains about 83 acres. The City and County's Sand Island Wastewater Treatment Plant occupies approximately 25 acres in the central area of the island. The Department of Land and Natural Resources (DLNR) Anuenue Fisheries is located on 4 acres fronting the Downtown Honolulu shoreline.

Military uses on Sand Island are located on approximately 40 acres of land fronting Downtown Honolulu. This area contains the primary operations of the U.S. Coast Guard in Hawaii.

Land ownership. With the exception of the U.S. Coast Guard facility, the Sand Island subarea is owned by the State of Hawaii.



Lease Encumbrance of State Lands. A long-term (expiring in the year 2014) lease covers much of the container yard area. Other than this, the remainder of the subarea is encumbered by short-term leases or by revocable permits.

2. Opportunities and Constraints

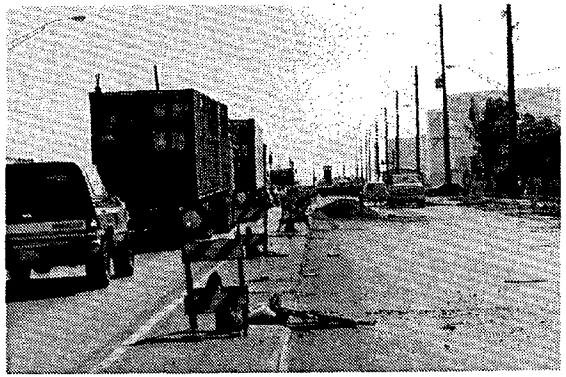
Opportunities:

- The area currently satisfies harbor requirements for container terminal operations.
- The Sand Island State Park is a valuable recreational resource to residents. Undeveloped lands along the Keehi shoreline will provide for the expansion of the park.

- Views from within the park offer significant visual resources to the community.

Constraints:

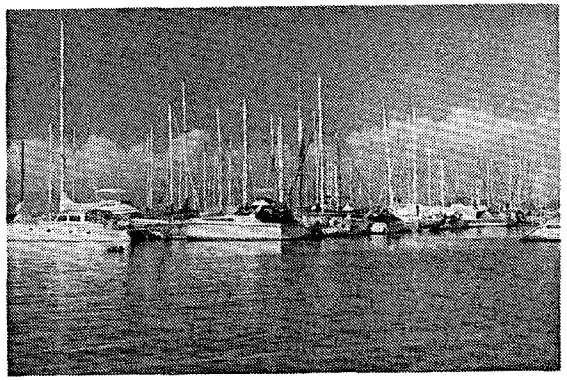
- The area has only one point of egress and ingress.
- The wharf between Pier 51 and 52 remains to be completed.
- The industrial area within the central portion of the subarea lacks adequate infrastructure and is visually unsightly.
- Potentially unsafe mix of heavy truck traffic and resident recreational traffic.
- The area is heavily impacted by noise from aircraft and industrial traffic.
- Federal Aviation Administration height restrictions limit development alternatives in the area.



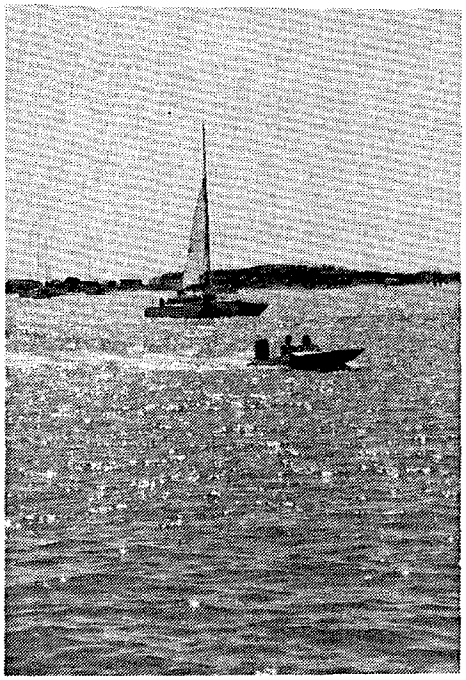
2.2.8. Keehi Lagoon

1. Subarea Overview

Description of Boundaries. The Keehi Lagoon subarea anchors the western end of the planning area with the Honolulu International Airport located directly to the west and the Sand Island and Kalihi Kai subareas to the east. Major traffic corridors which generally establish the boundaries of this subarea include Lagoon Drive, Nimitz Highway and Sand Island Access Road.



Existing Land and Water Uses. The Keehi Lagoon subarea encompasses about 194 acres of land and contains commercial, industrial, public facility and maritime uses. It also includes the small fishing community located on Mokauea Island.



Maritime activities include both industrial and recreational uses in the area. Maritime Industrial uses are located at Pier 60 and the Keehi Marine Center. Operations at Pier 60 involve off-loading of sand and gravel used by the concrete batching operation located nearby. Operations in the Keehi Marine Center include drydock facilities, boat building, sails repair and other maritime support functions.

Maritime Recreational activities include the berthing of small boats in the Keehi Lagoon Boat Harbor and La Mariana Sailing Club, as well as off-shore mooring for approximately 300 boats. Small islands in the lagoon are used as staging areas for activities such as jet skiing, parasailing, and water skiing. Canoe racing and fishing are also popular in the area.

Commercial activities are located in areas along Lagoon Drive and include restaurants, hotel accommodations, offices, auto sales and the primary tourist car rental facilities on the island.

Industrial uses such as tool manufacturing, laundry plants, airport support services and wholesale distribution warehousing are also located in the area off of Lagoon Drive. A major industrial activity along the Sand Island Access Road is the 8-acre jet fuel site. Miscellaneous industrial uses are located along the shoreline mauka of Pier 60.

The major Public Facility in the area is the 69-acre Keehi Lagoon Beach Park located on the Ewa shoreline of the lagoon.

Land Ownership. The State of Hawaii owns all land within the Keehi Lagoon subarea except for the privately owned area of industrial and commercial uses at the intersection of Lagoon Drive and Nimitz Highway.

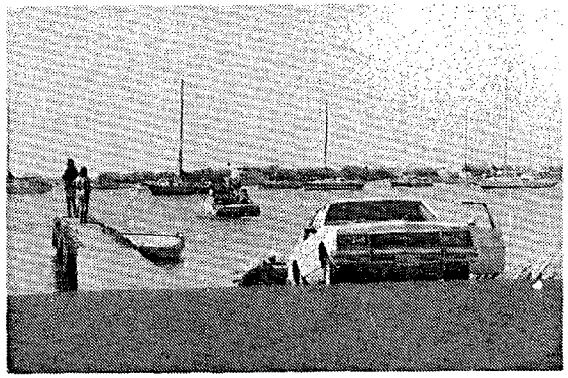
Encumbrance of State Lands. The marine center operations at the boat harbor and the private sailing club have leases on State land to years 2016 and 2014, respectively. Land on which the jet fuel tanks are located is encumbered to 2023.

All other State properties in the subarea are encumbered on year-to-year revocable permits.

2. Opportunities and Constraints

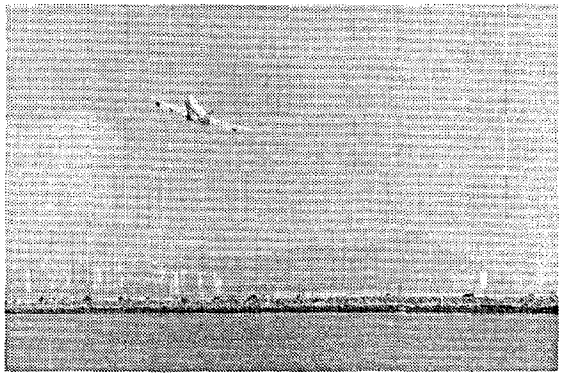
Opportunities:

- The area provides a large protected body of water and underdeveloped surrounding lands with high potential for marine recreational use.
- There is excellent access to the H-1 Freeway, Nimitz Highway, and Honolulu International Airport.
- The area could provide an airport terminus for the proposed intra-island ferry.
- The area has become a center for canoeing enthusiasts and has been the site for international canoe regattas during recent years.
- Shallow portions within the lagoon could feasibly be filled, thus creating new land areas in the central Honolulu area.



Constraints:

- The area is heavily impacted by noise from aircraft.
- Federal Aviation Administration height restrictions limit development alternatives in the area.
- Proximity of the area to the airport creates potential for catastrophe from aircraft accidents.



2.2.9 Barbers Point Harbor

1 Subarea Overview

Description of Boundaries. The Barbers Point Harbor subarea is located approximately 20 miles from Downtown, on the southwest shores of Oahu. Dedicated in 1985, the subarea encompasses a 38-foot deep harbor basin totaling

92 acres, plus an additional 148 acres that could potentially be used for maritime-related purposes.

Existing Land and Water Uses. At present, a ship repair company operates an 8,000-ton floating dry dock in the harbor which is capable of handling vessels over 500 feet long. The only other major water activity involves the shipment of petroleum products to the Neighbor Islands from the original barge harbor.

Much of the property surrounding the harbor is currently used for storage of the dredged material obtained from construction of the basin. The backland is planned for use as a multi-purpose cargo handling and temporary storage facility. Other planned uses include receiving automobiles, general cargo, petroleum products and bulk shipments such as grain, sand, coal and cement. The first increment of improvements has recently begun and includes the construction of a 1,600-foot wharf and 30-acre paved backland area.

Land Ownership. Land within the Barbers Point Harbor subarea is owned by the State of Hawaii. At present, the State owns a total of 240 acres, and is expected to purchase another 84 acres in the near future. Furthermore, the State has the option on an additional 56 acres in the long-term future.

Encumbrance of State Lands. The only encumbrance of State lands involves leases with petroleum companies for energy corridors from the harbor to their refineries in the adjacent industrial park.

2. Opportunities and Constraints

Opportunities:

- The area provides a sizeable amount of undeveloped land surrounding the new harbor.
- The harbor can accommodate the relocation of selected maritime operations (particularly bulk cargo shipping) from Honolulu Harbor.

- The new harbor may serve as a catalyst for the development of the Ewa area.

Constraints:

- The alignment and size of the harbor entrance channel and the maximum basin depth of 38 feet limit the size of vessels that can operate efficiently and safely in the harbor.
- Potential wharf space in the harbor is limited.
- The location of the harbor is a significant distance from existing markets and population centers in eastern Oahu.
- Major expansion and development of surrounding lands requires the removal of dredged materials.

2.3 INFRASTRUCTURE SYSTEMS

Wastewater, drainage, roadway and water supply systems within the waterfront area are generally at or near capacity. Electrical and telephone systems are continually being improved and no inadequacies exist at this time.

2.3.1 Wastewater Systems

The Kaka'ako and Kewalo areas are sewered by 69-inch and 36-inch sewer lines on Ala Moana Boulevard (Figure 4). The 69-inch and 36-inch sewer lines join with a 78-inch sewer line on Keawe Street that carries flows that originated as far east as Kuliouou in East Honolulu. The Downtown area is sewered by a 32-inch line which increases to a 36-inch sewer line near Keawe Street. These sewer lines enter the Ala Moana Sewage Pump Station. The Iwilei, Kapalama and Keehi areas are sewered by two 54-inch sewer lines on Nimitz Highway. The 54-inch lines flow into the Hart Street Sewage Pumping Station.

The Keehi Lagoon area off of Lagoon Drive is sewered by the Department of Transportation Airports Division sewer system. The airport system enters the

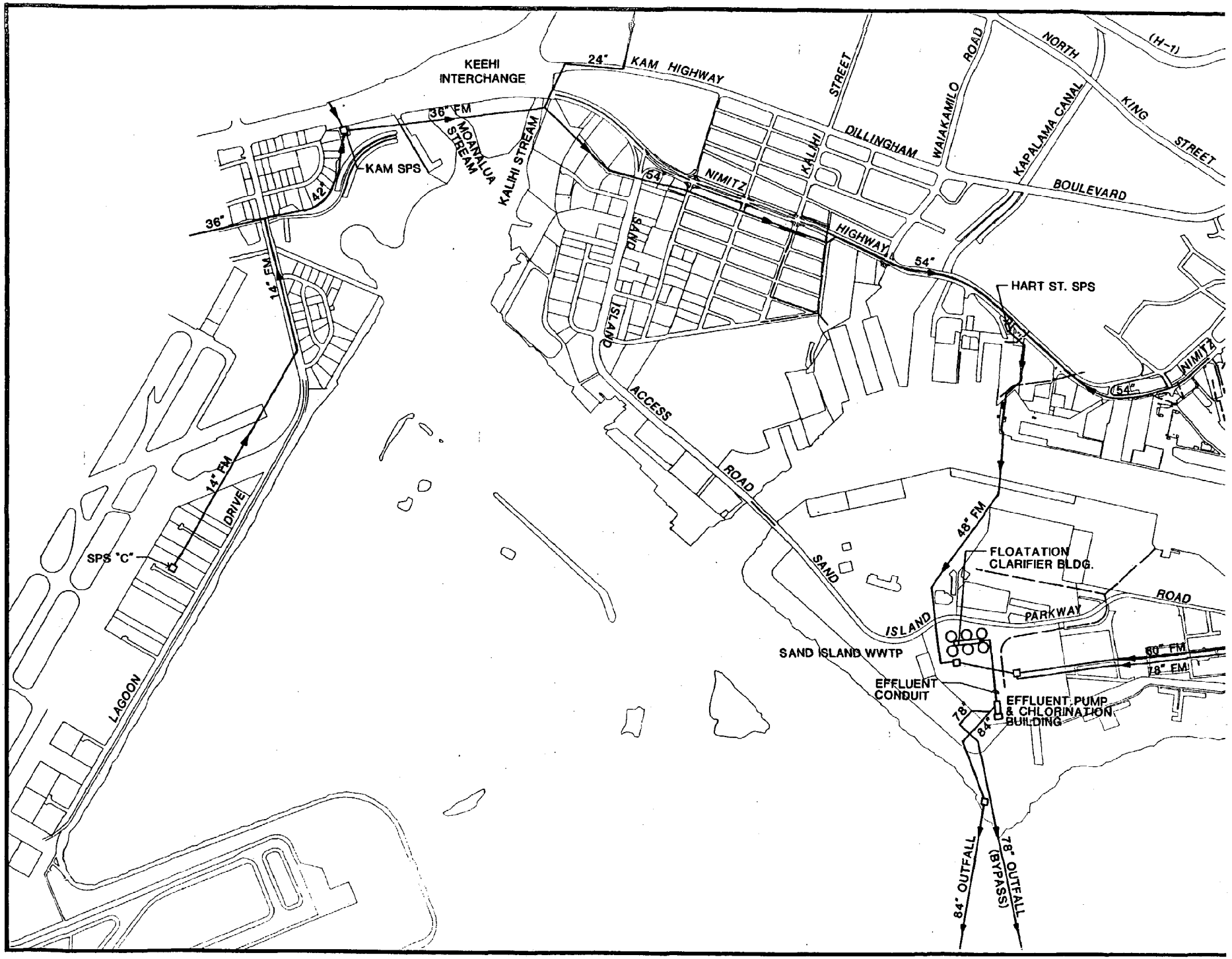
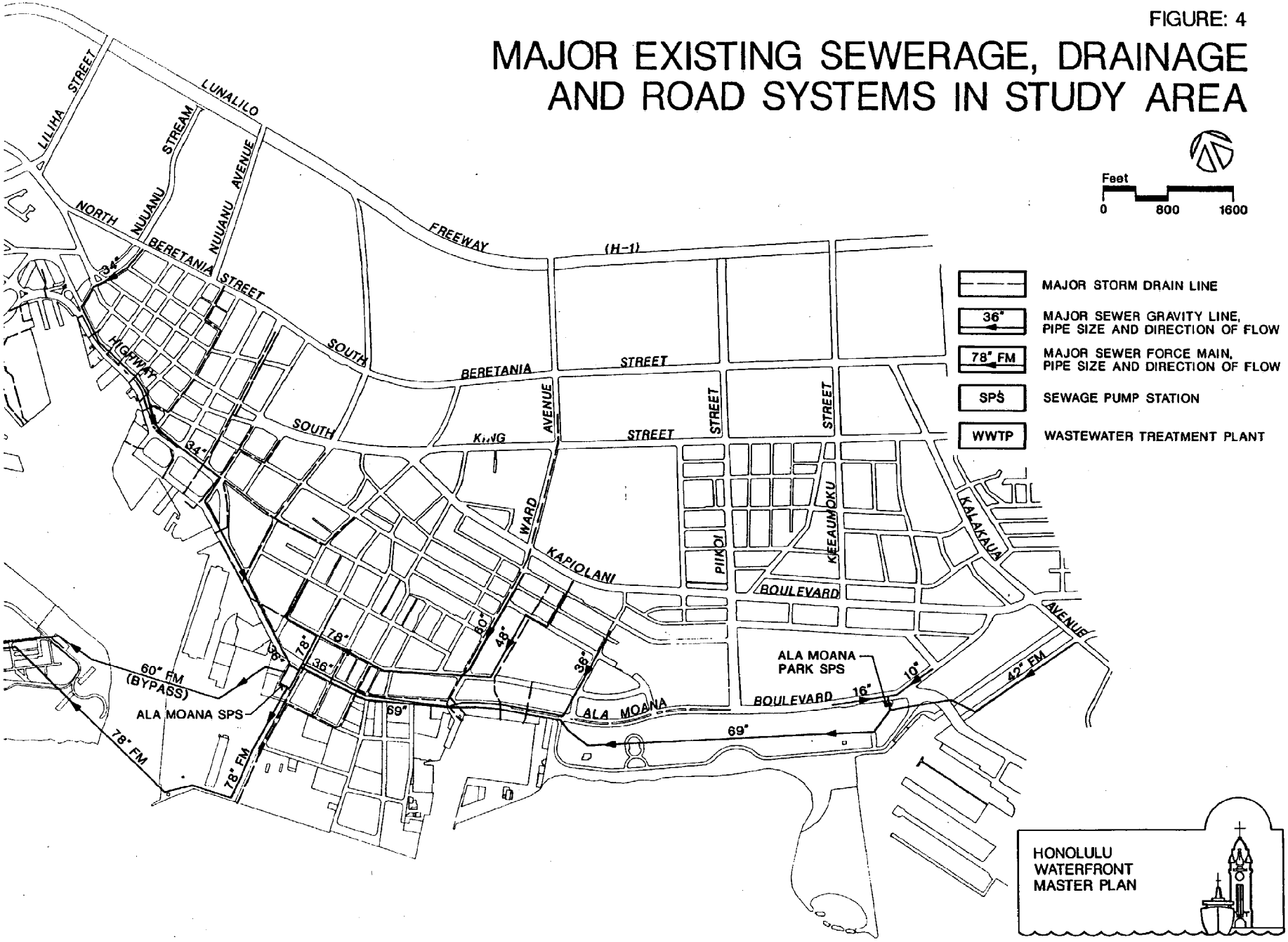

KEEHI
INTERCHANGE
24"
KAM HIGHWAY
36" FM
MOANALUA
STREAM
KALIHI STREAM
KAM SPS
42"
36"
14" FM
54"
NIMITZ
HIGHWAY
54"
SAND
ISLAND
ACCESS
ROAD
HART ST. SPS
54"
NIMITZ
48" FM
FLOATATION
CLARIFIER BLDG.
SAND
ISLAND
PARKWAY
ROAD
SAND ISLAND WWTP
60" FM
78" FM
EFFLUENT
CONDUIT
EFFLUENT PUMP
& CHLORINATION
BUILDING
78"
84"
84" OUTFALL
78" OUTFALL
(BYPASS)
14" FM
DRIVE
SPS "C"
LAGOON
STREET
KALIHI
DILLINGHAM
WAIAKAMILO
ROAD
NORTH
KAPALAMA CANAL
KING
STREET
(H-1)
BOULEVARD

FIGURE: 4

MAJOR EXISTING SEWERAGE, DRAINAGE AND ROAD SYSTEMS IN STUDY AREA



HONOLULU WATERFRONT MASTER PLAN

January 1989

municipal system on Aolele Street. The sewer line on Aolele Street enters the Kamehameha Highway Sewage Pumping Station which pumps the sewage via a 36-inch force main to the 54-inch sewer line makai of the Kalihi Stream Bridge. The Sand Island area is sewered by an 18-inch sewer line on the Sand Island Road and by a series of sewage lift stations within the Sand Island Park which directly enter the Sand Island Wastewater Treatment Plant. The Sand Island Wastewater Treatment Plant is located in the center of Sand Island. The City and County of Honolulu is presently preparing an Island-Wide Sewer Adequacy Study. The project is ongoing and only preliminary results are available at this time. The preliminary results from this as well as other ongoing studies have been incorporated in this report.

The major sewer lines in the study area carry the entire sewage flow that is treated by the Sand Island Wastewater Treatment Plant, which services an area from Kuliouou to the Airport. Many of these lines are at or near capacity. The 32-inch and 36-inch mains on Ala Moana Boulevard that sewer the Downtown area will also require relief in a few years. The 54-inch sewer line that sewers the Kapalama and Airport area is at capacity. The Nimitz Highway Relief Line Study is analyzing the area between Waiakamilo Road and the Hart Street Pump Station. Construction of the proposed improvements from this study are expected to be completed by mid-1990. The remaining portion of the 54-inch line from Waiakamilo Road to the 36-inch Kamehameha Highway force main will have to be relieved in the future. The Kamehameha Sewage Pumping Station and 36-inch force main are near capacity and will have to be upgraded.

The sewage from the Ala Moana and Hart Street Sewage Pump Stations is pumped to the Sand Island Wastewater Treatment Plant. The sewage from the Ala Moana Sewage Pump Station is carried by a 78-inch force main across Honolulu Harbor to the Sand Island Wastewater Treatment Plant. The Ala Moana Sewage Pumping Station is presently pumping an average of 57.5 mgd and has a capacity of 107 mgd. The Hart Street Sewage Pumping Station presently pumps 15.5 mgd and has a capacity of 68 mgd. The Sand Island Wastewater Treatment Plant has a capacity of 82 mgd. It discharges the treated effluent into

the Sand Island Ocean Outfall which discharges through a long diffuser located two miles offshore at a depth of 240 feet.

The Barbers Point Harbor area utilizes cesspools for sewage disposal. The nearest wastewater treatment plant is the large Honouliuli facility in Ewa.

2.3.2 Storm Drainage Systems

Storm drainage systems of the waterfront planning area include five major drainage features. They include the Kaka'ako drainage canal, Nuuanu Stream, Kapalama Canal, Kalihi Stream and Moanalua Stream. Of these features, Kalihi Stream and Moanalua Stream are prone to flooding and are so described by the Federal Emergency Management Agency's Flood Maps. The primary drainage systems of the Kaka'ako area are the Ward Avenue drain, the Cooke Street to Kewalo drain on Ala Moana Boulevard, the Kaka'ako Improvement District 2 drains on Cooke, Coral and Keawe Street, the Keawe Street drain, and the South and Punchbowl Street drain that runs along Ala Moana and discharges at Pier 4. The Downtown area has drainage systems on Richards Street, Alakea and Bishop Streets, Fort and Queen Streets, Bethel Street, Nuuanu Street, Smith Street, Maunakea Street and Kekaulike Street. The Iwilei area has drains that cross Nimitz and discharge at Piers 16, 17 and 18, Piers 23 and 24, and a large system that discharges at Pier 34. The Downtown, Iwilei and Kapalama areas have many systems that drain into Nuuanu Stream and Kapalama Canal. The largest drainage system is in the Kapalama area. This system drains into the Harbor with an outlet at Pier 40. The Lagoon Drive area is well drained by pipes entering Keehi Lagoon. The Barbers Point Harbor area will be protected from major floods by the new drainage channel that is presently being constructed in the Campbell Industrial Park.

The drainage system contains drains constructed as long ago as 1921. Since then, design standards for drainage systems have undergone many changes, as more information and experience has been gathered by the design community. The majority of the drainage systems in the planning area were not designed to the present City and County standards and do not provide drainage

protection from the 50-year flood. The Kaka'ako Improvement District 1 improvements increased the capacity of the Punchbowl drainage system which outlets near Pier 4. The Kaka'ako Improvement District 2 which is presently under construction will improve the drainage system in the Kaka'ako area from South Street to Coral Street.

Major Downtown area drains that cross Nimitz Highway from Queen Street to Richards Street cannot effectively convey the 50-year storm and will require relief in order to properly drain the areas above Nimitz Highway. Some of the mauka drainage systems of the downtown area drain to Nuuanu Stream. The Iwilei and Kapalama areas have two major drainage features, the Nuuanu Stream and the Kapalama Canal. Many of the drainage systems in this area drain into these two drainageways. The drainage systems that drain Nimitz Highway in this subarea are inadequate and will require relief. This is especially true of the drainage system that drains the Iwilei area and outlets in the Pier 34 area. The Sand Island drainage system consists of pipe systems on the Sand Island Road that drain into open channels that drain into the Kapalama Channel or Honolulu Harbor. A new system was constructed with the new bridge that drains directly into the Kapalama Channel. The eastern portion of the Sand Island Parkway is poorly drained.

2.3.3 Road Systems

The primary roadways utilized for east/west traffic flow in the waterfront area are Nimitz Highway and Ala Moana Boulevard. North to south traffic flow is provided for in the Downtown area by Bishop Street, Alakea Street, Punchbowl Street, South Street and Ward Avenue. North to south traffic flow in the Kaka'ako area is provided by Punchbowl Street, South Street, Keawe Street, Coral Street, Cooke Street, and Ward Avenue. The streets makai of Ala Moana Boulevard in Kaka'ako are not constructed to City standards and will require construction of curbs, gutters, sidewalks and street lighting. New underground utilities will be required in the makai area except for Cooke Street, Coral Street and a portion of Ilalo Street which are to be improved by the Kaka'ako Improvement District 2. North to south traffic flow is provided for the Kapalama and Iwilei area by

Waiakamilo Road, Kalihi Street and the Sand Island Access Road. The streets makai of Nimitz Highway such as Kalihi Street and Mokauea Street, are not constructed to present City Standards and lack curbs, gutters, sidewalks, street lighting and underground utilities. The north to south traffic flow in the Keehi area is provided by Middle Street, Sand Island Access Road and Lagoon Drive.

Portions of Ala Moana Boulevard and Nimitz Highway are presently at or over their capacity to accommodate traffic during peak periods. The portion of Nimitz Highway near the intersection with Lagoon Drive provides adequate service but the highway reaches capacity when it merges with the H-1 viaduct.

2.3.4 Water Supply Systems

The waterfront planning area obtains its water service from the Board of Water Supply (BWS) Honolulu Water District Low Service System which extends from Moanalua to Makapuu Point (Figure 5). The primary water sources for this system are the Punanani Wells, Kalauao Wells, Kaamilo Wells and Halawa Shaft which are located in the Pearl Harbor District and the Moanalua Wells, Kalihi Shaft, Kalihi Station, Beretania Station, Wilder Wells and Kaimuki Station located in the Honolulu District. Water developed in these districts flows through central Honolulu to demand centers in McCully, Moiliili, Waikiki, Kahala and East Honolulu. Water sources that serve the study area are at capacity. Presently, the entire Low Service System has an average daily water demand of approximately 57.5 million gallons per day (mgd).

Of this amount, approximately 8 mgd are used in the Moanalua and Airport area, 3.5 mgd in Kalihi, 35 mgd in the Palama to Kapahulu area and 11 mgd in the Kapahulu to Hawaii Kai area. Within the Palama to Kapahulu area, Waikiki uses 13 mgd, McCully uses 6 mgd and the Kaka'ako Downtown area uses 16 mgd. Over 30 mgd flow through the area to demand centers in Waikiki and East Honolulu.

The BWS, in conjunction with the Department of Land and Natural Resources, is aware of the situation and is making every effort to develop new groundwater

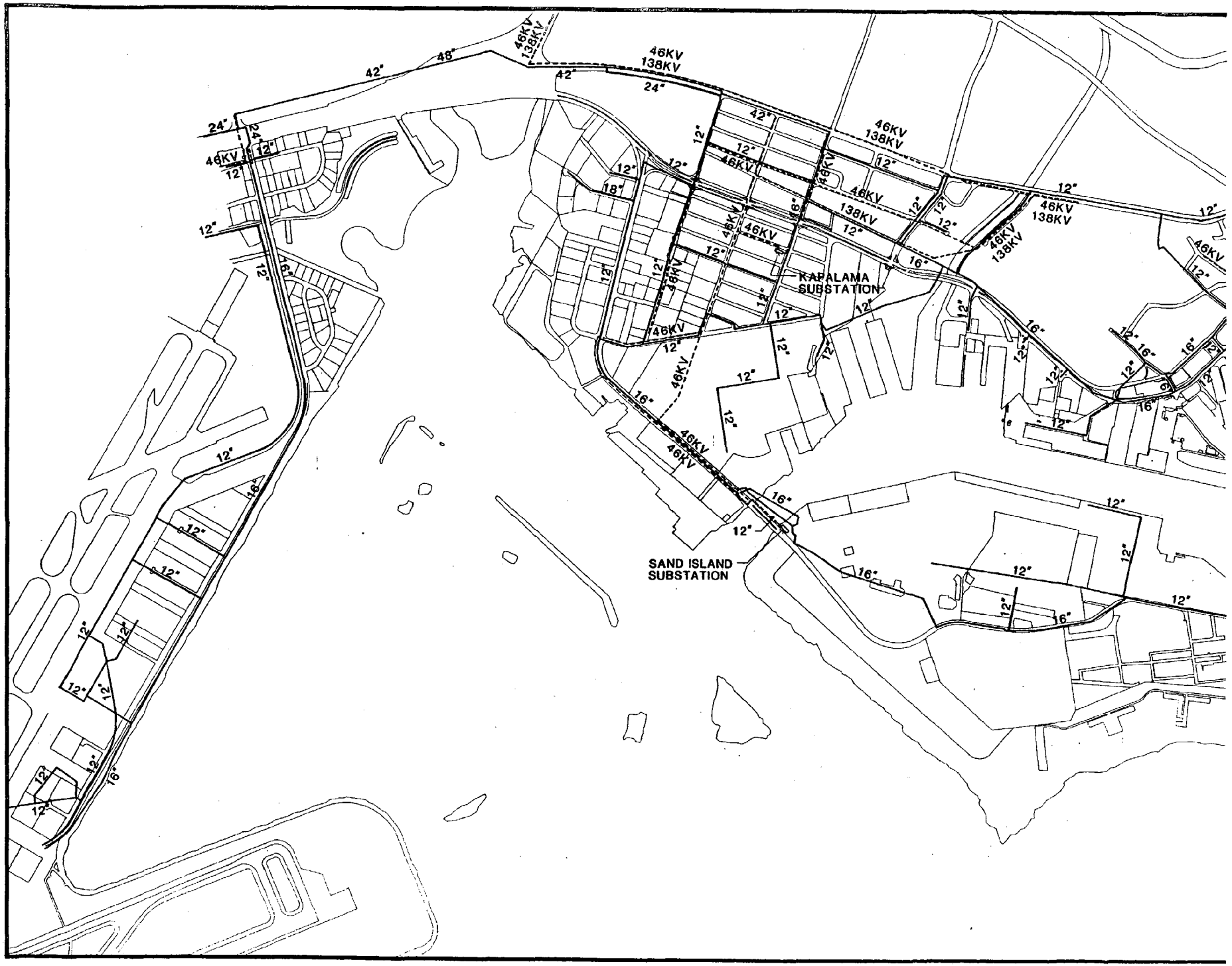
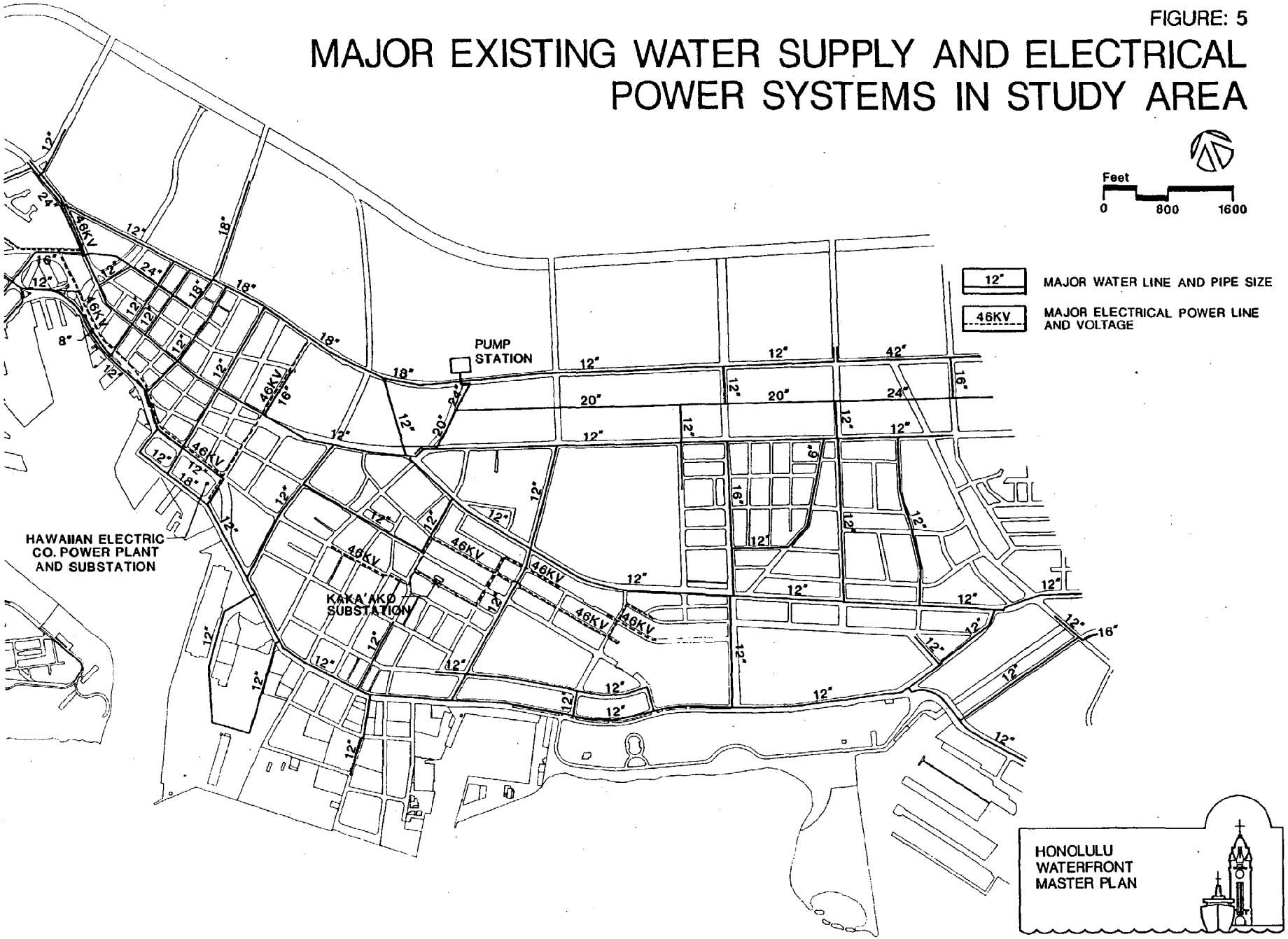

KAPALAMA SUBSTATION
SAND ISLAND SUBSTATION
46KV
138KV

FIGURE: 5

MAJOR EXISTING WATER SUPPLY AND ELECTRICAL POWER SYSTEMS IN STUDY AREA



sources on Oahu. They are also investigating the potentials of alternative means of potable water development such as wastewater reclamation and desalinization.

The primary water transmission line in the planning area is a 42-inch line that runs along Vineyard Boulevard from Liliha Street to Lusitana Street then down to Beretania Street to the McCully-Moiliili area. The western portion of the 42-inch water main runs along Kamehameha Highway and Dillingham Boulevard to Kalihi Street. A 12-inch main connects the two portions of the 42-inch main. The BWS intends to construct a new 42-inch pipeline on Liliha Street and Dillingham Boulevard to connect with the existing 42-inch pipeline at the intersection of Dillingham Boulevard and Kalihi Street. The 42-inch main on Kamehameha Highway crosses over to Kilihau Street after the intersection of Kamehameha Highway and Middle Street. The 42-inch main on Kilihau Street changes to a 24-inch main and 30-inch main heading mauka on Puuloa Road. A 24-inch main also heads makai on Puuloa Road to Kamehameha Highway. At the intersection of Puuloa Road and Kamehameha Highway the 24-inch main turns and heads west on Kamehameha Highway. A 16-inch main heads makai on Lagoon Drive to the airport water meter on Aolele Street. The Keehi area is served by the Honolulu International Airport water system.

The water supply system in the Downtown area includes water mains over 60 years old. Over 40 mgd passes through the Downtown area to meet the water demands of Kaka'ako, McCully, Moiliili, Waikiki and the rest of East Honolulu.

A critical component of the system is water storage. The subarea is served by the Bella Vista and Punchbowl Reservoirs. These reservoirs provide water storage to meet peak hourly demands and for emergencies. The two reservoirs are not adequate to meet the peak hourly demands and the additional peak hour requirements are met by source pumps. The major pump stations are the Kalihi Station and Beretania Station. Additional water storage and/or source pumping systems will be required to accommodate the future growth of the Honolulu Water District.

Water sources that serve the Barbers Point Harbor are owned by the Ewa Plain Water Development Corporation. The area has a new 16-inch main on Malakole Road which is connected to the existing 20-inch main. The new line is adequate to serve the initial harbor development, but continued expansion would necessitate the development of additional storage capacity in the future.

2.3.5 Electrical Power and Communication Systems

The Hawaiian Electric Company's Honolulu Power Plant presently provides power during peak hours to the Downtown and Fort Armstrong areas. The substation at the power plant site is adequate to serve the Downtown area. The Kewalo Basin and Kaka'ako area will require a new substation in the vicinity of the Ala Moana Shopping Center to meet the power requirements of the Kaka'ako redevelopment . The Iwilei area is served by the Iwilei Substation. There are also substations in Kapalama and on Sand Island. This area is adequately served by 12 KV distribution lines from these substations. The Hawaiian Electric Company has a substation located in the Keehi area that provides electrical power by 12kv distribution lines. The portion of the distribution system on Lagoon drive has underground duct lines. A new substation and transmission lines from the Campbell Industrial Park are planned for the Barbers Point Harbor.

Downtown Honolulu is served by the main central office of the Hawaiian Telephone Company. The company is presently planning to construct a new main office between Alakeo Street and Atkinson Drive. The Kapalama, Keehi, Sand Island and Barbers Point areas are adequately served and no major improvements are required to serve the proposed developments.

2.4 PRESENT JURISDICTIONAL CONTROLS

As noted at the beginning of this chapter, the State of Hawaii owns approximately 75 percent of the land within the planning area. The primary landlord for all State-owned property is the Department of Land and Natural Resources. Of those lands within the planning area under direct control of DLNR, about two-thirds are encumbered through general leases or revocable permits. Other

State-owned parcels are assigned to various State agencies including the Departments of Transportation, Agriculture, and Accounting and General Services for management purposes.

The major public entities and descriptions of their roles within the physical, regulatory and economic environments of the waterfront are outlined below and shown visually in Figure 6.

Department of Land and Natural Resources (DLNR)

This State department owns and manages significant acreage in the study area, including Magic Island Park, property in the Kaka'ako Peninsula, Sand Island State Park and the Sand Island industrial area. State Parks (Chapter 184, HRS), Land Management (Chapter 171, HRS), and the Office of Conservation and Environmental Affairs (Chapter 183, HRS) all have jurisdiction by way of regulatory and management responsibilities in the study area.

The DLNR reports to a six-member regulatory and policy board. The department's overall mission is to protect, control and regulate state conservation lands-- lands in the State parks system, lands which may be set apart as forest reservations, fishponds, and water resources. The department has the power of condemnation, and, as of the 1988 State Legislative session (Act 361), is empowered to establish improvement districts and issue revenue bonds to finance infrastructure development for industrial parks.

The Office of Conservation and Environmental Affairs has a regulatory function through its Conservation District Permit process-- a permit requirement that applies to most uses seaward of the certified shoreline. The Division of Aquatic Resources operates the Anuenue Fisheries Research Center on Sand Island.

Department of Transportation, Harbors Division (DOT-Harbors)

DOT-Harbors Division's mandate is embodied in Chapter 266, HRS. Title to harbor lands has been granted to it by executive order. The Harbors Division administers its own special funds, and manages user fees to fund harbor facility development and maintenance projects. DOT-Harbors' management responsibilities geographically encompass seven deep-draft harbors and two medium-draft harbors, and a medium-draft landing located on five different islands throughout the State. The Division manages the working harbor operations of Honolulu Harbor, which is the State's primary port.

The Harbors Division is one of DOT's three main divisions-- the other two are Airports and Highways. DOT-Harbors' mission is to control and manage shores, shore waters, navigable streams, harbors, harbor and waterfront improvements. Its responsibilities include the collection of monies, fees and dues paid to the State (i.e., wharfage and demurrage) and other user fees and the planning, construction, operation and maintenance of any harbor facility throughout the State. This Division is a major lessor in the study area.

Department of Transportation, Airports and Highways

The DOT Airports and Highways Divisions play important roles in the waterfront area. The Airports Division requires land for the storage of jet fuels, and regulates land uses and heights of structures in areas influenced by aircraft flight paths. The Highways Division owns and maintains State roads and highways in the area including Nimitz Highway, the main arterial roadway serving the waterfront area.

Hawaii Community Development Authority (HCDA)

HCDA's jurisdiction and mandate are embodied in Chapter 206E, HRS. The Kakaako Community Development District includes land within the original boundaries, plus areas that were added to the District by Act 355, SLH 1987. New

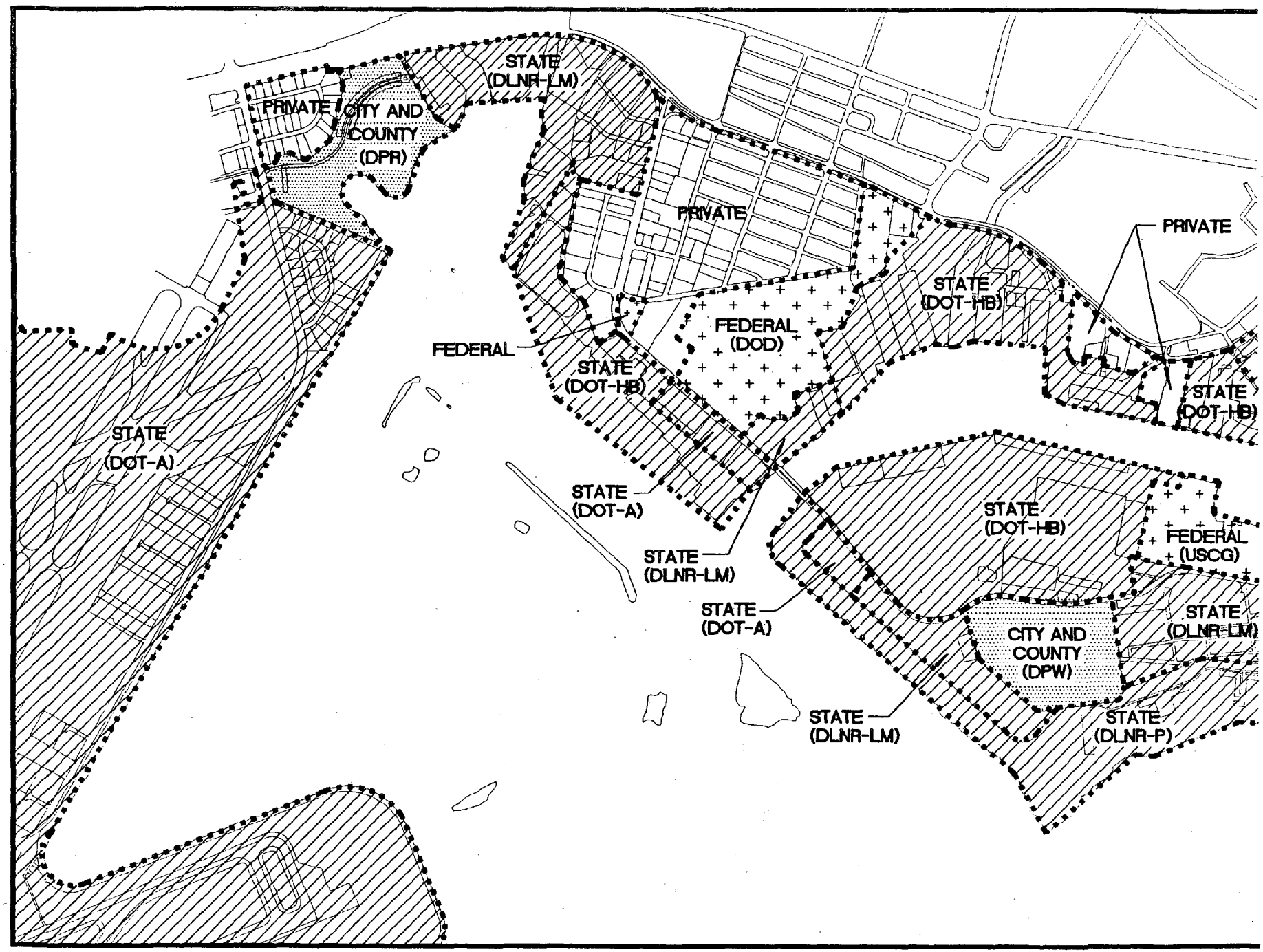
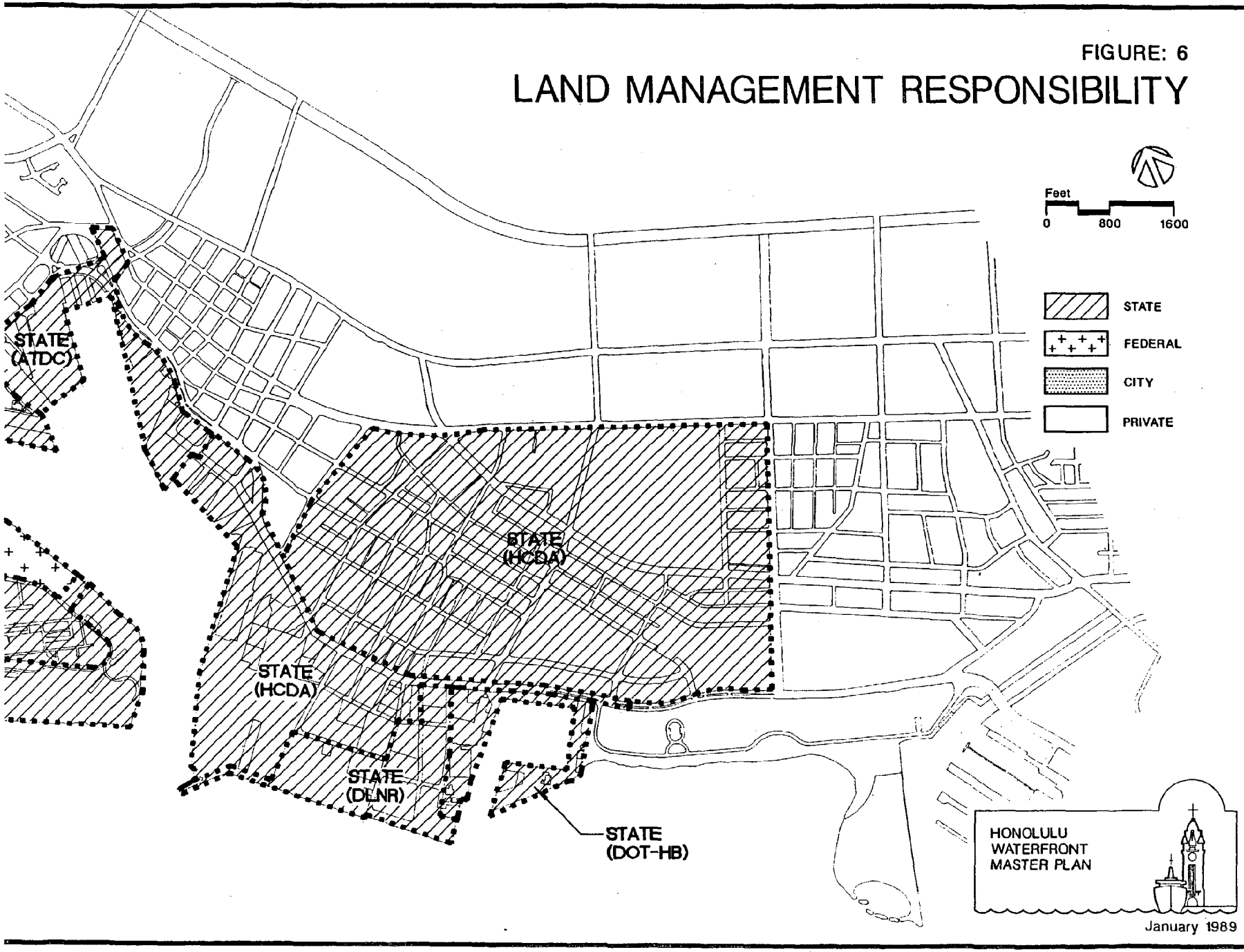

STATE
(DLNR-LM)
PRIVATE
CITY AND
COUNTY
(DPR)
PRIVATE
PRIVATE
STATE
(DOT-HB)
FEDERAL
(DOD)
FEDERAL
STATE
(DOT-HB)
STATE
(DOT-HB)
STATE
(DOT-A)
STATE
(DOT-A)
STATE
(DLNR-LM)
STATE
(DOT-HB)
FEDERAL
(USCG)
STATE
(DOT-A)
CITY AND
COUNTY
(DPW)
STATE
(DLNR-LM)
STATE
(DLNR-LM)
STATE
(DLNR-P)

FIGURE: 6

LAND MANAGEMENT RESPONSIBILITY



development controls for the expanded boundary areas will be enacted by HCDA upon the completion of a development plan for these areas.

This State agency is responsible for the planning and redevelopment of the section of the Honolulu Waterfront from Kewalo Basin to Pier 7. This area is generally referred to as "the Kakaako Makai Area," and is part of HCDA's larger "Kakaako Community Development District" which extends north to King Street and spans the area between Punchbowl and Piikoi Streets. HCDA is a public corporation which consists of an 11-member board of directors and an executive director who is appointed by the board. The agency is administratively attached to the State Department of Business and Economic Development (DBED). HCDA's mission is to plan and implement the redevelopment of the Kakaako district.

HCDA has three main functions. First, it has the authority to regulate development via its planning and zoning powers for those areas designated as community development districts. Second, it upgrades infrastructure systems through its district-wide improvement program. These may include improvements to sewer, water, drainage, street, electrical and CATV systems. Third, HCDA may develop public facilities or other projects such as parks, parking facilities, schools, day-care centers and housing developments.

Aloha Tower Development Corporation (ATDC)

ATDC's jurisdiction and mandate are found in Chapter 206J, HRS. Created by the State as a semi-autonomous public corporation, this special entity's charge is to promote the redevelopment of the Aloha Tower Complex. ATDC's area of jurisdiction, confined to Piers 8 through 11, was expanded in 1988 (Act 356) to include Piers 12 through 23.

The ATDC consists of a seven-member Board of Directors and is administratively attached to the State Department of Business and Economic Development (DBED). The Director of DBED serves as the Chairman of the Board. ATDC is

empowered to issue revenue bonds to finance its mandated redevelopment project.

The entity's mission is to facilitate the redevelopment of the Aloha Tower complex in order to achieve the following goals: strengthen the international economic base of the community in trade; enhance beautification of the waterfront; better serve modern maritime uses; and provide for public access and use of waterfront property.

Department of Business and Economic Development (DBED)

The Foreign Trade Zone, established by federal statutes, offers firms the special legal status of being within U.S. Customs territory. This means these firms do not pay dues or excise taxes on foreign goods and materials brought into the zone. Duties and applicable taxes are paid only when finished merchandise is imported for sale, and never when goods are exported. Hawaii's FTZ No. 9, located at Pier 2 in Honolulu Harbor, is one of the largest and most diversified of the United States' 140 Foreign Trade Zones.

The FTZ Division, itself operated by the Department of Business and Economic Development (DBED, also administers the operations of four special-purpose subzones, such as FTZ No. 9-A, Pacific Resources Inc.'s Hawaiian Independent Refinery located next to the Barbers Point Harbor at the Campbell Industrial Park. The FTZ Division has also sponsored applications for additional FTZ projects throughout Hawaii.

Governor's Office of State Planning (OSP)

In line with its statewide planning and interagency coordination responsibilities, OSP has been charged with the development of the overall long-range plan for the Honolulu waterfront.

City and County of Honolulu

The City and County has several roles in the waterfront area, including regulatory controls, land ownership and facilities development and maintenance. Major City facilities here include the maintenance yards for the Department of Public Works and the Board of Water Supply, the Ala Moana Sewage Pump Station, the Sand Island Wastewater Treatment Plant, Ala Moana Park and Keehi Lagoon Park. The City also owns and maintains the majority of the streets and sewer, water and storm drainage lines in the study area.

Federal Agencies

Various Federal agencies have regulatory, ownership and facilities development and maintenance roles in the waterfront planning area. The major federally-owned waterfront parcels are the site of the U. S. Immigration Service building on Ala Moana Boulevard, the Coast Guard Station on Sand Island and Pier 4, and Kapalama Military Reservation in Kalihi. Other Federal agencies include:

Department of Transportation, Federal Aviation Administration (FAA). The FAA was a party to the agreement enabling development of the reef runway. This agency's primary management interest is the maintenance of airport landing zones, which has implications on the Keehi Lagoon area..

U.S Army Corps of Engineers. The Corps of Engineers is responsible for maintaining navigable waters. Its statutory mandate comes from the Natural Rivers and Harbors Act. The Corps has an active program which plays a crucial role in the maintenance of harbor water depths and the regulation of uses seaward of the high water mark.

Other Federal agencies that have an active role and/or interest in the waterfront are the U.S. Customs Service, the U.S. Military Sealift Command, the General Services Administration, the Department of the Interior, Fish and Wildlife Service and the Environmental Protection Agency.

2.5 HISTORY

Travel by water is vital to island cultures such as Hawaii. The ancient Hawaiians spent much time in and on the ocean and the relationship between land and water has always been important. Early Europeans introduced foreign-style sailing vessels. They became popular and were used by King Kamehameha I during the unification of the islands. Many of these vessels were retained for peaceful commercial uses during subsequent years.

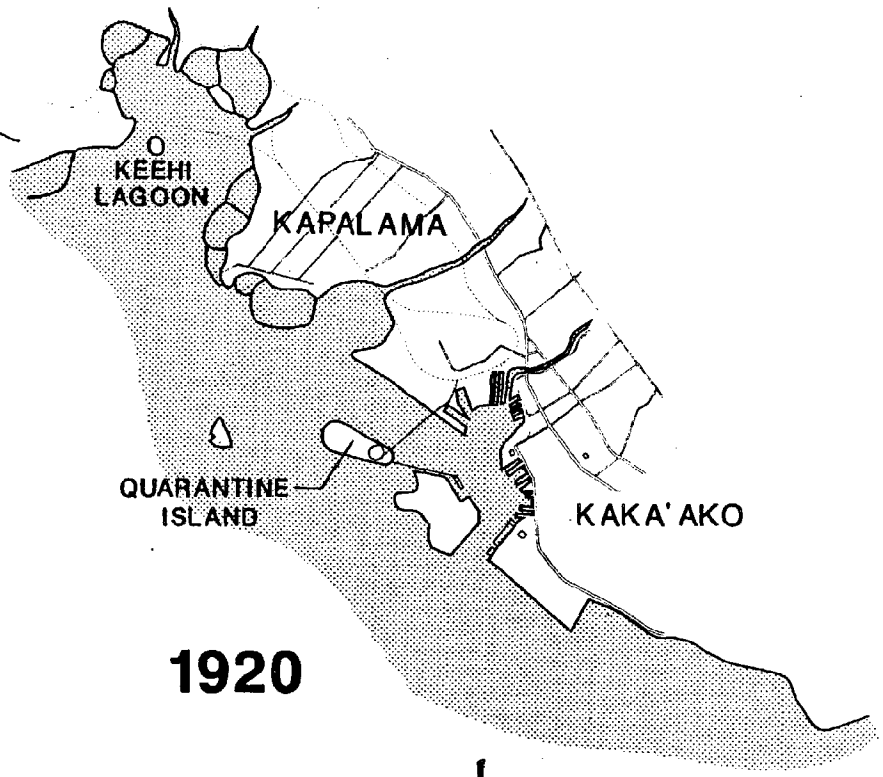
Honolulu Harbor's physical development is relatively young and dates back to the early 1800s with the arrival of European ships and subsequent commercial ventures. New wharfs and piers were constructed to meet immediate maritime needs. Unfortunately, these all too often became obsolete in a short period of time and were unable to accommodate larger and more technologically advanced ships.

Honolulu Harbor has continued to evolve (Figure 7) in order to meet maritime needs and pressures from urban expansion. Throughout this evolution, the focus towards the ocean has remained a major factor in the course of the waterfront and Hawaii's history.

2.5.1 Origins and First Western Observations

Honolulu Harbor was originally a small reefed basin created by the natural flow of freshwater from the streams of Nuuanu Valley. This flow of freshwater inhibited the growth of coral and created a long, narrow channel cutting through the reef into the deeper salt water.

By 1794, the first Western use of the harbor was recorded. At the time, the harbor channel was approximately 200 feet wide, three-quarters of a mile long, and about 30 feet deep.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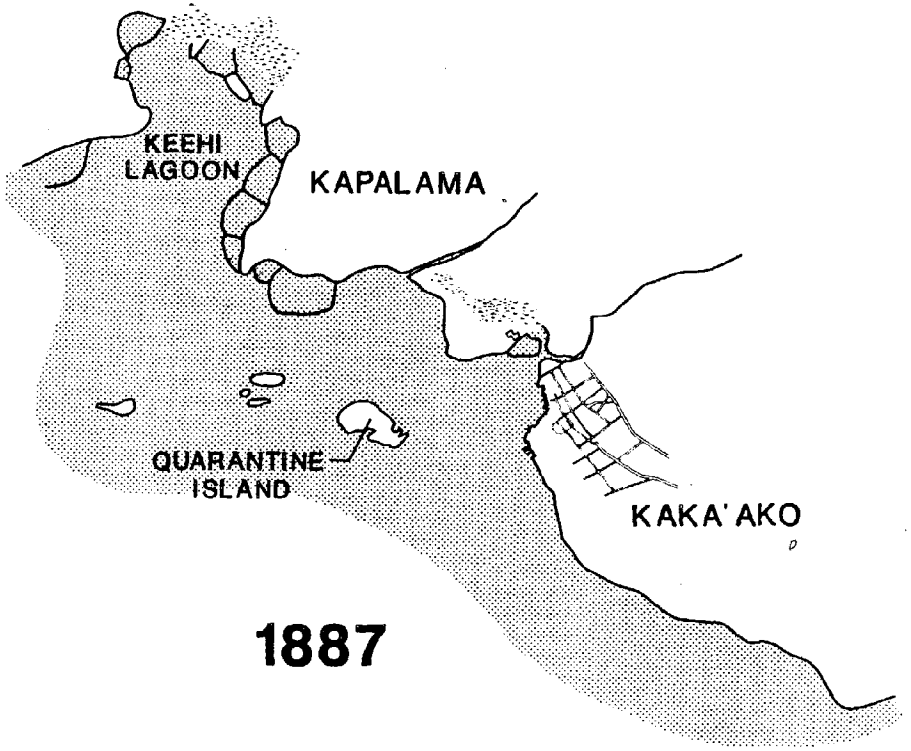
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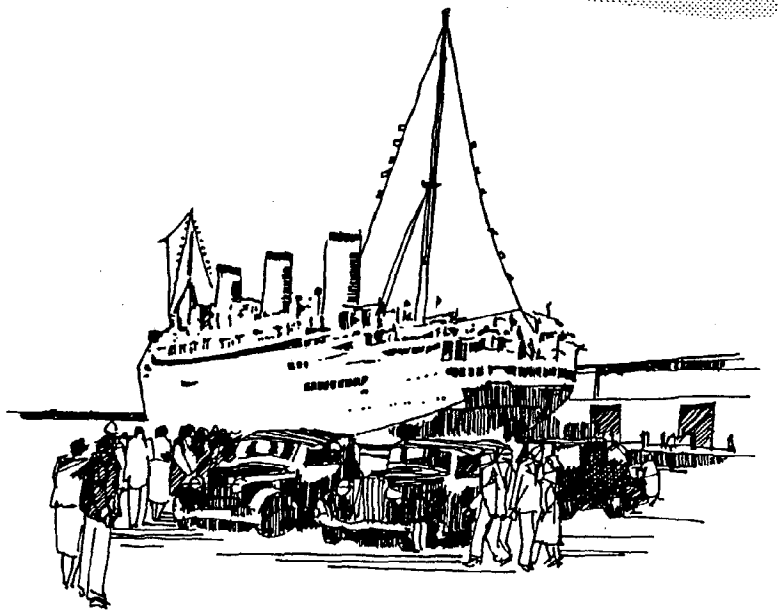
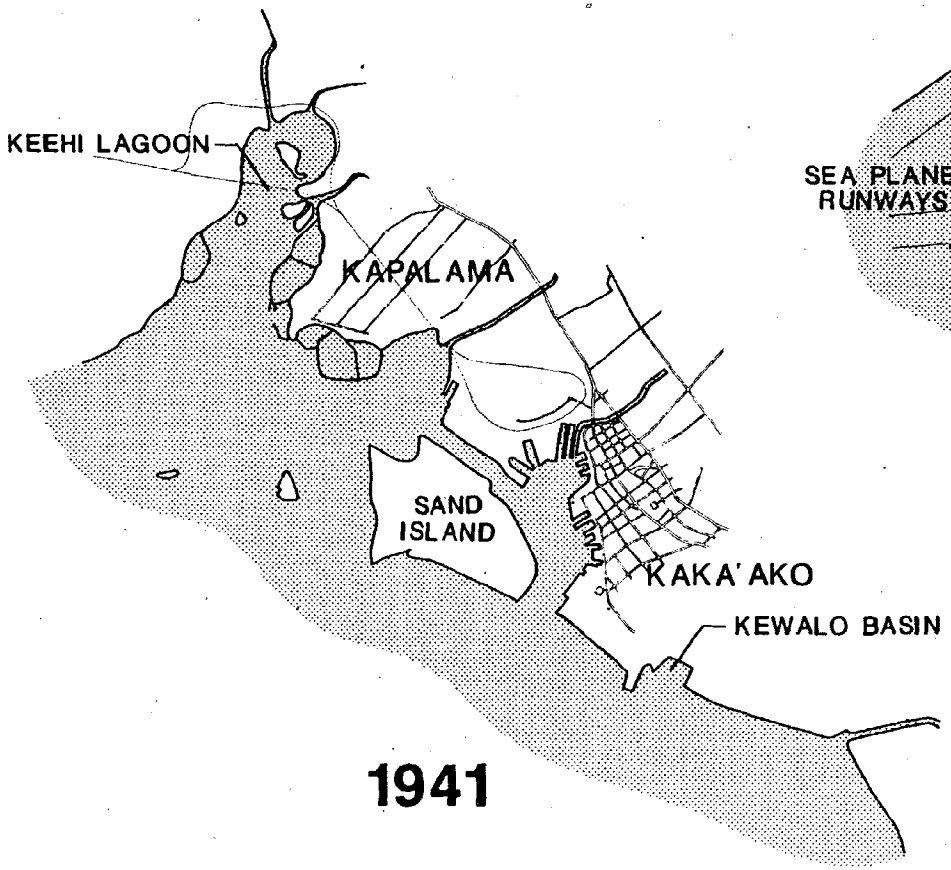
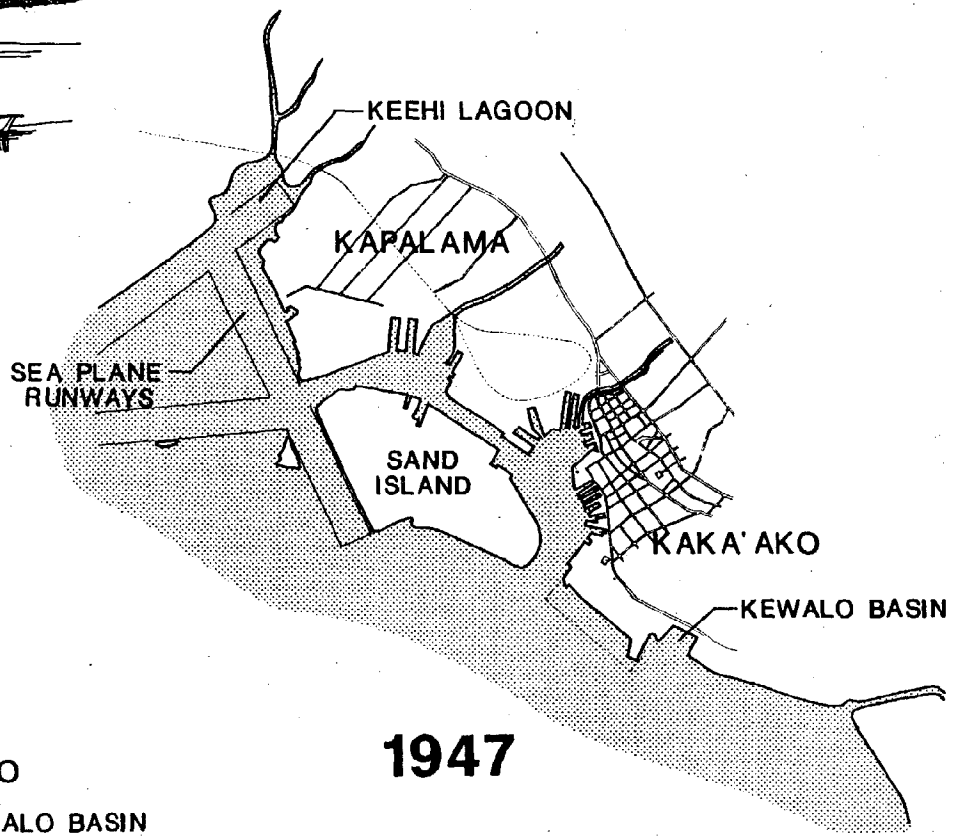


FIGURE: 7

EVOLVING HONOLULU SHORELINE





HONOLULU WATERFRONT MASTER PLAN

January 1989

European visitors observed a small Hawaiian community along the shores in today's Downtown area. Fishponds were present to the west from Nuuanu Stream to the Keehi Lagoon area. Native Hawaiians called the harbor Ke Awa o Kou or "the harbor of Kou". Two years later in 1796, the harbor was named "Fair Haven". This English name was later translated into Hawaiian as "Honolulu".

2.5.2 Early Developments (1809-1890s)

By 1809, King Kamehameha I relocated his seat of government from the Big Island of Hawaii to Oahu and constructed a royal village in the current Downtown Honolulu vicinity. This move resulted in increased contact with Western foreigners and Honolulu soon became the center of economic and governmental power in Hawaii. Fort "Kekuanohu" was built strategically on the makai side of Queen and Fort Streets where the AMFAC Towers are currently located. At the time, this fort fronted the original harbor shoreline.

Since there were no facilities in the harbor during the early 1800s for the loading and unloading of goods, ships arriving in Honolulu Harbor were forced to moor offshore and transfer their cargo and receive supplies by way of small boats. As the number of ships increased, the need for loading and unloading facilities became evident. The first wharf appeared in 1825. This consisted of a vessel's sunken hulk placed at the foot of Nuuanu Street near the site of Pier 12. The first printed harbor regulations were also created during that year.

By the mid-1800s a new maritime industry began to radically change Honolulu Harbor. Hundreds of whaling ships were now entering the harbor and the demand for moorage became a serious problem. Whaling vessels remained in the harbor while their cargo was transported back to the East Coast of the United States on faster clipperships.

To provide more space for these ships, soil siltation from the Nuuanu Stream into the harbor had to be contained. A breakwater wall was constructed from the foot of Maunakea Street to a point several hundred feet southwest of the

shore. Although this breakwater did reduce siltation, it also inhibited development further north into the harbor for a number of years.

Soon after this construction, efforts were organized to further improve the harbor. Fort Kekuanohu was demolished and approximately 22 acres of new fill land were created and named the Esplanade. This provided additional space for expansion of the port and much deeper and larger berthing areas for newer steampowered ships. Linkage with the outside maritime world was now assured.

During the 1850s, the pace of urbanization in Honolulu quickened. The advent of western landownership practices brought about expansion of the harbor and growth in the Downtown area in a more organized fashion. The area near Nuuanu Stream, known today as "Chinatown", began developing around 1855 as the first Chinese immigrants began leaving the rural plantations and settling near the harbor. This area was also adjacent to bars and clubs frequented by the visiting sailors arriving in large numbers.

As Hawaii's economy became dependent on sugar and pineapple cultivation, new harbor development pressures became evident. The 1876 Reciprocity Treaty with the United States allowed the importation of duty-free sugar and by 1882 harbor improvements set the stage for the exportation of sugar and pineapples. Three finger piers were constructed in 1892 by Dillingham's Oahu Railway and Land Company as the terminus for sugar arriving from rural Oahu. Although controversial and originally resisted by the Hawaiian Government, these new wharfs along with the existing 15 government-owned wharfs helped alleviate the demand for harbor berthing space.

By the end of the 1800s and just prior to Hawaii's annexation to the United States, a large wharf was built in expectation of the American battleship U.S.S. Olympia. Although this ship never arrived, the harbor gained more frontage in the area between existing Piers 5 and 6. During this time additional lands, such as the Ala Moana Park site, were also acquired from the Federal government. Transit sys-

tems such as street-car and horse-drawn carriage operations were already in use along the waterfront.

2.5.3 Post Annexation (1890s-1920)

With the end of the Spanish-American War in 1898 and the United States' acquisition of the Philippines, Hawaii's position and strategic value were evident. By 1898 Hawaii officially was annexed as part of the United States and formally became a Territory under the Organic Act in 1900. With Territorial status came new improvements to the harbor's design and regulations. The Organic Act established the position of Superintendent of Public Works for harbor duties and the first harbor line boundaries were established. Channel Wharf at Pier 2 was constructed and a cattle pen and ferry landing on Quarantine Island (portion of Sand Island) were built. By 1914 there were 20 piers in the harbor of which 11 were controlled and operated by the Territory of Hawaii.

2.5.4 Advent of Tourism and Industrial Growth (1920s-World War II)

During the 1920s, a number of changes occurred to the physical makeup of the waterfront, primarily due to the expansion of the pineapple and sugar industries. To the east, Kewalo Basin began as a dock facility for lumber, but soon became the center for a newly developing fishing industry.

The area today known as Fort Armstrong consisted of partially submerged lands and several acres used by the U.S. Army for supply storage between 1913 and World War II. Fort Armstrong was named in honor of Brevet Brig. General Samuel C. Armstrong who served with distinction during the American Civil War.

Perhaps most dramatic during this period was the beginning of tourism in Hawaii. By the late 1920s, Waikiki became a visitors' destination with new hotels such as the Moana and Royal Hawaiian. Visitors arrived and departed on passenger cruise liners. Most symbolic of this new growth in both tourism and maritime expansion was the construction of the 10-story Aloha Tower in 1921, which served

as the center for passenger cruise liners and as a vantage point for harbor control.

During these years, Sand Island consisted of small land fragments separated by tidal areas. Since the 1880s, a portion of this area was used for quarantine procedures and as a holding facility for immigrants entering the Territory.

2.5.5 World War II and Statehood (1941-1959)

With the bombing of Pearl Harbor in 1941, Hawaii became a major participant in the Pacific Front campaigns. Although the focus of waterfront military activities was still at Pearl Harbor, U.S. military work in Honolulu Harbor and Kewalo Basin did occur. Keehi Lagoon was dredged for seaplanes and areas such as the Reserve Channel (Kalihi-Kai Channel) and Kapalama Basin areas were widened, dredged and lengthened. New piers were also constructed. These improvements were presumed war costs with no appropriations or charges to Honolulu Harbor.

Shortly after the War ended in 1945, control of piers in the harbor was returned to the Territory from the military. A major landfill dump for solid waste incinerator ash began in 1948 and extended from the edge of Kewalo Channel parallel to the coast to Fort Armstrong.

As Honolulu prospered with its post-war economy, additional construction continued to alter the physical appearance of the harbor. Nimitz Highway was completed in the 1950s and a second entrance into the harbor was authorized under the Rivers and Harbors Act of 1954. Throughout this period, land filling and the construction of seawalls continued offshore in the Fort Armstrong, Ala Moana Park and Kewalo Basin areas.

By 1958, Alexander and Baldwin's Matson Company revolutionized the ocean cargo shipping industry with standardized containers that improved handling and theft problems. This was to have a major impact on the shipping industry in Hawaii.

2.5.6 Statehood to present (1959-)

Unprecedented growth in waterfront development followed Statehood. Continued dredging and construction accommodated the increasing demand for goods in the State. Landfilling at the Kaka'ako landfill continued until 1977. Approximately 200 acres of Sand Island reclamation land was turned over to the State by the Federal government. Over the years numerous demands were placed on the limited acreage of the island and by 1975 the area consisted of container storage areas, a major wastewater treatment plant, a light industrial area and a State recreational park.

Other areas such as Keehi Lagoon, Kapalama and Iwilei were affected by the continued construction of the International Airport, encroaching industrial uses and Nimitz Highway. Pressure for development in the downtown areas continued above Nimitz Highway and gradually revitalization concerns for the waterfront were expressed. Studies to address these issues of growth and development in the area began in the 1960s and have culminated with the Honolulu Waterfront Master Plan.

2.6 MAJOR PLANNING PROPOSALS

A number of planning projects for specific areas within the waterfront have preceded the current Waterfront Master Plan project. The most significant of these proposals have been reviewed during the planning process in order to establish a comprehensive understanding of development issues applicable to specific areas and to evaluate ideas which may continue to have merit for the future of the waterfront.

The following discussion presents a brief overview of past planning proposals. They are presented in chronological order beginning with the most recent.

Honolulu International Airport Master Plan Update & Noise Compatibility Program, Final Draft Report, Volume 1, Master Plan Update

This report was prepared by KFC Airport, Inc. and Peat Marwick Main & Co. in June of 1988 for the State Department of Transportation, Airports Division. This Update to the Airport Master Plan of 1981 assessed the effect of local and industry-wide changes on the airport since 1981 and extended its planning horizon to the year 2005. It addressed development issues to be dealt with during the next two decades and developed solutions for the problems associated with those issues.

Components of the Update Master Plan which could have an effect on the waterfront study include:

- Continued airport facility development is planned for the mauka side of Lagoon Drive. This includes a new general aviation area, aircraft maintenance facilities, air cargo facilities, and a large area for helicopter, air taxis and commuter services.
- The plan identifies a sizeable area of land in the Kapalama area (adjacent to Snug Harbor) for future airport support activities.

Kaka'ako Peninsula Proposed Convention Center Site, Executive Summary

This plan was prepared by Belt Collins & Associates in February of 1988 for the State Department of Business and Economic Development. The purpose of the plan was to create a design for the development of a convention center in the Kakaako Peninsula area. The plan expanded on selected ideas and issues raised during the 1987 OSP/HCDA waterfront "charette". With the convention center as the focus for development in the area, the plan envisioned additional development that would make the Kakaako waterfront area the center for international and business traveler activities.

Major components of the plan included:

- A convention center large enough to service a 20,000-person convention;
- An aquarium/ocean research center;
- 3,000 hotel rooms;
- A waterfront market place;
- An Immigration park;
- Maintaining container yard operations at Fort Armstrong in short-term, while providing for expansion of downtown into the area in the long-term;
- An inland waterway; and
- Expansion of the shoreline makai of Fort Armstrong for park use.

Keehi Lagoon Recreation Plan Update, Final Draft

This Plan Update was prepared by Edward K. Noda & Associates and Eugene P. Dashiell, AICP in December of 1987 for the State Department of Transportation, Harbors Division. The purpose of this plan was to update the Keehi Lagoon Recreation Plan (1977) in order to meet new needs related to ocean recreation which had been expressed by the community. This plan emphasized the potential growth in ocean recreation as well as the potential for business development in the area. It identified the need for additional berths for small and mid-size boats, land for industrial maritime support services, active ocean recreation areas and passive shoreline recreation areas.

Recommended development plan components include:

- Accommodating approximately 185 boats at a new marina located at Pier 60 near the La Mariana Sailing Club;

- Development of a large marina along Lagoon Drive for approximately 750 to 850 boats and the necessary launch ramps, fuel dock, ferry transit landing, and marine commercial facilities;
- Construction of a canoe center and race facility on the northeast shore (land nearest to the freeway);
- Development of the 300-acre "triangle" area to include a yacht racing/ocean recreation center (50 acres), a marina (about 350 berths), commercial maritime center (20-30 acres), park space, industrial park (40-100 acres), and possibly a 9-hole golf course.

The Honolulu Waterfront, A Reawakening

This document was prepared by the Hawaii Society of the American Institute of Architects, the Hawaii Chapter of the American Society of Landscape Architects and the Hawaii Chapter of the American Planning Association in November of 1987 for the Office of State Planning and the Hawaii Community Development Authority. Professionals from the above organizations participated in developing three design concepts for the waterfront area, concentrating specifically on the Kaka'ako Peninsula area. Based on input received from workshop sessions involving over 200 business and community leaders, written and graphic descriptions of the waterfront concepts were developed. The design process was meant to illustrate the wide array of opportunities and the breadth of community interests inherent to the waterfront area.

The three design concepts and their primary features are as follows:

- The Pacific Gateway concept envisioned the continued expansion of the central business district into the Kaka'ako Peninsula. It would provide for increased office, commercial, educational, and recreational facilities. It would create an active waterfront area. Major design components included a new inland waterway and marina and a new marine research and educational center.

- The Noho Kai (to Live by the Sea) concept featured a residential emphasis based on two premises. The first was that the area is attractive and viable for residential as well as for visitor uses. The second was that the maritime operations at Piers 1 and 2 would be retained. The design promotes the development of a marina in the central peninsula area.

- The Gathering Place concept placed emphasis on recreational and cultural activities. The centerpiece of this design was a Pacific Exposition (convention) Center. Other uses would include hotels, an ocean research center with an aquarium, a festival market place, museums, and large passenger ship facilities at Piers 1 and 2.

2010 Master Plan for Honolulu Harbor

This plan was prepared by the Harbors Division of the State Department of Transportation and the Chamber of Commerce of Hawaii Maritime Affairs Committee in October of 1986. It updates the 1995 Honolulu Harbor Master Plan created in 1976. Primary reasons for the update were changes in the desire of interisland barge operators to relocate to Piers 39-40, a dramatic increase in the passenger vessel industry, technological advancements in cargo handling, changes in Federal participation in navigational improvement projects, a growing conflict between maritime and non-maritime uses of harbor lands, the declining activity of the ship repair industry and an increase in tourist activities such as dinner cruises.

The 2010 Master Plan was a culmination of input from users of harbor facilities, those directly related to the development of new facilities, and State officials responsible for improving, operating, and maintaining harbor facilities.

Major recommendations of note to the waterfront planning efforts include:

- Continued container and general cargo operations at Piers 1 and 2 (Fort Armstrong);

- Continued passenger vessel handling at Piers 8 to 11, and possibly providing for a passenger ferry terminal at Pier 8 if other sites prove to be unfeasible;
- Renovation of Piers 12 to 15 for maritime activities compatible with the Aloha Tower development and the Downtown/Waterfront interface efforts;
- Continuation of existing activities at Piers 16 to 23;
- Improvements to sheds, yards, and pier structures at Piers 24-29;
- Continuation of uses at Piers 30-41, with possible improvements at Piers 37-40;
- Development of Pier 42;
- Continued major container operations on Sand Island; and

Kaka'ako Waterfront Park, Development Plan and Environmental Assessment

This document was prepared by the University of Hawaii, Sea Grant Extension Service in September of 1986 for the State Department of Land and Natural Resources, Division of State Parks. The intent of the plan was to provide recommendations to DLNR concerning the development of a major waterfront park along the shoreline on the Kakaako Peninsula. The report discussed the area's history, park development opportunities and constraints, regional recreational needs, future development in the surrounding area and park operation considerations.

Three alternative designs were developed and analyzed for the report:

- An Urban Waterfront theme providing for mostly passive-type activities, with a number of paths for jogging and walking;
- A Physical Fitness theme providing for more active recreation activities and the development of facilities which promoted sports events;

- An Ocean Heritage theme emphasizing the interpretive value of the site in terms of the area's history, surrounding maritime uses and views.
- The recommended plan encompassed aspects of all three design themes, featuring terracing of the landfill area to provide a major ocean viewing site; a continuous greenbelt pedestrianway from Ala Moana Boulevard to the shoreline; easily accessible picnic areas; renovation of the old City incinerator; an exercise parcourse, a small amphitheater and a children's play area.

Kewalo Basin Master Plan, Landside Facilities

This plan was prepared by Michael S. Chu in April of 1986 for the State Department of Transportation, Harbors Division. It was developed based on recommendations made by the Kewalo Basin Task Force (KBTF) in 1981, plus an updated evaluation of industry needs in the harbor.

The plan proposed land use and facility development for three areas within Kewalo Basin: the edge fronting Ala Moana Boulevard, the Waikiki edge adjacent to Ala Moana Park and the triangle peninsula on the makai edge. Major development plan components included:

- Ala Moana Boulevard edge: no land use changes; demolish "cruise boat" building; improve utilities; expand parking and circulation pattern.
- Waikiki edge: no land use changes; renovate existing net shed for office, storage, and commercial uses; develop sewer service to area; expand parking and circulation pattern.
- Triangle peninsula: clear and grade unused lands; develop 40-foot wide shoreline park; construct new net shed, restrooms, and storage lockers; develop sewer line to the area; improve parking and circulation; provide landscaping.

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Hawaii Ocean Center Concept Plan

This document was prepared by Rhodes/Dahl, Ace Design, BIOS, Robert O. Dahl and David C. Powell in December of 1985 for the State Department of Accounting and General Services. It described a program for interpreting the regional marine life of the Hawaiian ocean, the cultural history of Hawaiian beliefs and practices relating to the ocean, and state-of-the-art science and technology exhibits. The ocean center was proposed to be sited on the peninsula at Kewalo Basin.

The ocean center concept consisted of six major exhibits with specific themes. This included:

- Kumulipo Hymn of Creation: The entrance exhibit which sets the stage for the visitor to the center;
- Islands in Time: A variety of exhibits highlighting volcanic activity, focusing on the formation of the islands, early beliefs about island creation, and the on-going research that allows us to understand the geology of islands and the earth;
- The Shore: Outdoor and underwater viewing areas of Hawaiian water mammals, tidal conditions, and vegetation;
- Coral Reef: A large tank exhibit for viewing fish which inhabit Hawaiian waters and coral reefs;
- Open Ocean: Exhibits for viewing sharks, whales and other open ocean fish, plus research related activities; and
- The Surface: A series of exhibits on ocean technologies past, present and future.

Makai Area Plan, an Addendum to the Kaka'ako Community Development District Plan

This plan was prepared by the State of Hawaii, Hawaii Community Development Authority in October of 1983, and subsequently amended in 1986 and 1987. This plan serves as an addendum to the original Kakaako Plan, covering the additional 133 acres included in the Kaka'ako Community Development District since it establishment in 1976. The Makai Area Plan initially encompassed the Fort Armstrong area (Piers 1 and 2), four blocks of Bishop Estate land along Ala Moana Boulevard, the food distribution area in the central portion of the peninsula and Ala Moana Boulevard to Piikoi Street. In 1987, the Makai Area Plan was amended to reflect a further expansion of the District's boundaries, including the remainder of the Kakaako Peninsula, Kewalo Basin and lands makai of Ala Moana Boulevard from Piers 4 to 7.

In terms of the preferred land uses in the area, the largest single component of the plan provides for the continuation of waterfront industrial activities in the Fort Armstrong area. Mixed-use developments, identical to the type of developments envisioned for the mauka area, are planned for the private land fronting Ala Moana Boulevard (emphasis on commercial activities) and for the food distribution area (emphasis on residential use). Maximum allowable height of structures in these mixed-use areas would be 200 feet and 150 feet, respectively. Other components include:

- Transportation: Improvements to local roadways within the area and possible closure of Coral and Ohe Streets; general parking requirements; pedestrian circulation improvements; possible people mover system; bikeways.
- Urban Design: Urban form in the area controlled by guidelines involving building bulk, building setbacks, tower coverage, landscaping, etc.
- Utilities: Improvements to all utility systems as necessary.

- Historic Resources: Preservation of the U.S. Immigration Station & Department of Health Building and the Ala Moana Sewage Pump Station.
- Relocation: Relocation assistance by HCDA; policies for the provision of comparable replacement facilities and relocation payments that reflect reasonable relocation expenditures.

Sand Island Shore Protection Study: Final Detailed Project Report and Environmental Impact Statement

This report was prepared by the U.S. Army Corps of Engineers in October of 1983 for the Department of the Army. It focused on the evaluation of shore erosion and related problems at the Sand Island State Park, and their impacts upon the overall environmental, cultural, and recreational resources of the area. Alternative plans for protecting the shore from further erosion were developed, along with a cost/benefit analysis and an assessment of potential environmental impacts associated with implementation of these plans.

Major plan components include:

- Rehabilitation of existing revetment by excavating backfill and building new revetment structures at strategic sites; and
- Placement of three detached offshore breakwaters along 600 feet of shoreline to provide erosion protection.

Aloha Tower Plaza, Development Prospectus

This document was prepared by ROMA Architects in May of 1983 for the Aloha Tower Development Corporation (ATDC). It provides an outline of the development objectives as originally adopted by ATDC and a summary of the market potential of the proposed project. Also included is an explanation of the proposed public improvements, the guidelines for private development, the construction strategy, the status of governmental preconditions to implementation, and the terms and conditions of the lease.

The proposed project area totaled 13 acres and encompassed Piers 8 to 11 and Irwin Park. One leasehold parcel was to provide two development sites (a 3.4-acre hotel site and a 1.4-acre office site) connected by an underground parking easement. Major components of the development program included:

- 400-500 room hotel
- 600-1,000 seats of restaurant
- 100,000-150,000 sq.ft. office/retail space
- Parking to support activities
- Main cruise ship terminal at Piers 10-11 (17,000 sf)
- DOT replacement office space (5,000 sf)
- Back-up cruise ship facility at Pier 9 (8,500 sf)
- Inter-island terminal at Pier 8 (13,500 sf)
- Major open space & pedestrian improvements
- Pedestrian bridge over Nimitz Highway
- Access roadway and highway improvements
- Covered maritime operations area at Pier 11
- Rehabilitation of Aloha Tower

Conceptual Planning Study, Piers 2 to 18, Honolulu Harbor

This study was prepared by EDAW, Inc. in September of 1978 for the State Department of Transportation. The DOT invited people associated with maritime-related activities, other interested groups and individuals, and formed the "Downtown Waterfront Redevelopment Team." This team engaged a consultant to develop a conceptual plan for the area between Piers 2 and 18, based on the preservation of Aloha Tower as the focal point. Preliminary land use design concepts ranged from a maximum open space alternative to a maximum development alternative. The recommended long-range plan was one of maxi-

mum open space. Revenues were anticipated to be generated from such elements as floating attractions, charter and commercial boats and parking.

Principal plan elements included:

- Access from Downtown via pedestrian overpasses at selected sites;
- A continuous promenade from Pier 2 to 18;
- Extension of the land area at Piers 5 and 6, creating a larger park space and construction of a parking facility;
- Removal of the overpass at Pier 7, provision of charter and cruise boat mooring and berth space for a Sand Island shuttle ferry;
- Construction of a Hawaii World Trade Center on Piers 8 to 11;
- Removal of buildings on Piers 12 to 14, replaced by a promenade, landscaping and parking;
- Maintaining the firehouse at Pier 15, but removing other structures for a promenade; and
- Developing Piers 16 to 18 for commercial fishing.

Final Environmental Impact Statement for the Sand Island State Park

This plan was prepared by Aotani & Oka Architects in 1975 for the State Department of Land and Natural Resources, Division of State Parks. The proposed park plan encompassed 140 acres along the makai shoreline of Sand Island. Its purpose was to provide recreation opportunities, both passive and active, with primary orientation toward ocean, shore-oriented, and cultural activities.

Primary development proposals included:

- A boat park on the Keehi Lagoon side which would provide for boat launching, storage, and on-shore viewing area of boating activities; and

- A beach park from the south point to the area facing downtown for passive type of park activities.

Urban Design Study of the Honolulu Waterfront

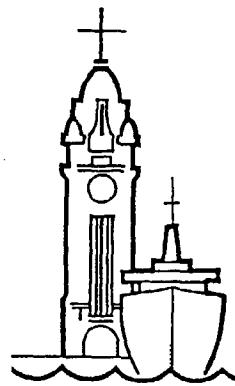
This study was prepared by the Oahu Development Corporation in October of 1968 for the State Foundation on Culture and the Arts. This study evaluated trends and policies that affected growth of the Honolulu waterfront, discussed urban design development controls, and presented various alternative designs for subareas from Keehi Lagoon to Diamond Head. The study ultimately set forth an urban design plan which proposed specific development projects based on its alternative analysis.

Specific development program elements within the waterfront planning area that were recommended by this 1968 study include:

- A harbor tunnel road from the airport, to Sand Island, under the main harbor channel and finally connecting into Ala Moana Boulevard at South Street;
- Enlargement of the Coast Guard area and providing for a maritime museum and historic ships display;
- Removal of piers 12 to 15 and construction of a promenade and berthing area for transient ships;
- Building pedestrian bridges over Nimitz Highway;
- Creating a beach along the shoreline of the Kakaako Peninsula;
- Expanding commercial fishing activities and ocean research operations in the Kewalo Basin area;
- Major expansion of Ala Moana Park onto the reef area; and
- Major marine recreational development in Keehi Lagoon.

The Comprehensive Plan, Ala Moana Reef

This plan was prepared by Belt Collins & Associates and Harland Bartholomew and Associates in February of 1961 for the State Department of Land and Natural Resources. The plan called for filling over 200 acres of submerged land which would provide for expansion of park space, along with land for hotels and commercial activities.



3.0 THE MASTER PLAN

This chapter presents the Master Plan. Section 3.1 reviews the overall waterfront goals which have guided the formulation of the Plan. Section 3.2 provides a planning overview identifying the unique aspects of the waterfront area, the long range "vision", and its supporting themes. Section 3.3 sets forth the development program, including a summary of the projected needs for various land use activities in the planning area. Section 3.4 describes the recommended development plans and provides descriptions of major uses and systems.

3.1 OVERALL WATERFRONT GOALS

The following goals have been established to serve as the basis for planning decisions in the waterfront area. These goals were formulated from a variety of sources with interests in the waterfront including the Legislature, the Governor, Federal, State and County agencies, and the Waterfront Focus Groups. Because of the size and complexity of the waterfront, and the potential competition among uses for waterfront property, the goals cannot be applied in a mutually exclusive manner. However, through careful phasing and management, most of the goals should be achievable with a minimum of conflict.

A. Physical

1. Land Use

Maritime Uses. Provide sufficient space and facilities (landside and waterside) to meet the functional requirements of Oahu's harbor and maritime needs for the long range economic welfare of the State.

Recreational Resources. Provide recreational resources (active, passive, social and cultural) to meet the needs of Honolulu's growing residential population, without jeopardizing the capability of meeting the State's maritime needs.

Urban Development. Provide space for water-related commercial, industrial and institutional facilities which meet the demands of the State's growing population and economy.

2. Urban Design

Public Access. Promote safe public access to the ocean and along the water's edge.

Views. Enhance views of and from the waterfront and protect significant existing view corridors.

Historic Resources. Protect existing historical landmarks and incorporate historical features and themes into waterfront redevelopment programs.

Design Quality. Encourage the highest quality of design for all public or publicly visible facilities and features.

Hawaiian Character. Develop distinctly Hawaiian design themes for major waterfront redevelopment projects.

Landmark Projects. Provide for one or more major landmark projects that will give the Honolulu waterfront its own world-renowned identifying symbols.

3. Circulation

Public Transportation. Promote the availability and use of public transportation (land and water-borne) to and within the waterfront area.

Service Access. Provide service access to all waterfront uses. Minimize conflicts and safety concerns between service vehicles and other users.

Nimitz Highway. Moderate the use of the Nimitz Highway corridor for through traffic and/or seek other ways, including grade separated facilities, to reduce this traffic barrier between the waterfront and areas immediately mauka of it.

Pedestrian and Bikeway Linkages. Provide a system of pedestrian ways and bikeways linking all major activity nodes along the waterfront to those areas mauka of it.

4. Infrastructure

Utilities. Provide adequate water, sewer, drainage, power and communication systems to meet the needs of existing and future waterfront activities in a timely fashion.

5. Environmental

Ecosystems. Minimize the adverse impacts on existing ecosystems in the harbor and the nearshore waters.

Surfing Areas. Protect surfing conditions along the coastline.

Public Health. Maintain air quality, noise, vibration, and night lighting levels within acceptable health and nuisance standards.

6. Phasing

Maritime Facilities. Insure that sufficient maritime facilities are available for the State's long range economic welfare before designating existing maritime lands for non-maritime uses.

Priority Projects. Encourage redevelopment to take place in an orderly and incremental fashion starting with identified "priority projects" which are expected to serve as catalysts for further development of surrounding properties.

Long Range Plan. Strive to implement a long range land use plan for the waterfront and avoid any actions which would foreclose implementing such a plan without fully analyzing and accepting the outcomes of such actions.

B. Economic

1. Existing/Future Operations

Harbor Operations. Maintain the viability of Honolulu Harbor as the State's primary port, and insure that the harbor operations will be able to accommodate all necessary existing and future inter-island and overseas statewide commerce needs.

Compatible Uses. Seek to expand or enhance existing operations which are compatible and consistent with the long range plans for the waterfront and minimize dislocation impacts of non-compatible uses.

Consolidation of Uses. Where practical, seek to consolidate similar uses or activities in order to provide more efficient services and common use of facilities.

Ocean-Related Uses. Encourage the development of uses and activities which take advantage of or seek to promote Hawaii's unique ocean-related opportunities.

2. Financing

Public Benefits and Costs. Seek to maximize public benefits while minimizing public costs for development within the project area.

Private Sector Role. Encourage private sector redevelopment wherever possible but provide sufficient off-site infrastructure or public/private development partnerships to reduce private sector risks and insure long-term project viability.

Financing Tools. Utilize innovative financing techniques to cover public expenditures such as tax increment financing, user fees, local improvement districts, etc.

3. Implementation/Operational Responsibilities

Implementation Organizations. Identify existing or create new government agencies, authorities or development corporations which will be responsible for implementing the long range waterfront plan.

Overall Coordination. Insure that an umbrella organization (if not one of the above) has the power to update, monitor and direct the overall implementation of the master plan on an on-going basis.

4. Phasing

Market. Do not proceed with any new development until there is a sufficient market to support the project or an economic benefit to the State.

Impacts on Existing Operations. Seek to minimize adverse economic impacts on existing businesses and other activities during construction of off-site infrastructure and adjacent redevelopment projects.

C. Social

1. Employment

Employment Opportunities. Enhance employment opportunities within the waterfront area to support the uses and activities being provided.

2. Housing

Priority Uses. Housing within the waterfront area should only be provided where it is not competing or conflicting with, nor impacted by, long-term maritime, commercial, industrial, recreational, cultural or institutional uses which need or benefit from waterfront locations.

Financial and Social Justification. Housing should only be considered when its financial returns can contribute significantly to reducing public costs for waterfront improvements, and its presence will enhance the sense of community by providing people and activities in the area 24 hours a day.

3. Development Impacts

Relocation Assistance. Relocation sites and assistance should be provided for existing activities which may prove to be incompatible with long term uses in the waterfront area.

Resident Focus. Uses within the waterfront area, particularly recreational and cultural, should be aimed at meeting the needs of the local residents first and visitors second.

4. Phasing

Community Facilities. Recreational, cultural and institutional facilities should be provided in the waterfront area as regional needs for these uses materialize, particularly as generated by the growing residential areas mauka of the Nimitz Highway and Ala Moana Boulevard.

3.2 PLANNING OVERVIEW

The Honolulu waterfront is recognized as a special public resource, unique in its potential to provide opportunities for economic development, public enjoyment and civic identity, in addition to serving as the State's principal port. The waterfront planning area stretches along six miles of the south shore of Oahu, encompassing over 1,550 acres and includes the Ala Moana Beach Park, Kewalo Basin, Kaka'ako Peninsula, Aloha Tower piers, Chinatown, Iwilei and Kapalama waterfronts, Kalihi Kai, Sand Island and Keehi Lagoon. Because of its important functional relationship to Honolulu Harbor operations, the Barbers Point Harbor located on the southwest shore of Oahu is also included in the planning area.

3.2.1 Contrasts

The Honolulu waterfront today is a study of contrasts, accommodating a full array of uses and activities ranging from commercial shipping operations within Honolulu Harbor to dinghy sailing in the Ala Wai Yacht Basin, from industrial uses such as the drydock and shipyard to restaurant operations in Kewalo Basin, from

active recreational activities at Ala Moana Beach Park to container and cargo operations at Sand Island, from the glass office towers of Bishop Street to the fuel storage and bunkering facilities on the Iwilei Peninsula, from the older residences of Kalihi Kai to the high-rise residences of the new Kaka'ako. These contrasts represent the very urban fabric of the city, tied together, sometimes tenuously, by the collective aspirations and needs of its residents and businesses. In his 1988 State of the State address to the people of Hawaii, Governor Waihee eloquently characterized the planning area:

"The waterfront is the face of Honolulu. Its features include our industry and vitality, our beauty and our grace, and our unique character as a people of land and sea. From Keehi Lagoon, where potential for recreation and maritime industry abounds, to the lifeline gateway of our port, to the treasured people-beckoning charisma of the Aloha Tower, to the old and new of Kaka'ako. It is a remarkable resource with vast potential unrealized."

The Honolulu waterfront represents at once the historic and mythological relationships between Hawaii's residents and the sea, the vital importance of ocean surface transportation to our Island State, and the daily interaction through recreation and commerce with the waterfront experienced by island residents.

3.2.2 Uniqueness

The Honolulu waterfront is unique in a number of respects when compared to other urban waterfronts in the nation. A major difference involves the level of use of the waterfront area. Other cities such as Boston, Baltimore, New York and Seattle have undergone and are continuing to undergo renewal of their waterfronts. These waterfronts were generally categorized as dysfunctional, unable to cope with modern shipping technologies and largely comprised of vacant rotting pier structures and deteriorated sea walls and bulkheads, with inadequate berthing and backland facilities, and poor access. Major port operations such as cargo handling, bunkering and provisioning gradually shifted away from the older urban waterfronts to more modern facilities, usually located on the outskirts

of the major urban area where economical land assemblage, deep water and access to major transportation corridors were available.

Planning for many of these urban waterfronts therefore largely assumed a blank slate and new uses could be imposed with minimal adverse impact to existing uses. The Honolulu waterfront is fundamentally different from its mainland counterparts in that, for the most part, the entire waterfront is fully utilized. With the possible exception of some areas within the Kaka'ako Peninsula, Sand Island and Keehi Lagoon, the entire 1,550 acre planning area is in active use. Thus a fundamental difference, aside from our unique historic and cultural differences, is that the introduction of any new uses into the waterfront will, to some extent, displace existing uses.

Another factor which sets the Honolulu waterfront apart from its mainland counterparts is land ownership. Many of the lands around typical mainland waterfronts are controlled by private owners such as railroad and shipping companies, and waterfront industrial plant operators. Thus the range of public planning options for redeveloping these waterfronts is restricted by virtue of the rights of the private property owner. Through fortuitous actions earlier in this century, the Honolulu waterfront is largely owned by the people of the State of Hawaii (76 percent). Of the remaining 24 percent, one third is owned by the federal government, with the balance controlled by private interests. Thus, the range of renewal options for the Honolulu waterfront is much broader, with the potential to be more inclusive of a much wider spectrum of community needs and aspirations, than are available to many mainland waterfront renewal programs.

It is from this understanding of the waterfront that the major themes of the Master Plan evolve. The themes, when integrated with the findings of the technical planning investigation, the overall goals discussed in the previous section, the legislative mandates and broad-based community input, result in the vision of the long-range Master Plan for the Honolulu waterfront.

3.2.3 *The Vision*

The vision for the Honolulu Waterfront Master Plan focuses on implementing the Governor's challenge to create a "people-oriented gathering place" within the waterfront planning area while at the same time providing sufficient land and facilities to accommodate the projected expansion of commercial maritime operations within the Honolulu and Barbers Point Harbors. The vision is comprised of a number of central themes described below.

1. Historical Precedent

Hawaii is perhaps unique among the fifty states in its recognition of the inalienable right of its people for access and use of coastal areas throughout the State. This recognition respects the traditional importance of the coastal resource for provision of food, commerce, recreation and cultural fulfillment. In recent times, the need to maintain public access and use of the shoreline has become more acute, as population growth has increased the amount of people seeking this resource and private development along the waterfront has effectively reduced the available area. Nowhere in the State is the need for public access and use more evident than along the south shore of Oahu, particularly along the Honolulu waterfront, an area which exhibits some of the highest population densities and the most exclusionary land use patterns.

2. Mauka/Makai Relationships

Another major traditional precedent which directly affects public access and use of the waterfront is the concept of mauka and makai relationships. Drawing from the basic land unit of the Hawaiian tradition, the ahupua'a, and shaped by the unique geography common to the high islands of the Pacific, spatial relationships between the coastal areas (makai) and the inland areas (mauka) are viewed as being fundamental to a well conceived plan.

A typical pattern of port development has occurred in Honolulu and urban waterfronts throughout the world which has had the effect of severing or greatly impeding the mauka-makai linkages. In the early stages of port development

the waterfront was essentially an extension of the town or village, with unrestricted mauka-makai access. The waterfront was, in essence, an integral part of the settlement. Ships were anchored offshore and cargo was transported to a small wooden jetty (perhaps constructed over a scuttled ship) by smaller boats. Because of its recognized value as a safe harbor, the Port of Honolulu became a favored provisioning stop in the growing trans-Pacific trade. The port represented a safe-haven and the threshold to the City of Honolulu. Perhaps partly because of the importance of maritime commerce, Honolulu also became the seat of government. Gradually over time, seawalls and bulkheads were constructed to improve anchorage facilities and cargo throughput (the amount of cargo passing over the pier).

With time, the growth of maritime commerce stimulated urban development within the port city and along the waterfront. With the coming of steamships, warehouses along the water's edge began to appear and wooden piers began to be replaced with larger docks made of stone and fill material. By filling out into the water to expand docking and storage facilities, the distance between the city's center and its shoreline was significantly increased. The need to move cargo from the waterfront into the surrounding region and the problems of traffic congestion within the port city often precipitated the construction of a new shoreline roadway, often on fill land. In many cities, including Honolulu, the importance of this roadway for regional circulation grew with expanding maritime commerce and the population base.

Over a period of perhaps one hundred years, Honolulu has undergone a typical pattern of port development which has effectively isolated the waterfront from the mauka areas. In short, the city has turned its back to the waterfront. The heavily used Nimitz Highway/Ala Moana Boulevard corridor has severed the traditional mauka-makai relationship between Kapalama, Chinatown, Downtown, Kaka'ako and Kewalo with their respective ocean frontages by creating a substantial physical and perceptual barrier. A critical planning challenge is to open up the deteriorated mauka-makai linkages and re-instill the vision of the waterfront as the gateway to Honolulu.

3. The Great Park Concept

The planning solution to creating a "people-oriented gathering place" on the Honolulu waterfront involves building on the traditional relationships of our island residents to the sea, the realities of ongoing and expanding port operations and the opportunities afforded by public control of the waterfront. Beginning in the early part of this century, planners have envisioned a system of great parks connected by a series of linear parkways stretching both circumferentially along the length of urban Honolulu and mauka-makai, providing access to the mountains and the sea. This system of parks would offer relief from the tensions of urban living, give ample space for active recreational activities, provide needed buffering between urban uses, and generally increase the quality of the urban environment. This in turn, would stimulate economic activity and ultimately have a positive impact on the quality of life for residents of Honolulu. The linear linkages between the larger park areas would range from completely separate circulation systems for pedestrian and bicycle uses to major landscaping elements along heavily travelled urban arterials. The total system, comprised of larger park areas and intermediate linkages, constitutes a major organizing thread winding through the diverse urban fabric of Honolulu.

The Great Park concept (sometimes referred to as the "lei of green") is gradually being implemented, with one of the more recent and widely acclaimed elements being the Hawaii Capitol District adjacent to Downtown. The Honolulu waterfront offers a tremendous opportunity to reinforce and expand the great park concept while at the same time providing major public access and use of the scarce waterfront area.

4. Maritime Integrity

Another important theme expressed in the vision for the Honolulu waterfront is the preservation and enhancement of the Port of Honolulu as the hub of the State's commercial harbor system. It is clearly recognized that Hawaii, as an island State, is almost totally dependent on ocean surface transportation. Approximately 80 percent of the required goods to keep the Hawaiian economy functioning are imported, and 98 percent of these imported goods are delivered

by ships. Exports, likewise, are transported almost entirely by surface vessels. Thus, no State is as dependent on ocean surface transportation as Hawaii, and there are no other economic transportation alternatives for its economic well-being. The majority of overseas inbound and outbound cargo movements arrive and depart via Honolulu Harbor.

In recognition of the critical importance of a sound maritime industrial base for Hawaii's continued economic growth, a significant element of the technical planning process involved a detailed analysis of existing and projected harbor requirements. In essence, the investigation identified the locational and facility requirements necessary to support efficient port operations through the year 2020. Beyond 2020, the investigation developed several long-term options which must be considered by policy makers over the coming years such as reducing transhipment of interisland freight (encouraging more direct neighbor island shipments), capital improvements to expand existing harbor facilities within Honolulu Harbor, on the neighbor islands and/or at Barbers Point, and long-term mixed-use of Pearl Harbor. Other options include intensification of existing facilities either through technological advances that would allow for increased throughput without increasing land area requirements or by increasing intensification and associated costs to consumers.

3.3 DEVELOPMENT PROGRAM

The following discussion presents an overview of the projected needs for various land uses including harbor cargo operations, commercial, industrial, residential, recreational and cultural activities. This provides the base information for future development. It also serves to highlight the types of activities that might be located in the waterfront area.

3.3.1 Harbor Cargo Operations

The assessment of harbor cargo operations in the waterfront was prepared by Moffatt and Nichol, Engineers of Long Beach, California. Primary objectives of

this study were to evaluate present cargo activities, project future activity levels and determine additional physical resource requirements to the year 2010.

Cargo projections vary by cargo class. The basis of the various projections included resident population growth, visitor population growth, the expected increase in per capita income, visitor spending, construction activity, agriculture and historical cargo activities. Information sources included the State Department of Business and Economic Development statistical records and forecasts, the Bank of Hawaii reports of business activity and the State Harbor Division's cargo activity records.

Total cargo activity is projected to increase from approximately 7.6 million short tons in 1987 to 11.7 million short tons in 2010, an increase of 54 percent. Containerized cargo exhibits the largest growth, increasing from 3.4 to 6.5 million short tons, an increase of 91 percent. This figure is equivalent to an average annual growth of 2.8 percent. Containerized cargo will account for 55 percent of the total 2010 cargo volume, an increase from the 1987 share of 45 percent. The trend is expected to continue beyond 2010 as indicated in the graphic below.

Table 1 gives estimated acreage figures for various cargo classes during 1986-87, plus projected additional acreage and total acreage requirements to the year 2010. The table shows that an estimated 65.4 - 75.4 acres will be required by 2010. Of the additional acreage estimated for 2010, 40 to 50 acres are for containerized cargo handling. This represents an increase of 26 to 33 percent over current levels of land use.

The only other significant demand for land is expected to involve the interisland cargo operations. Even though the total additional acreage demand is lower (22 acres by 2010), the actual rate of growth of this industry is much greater than the container industry. These acreage figures represent an overall percentage growth rate of 122 percent by 2010. This reflects the anticipated rapid growth of population on the Neighbor Islands.

Table 1:
YEAR 2010 PROJECTED MARITIME SHIPPING SPACE REQUIREMENTS
(Acres)

Cargo Class	1986-87	2010 Projected	2010 Additional
Break-Bulk General Cargo	19.6	19.6	0.0
Neo-Bulk General Cargo (Includes vehicles and lumber)	30.0	33.0	3.0
Interisland Mixture	18.0	40.0	22.0
Containerized Cargo	153.0	193.0 - 203.0	40.0 - 50.0
Dry Bulk: Silo	25.7	25.7	0.0
Dry Bulk: Stacking Low Density	8.9	8.9	0.0
Dry Bulk: Stacking High Density	3.3	3.7	0.4
Liquid Bulk: Molasses Chemicals	3.2	3.2	0.0
Liquid Bulk: Petroleum Products	10.0	10.0	0.0
Bunker Fuels	4.0	4.0	0.0
TOTALS	275.7	341.1 - 351.1	65.4 - 75.4

3.3.2 Other Maritime

Water-borne commerce in Honolulu Harbor and Kewalo Basin includes additional maritime activities and activities ancillary to the primary cargo operations. These include ocean cruise ships, excursion/dinner cruise ships, commercial and sport fishing, the U.S. Coast Guard and the University of Hawaii research activities.

Findings by Moffatt and Nichol for these individual maritime activities in terms of their estimated requirements to the year 2010 are presented in Table 2. At present, both the commercial fishing and ocean cruise ship industries are expected to remain relatively strong and require additional acreage in the future. In particular, the commercial fishing industry is projected to require an additional 3,200 linear feet of berthing space (an estimated 22.5 acres of water area). Furthermore, the industry is estimated to require 23 acres for added support facilities (e.g., ship repair, parking, net shed, ice plant, etc.). An additional 2 to 3 berths, with approximately 8 acres of land, is projected for ocean cruise ship operations. Other findings are briefly presented in the following discussion.

- Passenger demand for excursion/dinner cruise ships is expected to grow in direct proportion to the number of tourists visiting Honolulu. This will result in a future berthing demand for one additional vessel every other year or a total of 17 additional berths by 2010.

- Growth in the charter boat or sport fishing industry is projected to occur at a rate of 2 vessels every 5 years. This requires an expansion of facilities to provide 9 additional berths by 2010.

- The U.S. Coast Guard can meet future demands for land through internal land-use prioritization and multi-story construction within its current 35 acres of land. Vessel berthing demands are expected to require 1,700 linear feet of wharf, about 300 feet more than what exists today. There are about 725 feet of undeveloped shoreline within the property.

- The University of Hawaii Marine Expeditionary Center (Snug Harbor) requires approximately 10 to 15 acres of land and 1,000 to 1,100 linear feet of wharf.

- A permanent location for the AT&T cable ship requires 500 feet of wharf and approximately 1.5 acres of backland for storage and offices.

Table 2:
PROJECTED MISCELLANEOUS MARITIME SPACE REQUIREMENTS
(2010)

Maritime Activity	Additional Land Requirements	Additional Water Requirements
Ocean Cruise Ships	8 acres	2-3 berths
Excursion/Dinner Cruise Ships	2 acres	17 berths
Commercial Fishing	23 acres	3,200 LF berthing (22.5 acres)
Sport Fishing	1 acre	9 berths
Boat Repair Facilities	4.5 acres	-----

Ancillary Activity	Total Land Requirements	Total Water Requirements
U.S. Coast Guard	30+ acres	1,700 LF
University of Hawaii Marine Expeditionary Center	10 acres	1,000 to 1,100 LF
AT&T Cable Ship Facility	1.5 acres	500 LF
Anuenue Fish Hatchery	5 acres	(1)

(1) Proximity to ocean or harbor is needed. The facility requires an outfall for discharge of circulating water, and deep wells for intake of ocean water. Boat launch ramp requirement could be met at other boating facilities.

3.3.3 Commercial

The market assessment for the Honolulu Waterfront Master Plan was prepared by John Child & Company, Inc. The assessment evaluated the development op-

portunities for three major land uses including a Downtown business hotel, commercial office space and retail shopping. The assessment was based on a detailed analysis of those factors which influence supply and demand and consideration for the competitive advantages and disadvantages of each alternative. The results of this assessment are shown in Table 3, followed by a brief discussion of each category.

Table 3:
PROJECTED COMMERCIAL SPACE REQUIREMENTS
(2010)

Commercial Category	Projected Requirements
Business Hotel	400 to 500 rooms.
Office	2,000,000 s.f.
Retail	300,000 to 350,000 s.f.

Downtown Business Hotel. The market assessment for a business hotel in Downtown Honolulu evaluated visitor trends, business travel, projected demand, current and anticipated supply, estimated market share and the number of supportable hotel rooms.

Although the rate of growth in the number of visitors to the State has declined slightly during the 1980's, the number of arrivals has increased at an annual average rate of 5.7 percent between 1980 and 1987. A small but growing percentage of this total is traveling on business. For the Island of Oahu, visitor arrivals have increased at an average annual rate of about 5.1 percent during the 1980's, from 1.6 million in 1980 to nearly 4.6 million in 1987.

Estimated total visitor arrivals to Oahu are projected to increase from approximately 5.2 million in 1990 to 8.5 million in the year 2010. By 2010, business travelers are estimated to account for about 2.5 percent of all westbound arrivals and between 1.3 and 1.5 percent of all eastbound arrivals to Oahu. As a result, total business travel is projected to increase from about 108,000 arrivals in 1990

to 175,000 arrivals by 2010. Assuming a length of stay averaging 3.5 days and a party size of 1.1 persons, the business travel market segment could support a demand of approximately 940 room-nights in 1990, increasing to 1,530 room-nights by 2010.

The market share for a Downtown hotel is assumed to increase from 15 to 20 percent in 1990 to a stabilized 25 to 30 percent share by 2000. Based on this assumption, the supportable room-nights could increase from between 130 and 170 rooms in 1990, to between 380 and 460 rooms by 2010. Based on an assumed occupancy rate of 75 percent, the Downtown market segment could support a hotel with 400 to 500 rooms.

Commercial Office. The market assessment for commercial office development evaluated the projected demand, current and anticipated supply, estimated market share and supportable net rentable area.

The demand for office space in Honolulu has increased from between 200,000 to 225,000 square feet per year during the 1970's, to over 300,000 square feet annually since the early 1980's. Based on an analysis of the expected growth in selected sectors of the labor force and the office space requirements per job formation, the projected demand for office space is expected to gradually decline from about 260,000 square feet per year in 1990 to about 130,000 square feet per year by 2010.

The existing Class A office inventory in Honolulu includes 24 buildings with a total about 5.1 million square feet of net rentable area. About 60 percent of the space is located within the Downtown financial district of Honolulu. The remainder of the inventory is located along the Kapiolani Boulevard corridor and in Waikiki. At present, there are 12 additional office buildings with an estimated 2.6 million square feet of net rentable area either under construction or are proposed for development over the next five to ten years.

Based on the locations and development timetables of the planned and proposed office developments, waterfront office development on both State and

privately-owned property could amount to an estimated 2,000,000 square feet between 1990 and 2010.

Retail Shopping. The market assessment for retail shopping development projected demand in the form of retail expenditures, current and anticipated supply, estimated market share and supportable net rentable area.

Visitor expenditures are a growing and vital component of the local economy. These expenditures in Honolulu outside Waikiki have increased from about 11 percent of total retail expenditures in 1977 to about 15 percent in 1985. They are projected to increase from about 17 percent in 1988 to about 24 percent by 2010. Retail expenditures outside Waikiki made by Honolulu residents and visitors are projected to increase by about $500 million, from nearly $2.8 billion in 1988 to nearly $3.3 billion by 2010, in constant 1988 dollars.

At an average sales volume of between $300 and $350 per square foot, total retail space requirements resulting from the increase in retail expenditures in Honolulu is projected at between about 1.4 and 1.7 million square feet over the next 22 years.

Based on the locations and development timetables of the planned and proposed retail developments in Honolulu, waterfront retail development is estimated to capture a 20 percent market share of demand for new retail space, totaling between about 300,000 and 350,000 square feet of leasable floor area by 2010.

3.3.4 Industrial

A market analysis for industrial land in the general Honolulu area was not conducted for this plan because it is well known that the demand for light industrial space in central Honolulu far exceeds the dwindling supply. However, some findings concerning the demand for land were presented in the Keehi Lagoon Recreation Plan Update: Final Draft, prepared by Edward K. Noda and Associates and Eugene P. Dashiell, AICP in December of 1987. This report noted there is a high demand for industrial properties on Oahu, with vacancy rates in

the town and airport areas being as low as two percent. While there is considerable industrial land available in other parts of the island, many businesses will pay higher prices to stay in the Honolulu area near the airport, shipping services and customers.

3.3.5 Residential

A potential market for residential uses in the area is assumed to exist, particularly in the Kaka'ako Peninsula. The Final Supplemental Environmental Impact Statement for the Kaka'ako Community Development District Plan (HCDA, 1985) notes that "the Kaka'ako area is in a position to strongly compete with an area extending from Pearl City through Hawaii Kai for a share of future apartment and condominium development on Oahu." The plan for the mauka Kaka'ako area allows for the development of residential units to support a population of approximately 45,000. Due to its location, the makai area of Kaka'ako would also attract residential projects if the land were available. Such projects would likely be directed towards the upscale market to take advantage of the frontage near the shoreline.

3.3.6 Recreational

Parks and Open Space. The State Recreation Plan (DLNR, 1980) states that "the recreational/civic open space character which has already been partially established for Honolulu's waterfront from Diamond Head to Keehi Lagoon should be enhanced by providing additional public recreation sites or facilities where possible or by designing non-recreational facilities to accommodate open space." The 1985 Update to the plan notes there is a continuing high demand for coastal based activities such as picnicking and swimming/sunbathing in the Primary Urban Area of Honolulu. Demand for activities such as field and court games was rated as moderate.

House Resolution 540, H.D. 2 of the 1978 State Legislature requested the development of a Kaka'ako Waterfront Park. In 1985, DLNR contracted consultant services for the purpose of creating a development plan and producing an

environmental impact statement for this park. During the planning process, a park user survey was conducted at Magic Island, Ala Moana and Sand Island Parks. The survey found that "picnicking" and "looking at scenery" were the two most common activities of respondents while visiting these beachfront areas. When asked what they would most like to see in a new park, people most often listed features such as picnic areas, tables and benches, and more shade trees.

Aquarium. During the past decade, construction of aquariums in cities such as Monterey, Seattle, Baltimore and Boston have proven to be major successes, both in terms of their financial return and as a visible community resource. Such a facility has been identified as a potentially valuable element for the waterfront of Honolulu. This is based on the following:

- An aquarium could be a showcase project in the waterfront area and could serve as a catalyst for further redevelopment of underutilized lands.
- The existing Waikiki Aquarium has been operating in Kapiolani Park for 30 years. Recent renovations have upgraded the condition of the facility and exhibits. However, the site on which the facility is situated provides no potential for expansion and parking is extremely limited.
- Other privately-operated aquarium exhibits on Oahu are also older and do not provide state-of-the-art technology.
- During recent years, support for a Hawaii Ocean Center in the waterfront area has been expressed by some in the community. The HOC was envisioned to be a major "living museum", offering educational and recreational programs to both the general public and school groups. It would combine programs interpreting the regional marine life of the Hawaiian oceans, the cultural history of Hawaiian beliefs as well as practices in using the ocean, and state-of-the-art science and technology exhibits indicating modern concepts and practices for using and protecting the ocean.

It is believed that a city the size of Honolulu, with its unique location in Pacific Ocean, provides an ideal situation for a major aquarium comparable in quality to the above facilities on the mainland. As a showcase project within the waterfront,

an aquarium should be geared to attract residents and tourists alike. Since many mainland cities are in the process of constructing or are planning the development of an aquarium, such a facility in Honolulu should provide visitors with a unique experience, both in terms of the content of exhibits and their presentation (i.e, taking advantage of Hawaii's weather to provide outdoor displays). For residents, an aquarium should provide a setting that encourages repeated visits to explore additional facets of the facility. Most importantly, an aquarium should be viewed as a valuable resource which strives to instill a sense of civic pride to the community.

Additional elements which would be important features in an aquarium envisioned for the waterfront include:

- An architectural style that provides for a variety of experiences which leave a memorable image in the minds of the visitor;
- Exhibits which highlight the history and evolution of plant and animal life from regional waters; and
- Educational components and public conservation programs.

Amphitheater. An amphitheater was identified as a priority use in the waterfront park because of the limitations of the Waikiki Shell to continue to meet the community needs for outdoor concert space. The Shell was designed for an optimum number of 8,000 persons. For many popular performances, this number is exceeded, resulting in heavily crowded conditions.

The Shell's location in Kapiolani Park in proximity to residential development has grown as an issue over the years. In particular, noise intrusion complaints have limited the number and types of performances acceptable at the facility. During recent months, the State has begun enforcing noise standards for the area. This action has resulted in fines and a further reduction in entertainment opportunities.

Additional factors which support the development of such a facility in the waterfront include:

- The Kapiolani Park site has limited parking and large events create a substantial traffic burden on the area;
- Proposed sound-abatement improvements will not completely be able to resolve the problem of noise impacts on surrounding neighbors; and
- There are potential legal problems concerning the use of land within Kapiolani Park for profit-making activities.

3.3.7 Cultural

Performing Arts Center. A Performing Arts Center was identified as a beneficial facility in the waterfront because of the present need observed in the community. Honolulu does have a number of small- to mid-size theater facilities. However, many of these are associated with schools, making it difficult for outside organizations to arrange their schedules to account for limited time and space availability during the school year. Other facilities are also heavily used. Space for rehearsals is even more limited. According to a representative of the Honolulu Theater for Youth, the organization could use a new theater between 25 and 33 weeks annually.

Museum. As cultural amenities, museums add to the quality of life in communities and nurture education and learning. Over the past years, a number of cities across the mainland have developed museums directed at children of the area. Recently, a pilot program was begun in Hawaii as the first step to developing a Hawaii Children's Arts, Sciences and Technology Museum. This facility is envisioned to provide a strong educational framework, focusing on natural sciences, technology, humanities and the arts, with an emphasis on an environment of "hands-on, minds-on" experiences to inspire the young and educate people of all ages. The facility is planned to specialize in creating unique learning experiences by physically involving the museum visitor with objects in a contextual setting. Unlike most traditional museums, children's museums are client-centered instead of object-centered. The concept of involving people in a tactile, sensory way increases understanding and stimulates learning. The museum

has been provided with space at the Dole Cannery Square for a limited three-year timeframe.

3.4 RECOMMENDED DEVELOPMENT PLANS

The Honolulu Waterfront Master Plan is a vision for Honolulu's waterfront for the short-term and long-term future. It is a plan which seeks to implement priority projects in the near future, while maintaining a long-term vision with sufficient flexibility to meet changing community needs and desires.

Based on this premise, the plan is presented in two phases. The first phase represents a short-range plan, intended to incorporate and describe the process for the implementation of specific priority projects over the next five- to ten-year period. The second phase represents the long-term plan for the waterfront; a view of the planning area by the year 2010 and beyond. Technical studies conducted for this plan (i.e., Harbor Operations, Market Analysis, Traffic Analysis, etc.) used the year 2010 as the target year for estimating future demand requirements and potential impacts in the waterfront. Therefore, much of the long-range plan represents a desired land use pattern of the area in 2010. However, in recognition of the ongoing growth and development that will occur beyond this point, the long-range plan also includes elements that should be expected to happen well beyond the year 2010.

Goals for the waterfront, along with the overall vision and themes that have directed the planning effort, were presented in the previous sections. These ideas are interpreted as functional planning design elements in this section under major categories relating to Maritime Activities, Economic/Urban Development, Recreation/Leisure and Circulation.

Maritime Activities are those uses that seek to insure the preservation and enhancement of Honolulu Harbor and related statewide maritime operations. This is accomplished by providing necessary space and facilities to meet requirements for Honolulu's commercial maritime needs of the future and guaranteeing

the availability of other statewide maritime facilities before relinquishing existing maritime lands for non-maritime uses.

Economic/Urban Development involves uses that address a number of physical, economic and social goals for the future. These elements include the redevelopment of key non-maritime areas along the waterfront while stressing the importance of greater public access, and "mauka/makai" relationships in terms of improved connections between inland neighborhood areas and their adjoining waterfront locations.

Recreation/Leisure involves uses that provide recreational, cultural, open space and urban design features which create a setting along the waterfront that encourages the "people-oriented gathering place." These elements include major links of the Great Park concept and are intended to add variety and diversity to the typical beachpark experience.

Circulation involves plan elements that create the necessary features related to the movement of people critical to attaining the goals and vision for the waterfront area. These elements provide for public access, both laterally and mauka/makai, and link together the final ingredients for the park concept throughout the study area.

The Master Plan is described in two parts. The first presents a planning area overview of each phase in terms of the major categories defined above. This discussion highlights proposed projects and improvements that are planned within the short- and long-term phases to implement the vision and goals for Honolulu's waterfront. The second part presents a more detailed description and rationale for individual projects planned for the waterfront. This discussion focuses on specific subareas to provide more detail on plan elements.

3.4.1 Overview of Recommended Development Plan Phases

The following discussion presents a brief overview of potential projects within the short- and long-range plan phases. A more detailed discussion of these projects is provided in Section 3.4.2.

3.4.1.1 Short Range Plan -- 5 to 10 Years (Figure 8)

The first five to ten years will be extremely important to the long-term success of the Master Plan. It is during this time that the direction for the desired future of the waterfront area is firmly established. This will be accomplished initially through the implementation of priority projects: opportunities which currently exist and provide the potential to significantly enhance key areas of the waterfront in the near future.

Maritime Activities

The short range plan includes elements that support existing directions within Honolulu Harbor and promote greater efficiency of specific maritime operations. Proposed improvements during this timeframe also set the stage for major improvements intended to be accomplished during the following 10-year period. Key maritime plan elements within the next five to ten years include:

- Maintaining the existing container yard area at Fort Armstrong as an interim cargo handling facility, providing for the continuation of roll-on/roll-off activities and possibly reinstating gantry container operations if the need exists for such an operation at this facility. However, this is intended to be strictly a holding action until the disposition of the Kapalama Military Reservation lands is resolved and the use of Barbers Point Harbor for container facilities is fully evaluated. Any improvements to the Fort Armstrong yards for expanded container use should be solely at the operator's or lessee's expense, and no leases should extend beyond a five-year timeframe, with annual renewal possible thereafter until alternative cargo handling sites become available.

- Continuation of Piers 8 to 11 at Aloha Tower for cruise ship operations. Redevelopment of this complex must provide new and renovated facilities to accommodate space requirements for three passenger cruise ships including the necessary pier apron space, servicing and storage areas, baggage handling facilities, customs space, vehicular pick-up/discharge areas and passenger check-in/waiting lounges (along with other related urban development described below).

- Construction of a terminal for the intra-island ferry at Pier 6 near the existing site of the Oceania Floating Restaurant (with interim facilities located at Piers 13 and 14 or Pier 8 until the Pier 6 site is available).

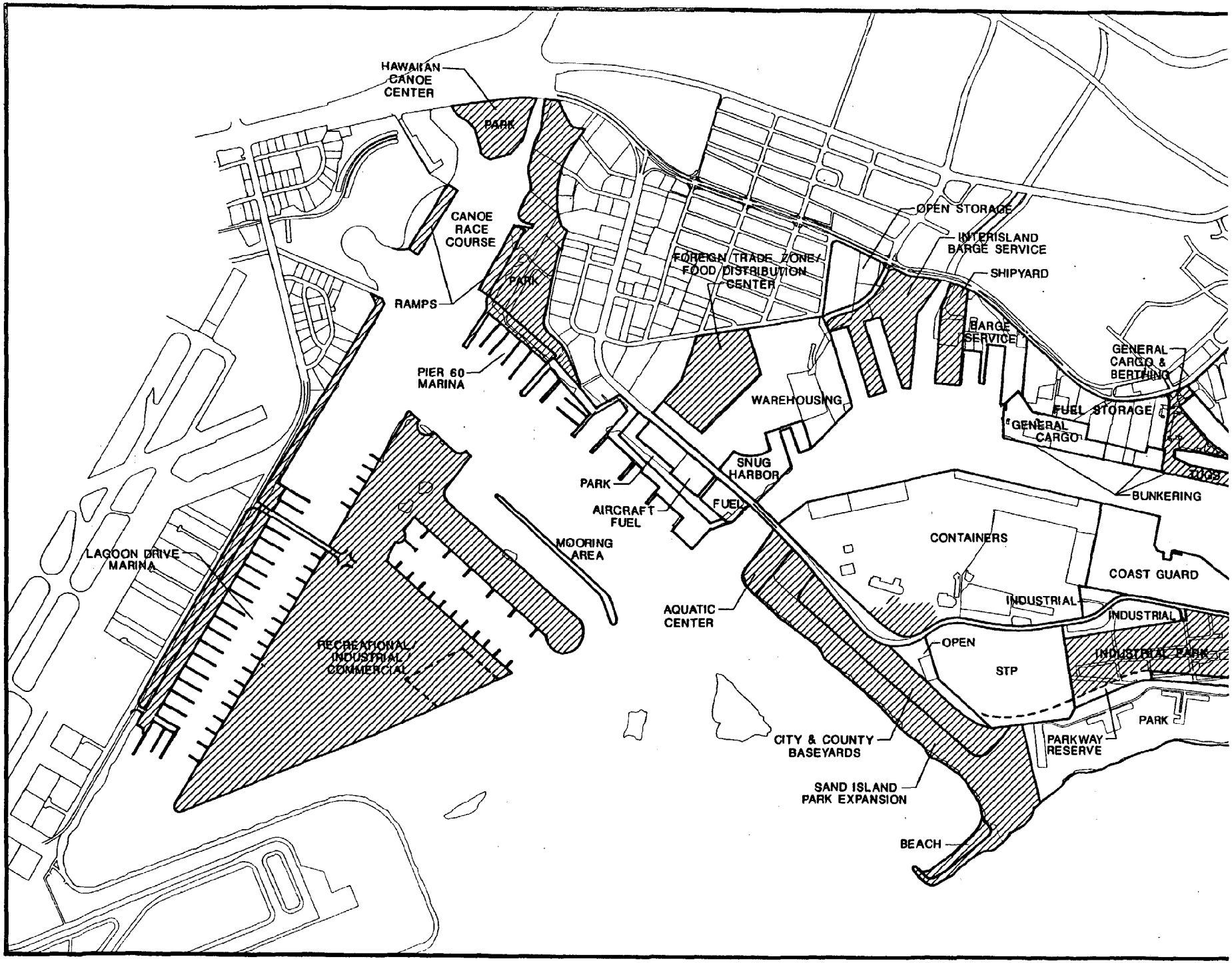
- Relocation of the inter-island barge operation (Young Brothers Company) to Piers 39 and 40.

- Following the relocation of the inter-island barge operations, demolition of outmoded structures and general wharf improvements to the Pier 24 to 29 area including widening the Pier 26 and 27 slip (on the Pier 27 side). Upon completion of these improvements the Plan envisions: relocation of the Hawaiian Tug and Barge operation to Pier 27, and accommodation of the overnight berthing facilities for the intra-island ferries at Pier 22 and/or 25. The remainder of the area would be utilized for general cargo and storage including the possible infilling of a portion or all of the slip between Piers 22 and 25 if this slip is not used for berthing space.

- Redevelopment of the Pier 37 and 38 area as a ship repair and drydock facility and relocation of the Honolulu Shipyard, Inc. from its present location at Pier 41. The soon-to-expire lease on lands occupied by jet fuel tanks may be renewed on an annual basis until the shipyard is relocated, at which time they should be reconstructed at the Campbell Industrial Park refinery. The existing liquified petroleum gas facilities should be relocated to the mauka end of the property once the jet fuel tanks have been removed while retaining the stub pier in the Kapalama canal channel for barge service.

- Purchase of lands currently owned by the Federal government at Kapalama. Mauka locations within this area are proposed to be utilized for the relocation of the Foreign Trade Zone at Pier 2 and the food distribution activities on the Kaka'ako Peninsula. (Future utilization of this area for expanded container operations, possibly within the 5- to 10-year short-term timeframe, make the purchase of this property mandatory at this time.)

- Expansion of the Sand Island container yard to include the undeveloped acreage behind the existing Sealand facilities (CY8), improvements to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RAMPS
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OPEN STORAGE
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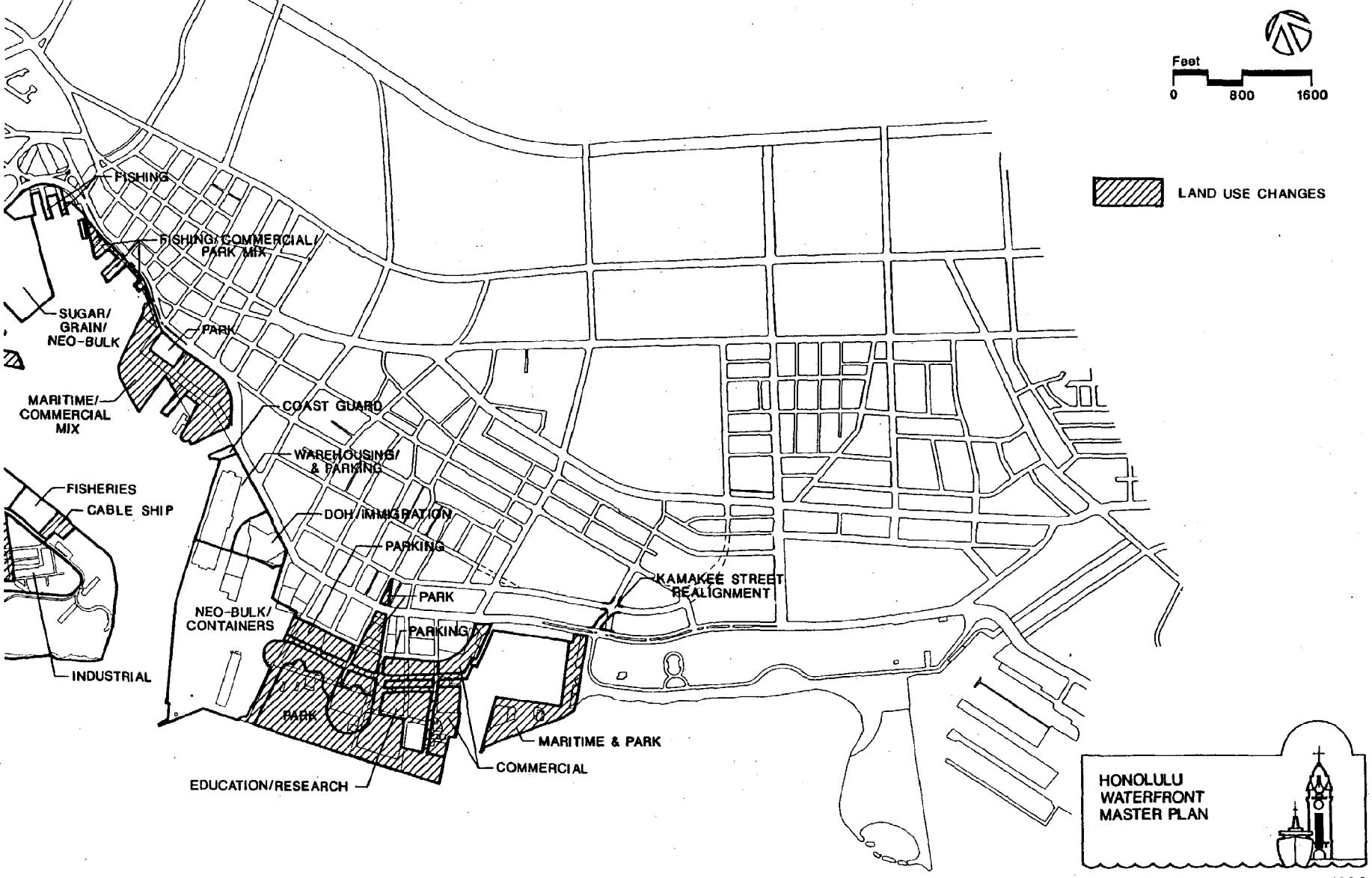
SHIPYARD
BARGE SERVICE
GENERAL CARGO & BERTHING
WAREHOUSING
FUEL STORAGE
GENERAL CARGO
SNUG HARBOR
PARK
AIRCRAFT FUEL
FUEL
BUNKERING
MOORING AREA
LAGOON DRIVE MARINA
CONTAINERS
COAST GUARD
INDUSTRIAL
INDUSTRIAL
AQUATIC CENTER
OPEN
STP
INDUSTRIAL PARK
RECREATIONAL/ INDUSTRIAL/ COMMERCIAL
PARK
CITY & COUNTY BASEYARDS
PARKWAY RESERVE
SAND ISLAND PARK EXPANSION
BEACH

FIGURE: 8

SHORT-RANGE PLAN



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areas recently obtained from the Coast Guard (CY9), completion of wharfs between Piers 51B and 52, and the Pier 53 extension.

- Construction of the proposed cable ship berthing and servicing facilities on Sand Island on the Waikiki side of the Anuenue Fisheries site. The initial lease should not extend more than 10 years with the understanding that the State will seek an alternative site within the harbor as other space becomes available.

- Completion of the 1,600 feet of wharf and 30 acres of backland currently under construction at Barbers Point, and the provision of facilities to handle a combination of cargos, principally neo-bulk, dry bulk and liquid bulk. In addition, if further technical and economic studies indicate that it is in the State's maritime interests to provide container facilities at the Barbers Point Harbor, then improvements to permit safe navigation of containerized cargo ships and other vessels with loaded draft in excess of 34 feet should be implemented.

Economic/Urban Development

Proposed uses relating to economic and urban development would result in significant changes to the existing waterfront area. These uses are planned to provide facilities and activities that firmly establish the Honolulu waterfront as a gathering place for residents and visitors. Key locations in Downtown and at Kewalo Basin are identified as primary redevelopment sites which will serve as catalysts for ongoing long-term economic development. These development areas are intended to provide adjacent mauka districts with a new and stronger sense of a connection with their adjoining waterfront areas. Major proposed uses relating to economic and urban development in the short range plan include:

- Redevelopment of the Aloha Tower/Irwin Park area within the context of a larger redevelopment area which could include the Maritime Museum at Pier 7, the Hawaiian Electric Company (HECO) parcel and the public parking area at Piers 5 and 6. Possible uses for the area include a hotel, office

structures and a festival marketplace, as well as the continuation of the cruise ship operations discussed previously.

- Commercial redevelopment of the Ewa edge of Kewalo Basin from the Fisherman's Wharf Restaurant to the John Dominis Restaurant which could include a major privately funded aquarium. The proposed development should build on the existing character of the harbor, in recognition of the value of the area to the commercial fishing and tourism industries. Services for commercial fishing and other maritime operations will be encouraged to remain or be incorporated in this area, although those which are clearly incompatible with public activities (such as fueling facilities) should be relocated to the Kewalo Peninsula.

- Relocation and consolidation of marine research activities currently in the Kewalo Peninsula area to the area adjacent to the Look Laboratory on the Kaka'ako Peninsula with potential operational linkages to an aquarium.

- Redevelopment of Piers 12 to 15 in the Chinatown area with an emphasis on historic Downtown and Chinatown themes. Activities envisioned for the area include an interpretive center at Pier 12, renovation of the Pier 13 and 14 site to provide for support facilities for the commercial fishing industry as well as fishing wholesaling and retailing operations, restaurants, and the potential relocation of the Oceania Floating Restaurant to Pier 15 if such a move proves feasible to a buyer of the facility.

- Development of approximately 40 acres of lands within the central Sand Island area as an industrial park. Designation as an industrial park would allow the State to grant long-term leases, which in turn would allow the lessees to establish an improvement district for roadway and utility improvements in the area. (Surrounding industrial lands would be maintained for such uses on a revocable permit basis, facilitating reallocation for other activities in the long-term.)

- Implementation of the agreement between the State of Hawaii and the City and County of Honolulu to relocate the City's Corporation Yards and possibly other base yards located on the Kaka'ako Peninsula to Sand Island.

- Fill and dredge the portion of Keehi Lagoon known as the 300-acre "triangle" in order to create approximately 250 acres of new land, 150 acres of which is to be used for industrial and commercial activities. Space for the future relocation of the University of Hawaii's Marine Expeditionary Center at Snug Harbor should also be provided in this area. The triangle could also provide space for some commercial fishing vessels (along with servicing facilities) if the demand exceeds the capacity of Kewalo Basin and Honolulu Harbor to meet the needs of this industry. It would also provide space to meet the relocation and expansion needs of existing Kaka'ako and Sand Island industrial tenants.

Recreation/Leisure

Short-term recreation and leisure plan elements are vital to the overall redevelopment of the waterfront and to the vision of the area as a people-oriented gathering place. These elements implement the efforts to realize the long-term goal of a "lei of green" from Waikiki to the airport, while at the same time providing additional variety and diversity to the beachfront experience. These elements seek to promote the Great Park concept for the Honolulu waterfront.

Short range recreation and leisure plan elements include:

- Development of the first phase of the Kaka'ako Waterfront Park on approximately 55 acres (with an additional 7 acres of offsite parking to accommodate peak period parking needs). In addition to landscaped passive open space areas for picnicking, walking, jogging and informal field sports, major cultural and public amenities such as an amphitheater and a museum/performing arts center would be provided. An inland waterway along the perimeter of the park is also proposed to be constructed as an added recreational and visual amenity.

- Development of a Children's Museum which could be incorporated into one of two possible sites: 1) the proposed performing arts complex in the Kaka'ako Waterfront Park; or 2) the old pumping station building on Ala Moana Boulevard Ewa of the Gold Bond Building.

- Expansion of Ala Moana Park into the Kewalo Basin and Peninsula area, creating pedestrian access into the central harbor and a 4-acre extension of the park and pedestrian promenade along the makai side of the peninsula.

- Implementation of the second phase of the Sand Island State Park Plan comprising a 53-acre site on the Ewa shoreline of Sand Island. Incorporated within this area is an aquatic resources and outdoor recreation training facility along with a boat launch ramp, located just makai of the access bridge to Sand Island.

- Implementation of the Keehi Lagoon Recreation Plan to establish Keehi Lagoon as a major ocean recreation area. This includes an 800-slip marina along Lagoon Drive, recreation and boating facilities within the "triangle" area, canoeing facilities at the mouth of the Kalihi and Moanalua Streams and a marina and boat repair/marine railway facility at Pier 60.

Circulation

Short range plan elements concerning circulation are intended to improve the movement of traffic and encourage the availability and use of public transportation to and within the waterfront area. They provide for greater mauka/makai access and open up new areas within the waterfront for pedestrian traffic. Major elements under consideration include:

- Support for the development of a feasible rapid transit system that could provide a high level of public access to the waterfront and diminish the need for automobile use in the area.

- Providing an urban promenade connecting the Downtown, Kaka'ako and Kewalo areas which encourages pedestrian traffic laterally through the waterfront.

- Construction of pedestrian overpasses crossing Nimitz Highway and Ala Moana Boulevard. A total of six walkways are currently being proposed, several of which could be incorporated with potential transit stations. These overpasses would also tie into the system of pedestrian and bikeway

paths that provide for lateral movement along the entire length of the planning area.

3.4.1.2 Long-Range Plan (Figure 9)

The second phase of the Master Plan would build on the accomplishments of the preceding period, continuing the established directions for redevelopment towards accomplishing the overall vision intended for the Honolulu waterfront. Much of this is expected to occur between the years 2000 to 2010, when significant development projects are proposed for completion. Additional development, particularly in regards to expansion of maritime cargo operations, may occur beyond the year 2010. Collectively, these projects are intended to continue the redevelopment of the planning area that is designed to provide for the continued viability of the harbor, economic improvements which benefit the entire community, greatly expanded recreational activities and optimal public access to the waterfront.

Maritime Activities

Proposed maritime uses envisioned to be completed in the long-term provide for significant redevelopments designed to increase the capacity of primary operations in Honolulu Harbor, Kewalo Basin and Barbers Point Harbor. These uses are intended to provide the necessary space and facilities in order to satisfy maritime requirements to and beyond the year 2010. The major maritime uses proposed for development in the long-term include:

- Development of passenger cruise ship terminals and lay berths at Piers 1 and 2, insuring this vital harbor frontage is utilized for large vessels and itinerant traffic.

- Redevelopment of Kapalama Military Reservation and adjacent lands as a full-scale modern containerized cargo terminal, incorporating the relocation of any interim gantry crane operations from Fort Armstrong. (If this land does not become available to the State, cargo handling operations within the harbor will need to be reconsidered.) This will require the relocation of the University Snug Harbor facility to the Keehi Triangle.

- Relocation of the grain and flour manufacturing activities at Piers 22 and 23 to lands adjacent to the Barbers Point Harbor facilities (assuming they can remain economically viable in this new location) and renovating the area containing Piers 19 to 23 for neo-bulk cargo operations.

- Demolition and dredging of the existing Pier 4 area (including the purchase and relocation of the existing Coast Guard facilities), creating approximately 700 feet of water frontage along Ala Moana Boulevard. This area is to provide for the expansion of berthing facilities for large dinner cruise boats.

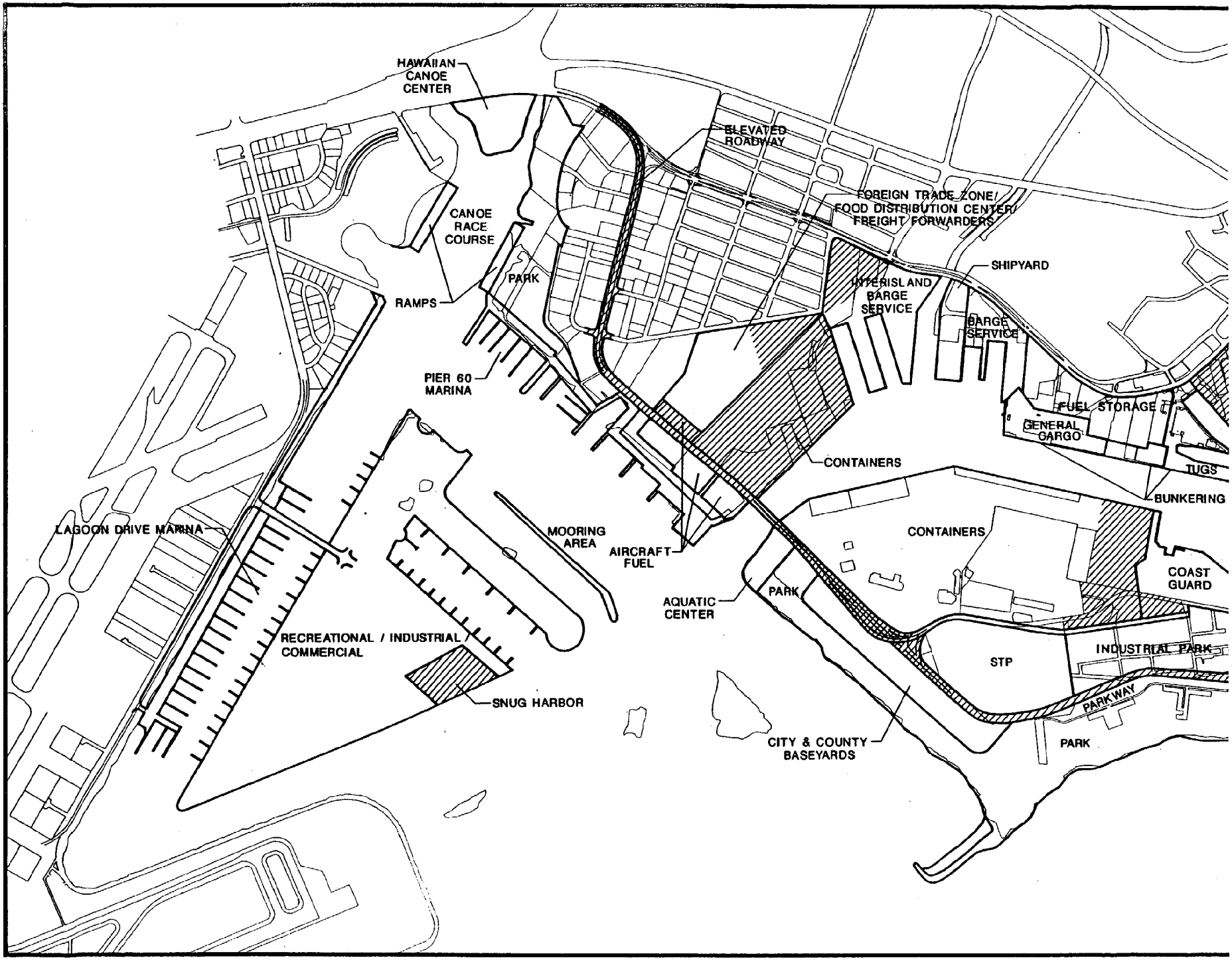
- Expansion of Kewalo Basin to accommodate additional dinner cruise and commercial fishing boats. This would be accomplished by dredging approximately 7 acres of the existing peninsula and using the dredge spoil to fill beyond the existing shoreline, thus creating a new protective peninsula.

- Expansion of the Sand Island container yard into approximately 30 acres of land owned by the Coast Guard. In return for this land, the Coast Guard would expand its operations into the existing industrial area and into the Anuenue Fisheries Research Center site. The Fisheries Center would need to be relocated to accommodate this, possibly to a large scale pond research, training and demonstration facility, a concept which is currently being explored by DLNR.

- Expansion of the inter-island barge service operations, relocation of freight forwarding operations and construction of aircraft fuel tanks (if needed) into the remaining mauka portions of the Kapalama Military Reservation lands.

- Relocation of the cable ship berth and servicing facility from Sand Island to a suitable location within the harbor, possibly to Pier 26.

- Possible construction of a new slip with two or four 800-foot cargo berths in the Barbers Point Harbor mauka of the existing basin along with up to 120 acres of backland.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ELEVATED ROADWAY
FOREIGN TRADE ZONE/ FOOD DISTRIBUTION CENTER/ FREIGHT FORWARDERS
CANOE RACE COURSE
PARK
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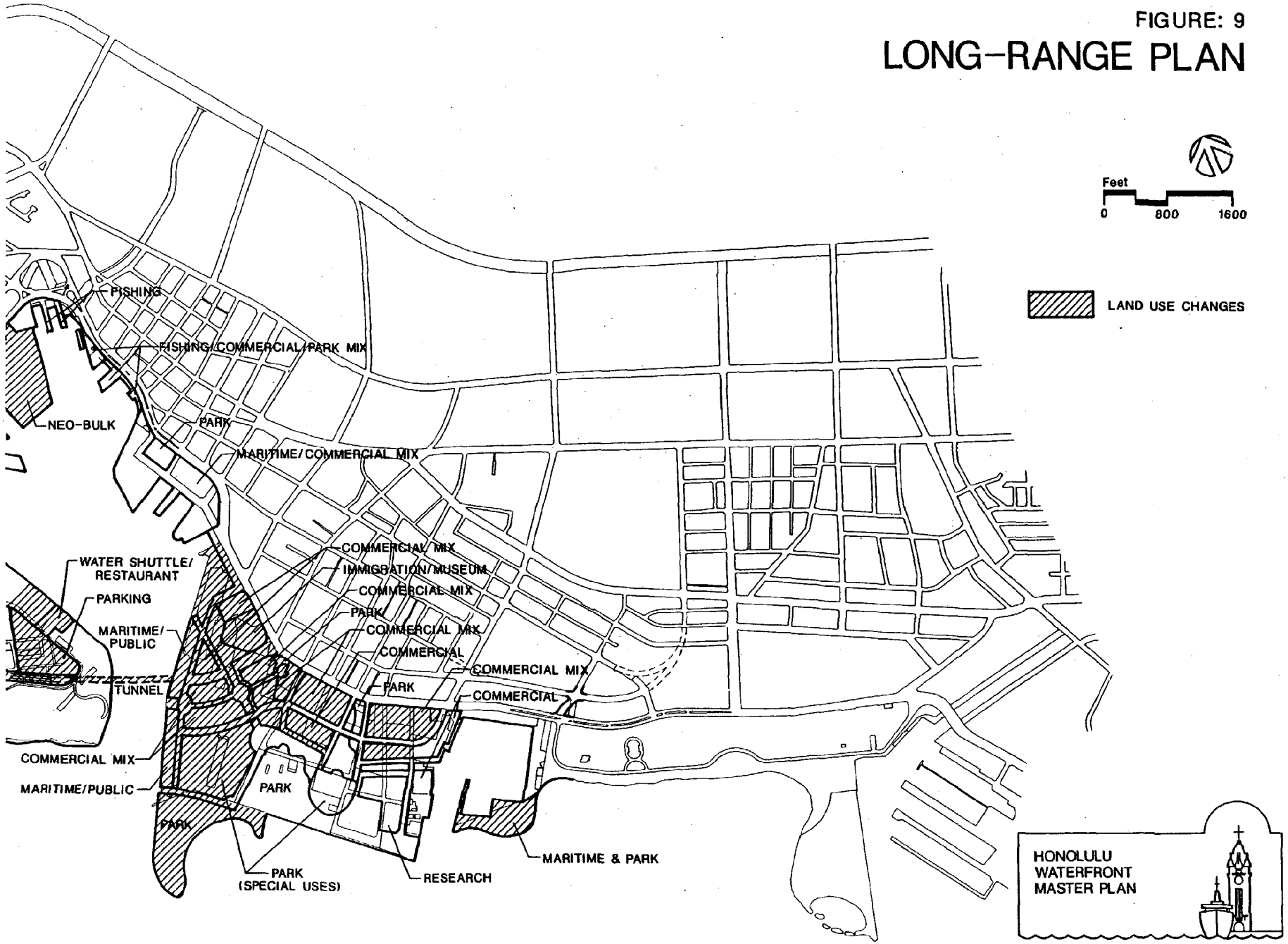
SHIPYARD
INTERISLAND BARGE SERVICE
BARGE SERVICE
PIER 60 MARINA
FUEL STORAGE
GENERAL CARGO
CONTAINERS
TUGS
BUNKERING
LAGOON DRIVE MARINA
MOORING AREA
AIRCRAFT FUEL
CONTAINERS
COAST GUARD
AQUATIC CENTER
PARK
RECREATIONAL / INDUSTRIAL / COMMERCIAL
STP
INDUSTRIAL PARK
PARKWAY
SNUG HARBOR
CITY & COUNTY BASEYARDS
PARK

FIGURE: 9

LONG-RANGE PLAN



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Several additional long range options are available in order to satisfy future maritime space requirements in the State beyond those described above. These include: the creation of Sand Island makai terminals with a new channel 5,000 feet long and 1,000 feet wide within a landfill area makai of the existing park; relocation of the U.S. Coast Guard Station out of Honolulu Harbor and using this and lands currently in industrial use for cargo handling; and the development of Neighbor Island harbors to handle direct cargo liner service.

Economic/Urban Development

Proposed urban development between years 2000 and 2010 is intended to include the final redevelopment actions that complete the transformation of the central waterfront area into the gathering place of Oahu; a place where people relax, play, work, and enjoy new cultural amenities. Major components during this phase of the Plan include:

- Completion of the inland waterway through the Kaka'ako Peninsula, extending from Kewalo Basin to the newly constructed water frontage at Pier 4.
- Redevelopment of various lands in the Kaka'ako Makai area fronting Ala Moana Boulevard, adjoining the inland waterways and extending into the Fort Armstrong area for commercial mixed-use activities.
- If and when the Pier 19 to 23 area is no longer needed for maritime operations, possible long-term redevelopment of the area into a large mixed-use development creating a new Iwilei urban waterfront complex.
- Possible redevelopment of the lands behind the Pier 30 to 33 area along Nimitz Highway into office and commercial retail uses when there is sufficient demand in this area to support such uses and it is no longer needed for fuel storage or maritime support uses. (Efforts should be made to relocate automotive fuel storage and distribution operations to their ultimate location in the Campbell Industrial Park.)

- Construction of a restaurant in conjunction with a water taxi terminal on the Sand Island site to be vacated by the cable ship and its support services.

Recreation/Leisure

Implementation of the Great Park concept for the Honolulu waterfront is continued during the second phase of the Plan. Recreation and leisure plan elements provide final ingredients in order to bring about the creation of Honolulu's "Central Park." These elements include:

- Expansion of the Kaka'ako Waterfront Park into the Pier 1/Fort Armstrong area. This is envisioned as a urban activity park, containing approximately 16 acres of entertainment, recreation, commercial, cultural and educational uses within a park-like setting.

- Filling of the shoreline area makai of Fort Armstrong and creating approximately 17 acres of passive recreation and beachfront park land similar to Magic Island as well as building up a protective reef in front of the beach which would also improve the surfing conditions in this area.

- Dredging a new circulation channel through the Ewa end of the Ala Moana Park reef in order to improve water quality at the beach park and provide fill for the expansion of the Kewalo Basin peninsula.

Circulation

Circulation elements would continue the directions set in the earlier phase by encouraging the use of public transportation and by providing measures which mitigate problems restricting the efficient flow of traffic in the central Honolulu area. Major elements included in the 2010 Plan are:

- Development of a people-mover system in the Kaka'ako Peninsula area that would tie into the proposed rapid transit system mauka of Ala Moana Boulevard.

- Possible construction of a Sand Island Bypass and a tunnel underneath the entrance to Honolulu Harbor, allowing for the movement of traffic between the airport area and Kaka'ako/Waikiki, thus by-passing Nimitz Highway and the Downtown area.

- Redevelopment of the roadway system in the Kaka'ako Peninsula, including the extension of Ward Avenue, Punchbowl and South Streets makai of Ala Moana Boulevard, and a major entrance into the waterfront park via Cooke and Ohe Streets.

- Completion of an urban promenade that extends along the waterfront from Ala Moana Park to the Chinatown area.

- Development of a harbor water taxi system with terminals at Fort Armstrong, the Aloha Tower and Sand Island.

- Construction of a 10-acre parking area near the Diamond Head end of Sand Island to serve as overflow park parking on weekends and Downtown parking (via water taxi) on weekdays.

3.4.2 Description and Analysis by Subarea

This section provides greater details concerning the proposed plan land uses highlighted in the discussion above, and presents the rationale for including these elements in the Master Plan. The various land uses are described by subareas as envisioned in the long term future (i.e., by year 2010 and beyond).

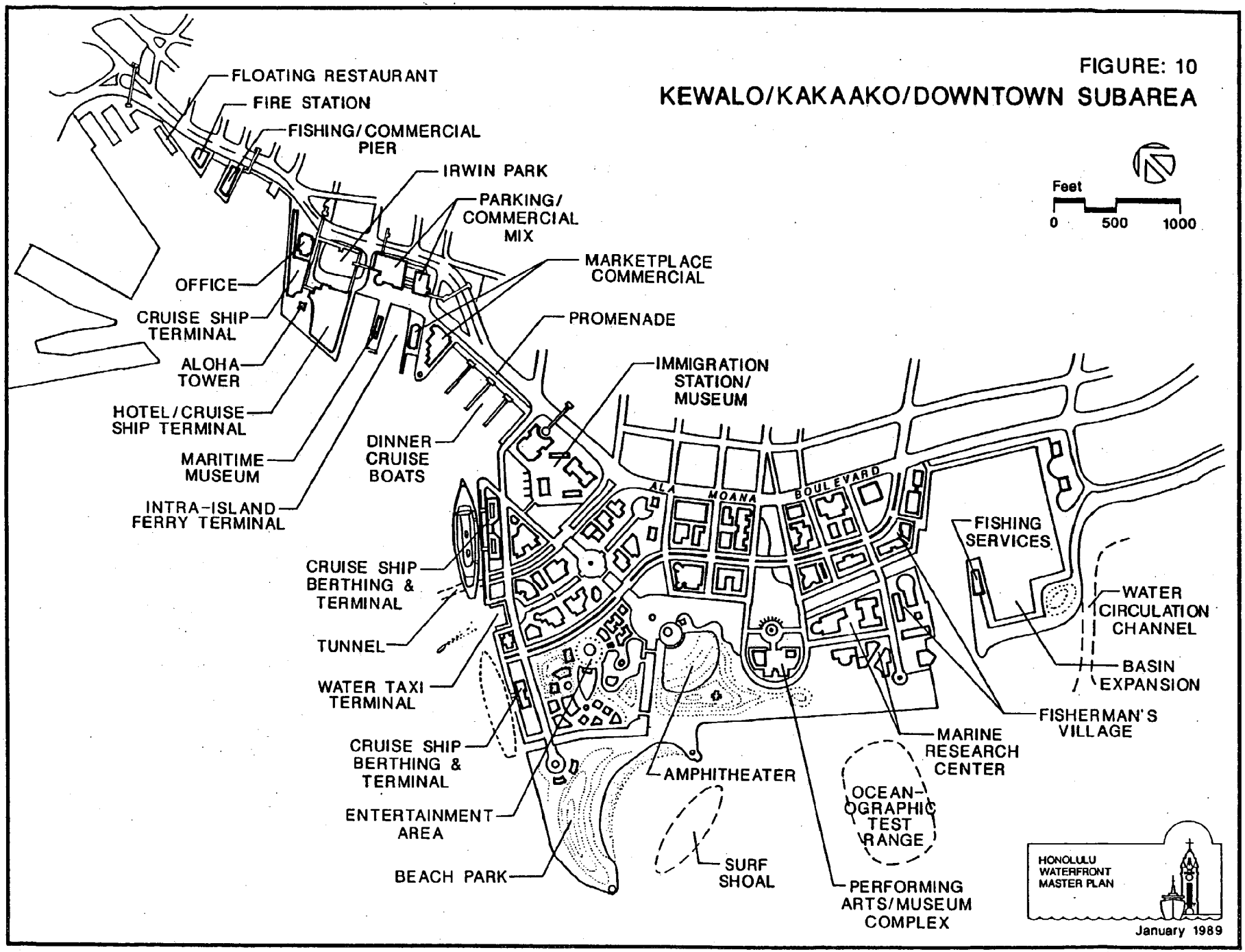
3.4.2.1 Kewalo/Kaka'ako/Downtown Subarea (Figure 10)

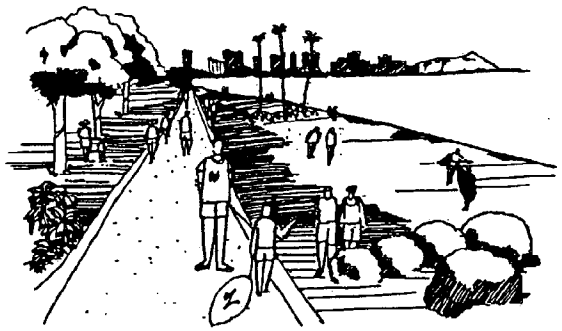
Ala Wai Boat Harbor Activities

No major changes are proposed for the Ala Wai Boat Harbor. The current recreational boating uses should prevail along with their supporting services and activities.

FIGURE: 10

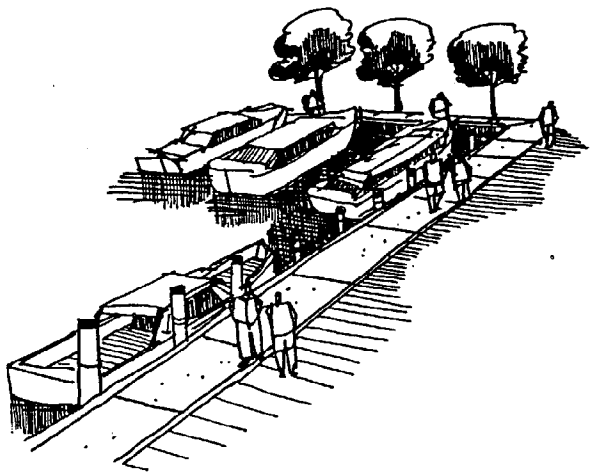
KEWALO/KAKAAKO/DOWNTOWN SUBAREA





Expansion of Ala Moana Park

The Ewa end of Ala Moana Park is planned to be expanded into the Kewalo Basin area. This would be accomplished by relocating the existing net sheds and other commercial fishing service facilities to the Kewalo Peninsula, relocating the Marine Mammal facility to the Kaka'ako Peninsula ocean research park, demolishing some or all of the existing structures (marine sales and restaurant facilities might remain) and fences along the Ewa boundary of the park, and adding landscaping in the area to achieve greater emphasis on pedestrian movement while still maintaining vehicular access and parking for the piers. Expansion of the park is seen as a way to create a continuous flow between the park and basin, and to open up the view corridors and view planes.



Kewalo Basin Harbor Expansion

Kewalo Basin is a medium draft commercial boat harbor which serves as the homeport for excursion, commercial fishing and charter sport fishing boats. The harbor is currently operating at near capacity. It is the hub of the commercial fishing industry as well as the center for the visitor maritime industry due to its convenient location near Waikiki. Combined together, these industries provide a significant economic element within the waterfront. The Plan envisions that Kewalo Basin is maintained and enhanced as the focal point for these activities.

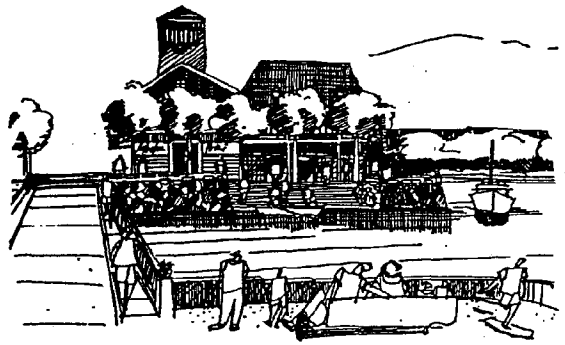
Plans for Kewalo Basin provide for the expansion of the area in order to meet future demands from the commercial fishing and dinner cruise ship industries. Expansion is planned to be accommodated by dredging on the inland side of the peninsula to create a larger water area and using the dredge material to fill the area makai of the existing Kewalo Peninsula shoreline. Additional fill material will be available from the new circulation channel dredged to improve the water circulation and quality at the Ewa end of the Ala Moana Park. The new harbor area for boats will add approximately 7 acres to the existing basin. The fill area would not extend into the ocean any further than the existing jetty which marks the entrance to the harbor. As a result, surfing sites would not be impacted according to preliminary ocean engineering analyses. Service facilities to accom-

modate the needs of the commercial fishing industry are to be located on the peninsula at Kewalo. These facilities would include a net repair shed, ice plant, bait and tackle storage, and fueling facilities.

Additional excursion and commercial fishing boats which may be too large for Kewalo Basin are planned to be accommodated within Honolulu Harbor or the Keehi Triangle and will be discussed below.

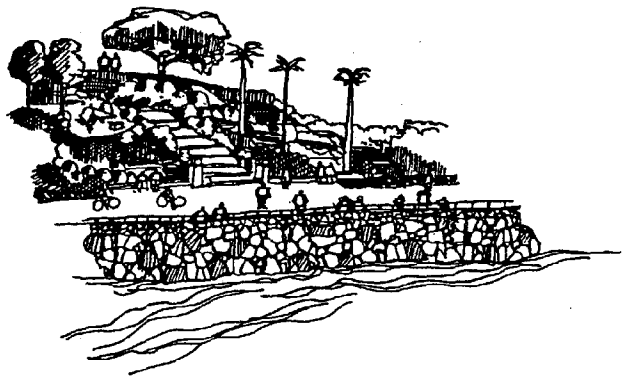
Kewalo Basin Commercial Redevelopment

Major commercial redevelopment is planned for the Ewa edge of Kewalo Basin from the existing Fisherman's Wharf Restaurant to the John Dominis Restaurant. The plan envisions a "fishing village" environment that would feature commercial fishing berths and a variety of retail shops, outdoor cafes, restaurants and tourist-related attractions. The theme of this development is intended to build on the existing character of the harbor, highlighting the value of the area to the commercial fishing industry as well as to the visitor industry with the various dinner and harbor cruise boats and charter sport fishing boats berthed in the harbor.



An important facility which should be included along this Ewa side of Kewalo is a first class aquarium complex featuring state-of-the-art exhibits highlighting Hawaiian ocean life. Such a facility, which should be developed with private funds, would be a primary attraction and would generate additional development in the area. The aquarium would be located adjacent to the park in Kaka'ako where complementary activities (such as the marine sciences research park) are proposed to be located.

Structures within the area would be low-rise, consisting of a series of one to three story buildings which express an architectural style appropriate to Kewalo as a local fishing village. This scale and style would be carried out along the inland waterway which would begin at Kewalo Basin between the existing cannery and drydock facilities, and continue into the Kaka'ako Peninsula. A waterfront promenade extending along the entire Ewa side of the basin in front of the village area would connect the mauka side of Kewalo to the Point Panic park.



Fishing or maritime services currently located in this area should be integrated into the commercial development wherever possible, but those which are not compatible with the public's use of the waterfront should be relocated to the Kewalo Peninsula. However, boat building and repair services currently in the area should be relocated to the Pier 60 area at Keehi Lagoon. The fish auction may be relocated to Piers 13 and 14 as part of the Chinatown pier renovations.

Kaka'ako Waterfront Park

The waterfront in Kaka'ako is planned to be the "Central Park" of Honolulu, providing an important link in the "lei of green" extending from Waikiki to the airport. Recreational activities commonly provide for the "refreshment of the body and mind." Based on this concept, uses in the park are planned to include passive and active, cultural, entertainment, educational and commercial activities for the recreational well being of all who visit the area.

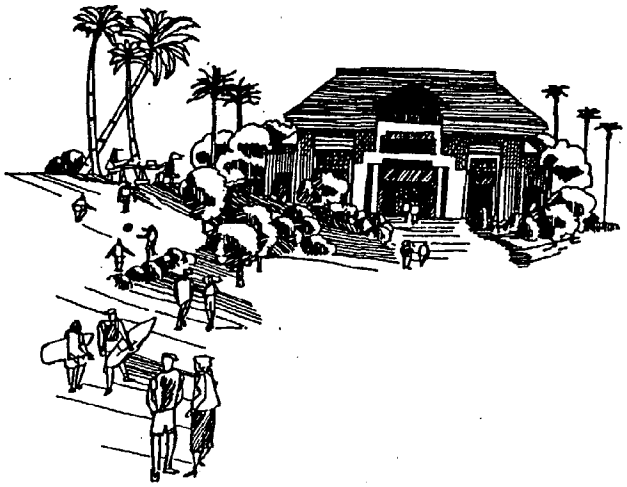
Upon completion, the Kaka'ako Waterfront Park is planned to encompass more than 100 acres, although parts of this will incorporate commercial, entertainment, maritime, cultural, educational and water-oriented activities, all in a park-like setting. The park will be heavily landscaped, providing ample open space for passive recreational activities, particularly on the sculptured landfill and along the waterfront promenade. Major components of the park are described below.

Waterfront Promenade and Shoreline Park. The shoreline park area, which extends from the existing Point Panic Park to the waterway at Fort Armstrong, covers approximately 30 acres. The entire shoreline will be circumscribed by a major pedestrian promenade for walking, jogging and casual bicycling. Behind much of the promenade will be passive park areas with grass, trees, and occasional shelters. A large portion of the passive area will be taken up with the existing landfill mounds which will be sculptured to form picnicking, observation and relaxation areas. Other more level areas will be open and suitable for informal games of softball, touch football, frisbee, etc.

Amphitheater. This facility is proposed to be located on 6 to 8 acres and should accommodate between 10,000 to 12,000 people. There could be approximately 5,000 fixed seats, with grass seating built on the regraded slopes of the existing landfill. The location and design of the amphitheater would minimize potential noise impacts on surrounding properties by directing the sound towards the ocean. Modern design and construction techniques would equip a facility suitable for a variety of performances.

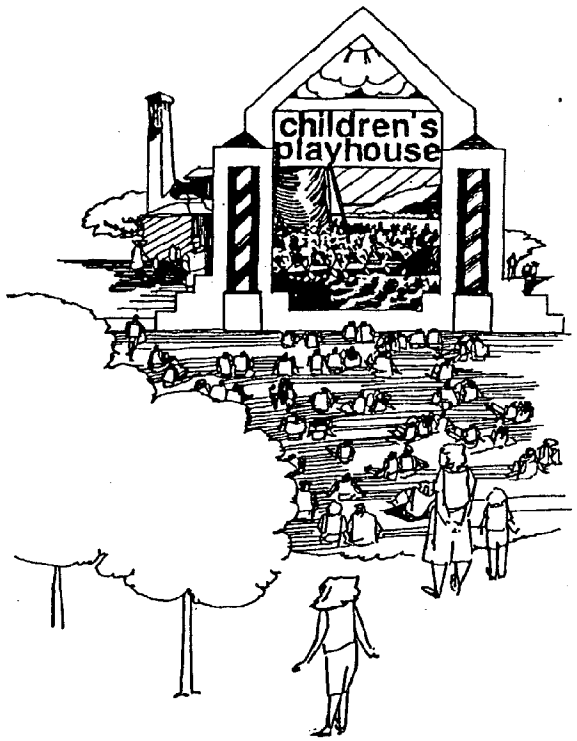
The proposed amphitheater at Kaka'ako would be subject to noise from aircraft overflights (the site is between the 60 and 65 Ldn aircraft noise contours) and thus may not be ideal for symphony concerts or other subdued performances. Such performances could remain at the Waikiki Shell since they do not generate significant noise complaints. Music performances which are not overly sensitive to external noise could be conducted here with little or no adverse impact on adjacent lands.

Performing Arts Center and Museum Complex. This complex of cultural uses is planned to cover 2 to 4 acres. The performing arts center would provide facilities for theater productions, rehearsals, set design and construction, classrooms and wardrobe storage. Possible users of this facility include the Honolulu Theater for Youth and/or other professional theater groups which may be established in Honolulu in the future. The performance center should feature two theaters, one in the range of 800 to 1,000 seats, and the other of approximately 250 to 300 seats for smaller shows, experimental theater or cabaret-style performances.



Funds to construct such a facility should be privately obtained or raised through public/private matching grants, although the State could provide the necessary infrastructure and parking (which could be shared with other park users).

A museum could also be incorporated into this cultural complex. One possible user is the Hawaii Children's Arts, Sciences and Technology Museum. which currently has plans to utilize space at the Dole Cannery Square. However, this site may be available for only three years. The museum was included in the park



design because: 1) of the possibility to nurture education and learning among the youth in the community which ultimately may have social/economic returns for the public investment, and 2) to broaden the appeal of the park as a gathering place to a wider cross section of the community. However, because of the possible immediate need to find a permanent home for this facility, another site for consideration in the area is the old pumping station at Fort Armstrong.

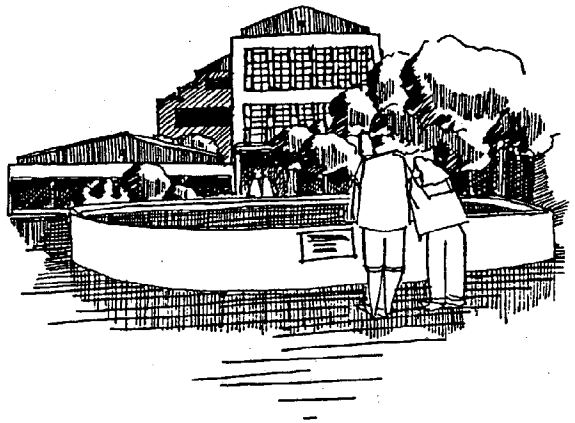
Marine Science and Research Park. This facility of approximately 6 to 8 acres would provide for the consolidation of University of Hawaii research activities and NOAA's National Marine Fisheries Service (NMFS). University facilities would include Look Laboratory, the Pacific Biomedical Research Center (PBRC) and the Marine Mammals Laboratory. (These facilities, including NMFS, currently operate on approximately 4.5 acres.) Set in a campus-like environment, the research center is envisioned to provide public educational displays and programs in addition to ongoing research projects.

The Marine Science and Research Park would consolidate various water-dependent research facilities currently located in the waterfront planning area. The proposed site in the Kewalo/Point Panic area provides a location near the Manoa campus, thereby facilitating commuting by faculty and students. The site is also adjacent to the underwater research test range located off of Point Panic and has access to ocean water which is of a quality sufficient to meet their research needs. Establishment of the research center recognizes the economic and public educational benefits the University and others involved in ocean research provide to Hawaii and the general public.

Development of the research center should be coordinated with any aquarium developed in the area to create an environment where research and aquarium activities could provide services that assist and complement each other. Public exhibits which highlight research activities at the center would provide exposure benefiting the public by heightened awareness of the ongoing research and progress made to improve the quality of life in the community. The research center would also attract additional foundation grants and research funds to help

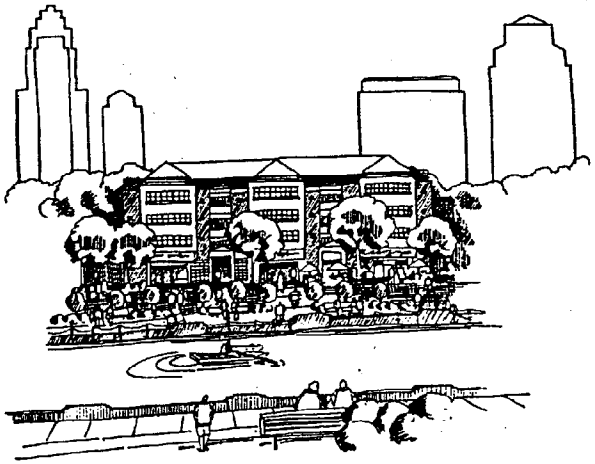
these programs grow and diversify as a result of increased interest on a local and national scale.

The Kewalo peninsula was also evaluated as a potential site for the marine research center. However, the isolated location of the site, its limited size, and the need of other users for the area were considered to be contrary to the objective of creating a facility that would be more accessible to the public in order to increase awareness and knowledge of the ocean sciences and its resources. The selected site in Kaka'ako addresses the goal of increasing public access to the water, and encourages the development of uses and activities which take advantage of and seek to promote Hawaii's unique ocean-related opportunities.

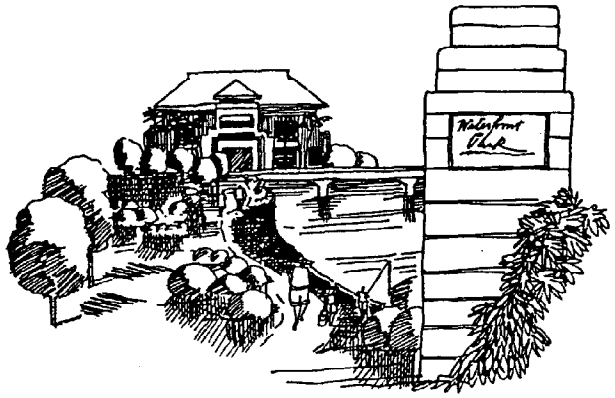


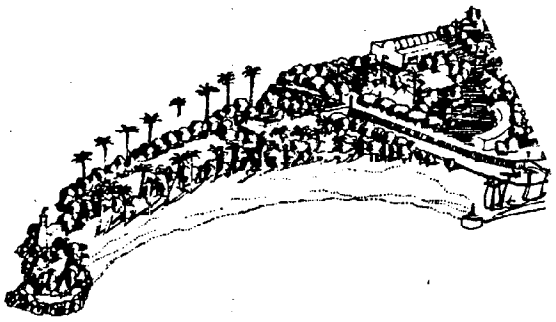
Inland Waterway in the Kaka'ako Peninsula. An inland waterway system is planned through the Kaka'ako Peninsula, extending from Kewalo Basin to the newly constructed water frontage at Pier 4 and covering 15 to 18 acres. Much of the waterway would be approximately 100 feet in width, with some areas forming lagoons of up to 250 feet across. The waterways would not only be for passive enjoyment, but also for activities such as paddling, canoeing, rowing, model boat sailing and fishing.

The inland waterway system provides significant economic and aesthetic benefits which accrue to the adjacent land areas. Preliminary analyses of the costs and benefits associated with the waterway finds that the feature should essentially be able to "pay for itself." The prospective costs of canal and bridge construction are expected to roughly equal the projected premiums paid by developers of adjacent commercial lands. It should be noted that the analysis did not attempt to quantify the added value perceived by park visitors. The rationale for the proposed alignment is based on the concept of bringing more water frontage into the Kaka'ako area, creating a new urban waterfront for the Kaka'ako community in addition to the passive waterfront of the shoreline park.



Waterfront Park Entrance. The original boundaries established for the Kaka'ako Waterfront Park included the block bounded by Ala Moana Boulevard, Ilalo, Koula and Ahui Streets. This was the only park frontage on Ala Moana and





was to be the primary park entrance. Further evaluation of the HCDA plan for the mauka portions of Kaka'ako suggests that a better location for this entrance would be an alignment along Cooke Street which is designated as a major "view corridor" street and a link between Mother Waldron Park and the Waterfront Park.

A new mauka extension of Ohe Street creates a small triangular passive park on the mauka side of Ala Moana, thus requiring users of Ala Moana Boulevard to actually drive through a small portion of the Waterfront Park. This should greatly enhance the visibility of the park (including a possible extension of the waterway) as well as providing a very central access point to its many facilities.

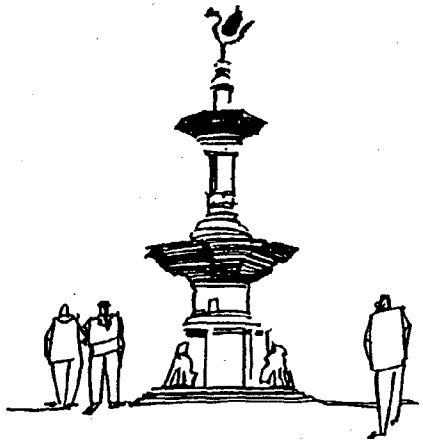
Since these two areas designated for the park entrance (between Cooke and Ohe Streets on the makai and mauka sides of Ala Moana) are currently owned by the Bishop Estate, it is proposed that they be exchanged for the State-owned block which was designated on the original plan as the entrance to the park. The land involved in the exchange covers approximately three acres under both land holdings.

Land Reclamation for Park Use. The Plan calls for filling makai of the shoreline area off of Fort Armstrong and creating approximately 17 acres of passive recreation and beachfront park land similar to Magic Island. This additional park land will contain picnic areas, a beach, and other passive recreation areas. In addition, a protective shoal is proposed to be constructed underwater makai of the new beach in order to improve surfing conditions at the site and protect the new beach. This project is proposed because of the present and increasing need and desire for beach space and surfing sites in urban Honolulu. Preliminary ocean engineering studies indicate that the landfill and surf shoal are technically and environmentally sound improvements.

Urban Park Entertainment Area. The makai portion of the Fort Armstrong and Pier 1 area is planned to be transformed from maritime use into a major activity center set in an urban park environment. This area is approximately 16 acres and intended to feature entertainment, commercial, recreational, cultural and educational activities in a landscaped, park-like setting. It is envisioned as a high-

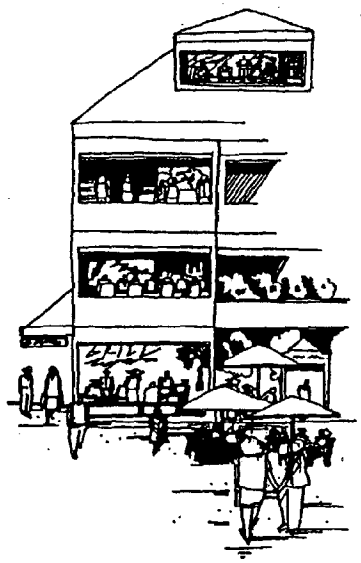
ly active complex for people to spend their leisure time, both day and night, and would most closely resemble such facilities as a permanent Expo site, an Epcot Center, a Tivoli Gardens in Copenhagen and a Seattle Center. It offers a major opportunity for private investment into a revenue generating facility that would benefit both the State and the private sector while creating an exciting and potentially world-renowned complex all in a park-like setting. The rationale for this entertainment center is the economic value that such uses could provide to the State and its ability to promote the goal of making the waterfront a gathering place for all people, at all times.

The Kaka'ako Waterfront Park is planned to provide more than the typical beachfront experience which largely gives visitors "refreshment of the body." The intent is to provide for "refreshment of the mind" as well. Such an intent is believed to be a public good in that educational facilities (i.e., research center, museum, aquarium, etc.) increase awareness of our community to the lessons of the past and better prepares visitors to these facilities for coping with the challenges of the future. Furthermore, cultural facilities (i.e., performing arts center, amphitheater, etc.) stimulate diversity and pride in the City, while entertainment uses provide outlets for the growing amounts of leisure time available to residents. It is believed there is a need for these types of facilities to establish an identity for Honolulu as it enters the 21st century.



Mixed-Use Development on Kaka'ako Peninsula

A mixture of commercial, office and possibly residential uses are envisioned for approximately 40 acres on the Kaka'ako Peninsula. This area includes approximately 11 acres of privately-owned lands along Ala Moana Boulevard, parcels along the mauka side of the proposed inland waterway and lands within the mauka portion of the Fort Armstrong area. Along Ala Moana Boulevard, the floor area ratio (FAR) is planned to be 3.5, with a maximum height of 200 feet. On other parcels, the FAR will be 2.5. Height limits will vary, stepping down towards the shoreline. In the mauka Fort Armstrong area where a new Kaka'ako waterfront is planned along the canal, greater lot coverage might be encouraged



in order to limit the height of structures. The mixed-use area is planned to include a significant portion of the parking required for users of the waterfront park.

At the present time, the Plan does not provide for the inclusion of residential uses in the mixed-use area. As stated in the goals for the waterfront, housing should only be provided if it is not competing with or impacted by other uses which benefit or need a waterfront location. There are, however, positive factors which should be noted concerning the potential of residential uses in the Kaka'ako Peninsula.

First, marketing analyses show that residential uses create higher land values the closer they are to the waterfront. A model of specific development parcels in the Fort Armstrong area indicates a premium of up to 25 percent for residential property located adjacent to the waterways. Second, housing in the Kaka'ako Peninsula would open the area to an additional market which would likely increase the pace of development in the area. Third, housing would provide a 24-hour population that would promote the concept of the area as a gathering place. Finally, housing provides an opportunity for people to live and work in the same vicinity, thus reducing traffic generation in the area.

Arguments against housing in the area include the potential of noise impacts from aircraft, roadway traffic and the proposed amphitheater. The Fort Armstrong area is and will continue to be subjected to aircraft noise generated from flight operations associated with Honolulu International Airport. Properties fronting Ala Moana Boulevard are also impacted by traffic noise generated by vehicular movements along Ala Moana Boulevard. Although the proposed amphitheater is to be situated facing the ocean, the proximity of housing to this facility nonetheless presents the potential for noise impacts. (Such a situation has recently limited the use of the Waikiki Shell.)

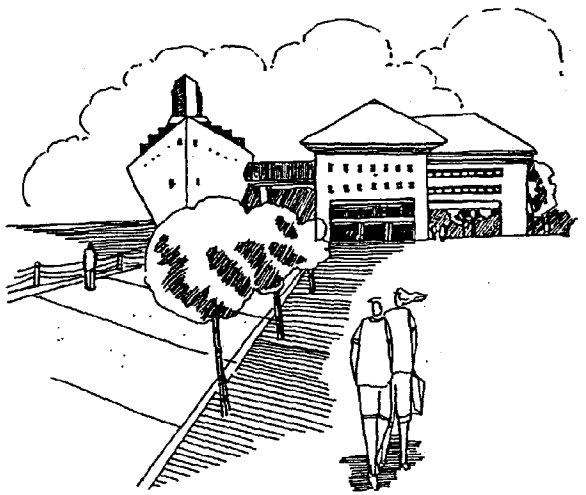
Another negative factor is that the housing would be targeted for higher income families unless provisions were included for subsidized housing. However, the addition of low-cost housing would decrease the potential economic benefits used to subsidize other public improvements in the area. A final factor against

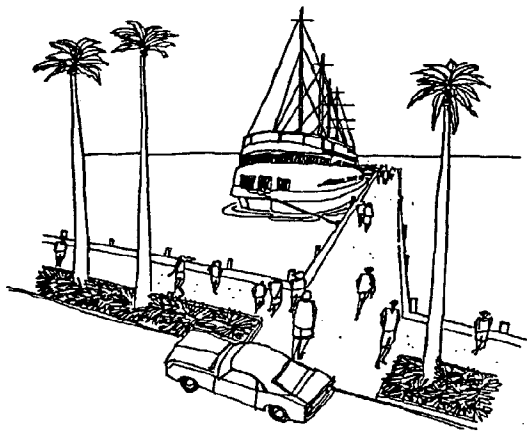
housing is the anticipated demand for parking. As noted earlier, the mixed-use area is planned to provide parking for the general area and park visitors. Office structures would include parking that could be utilized at night and on week-ends by the general public. Residential parking would limit this potential. The fact that there will be thousands of residential units constructed in the mauka portions of Kaka'ako generally negates the need for any residential development in the makai area.

Passenger Cruise Ship Terminal at Piers 1 and 2

Plans for the Pier 1 and 2 area at Fort Armstrong call for passenger cruise ship terminals and deep draft lay berths areas for itinerant vessels. The passenger terminals are envisioned to be low-rise structures for the efficient movement of passengers and luggage. Restaurants could also be incorporated into the structures, and viewing platforms on the upper level of the terminals could be open to the public in order to enjoy the views of the harbor. An area approximately 100 feet wide would be reserved along the length of the piers for access and servicing. Portions of this area may be closed to public use during times when the passenger ships and other vessels are docked at the pier. At other times, this area would serve as a pedestrian promenade.

Expansion of the passenger cruise ship facilities in the harbor is based on analyses which project land and water requirements for passenger cruise vessels by the year 2010 to be an additional eight acres and two to three berths. At present, all three berths at the Aloha Tower are utilized for homeporting of passenger cruise ships. There is a possibility that other ships would also homeport in Honolulu if space were available. An additional factor supporting these facilities along Piers 1 and 2 is that it would maintain the harbor's longest continuous pier frontage in maritime use. At the same time, this use is seen as very compatible with other activities planned for the Kaka'ako area.





Expanded Water Frontage at Pier 4

The plan proposes that new water frontage along Ala Moana Boulevard be created by dredging the existing Pier 4 area and portions of Pier 2 at the Foreign Trade Zone. This would create approximately 500 feet of new water frontage (for a total of approximately 700 feet). This area would provide for the expansion of berthing facilities for large dinner cruise boats like the Alii Kai and Rella Mae. The site could also incorporate a new berth area for the Coast Guard if it is necessary to provide a boat connection between the Federal Building and the Coast Guard's Sand Island facility.

The harbor study conducted for the Plan indicates that excursion or dinner cruise boat berthing needs will increase by 17 berths by the year 2010. While Kewalo Basin is projected to provide for some of these, it is limited to handling only the small- to mid-size vessels. Additional overnight berthing could also be provided at the Keehi Triangle with scheduled pick-ups at these Pier 4 facilities.

A pedestrian promenade and vessel servicing way would be provided in a 100-foot wide section between Ala Moana Boulevard and the water's edge. Bus parking could be provided in conjunction with the possible festival marketplace on the Ewa side of the piers so that tourists who use the dinner cruises would take advantage of these retail facilities.

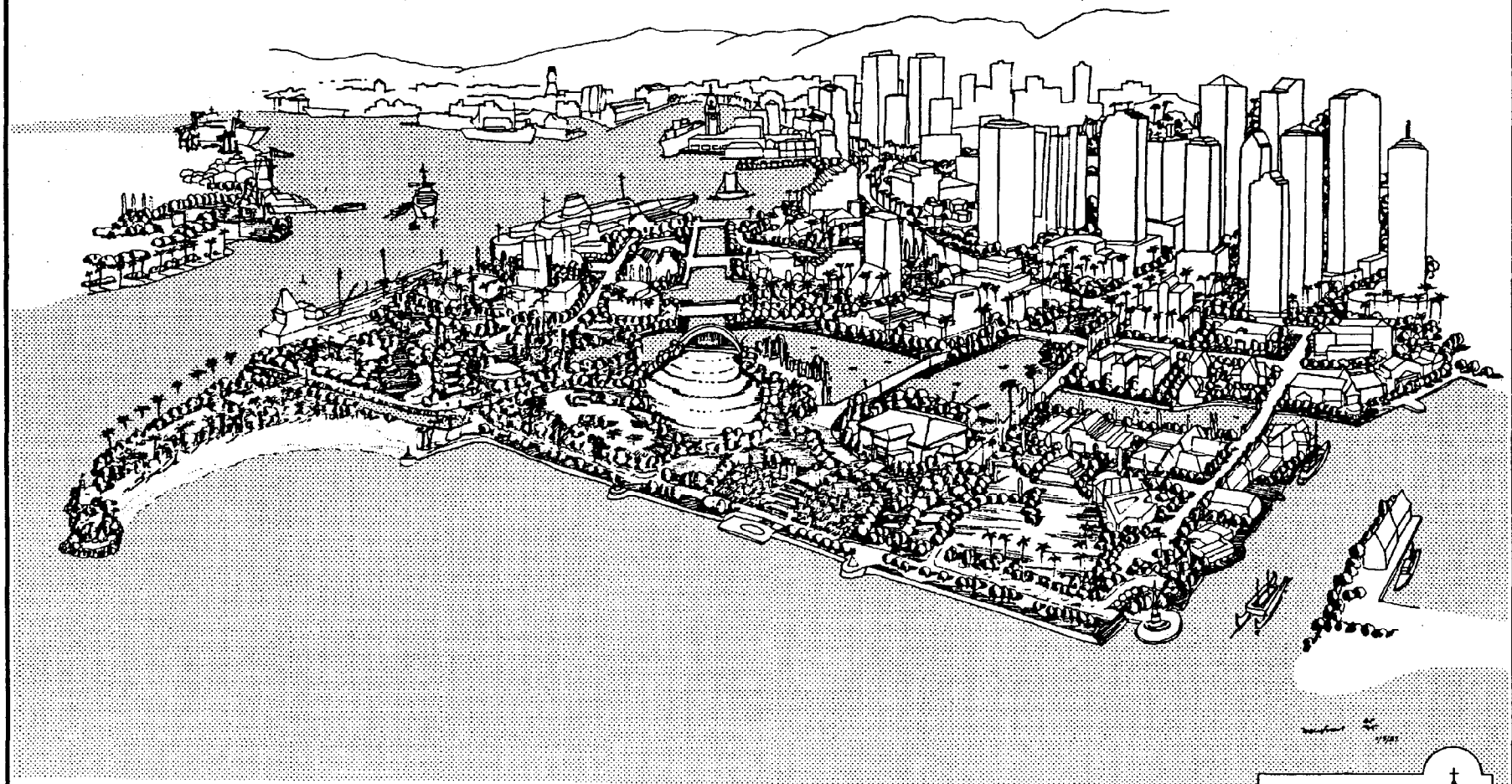
Vision of the Kaka'ako Waterfront

The many proposed changes to Kaka'ako, as described in the foregoing sections, combine to realize a comprehensive long-term vision of urban life on Honolulu's Waterfront. This vision, the "Gathering Place", is a central theme and fundamental objective of the Waterfront Plan and is expressed most vividly in the concepts and proposals for Kaka'ako and Downtown.

A sense of this future is conveyed through the aerial sketch in Figure 11. The point of view of the sketch is off-shore looking across the Kaka'ako Peninsula towards Downtown and the Koolau Mountains. Apart from the timeless elements of mountains and ocean, little else is common to the Kaka'ako of 1988.

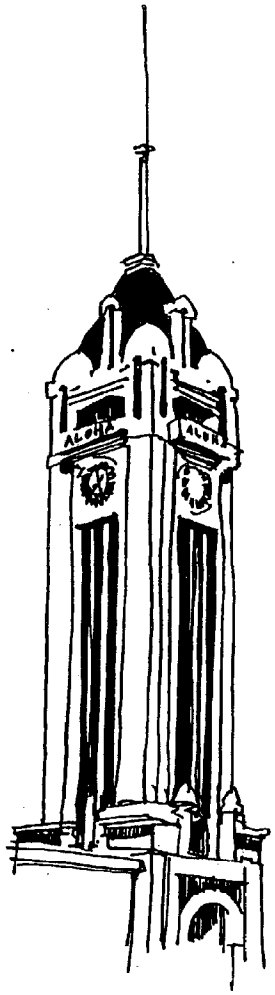
FIGURE: 11

VIEW OF KAKA'AKO



HONOLULU
WATERFRONT
MASTER PLAN

January 1989



The proposed Waterfront Park, a major element in the "lei of green" connecting Sand Island to Kewalo Basin, is the primary feature of the sketch. From left to right, major elements of the park include:

- A peninsula of new parkland along the Diamond Head side of the Honolulu Harbor entrance channel, providing water-related recreation space, ocean views, and a protected beach.
- An "urban park entertainment area" combining only the best features of a public garden, an entertainment center, and a permanent fairground.
- A grassed "ridge" of high ground with trees (utilizing the existing Kaka'ako landfill), providing topographic variety, a regional reference point, and spectacular views of the mountains, ocean and Downtown.
- A "state-of-the-art" outdoor amphitheater for popular music concerts and other events. In line with the Aloha Tower along the axis of the inland waterway, the amphitheater provides a major focal point within the park.
- An inland waterway connecting Honolulu Harbor with Kewalo Basin. The waterway introduces a significant waterfront amenity to the inland areas of the Kaka'ako Peninsula, it supports aquatic recreational activities such as protected boating and fishing and provides a natural boundary between urban and park uses.
- A performing arts center complex adjacent to the amphitheater. Facing makai, the complex overlooks the waterfront promenade and a hillside seating for viewing of water-based events in the nearshore waters. In the mauka direction, the complex anchors a formal extension of water and park across Ala Moana Boulevard, creating an access corridor and visual link between the waterfront and mauka Kaka'ako area.

Aloha Tower/Downtown Redevelopment Area

The Aloha Tower Development Corporation (ATDC) has established a set of guidelines for the redevelopment of the Aloha Tower area. Specific proposals will be solicited in the near future requiring that these guidelines be met for any

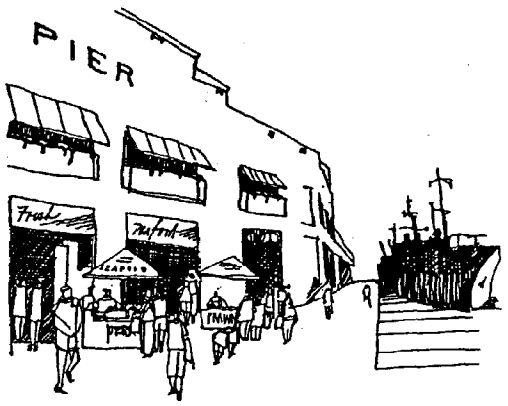
redevelopment within the ATDC boundaries. One example as to how these guidelines might be met is illustrated in the schematic plan for the Aloha Tower site (Figure 10) which calls for hotel, office and maritime activities similar to those specified in a 1983 ATDC proposal. The current plan illustrates a possible high-rise office structure at Pier 11, and a 400- to 500-room mid-rise hotel at Piers 8 and 9, both built above the cruise ship terminal levels. The existing gallery level extending along the perimeter of the site from Pier 8 to 11 could be retained in order to continue the accommodation of three passenger cruise ships, along with some portions of the warehouse area at Pier 10 for maritime service space.

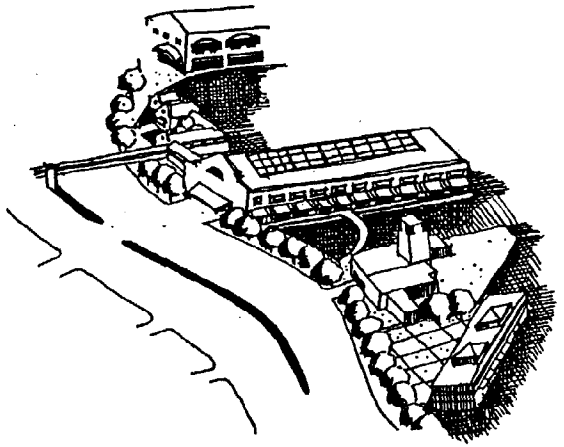
The HECO site on Nimitz Highway could potentially incorporate mid- to high-rise office and retail facilities and the majority of the parking required for the redevelopment area. The final element in the area is a possible festival marketplace at Piers 5 and 6 consisting of a low-rise structure with space for restaurants and various types of retail shops.

The proposed intra-island ferry terminal is suggested to be incorporated within this site, preferably at Pier 6, if the occasional surge problems at this pier can be accommodated. Interim facilities for these ferries could be located at Piers 13 and 14 or Pier 8 until the Pier 6 terminal is available (These piers could also be used under extreme surge conditions). The proposed intra-island ferry terminal is incorporated within this area because it provides a more central location relative to downtown activities than does the Pier 13 and 14 site, and the proposed uses in the festival marketplace would be very compatible with pedestrian traffic from the ferry operation.

Regardless of the specific proposals, the plan sees the benefit of considering the area between Piers 5 and 11 as an integrated development. The key factors for any development in this area should be its relationship to Downtown, the maintenance of cruise ship operations, and the protection and enhancement of the Aloha Tower.

Marketing analyses conducted for the Master Plan indicate that the Aloha Tower/Downtown site provides a unique identity and environment that incor-





porates the historical maritime aspects of the waterfront with the modern central business district of Honolulu. Such a site can easily be distinguishable from other retail facilities in the city. Additional key locational advantages of the site include being situated along major transportation corridors, its proximity to government as well as financial centers and its central location relative to Waikiki and the airport.

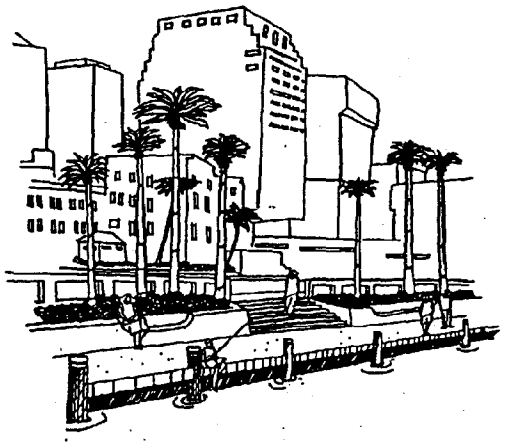
Chinatown Waterfront Redevelopment

The Chinatown waterfront area is made up of Piers 12 to 15 along Nimitz Highway. The social, economic and historic character and ambiance of the general area presents an opportunity to create a unique style of development which captures the essence of the historic waterfront.

Because of its significance as one of the earliest developments in Honolulu, Pier 12 is an ideal site for an interpretive center to serve as the focal point for walking tours that highlight and discuss the harbor's history. Development on Pier 12 first occurred in the early 1800's as Honolulu became the social, economic and political center of Hawaii. Today, the site has been reduced to a parking lot and its historical importance has become obscured. It is proposed that the Pier 12 area be improved as an interpretive center and be developed within a park-like setting.

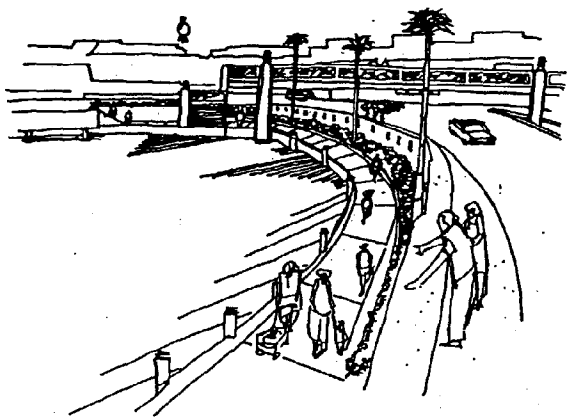
This center will be the focus for the "Ala Makai Seashore Trail", an interpretive program which tells the story of Honolulu's birth and growth. Boston's Freedom Trail is an example of such an urban path which both encourages visitor and local resident participation and provides educational information about the city. Various themes will be used to present creative experiences which highlight the emergence of a diverse and cosmopolitan city from pre-contact times to present day Honolulu. Extending beyond the center and along the proposed waterfront promenades will also be physical references to the historic fabric of old Honolulu such as outdoor signage and plaques, well-placed stereoscopic viewers which superimpose historic images on the same contemporary site and mini interpretive centers in other locations such as the Immigration Building and Aloha Tower.

Piers 13 and 14 would be renovated to provide support facilities for commercial fishing vessels, as well a site for the potential sale of fresh seafood. The redevelopment of the Kewalo Basin area discussed earlier could result in the relocation of fresh fish operations. Such activities could be located in the structure at Piers 13 and 14, where boats could dock and unload their catch. The site could also contain small scale restaurants to enhance the Chinatown linkage to the water.



Access and parking for the Pier 13 and 14 activities are somewhat restricted because of the close proximity to Nimitz Highway and the limited size of the site. Sufficient space for truck loading and unloading of fish as well as parking for wholesale buyers and sellers must be provided in the pier area (possibly on an upper level). However, additional parking for the general public will be dependent on the availability of space in the public parking facilities on the mauka side of Nimitz Highway. Pedestrian bridges across Nimitz are important linkages to facilitate this movement as well as enhancing the overall ties between this section of the waterfront and Chinatown.

As residential projects planned by the City are developed along Nimitz Highway, the demand for leisure areas will increase. The Pier 15 area could provide a limited amount of open space along the waterfront. Open space is already very scarce in Chinatown. The fire station is expected to remain at its present site. The remainder of the area could be cleared and developed as an urban park and fishing pier area. Pier 15 could also provide a new berthing area for the Oceania Floating Restaurant if such a move proves feasible to the buyer of the vessel.



As noted above, the pedestrian promenade and walkways connecting the waterfront with the mauka side of Nimitz Highway are key elements of redevelopment in the area. These are discussed further in Section 3.4.3.1.

3.4.2.2 Iwilei/Kapalama/Sand Island Subarea (Figure 12)

Redevelopment of Piers 19-23

Although short-range uses anticipate the continuation of the existing raw sugar storage and flour and grain handling operations, these should, in time, be relocated to Barbers Point (assuming that sugar is continued to be produced on Oahu in the years ahead and that the flour milling can remain viable at that location). This would permit the entire area to be utilized for neo-bulk operations as long as those needs are not being met elsewhere in the harbor and in other ports throughout the State.

However, if this land was no longer needed for maritime operations at some point in the future, the 20-acre site would be very suitable for a major mixed use complex of office/residential structures with public waterfront promenades and views overlooking the Harbor, Downtown, Chinatown and Punchbowl. Expansion into Iwilei of offices and other commercial uses as a result of the saturation and high cost of Downtown office space is expected to continue (witness the transition of cannery and warehouse space by Castle & Cooke, Gentry, Shidler and others in this area over the past several years). A pedestrian and functional linkage between Piers 19-23 facilities and these interior redevelopment areas in Iwilei will strengthen the mauka-makai relationships which are being re-established in other parts of the waterfront.

Redevelopment of Piers 24 to 29

Redevelopment of Piers 24 to 29 is intended to provide improvements for ongoing maritime industrial operations. The current tenant, the inter-island cargo shipping operations, would be relocated to new and larger facilities at Piers 39 and 40. Some outmoded structures would then be demolished and general wharf improvements would be made. These would include widening the slip between Piers 26 and 27 by removing the shed between Piers 27 and 28 and reconstructing the pier in a much narrower configuration since it would no longer

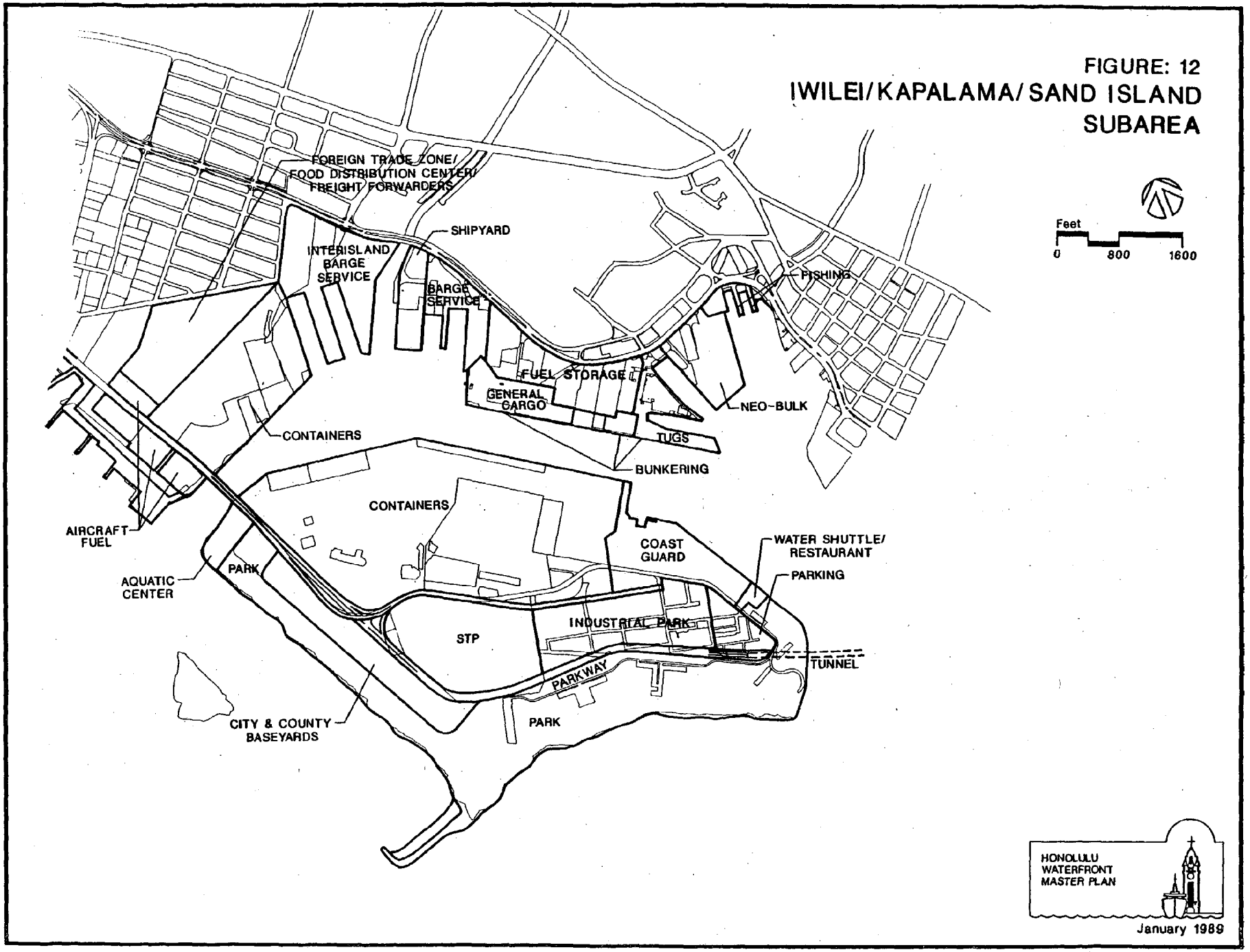
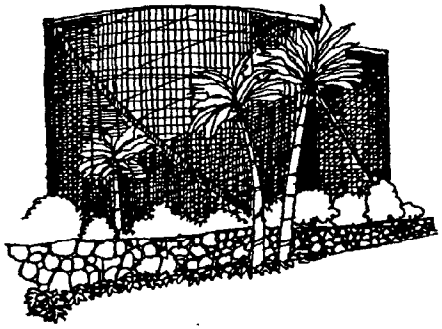


FIGURE: 12
IWILEI/KAPALAMA/SAND ISLAND
SUBAREA

be needed for cargo operations. The makai face of the pier would be equipped with new bunkering facilities.

Upon completion of these improvements, the Hawaiian Tug and Barge tugboats would be relocated to Pier 27 and Piers 28 and 29 would be used for bunkering. The AT&T cable ship and its 1.5 acre cable storage facility could be relocated from Sand Island to Pier 26. Intra-island ferries could berth in the Piers 22 to 25 area when not in service. The rest of the area behind Piers 24-29 would be utilized for general cargo and storage. It is also possible to fill a portion or all of the slip between Piers 22/23 and 24/25 to provide additional space for neo-bulk facilities.



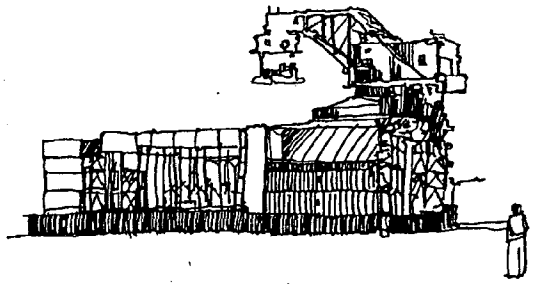
Petroleum Fuel Storage Facilities

At present the petroleum-oils-lubricants (POL) facility occupies 23 acres of privately-owned land fronting Piers 30 and 31. The landside area is used as storage and distribution of POL. Bunkering of ships occurs along Piers 30 to 33. Due to the recurring public concern over the potential health and safety hazards associated with the proximity of this POL facility to downtown Honolulu, a special study was commissioned as part of the Waterfront Project to explore the feasibility of relocating and consolidating the POL storage and distribution facilities and some of the jet fuel tankage.

Although the study indicated that relocation and consolidation was possible, the lack of suitable relocation sites and the high cost of reconstructing the facilities made such a program infeasible. Current recommendations are to formalize the safety inspection procedures to insure the highest level of safety standards are maintained at these facilities and to encourage and begin planning the relocation of vehicle fuel storage and distribution operations to Campbell Industrial Park. If additional space for aircraft fuel storage is needed in the long term, space for tanks can be provided in the Kapalama Military Reservation on the mauka side of Sand Island Access Road across from the existing tank farms.

Redevelopment of Piers 37 and 38

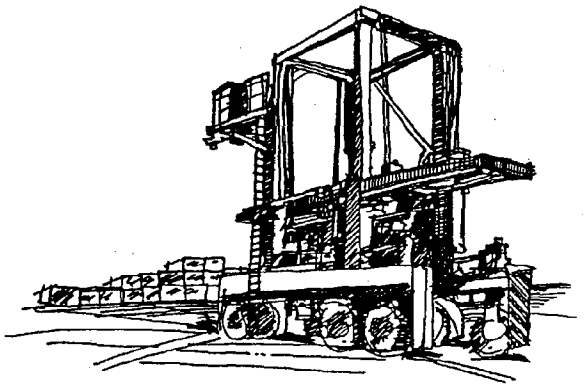
As a short term project to achieve the long range goal of acquiring and converting Kapalama lands from the federal government into maritime container operations, current lessees at Piers 37 and 38 would be relocated to make way for a new shipyard drydock facility to replace the facility currently at Pier 41.



The sequence of moves would include the relocation of the existing jet fuel tankage to the airport or Campbell Industrial Park; relocation of the liquified petroleum gas (LPG) facilities to lands occupied by the existing jet fuel tanks at the mauka end of the site; and redevelopment of the Piers 37 and 38 area into a ship repair and dry dock facility for relocation of Honolulu Shipyard, Inc. (The existing stub pier for the LPG barge would remain in Kapalama Canal.) These actions would ultimately achieve greater efficiency of harbor operations through the consolidation of some operations, and relocation of others to more appropriate locations.

Inter-Island Barge Service at Piers 39 and 40

Prior to the initiation of the Honolulu Waterfront Master Plan Project, Piers 39 and 40 were identified as an appropriate area for relocation of the inter-island cargo operation because the current facility at Piers 24 to 29 is dated and inadequate. Harbor analyses for this project concur with this recommendation. The ultimate size of the facility would be 37 acres with 4,400 linear feet of wharf. Improvements to the area would include the partial demolition of portions of the existing transit sheds and construction of barge end-loading facilities.



Kapalama Military Reservation

The State should make every effort to acquire the remaining 67 acres at Kapalama which are owned by the Federal government. These lands are expected to be sold in two increments starting this year. The mauka portion of Kapalama is intended to provide the relocation site for the Foreign Trade Zone (FTZ) from Fort Armstrong, the food distribution center from the Kaka'ako Peninsula, and possible jet fuel and freight forwarding operations. The remainder of

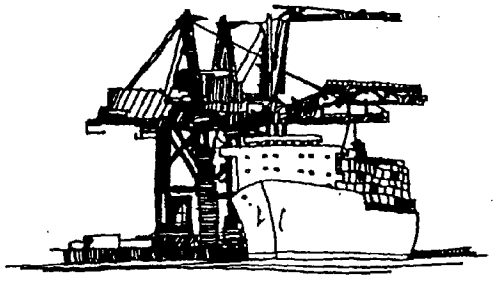
the property should be used for containerized cargo handling. This would require the relocation of the shipyard as discussed above and of the University of Hawaii Marine Expeditionary Center at Snug Harbor to the proposed triangle area in Keehi Lagoon.

The existing access to the area (located at the intersection of Waiakamilo Road and Nimitz Highway) could be eliminated if alternative entries to other portions of Kapalama were provided at the ends of Libby Street, Kalihi Street and/or along Sand Island Access Road.

The Kapalama area is expected to be a vital element in providing for the long-term cargo handling needs in Honolulu Harbor. As the industrial maritime activities presently located at Fort Armstrong become less compatible with redevelopment in the area, Kapalama will be the most appropriate site for the relocation of these activities. Furthermore, the cost of purchasing the property can be recaptured in higher land values at Fort Armstrong.

Sand Island Container Yards

The existing Sand Island container yards have the potential to be expanded and improved so that they can continue to handle the vast majority of Honolulu Harbor's container operations for many years to come. The short term project areas for expansion include approximately 12 acres of undeveloped land between Sand Island Road and the existing Sea-Land container yard (CY8), and approximately 8 acres of undeveloped land on the Waikiki-side of the Matson terminal (CY9). Short term pier improvements include the extension of Pier 51B to join Pier 52 and an extension of the eastern end of Pier 53.



Long term expansion plans include the possible addition of 30 acres of Coast Guard and existing industrial lands at the eastern end of the container yard and a further extension of Pier 53.

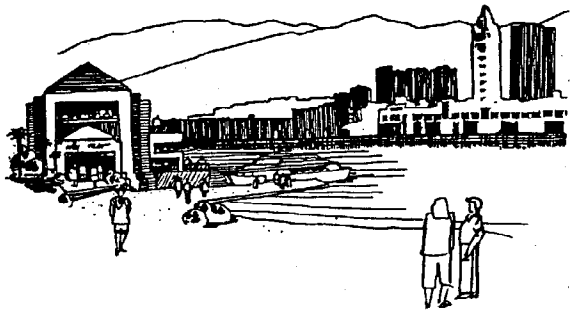
U.S. Coast Guard/Sand Island

In order to permit the expansion of container operations on Sand Island, partial relocation of the Coast Guard facilities is being recommended in the Long Range Plan. Currently the Ewa end of the Coast Guard property is relatively unobstructed with buildings and provides an ideal expansion area for container operations. Relocation of the Anuenue Fisheries and realignment of the access road in a more southerly location would permit the Coast Guard to relocate some of its open space uses to these new areas without displacing major existing structures on the property. A new pier could be constructed in front of the existing Fisheries site to replace the lost pier space adjacent to Pier 53.

All of this is dependent on the willingness of the Coast Guard to relocate since it is on Federal property and under no obligation to move its operations and on finding a suitable relocation site for the Fisheries operations. DLNR has proposed the development of a large scale pond research, training and demonstration facility to be located somewhere on Oahu. The eventual relocation of the Anuenue Fisheries operations to this site would be appropriate.

Sand Island East End Park Improvements

The east end of Sand Island is recommended to be designated for park-related improvements including docking facilities for Downtown and Kaka'ako water taxis or shuttles, an adjacent restaurant (or restaurants) with views looking back to the City and mountains, and a large landscaped parking area. (It is recommended that the cable ship and its support facilities be relocated to another site within the harbor when one becomes available, possibly Pier 26.) The parking area (approximately 10 acres in size) could serve as an overflow parking facility for weekend and holiday use of the park. During the week it can serve as an alternative parking area for Downtown workers who can then take the water shuttle to and from the Downtown and Kaka'ako terminals and avoid the high cost (or lack) of Downtown parking.



Sand Island Industrial Lands

Approximately 40 acres of land within the central Sand Island area would be developed as an industrial park. The designation of this as an improvement district would allow the State to grant long-term leases to various businesses, which subsequently would allow for lessees to provide roadway and utility improvements for the area. The costs of these improvements would have to be borne by the lessees who would benefit from them. Thus, it is assumed that many of the existing tenants would not be able to afford the increase in rents necessitated by these improvements and would either relocate elsewhere or remain in an unimproved section of the industrial lands.

These unimproved areas would be retained on a revocable permit (month-to-month) basis until they are needed for the other activities shown on the long-range plan. Tenants in these areas which are then seeking long term leases could be accommodated in the industrial space to be developed in the Keehi Triangle.

Extension of the Sand Island Park and Relocation of City Corporation Yard

The City and County of Honolulu's vehicle and equipment baseyard operations which currently occupy 17.6 acres of prime Kaka'ako Peninsula are scheduled to be relocated to a 26-acre parcel on the makai side of Sand Island Access Road. In order to maintain a right-of-way for the proposed Sand Island Parkway, current plans for the Public Works yards may need to be revised, although sufficient space should be available in the area now designated for jet fuel (space within the Kapalama Military Reservation on the mauka side of Sand Island Access Road is being reserved for jet fuel storage if it is needed in the future). The larger area on Sand Island would allow for consolidation of some of the City's inner-city baseyard operations which are currently located on scattered sites in Honolulu. The site may also be able to accommodate the operations of the Board of Water Supply's 1.5-acre baseyard currently located in the Kaka'ako Peninsula if other locations are not available.

This move would implement an agreement between the State and City. As part of the agreement, the City is expected to develop the final 53-acre phase of the Sand Island State Park (makai of the proposed baseyard) in accordance with the State's Sand Island State Park Master Plan of 1973. Upon completion of this phase the park will be 140 acres in size.

Although not part of this agreement, the State is also proposing an extension of the park at the southern point extending along the reef lands toward the Reef Runway. This would provide a sheltered beach area at the end of the old seaplane runway for Sand Island park users.

Also incorporated within this area would be an aquatic center and outdoor recreation program site along with a boat launching ramp and related parking, restroom and washdown facilities located on approximately 6 to 8 acres just makai of the access bridge to Sand Island.

3.4.2.3 Keehi Lagoon Subarea (Figure 13)

Keehi Lagoon is a protected body of water ideally suited for a first-class maritime and recreation complex. The Final Draft of the Keehi Lagoon Recreation Plan Update (December 1987) proposes such an undertaking which would ultimately feature over 1,000 new berths for recreational vessels, a redeveloped Pier 60, new commercial marine facilities, a canoe race complex and approximately 250 acres of new land in the triangle area of the lagoon that would contain a 50 percent recreation/education mix of uses and 50 percent marine-related commercial and light-industrial uses.

The majority of new vessel berths are to be located in a new marina development along Lagoon Drive that is expected to provide for 750 to 850 boats, depending on the mix of vessel size. The marina will also include support and ancillary facilities such as an administration building, comfort stations, boat launch facility, boat fueling dock, restaurant/snack bar, club house, marine supply store and other concessionaires. The area will also provide a site for an intra-island ferry terminal which will link the airport with the Downtown and Waikiki areas. A second smaller marina area is planned for Pier 60, which would also

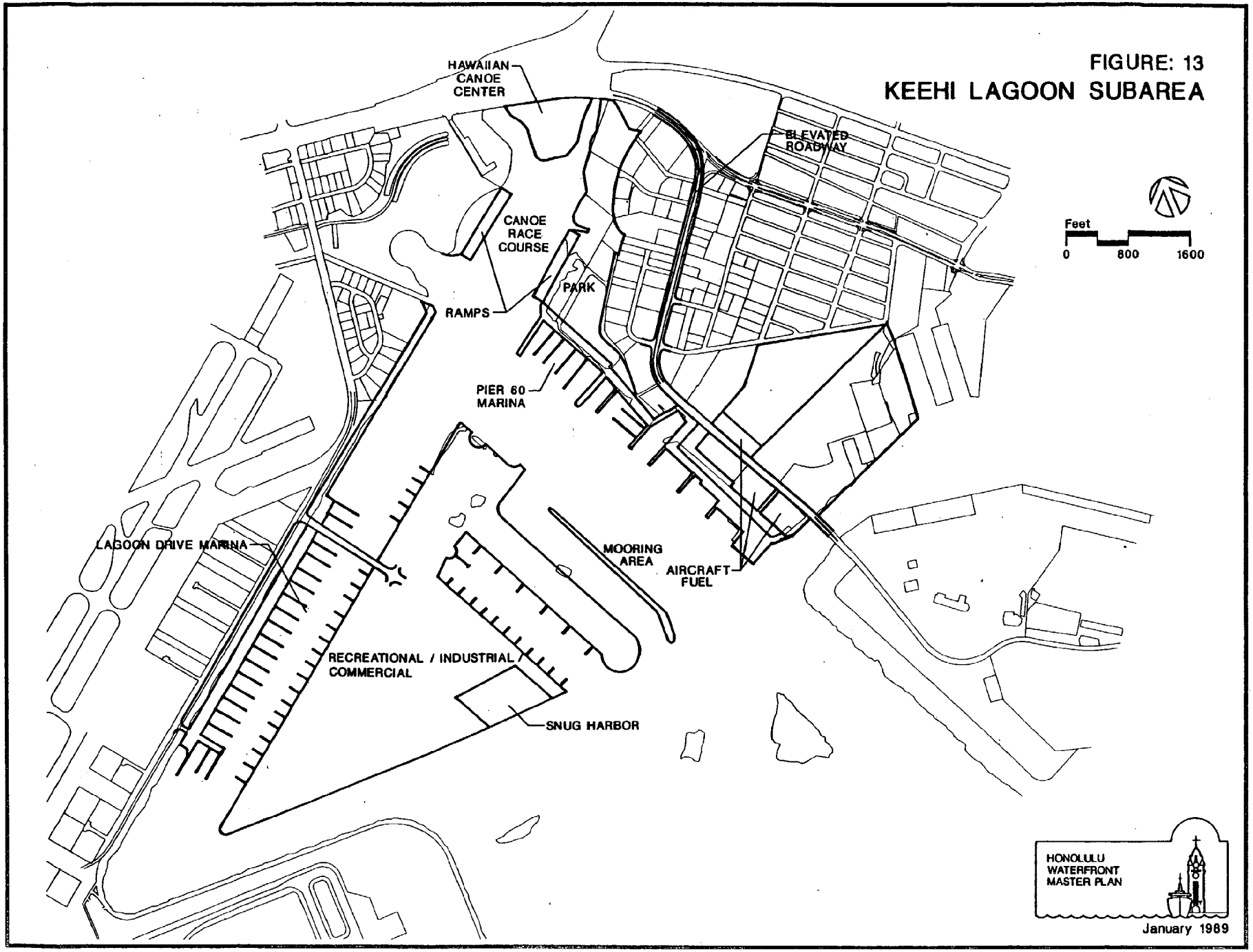


FIGURE: 13
KEEHI LAGOON SUBAREA
HAWAIIAN CANOE CENTER
ELEVATED ROADWAY
CANOE RACE COURSE
PARK
RAMPS
PIER 60 MARINA
LAGOON DRIVE MARINA
MOORING AREA
AIRCRAFT FUEL
RECREATIONAL / INDUSTRIAL / COMMERCIAL
SNUG HARBOR
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HONOLULU WATERFRONT MASTER PLAN
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provide space for the boat repair and marine railway facilities currently located at Kewalo Basin if these facilities are needed to meet the needs of the boating operations.

The canoe race complex is planned to be located in the northeast corner of the lagoon at the mouth of the Kalihi and Moanalua Streams. Canoe races are currently held in the area offshore of the Keehi Lagoon Park. The concept in the Keehi Recreation Plan Update consists of a Hawaiian Canoe Center located in the open land area at the confluence of the two streams, ramps on each side of the canoe race course with canoe storage sheds, and pedestrian bridges across both streams to provide access to the ramps.

The Waterfront Master Plan recommends additional park improvements along the shoreline between the Pier 60 area and the Canoe Center. This area, which at present is either vacant or being used for unstructured open industrial storage, forms an important linkage between the other proposed recreational facilities at Keehi. The area is envisioned to provide typical active and passive park uses, aimed largely at fulfilling future open space and recreation requirements of the Kalihi and other surrounding communities. Improvement of this area for park purposes would complete a key segment in the "lei of green" concept for the waterfront.

The triangle area in the lagoon is defined by the old seaplane runways. Upon completion, the triangle would be 300 acres in size (about 250 acres of land and 50 acres of water for berthing of boats and a water skiing area), half of which is to be devoted to recreational and educational facilities (including a yacht race facility) and half to marine commercial and light industrial uses. A portion of the triangle is being proposed as the relocation site for the University of Hawaii's Marine Expeditionary Center (Snug Harbor) facility which requires approximately 15 acres of land and 1,000 linear feet of pier frontage. In addition, the large slips could be used as overflow berthing areas for commercial fishing vessels and dinner cruise boats which cannot be accommodated in Kewalo Basin and Honolulu Harbor. (Servicing facilities for these vessels would also need to be

provided here.) As noted earlier, the area could also be a potential relocation site for some industrial tenants currently located at Sand Island.

The development of Keehi Lagoon as a major marine recreation area is a significant step towards addressing the continuing needs for such facilities in the central Honolulu area now and in the future. The site will provide a berthing and marina area for many of the 1,700 recreational vessels currently on the State Department of Transportation waiting list as of March 1988. In addition, industrial land on the triangle will provide needed space in the Honolulu area for businesses that require a location near major transportation facilities located nearby. Figure 14 provides a sense of the future Keehi area through an aerial sketch looking from above the airport back towards Sand Island and Honolulu Harbor.

The bird habitat currently located within the triangle area would either be relocated or funding would be made available to improve the Honouliuli bird habitat.

3.4.2.4 Barbers Point Harbor Subarea (Figure 15)

Upon completion of the 1,600 feet of wharf and 30 acres of backland presently under construction, Barbers Point Harbor will have physical facilities to handle a combination of cargos, principally neo-bulk, dry bulk and liquid bulk. The construction schedule of these terminal facilities will place them in service in the short range planning period. Dry bulk users will be expected to provide wheel-mounted loader and unloader equipment at dockside, cargo storage outside of the wharf area (remote storage) and conveyors connecting the wharf and storage areas.

Cargo capacity estimates for these terminal facilities as they would be operated during the 2010 timeframe are an estimated 250,000 short tons of neo-bulk and 750,000 short tons of dry bulk for a total of 1 million short tons per year. An additional 2.5 to 3.0 million tons of coal per year could be added to this if Hawaiian Electric's power plant at Kahe converts to a coal operation.

Limited container operations may also be feasible in this timeframe utilizing the soon-to-be-constructed landside facilities. This may require the relocation of

FIGURE: 14

VIEW OF KEEHI LAGOON

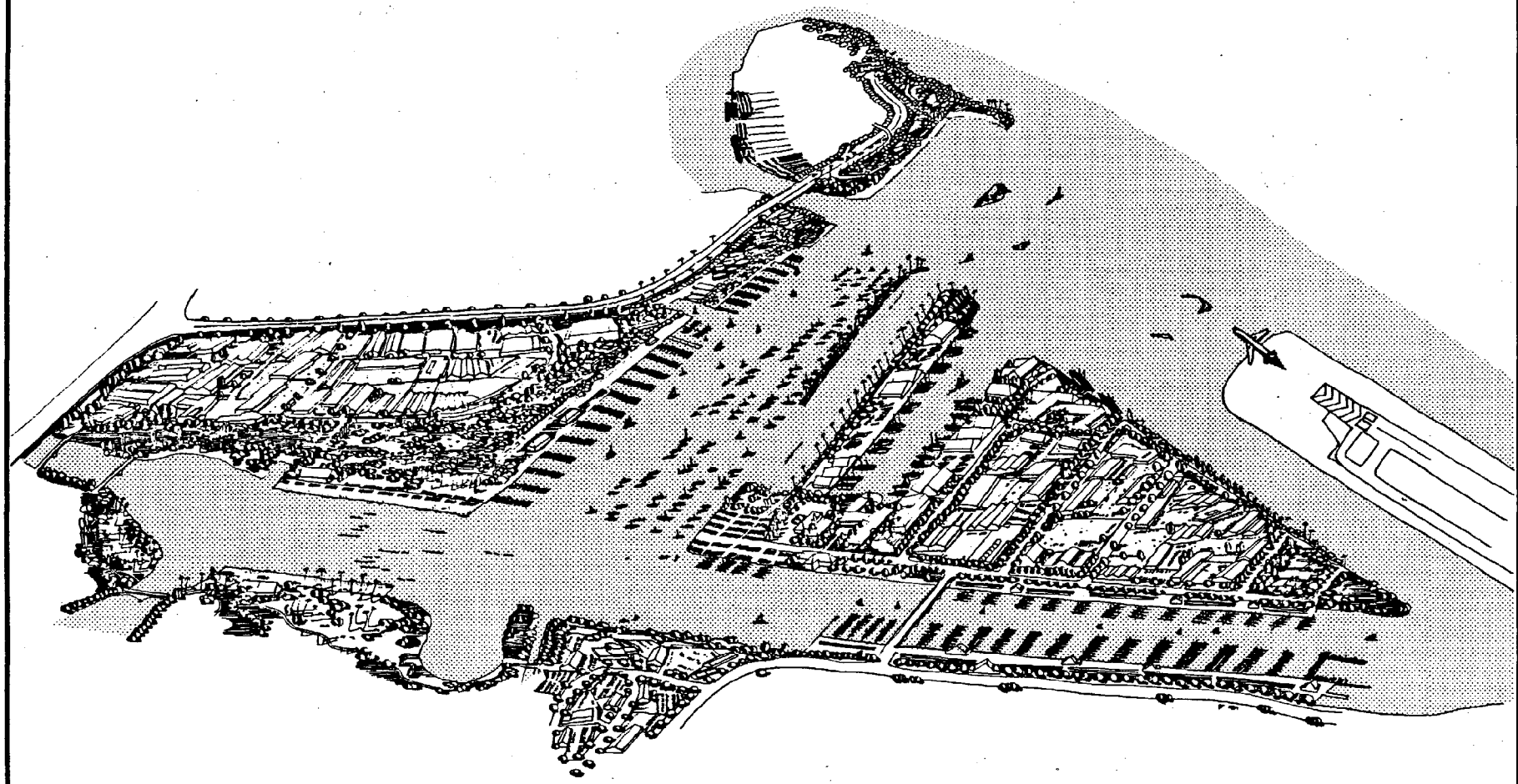

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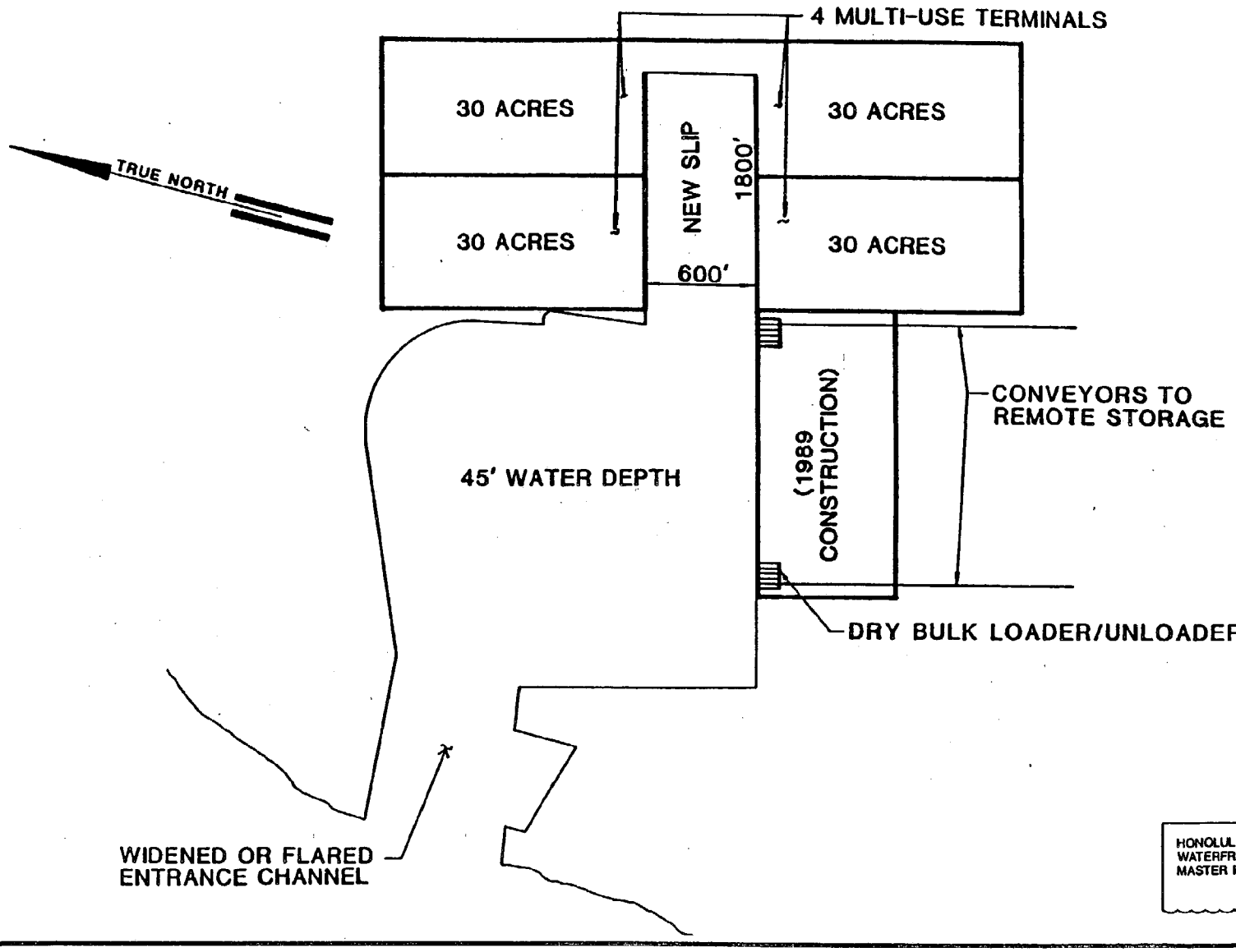
FIGURE: 15
BARBERS POINT HARBOR
SUBAREA



some of the bulk-handling facilities and improvements to the Piers 3 and 4 areas (*improvements to the backlands behind these piers is now in the design phase*) to accommodate some of these uses, and the widening and/or flaring of the channel entrance.

The long-range proposal for Barbers Point Harbor calls for deepening the entrance channel and basin in order to provide for the safe passage of deep-draft ships. A new slip 1,800 feet long and 600 feet wide could be constructed mauka of the existing basin along with 120 acres of new backland. Four high capacity containerized cargo terminals could then be put into operation. Such improvements would make it possible for containerized service to operate at Barbers Point in addition to larger bulk carrier ships.

3.4.3 Regional System Plans

3.4.3.1 Circulation (Figure 16)

The Master Plan includes a number of measures which are intended to provide for the efficient and, where possible, the enjoyable movement of people within and through the planning area. These measures are described in the following discussion.

Pedestrian/Bikeway Paths

A system of pedestrian and bikeway paths is planned to provide for movement laterally along the entire length of the waterfront area, plus in a mauka/makai direction with pedestrian overpasses linking the waterfront with lands above the Nimitz Highway and Ala Moana Boulevard corridor. This system of paths promotes the goal of greater public access to all areas of the waterfront. It is intended that the pedestrian/bicyclist/jogger has the opportunity to explore the shoreline from Ala Moana Park, through Kaka'ako and Downtown, along Nimitz Highway on a pathway separated from vehicular traffic or crossing over to Sand Island via a water taxi and ultimately ending the journey at Keehi Lagoon. Possibilities exist to connect this trail system up to the Pearl City Bike Path, thus

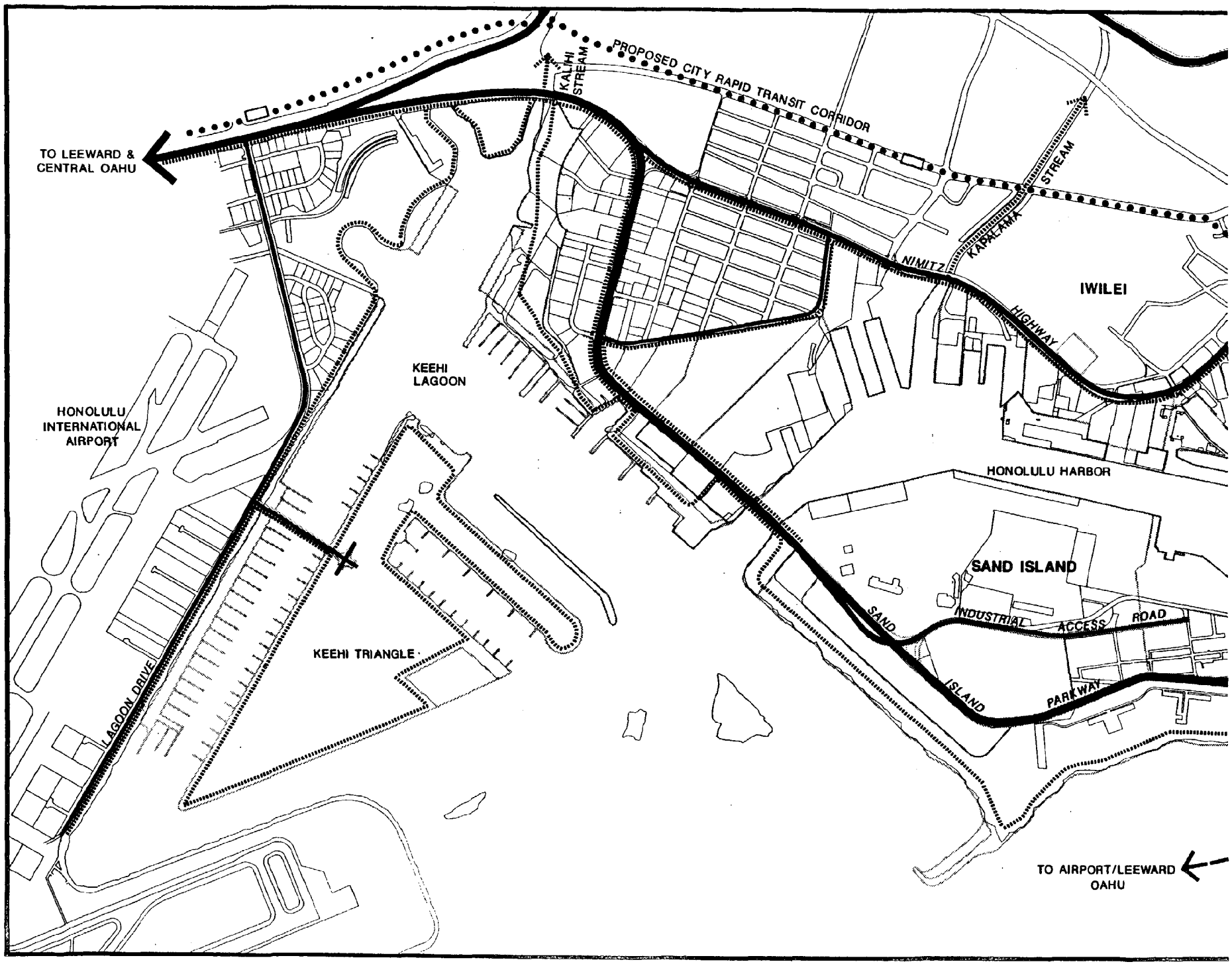
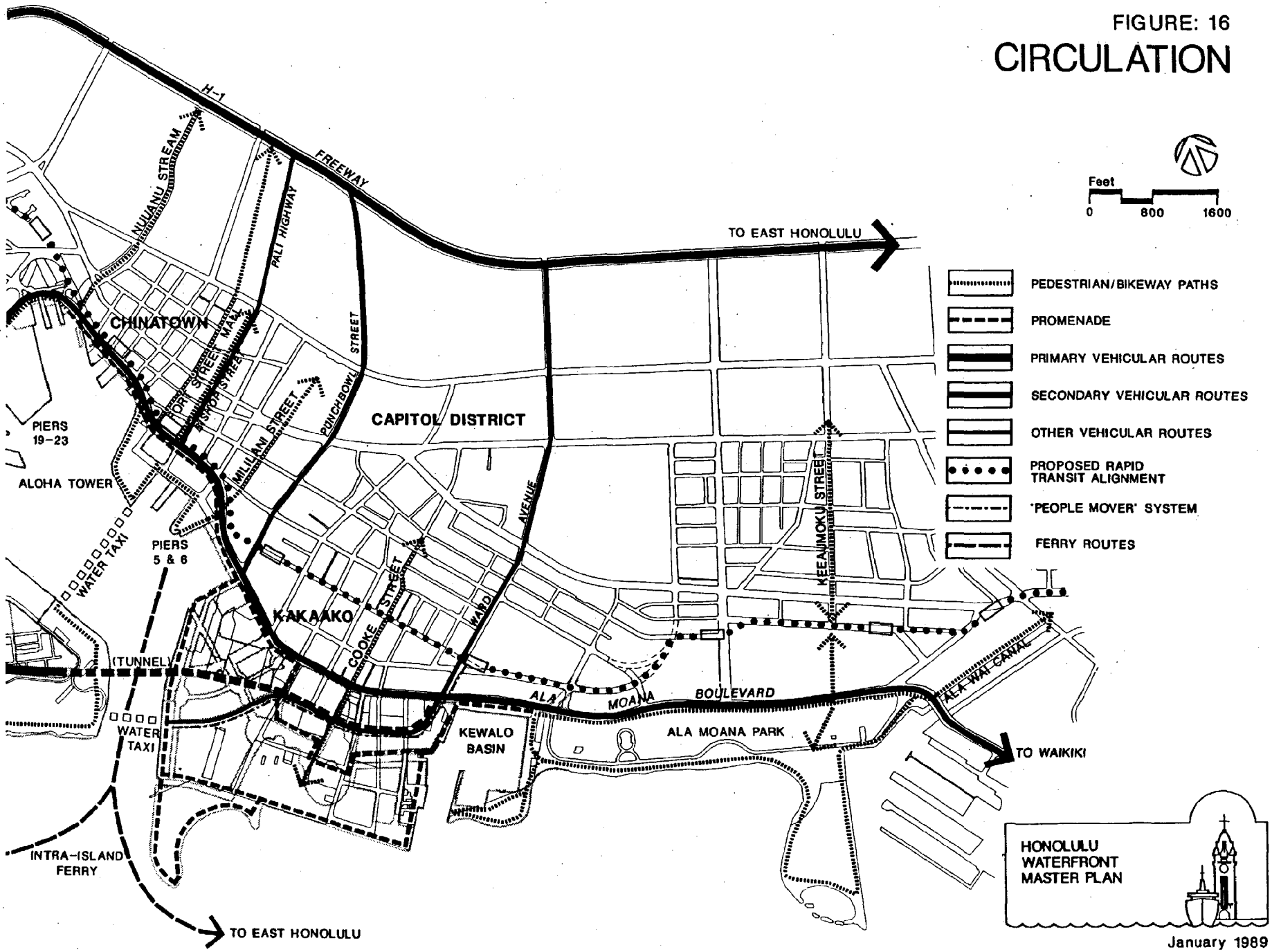

TO LEEWARD & CENTRAL OAHU
KALIHI STREAM
PROPOSED CITY RAPID TRANSIT CORRIDOR
KAPALAMA STREAM
NIMITZ HIGHWAY
IWILEI
KEEHI LAGOON
HONOLULU INTERNATIONAL AIRPORT
HONOLULU HARBOR
SAND ISLAND
SAND ISLAND INDUSTRIAL ACCESS ROAD
PARKWAY
KEEHI TRIANGLE
LAGOON DRIVE
TO AIRPORT/LEEWARD OAHU

FIGURE: 16

CIRCULATION



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serving to enhance the link between the waterfront and the growing communities of Leeward Oahu.

Waterfront Promenade

Within the Kaka'ako, Downtown and Chinatown areas a pedestrian promenade is envisioned to further enhance the experience of being on the Honolulu waterfront. Like many great waterfronts around the world, the promenade is meant to leave the user with an intimate feeling of the sights and sounds of the Honolulu waterfront and a sense of the character of the City as a whole. It is also intended to convey the importance of the history of the area through the incorporation of the Ala Makai historic waterfront walk program and facilities which provide interpretive features at key waterfront locations including Pier 12, Aloha Tower and the Immigration Building.

The promenade should not conflict with industrial operations of the working harbor which could pose a hazardous condition, but should provide the user an opportunity to view the various activities in the harbor from a safe distance.

Beginning at Pier 15, the promenade is intended to extend out over the water, separating pedestrians from the vehicular traffic and linking the piers within the Chinatown development area to the Aloha Tower complex. The promenade then winds through Irwin Park and the redeveloped Aloha Tower site and once again meets the shoreline at Pier 8, continuing along past the Maritime Museum into the festival marketplace at Piers 5 and 6. The newly expanded waterfront area at Pier 4 will provide a new visual experience along the promenade as it enters the Kaka'ako Peninsula. At this point, the promenade splits into two parts, one continuing through the center of the peninsula along the inland waterway, and the other in a makai direction along Piers 1 and 2 and along the Kaka'ako shoreline. The promenade ends at Kewalo Basin, connecting up with the pedestrian/bikeway paths that connect to Kapiolani Park and beyond via the Ala Wai Canal.

Vehicular Routes

Greatly improved access and circulation to and within the waterfront area can be provided by several important plan elements, although all require further study and evaluation. The most significant involves the possible construction of a Sand Island Bypass and tunnel underneath the harbor entrance. This improvement would begin at the H-1 Freeway in the vicinity of the Middle Street interchange. It would continue along a viaduct over Sand Island Access Road until it reaches the vicinity of the bridge. Once on Sand Island, the Bypass/Parkway would proceed along the mauka boundary of the proposed Corporation Yard (with a fly-over into the container yard operations), makai of the wastewater treatment plant and along the boundary between the park and the industrial area. The Bypass/Parkway would then enter a tunnel under the Harbor entrance that would extend under Fort Armstrong and the Kaka'ako makai area to the intersection of Ward Avenue and Ala Moana Boulevard.

The impact of this development would be to divert traffic from Nimitz Highway (an estimated 70 percent of the total traffic on Nimitz Highway is defined as through traffic) onto this parallel facility, thereby improving access and circulation in areas Ewa of Ward Avenue. Nimitz Highway would then serve primarily local traffic rather than as an arterial corridor. Improvements along Nimitz Highway could involve a more defined separation of the pedestrian and bikeway system, with a much greater level of landscaping. As redevelopment of lands fronting Nimitz Highway in the Iwilei area occurs, this transportation corridor is expected to become a more pleasing avenue into the Downtown area.

Secondary roadway improvements would largely be limited to the Kaka'ako and Downtown areas. Ward Avenue is planned for extension into the Kaka'ako Peninsula, aligning itself with Ilalo Street. It continues as the only Ewa/Diamond Head roadway through the area and is extended into the Fort Armstrong waterfront, ending near the existing Piers 1 and 2 area.

The main entrance to the waterfront park would be via a one-way loop made up of Cooke and Ohe Streets. Traffic would proceed makai on Cooke Street, cir-

cling behind the Performing Arts Center and Museum Complex, then exiting from the area on Ohe Street.

Lastly in the Kaka'ako Peninsula, Punchbowl and South Streets are to provide a couplet system within the Fort Armstrong area. Punchbowl Street will continue makai along the waterfront and South Street will be used as a local service road and for exiting the area going mauka.

Possible roadway improvements in the Downtown area include the closing of some of the streets around the Aloha Tower complex makai of Nimitz Highway. Bishop Street would continue to serve as a service road into the Aloha Tower site. A service access would also be provided into the Pier 5 to 7 area via the existing Richards Street entrance.

Rapid Transit

The City and County of Honolulu is currently working on a Preliminary Engineering Study (combining planning and design concepts with analysis of environmental impacts) for a 15- mile rapid transit corridor connecting the Waiawa area, through Downtown, to Moiliili and Waikiki, with branches to the Airport and the University of Hawaii. Although still a long way from being implemented, this proposed transit system is in keeping with long range plans of the Oahu Metropolitan Planning Organization (OMPO), which combines and coordinates planning resources of the City and County Departments of Transportation Services (DTS) and General Planning (DGP), and the State Departments of Transportation (DOT) and Business and Economic Development (DBED). OMPO's plans integrate rapid transit with feeder bus networks and associated highway improvements.

To date, preliminary studies have determined that the "mainline" rapid transit corridor will be close enough to the waterfront to provide significant service to anticipated development and public activities in the area. Indeed, service to the waterfront is one of several important considerations affecting the final determination of transit routing in Downtown and Kaka'ako.

At this stage, four alternative transit routes (or "alignments") for Downtown and three for Kaka'ako have been identified. Three of the Downtown alignments serve the waterfront directly with station sites near the Aloha Tower area. All Kaka'ako alignments are mauka of Ala Moana Boulevard but station sites near the new One Waterfront Place/Restaurant Row and the Ward Warehouse are in close proximity to anticipated Kaka'ako waterfront activity centers.

The Circulation Plan shows one "hypothetical" transit alignment which may best serve the particular needs of the waterfront. Combining several of the DTS alternatives, the alignment follows Nimitz Highway across the Downtown waterfront with stations projected at Iwilei Street, Maunakea Street and Aloha Tower. The alignment proceeds through Kaka'ako along Pohukaina and Auahi Streets with stations at Punchbowl Street and Ward Avenue.

Although the "hypothetical" DTS alignment provides excellent service to the Downtown waterfront, it does not provide direct access to the area of Kaka'ako makai of Ala Moana Boulevard. It is proposed in the Waterfront Plan to serve this area with a secondary transit system using scaled-down "people mover" technology. The Circulation Plan shows one promising alignment: a route along the Ward Avenue Extension/Ilalo Street connecting the Sand Island water shuttle terminal, between Piers 1 and 2, with the main transit corridor at Ward Avenue. This alternative would directly support the projected redevelopment of the Fort Armstrong area.

Even with major improvements to waterfront vehicular circulation, rapid transit would be a vital factor in achieving ultimate waterfront development objectives. Preliminary studies indicate that the major road improvements proposed in this Plan, including the Sand Island Parkway and tunnel, only support anticipated development of the Kaka'ako Peninsula through the 2010 timeframe. Beyond this point, further development would require a creative mix of alternative access, planning, and design strategies, with a major emphasis on orienting commuter activities to maximize rapid transit utilization.

Hypothetically, a transit system of the type being proposed here can carry the same number of people (10,000 to 15,000/hour) as 4 to 5 lanes of rush hour traffic (2,500 to 3,000 /lane/hour) in each direction. In order to fully develop the Kaka'ako Peninsula as currently planned, preliminary studies indicate that additional laneage of this magnitude will have to be provided through the Central Honolulu area or transit ridership will need to approach its system capacity.

Intra-Island/Inter-Island Ferry System

An intra-island ferry system is planned to begin service from Hawaii Kai to Waikiki and Downtown in 1990. The temporary location of a terminal for this activity is planned for Piers 13 and 14. A permanent site has been identified at the proposed festival marketplace at Piers 5 and 6. This is adjacent to a proposed rapid transit station which would permit commuters to quickly transfer and move to other locations within the urban core which are beyond the Downtown walking range. Ultimately, the system is planned to be expanded by providing service to the airport, Leeward Oahu and possibly the Neighbor Islands.

Water Shuttles/Taxis

Small water shuttles or water taxis are proposed to run initially between the Downtown area (Piers 5 and 6) and Sand Island to provide pedestrian access to the park. (A reverse role is also possible where Downtown commuters can park on Sand Island and take the shuttle to and from work.) When the Kaka'ako Peninsula and Fort Armstrong areas are built up, provisions could be made for an additional shuttle to connect that area to Sand Island as well.

3.4.3.2 Open Space/Recreation (Figure 17)

The waterfront open space and recreational area is envisioned as a coherent, comprehensive system of great parks linked together by a series of linear parkways. This "lei of green" will traverse along the urban waterfront from Magic Island and Ala Moana Beach Park, to the Kaka'ako Waterfront Park, Downtown/Chinatown, Sand Island, and the Keehi Lagoon recreation area. Such a concept would open the urban Honolulu waterfront to the public by creatl-

lished with landscaped promenades and mauka-makai view corridors. The physical connections and visual images achieve the goal of forming linkages between mauka communities and their waterfronts.

The vision of this emerald necklace forms a landscape of harmony and serenity in the waterfront area and includes areas where the natural environment such as Nuuanu Stream penetrates this green belt. The open space plan links water and mauka communities to mitigate the Ala Moana Boulevard/Nimitz Highway barrier which has hindered these community's access to their waterfronts.

The Kewalo-Punchbowl relationship would be renewed with redevelopment of the Kewalo Basin landside facilities and opening up of the Ala Moana Park edge of the Basin to expand the beach as well as access to it with promenades and pedestrian bridges from the mauka Victoria Ward properties to Kewalo. Landscaping and pedestrian ways along Ward Avenue to the Blaisdell Center, Thomas Square and the Art Academy will enhance the visual and physical linkage along this Kewalo to Punchbowl corridor.

The Kaka'ako/Capitol districts would be linked in a dynamic manner with the Cooke Street corridor forming the Diamond Head boundary and the Civic Center complex the Ewa edge. The State Capitol, Iolani Palace, Honolulu Hale Judiciary buildings and the Federal complex would form a historic/cultural visual link to the waterfront. Mother Waldron Park would connect to the Kaka'ako Waterfront Park along Cooke Street.

A third linkage to be renewed is that of the Downtown-Chinatown districts with their historic stretch of the original Honolulu waterfront. The natural link created by the Nuuanu Stream promenade can re-instill the mauka-makai community beginning with Foster Gardens and Aala Park, bringing the community down to the historic beginnings at the waterfront, breaking the Nimitz barrier with a series of pedestrian bridges by way of the Fort Street Mall and the Nuuanu Stream promenade. Yet another link would be created to the Sand Island State Park through the use of the water as a passageway with water taxis and shuttles to enhance the Honolulu waterfront experience.

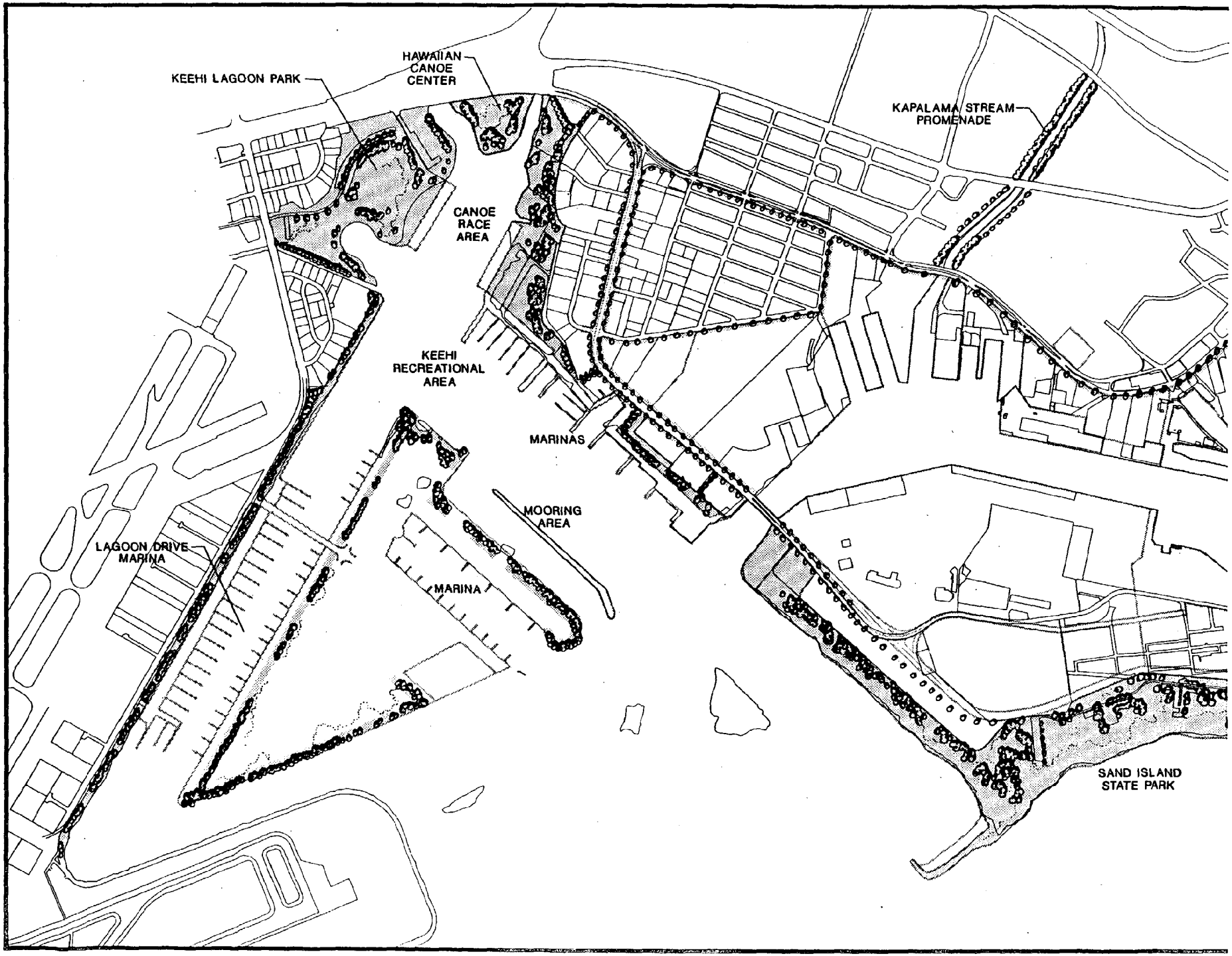
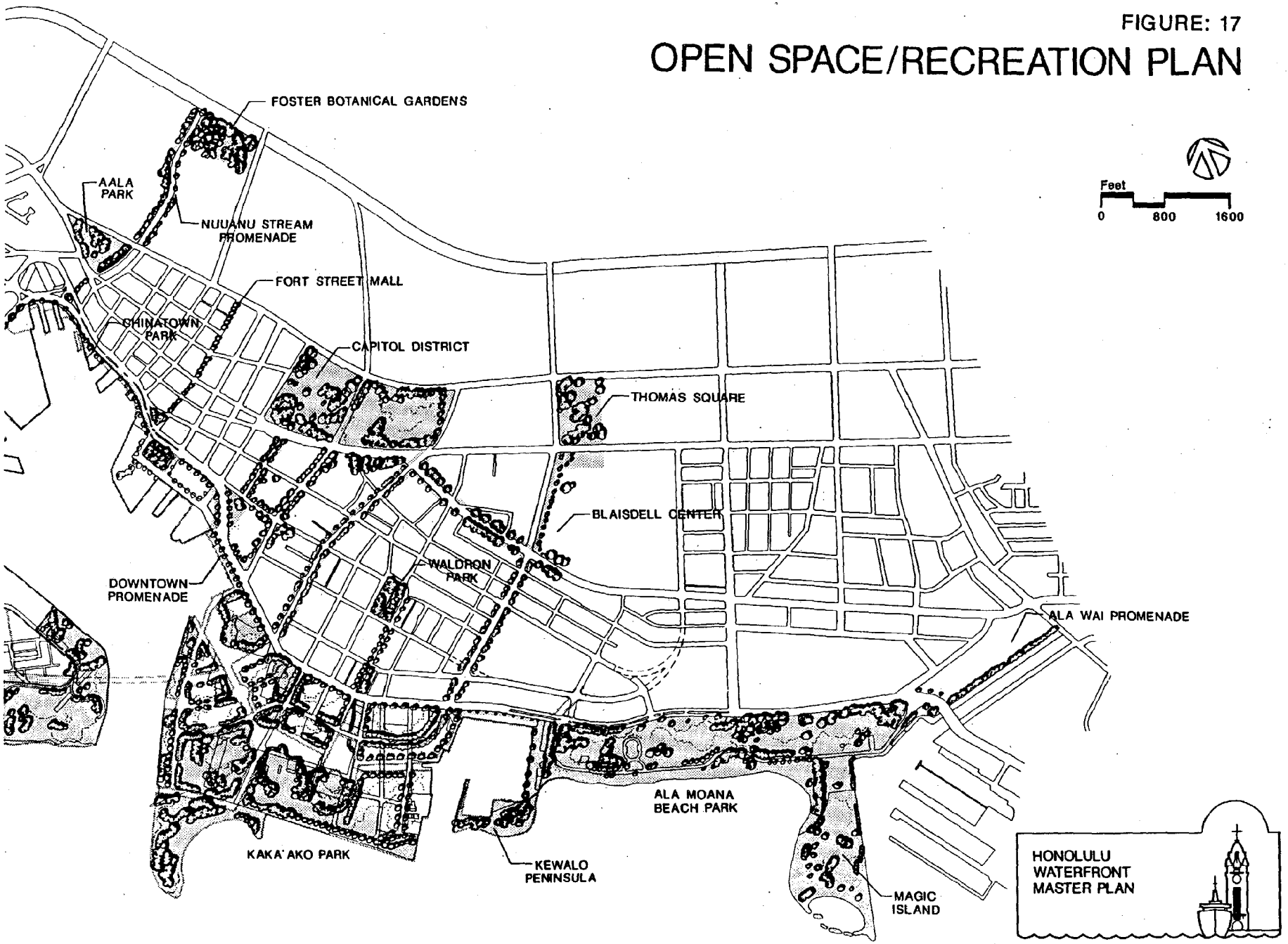

KEEHI LAGOON PARK
HAWAIIAN CANOE CENTER
KAPALAMA STREAM PROMENADE
CANOE RACE AREA
KEEHI RECREATIONAL AREA
MARINAS
MOORING AREA
LAGOON DRIVE MARINA
MARINA
SAND ISLAND STATE PARK

FIGURE: 17

OPEN SPACE/RECREATION PLAN



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A fourth revitalization of the mauka-makai community is the Kalihi-/Keehi Lagoon Park and recreational boating area. The significant infusion of public and private investment into Keehi Lagoon and its surroundings, would result in a major park and ocean sports recreation complex, thereby becoming the Kalihi community's playground. The Lagoon's calm waters have attracted significant interest in the development of new marinas for over 1,000 recreational vessels, a yacht racing facility, a canoe racing complex and major park lands. This would distinguish the Kalihi/Keehi Lagoon waterfront district as the premier recreation and ocean sport playground in the State.

3.4.3.3 Sewerage System

Improvements to the sewerage system (Figure 18) in the Central Honolulu area will be required even without major development within the waterfront. Improvements that will have particular importance to development in the planning area include the following:

- In Kaka'ako, the proposed 78-inch main on a portion of Auahi Street from Keawe Street to Koula Street should be continued from Koula Street to Ward Avenue.
- A new 42-inch relief line on Auahi Street from Kamakee Street to the new 78-inch main on Ward Avenue will be required to relieve the 36-inch line that carries sewage from Waikiki.
- In Downtown, a new 42-inch relief line will be required to operate in parallel with the existing 32-, 34- and 36-inch mains on Ala Moana Boulevard.
- A 42-inch line in the area between Waiakamilo Road and the Hart Street Pump Station to sewer developments proposed for the Keehi Lagoon area.
- The remaining portion of the 54-inch line from Waiakamilo Road to the 36-inch Kamehameha Highway force main will require a 42-inch relief line.
- The Kamehameha Sewage Pumping Station will have to be upgraded from 26 mgd peak capacity to approximately 37 mgd.

- A new sewage pumping station with a peak capacity of approximately 6.7 mgd will be required along with a new 18-inch force main on Lagoon Drive to the 42-inch line on Aolele Street.

- The Ala Moana Sewage Pumping Station will require an odor control system to insure proper operation within the proposed developments of the master plan.

- The Sand Island Wastewater Treatment Plant has a capacity of 82 mgd. The outfall has a capacity of 202 mgd. The treatment plant is expected to reach its capacity by the year 1995. The City and County of Honolulu is presently planning to upgrade the treatment plant's capacity to 106 mgd. The possible options for plant upgrade include the possible modification of the treatment process from primary treatment to secondary treatment. The subject of treatment process modification is still being explored by the City and County and the Environmental Protection Agency.

While many of these improvements are required to serve the overall growth and development of the central city, they will need to be expanded and/or accelerated to meet the development needs proposed in the master plan. The descriptions above reflect those needs, but only the net changes are directly attributable to the waterfront project.

3.4.3.4 Storm Drainage System

Virtually all of the existing and proposed storm drainage systems (Figure 18) in the central Honolulu area penetrate the waterfront planning area. Since most of them serve areas mauka of the planning area, only a small part of the improvements can be attributed to the waterfront project. However, many will require modifications as they pass through the project area based on the plans described in this report. These systems and modifications are discussed below.

The Kaka'ako Improvement District 2 drains will soon be under construction and will provide 50-year storm protection from South Street to Cooke Street. The portion of this system on Ilalo Street and Keawe Street includes two 11.5 by 9-foot box drains that discharge into a 30-foot wide open channel. This system

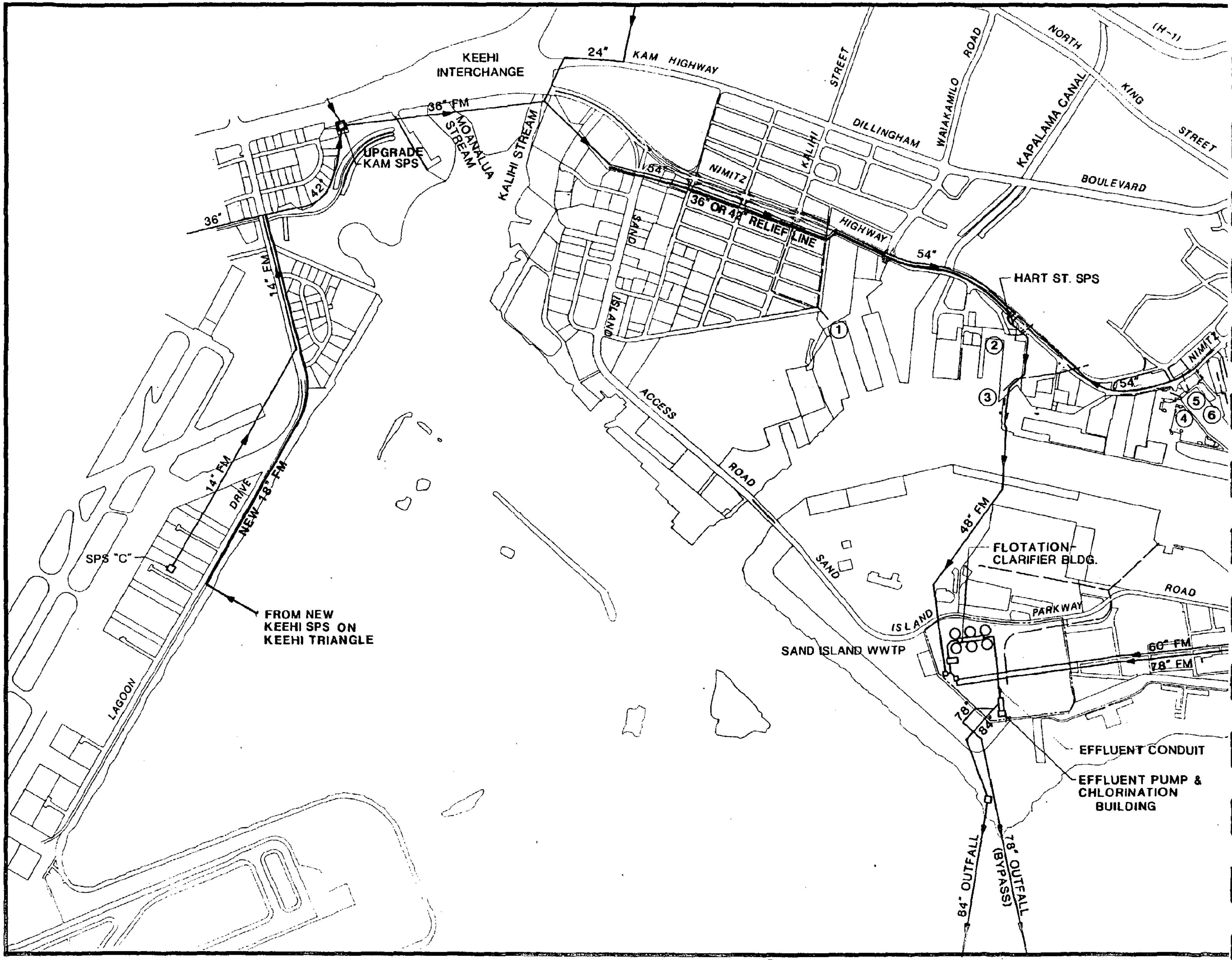
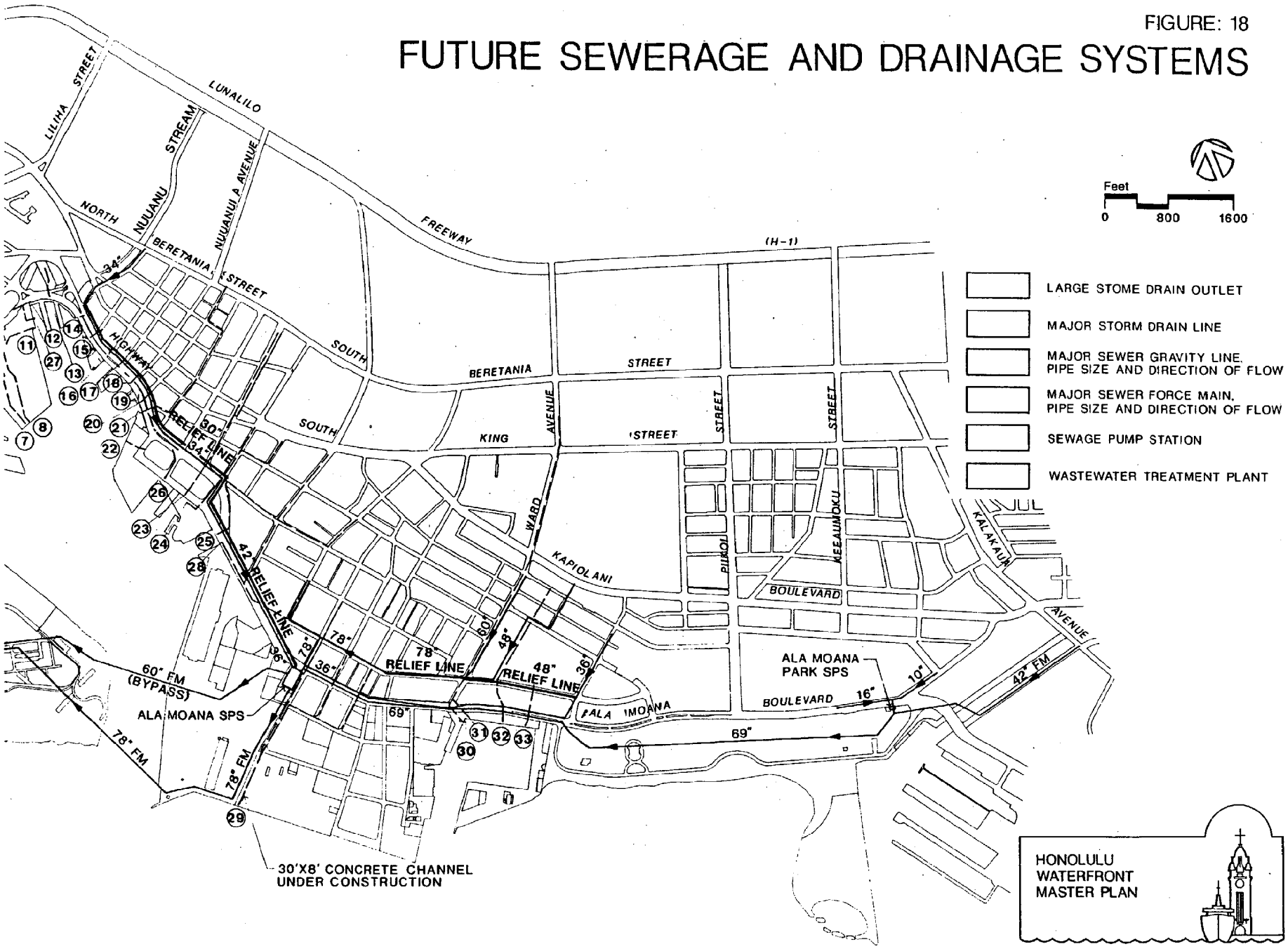

KEEHI
INTERCHANGE
24"
KAM HIGHWAY
36" FM
UPGRADE
KAM SPS
MOANALUA
STREAM
KALIHI STREAM
42"
36"
14" FM
54"
NIMITZ
36" OR 42" RELIEF LINE
HIGHWAY
SAND
ISLAND
STREET
KALIHI
DILLINGHAM
WAIAKAMILO
ROAD
KAPALAMA CANAL
NORTH
KING
STREET
(H-1)
BOULEVARD
54"
HART ST. SPS
NIMITZ
54"
1
2
3
4
5
6
ACCESS
ROAD
14" FM
DRIVE
NEW 18" FM
SPS "C"
FROM NEW
KEEHI SPS ON
KEEHI TRIANGLE
LAGOON
48" FM
FLOTATION-
CLARIFIER BLDG.
SAND
ISLAND
PARKWAY
ROAD
SAND ISLAND WWTP
60" FM
78" FM
78"
84"
EFFLUENT CONDUIT
EFFLUENT PUMP &
CHLORINATION
BUILDING
84" OUTFALL
78" OUTFALL
(BYPASS)

FIGURE: 18

FUTURE SEWERAGE AND DRAINAGE SYSTEMS



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will also relieve the small drain that runs from Cooke Street to Kewalo Basin along Ala Moana Boulevard.

The Cooke Street drain along Ala Moana Boulevard joins with the Ward Avenue drain. This drain is inadequate and must be relieved. Preliminary drainage studies by HCDA stated that a new relief drain for the Ward Avenue drain on Kamakee Street would be needed. The new relief drain would require two 12 by 10-foot box drains that would discharge into Kewalo Basin.

The planned network of canals or waterways in the interior of the Kaka'ako area will be integrated into the existing drainage system. There are three sources of energy or driving force which may effect or aid in promoting positive flow or circulation in the waterway system. One is tidal action, the second is wind-induced currents, and the third is freshwater inflow. A depth of 5 to 6 feet below Mean Sea Level (MSL) for the interior waterways is planned and believed to be reasonable to insure adequate flushing of the system.

The proposed interior storm drainage systems for the Kaka'ako Makai area can directly outlet into the proposed waterways, thereby reducing the size of the required drain lines. The mauka-makai waterway branch will replace the new 30-foot wide concrete channel to be constructed by the Kaka'ako Improvement District 2 project. The concrete channel is planned to have a depth of 8 feet below MSL, with a capacity of 1,013 cubic feet per second, sufficient to protect against the 50-year flood. The new waterway will provide over twice the cross sectional area of flow, reducing the velocity of the storm waters, so no loss in flow capacity is expected as long as the proposed waterways are properly maintained. Should the waterways be allowed to become more shallow due to siltation, their effectiveness as drainageways would be diminished. This could impact upon the ability of the Kaka'ako drainage system to drain the mauka areas from the 50-year storm.

Drains in the Downtown area range in size from 18 inches to 36 inches with one 4.5 by 3-foot box drain on Alakea Street. They will require relief drains to prevent flooding from Nimitz Highway to the Harbor. The largest relief lines are on Alakea

Street which will require a new 6 by 4-foot box drain and on Richards Street which will require a new 60-inch relief line.

In the Iwilei area, the largest drainage system crossing Nimitz Highway is inadequate and will require a 10 x 6-foot relief line from the harbor to Nimitz Highway. There are other inadequate drains in the Iwilei area but their drainage areas are small and the required relief lines are not very large.

The Lagoon Drive area is well drained by pipes entering Keehi Lagoon. Development proposed in the area will require a new drainage system in the triangle area. This system will consist of drain pipes along the interior road that drain directly into the harbor. The largest pipe size will be 48 inches at the outlet.

On Sand Island, the major pipe drains are located on the Sand Island Parkway and empty into the Kapalama Channel or open ditches. The major outlet for the eastern portion of the Sand Island Parkway is a ditch that crosses the Coast Guard Property from the Sand Island Parkway. This ditch is inadequate and requires relief. A relief drain will run along the Sand Island Parkway toward the entrance of the Sand Island State Park and discharge into Honolulu Harbor. The new box drain will range in size from 10 by 6-foot to 16 by 8-foot.

The Barbers Point Harbor area presently has no drainage facilities to accommodate offsite drainage. A major drain is under construction to drain the James Campbell Industrial Park and protect the Harbor from offsite runoff.

3.4.3.5 Water Supply System

The recently formed State of Hawaii Commission on Water Resource Management is empowered to administer the new State Water Code. The State Water Code was developed to assure the maximum beneficial use of ground and surface waters by establishing rules for reporting and gathering meaningful data on all water uses and sources. The Code requires each County to prepare a Water Use and Development Plan to be used as a tool by the Commission to administer the Water Code. The Water Use and Development Plan will take into consideration the Honolulu Waterfront Master Plan as it is required to incorporate State

Projects. The findings of the Water Use and Development Plan are not available at this time so the analyses of the regional infrastructure systems for water are based on the assumption that additional groundwater sources on Oahu can be developed to meet the projected water demand. It is also assumed that these new water sources can be directly used by the Low Service System or by another system that can divert additional water to the Low Service System.

The master plan will require the development of approximately 4.0 mgd of new water sources by the year 2000 and another 0.8 mgd by 2010 (Figure 19). An additional 1.1 mgd, primarily to meet commercial and office demand, would be developed beyond 2010, assuming that the growth in these areas remains constant and that the need is met in the waterfront area. Based on BWS standards, the 5.9 mgd demand resulting from the plan would require a total reservoir storage capacity of approximately 8.8 million gallons.

Facilities in the Downtown area are vital to servicing eastern areas of Oahu. In order to move the water developed in the Pearl Harbor District and Honolulu District to Waikiki and East Honolulu, the existing transmission system must be upgraded in order to keep water pressures in the Downtown area in the 75 to 80 psi range. This would require the existing 36-inch line from Liliha Street to Kuhio Avenue be upgraded to a 42-inch pipeline. The tentative route for this line is along Ala Moana Boulevard into Waikiki.

The Downtown grid system will require upgrading to adequately service the proposed Aloha Tower development. Major improvements required in the area include two new segments of 16-inch lines on Richards Street from Nimitz Highway to Merchant Street and from Hotel Street to Beretania Street, a 12-inch line on Smith Street from Nimitz Highway to Beretania Street and a 8-inch line on Merchant Street from Nuuanu Avenue to Richards Street.

A majority of the water demand resulting from improvements in the Short Range Plan is attributable to development (in particular, the triangle area) in the Keehi Lagoon area. In order to meet this demand, a new 16-inch line from the exist-

ing 24-inch line on Aolele Street will be required to service operations on the triangle area.

No other major improvements to the water system are foreseen at this time. The Kaka'ako Makai Water Master Plan, prepared by the Hawaii Community Development Authority and accepted by the Board of Water Supply, calls for a looped system of 8-inch and 12-inch pipes adequate to meet the needs of proposed plan developments. The 16-inch line servicing Sand Island from the Kalihi Kai area is adequate to serve the proposed development unless the rate of use significantly increases. If this were to happen, a new 12-inch parallel line would be required to provide service to the area. The water master plan for the Barbers Point Harbor has been accepted by the BWS and is adequate to provide for the future development of up to 144 acres.

3.4.3.6 Electrical Power and Communications

The substation at the Downtown power plant site is adequate to serve the area but would have no spare capacity to serve proposed developments in the Fort Armstrong area. A new substation in the Kaka'ako or Fort Armstrong area could be designed to also serve the Downtown area, thereby allowing for the removal of the substation at the power plant when the Aloha Tower area is developed. There are existing substations in the Kaka'ako and Kewalo areas, but proposed developments will require one additional substation in the future. A new substation is planned in the vicinity of the Ewa end of the Ala Moana Shopping Center. Other electrical improvements (Figure 19) in the waterfront include:

- The proposed Keehi developments will require a new substation and 46 kv electric power transmission line from Kamehameha Highway.
- The Barbers Point Harbor will require a new substation and 46 kv transmission line from the substation at Campbell Industrial Park.

The Hawaiian Telephone Company central office serves the Downtown area. The company also maintains a field office in Kaka'ako. To provide improved service to the Kaka'ako area, Hawaiian Telephone Company is planning to construct a new central office mid-way between Atkinson Drive and Alakea Street.

A new remote office will also be required on Sand Island in order to service proposed new developments.

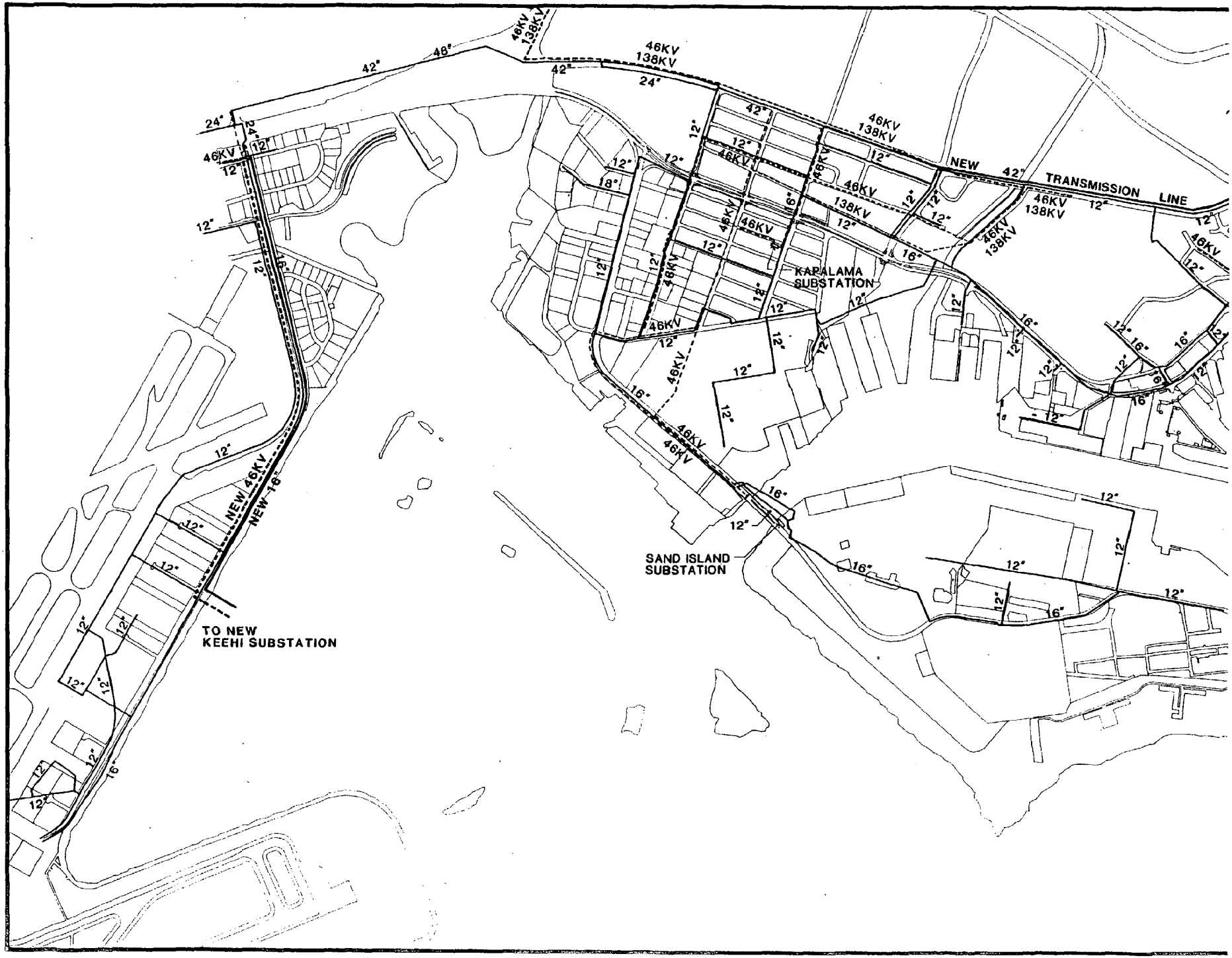
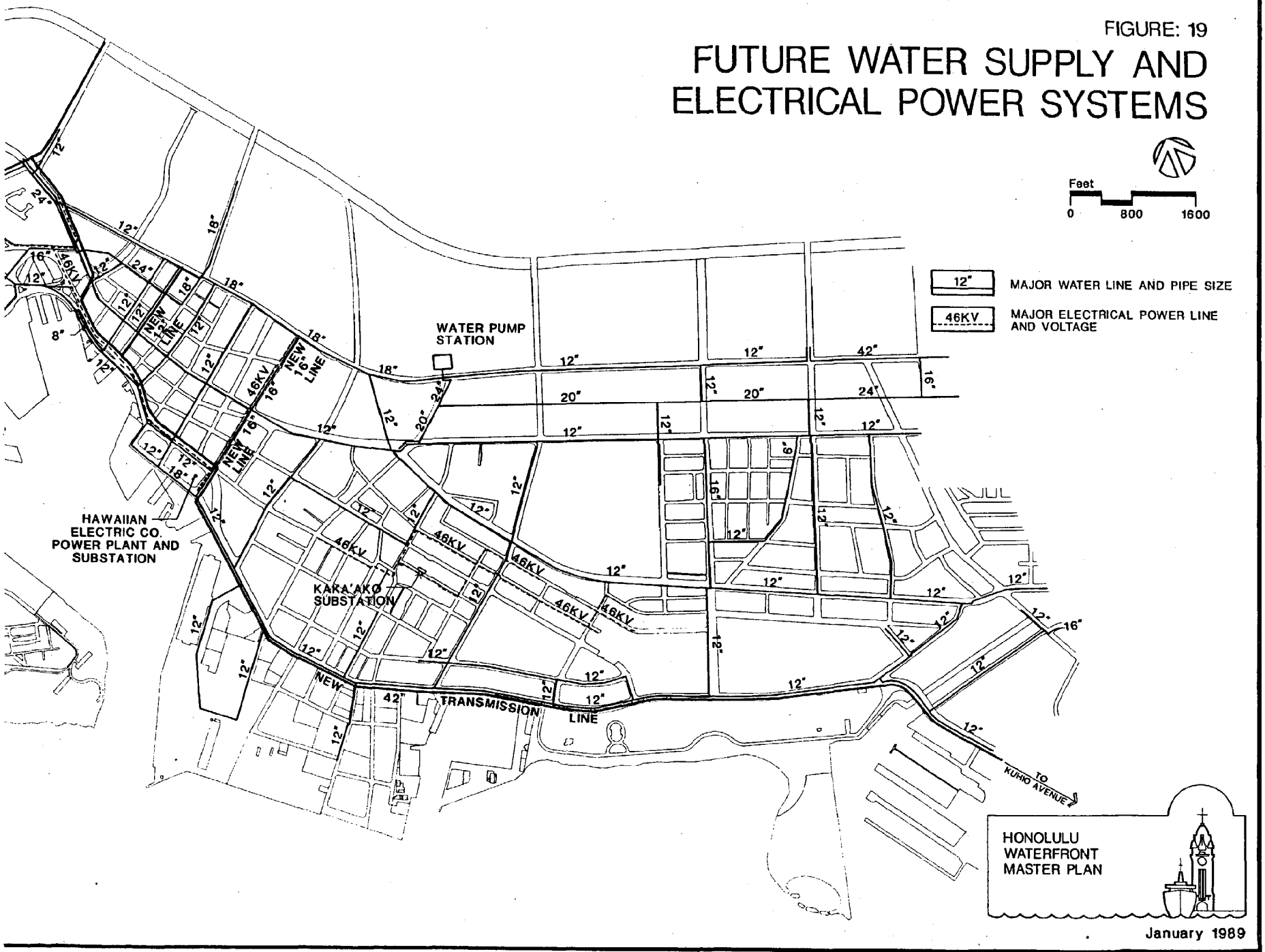

NEW 42" TRANSMISSION LINE
KAPALAMA SUBSTATION
SAND ISLAND SUBSTATION
TO NEW KEEHI SUBSTATION
NEW 46KV
NEW 16"
46KV
138KV

FIGURE: 19

FUTURE WATER SUPPLY AND ELECTRICAL POWER SYSTEMS



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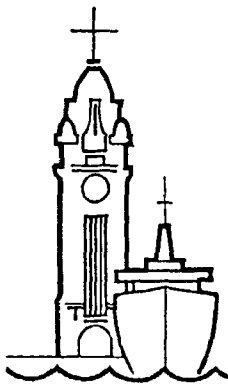


4.0 FINANCIAL PROGRAM

This Chapter focuses on the projected public costs, financing alternatives and estimated public revenues for the master plan recommendations. Although estimated private costs have been quantified where necessary to determine ground rents and tax revenues, the majority of the narrative deals with public costs and benefits. This Chapter represents a collaborative effort between the firms of John Child & Company, Inc. (public revenue and cost benefit analysis), Dean Witter Capital Markets (public finance) and the Joint Venture (project costs, coordination and writing). A summary of major findings is presented in Section 4.1. Section 4.2 presents a review of major public costs. Section 4.3 reviews various alternatives for securing public financing to fund the identified public improvements. Section 4.4 analyzes the various parcels within the planning area identified for private development to derive an estimate of the potential ground rent return the State could expect from development. Finally, Section 4.5 presents an analysis of the major public costs and benefits associated with the development of the non-maritime uses within the planning area.

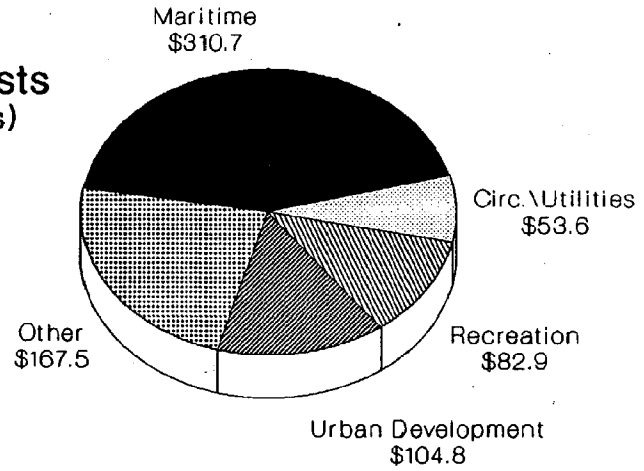
4.1 OVERVIEW AND CONCLUSIONS

The implementation of recommended master plan improvements will require an enormous investment of public support, public and private capital, labor and other resources to fully utilize the potential that exists within the Honolulu Waterfront. This Chapter focuses on the projected public costs, benefits and financing alternatives. An overview of the major findings and conclusions of this Chapter is presented below.

4.1.1 Costs

Over the next twenty to forty year period, the plan envisions a total public investment of approximately $700 million within the waterfront area to fund major maritime, recreation and infrastructure improvements, roughly split between the short (5-10 year) and long-term (10-20 year) phases (not including an estimated $265 million to construct the proposed Sand Island Bypass Highway).

Estimated Public Costs
(Millions of 1989 Dollars)



Major maritime project costs include significant maritime improvements to Honolulu Harbor and the development of new container terminals at Barbers Point Harbor and the Kapalama Military Reservation. Major recreation costs include the development of major parks at Kaka'ako and Kalihi Kai, and the development of other public facilities such as the Kaka'ako amphitheater, canoeing center at Keehi Lagoon, an inland waterway within Kaka'ako, and a new system of public promenades to provide public access to the waterfront. Significant urban development costs include the construction of major on-site infrastructure which will in turn allow for the subsequent development of identified public parcels with the waterfront. Major circulation/utilities costs include provision for funding the construction of off-site infrastructure necessary to service the public

lands within the waterfront. Other costs include funds for major relocations precipitated by the plan, such as the Food Distribution Center and the Foreign Trade Zone, as well as funds for the acquisition of the Kapalama Military Reservation and the development of a Marine Research Center at Kaka'ako.

4.1.2 Public Financing Alternatives

Public financing will play a valuable role in plan implementation. By stretching the cost of public improvements over a period of years, public financing will stabilize the cashflow requirements of the project area and achieve a better matching of revenues and expenditures. It will also achieve a certain "equity" by spreading the costs of an improvement over its useful life.

At present, the State has only two financing mechanisms which pass Master Plan improvement costs directly to its users -- (1) special benefit assessment bonds for a portion of the urban development costs and (2) harbor revenues bonds for maritime improvements. However, maritime revenues will need to increase substantially if relied upon to cover all of the Maritime costs. Recommended plan improvements should result in soaring real property tax revenues; however legal mechanisms do not exist by which the State can capture those revenues. Sales tax and hotel tax revenues will flow to the State and could represent a bondable source of security; however, even with the legal means to pledge such revenues, the State like other states, may have little inclination to do so since such revenues would strengthen its General Fund. Finally, although ground lease rentals can potentially be captured, such revenues, alone, provide an inherently weak source of security in a bond issue.

To the extent the State cannot capture and pledge a predictable and established revenue flow to a bond issue, or use special assessment bonding, it necessarily most rely on general obligation bonds, certificates of participation, pay-as-you-go financing from project area revenue flows, and/or private funds to pay for public improvements. However, the obstacles to implementing other forms of financing suggest possible elements of a basic strategy to reducing the dependency on general obligation bond financing. These include:

- Increasing and broadening the base of revenues which can realistically be bondable by State agencies -- e.g. maritime revenues.

- Coordinating with the City and County with respect to sharing the "windfall" of increased property tax revenues from the planning area.

- Adoption of legislation which may increase the flexibility of spreading special assessments and levying special taxes on the basis of more general benefit.

- Utilizing ground lease rentals for the following purposes: pay-as-you-go financing (thereby reducing future bonding requirements); broadening the revenue base of a public agency with existing bonding capabilities; or for reimbursing a revolving fund, if one is established.

The above guidelines will not completely eliminate the need for general obligation bond financing. However, the State may be able to limit the use of general obligation to those facilities which provide more regional benefit, such waterfront parks and other recreation facilities, or which have no other financing alternatives. In limiting the use of general obligation bonds, the State not only would limit its risk but enhance the potential return on its investment.

4.1.3 Public Revenues

A significant development potential for office, commercial industrial, and hotel uses exists within the planning area. This development potential can be translated into the form of significant annual ground lease rentals, paid by private developers wishing to develop the public lands. The ground rents generated from public lands leased for private development represent a primary source of public revenue which could be used to finance public improvements within the planning area on a pay-as-you-go basis through reimbursement of a revolving fund and or reimbursement for bond debt service payments. Other indirect revenue sources, discussed further in Section 4.5, such as real property, conveyance and transient accommodations taxes can also be expected to generate public revenue.

Based on conventional leasing assumptions and in consideration of the projected development phasing and estimated land values, the annual ground rental income stream from the privately-developed, publicly-owned lands within the planning area are projected to increase from about $8.2 million in 1993 to nearly $22.7 million in 2018, at which time it will stabilize until 2052 when original leases will begin to expire and new leases will be negotiated. Ground rent payments and reversionary interests total nearly $l.5 billion over the entire projection period (approximately 68 years), in constant l989 dollars.

4.1.4 Cost/Benefit

Public costs and benefits associated with plan implementation include monetary as well as non-monetary "qualitative" aspects, such as benefits attributable to public parks and open space. The analysis conducted for the master plan focuses on the monetary costs and benefits associated with the implementation of the Master Plan.

The analysis first identified and projected sources of revenue and expenses to the State and County governments resulting from plan implementation. Revenues were narrowly defined to include income generated from the private development of public land, directly through ground leases and indirectly through conveyance, real property and transient accommodations taxes. Costs included all urban development, recreation, circulation/utilities and relocation costs identified in Section 4.2. Projected maritime costs and those associated with the design and construction of the proposed Sand Island Bypass highway were excluded in the analysis as both costs represent major regional or system-wide improvements benefitting a user group extending far beyond the waterfront. Projected State and County operating and maintenance costs were then identified and subtracted from the projected revenue stream.

After operating expenses, the net revenue to the County is projected to increase from nearly $4.5 million for the five years ending 1995 to $32.8 million for the five years ending 2010. Thereafter, the net revenues would average nearly $11.1 million per year over the project's remaining economic life.

Similarly, the net revenue to the State resulting from development of non-maritime master plan improvements is projected to total nearly $43.6 million for the five years ending 1995, and would be expected to increase to a total of $126.9 million for the five years ending 2010. Thereafter, the net revenue could average about $30.3 million per year.

Capital expenditures, excluding those associated with the maritime and Sand Island Bypass Corridor, are projected at about $409 million. Once implemented, the net State revenue from the recommended improvements could pay back the capital investment within the first 20 to 25 years of the redevelopment program.

4.2 MAJOR PUBLIC PROJECT COSTS

This section reviews the costs of major public improvements described in Chapter 3. Private improvements are assumed to be borne by private developers and are discussed briefly in Section 4.3. The process by which the costs were determined is discussed first, followed by a summary of overall costs and then a review of major short and long range improvements within each of the five major categories (maritime, recreation, circulation/utilities, urban development, and other).

4.2.1 Cost Methodology

Major project costs were estimated using conventional engineering costing standards applied to land use and facility plans to identify overall construction costs. The estimated construction costs of each project were adjusted upwards by ten percent to allow for unanticipated contingencies. These costs were then inflated by an additional ten percent to provide for anticipated planning, design and engineering fees. Thus, the costs discussed in this Section are inclusive of all of the above. All costs discussed in this section are in 1989 dollars. Major offsite infrastructure costs were first estimated in terms of total regional cost, then adjusted to reflect the approximate share attributable to proposed waterfront development. These costs were then further adjusted to prorate the waterfront share between the public and private lands within the planning area, using a

proration procedure similar to that currently being used in Kaka'ako by HCDA. Offsite infrastructure costs for the proposed development of the Keehi Triangle area were also excluded as these are assumed to be part of the private developer's cost. A similar proration procedure was used in estimating the public share of onsite infrastructure (such as major Kaka'ako roadway improvements).

4.2.2 Overall Public Costs

Overall public costs of plan implementation amount to $719.5 million as identified in Table 4 below.

Table 4: OVERALL PUBLIC COSTS

(Millions of 1989 Dollars)

Category	Short Range	Long Range	Total
Maritime [1]	$70.0	$240.7	$310.7
Recreation	53.1	29.8	82.9
Circulation/Utilities [2]	42.7	10.9	53.6
Urban Development	45.1	59.7	104.8
Other [3]	153.0	14.5	167.5
TOTALS	$363.9	$355.6	$719.5

[1] Includes $96.4 million for upgrading Barbers Point to major container terminal (long-range)

[2] Does not include estimated $265.4 million for Sand Island Bypass & Tunnel

[3] Includes $87.2 million for acquisition of Kapalama Military Reservation

4.2.2 Short Range Costs

Short-Range costs include those projects planned for development prior to 2001.

Maritime

Short Range maritime improvements are estimated at $70.0 million as identified below. Major costs include the rehabilitation of Piers 24 to 29, the relocation of barge operations to, and redevelopment of Piers 39 and 40, and improvements to the Sand Island container terminals.

Rehabilitation of Piers 24 to 29	$18,305
Relocation of barge operations to Piers 39-40	16,013
Central Sand Island container expansion	15,887
Barbers Point terminal improvements	9,800
Redevelopment of Piers 37-38	8,712
Keehi mooring system	775
Pier 36 Improvements	575
Subtotal	$70,067

Recreation

Total short range recreation improvements are estimated at $53.1 million. Major recreation improvements include the $13.8 million for the first phase of the Kaka'ako waterfront park, $8.6 million for the proposed inland waterways within the Kaka'ako makai area, and $7.1 million for the proposed 12,000-seat Kaka'ako amphitheater.

Kaka'ako waterfront park (Ph 1)	$13,839
Kaka'ako inland waterways (Ph 1)	8,645
Amphitheater	7,150

Keehi Lagoon Canoeing Park	6,435
Kalihi Kai Park	5,940
Kaka'ako bridges (Ph 1)	3,080
Promenades (Ph 1)	2,049
Expansion of Ala Moana Park into Kewalo Basin	2,002
Sand Island Swimming Beach	1,806
Kaka'ako parking	1,188
Sand Island Aquatic Center & Boat Landing	743
Redevelopment of Piers 12 to 15	249
Subtotal	$53,126

Circulation/Utilities

Total short range circulation/utilities improvements are estimated at $42.7 million. This estimate does not include an estimated $0.5 million needed to initiate right-of-way studies for the proposed Sand Island/Kaka'ako bypass & tunnel due to the regional rather than waterfront benefits this facility will provide. The major project costs in this category consist of offsite improvements ($41.0 million). Offsite improvements include costs to develop the necessary offsite infrastructure such as sewer, water, drainage to service public lands within the planning area.

Off-site improvements	$41,002
Pedestrian bridges over Ala Moana/Nimitz (6)	1,696
Subtotal	$42,698

Urban Development

The major urban development improvement identified in the short term is the $45.1 million public share of constructing major on-site infrastructure (roads, sewer, drainage, etc.,) into the Kaka'ako makai area, including the partial exten-

sion of Ward Avenue into the makai area (private share estimated at $8.4 million).

Other

The "other" category totals $152.9 million and includes the major cost of acquiring the Kapalama Military Reservation from the federal government ($87.2 million) and the costs to relocate various uses within the Kaka'ako makai area to the Kapalama lands (i.e., relocation of the Foreign Trade Zone, Produce Center and Y. Hata) to allow for the development of the first phase of the Kaka'ako Park.

Acquisition of Kapalama M. R.	$87,216
Relocation of Y. Hata to Kapalama	28,479
Relocation of FTZ to Kapalama	17,468
Relocation of Produce Center to Kapalama	15,609
Marine Research Center	4,202
Subtotal	$152,974

4.2.3 Long-Range Costs

Long-Range costs include those projects planned for development beyond 2000.

Maritime

Long-Range maritime improvements are estimated at $240.6 million as identified below. The major cost item, $96.4 million for improvements to Barbers Point Harbor, is scheduled for beyond 2010. As noted in Chapter 3, these improvements include the construction of a major new slip with up to four 800-foot cargo berths mauka of the existing basin along with the improvement of 120 acres of additional backland. Other major costs include the expansion of the Sand Island Container terminal ($42.8 million- includes $21.7 million for land acquisition), redevelopment of Kapalama Military Reservation into a modern container ter-

minal ($30.6 million), and relocation of the grain and flour milling operations to Barbers Point Harbor ($18.3 million).

Improvements to Barbers Point Harbor	$96,396
Sand Island container yard expansion	42,833
Redevelopment of Kapalama for container operations	30,602
Relocation of grain & flour to Barbers Point	18,295
Dinner cruise ships at Pier 4	13,945
Redevelopment of Piers 19 to 23	13,596
Kewalo Basin expansion & circulation channel	10,319
Pier 1 & 2 cruise boat terminals	7,383
Sand Island Coast Guard improvements	4,252
Expansion of interisland barge operations	3,049
Subtotal	$240,671

Recreation

Total long-range recreation improvements are estimated at $29.8 million. Major improvements include the $29.0 million for the proposed Kaka'ako Beach Park (major cost elements include shore protection, beach extension and submerged breakwater).

Kaka'ako beach park	$29,053
Kaka'ako passive park (Ph 2)	743
Subtotal	$29,796

Circulation/Utilities

Total long-range circulation/utilities improvements are estimated at $10.9 million. This estimate does not include an estimated $264.9 million needed to build the proposed Sand Island/Kaka'ako bypass & tunnel facility. Design and construction costs for this facility are noted in this report but are excluded from the financial analyses because the improvements are required to meet regional transportation needs for the Central Honolulu corridor irrespective of the Waterfront development. The major project costs in this category consist of offsite improvements ($10.1 million).

Off-site improvements	$10,135
Promenades	773
Subtotal	$10,908

Urban Development

Major urban development improvements identified beyond 2000 (estimated at $59.7 million) are focused on the Fort Armstrong area of Kaka'ako. Major elements include the final phase of major infrastructure construction ($32.5 million), a "people-mover" system ($16.5 million) and inland bridges and waterways ($6.5 million and $4.2 million, respectively).

Kaka'ako roadways (Ph. 2)	$32,511
Kaka'ako people-mover system	16,500
Kaka'ako bridges (Ph. 2)	6,490
Kaka'ako inland waterways (Ph. 2)	4,166
Subtotal	$59,667

Other

The relocation of the U.H. Snug Harbor marine expeditionary facility (from Kapalama to the proposed Keehi triangle) is projected for implementation near 2000 to allow for the development of the proposed Kapalama container yard. Total costs for this relocation are estimated at $14.5 million.

4.3 PUBLIC FINANCE

A major objective of the Honolulu Waterfront Master Plan is for the Project Area to be financially self-supporting. That is to say, the revenues generated from those who use or benefit from the Project Area should offset the public costs identified in Section 4.2 of the chapter and the costs of ongoing maintenance. Although over its lifetime the Project Area is projected to generate significant public benefit, revenue flow necessarily will lag public expenditures in the early years. Master plan implementation contemplates substantial upfront investment for land acquisition, relocation and public infrastructure costs (approximately $364 million in the short-range) whereas project area revenues from ground leases, sales tax, hotel tax and other sources will require a number of years to materialize.

Public financing will ease the cash flow burden of the Waterfront's public projects -- especially in the early phases -- by stretching the payment for those projects over a period of years. For example, if the acquisition of the Kapalama Military Reservation were to be financed for a period of 20 years at an average interest rate of 7.5%, the debt service payments would be approximately $7.94 million per year as opposed to approximately $87.2 million up front. By stretching the payment for public projects over a period of years, public financing thus achieves the following two benefits for the Waterfront Area: (1) it permits a closer matching of public expenditures and Project Area revenues on a yearly basis and (2) it spreads on a more equitable basis the costs of public projects over their useful life and among those who benefit therefrom. In addition, the ability to generate upfront funding for public projects may allow an acceleration of project acquisition and construction before an increase in costs due to inflation.

4.3.1. Overview

The implementation of a financing program for the public projects contemplated by the master plan involves a balancing of public policy objectives and market considerations within constraints imposed by State law.

As noted earlier, the public policy objective is a self-supporting Waterfront in which the costs of public projects are borne by those who benefit from their use. To that end, these objectives would be ideally served by those financing vehicles which are secured solely by the revenues generated from the Waterfront area -- i.e. sales and hotel tax receipts, ground lease payments, real property taxes and other revenues. From a marketing standpoint, however, investors and credit agencies generally balk at bonds secured by revenues which will not begin to materialize until several years after issuance. They require a source of security which is established, predictable and sufficient to cover debt service payments on a timely basis. As such, general obligation bonds would represent the most marketable financial vehicle because they are secured by the State's full faith and credit and taxing power.

The marriage of issuer objectives and market requirements occurs within the limitations imposed by state law relating to bond issuance. A bond issuer must possess the legal authority both to issue bonds for a particular purpose and to pledge a marketable source of security therefor. Otherwise, a project may not lend itself to a particular financing vehicle and alternatives must be pursued.

The purpose of this section is to review the public financing alternatives for each category of public projects referenced in the Master Plan. Consideration is given to the following issues:

- Financing techniques currently permitted under State law -- their basic structure, security features, marketability, potential for implementation and ability to satisfy the public policy objectives.

- Alternative approaches and techniques that other states have implemented to finance similar public projects.
- Mainland models and their applicability to the master plan implementation.
- An overall approach implementing a strategy for financing Waterfront improvements.

4.3.2 Public Financing Alternatives for Master Plan Projects

A. Maritime Projects

The master plan envisions approximately $310.7 million of maritime and maritime-related projects over the next 20+ years. Such projects include the rehabilitation of various piers, expansion of container operations, terminal improvements and other improvements. (See Section 4.2 for discussion of major project costs.) In Hawaii, as elsewhere, maritime projects can be financed by one of two means: harbor improvement revenue bonds or state general obligation bonds.

1. Harbor Improvement Revenue Bonds

With a majority vote of the members of each State legislative house, the State of Hawaii may issue revenue bonds secured by revenues received by the Department of Transportation, Harbors Division (DOT Harbors) and deposited in the Harbor Special Fund. The bond security is grounded in the requirement that the Department "adjust, fix and enforce rates" pertaining to harbors, wharfs and properties managed by it in an amount sufficient to pay debt service on its bonds, provide for operation and maintenance of its properties and reimburse the State for general obligation bonds issued for harbor or wharf improvements. (Section 266-17, HRS)

The issuance of harbor improvement revenue bonds for the maritime projects contemplated by the Waterfront Master Plan presupposes the existence of sufficient revenues after payment of operation and maintenance and certain other costs ("net revenues") to pay or "cover" the annual debt service on outstanding harbor revenue bonds and bonds issued for such maritime improvements. If bonds are issued under the State's existing bond resolution, net revenues must

cover such combined debt service by 1.50 times. DOT Harbors has advised us that the issuance of its Series 1989 bonds in January or February will exhaust its capacity to issue additional bonds under current rates and fees charged to users. DOT Harbors probably could eke out a modest amount of additional capacity if it were to issue subordinate lien bonds with a lower coverage requirement. However, such bonds would bear a higher interest rate and, for security purposes, may contain certain "anti-dilution" restrictions affecting the State's ability to issue future senior lien harbor debt.

There appear to be two basic means by which net revenues could be increased to a level which would support the debt service attributable to the maritime projects identified in the Master Plan. First, DOT Harbors could increase the rates it charges to commercial users of its facilities. We note that such rate increases have been suggested by Venture Associates in its January 1988 *Report To Director Identifying and Evaluating Revenue Opportunities for The Hawaii Department of Transportation*, and that apparently DOT-Harbors has scheduled rate increases in April and October to support the issuance of approximately $80 million of additional harbor improvement revenue bonds pursuant to its five year plan. An independent consultant would need to determine the extent to which such rate increases are commercially feasible and the amount of additional revenues to be generated therefrom. We further note that the relatively small amount of Maritime projects in the initial phases of Master Plan implementation -- approximately $70 million (excluding the purchase of the Kapalama Military Reservation) over the next 10 years -- would produce a relatively modest burden on rates. However, that burden will significantly increase to support the Kapalama redevelopment and the Barbers Point Harbor improvement projects scheduled for the later phases of the Waterfront Master Plan implementation. Even with steady and substantial increases in rates, the resulting net revenues still may be insufficient to cover debt service attributable to these projects.

A second approach for increasing available net revenues involves a broadening of the revenue base available for debt service. The approach taken by many port authorities on the Mainland is to commingle harbor and airport revenues and ground lease rentals (e.g., Oakland, San Diego). While this approach could

produce the desired effect of funding the Kapalama redevelopment and Barbers Point harbor improvements, it involves an administrative overhaul of DOT's existing system, probably legislation and possibly waivers under current FAA restrictions.

While DOT Harbors could charge higher rates so as to increase its bonding capacity, such action would effectively transfer the cost of the Waterfront Master Plan implementation on commercial shippers. These shippers, in turn, may pass on the increased costs to the local economy in terms of higher cost of goods.

2. General Obligation Bonds

As an alternative to Harbor Improvement Revenue Bonds, the State could issue general obligation bonds to finance the maritime and maritime-related improvements. These general obligation bonds could be of the non-reimbursable or reimbursable type. Non-reimbursable general obligation bonds are payable from the general fund of the State and the full faith and credit and taxing power of the State are pledged to such payment. Their marketability depends on the overall financial health of the State's economy and not the revenue stream generated by the projects financed. By State Constitution, State general obligation bonds may be issued to the extent that such issuance would not cause annual debt service on the State's outstanding general obligation bond indebtedness to not exceed in any fiscal year, an amount equal to 18.5 percent of the State's average annual general fund revenues for the three fiscal years immediately preceding such issuance.

Reimbursable general obligation bonds are issued for the purposes of a public undertaking or improvement from which revenues or user taxes may be derived. From a bondholder's standpoint, the security for a reimbursable general obligation bond is the same as the usual general obligation bond. However, reimbursable general obligation bonds require, by law, a reimbursement to the general fund from the revenues generated by the public undertaking. Reimbursable general obligation bonds do not count against the 18.5 percent limit to the extent that reimbursement is received.

General obligation bonds represent the lowest cost of capital available to finance the public improvements for the waterfront area. The interest rates on a State of Hawaii general obligation bond may run approximately one-half to one point lower than the rate of interest on a harbor revenue bond. Moreover, general obligation bonds do not require the establishment of debt service reserve funds. Accordingly, the same annual debt service payment can finance more improvements with general obligation bonds than with harbor revenue bonds.

General obligation bonds would effectively spread the costs of the harbor improvements on to all State residents without regard to the benefit derived from the harbor users. To the extent that harbor improvements benefit the statewide harbor system, this would be an appropriate use of general obligation bonds. However, it should be noted that the issuance of general obligation bonds will use up precious bonding capacity needed for other non-revenue generating State projects. Given the potentially viable alternative of additional harbor improvement revenue bonds, the State may wish to preserve its general obligation bonding capacity for other uses.

B. Urban Development Projects

The Waterfront Master Plan anticipates several public improvements which fall under the heading "urban development." These improvements consist of basic items of infrastructure in the Kaka'ako area -- roadways, waterways and bridges -- that are needed to encourage private development in the master planned area. In addition, a people mover system is planned for the final phase. (See Section 4.2 for discussion of major project costs.) Under current law, financing for these projects can be implemented in two basic ways: special assessment financing and general obligation bonds. Other potentially attractive strategies, such as tax increment financing, will require additional steps before their implementation for the Waterfront project.

1. Special Assessment Financing

To the extent that the improvements are considered to provide special benefit to particular private property owners or long-term land lessees, the improvements could qualify for improvement district or special assessment financing. Under

this approach, the Hawaii Community Development Authority (HCDA) would issue bonds payable from special assessments levied against the properties in the district. HCDA already has used this approach to finance other improvements in the Kaka'ako area.

Under current law, the assessment would be "spread" against the properties on the basis of frontage or area in accordance with the benefit received. The HCDA could achieve greater flexibility if the law were amended to permit the spreading of assessments on any basis of benefits received as determined by HCDA.

Special assessment bonds effectively transfer the cost of a public improvement to the private sector. Accordingly, they achieve the public policy objective of spreading the cost of an improvement on to those benefited by it. From the standpoint of marketability, assessment bonds are sold on an unrated basis and generally bear interest rates which are approximately 75-150 basis points higher than a general obligation bonds. Because the bonds are secured by a lien against the benefited real property, the marketability of and security for the bonds is directly related to the underlying assessed value of the real estate. The most marketable of assessment bonds are issued for improvement districts with already developed parcels. The least marketable assessment bonds are issued in connection with undeveloped land. Like HCDA's outstanding improvement district bonds, the benefited real estate should provide ample security for improvement district bonds in the Waterfront Master Plan area.

A drawback to the widespread use of assessment bond financing is that so much of the land in the Waterfront Master Plan area is publicly owned. As a possible means of overcoming this drawback, it would be necessary for a strong, long-term lessee to be in place with an underlying ground lease which extends far beyond the final maturity of the improvement bonds.

Under current law, the people mover project may have greater difficulty in being financed through special assessment bonds. The statutes do not specifically authorize the issuance of bonds for such vehicles which, in general, tend not to be financed by property assessments. The usual means are leasing or private

funding and operation as apparently is the case of the current system used for Restaurant Row.

To the extent that similar urban development improvements are required in the Aloha Tower area, the options are more limited. Aloha Tower Development Corporation (ATDC) is empowered to issue bonds secured only by the rates, rentals and other revenues generated from the projects it finances. Such revenues are likely to be derived from the leases of the commercial and other properties in its area. Although these leases may generate sufficient cash flow to support a commercial mortgage or provide an attractive return on investments, commercial lease rentals alone may not provide a sufficiently reliable source of security for a marketable bond issue. Moreover, the private nature of the lease payments may cause any bonds issued by ATDC to be taxable. Unlike HCDA, ATDC does not possess the authority to issue improvement district bonds.

2. General Obligation Bonds

To the extent that the urban development projects cannot rely upon special assessment financing for funding, general obligation bonds appear to represent the remaining alternative currently permitted under State law. By necessity, these general obligation bonds would be of the non-reimbursable type because the undertaking -- infrastructure improvements -- are non-revenue producing. The use of general obligation bonds, however, would entail the same considerations relative to cost-effectiveness, spread of payment burden and impact on debt capacity as discussed in connection with financing maritime improvements.

3. Alternative Approaches

Tax Increment Financing. A potentially valuable source of public financing for the urban development projects within the Waterfront Master Plan area involves the use of tax increment financing. In essence, tax increment financing would isolate the increase in real property tax revenues attributable to growth in assessed valuation and pledge those incremental real property tax revenues to secure a bond issue. Tax increment financing has been used throughout the United States, and especially in the State of California, to finance various public

and private redevelopment projects. Tax increment financing in the State is currently authorized under Chapter 46 of the Hawaii Revised Statutes.

From an issuer's standpoint, tax increment financing holds great appeal for several reasons. First, it represents a form of financing that is arguably self-supporting. The financing vehicle provides for improvements in the project area and the project area generates an identifiable stream of revenues which ultimately pay for the cost of financing the improvements. Second, tax increment financing represents a form of financing which is well-understood and accepted by the marketplace. Third, given the anticipated diversity in the Master Plan area, the security for tax allocation bonds could be potentially very attractive.

Despite the enormous potential of tax increment financing, there currently are practical obstacles to its implementation in connection with the Waterfront Master Plan. First, no tax increment districts have yet been created in the Waterfront Master Plan area. Thus, there currently is no flow of tax increment with which to secure a bond issue. Moreover, even if immediate steps were taken to create such district or districts, it will take several years for the tax increment flow to build in sufficient quantity to support a sizable bond issue. Accordingly, the financing technique should begin to have greater value in the longer term.

Second, under current law, tax increment financing requires the approval of the City and County of Honolulu. The statutes permit only counties to issue tax increment bonds. However, the taxing structure in the State does not inherently provide the motivation for such issuance because the City and County would receive the increased property tax revenues from development in the Waterfront Master Plan area under any circumstances.

Accordingly, for the State to benefit from the tool of tax increment financing, one of two events must occur. First, it could amend current law to permit the issuance of tax increment bonds by a state agency such as HCDA. This approach may be viewed as a disruption to the basic system of property taxation in the State and, at a minimum, require County agreement to share in tax increment revenues. Alternatively, it could solicit the cooperation of the City and County to

share in the tax increment flow either by way of a reimbursement agreement with the State or the issuance of tax increment bonds for the master plan area. The inducement would be the property tax "windfall" that the City and County would receive from private development in the Waterfront Master Plan area. The County, however, may argue that it should receive the tax increment because of the added costs of services attributable to the new development.

In any event, tax increment can represent a form of Project Area revenue flow to the State only after the formation of tax increment districts and the completion of private development. At this point, the financing vehicle could be needed to finance public improvements or to provide reimbursement for previous public expenditures.

Special Tax Bonds. Despite the potential attractiveness of special assessment bonds to finance urban development and improvements, an inherent limitation in the technique is the requirement of special benefit. Some improvements such as roads, parks and certain public utilities may confer only a general benefit on particular land parcels. In California, a financing tool has been increasingly used to finance such items of general benefit -- "Mello-Roos" bonds, so named after the state legislators which drafted the statute. Under this approach, special tax districts are formed for the purpose of financing the costs of public improvements and services within the district. A special tax, rather than an assessment, is levied annually on parcels without regard to special benefit from the improvement, in an amount sufficient to pay debt service on bonds issued to finance such improvements. The tax generally requires a 2/3 vote of registered voters in the district or if there are fewer than twelve registered voters residing in the district, the 2/3 vote of property owners in the district. In many practical respects, Mello-Roos bonds bear great similarities to special assessment bonds in terms of security, marketability and collection of the tax, although Mello-Roos bonds provide far greater flexibility. Mello-Roos bonds have generally been issued in connection with large real estate developments; however, they have been increasingly used in connection with public improvements needed for already developed areas. "Mello-Roos" legislation currently exists in California, Arizona and Florida. Similar legislation is currently being drafted in Hawaii.

Non-Bond Techniques. Several techniques not involving bond financing have been used throughout the United States to pay for the costs of urban development improvements. These include: (1) the use of developer fees, (2) the transfer of public costs to developers in exchange for density bonuses or ground rent subordination, and (3) federal grants. While these techniques each impose the costs on parties other than the State, their impact on the overall cost of the Waterfront improvements may be minimal, if not unpredictable. Federal grant monies, once a major source of financing urban improvements, have all but disappeared. Only the Community Development Block Grant (CDBG) program remains but provision of CDBG funds now is largely tied to low income housing. Moreover, the CDBG program is administered at the County level. The use of CDBG funds, if any, would then require a coordinated effort by the State and the County. It is noted that the President's proposed budget for Fiscal Year 1989/90 would eliminate the CBDG program. The public benefits that are available from the developer-related alternatives will depend on specific negotiations with each developer.

C. Recreation Improvements

The Waterfront Master Plan envisions approximately $86.4 million in recreation improvements. These projects essentially consist of upgrading and expanding public recreational facilities in the Waterfront area (e.g., parks and an amphitheater) and improving public access to those facilities. (See Section 4.2 for discussion of major project costs.)

Financing options for parks and other recreation improvements tend to be rather limited. Parks are inherently non-revenue producing and, as such, require other sources of security to support a financing. As a further practical matter, parks provide regional benefit to the state residents rather than special benefit to particular property owners. It is unlikely, then, that the kind of park improvements identified in the Waterfront Master Plan would qualify for special assessment financing.

Under current state law, the options are: general obligation bonds and certificates of participation.

1. General Obligation Bonds

The use of general obligation bonds to finance recreational improvements is not necessarily inconsistent with the public policy objectives for the Waterfront. The parks potentially will benefit everyone on an equal basis -- not just the property owners and lessees of the Waterfront Master Plan area. Accordingly, a rational basis exists to spread the costs among a broader population base. Indeed, general obligation bonds were used in Seattle to pay for regional improvements such as parks and waterways.

2. Certificates of Participation

Alternatively, the State could finance the recreational projects through the issuance of certificates of participation. Certificates of participation are the functional equivalent of bonds. Like bonds, they pay principal and interest to the holders over the term of the financing. The basis of a certificate of participation structure is a financing lease between the public agency and a non-profit public benefit corporation. The lease would require the State to annually appropriate monies from its General Fund in an amount sufficient to meet annual principal and interest requirements. Those payments, in turn, are assigned to a trustee who repays the certificate holder. Unlike general obligation bonds, the public agency cannot be compelled to raise taxes and revenues to pay debt service if its general fund is insufficient.

The credit strength of a certificate of participation issue will depend on the general fund and operating strength of the public agency. To that end, the State would obviously represent the most creditworthy public agency to be involved in a certificate of participation structure. By the same token, if the various revenue streams from the Waterfront area can be commingled into another public entity, that entity may develop the fiscal strength to support a certificate of participation issue.

Developed in California, certificates of participation are widely used throughout the United States as a means of financing the costs of land and public facilities. In many States, they have become popular alternative to general obligation bonds because they circumvent state debt limitations, voter approval require-

ments and other restrictions. Moreover, certificates of participation represent a very marketable security -- although they generally are rated one or two notches below an issuer's general obligation bond rating and will bear a higher interest rate.

The relatively easy access to general obligation bonds in Hawaii has obviated the need to use certificates of participation financing. However, properly structured certificates of participation financing would offer the advantage of preserving state general obligation bond capacity. This is because certificates of participation technically do not constitute "debt" in the constitutional sense. Assuming the Waterfront project generates sufficient sales and hotel tax receipts for deposit in the state's general fund, the use of certificates of participation arguably would be consistent with objective of a self-supporting project.

3. Tax Increment Financing

The alternative of tax increment financing remains a theoretical possibility assuming a cooperative arrangement between the State and the City and County (see "Urban Development Projects").

D. Circulation/Utilities

Public development within the planning area requires approximately $319 million of costs attributable to circulation and utilities projects. The utilities projects fall into three categories: water and sewer; drainage; and power/communications.

The large majority of circulation costs are attributable to the $265.4 million Sand Island bypass and tunnel scheduled for the final phase of master plan implementation. Because of the fundamentally different nature of these public costs, this section is organized in a slightly different manner than the previous sections.

1. Utilities

Water and Sewer. In most municipal utility financings, the public agency is able to recover its capital costs from user fees, connection charges and other revenues of a utility enterprise. Because the revenue stream -- especially from user fees -- is considered so reliable and predictable due to the essential nature of the service, they can support a very marketable and creditworthy bond issue.

In Hawaii, only the counties and county boards of water supply impose user charges. This presents a rather anomalous circumstance: the State is charged with the above mentioned capital costs yet, under current law, it cannot directly recover its costs through rates. Rather, it must rely on the County to charge sufficient rates with which to reimburse the State over time.

From a financing standpoint, the situation appears to leave the State with two basic options. First, it could finance these utility costs through general obligation bonds or certificates of participation as described in previous section. It, then, could enter into a cooperation agreement with the City and County pursuant to which the City and County would agree to reimburse the State by passing through those costs in the rates to the ultimate user. Alternatively, the City and County could assume these costs and finance them directly through revenue bonds. This alternative presupposes that County has or can obtain through legislative amendment the power to assume such costs.

Financing the State's water and sewer costs through bonds payable from user fees potentially raises a question of equity. Such financing -- whether directly by the City and County or by way of reimbursement to the State -- may be seen to spread the capital cost to existing users rather than concentrating the repayment obligation among those users in the area of expansion which created the increased need. In order for the State to accomplish this objective, it would need to look only to the connection fees collected in the Waterfront area and the user fees attributable to such users. The credit markets consider connection fees too uncertain in timing and in amount to support a financing. Accordingly, this may preclude the direct issuance of revenue bonds by the City and County. To expedite its recovery of utility costs and to broaden the base of its potential receipts, the State may wish to consider an approach adopted in California, Florida and other high growth states. The approach involved the imposition of a standby or availability charge levied annually against the beneficial user of owner of each parcel for the availability of water and sewer service.

Whether or not the State needs to act as the issuer, the self-supporting nature of these improvements will require the cooperation of the City and County.

Drainage. The public financing options for drainage improvements assume a slightly different characteristic than the options for financing water and sewer costs. Because drainage improvements are non-revenue producing, the cost of such improvements cannot be recovered from user fees. However, drainage facilities may qualify for improvement district financing if a finding of special benefit can be made. At this time, the best candidates appear to be the improvements located in the Kaka'ako area or Sand Island.

With respect to the drainage improvements which do not qualify for special assessment financing, general obligation bonding appears to represent the only viable financing option under current state law. Whereas certificates of participation are appropriate for land acquisition and public facilities, the credit markets look unfavorably upon the use of certificate of participation for drainage, landscaping and similar infrastructure improvements.

Electric, Telephone and CATV. Electric, telephone and CATV improvements may require little or no public financing, depending on the length of the payback period. Given the relatively minor cost of the improvements, the public utilities may be willing to pay for the upfront costs.

2. Circulation

Like the recreation improvements discussed earlier, the Sand Island bypass and tunnel represent an inherently non-revenue producing facility. Even if the State were to impose a toll for tunnel, start-up toll roads are virtually impossible to finance on the basis of toll road revenues alone because of the absence of proven collection history or established traffic patterns. Moreover, the use of tolls, with rare exception, historically has precluded the receipt of federal grants. Accordingly, under current Hawaii law, only general obligation bonds would appear viable.

With a project of such magnitude as the Sand Island bypass and tunnel, and the long time frame for its implementation, it is instructive to review the means by which similar roadway facilities have been financed elsewhere.

First, we note that State governments have relied upon Federal Highway Administration funds for all or a portion of road costs. It is unclear whether the Sand Island bypass would qualify for such grants or whether such grants will be available in the next century when the project is scheduled for construction.

Given the uncertainty of federal funding, issuers in many states have relied upon sales tax revenues to pay for the cost of transportation improvements. California counties have especially relied upon sales tax revenues to finance the costs of road improvements within their jurisdictions. In California, with voter approval, counties are eligible to increase the sales tax by up to one percent and to use the sales tax receipts generated from taxable transactions in their jurisdictions to pay for transportation-related costs. The Counties of Los Angeles, San Diego, Contra Costa, Alameda, Santa Clara, Riverside, San Mateo and Fresno all have had successful sales tax elections. Many of these counties, including Los Angeles and San Diego, have issued tax-exempt debt supported by sales tax revenues.

The State of Illinois is an example of a state which has adopted a bond program payable from sales tax revenues. Under that program, the State has issued approximately $550 million of sales tax revenue bonds to finance general infrastructure needs, including roadways. We note that the Illinois program represents the exception rather than the rule, because states tend to be reluctant to issue bonds on the basis of revenues that otherwise would be paid to the general fund. States, however, may look to the expected sales tax receipts to determine the return on a particular public investment.

More frequently, states will finance the cost of road improvements through motor fuel tax revenues, vehicle registration fees and other highway user fees. The list includes Arizona, Oregon, Delaware, Michigan and Montana. The rationale behind this approach is that the cost of highway improvements is passed on directly to the users in an amount relative to their use.

E. Other Improvements

The final category of projects consists of such miscellaneous items as relocation costs, the acquisition of Kapalama Military Reservation, the construction of the Marine Research Center and the development of fuel distribution and storage facilities on Sand Island.

As with many of the projects referenced in the master plan, these projects also are non-revenue bearing. Accordingly, any public financing therefore must rely on some source of security external to these projects. Most likely, this will mean general obligation bonds or other form of State funds.

The efficacy of pursuing any of the other alternatives discussed throughout this section will be greatly limited by project timing -- which is scheduled for the early phases of Master Plan implementation. It is doubtful revenues from the project area will have materialized at such stage in an amount sufficient to pay for these costs on a current basis.

4.3.3. Mainland Models

The Honolulu Waterfront Master Plan implementation involves a unique set of financial, legal and public policy considerations. The timing and nature of its project needs, the relationships among applicable governmental entities and the sources of security available for bond issues are not duplicated in connection with any waterfront development on the Mainland. Nonetheless, from the standpoint of financing -- particularly in connection with the "urban development" -- it is instructive to review the approaches which led to the successes enjoyed by certain notable projects and their applicability to the Honolulu Waterfront.

A. San Diego, California

1. Approach

Virtually all of the waterfront development in San Diego has occurred on land which is under the control of the San Diego Unified Port District. The Port District, which coordinates harbor and tidelands development within the geographic

boundaries of the City of San Diego and neighboring cities, consists of three operational departments: harbors, airports and properties. Because it is not a deep water port, the District recognized early on that it would have difficulty in competing with the Ports in Long Beach and Los Angeles. By contrast, the Port District always has viewed the shoreline as a special urban amenity and, accordingly, has heavily emphasized the area of property management. Because of the desirability of the waterfront area, the Port District provides no land write downs and its standard leases require a base ground rent and a percentage of gross revenues. The revenues generated by these leases and from the airport has placed the Port District in such a cash rich position that it pays cash for the parks, marinas and other public improvements of general benefit. It is even paying cash for a $140 million convention center for the benefit of the City of San Diego.

2. Applicability to Honolulu Waterfront

While the property management division of the Port District is widely viewed as a model for other waterfront agencies, its enviable financial position is a result of circumstances not present with respect to the Honolulu Waterfront. First, San Diego apparently never faced in its early years the level of expenditures for public improvements that the Honolulu Waterfront Master Plan currently contemplates. The improvements in San Diego seemed to be installed after the receipt of revenues from all sources. In addition, the operation of both a successful airport as well as the harbor has significantly broadened its revenue base and added to the financial resources available for public improvements. As a result, there has been an insignificant amount of bond issuance in connection with the shoreline development in San Diego. This broad level of bondable resources is not currently available to Honolulu Waterfront.

B. Port of Oakland

1. Approach

Oakland's Jack London Square is a masterplanned waterfront development on land controlled by the Port of Oakland. The development emphasizes commercial, retail and recreational activities. The Port represents the only public entity

involved in the development. Property development recently has usurped transportation as the principal focus of the Port. It is being spearheaded by the Port's Properties Management Division, now one of two major divisions of the Port. The other is the Transportation Division which is responsible for the operation of the airport and the harbors. Like the San Diego Unified Port District, the Port of Oakland generally has acted as a lessor of real property pursuant to which it receives a ground rent and participation in its lessee's cash flows. Unlike the San Diego Unified Port District, however, the Port of Oakland, at times, has been willing to subordinate its rents to outstanding mortgages as a means of inducing certain developments. With respect to public improvements in the area, the Port generally has paid for street improvements with excess cash, but has bonded for some of the more costly improvements, such as a parking garage. Such bonds were secured by the Port's general revenues, commingled in one fund from maritime operations, airport and property leases.

The Port of Oakland is known for its modernized and competitive harbor facility. At present, the Port is proceeding with its most ambitious plans -- to serve as joint venture partner in connection with an office building development. While the return is expected to be handsome, the nature of the capital commitment to fund the project may affect the Port's overall creditworthiness.

2. Applicability to Honolulu Waterfront

Compared to Honolulu, the scope of the Port of Oakland's waterfront development is rather modest. Its big investment is occurring at present after several years of steadily developing the commercial dimensions to the waterfront. Moreover, the commercial development has been benefited by the level of resources that flow into the Port from airport and harbor improvements. These revenue sources constantly have been used to fuel the success of the Port which, in turn, has facilitated property development.

C. Boston, Massachusetts

1. Approach

The waterfront of Boston falls under the jurisdiction of the Massachusetts Port Authority, the City of Boston and the Redevelopment Authority of the City of Bos-

ton. The Port Authority has operating divisions for the airport, seaport, bridges and property development. The property development division is primarily concerned with generating sufficient revenues to support traditional maritime activities and to create jobs. For property development, the Port Authority has relied on federal funds for its projects. As an example, it received $8,500,000 of funds from the Economic Development Authority to renovate the Old Boston Fishing Pier to enhance its function as an active fish processing pier. As for the remainder of public land along the waterfront, the City has been generally able to obtain exactions from developers who want to build along the waterfront. For example, in the Burroughs walk project, the developer agreed to provide underground parking, a new dock for the fireboats, offices for the fireboat department and a $475,000 contribution to a neighborhood economic development program. The City generally has not issued bonds for public improvements in the waterfront area. One exception was when it issued approximately $12,000,000 in general obligation bonds for the development of a 105-acre Navy shipyard site acquired in 1978; private investment there, however, has exceeded $850,000,000. The Navy shipyard site is the location of the New England Aquarium, a hospital and various commercial and retail establishments.

2. Applicability to Honolulu Waterfront

The Boston model appears to represent a more intense commercial focus than contemplated by the Honolulu Waterfront Master Plan. As such, it required a much smaller scale of public contribution. Park improvements, relocation costs, utility costs and major land acquisitions were not involved in the same magnitude. The Boston experience, however, illustrates the level of private investment that can be spurred by a relative modest amount of public funding.

D. Baltimore, Maryland

1. Approach

The waterfront in Baltimore falls under the jurisdiction of three entities: the Port Administration of the Maryland Department of Transportation, the City of Baltimore and the Inner Harbor Management Group (IHMG). The Port Administration charge is limited to cargo maintenance and traditional maritime activities. It

derives all funding from the State and has not relied on public financing. It does not act as a developer. Much of the noted urban development along the waterfront has been managed by the IHMG, a private, non-profit organization that was created in the 1950s. In addition to facilitating development, the IHMG can and has acquired property that later has been used for public purposes. The IHMG was especially important in its early years because the City did not have a planning department at that time. The City, however, has been willing to lend its general obligation bonding powers to finance needed public improvements. In addition, the City and the IHMG has relied upon federal and state funds, CDBG and UDAG funds and Title I moneys. The State contribution was $35 million for a convention center. The City motivated the State to make this contribution because of the tax benefits which would flow to it. With its waterfront currently flourishing, the City now is able to rely on the private development to fund additional infrastructure and is in a position to command market rate leases from its developer tenants.

2. Applicability to Honolulu Waterfront

The Baltimore waterfront involved a level of public funding that is roughly comparable to the public urban development costs of the Honolulu Waterfront. However, a large part of its public funding sources derived from federal grant programs which have virtually disappeared. Thus, unlike the City of Baltimore, the State of Hawaii must rely on its own financial resources to pay for public projects. Baltimore's success also points up the value of a close working relationship between the City and State. It allowed the City to allocate the public cost of a convention center onto the State by reason of the tax benefits which flow therefrom. A similar relationship could produce equivalent benefits to the State of Hawaii with respect to tax increment financing.

E. Seattle, Washington

1. Approach

The Seattle waterfront falls under the jurisdiction of four public entities: the Port of Seattle; the Department of Natural Resources; the City of Seattle; and various special purpose public development authorities. The Port of Seattle, which is in-

dependent from the City, generally has had a maritime focus. It has permitted a modest amount of commercial, restaurant and office development on its piers. With its financial resources from its maritime operations, it is beginning to acquire land in the "uplands" area for the development of hotel, office and residential facilities. The Department of Natural Resources owns the tidelands area and generally coordinates waterfront activity. Most of the urban waterfront development in Seattle, however, has occurred on City-owned land. This land, in turn, is leased to public development authorities which administer the actual development. The City generally does not become directly involved in development. From a public funding standpoint, the Seattle waterfront has relied on numerous sources to finance public improvements. These include: City general funds for street improvements (a special levy measure was turned down by the voters); Economic Development Authority grants, Urban Renewal funds and CDBG monies for certain public facilities and private redevelopment; and County general obligation bonds for such regional facilities as waterfront parks, a museum and an aquarium.

2. Applicability to Honolulu Waterfront

The Seattle waterfront is governed by a political structure which rivals that currently governing the Honolulu waterfront for complexity. While public investment of funds for urban development has been impressive, the participation of other governmental agencies is notable -- especially the willingness of the County to issue general obligation bonds for regional facilities (waterfront parks, museum and aquarium) benefiting a wide range of users.

4.3.4 Conclusion

Public financing can play a valuable role in Waterfront Master Plan implementation. By stretching the cost of public improvements over a period of years, public financing stabilizes the cashflow requirements of the project area and achieves a better matching of revenues and expenditures. It also achieves a certain "equity" by spreading the costs of an improvement over its useful life.

While the overall Waterfront area is expected to generate significant revenues for years to come, financing the public improvements identified in the Master Plan poses considerable challenges. The obstacles relate to the nature and timing of those revenues, and the ability to pass the costs of the Waterfront directly to its users. Table 5 which follows summarizes currently available techniques and other bonding alternatives for each category of public improvement as discussed above.

At present, the State has only two financing mechanisms which pass the Waterfront Master Plan improvement costs directly to its users: (1) special benefit assessment bonds for a portion of the urban development costs and (2) harbor revenues bonds for maritime improvements. However, maritime revenues will need to increase substantially if relied upon to cover all of the Maritime costs. The potential exists to recover the costs of public utility improvements from rates; however, this will necessitate coordination with the City and County and public utility companies. The improvements to the Waterfront Master Plan area should result in soaring real property tax revenues; however legal mechanisms do not exist by which the State can capture those revenues. Sales tax and hotel tax revenues will flow to the State and could represent a bondable source of security; however, even with the legal means to pledge such revenues, the State like other states, may have little inclination to do so since such revenues would strengthen its General Fund. Finally, although ground lease rentals can potentially be captured, such revenues, alone, provide an inherently weak source of security in a bond issue.

To the extent the State cannot capture and pledge a predictable and established revenue flow to a bond issue, or use special assessment bonding, it necessarily most rely on general obligation bonds, certificates of participation, pay-as-you-go financing from Project Area revenue flows, and/or private funds to pay for public improvements. However, the obstacles to implementing other forms of financing suggest possible elements of a basic strategies to reducing the dependency on general obligation bond financing. These include:

Table 5: ALTERNATIVE PUBLIC FINANCING TECHNIQUES

	CURRENT LAW		ALTERNATIVES	
Category of Improvement	Financing Technique	Comments	Financing Technique	Comments
Maritime	Harbor Improvement Revenue Bonds	Need to increase Net Revenues to provide additional bonding capacity costs borne by maritime users.		
	General Obligation Bonds	Reimbursable or Non-Reimbursable; lowest borrowing costs. Costs spread to all State residents.		
Urban Development Projects	Special Assessment Bonds	Improvements must benefit a private owner underlying real estate must have sufficient assessed value to support bonds, higher borrowing cost. HCDA would be issuer.	Tax Increment Financing	Potentially self-supporting financing. However, County must act as issuer. Current tax structure may act as disincentive since County would receive real property taxes anyway.
	General Obligation Bonds	Non-Reimbursable	Special Tax Bonds	Similar to assessment bonds but not limited to those improvements which confer special benefits. Requires legislation.
Recreation	General Obligation Bonds	Non-Reimbursable		
	Certificates of Participation (COPs)	Easy access to State G.O. bonds without vote generally obviates need for COPs. Preserves G.O. capacity.		

	CURRENT LAW		ALTERNATIVES	
Category of Improvement	**Financing Technique**	**Comments**	**Financing Technique**	**Comments**
Utilities				
Water and Sewer	General Obligation Bonds	State to recover costs from County in rates charged to waterfront users.	Standby/ Availability Charge	Broadens base of revenues available to reimburse State. Legislation is probably required.
	Certificates of Participation			
	Revenue Bonds	County would be issuer. Questions of "equity" could arise if all users of system are required to pay for capital costs.		
Drainage	General Obligation Bonds	Non-Reimbursable		
	Special Assessment Bonds	Requires finding of special benefit.		
Electric	No public financing may be required			
Communication	No public financing may be required			
Circulation	General Obligation Bonds		Revenue Bonds payable from Sales Tax, Motor Vehicle Tax, Vehicle Registration, Hotel Tax, etc.	Requires legislation Sales and hotel tax alternatives may not be preferred because such revenues would otherwise flow into General Fund.
Other Improvements	General Obligation Bonds	Project timing may "preclude" other techniques		

- Increasing and broadening the base of revenues which can realistically be bondable by State agencies -- e.g. maritime revenues.
- Coordinating with the City and County with respect to sharing the "windfall" of increased property tax revenues from the Waterfront Project Area.
- Adopting of legislation which may increase the flexibility of spreading special assessments and levying special taxes on the basis of more general benefit.
- Utilizing ground lease rentals for the following purposes: pay-as-you-go financing (thereby reducing future bonding requirements); broadening the revenue base of a public agency with existing bonding capabilities; or for reimbursing a revolving fund, if one is established.

The above guidelines will not completely eliminate the need for general obligation bond financing. However, the State may be able to limit the use of general obligation to those facilities which provide more regional benefit, such waterfront parks and other recreation facilities, or which have no other financing alternatives. In limiting the use of general obligation bonds, the State not only would limit its risk but enhance the potential return on its investment.

4.4 PUBLIC REVENUES

A significant development potential for office, commercial industrial, and hotel uses exists within the planning area. This development potential can be translated into the form of significant annual ground lease rentals, paid by private developers wishing to develop the public lands. The ground rents generated from public lands leased for private development represent a primary source of public revenue which could be used to finance public improvements within the planning area on a pay-as-you-go basis through reimbursement of a revolving fund and or reimbursement for bond debt service payments. Other indirect revenue sources, discussed further in Section 4.5, such as real property, con

veyance and transient accommodations taxes can also be expected to generate public revenue.

4.4.1 Methodology

The steps involved to analyze the public revenue sources within the planning area are outlined as follows:

1. Identified the sites which are owned by the State of Hawaii that could be leased for private development.
2. Reviewed the master plan to determine the land uses for the selected sites.
3. Evaluated the development potential of each site in terms of its development density and mix of uses.
4. Assessed the market support for the various uses and the availability of the necessary infrastructure in order to project the likely development phasing of the selected sites.
5. Estimated the current land values for the selected sites, assuming the completion of the necessary infrastructure, and considering each site's physical characteristics, location and development potential.
6. Reviewed contemporary leasing practices for comparable properties.
7. Based on the projected development phasing, estimated land values and recommended lease terms.
8. Projected the ground rental income stream for the selected sites.

4.4.2 Site Identification

The master plan includes 21 sites which could be leased by the State of Hawaii for private development, as shown in Table 6 below. The majority of these sites are between Kewalo Basin and Pier 14, as shown in Figure 20.

Through the establishment of ground leases on the selected sites, the State of Hawaii would benefit from increasing land values and ground rents resulting from the implementation of the master plan.

Table 6: WATERFRONT DEVELOPMENT PARCELS [1]

Site	Location	Use	Land area (acres)
CMX-01	Fort Armstrong	Office	1.60
CMX-02	Fort Armstrong	Office	1.93
CMX-03	Fort Armstrong	Office	2.42
CMX-04	Fort Armstrong	Office	2.33
CMX-05	Fort Armstrong	Office	3.70
CMX-06	Fort Armstrong	Office	1.76
C-01	Kaka'ako Makai	Retail	1.76
C-02	Kaka'ako Makai	Retail	1.88
C-03	Kaka'ako Makai	Retail	1.45
C-04-R	Kaka'ako Makai	Office	1.28
C-05	Kaka'ako Makai	Specialty [2]	16.77
C-06	Kewalo Basin	) Retail & tour-	1.68
C-07	Kewalo Basin	) ist-oriented	1.82
C-08	Kewalo Basin	) facilities	5.29
C-09	Piers 5 and 6	Retail	4.00
C-10	Piers 13 and 14	Specialty [3]	1.00
C-11A/B	Fort Armstrong	Retail	0.56
C-IIC	Sand Island	Retail	0.50
AT-01	Aloha Tower	Business hotel	3.40
AT-02	Aloha Tower/HECO site	Office	NA
I-01	Sand Island Parking	Industrial	9.50
I-02	Sand Island Industrial	Industrial	40.00

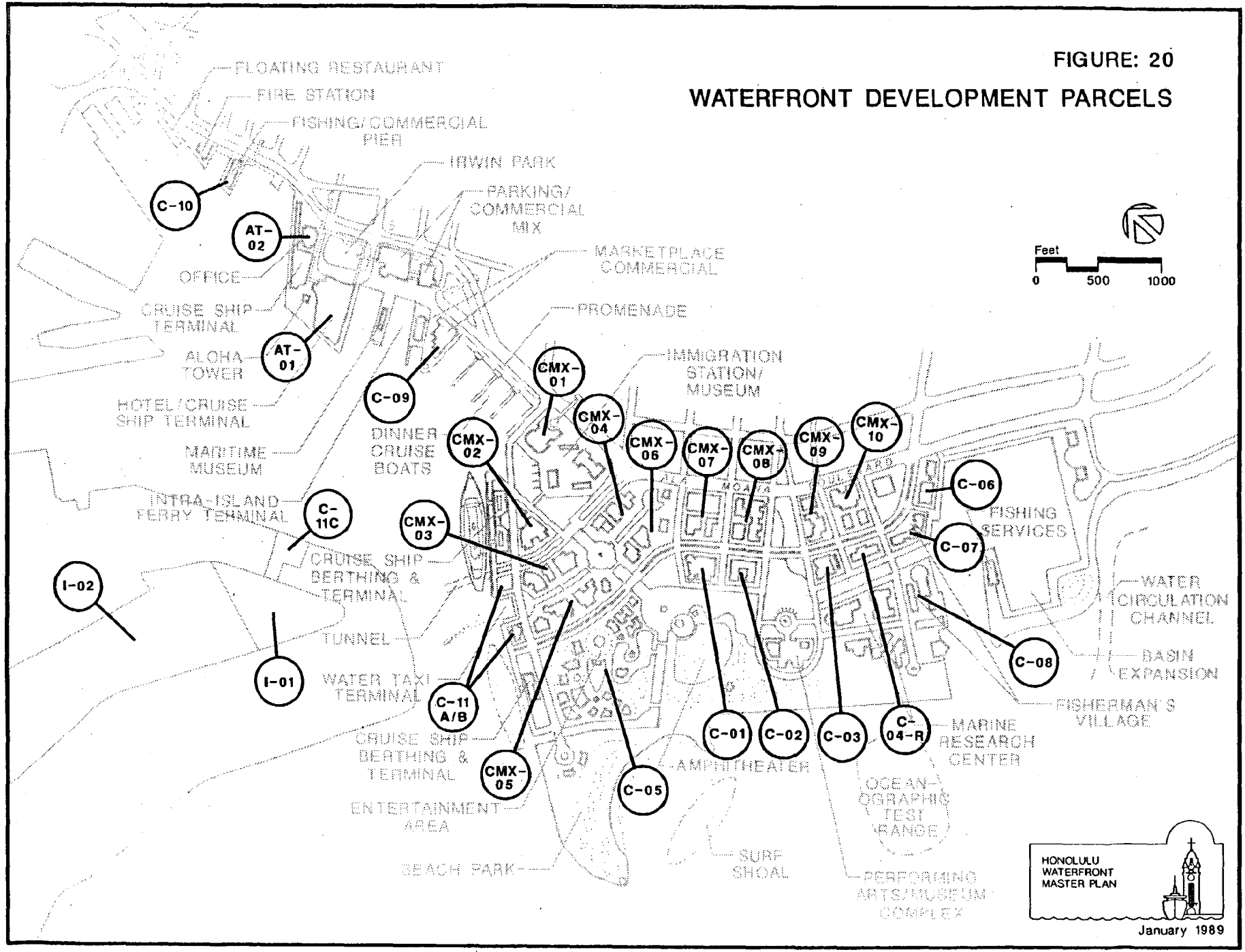
[1] Parcels CMX-07 to CMX-9 (See Figure 20) are privately-owned and have therefore been excluded from the analysis. Parcel CMX-10 is assumed to be acquired via a land exchange. Parcel AT-02 is owned in part by the State.

[2] The Entertainment Area is intended to feature entertainment, commercial, recreational, cultural and educational activities in a landscaped, park-like setting.

[3] Piers 13 and 14 could include the wholesale fish market which could be relocated from Kewalo Basin. The development could also include a restaurant and related facilities set in a unique fish market environment.

FIGURE: 20

WATERFRONT DEVELOPMENT PARCELS



4.4.3 Land Use Categories

The selected sites in the Waterfront study area have been classified into four broad categories based on the proposed master plan. The categories include:

1. Commercial Mixed Use (CMX)
2. Commercial (C)
3. Aloha Tower (AT)
4. Industrial (I)

General development opportunities within each category are discussed under the following subheadings.

Commercial Mixed Use (CMX)

Sites with a Commercial Mixed Use (CMX) designation could primarily be developed for office use. Such sites could provide a source of the Class A office space which is anticipated to be required to meet the needs of Honolulu's future office market.

CMX development could also include a relatively small retail component. For the purposes of this study, this ancillary retail component is estimated at about 10,000 square feet per acre of land developed, or between 8% and 12% of the total net rentable area.

Class A office developments in Honolulu have typically allocated between 5% and 15% of the net rentable area for ancillary retail use, with an overall average of about 10%.

These ancillary retail areas are usually occupied by tenants who service the needs of the office users in and immediately around the complex. Typical retail users include:

- Restaurants
- Convenience shops

- Gift shops
- Florists
- Hair stylists.

Commercial (C)

Sites with a Commercial (C) designation could either be devoted entirely to retail development or provide an equal amount of retail and office space, depending on their location and physical characteristics.

Aloha Tower (AT)

Development at the Aloha Tower site provides a unique opportunity to integrate Class A office development with hotel development, while maintaining the necessary space requirements for maritime uses. Ultimate development of the Aloha Tower site could be incorporated with redevelopment of the adjoining HECO site.

Industrial (I)

Industrial development on Sand Island will result in the creation of fully-serviced lands suitable for a variety of industrial uses and the opportunity for expanding the parking facilities serving downtown Honolulu..

4.4.4 Development Potential

The development potentials for the commercial and commercial mixed use sites in the Honolulu Waterfront area are expressed in terms of net rentable area and based on three components:

- Floor area ratio (FAR)
- Ratio of net rentable area to gross building area
- Relationship between retail and office space.

Variations in development potential assumptions are outlined as follows:

- The Kewalo Basin Commercial redevelopment, comprising sites C-06, C-07 and C-08, are planned for development with a commercial "fishing village" that would feature a variety of retail shops, outdoor cafes, restaurants and tourist-related attractions. Retail development on these sites has been estimated to total about 63,000 square feet.

- Piers 5 and 6, identified as C-09, are assumed to be developed with an 80,000 square foot Festival Marketplace.

- The Aloha Tower site, AT-01 and AT-02, is assumed to have a development potential which includes a 400- to 500-room hotel and a 664,000 square foot office complex that incorporates the adjoining HECO site.

- Piers 13 and 14, identified as C-10, could be renovated to provide support facilities for commercial fishing vessels, such as a wholesale fish market. Retail development could be limited to about 10,000 square feet devoted to restaurant and related uses.

4.4.5 Projected Market Support

The demand for hotel, commercial office and retail shopping uses have been analyzed and presented in a separate market assessment and are summarized in the development program presented in Chapter 3. These assessments are based on a detailed analysis of those factors which influence supply and demand and consider the competitive advantages and disadvantages of each alternative.

Based on the hotel market assessment, a 400- to 500-room business hotel on a portion of the Aloha Tower site could be supported by 2000.

The additional demand for office and retail area in the study area is projected to total 2.0 million square feet and 350,000 square feet, respectively, by 2010.

Market support for other components of the master plan are discussed as follows:

- The Entertainment Area (C-05) is envisioned as a highly active complex for people to spend their leisure time. Its unique orientation and location

within the Honolulu Waterfront could enhance its appeal to both residents and visitors. Lands for this specialty area could be available after 2000.

- The redevelopment of Piers 13 and 14 (C-10) into a wholesale fish market could provide a unique setting for a seafood restaurant and ancillary uses. This specialty area could be developed by 1996 and 2000.

- The 10-acre parcel identified as I-01 could offer about 1,000 at-grade parking stalls which, in conjunction with a water taxi system, could provide alternative parking opportunities for Honolulu's waterfront. The development of this parcel would be between 2006 and 2010.

- Parcels within the Sand Island Industrial Park (I-02) are presently leased by the State of Hawaii to individual users on short-term leases. Market support for these lands is expected to continue into the future.

4.4.6 Development Phasing

The development phasing for the selected sites in the study area are based on the:

- Projected demand for the various land uses

- Availability of the necessary infrastructure to service the sites.

Projected development phasing for the various components in the Honolulu Waterfront study area are discussed below.

Retail

Retail development of a majority of the commercial sites in the study area by 2010 could be supportable, based on the projected demand requirements, density assumptions, and the availability of the necessary infrastructure.

The Entertainment Area (C-05) and Piers 13 and 14 (C-10) offer unique commercial opportunities and could be developed between 1996 and 2010.

Office

Office development within the Aloha Tower/HECO assemblage could be supportable between 1991 and 1995. Aside from small scale development on sites C-03 and C-04-R, major office development opportunities on State-owned lands are not projected until between 2001 and 2010, because of the lack of available development sites.

Four sites along Ala Moana Boulevard owned by the B.P. Bishop Estate could potentially be developed for office use and, therefore, compete with development on State-owned sites for office space users. Considering the availability of State-owned sites and the demand for office space, development on two of the four Bishop Estate sites could occur between 1996 and 2010. The remaining two sites could be developed after 2010.

The development schedule of the ancillary retail space is anticipated to coincide with the primary office development.

Hotel

The hotel development could begin between 1991 and 1995 in order to provide the necessary facilities and achieve a stabilized occupancy rate during the following five-year period.

Industrial

Market support for the existing Sand Island Industrial Park improvements is expected to continue into the future. The development of the Sand Island parking facility could begin between 2006 and 2010.

In summary, development on a majority of the State-owned sites in the Honolulu Waterfront study could be supportable by 2010. The demand for various land uses beyond 2010 has not been assessed, however, the remaining undeveloped sites could be developed by 2020, assuming demand remains at levels projected between 2006 and 2010.

4.4.7 Land Values

The potential land values for the selected State-owned sites are influenced by:

- Location
- Physical characteristics
- Development potential

Based on a review of land values for comparable properties in Honolulu, and considering the proposed changes to the Honolulu Waterfront, the aggregate value of the selected State-owned lands could be over $260.0 million (excluding those dedicated to maritime uses), in constant 1989 dollars.

The land value estimates are based on the following assumptions:

- The necessary infrastructure is completed.
- The sites are unencumbered by existing leases or easements which might adversely affect land use and development.
- Land use regulations governing development would be similar to those outlined under the current Land Use Ordinance.

4.4.8 Ground Lease Trends

This section reviews the contemporary lease terms for long-term ground leases and concludes with ground lease recommendations for the selected land uses found in the study area.

Contemporary Lease Terms

Contemporary lease terms for non-residential properties are generally as follows:

- Total lease term between 55 and 75 years.

- Predetermined ground rents during the initial "fixed term," generally 30 years in length.
- Ground rent for the first 10 years based on an 8% annual return on the estimated land value.
- Ground rent during the second and third 10-year periods increased between 50% and 75% over the rent during the previous period.
- Ground rent during the remaining lease term renegotiated in increments of 10 years and based on the then land value multiplied by the then fair market rate of return.
- As additional payments, the lessee is typically responsible for all taxes, charges, assessments and other expenses associated with the property.

Ground leases covering retail and hotel sites also include provisions for percentage rents which would be paid in addition to minimum (fixed) rents.

For retail properties, the calculation of percentage rents is generally based on one of two formulas:

- 1% to 2% of the gross sales volume generated by the retail development.
- 7% to 20% of the gross rental income generated by the retail development.

Percentage rents associated with hotel ground leases are typically based on a percent of gross departmental revenues, shown as follows:

Hotel Departmental Revenue	Percentage Rent
Rooms	4.0- 6.0%
Food	1.0- 3.0%
Beverage	2.0- 4.0%
Concession and other	10.0-20.0%

In both cases, percentage rents do not typically apply until sales volumes or gross rental income have surpassed a predetermined "breaker" level.

Market Lease Terms

Based on the review of current leasing trends, the market lease terms for the State-owned sites could be as follows:

- Lease term of 60 years.
- Lease rents fixed for first 30 years.
- Ground rent for the first 10 years based on an 8% return on the estimated land value.
- Ground rents increased by 50% for the second and third 10-year increments of the fixed rental period.
- Ground rent to be renegotiated for three remaining 10-year periods based on the then fair market value of the land multiplied by the then fair market rate of return for similar properties.
- As additional payments, the lessee would be responsible for all taxes, charges, assessments and other expenses associated with the property.

The ground leases for the retail and hotel sites could also include provisions for percentage rents. The percentage rent associated with the retail ground leases could be based on 2% of the gross retail sales in excess of the breaker.

The percentage rent for the hotel ground lease could be based on a share of departmental revenues, shown as follows:

Hotel Departmental Revenue	Percentage Rent
Rooms	6.0%
Food	1.0%
Beverage	3.0%
Concession and other	15.0%

4.4.9 Projected Ground Rents

The ground rents generated from public lands leased for private development represents a source of revenues which could be used to finance redevelopment projects in the Honolulu Waterfront master plan.

Lease terms and conditions may vary between the selected State-owned sites, as each lease is tailored to the specific needs of both the lessor and lessee. However, at a minimum, each lease should provide for a fair return on the underlying land value.

The income stream resulting from the leasing of the selected sites is based on the following assumptions:

- Ground rents are based on an 8% annual return on the initial land value and are expressed in constant 1989 dollars during the projection period to facilitate the comparison to the development costs.
- The impact of percentage rents associated with the retail and hotel sites is not addressed.
- The value of any site improvements at the end of the lease term is assumed to be nominal. The underlying land value provides the basis for projecting the reversionary interest in the selected sites to the State.

- The ground leases are assumed to begin at the mid-point of each five-year period of the development schedule, beginning with 1993.

Based on conventional leasing assumptions and in consideration of development phasing and estimated land values, the annual ground rental income stream from the privately-developed, publicly-owned lands within the planning area are projected to increase from about $8.2 million in 1993 to nearly $22.7 million in 2018, at which time it will stabilize until 2052 when original leases will begin to expire and new leases will be negotiated.

Ground rent payments and reversionary interests total nearly $1.5 billion over the entire projection period, in constant 1989 dollars.

4.5 PUBLIC COST BENEFIT ASSESSMENT

Public costs and benefits associated with plan implementation include monetary as well as non-monetary "qualitative" aspects, such as benefits attributable to public parks and open space. The analysis conducted for the master plan focuses on the monetary costs and benefits associated with the implementation of the Master Plan.

The analysis first identified and projected sources of revenue and expenses to the State and County governments resulting from plan implementation. Revenues were narrowly defined to include income generated from the private development of public land, directly through ground leases and indirectly through conveyance, real property and transient accommodations taxes. Costs included all urban development, recreation, circulation/utilities and relocation costs identified in Section 4.2. Projected maritime costs and those associated with the design and construction of the proposed Sand Island Bypass highway were excluded in the analysis as both costs represent major regional or system-wide improvements benefitting a user group extending far beyond the waterfront. Projected State and County operating and maintenance costs were then identified and subtracted from the projected revenue stream. The resultant net State revenues were then compared to the projected State capital expenditure.

4.5.1 Methodology

The steps to analyze the costs and benefits of the master plan are outlined as follows:

1. Classified the phasing of the public improvements of the master plan in 5-year periods from 1991 through 2010 and beyond.
2. Identified and projected the public non-maritime capital expenditures.
3. Identified and projected sources of revenue and expenses to the State and County governments resulting from implementing the master plan.
4. Compared the net revenue generated through the implementation of the master plan to the projected capital expenditure.
5. Estimated the payback period for the master plan.

The analysis of the costs and benefits are presented under the following sub-headings. All projections are in constant 1989 dollars.

4.5.2 Capital Expenditures

The capital expenditures associated with the various public improvement projects would total approximately $700 million over 20 years as discussed in Section 4.2. These costs would be paid by the State of Hawaii.

Nearly $410 million or nearly 60% of the total expenditure would be for non-maritime projects. These non-maritime expenditures are grouped in four categories, shown as follows:

- Recreation: Development of passive and active parks and beaches, amphitheater, marinas, boat landings, aquatic center, inland waterways and promenades.
- Urban development: Construction of roadways, bridges and transportation systems in the Kaka'ako area.

- Circulation: Pedestrian bridges, additional promenades and selected offsite improvements to enhance circulation through the study area. []
- Other: Marine Research Center and relocation and land acquisition costs incurred in the process of implementing the recommended plan.

4.5.3 Operating Revenues and Expenses

Once implemented, various components of the master plan will provide income to the State and County governments. They would also require periodic maintenance and incur operating expenses. The income and expenses associated with the implementing the plan are discussed below.

Revenue

The major sources of revenue to the State include:

- Ground lease rents
- General excise tax
- Transient accommodation tax.

The revenue to the County results from increased property values and real property taxes.

The projected revenues from these sources are discussed under the following subheadings.

Ground Lease Rents

The ground rents generated from public lands leased for private development represents a major source of revenue. The ground rental income would extend well beyond the 20-year projection period.

Based on the estimated land values and current leasing practices, the annual ground rental income is projected to increase from about $8.2 million in 1993, stabilize at nearly $22.7 million from 2018 to 2052, and gradually decline until the last ground lease expires in 2078.

This income stream would total about $25 million between 1991 and 1995, increasing with market support for various land uses, and total over $80 million between 2006 and 2010.

The subsequent ground rents and the reversionary interests in the development sites over the following 68 years would total an additional $1.3 billion.

Transient Accommodation Tax

The transient accommodations tax, also known as the hotel room tax, is imposed at a rate of 5% on the gross rental proceeds from furnishing accommodations to transients for less than 180 days.

The master plan includes a 400 to 500-room hotel on a portion of the Aloha Tower Complex. The hotel could open between 1991 and 1995. Its target market would be the business traveler.

Based on the existing and anticipated competition for business travelers, the average occupancy rate of the Aloha Tower hotel would be expected to increase from about 55% to between 85% and 90% by 2000. The room rate could average about $150 per night.

The room revenue for the Aloha Tower hotel is projected to increase from about $15 million per year between 1991 and 1995 to nearly $25 million per year between 2006 and 2010, based on the anticipated levels of operation.

As a result, the transient accommodation tax revenue from the proposed hotel could increase from about $750,000 per year between 1991 and 1995 to about $1.2 million per year between 2006 and 2010.

General Excise Tax

The general excise tax is a tax on the gross proceeds of business transactions. The tax applies to all levels of business activities including consumer, production, manufacturing and wholesaling activities.

The projected general excise tax from development of the Honolulu Waterfront is based on projected sales revenue from the hotel and retail uses. Estimates

of the general excise taxes from office and industrial uses in the Honolulu Waterfront area would be dependent on the characteristics of the tenants, who are unknown at this time. Therefore, the general excise tax for office and industrial development has not been included.

The proposed hotel could achieve annual revenues increasing from about $23 million to nearly $40 million over the 20-year projection period, based on anticipated levels of operation and relationship between department revenues.

The net rentable area devoted to primary and secondary retailing in the Waterfront area is projected to increase from about 177,000 square feet to over 500,000 square feet by 2010. An additional 200,000 square feet could be developed after 2010.

The retail facilities could be expected to generate gross annual sales averaging about $300 per square foot. As a result, annual revenues would increase from about $53 million between 1991 and 1995 to nearly $152 million between 2006 and 2010 and stabilize at about $210 million beyond 2010.

Annual general excise tax revenues are projected to increase from about $3.1 million between 1991 and 1995 to nearly $7.6 million between 2006 and 2010. The annual general excise tax revenue would stabilize at nearly $10 million in the years after 2010.

Real Property Tax

The master plan would ultimately have a direct and positive impact on the property values in the Waterfront area. As a result, the County will directly benefit from the higher property values through increased real property taxes.

At completion the property values in the Waterfront area could total about $1.3 billion. The majority of these improvements are expected to occur by 2010.

The real property tax for commercial, industrial, and hotel land uses in Honolulu is $9.45 and $10.71 per $1,000 of assessed values, shown as follows:

REAL PROPERTY TAX RATES

(July 1, 1988 to June 30, 1989)

Land Use	Tax rate per $1,000 of net assessed value
Hotel	$10.71
Commercial	9.45
Industrial	9.45

The annual real property tax revenue to the City and County of Honolulu is projected to increase from $1.8 million to $8.1 million over the 20-year projection period, based on the current tax rates and anticipated development schedule.

The real property taxes are projected to stabilize at about $12.6 million upon full development at some point beyond 2010.

Total Operating Revenue

Based on the preceding analysis, the total revenue resulting from the development could total about $52.8 million between 1991 and 1995, increasing to about $167.4 million between 2006 and 2010. Thereafter, the annual revenues are projected to average about $43 million.

About 75% to 80% of the projected revenues would be paid to the State. The remainder, consisting of real property taxes, would flow to the County.

Operating Expenses

As the Honolulu Waterfront develops, certain improvements will require maintenance. The facilities requiring the most maintenance would include the parks, public promenades, an amphitheater and public rights-of-way. For the purpose of this analysis, responsibility for maintenance of these facilities is assumed to be that of the City and County of Honolulu.

The operating expenses associated with these facilities are a function of their area or size. Most of the facilities which require maintenance are scheduled for completion by 1995.

The annual operating expenses for the facilities are estimated to range from $50 per seat for the amphitheater to $4,500 per acre for the parks, as shown below:

ESTIMATED ANNUAL OPERATING EXPENSE
(in 1989 dollars)

Use	Unit	Expense per unit
Parks	acre	$4,500
Amphitheater	seat	50
Promenades	foot	1
Parking areas	space	2.4
Public rights-of- way	mile	38,000

Expenses associated with police and fire protection and State and County administration will also increase over the projection period. However, these expenses would result from population growth which is anticipated to occur regardless of the redevelopment in the study area. Therefore, these expenses have been excluded.

The total annual operating expense could increase from $930,000 to $1.55 million over the projection period, based on the per unit operational expense estimates and the proposed development schedule.

Net Revenue

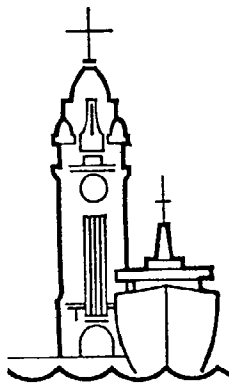
Based on the preceding analysis, the projected revenue to the State and County would exceed the associated expenses and result in a plan that would be self-sustaining over its economic life.

After operating expenses, the net revenue to the County is projected to increase from nearly $4.5 million for the five years ending 1995 to $32.8 million for the five years ending 2010. Thereafter, the net revenues would average nearly $11.1 million per year over the project's remaining economic life.

Similarly, the net revenue to the State resulting from development of master plan improvements is projected to total nearly $43.6 million for the five years ending 1995, and would be expected to increase to a total of $126.9 million for the five years ending 2010. Thereafter, the net revenue could average about $30.3 million per year.

4.5.4 Payback Period

Capital expenditures, excluding those associated with the maritime and Sand Island Bypass Corridor, are projected at about $409 million. Once implemented, the net revenue from master plan improvements could pay back the capital investment within the first 20 to 25 years of the redevelopment program.



5.0 MANAGEMENT FRAMEWORK

The Honolulu Waterfront Master Plan envisions a diversity of public and private projects and improvements during the next twenty years and beyond. The Plan provides a framework for reinforcing and expanding waterfront uses to create an environment that is at once a dynamic international port and an exciting gathering place for residents and visitors alike.

Implementation of this vision will require a tremendous investment of time, energy, expertise, and dollars. The ultimate success of the Plan will also hinge on the governmental agency or agencies that are charged with the design, financing, construction, and management of major Waterfront projects and systems. Thus, the implementation/management framework for the Waterfront is one of the most critical issues to be addressed by the planning team.

5.1 PROBLEM STATEMENT AND PURPOSE OF THE MANAGEMENT FRAMEWORK

The purpose of the management framework is to realize the development and use potential of the Honolulu Waterfront. Because management is--and should be--closely tied to the Master Plan, it is helpful to review key characteristics of the plan itself: systems orientation, comprehensive, clear activity focus, consensus-based action, visionary, State initiatives with private-sector participation. Taken as a whole, the comprehensive master planning approach represents a new way of looking at the Waterfront. The question arises, then, whether implementation of the Plan requires a new type of management framework.

- **Systems orientation.** The Master Plan covers a large area, almost 1,550 acres. Within this area are a number of critical systems, such as harbor

operations, circulation, and public facilities. They are called systems because the various components are interrelated; changes in one area can affect the operations or condition of other areas.

- **Implementation need:** Planning and management areas must be broad enough to encompass meaningful tracts within which system-wide actions and consequences may be understood and controlled.

- **Comprehensive.** The Plan's wide geographic scope has resulted in a comprehensive plan for the entire Waterfront. The first of its kind in Honolulu, the Master Plan is a departure from earlier piecemeal planning efforts.

  - **Implementation need:** The flexibility provided by consolidated planning and management areas is important. Since most of the real estate is already developed, future, higher use of the Waterfront will require relocation and rearrangement of uses, including some that cross agency jurisdictional lines, as presently drawn.

- **Clear activity focus.** The gradual progression of the Plan from short- to long-term proposals shows the emergence of three primary areas: urban redevelopment from Kewalo Basin to Chinatown, industrial maritime from Pier 23 to Kapalama, and marine recreational at Keehi Lagoon.

  - **Implementation need:** Given the underlying direction of the Plan to rationalize uses along the Waterfront, the management framework should be equally clear in identifying the entities that should manage these areas, i.e., to minimize administrative overlap.

- **Public participation.** The Plan described in Chapter 3 was shaped by the ideas of many people in government, business, and the community at large. The Plan's openness to public input continues with the publication of this document and legislative deliberation.

  - **Implementation need:** Public participation is not only a process for receiving ideas and feedback, it is also a process for achieving consen-

sus on a plan of action. Broad-based consensus provides the mandate for relevant agencies to implement the Plan.

- **Visionary.** In recent years, the value of the Honolulu Waterfront as a regional resource has become apparent and demand to use this area has surfaced from many sectors of the community. The Plan reconciles a variety of uses. It does so under an umbrella of common themes that provide strong images, such as "working waterfront," "lei of green," and "people-gathering place." Images are rallying points for diverse groups and a vision can sustain a development process over many years.

  - **Implementation need:** The management equivalents are organizational goals and priorities. Clear foci help agencies to harness synergistic effects among discrete projects, creating a whole that is greater than the separate components.

- **State initiatives with private-sector participation.** The Plan documents the extent of existing State presence in the Waterfront area as the dominant landowner and operator of public facilities.

  - **Implementation need:** The Plan calls for increased State initiatives through investment in infrastructure and additional public facilities. These improvements are expected to enhance the market for redevelopment and generally will precede private investment. Nevertheless, active private-sector participation is one of the ultimate objectives of the Master Plan. The financial program outlined in Chapter 5 begins to clarify the roles of the public and private sectors, balancing their respective strengths: government's commitment to the public trust and ability to shoulder large risks versus business's ability to respond quickly and innovatively to the market.

5.2 METHODOLOGY

The discussion in this chapter provides the following: (1) identification of management functions that are necessary to implement the Plan and are, therefore, criteria for evaluating alternative management systems, (2) preliminary find-

ings on existing local agencies and Mainland models, (3) four alternative management frameworks, and (4) the recommended framework.

The present discussion distinguishes between Plan implementation and project implementation, and focuses on the former. The difference between them is one of scale: Plan implementation refers to the entire area covered by the Honolulu Waterfront Master Plan, whereas project implementation refers to smaller units, such as subareas or even parcels within a subarea. It also allows us to view management as a two-tiered process. The first tier establishes general responsibilities for initiating, administrating, and coordinating progress on the Plan. The second tier would manage project-level development. Because individual projects are still conceptual, detailed project management schemes require further study.

The management study consisted of the following steps:

- Review existing agencies that have jurisdiction in the waterfront.
- Identify future management needs arising from the Honolulu Waterfront Master Plan.
- Evaluate local public agencies in terms of their institutional capacity to undertake new responsibilities.
- Evaluate Mainland models in terms of their respective track record and their suitability to the Honolulu context.
- Formulate distinct implementation strategies/management frameworks which combine relevant local and Mainland components.
- Consider the advantages and disadvantages of each alternative.
- Recommend a management framework.

5.3 OVERALL PLAN MANAGEMENT REQUIREMENTS

A workable management framework for the Honolulu Waterfront will have to coordinate many complex development components. It should be noted that the most appropriate management framework is not necessarily a single organization that would provide all of the management functions; it may be several organizations working together. The components of Plan implementation are expressed in the following list of management objectives.

- Promote and carry out both long- and short-term plans for the waters and lands of the Honolulu Waterfront.
- Develop and adhere to a series of guiding principles that provide long-term continuity.
- Allow flexibility in project execution to accommodate changes in political, social, financial, and environmental circumstances.
- Establish a mechanism for mediating conflicts in land use patterns and equity issues.
- Set guidelines for resolving "best use" criteria with water-dependent and comprehensive planning needs.
- Communicate information to and from the users and regulators of the Waterfront area.
- Focus attention on public access and public trust issues.
- Support channels through which constituencies with Waterfront interests can be represented, particularly those that are fragmented and unorganized.
- Encourage inter-governmental and inter-agency exchange of ideas and issues about the Waterfront as they affect their respective jurisdictions.

- Design and develop public facilities in the Waterfront area to be durable, quality components of the urban environment.
- Maritime Uses. Encourage the productivity and competitiveness of maritime activities, including the expansion or modification of facilities and services to meet changes in cargo traffic and new shipping technology.
- Urban Commercial Uses. Facilitate the development of revenue-generating activities, providing appropriate incentives so that both the public and private sectors gain equitable returns on their investments.
- Recreational Uses. Expedite activities to upgrade and expand public access to and recreational facilities in the Waterfront area.

5.4 THE EXISTING MANAGEMENT FRAMEWORK

The starting point for determining a suitable management framework was to identify public entities and their responsibilities in the Waterfront area. These agencies are listed below and described more fully in Section 2.5.

State Agencies

Aloha Tower Development Corporation (ATDC)--attached to DBED

Department of Accounting and General Services

Department of Agriculture

Department of Business and Economic Development

    Foreign Trade Zone

Department of Land and Natural Resources (DLNR)

    Aquatic Resources Division

    Land Management Division

    Office of Conservation and Environmental Affairs

    State Parks Division

Department of Transportation (DOT)
- Harbors Division
- Airports Division
- Highways Division

Governor's Office of State Planning (OSP)

Hawaii Community Development Authority (HCDA)--attached to DBED

University of Hawaii

City and County Agencies
- Board of Water Supply
- Department of Public Works
- Department of Parks and Recreation

Federal Agencies
- Environmental Protection Agency
- Federal Aviation Administration (FAA)
- Fish and Wildlife Service
- General Services Administration
- National Oceanographic and Atmospheric Administration
- U.S. Army Corps of Engineers
- U.S. Coast Guard
- U.S. Customs Service
- U.S. Immigration Service
- U.S. Military Sealift Command

Figure 21 shows the pattern of land ownership and management responsibility involving four major State agencies: DOT-Harbors, DLNR, HCDA, and ATDC. One of the shortcomings of the existing management framework is the division between ownership on one hand, and authority to plan and develop on the other

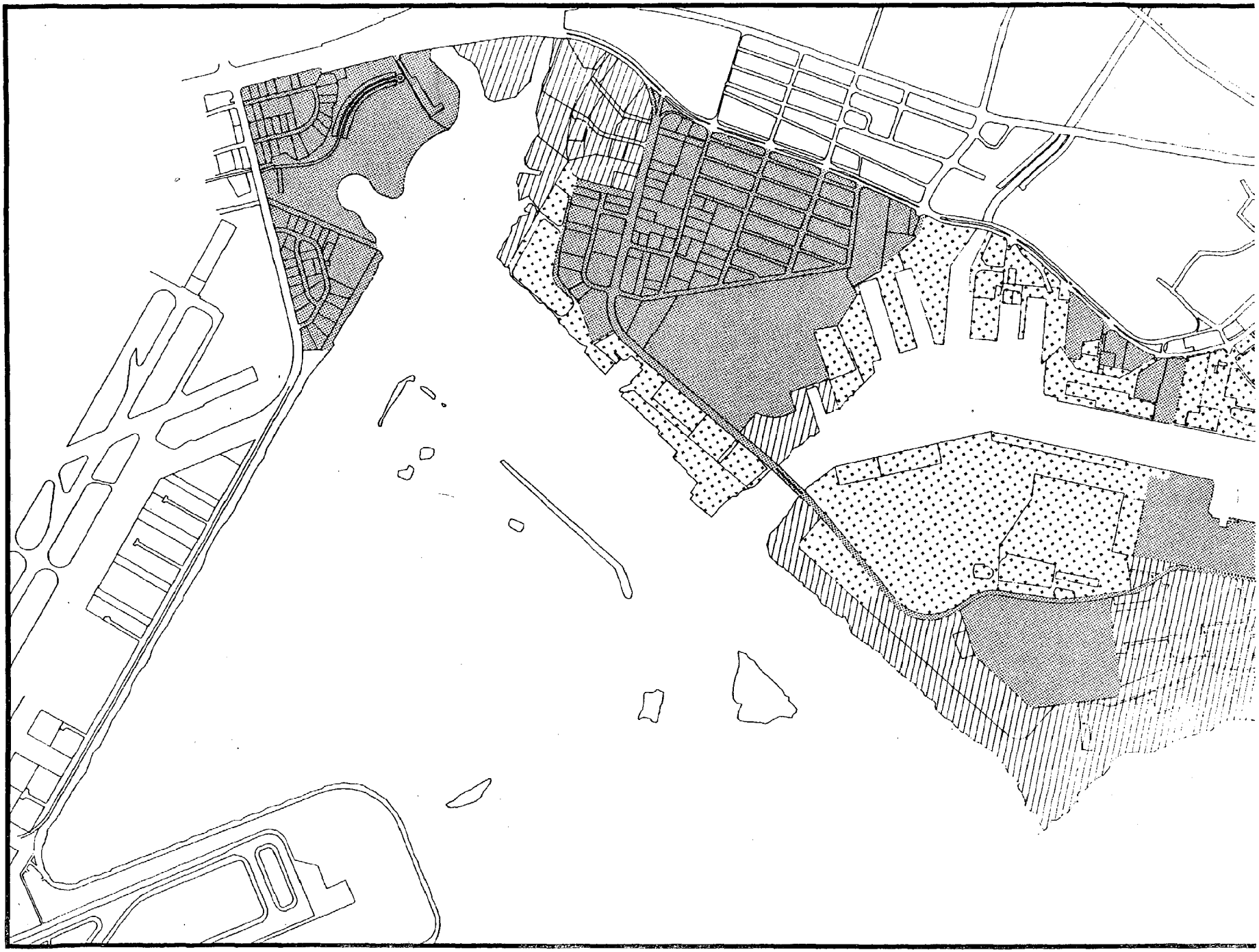
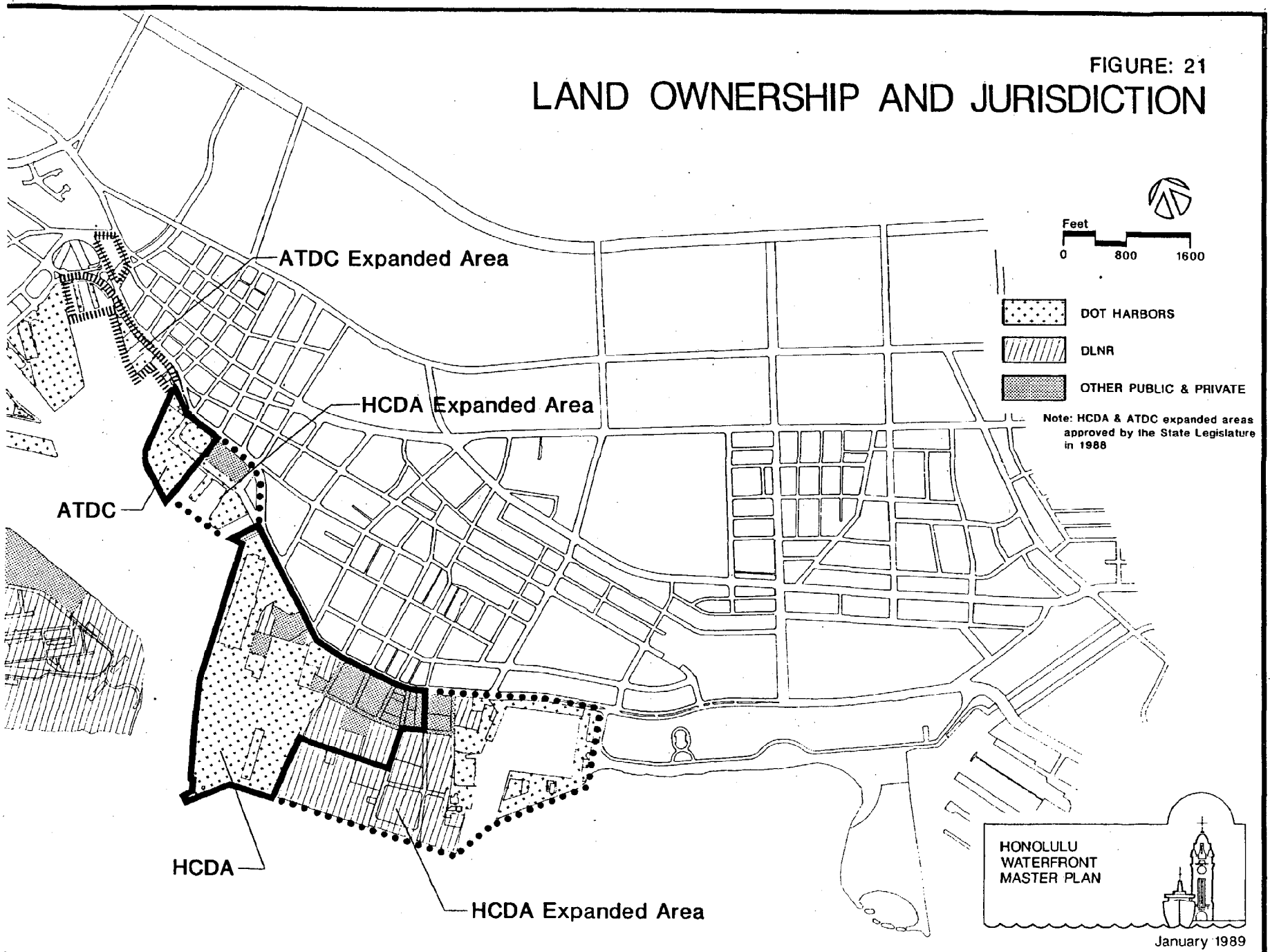


FIGURE: 21

LAND OWNERSHIP AND JURISDICTION



January 1989

hand. Overlapping jurisdictions are notable in the Kewalo Basin, Kakaako Peninsula, and Aloha Tower areas. A further complication, albeit temporary, has resulted from HCDA and ATDC boundary expansions approved by the 1988 Legislature. Although the boundary for HCDA's Makai Area was moved eastward to include Kewalo Basin, the official Makai Area Plan has not been modified as yet. Therefore, development controls are contingent upon City and County development plan and zoning ordinances. Similarly, ATDC's boundary was extended westward to Pier 23; however, the Administrative Rules and planning guidelines have not been amended to cover this area.

It should be noted that shared jurisdiction is not necessarily an unworkable situation. For example, Kewalo Basin will continue to be a medium-draft harbor operated by DOT. At the same time, HCDA should provide planning guidance on the future direction of the area and how Kewalo Basin relates to future development. Planning authority and operational authority can function on parallel planes, provided there are adequate opportunities for coordination.

Shared jurisdiction becomes more problematic, however, when a third party enters, such as a private developer. A 1987 report on the redevelopment of Aloha Tower prepared by the Legislative Auditor cited the inability of ATDC to provide clear title to the developer as one factor that stymied the project. This type of situation will have to be confronted under the Waterfront Master Plan for two reasons. First, jurisdictional overlap occurs precisely in those areas designated for urban redevelopment, including targeted priority areas. Second, the Master Plan relies on private developers for most new urban construction, thus requiring some form of leasehold land conveyance. Resolving jurisdictional redundancy will require careful case-by-case analysis based on each agency's operational and development interests in the area.

The following discussion briefly reviews the potential for certain existing agencies to undertake new or modified responsibilities resulting from the Master Plan. This assessment is based on their institutional capacity, including: the body of legislated powers and authority, staff expertise and experience, historical policies and practices, and public expectations.

Hawaii Community Development Authority (HCDA)

HCDA has an Executive Director and a full-time staff who oversee the implementation of the Kakaako Community Development District. Ongoing functions and responsibilities include enforcement of development district standards, supervision of infrastructure development, coordination of legislative programs and rules, and public information activities. The agency has the authority to issue bonds for construction and acquisition of any public facility. It may also exercise the power of eminent domain.

To fulfill its mission of promoting and encouraging private reinvestment in Kakaako, HCDA has adopted a master plan which allows property to be redeveloped for more intensive uses and has enhanced real estate values throughout the district by improving public facilities and utility systems. Through the regulatory process, HCDA has successfully negotiated concessions from private developers that have produced public benefits. To date, HCDA has not had an opportunity to package redevelopment parcels or engage in competitive Request-for-Proposal (RFP) processes. Because much of the land in the Waterfront area is publicly owned, HCDA may have significant future opportunities to develop this more active role.

HCDA has prepared a Makai Area Plan for a portion of the lands and waters within its jurisdiction makai of Ala Moana Boulevard. The original plan is now incomplete because of legislative action approving HCDA boundary expansion in 1987. For the most part, redevelopment activities mauka of Ala Moana Boulevard have been the focus of HCDA's attention and are likely to require the continued effort of existing staff for several more years. Therefore, additional personnel would be required to fully meet the planning and management needs of the makai area.Aloha Tower Development Corporation (ATDC)

In 1988, the Governor appointed an executive officer for the agency. Also in 1988, a public hearing was convened to review rule changes that would allow ATDC to solicit new development proposals.

In the past, legislative consideration has been given to consolidating ATDC's jurisdiction with that of HCDA. The missions of both public corporations involve urban redevelopment and both are administratively attached to the Department of Business and Economic Development. Therefore, combined staffing could result in management efficiencies and economies of scale.

Department of Transportation, Harbors Division (DOT-Harbors)

Departmental policy has focused on maintaining a viable working harbor by meeting the needs of industrial, maritime operations and clients. This practice has co-existed with a custodial view of real estate management, resulting in a lesser priority for developing complementary commercial facilities on the waterfront that would enhance revenues and increase public access to the water's edge.

There has been some indication from Honolulu Harbor users that a better-funded and more active program is needed for the maintenance and improvement of various maritime facilities. This basic need should be addressed as part of the recommendations for changes and improvements in the overall waterfront management framework.

Like other State agencies, the Harbors Division acquires property from the Department of Land and Natural Resources by Executive Order which provides the transfer of rights. This action is preceded by a request which documents the amount, location, and purposes for which land is required. The central purpose for properties held by DOT-Harbors is, of course, related to transportation services; nevertheless, there is some flexibility in legal interpretation which provides access to an array of commercial, office, industrial, and recreation development possibilities. DOT-Harbors' tendency to narrowly interpret the types of facilities that can be developed signals the need to enhance staff capability if property management and/or development were to become a higher organizational priority. A recent exception is the agency's sponsorship of the Keehi Lagoon Recreation Plan for a mixed-use recreation area centered around boating

facilities. Actual implementation of this plan, however, may require expertise that is not fully available in the organization.

Department of Land and Natural Resources (DLNR)

DLNR's major roles as controller and regulator of public lands and water resources would generally create a conflict of interest should it assume the role of land developer, or even a facilitator of private development. New leadership initiatives, mandates, and personnel would be required to expand DLNR's scope of activities. Moreover, a development-oriented direction may be contrary to the powers and duties historically ascribed to an agency that is charged with conserving and managing natural resources on the State's behalf.

5.5 TYPOLOGY OF MANAGEMENT STRUCTURES WITH MAINLAND MODELS

Several types of management structures currently operate in waterfront areas across North America. These structures are described and one or more working models are cited from cities elsewhere.

Port Authority

Since the turn of the century, public port authorities have become an important part of the port industry. Most public port authorities derive their powers and obligations directly or indirectly from state law. In some states, port authorities operate directly under state statute as state-level departments or as special districts. Others are controlled indirectly by states, with powers passed from the state to municipalities or counties, which, in turn, create the port authority.

The types of port authorities vary among the states. Most ports operate within a legislatively defined local region. California ports, with few exceptions, are independent agencies with powers granted by city government. In Washington and Oregon, port authorities are created under state enabling statutes, but operate at the local level. The ports of Texas derive their authority from the state,

but operate as county navigation districts. Many East Coast states have a single, statewide port authority. Despite differences in organizational structure, the enabling legislation in the various states have several features in common:

- The legislation creates a public role and responsibility to improve and develop waterborne commerce.
- A port commission is established to exercise that responsibility.
- The port authority is authorized to develop, build, finance, and promote facilities and services necessary to the public port enterprise and its objectives.

The importance of port authorities in waterfront redevelopment has increased in recent years because they have expanded their jurisdictions to include activities outside the traditional waterborne transportation emphasis to include airports, bridges, and office buildings. These investments often endow a port authority with major financial resources.

Although fiscally autonomous port authorities, such as the Mainland examples described below, appear attractive to Hawaii, it is important to point out key differences between the Mainland and Hawaii. Many ports on the Mainland now control vast acreages along coastal and riverine waterfronts. They acquired these tidelands decades ago, at a time when the land was still undeveloped and much of it considered a management burden. Savvy port managers were able to develop lands gradually as market demand emerged. With accumulated revenues, further investments were possible so that, today, many ports find themselves in a cash-rich position able to fund non-maritime public improvements. In contrast, the Honolulu Waterfront is almost completely developed and there is growing competition for future use of the limited land area. Rather than being able to build fiscal strength over a period of time, a Hawaii port authority, if one is established, would be expected to fund immediately a substantial amount of capital improvements for harbor facilities and urban infrastructure. Additional claims on Honolulu Harbor revenues are being made by other, less profitable

ports throughout the state that, nevertheless, require facility upgrade and expansion.

Port of Los Angeles. A tidelands grant from the State of California has enabled the City to foster port development, which is managed through the City's Harbor Department. A five-member Board of Harbor Commissioners, appointed by the mayor with City Council approval, oversees port development and operations. The port operates on its own revenues and, to date, has not required any tax revenues.

Port of Long Beach. Located adjacent to the Port of Los Angeles, the Port of Long Beach is an autonomous public entity established under the City Charter. The City retains the right to approve the Port's budget. The Port is governed by a five-member Board of Harbor Commissioners appointed by the City Manager.

Port of Oakland. The Port of Oakland is a public enterprise established by the City of Oakland and is a component unit of the City. Operations include the Port of Oakland marine terminal facilities, the Oakland International Airport, and commercial property rentals. The Port is under the control of a seven-member Board of Port Commissioners and is administered by an Executive Director. The Port prepares and controls its own budget, administers and controls its fiscal activities, and is responsible for all Port construction and operations.

Port Authority of New York and New Jersey. The Port Authority of New York and New Jersey, a public corporation, was established by an interstate compact approved by the U.S. Congress in 1921. Its jurisdiction covers an area within approximately 25 miles of the Statue of Liberty and includes 17 county governments, 234 municipal governments, and more than 200 special-purpose authorities and commissions. The Port Authority Commissioners, six from each state, are appointed by the governors of New York and New Jersey and approved by their respective state legislatures.

Massachusetts Port Authority (Massport). Massport is an independent special-purpose governmental unit, established by the Commonwealth of Mas-

sachusetts in 1956. The port authority has management control over cargo transfer throughout Boston Harbor. Massport also manages Logan International Airport, operates several bridges, and is a major landowner in the area. The state enabling charter granted Massport broad government powers including bonding authority, land use controls, and power to establish user charges.

Superagency

Given the complexity of management mechanisms governing waterfront areas, another proposal is to establish a single agency or superagency with comprehensive authority to plan, finance, develop, and operate all waterfront activities. The superagency is a way to rationalize the overlapping policy and geographical jurisdictions of agencies with interest in the waterfront area and whose fragmented power is an obstacle to the timely transition and rejuvenation of abandoned or underutilized harbor areas. The agency may be a public corporation outside of direct governmental control or it may be a public agency with departmental status, although the breadth of its powers is likely to provide a large measure of de facto autonomy.

Another characteristic of the superagency is its active involvement in promoting retail, commercial, and recreational uses and general public access which, traditionally, have been viewed as inappropriate in port areas. Until recently, little thought was given to varied uses of downtown waterfronts once cargo handling and coastal manufacturing had lost their viability in these locations.

San Diego. The San Diego Unified Port District is a public corporation created by an act of the California legislature in 1962 and approved by voters in the cities of Coronado, Chula Vista, Imperial Beach, National City, and San Diego. The Port is governed by seven, non-salaried commissioners. These members are appointed by the city councils of each of the five participating municipalities: the San Diego city council appoints three commissioners and each of the other city councils appoints one commissioner each. Policies by which the District operates are established by the Board of Port Commissioners, while daily activities are supervised by the Port Director and carried out by the District staff.

The District was established to manage the harbor, operate the international airport at Lindbergh Field, and administer the public tidelands surrounding San Diego Bay, except for Federal properties. Strictly speaking, the District is another port authority, but given the breadth of its powers, it lies at one end of the spectrum of port authorities whose powers range from conservative to liberal. In San Diego's case, explicit authority has been granted to promote and develop commerce and recreation, as well as the more traditional port domains of navigation and fisheries.

Public Development Agency

Public development agencies or corporations are created as sub-units of state or local governments to manage development within a designated area. The goals of the agency may include improvement of social and economic conditions, preserving the character of historic areas, or improving the business climate for new private investment. Within its delineated boundaries, the agency may retain governmental powers, such as eminent domain, urban renewal authority, taxation power, and controls over planning, zoning, and urban design. Furthermore, the public development agency may be used to facilitate land acquisition and to make loans of public funds, thus circumventing statutory or charter restrictions.

Seattle. Pike Place Market, a 22-acre commercial area of Seattle was restored through an ambitious program administered by the Department of Community Development through its Pike Project Office. The Office maintained a traditional urban renewal posture, but worked closely with the Pike Place Market Preservation and Development Authority, a non-profit development corporation (see below) which had the authority to operate more creatively. Partly as a result of the its success with Pike Place Market, the Department of Community Development has developed a major Harborfront Public Improvement Plan which includes efforts to bridge the Market and the Harborfront.

Boston. When the Boston Redevelopment Agency (BRA), succeeded the City's Planning Board, it inherited an emerging waterfront redevelopment program,

which later became known as "The Hundred-Acre Project." A centerpiece of BRA's efforts is the renovation and reuse of Faneuil Hall and Quincy Market, and the wharf-by-wharf redevelopment of the adjacent waterfront area. One of its current projects is redevelopment of the Charlestown Navy Yard. BRA's fiscal strength has grown steadily as revenues from a string of successful redevelopment projects are plowed back into a revolving fund.

New York. Battery Park City Authority (BPCA) is a public corporation created by the New York State Legislature in 1968 to develop Battery Park City as a new residential and commercial community. The 92-acre landfill site is owned by BPCA. It is located at the tip of lower Manhattan along the Hudson River and is adjacent to the Wall Street Financial District.

Quasi-public (Non-profit) Development Corporation

The quasi-public organization has proven successful where traditional public efforts to guide development have not worked satisfactorily. Its primary purpose is to create a flexible organization that operates separately from a public redevelopment agency, but under the general guidance of local government. Private corporation status allows a management group to assume an unaligned, third-party role in negotiations between local officials and developers. In some cases, corporations have assumed equity positions, for example, through joint venture development.

Development corporations must register with a state corporation commission in compliance with legal incorporation requirements. Non-profit status may provide tax benefits. After the corporation is approved, it may execute a contract with a local government in which planning and management responsibilities are defined. The degree of autonomy granted the private corporation will vary depending on the nature of the project and the state's enabling statutes. Frequently, the corporation will assume all responsibilities that are commonly performed by a local community development agency.

Toronto. Harbourfront is a 92-acre, mixed-use redevelopment project on the central Toronto waterfront. Public and private sector investments are coordinated by the Harbourfront Corporation. The federal government owns shares in the corporation which has a local nine-member Board of Directors. The Corporation received start-up funds from the federal government, but is currently self-sufficient.

Baltimore. Charles Center-Inner Harbor Management, Inc. is a non-profit, no-stock corporation that is under contract with the City to manage the Inner Harbor Plan. Baltimore's Inner Harbor is a combination of independently conceived attractions tied together by the waterfront and common pedestrian circulation systems.

Waterfront Management Council (Commission)

Waterfront councils are special-purpose governmental bodies formed specifically for the purpose of dealing with coastal areas. They may be regional, encompassing multi-county or multi-city areas, or they may be limited to a single municipality or district. State enabling legislation is usually required.

Waterfront councils are empowered to control land use and development within their zones of jurisdiction. Land use planning studies, environmental assessments, shoreline access plans, and waterfront development proposals are examples of planning functions frequently assumed by these councils. They may also assume a regulatory function as part of their management responsibilities, usually by a permit that is required before a landowner can make significant alterations to shoreline property. This permit is in addition to other development approvals, thus adding another layer of bureaucracy. Nevertheless, some councils have become successful forums for mixing representatives from all levels of government, private businesses, and citizens groups.

San Francisco. The San Francisco Bay Conservation and Development Commission (BCDC) is a regional waterfront commission. It was established by the California legislature in 1965 to regulate uses along a 100-foot band of shoreline

surrounding San Francisco Bay. Following formal approval of the Bay Plan, it was given permanent status in 1969.

5.6 ALTERNATIVE MANAGEMENT FRAMEWORKS

To simplify the analysis, the planning team looked at three primary functions: (1) harbor maritime development and operations, (2) urban and recreation development and operations, and (3) planning and coordination. The alternative management frameworks examine different relationships among the three elements and their overall relationship to the Master Plan.

This breakdown of functions recognizes differences in the management needs of maritime versus non-maritime land uses and facilities that may be summarized as follows.

Harbor Maritime Development and Operations

Expertise: Shipping technology, harbor administration, maritime facility planning (space allocation and layout)

User groups: Limited number of fairly well-defined clients, ongoing relationship with this constituency, relationship largely between organized groups

Financing: DOT-Harbors manages its own special funds, and manages user fees to fund maintenance programs and some harbor facility projects. Future restructuring opportunities include the possibility of expanding the fiscal base by recovering revenues from urban redevelopment sites.

Urban (and Recreation) Development and Operations

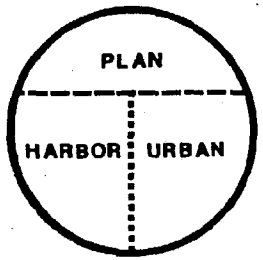
Expertise: Real estate development, "people-oriented" urban design

User groups: The general public (individually and collectively), many interest groups--not all of whom are organized and have formal spokespersons

Financing: Private sector investment (direct and through exactions), public incentives (development bonuses), bond revenues and loans, lease revenues, tax revenues, special assessment districts. Possible need for early, strategic investments, for example, a public open space program to create initial attraction and pedestrian circulation system to improve access. A characteristic that often distinguishes recreation from other types of urban land uses is that it generates no revenues.

Four different management frameworks are outlined below to show how the major actors would relate to each other and to the Master Plan.

Alternative Framework 1: Superagency



Key Characteristics:

- Consolidated waterfront redevelopment area or harbor district
- Single organization operating under a broad mandate

Description:

The superagency would be solely responsible for implementing the recommendations of the Master Plan and for reviewing and updating the Plan on a regular basis. Its two primary divisions would be: (1) harbor operations and (2) property management and development. Financial and operational targets and procedures should be established at the division level; however, the planning staff would coordinate major projects for facility and land use development. The agency would be accountable to the governor and legislature through a Board of Commissioners which sets overall policy and direction.

Financing. The proposed superagency would be set up as a financially self-sustaining entity. Revenues would co-mingle in a common fund to support the agency's operating and capital expenses. It is recognized that the agency would require substantial start-up funds (or annual State assistance) until investments

generate revenues sufficient to cover initial expenses and establish a viable revolving fund for further public improvements.

Mainland Models:

The San Diego Unified Port District has a mandate which covers "navigation, commerce, fisheries, and recreation." Among major U.S. ports, recreation opportunities in San Diego are unsurpassed. The specific charge from the legislature to promote and protect recreational interests is seen as a key factor. San Diego's Embarcadero district, like the Honolulu Waterfront, is anchored by major public recreation areas. Active industrial and shipping uses are also located within this stretch, yet the various uses have been accommodated.

The Port District's property management is a successful enterprise. Leasehold land arrangement allow the public to recapture dollars from the ongoing profitability of private businesses. As the leases expire, the land uses can be reassessed.

Although port authorities in other cities are becoming more aggressive in executing their responsibilities, particularly in the area of property management, they still share jurisdiction for the waterfront with other public sector actors. For example, Massport must contend with the Boston Redevelopment Authority, while the Port Authority of New York and New Jersey has New York City's Department of Ports and Terminals.

Relationship with Existing Local Agencies:

Establishment of a superagency would require the creation of a new public entity which could be accomplished in one of two ways:

- Consolidation of jurisdiction for land management over the Waterfront and its assignment to a single agency.

  State agencies that have major property management responsibilities in the Waterfront area include DOT-Harbors, DLNR, ATDC, and HCDA. Although development in the mauka and makai areas of Kakaako should be

coordinated, the former has unique development needs and is correctly excluded from the Waterfront Master Plan area. Any territorial consolidation should not absorb all of HCDA's district, but only the makai portion.

On the other hand, all of DOT-Harbors' Oahu jurisdiction should be folded into the superagency. This would allow more efficient management of harbor operations islandwide, including reassignment of resources and functions, and also would provide a larger revenue base that can support smaller operations.

The superagency may also have jurisdiction over neighbor island ports and, therefore, acquire the authority to develop non-maritime uses in these locations as well. Alternatively, separate State-chartered port authorities may be established at the county level.

- Expansion of the authority granted to one of the agencies.

  Given its dominant presence on the Honolulu Waterfront and the technical complexities involved in running port operations, DOT-Harbors would be most suitable for assuming broader responsibilities. In-house property management expertise would have to be supplemented, although contracting with third-party developers is an option for actual project execution.

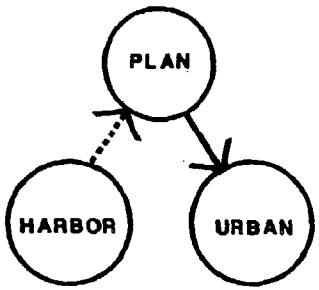
Advantages:

- A single set of priorities for the Waterfront area, thereby reducing jurisdictional overlaps.
- High visibility, demonstrating strong State support for the Waterfront.
- Access to a potentially larger pool of financial resources and the ability to allocate resources internally from high revenue-generating activities to those that provide less income, but are nonetheless important to the public interest.

Disadvantages:

- Political implications of creating a powerful new governmental body.
- Potential difficulties in resolving conflicts among different elements of the superagency's mission.

  Potential for lost development opportunities if only one agency is in charge of implementing the Waterfront Master Plan. The presence of several waterfront-related agencies may increase the number of initiatives and, thus, increase the probability of producing winning projects.



Alternative Framework 2: Lead Urban Waterfront Development Agency

Key Characteristics:

- Central planning agency to oversee the Waterfront Master Plan
- Establishment of a "harbor district" and an "urban waterfront district"
- Expansion of the port operator's property management authority to include development of non-maritime facilities.
- Regulatory authority over activities in the harbor district
- Active implementation of redevelopment in the urban waterfront district through a separate development arm, possibly a non-profit corporation

Description:

The central planning agency would have responsibility for overall Plan implementation, as well as periodical review and update of the Plan. It would coordinate the activities of the two main actors in the waterfront area: a port operator and a non-profit development corporation. However, a different type of relationship is maintained with each of them.

The port operator would have jurisdiction over all maritime and non-maritime activities within the designated harbor district, the area used for waterborne transportation and commerce. Major facility development within the harbor district would require a permit from the planning agency to ensure compliance with the Master Plan.

On the other hand, for the area planned primarily for urban redevelopment (namely Kewalo Basin to Chinatown), the planning agency's role would extend beyond regulatory authority to active promotion, design, and development. Although the planning agency retains the prerogative to control policy, substantial public powers would be conveyed to a non-profit development corporation. Modeled after the Charles Center-Inner Harbor Management organization in Baltimore, this corporation would have the flexibility of a private business. Its functions would include: coordination of activities among public agencies, design and construction of public improvements, and recruitment of developers for specific parcels.

Financing. This management framework is amenable to any one of several options for distributing net revenues: (1) return of all proceeds to the State's General Fund, (2) pooling into a common fund for all Waterfront development, (3) channeling into a Harbors Fund in which monies could be spent on maritime facilities statewide, or (4) separating into discrete funds for harbors, recreation, and urban redevelopment--each with its own budgetary control. In any of these cases, a key issue is the provision of replacement port facilities due to displacement by non-maritime uses.

Mainland Models:

Among successful mixed-use waterfront developments on the Mainland, it is more common to find examples in which the focus is limited to urban uses, than those integrating urban and industrial port uses. The sampling below includes different types of agencies with different development strategies.

Baltimore's Charles Center-Inner Harbor Management, Inc. is one that operates much like a private enterprise, reflecting its origins as an initiative of the local business community. The Corporation's "neutral" stance vis-a-vis the City and its ties to the private sector have been important factors in attracting investment. Under its contractual arrangement, the Corporation is able to conduct confidential negotiations with developers interested in buying or leasing City property or it can negotiate joint public-private ventures between the City and private developers. Safeguards to protect the public interest include access to the Corporation's books and a requirement to share any windfall profits with the public sector. The Corporation operates from a revolving fund for expenses which are reimbursed by the City monthly. These costs have amounted to less than one percent of private investment.

Battery Park City Authority has received considerable acclaim for its design and development strategy which includes fairly rigid guidelines restricting the usage, shape, and appearance of buildings. At the same time, BPCA seeks to encourage diversity by packaging relatively small parcels for which developers bid competitively. BPCA has facilitated the development process by preparing a single, generic Environmental Impact Statement for the entire project area and formulating a common master lease.

Harbourfront Corporation in Toronto, Canada is a creature of the federal government. At 92 acres, Harbourfront is almost identical in size to Battery Park City. Yet in other respects, the two projects are very different. Where BPCA developed detailed plan specifications, Harbourfront Corporation worked from a series of flexible guiding principles. In part, the Corporation's strategy stemmed from a soft and uncertain market for waterfront development in Toronto. Its seed fund of $27.5 million was approximately one-tenth the size of BPCA's start-up capital. Nevertheless the Corporation used this money to good purpose, focusing on modest facility and landscaping improvements and cultural programming that would attract the public to the site at minimal cost. This strategy also drew sufficient private investment so that the Corporation was able to become self-sufficient within its target of seven years.

The Pike Project Office, administratively situated in the Seattle Department of Community Development, acted on behalf of the City to implement the 1974 amended Pike Place Market Urban Renewal Plan. The Office performed traditional redevelopment tasks, including property acquisition, relocation of residents and commercial tenants, provision of capital improvements, property disposition, rehabilitation, and grant management. Because successful implementation of the plan required that key properties remain in public control, the Pike Place Market Preservation and Development Authority, a non-profit public corporation, was created to develop, operate, and manage major commercial and residential properties. PDA and the City worked closely in the early stages of the Market's rehabilitation; however, PDA eventually became the central development vehicle. This experience has shown the effectiveness of two organizations working in tandem: the City focusing on strategic planning and PDA assuming day-to-day implementation responsibilities.

Relationship to Existing Local Agencies:

Of the existing agencies, the Office of State Planning is most appropriately positioned to take on the function of the central waterfront planning coordinator. Within OSP, a separate Waterfront Project unit could serve to distinguish this function. Another potential candidate for the planning coordination role is the Department of Business and Economic Development, the parent agency of HCDA and ATDC. DBED is less suitable to serve as a regulator of maritime facility development, although there is compatibility between DBED and the proposed port operator in the area of trade promotion.

Creation of a more diversified port operator would require expanding the powers of DOT-Harbors, whether it remains a division of DOT or is established as a separate entity.

Creation of a lead urban waterfront development agency could be accomplished by consolidating ATDC and the makai portion of HCDA under the banner of a new entity.

Advantages:

- The planning agency would have the ability to encourage and promote development, rather than being dependent on the initiative of other organizations.
- The planning agency would also be a clear intermediary to resolve conflicts between public entities, between government and private developers, and between regulators and users.
- Autonomy of port operations is maximized, while providing coordination for the orderly transition of land uses.
- As in the case of Charles Center-Inner Harbor Management, Inc. the contract could be renewed yearly, thus ensuring that the functions specified are tailored to the needs of plan implementation, rather than being permanent ones that have grown obsolete.
- A non-profit corporation allows the possibility of employing a wider range of development tools than otherwise might be available to a public agency.
- A development corporation organized along the lines of a business venture may increase the confidence of potential financial supporters.

Disadvantages:

- Even with strong public support for urban renewal, successful development is still dependent on larger market forces. Expectations of the development agency and incentives for optimal performance must reflect a realistic assessment of local economic conditions. Therefore, designation of a "lead" agency in and of itself would not eliminate the need to coordinate the efforts of other relevant agencies.
- Expectations for more autonomous harbor management, such as a port authority, must be evaluated against the absence of accumulated cash

reserves to fund large front-end costs for port improvements and urban infrastructure.

Alternative Framework 3: Waterfront Commission

Key Characteristics:

- Representative body to coordinate the Waterfront Master Plan
- Regulatory process

Description:

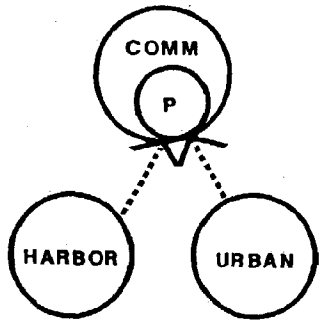
The State Legislature would create a waterfront commission with representation from different state, local, and federal agencies, organizations with interest in the waterfront, and the general public. The Legislature would also adopt formally the Waterfront Plan.

The Commission's tasks would include: (1) administration of a permit process for shoreline development, (2) periodic updating of the Master Plan, and (3) development of more detailed plans for special areas, as deemed appropriate.

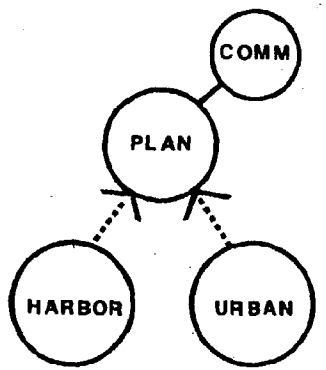
Financing. The financial arrangement is not a distinguishing characteristic of this management model. The Commission itself would not be involved in project financing.

Mainland Model:

The San Francisco Bay Conservation and Development Commission (BCDC) is a regional waterfront commission whose particular mandates are embodied in the Bay Plan. BCDC's primary goals are to protect the natural resources of waterfront areas, to assure that developers provide maximum feasible public access, and to reserve shoreline sites for water-oriented priority land uses, such as ports, water-related industries, airports, wildlife refuges, and water-related recreation. It maintains substantial control over a 100-foot band of shoreline covering 9 counties and 36 cities.



VARIATION 1



VARIATION 2

Relationship to Existing Local Agencies:

No significant change is proposed for the internal structures of existing agencies; however, major developments in the Waterfront area would be reviewed by the newly created Commission to ensure compliance with the Plan.

The appointees to this special-purpose body would represent a wide range of interests (San Francisco's BCDC has 27 members). The day-to-day business of the Commission would be handled by one of several groups:

- Provision could be made for the Commission to have its own dedicated staff
- Another variation is for staff support to be provided by an existing agency. One possibility is OSP, in which case, the Commission could be the advisory and decision-making arm of the Waterfront Project unit. Staff service could also be provided by the Coastal Zone Management Office in OSP, in which case, the Commission's permit could be coordinated with the CZM consistency review and findings process for projects located in the Waterfront area. A third, more remote candidate, is for the Office of Conservation and Environmental Affairs in DLNR to provide staff service.

Advantages:

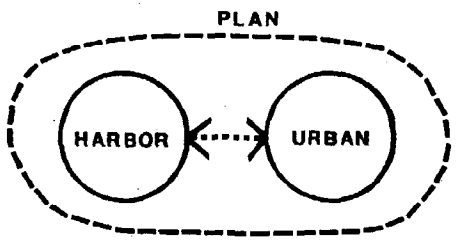
- Collective representation in a single forum by a wide range of interests will provide an opportunity to discuss and consider key issues related to the waterfront.
- The Commission could be an effective vehicle for raising public support for the waterfront by disseminating information about development efforts.

Disadvantages:

- A regulatory mechanism is more effective for controlling development than actively promoting it. For example, while many people have lamented the decline of San Francisco's working waterfront, BCDC cannot provide the incentives to reverse this trend.

- The Waterfront development permit adds another layer of "red tape."

Alternative Framework 4: Informal Waterfront Coordination



Key Characteristics:

- Minimal change in the relationship among existing waterfront agencies
- Changes in enabling legislation to expand the powers of core waterfront agencies sufficient to implement their respective portions of the Waterfront Master Plan.

Description:

This framework is based on "business as usual," although agency mandates could be modified officially to require capital programming consistent with the Plan. It is likely, however, that successful implementation of the Plan under this scenario will depend on ad hoc channels: crusading efforts of particular government and business leaders, informal coordination among bureaucrats, monitoring by the media, and the urging of citizens.

Financing. The fiscal arrangement would not differ significantly from what exists at present. However, provision could be made for transfer of funds from urban redevelopment to port improvements. For example, displacement of cargo shipping facilities from Fort Armstrong could be tied to construction of replacement facilities and/or lease payments to the Harbors Fund.

Mainland Models:

Some of the most active waterfronts, from both maritime and non-maritime perspectives, are located in cities characterized by fragmented authority and overlapping jurisdictions. Although they lack overarching authority, individual agencies that incrementally have revitalized their waterfronts. These cities include:

- Baltimore: Baltimore Port Administration, City of Baltimore Department of Housing and Community Development/Charles Center-Inner Harbor Management, Inc.
- Boston: Massport, Boston Redevelopment Authority
- New York City: Port Authority of New York and New Jersey, City of New York Department of Ports and Terminals, City of New York Office of Economic Development for South Street Seaport District, Battery Park City Authority
- Seattle: Port of Seattle, City of Seattle Department of Community Development, Pike Place Market Preservation and Development Authority

Relationship to Existing Local Agencies:

The integrity of existing agencies would not be altered; however, their capacity to undertake new responsibilities would be expanded as needed to implement the Master Plan.

Advantages:

- Agencies are empowered to be more effective within their own spheres of activity.
- Availability of a common plan provides direction for in-house planning efforts.
- The various waterfront constituencies will have access to agencies promoting their specific interests, so that compromise and negotiation occur in the public, political arena.

Disadvantage:

- No agency with responsibility for overseeing the "big picture" of the Master Plan; all actions are voluntary.

5.7 RECOMMENDED FRAMEWORK

No single framework, as constructed above, was felt to provide a satisfactory means of implementing the Honolulu Waterfront Master Plan. Discussions with public officials and comments received from businesses, community groups, and members of the general public pointed to a modified management framework which draws on various elements from the four models, but is also more closely matched to the local context. The recommended framework, therefore, is a synthesis based on particular strengths in each of several agencies and the collective strength that a diversity of organizational structures and priorities can provide.

Plan Implementation and Coordination through a Waterfront Advisory Committee

Key Characteristics:

- Updates of the Waterfront Master Plan and overall guidance and coordination to be provided by a policy-making Waterfront Advisory Committee comprised of key agency directors.
- Actual implementation to be carried out by line departments and special State agencies and authorities that may contract with one or more private, non-profit development corporations or project management firms.

Description:

The Waterfront Advisory Committee membership would consist of the Directors of the Office of State Planning, Department of Transportation, Department of Land and Natural Resources, Budget and Finance, and the Executive Director of the Hawaii Community Development Authority. The Director of OSP would be designated Chairman of the Committee; OSP would also provide staff support.

The Waterfront Advisory Committee would be charged by the Governor to provide overall guidance and coordination for the Waterfront planning and development process. The Committee's role would thus include the following functions:

- Coordinate the implementation and timing of major Waterfront development projects.
- Review budgets for Waterfront-related projects proposed by State agencies.
- Mediate significant conflicts that may arise among State agencies relative to Waterfront projects.
- Provide overall policy-level guidance for the incremental development and improvement of the Honolulu Waterfront.

Actual project implementation would be carried out by individual agencies or organizations. DOT-Harbors would continue as the agency charged with development and maintenance of maritime sites and facilities. It is recommended that DOT-Harbors' existing management systems be augmented by two new components: (1) advisory committees consisting mainly of port users for each of the commercial ports in the "Port Hawaii" system, and (2) a Special Maintenance Fund that would allow DOT-Harbors to respond quickly to unanticipated but urgently needed major maintenance and improvement projects.

It is strongly recommended that the implementation of urban redevelopment projects in the Kewalo Basin to Chinatown waterfront zone be undertaken by a single state government agency. This stretch of the waterfront has the greatest potential for public gathering places, cultural facilities, and high value commercial projects. It is therefore highly desirable that the overall plan for the area, as well as more detailed design standards and project-specific requirements, be implemented in a coordinated and consistent fashion. Currently, there are two special urban development agencies with adjacent jurisdictional areas here: the Aloha Tower Development Corporation and the Hawaii Community Development

Authority. Of the two, HCDA is clearly the stronger agency in terms of management experience, accomplishments and staff strength. It is therefore recommended that ATDC be absorbed into HCDA, and that HCDA be charged with the coordination and implementation of urban redevelopment projects in Honolulu's urban waterfront district-- from Kewalo Basin to Chinatown.

As one of the Master Plan's priority projects, development of the Keehi Lagoon recreational facilities is expected to occur in the near-term future. A new private, non-profit corporation could be formed and enter into a contractual agreement with the State. The corporation would have a small staff with experience and expertise in project development. Staff functions would include coordinating publicly-funded improvements, preparing an RFP for the proposed development, implementing the RFP process, negotiating an agreement with the developer, and providing management and oversight services during the development process. Provided this process works well at the Keehi site, the same entity or a similar one could be called upon to manage the development of other Waterfront recreational projects. Alternatively, the Keehi Lagoon recreational development program could be managed by a private project management firm, or implementation could be carried out by a team consisting of DOT-Harbors staff and consultants.

OSP staff would supervise periodic review and update of the Master Plan. Information compiled and monitored on an ongoing basis would provide technical reference for the committee as a whole. Furthermore, OSP would continue to serve as the public's point-of-contact for Waterfront progress and planning issues that are not project-specific.

Financing. The recommended management framework would be able to utilize the public and private financing tools identified in Chapter 5, provided adequate statutory authority for such use has been granted. Nothing inherent in the management structure precludes the use of any recommended financing mechanism.

Relationship with Existing Local Agencies:

This framework would not require the creation of any major new agencies, although existing agencies would be restructured. The Waterfront Advisory Committee would report to the Governor and formulate general planning guidelines for the operational agencies. The Committee would be backed by statutory powers requiring relevant agencies to consider its recommendations. It would also have the status and visibility of a "blue ribbon" committee.

As noted above, DOT-Harbors would remain unchanged, except as Plan recommendations may affect internally generated initiatives. HCDA's area of jurisdiction would be expanded to include the Waterfront area presently assigned to ATDC. This expansion of HCDA's responsibilities would require some increase in staff strength.

Advantages:

The Committee could be established expeditiously since no new agency is being created. Given the group's membership and their access to the Governor, the Committee will be able to provide leadership from the top levels of the State administration and to support a cohesive package of proposals for legislative consideration.

Restructuring within existing State agencies would be minimized. Admittedly, a framework that involves several agencies makes coordination more complex. At the same time, however, it maximizes the number of agencies sponsoring concurrent projects. Diversity in the types of projects and development strategies undertaken increases the chances for establishing momentum in the Waterfront area.

Proposals for each of three broad planning areas: urban redevelopment, industrial maritime, and recreational maritime, will be implemented by organizations whose respective mission and staff expertise are appropriate to the area's development needs and priorities. In the first two areas, HCDA and DOT-Harbors have ongoing relationships with particular constituent groups. These es-

tablished communication channels should be kept open to ensure the voices of those affected by change are heard.

Disadvantages:

No single organization is given overriding responsibility to implement the Master Plan and there is no mechanism to enforce compliance with the Plan. Because departmental committee members have different interests to protect, consensus may be difficult to achieve. An active and effective Committee would depend on a combination of strong internal leadership; strong support and coordination from a higher source, such as the Governor's Office; and strong pressure from outside sources, such as the public, business community, and media.

Advocates of a separate ATDC may not agree with the proposed expanded role of HCDA. However, creation of the Honolulu Urban Waterfront District under HCDA would rectify ATDC deficiencies, such as the inability to use a potentially important financing tool: issuance of improvement district bonds. Also, since redevelopment efforts are housed in the same office, maximum coordination can be achieved to integrate the areas mauka and makai of Nimitz Highway-Ala Moana Boulevard.

5.8 PROJECT MANAGEMENT REQUIREMENTS

The Master Plan calls for scores of individual projects that will develop new or expanded maritime, urban commercial, recreational, transportation, and other public facilities. Each project will have somewhat different requirements for management expertise, style, and structure. Nevertheless, there are several common objectives at the project level which are derived from the broader goals of the Master Plan:

- Utilize organizational forms and financing tools currently permitted under state law or for which there is strong reason to believe a proposed statutory change would be approved.
- Minimize risks to the State.

- Pursue implementation strategies that create opportunities for public-private partnership and do not put public agencies in competition with the private sector.
- Encourage private initiatives, for example, through lease arrangements of sufficient duration to amortize improvements.
- Devise appropriate mechanisms that allow the State to recapture a fair share of private benefits created by public investments.
- Provide for public participation in the project planning and design phase.

It is premature to recommend specific action plans to implement projects that are still in the conceptual stage. The actual steps of project implementation will be detailed and complex, requiring legal review. These management schemes will vary according to the nature of the projects: who are the intended users and what are their needs, what is the land disposition, who will develop, what are the proposed sources of funding, how should revenues (if any) be distributed, who will operate and maintain the project once it is completed, and where will the operating expenses come from. The answers to such important questions remain largely unresolved and will be hammered out as the projects themselves take shape. A common thread among the projects should be an emphasis on joint public-private participation wherever possible. The task ahead is to determine their respective roles and contributions.

5.9 CONCLUSION

The purpose of the management framework is to realize the development and use potential of the Honolulu Waterfront. The Master Plan brings a new perspective to the Waterfront, one that is systemic, consensus-based, visionary, and State-initiated with strong private sector participation. To implement this new planning approach, changes are needed in the way the Waterfront area is being managed.

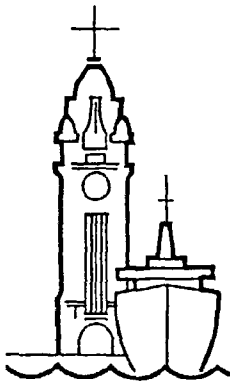
The management framework is conceptualized as being two-tiered: first, a structure that will realize the overall "vision" of the Waterfront Master Plan, and, second, a network of organizations that will actually implement specific projects. In this chapter, four different frameworks were examined as models of how the major administrative actors would relate to each other and to the Master Plan:

- Superagency
- Lead Urban Waterfront Development Agency
- Waterfront Commission
- Informal Waterfront Coordination

The recommended framework is a modification of Alternative Framework 4. It would rely on the initiatives of several agencies working in tandem under the coordination and direction of a newly formed Waterfront Advisory Committee. The Committee would be composed of five major agency directors: the Directors of the Office of State Planning, Department of Transportation, Department of Land and Natural Resources, Budget and Finance, and the Executive Director of the Hawaii Community Development Authority.

The Master Plan's systemic view of the Waterfront has led to three general development areas. In response, the management framework provides for a single agency to be charged with primary planning and development responsibilities in each of those consolidated areas: HCDA for the waterfront redevelopment district from Kewalo Basin to Chinatown, DOT-Harbors for the industrial maritime area from Pier 23 to Kapalama, and a private, non-profit corporation or similar management entity for the marine recreational area at Keehi Lagoon.

A vision as grand as the new Honolulu Waterfront will require shared resources and timely, decisive action. The recommended management framework streamlines State administration of a valuable public resource. Public agencies are aligned with their main mission and the types of development they are best equipped to manage. The management framework is also compatible with full deployment of the public and private financing tools that have been recommended.



6.0 ENVIRONMENTAL ASSESSMENT

This Chapter presents an assessment of the environmental impacts resulting from implementation of the Waterfront Master Plan.

6.1 SCOPE

The purpose of this section of the Pre-final Master Plan Report is to provide a preliminary assessment of the project's possible adverse environmental impacts and appropriate mitigating measures. A project of this size and scale will inevitably result in some significant impacts, both short- and long-term. Technical studies conducted for this report analyzed alternative actions to minimize these potentially negative consequences.

Descriptions of possible impacts are general for the purposes of this report. This chapter is not intended to fulfill the requirements of Chapter 343, HRS, whereby the expected findings of an environmental assessment should determine the need for an environmental impact statement overall. Instead, specific development projects identified for implementation in this master plan will require separate environmental impact statements through which full disclosure of impacts and mitigating measures will be made.

Major potential impacts and their mitigating measures are:

- A special study conducted for the master plan project, evaluated the feasibility of relocating and consolidating the petroleum facilities in the planning area. This concept was based on public concern over the potential health and safety hazards. Although the study indicated that relocation and consolidation was possible, the lack of suitable relocation sites and the high cost of reconstructing the facilities made such a program infeasible at this time. Current recommendations are to formalize the safety inspection procedures to insure the highest level of safety standards are maintained at these facilities and to encourage and plan for the eventual relocation of vehicle fuel storage and distribution operations to Campbell Industrial Park.

- Traffic volumes in the Ala Moana Boulevard/Nimitz Highway corridor are expected to increase by 34 percent even without the waterfront project. While a combination of transportation alternatives such as rapid transit and high occupancy vehicle systems may offer some relief, significant improvements, such as a new highway and underwater tunnel linkage between Kaka'ako and the Airport via Sand Island, may be necessary to relieve the through traffic congestion in this corridor and to increase access to the waterfront in the long run.

- The master plan identifies three proposed offshore landfills at Keehi Triangle, and the Kaka'ako and Kewalo Peninsulas which will provide major new land areas for recreational, educational and commercial purposes. Preliminary ocean engineering and marine biology studies done for the master plan indicate that these fills can be developed without significantly impacting natural and recreational marine resources.

- Development of the Honolulu Waterfront will result in displacement and/or relocation of some current activities and facilities. Relocation sites identified for the waterfront plan were divided into two major land use groups--industrial and marine-related. Within the short-term the Kapalama Military Reservation land and the Keehi triangle site will be available for relocation of displaced industrial activities. Marine relocation sites are limited in scope to areas currently available within Honolulu Harbor. For the most part, relocation of selected uses within the harbor would provide for a more efficient arrangement of land uses.

6.2 MARITIME INDUSTRY

Harbors Division statistical data for the last five years, supplemented by U.S. Army Corps of Engineers commodity statistics, have been used in the Harbor Study. Fiscal year 1986-87 is used as the study base year. For the base year, a total of approximately 7.25 million short tons of cargo were shipped through the port, both inbound and outbound.

Containerized cargo, domestic and foreign, is the largest cargo class at 3.4 million short tons accounting for 45 percent of the total port tonnage. Over 150 acres, or 58 percent of the port land area, are devoted to handling containers. Petroleum products form the second largest class at 1.4 million short tons or about 19 percent of the total tonnage. However, only 10 acres or less than 4 percent of the port area is required to service this cargo.

Containerized cargo activity merits particular emphasis. Not only is it the port's largest cargo movement, but it has the fastest growing volume. As it continues to exhibit growth, it places a demand upon the port's land and water resources greater than all other cargo classifications combined. The growth in containerized cargo and autos, the dominant water borne cargo activities, is attributed to Hawaii's increasing population (both resident and tourist), state purchasing power, construction activity and personal income.

6.2.1 Existing Conditions

Honolulu is the State's principal port. All general cargo, including mainland and foreign containers destined for Hawaii, is received through Honolulu. Cargo with neighbor island destinations is transshipped through the port by feeder vessels.

There are about 258 acres of land in Honolulu Harbor devoted to cargo transfer and storage activities. In addition, there are 30 acres of terminal area under construction at Barbers Point Harbor. Mainland and foreign containers are handled at Fort Armstrong, Piers 1 and 2; and Sand Island, Piers 51-53. Neighbor island containers are handled at Piers 24-29. Refer to Figure 22, Honolulu Harbor and Vicinity.

Piers 1 and 2 - Fort. Armstrong

Fifty acres are available for cargo operations including space presently occupied by a container freight station and FTZ subzone warehouse. Current production involves a mixture of container, neo-bulk, and roll on-roll off cargo traffic.

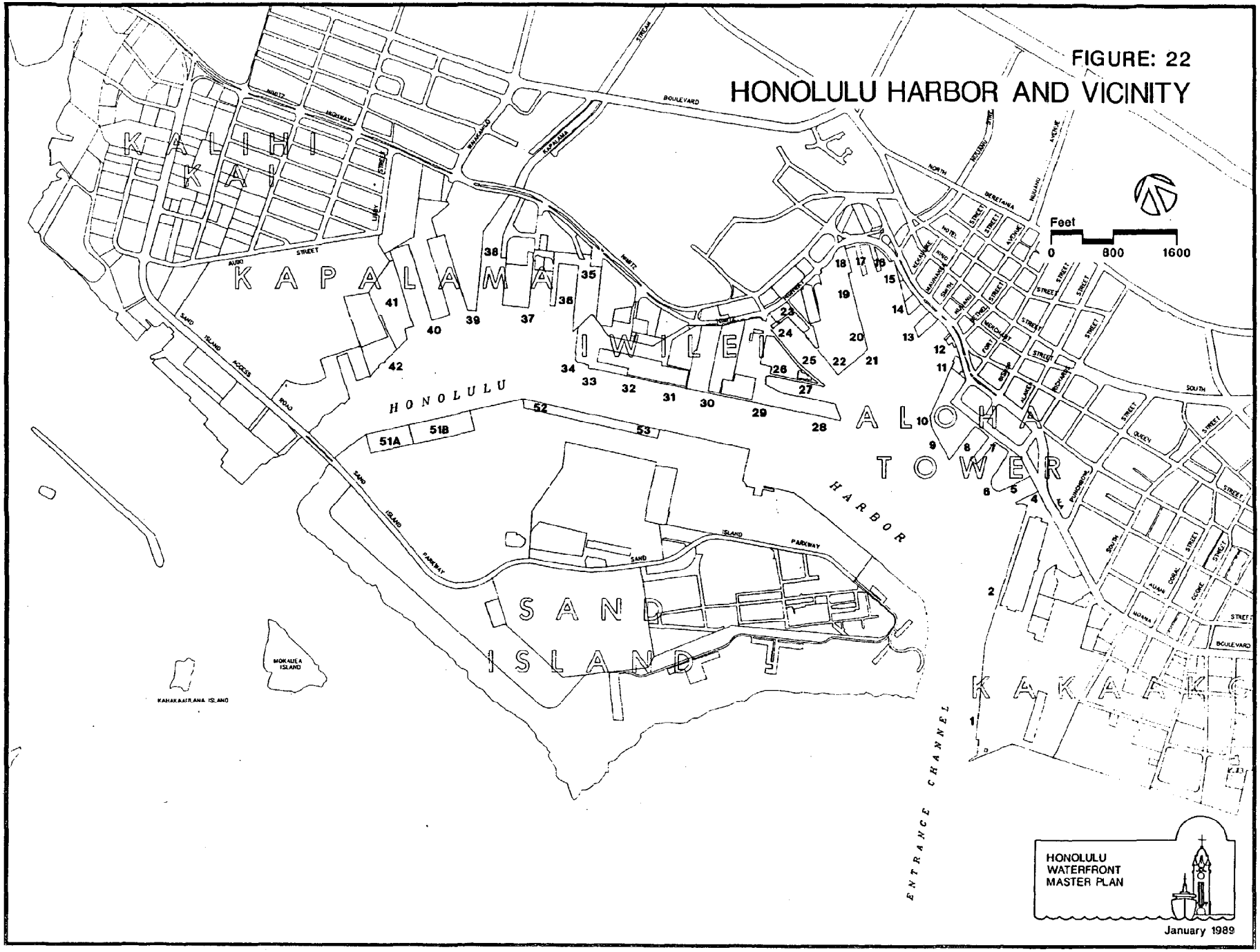


FIGURE: 22
HONOLULU HARBOR AND VICINITY
Feet
0
800
1600
KALIHI
KAI
KAPALAMA
IWILEI
HONOLULU
HARBOR
ALOHA
TOWER
SAND
ISLAND
KAKAAKO
ENTRANCE CHANNEL
MOKAUEA ISLAND
KAHAKAAKAUNA ISLAND
BOULEVARD
NIMITZ HIGHWAY
SAND ISLAND ACCESS ROAD
SAND ISLAND PARKWAY
AUAHI STREET
KAPALAMA
STREAM
NORTH BERETANIA
SOUTH
QUEEN
KEAWE
MAUNAKEA
PIIKOI
RICHARDS
BISHOP
ALAKEA
PUNCHBOWL
KA
AUAHI
COOKE
MONNA
51A
51B
HONOLULU
WATERFRONT
MASTER PLAN
January 1989

Piers 4-17

These piers are not cargo piers and were excluded from the cargo analyses.

Piers 18-23

These piers are devoted to a variety of maritime uses including break-bulk, neo-bulk, dry bulk, and liquid bulk cargos and tug boat berthing. In all, there are 20.5 acres makai of Nimitz Highway. Sugar, flour, and grain facilities are generally adequate for present and future demand.

Piers 24-29

Originally, this part of the harbor was designed to accommodate ships and cargo transfer methods in use up to about World War I. The slips are marginally usable today for barge operations and small ships. The interisland mixture cargo operation at these piers is a barge operation. The piers and backland are intensively used to the point of congestion both on the landside and waterside of the operation. Transit sheds are dilapidated, inadequate to shelter the cargo, and malplaced for the service for which they are used.

Piers 31-33

There are about 11 acres usable for cargo operations. The area has a transit shed covering 7.3 acres and marine fueling stations along the wharf face fed by pipelines from the tank farms in back of Piers 29, 30, and 31. The piers are presently used for general cargo, newsprint storage, bunkering, and supplying transient fishing vessels.

Pier 34

This is primarily a liquid bulk pier with connecting piping to the local storage facilities at Pier 30 and across the Kapalama Channel to airport fuel storage tanks. With 35 to 40 feet of water, it serves well as a liquid bulk terminal with remote storage. Cement barge loading is also accommodated at this pier.

Pier 35

The marginal wharf fronting this terminal is 705 feet long with a water depth of 27 to 35 feet. The backland extends about 150 feet from the wharf face to make about 2.5 acres usable for general cargo and small dry bulk operations. Present cargo consists of bulk cement barged to the neighbor islands, scrap iron, and general cargo. Fishing vessels are berthed here for minor maintenance between voyages.

Pier 36

Known as the "Pineapple Pier," Pier 36 supports the interisland service to Lanai. It is operated by Dole Company for general cargo and pineapple transport on barges. There is little backland needed at the pier because the Dole Cannery mauka of Nimitz Highway serves as remote backland. Pineapples in crates are loaded from barges directly onto trucks and hauled directly to the cannery. Empty crates are hauled on the return trip. Miscellaneous general cargo travels as supercargo on the barges.

Piers 39 and 40

The combined piers contain about 40 acres of backland (including military reservation land) and the 4 berths are each about 1,000 feet long with 30 feet of water depth. The piers were built for World War II service and have about 7 acres of covered storage. This terminal complex is used for mixed purposes, general cargo neo-bulk, automobiles, and dry bulk (with remote backland storage).

Snug Harbor - Kapalama Military Reservation

A shallow draft (25 feet) slip about 400 feet long and 100 feet wide serves the University of Hawaii Oceanographic Support Facility fronting this site. Inland is a parcel of land belonging to the Federal government and known as the Kapalama Military Reservation. Improvements consist of warehouse buildings. The military reservation lands are to be sold at auction and may be purchased

for conversion to a container terminal in time to meet the demand for container cargo by the year 2000.

Piers 51A and 51B

Pier 51A is contiguous with Pier 51B, but the two are used separately. Pier 51A is used both as a container terminal with chassis storage and as a liquid bulk terminal with remote backland storage. The liquid bulk cargo is jet fuel. The mixed use is compatible under present conditions because the container ships have priority use and the frequency of both container ships and liquid bulk ships is low enough to avoid major conflicts in berth utilization.

Pier 51A is listed as having a berth length of 556 feet and water depth of 40 feet. Larger ships must occupy part of Pier 51B for berthing. Backland used for Pier 51A container operations is about 16 acres. Pier 51B is used for barge berthing in connection with Piers 52 and 53; however, it fronts an existing container yard and could be used for container handling. Only bunker fuel is reported as cargo activity. Pier 51B is listed as 800 feet long with 40 feet of water depth.

Piers 52 and 53

Piers 52 and 53 combine for a total berthing length of 1,746 feet and have 40 feet of water depth. They have a contiguous backland of about 90 acres. The piers and backland are operated as a container terminal with containers grounded in the yard. Interisland container transshipment is accomplished on site by loading barges at the terminal. In addition to container cargo, a portion of the terminal is used for liquid bulk cargo (molasses).

Pier 60

Pier 60 consists of a lowlying bulkhead earthfill of about 5 acres having a berthing area for barges bringing sand and concrete aggregate materials from neighbor islands. It lies in the Keehi Lagoon complex and has access via Kalihi Channel. Pier 60 is next to a major concrete batch plant serving Oahu.

Barbers Point Harbor

Barbers Point Harbor consists of a single basin of approximately 92 acres in size with a 450-foot wide channel entrance. Water depth in the entrance channel is 42 feet and in the basin is 38 feet. Along the Diamond Head side, a new marginal wharf 1,600 feet long and a paved backland of 30 acres is under construction and due for completion in 1990. Authorized by Congress in 1965, the harbor was designed to accommodate shipping vessels 720 feet long with a 34-foot loaded draft.

6.2.2 Future Conditions Without the Project

The following conditions are expected to occur even without the project. Total cargo throughput will increase from approximately 7.2 million short tons in 1987 to 11.0 million short tons in 2010, an increase of 53 percent. Containerized cargo exhibits the largest growth, increasing from 3.4 to 6.5 million short tons, an increase of 88 percent, equivalent to an average annual growth of 2.8 percent. Containerized cargo will account for 58 percent of the total 2010 cargo volume, an increase from the 1987 share of 47 percent. The trend is expected to continue beyond 2010. The neighbor island cargo traffic will grow at a slightly higher rate, from 0.5 percent to 3.0 percent annually, or to 1.0 million short tons per year in 2010.

Projected cargo volumes will require additional physical resources, landside and water areas, by the year 2010. An additional 65-75 acres and 7 vessel berths are needed to satisfy 2010 cargo handling demand. Containerized cargo facilities require 40-50 acres and two berths; the neighbor island cargo facilities require 22 acres and two berths. Together, these two activities dominate future maritime cargo needs, accounting for 86 percent of projected acreage requirements for the year 2010.

6.2.3 Future Conditions With the Project, Probable Impacts and Mitigating Measures

Present container cargo operations at Piers 1 and 2 are proposed to be replaced by urban uses including an urban activity park and other commercial/office mixed uses. The deep water berths at Piers 1 and 2 would be retained for cruise ships and transient vessels.

However, the Waterfront Master Plan recommends that the State buy Kapalama Military Reservation land (available for auction in early 1989) behind Piers 39 and 40. This action would help shift cargo handling operations away from an area undergoing urban redevelopment (Kakaako Peninsula). Without relocation, problems could emerge because of incompatibility between industrial harbor operations and nearby residential, commercial and recreational activities in Kakaako.

An additional 53 acres of Kapalama Military Reservation land are expected to become available for auction in the future, and the State proposes to acquire this acreage to meet the need for expanded maritime containerized cargo operations by the year 2000.

The proposed shift of container operations from Ft. Armstrong to Kapalama, and Piers 39 and 40 would, in time, probably result in increased ship traffic near the Ewa end of Honolulu Harbor. However, the increase in traffic complexity and delays is a natural process for any maturing port. It is a common phenomenon in other ports.

Ship arrivals and departures are currently scheduled and controlled to assure efficient traffic movement in and out of the harbor. As cargo container movement and operations increase, the practice of timing ship arrivals, departures, and movement within the harbor would need to be more closely coordinated among the various maritime companies, with DOT-Harbors continuing to take the lead in the ongoing effort. Close coordination would be critical to avoid con-

gestion and to alleviate the concerns for safe vessel movement and schedule disruptions.

An economic feasibility study of future demands for maritime facilities, including containerized cargo, at Barbers Point Harbor is proposed. The special study would include a benefit-cost analysis. If the analysis so indicates, technical studies would be initiated as appropriate. The study would also investigate feasible alternatives to Barbers Point in the long range options.

6.3 TRAFFIC/TRANSPORTATION

6.3.1 Existing Conditions

The Honolulu Waterfront project will primarily affect Nimitz/Ala Moana Boulevard. Mauka-makai streets that carry the majority of the traffic to and from Nimitz/Ala Moana are Kalihi Street, Waiakamilo Road, Nuuanu Avenue, Bishop Street, Alakea Street, Punchbowl Street, Ward Avenue, Piikoi Street, and Atkinson Drive.

Nimitz Highway/Ala Moana Boulevard is a major divided highway, providing an important link between the airport area, Downtown, and Waikiki. There are four lanes in each direction from the Keehi Interchange to Sand Island Access Road. From Sand Island Access Road to Iwilei, there are three through lanes in each direction. Between Iwilei and Kakaako, Nimitz widens to four lanes in each direction.

From Kakaako to Waikiki, Nimitz Highway continues on as Ala Moana Boulevard with three lanes in each direction. Exclusive left turn lanes are provided in the medians at major intersections. Separate phases are given to left turn movements at signalized intersections. The posted speed limit on Nimitz/Ala Moana is 35 miles per hour. The highway right-of-way width varies from 100 feet to 120 feet.

Nimitz Highway serves as the major access to other roads serving the waterfront area including Lagoon Drive and Sand Island Access Road. Ala Moana Boulevard serves as the major access to the Kakaako Makai area.

Presently, the bulk of the traffic to/from Honolulu to other population centers is served by the H-1 Freeway, Kamehameha and Nimitz Highways, and the Moanalua Freeway between Leeward Oahu, Likelike and Pali Highways between Windward Oahu, and the H-1 Freeway and Kalanianaole Highway between East Oahu.

6.3.1.1 Existing Traffic Volumes and Capacity of Highways

Because Nimitz Highway/Ala Moana Boulevard is one element of a large network of arterials, it is important to assess the overall regional traffic condition. Peak hour traffic volumes and estimates of street capacities for the year 1985 were used to evaluate the operation of the existing regional highway network. Volumes and capacities were researched and estimated for the Middle Street, Nuuanu-Waolani Stream, and Manoa-Palolo Drainage Canal screen lines. Screen line traffic volumes for the year 1985 were obtained at traffic count stations from the State Department of Transportation.

The capacities of the highway network crossing the screen lines, including freeway, arterial, and local streets, were estimated using procedures from the Highway Capacity Manual (Special Report 209, 1985). Capacities of the streets were estimated under conditions of maximum capacity. The values of arterial capacities were estimated by the nearest congestion point in both directions. Traffic volumes and the volume to capacity ratios (V/C) of the highways and streets crossing the screen lines were determined, and are listed in Table 7.

Table 7: 1985 SCREEN LINE VOLUME AND CAPACITY

	Eastbound		Westbound	
Roadway	Volume	V/C Ratio	Volume	V/C Ratio
Middle Street Screen Line				
Nimitz Hwy	2300	0.64	3600	0.81
H-1 Freeway	3700	0.69	4200	0.78
Kamehameha/ Dillingham	1600	0.73	1500	0.82
Other Streets	2300	0.65	2900	0.77
Nuuanu-Waolani Stream Screen Line				
Nimitz Hwy	2500	0.70	2800	0.79
H-1 Freeway	4700	0.87	4400	0.81
King Street	1600	0.52	0	0.81
Beretania	250	0.28	2900	0.81
Vineyard	1200	0.44	1200	0.44
Local Streets	2000	0.37	2700	0.48
Manoa-Palolo Drainage Canal Screen Line				
Ala Moana	1800	0.67	1700	0.63
H-1 Freeway	6100	0.85	3100	0.43
Kalakaua Ave.	1700	0.94	1400	0.75
King Street	1900	0.53	0	----
Waialae Ave.	0	----	1600	0.59
Local Streets	2100	0.33	4100	0.76

6.3.1.2 Waterfront Area Intersections -- Peak Hour Volumes and Capacity

Recorded and estimated traffic volumes for the year 1988 and intersection capacity analysis were used to evaluate the operation of Nimitz Highway and Ala Moana Boulevard. Key intersections along Nimitz Highway and Ala Moana Boulevard were analyzed using the "Planning Analysis" procedure to estimate intersection capacity from the Highway Capacity Manual. Planning analysis estimates the capacity of an intersection by adding conflicting traffic movement volumes. If the sum of the conflicting movement volumes is below 1,200, the intersection is below capacity; from 1,201 to 1,400 the intersection is near capacity; and above 1,400 the intersection is over capacity. The results of the analysis are shown in Table 8.

Table 8: EXISTING CAPACITY ALONG NIMITZ/ALA MOANA

Intersection	Morning Peak Hour	Afternoon Peak Hour
Lagoon Dr.	Under	Under
Sand Isle Access Rd.	Over	Over
Kalihi St.	Over	Over
Waiakamilo Rd.	Over	Over
Bishop St.	Under	Under
Alakea St.	Under	Near
Punchbowl St.	Under	Near
South St.	Under	Under
Ward Ave.	Under	Near
Atkinson Dr.	Under	Under

6.3.2 Future Conditions Without the Project

Land uses on Oahu are projected to increase in intensity, as indicated by projected increases in population and employment. Projections extrapolated

from the DBED M-F series indicated that Oahu is estimated to increase by 25 percent in population and 30 percent in employment, from 1988 to 2010. This increased intensity of land use is expected to increase traffic correspondingly .

Afternoon peak hour traffic crossing Kalihi Stream in the Ewa and Diamond Head directions is expected to increase from 22,100 vehicles in 1985 to 29,500 vehicles in 2010, an increase of about 34 percent. Traffic crossing the Ala Wai Canal, Manoa-Palolo Drainage Canal, and Manoa Stream is expected to increase from 25,500 vehicles in 1985 to 32,000 vehicles in 2010, an increase of about 25 percent. Traffic and congestion during off peak hours are also expected to increase.

The traffic engineering consultants found that the forecasted traffic even without the project would be sufficiently significant such that additional laneage through central urban Honolulu would be necessary. While the determination of the need for such laneage would usually be addressed in the context of regional needs, the team evaluated three alternatives: (1) a Sand Island Parkway from H-1 at Middle Street to Kakaako, (2) a Nimitz viaduct and tunnel, or (3) additional laneage mauka of Nimitz/Ala Moana. Other needed improvements would be the elimination of on-street parking on King Street and re-striping to provide two through lanes with a bus stop by-pass. If further studies by the State Department of Transportation find that a new, major corridor is indeed needed through the waterfront area, the Sand Island Parkway and harbor entrance channel to Ward Avenue may be the most viable solution. Major traffic movement westbound would be via a tunnel roadway from Ward Avenue to the Sand Island Parkway tunnel. Two eastbound lanes from the Parkway would continue on Ala Moana Boulevard, with an exit onto Ward within the Peninsula area. One lane westbound on Ala Moana Boulevard would be underground, crossing Ala Moana heading makai. The second lane westbound would begin as a tunnel entrance makai of Ala Moana along the makai leg of Ward Avenue.

This proposed configuration offers the benefits of increased access to Kaka'ako Peninsula with no at-grade traffic crossing of through traffic with Ala Moana traffic heading either east or west.

At major intersections such as Waiakamilo Road and Ward Avenue along Nimitz, major intersection improvements would be needed even with the Sand Island Parkway. The traffic engineers recommend that at Waiakamilo and Nimitz, 2 lanes are needed for the southbound approach, one for the northbound, and one lane for both the east and westbound approaches. At Ward and Ala Moana Boulevard, one lane should be added on the southbound approach, and two lanes in the eastbound direction.

6.3.3 Future Conditions With the Project, Probable Impacts and Mitigating Measures

Overall, traffic conditions in the study area with the waterfront project will be somewhat worse than without the project. The project would add traffic to specific subareas and roadway points. The traffic study assumed that either the Sand Island Parkway or the Nimitz viaduct/tunnel lanes would be built, and traffic impact results are shown in Table 9 below by comparing the traffic increase and capacity level for the project versus the traffic without the project. These intersections represent the most critical intersections through the study area and serve as major or primary access points to the waterfront subareas.

Table 9: 2010 TRAFFIC IMPACT (Afternoon Peak Hour)

	WITHOUT PROJECT (1)		WITH PROJECT (2)	
Intersection	Critical Vol.	Capacity	Critical Vol.	Capacity
Lagoon Dr.	1320	Near	1720	Over
Sand Isle Access Rd.	1000	Under	1060	Under
Waiakamilo Rd.	1330	Near	1820	Over
Bishop St.	950	Under	1070	Under
Ward Ave.	1380	Near	1760	Over

(1) With Sand Isle Parkway or other major new facility & needed improvements.
(2) With Sand Isle Parkway or other major new facility and proposed waterfront land uses.

The mitigating measures below have been proposed by the project traffic engineers. These pertain primarily to the impacts by the waterfront project. Even without the project, various improvements are required such as a major freeway type facility, as represented by the Sand Island Parkway. While the parkway may be situated in the waterfront area, it is not a mitigating measure for the proposed development of the area. It is required by the anticipated growth in population and employment predicted by the Department of Business and Economic Development for the year 2010. Moreover, intersection improvements are needed to achieve the capacity levels in Table 6-3 above.

Keehi. With the proposed industrial and recreational land uses in Keehi Lagoon, the project would significantly increase traffic. Keehi development coupled with traffic growth due to other development on the airport and the surrounding light industrial area will cause congestion at the intersection of Lagoon Drive and Nimitz Highway.

Mitigating Measures. Add a single-lane frontage road along Nimitz Highway for traffic turning right from Lagoon Drive merging onto Nimitz eastbound at least 400 feet downstream and at a point with adequate sight distance. Also, restripe the existing intersection configuration to permit left-turn capacity heading makai to Lagoon Drive.

Iwilei/Kapalama/Sand Island. Several access roadways (Sand Island Access and Puuhale Roads, Mokauea and Kalihi Streets) serve this general area. Forecasts indicate that intersections on Nimitz Highway would operate below or near capacity. Truck traffic volumes will change depending on the specific intersection, with westbound volumes increasing due to the growth in the Leeward area. Major impacts are probable at the Waiakamilo and Nimitz Highway intersection if Nimitz Highway remains in the same configuration.

Mitigating Measures. It is recommended that one lane northbound be added to improvements already required without the project. Add a single-lane overhead ramp from Waiakamilo southbound to Nimitz eastbound, or alternatively add one lane westbound from Waiakamilo to Kalihi Street.

Chinatown Waterfront. Proposed land uses would be minor generators of traffic; e.g., fire station, sale of fish, interpretive center, and park. Most patrons are expected to walk as part of the contemplated pedestrian promenade.

Aloha Tower/Downtown. The Aloha Tower area uses by 2010 could be retail, office space, and a 400-500 room business hotel. The primary ingress and egress point will be Bishop Street at Nimitz Highway. With the development, traffic would increase but would not be a significant impact, assuming present Nimitz Highway laneage. Little impact is expected at Bishop and Nimitz Highway if Nimitz remains in the same configuration.

Mitigating Measures. The master plan recommends a pedestrian grade-separated walkway between Downtown and Aloha Tower to bridge the Nimitz Highway corridor.

Kaka'ako Peninsula. The Peninsula is served by several access points to Ala Moana Boulevard. Two major types of traffic generating uses are contemplated. First, office and commercial uses are planned. This type will have the greater impact on the peak hour traffic. The second type of use is the recreational or entertainment type of use--the waterfront park, amphitheater, performing arts center, and museum complex. The peak period for use of these facilities will be during the off-peak traffic hours; i.e., weekend or evening hours. Based on the low level of weekend traffic on Nimitz/Ala Moana, these uses would be complementary in terms of traffic generation and available road capacity. Thus, while more detailed time-of-day, mode of arrival, event characteristics, and traffic forecasting analysis would be needed for traffic signal and other control requirements, these uses would have traffic impacts which could be mitigated.

Significant impacts are expected due to commercial and office space development. Traffic impact will vary by intersections serving various uses and destinations in the peninsula. Major intersections will be over capacity. High traffic congestion is likely during the weekday peak hours. Weekend traffic will operate below capacity. Friday evening traffic will be congested with time overlap between commuters and attendees of amphitheater or cultural events.

Mitigating Measures. Road widening at intersections would be required to permit Ala Moana Boulevard intersections to operate at or below capacity. In addition to lane improvements required even without the project, it is recommended that two lanes be added to the northbound approach. It is recommended that the westbound and northbound left turns be banned during the peak hours.

Shuttle bus routes and service through the downtown and Kakaako areas should be implemented. Also, if a system is constructed, improvements should include locating rapid transit stations within walking distance of the Peninsula area in order to serve major developments.

Other mitigating measures include:

- Institute and manage carpool/vanpool programs for employee parking;
- Develop and institute transit fare programs for employees;
- Plan and implement special event traffic control plans for access and parking management.
- Evaluate and when appropriate, implement staggered work hour program.

6.4 AIR QUALITY

6.4.1 Existing Conditions

Air quality standards applicable in the Honolulu Waterfront study area are those of the State of Hawaii and the U.S. Environmental Protection Agency (EPA). Sulfur dioxide (SO2) and lead (Pb) standards are the same at both levels of government. Nitrogen dioxide (NO2), carbon monoxide (CO), and ozone (O3) standards are more stringent at the State level than those used by the Federal government.

The State has operated a number of air quality monitoring stations over the years in the general vicinity of the waterfront. Ozone measurements continue to be collected at a Sand Island sampling site. The longest operating station is located

at the State Department of Health building at the corner of Punchbowl and Beretania Streets several blocks mauka of the waterfront area.

The data from these stations suggest that, with the exception of CO, all State and Federal standards are probably being met within the waterfront area. In the case of CO, State standards are probably being exceeded in the vicinity of a number of major intersections along Ala Moana Boulevard and Nimitz Highway during peak-hour traffic and low windspeed conditions.

While Honolulu's prevailing northeasterly tradewinds provide the natural ventilation which generally maintains an acceptable level of air quality, these winds cannot be relied upon as the sole means of air pollution control. This is due to the numerous periods of absence of brisk tradewinds.

The principal air pollution sources in the area are motor vehicle traffic along Ala Moana Boulevard, Nimitz Highway, and adjacent streets; motor vehicle activity associated with industrial activities, including container yard operations; ship and boat operations; petroleum storage and handling facilities; and the power plant.

6.4.2 Future Conditions without the Project

Based on traffic impact analysis, forecasts indicate that population will increase by 25 percent, and employment by 30 percent from 1989 to 2010 even without the project. There will be an expected corresponding increase in traffic, which will result in even higher levels of carbon monoxide emissions.

Even without the waterfront project, HECO has plans to close its Downtown power plant within the next several years. This action would contribute to lower emissions and improved air quality in the Downtown area in the short term.

The longer term outlook would be an even greater magnitude deterioration of air quality with continued growth in the number of mobile and stationary sources in urban Honolulu.

6.4.3 Future Conditions with the Project

Intensified urban use of the waterfront lands will likely attract additional mobile sources, or motor vehicles, into an already congested area. In the near term, this may not result in a net increase in mobile source emissions due to the offsetting effect of the Federal motor vehicle control program. At some point in the future, however, the traffic growth rate may exceed the vehicle emissions reduction rate and air quality will begin to deteriorate again.

6.4.4 Probable Impacts and Mitigating Measures

Closure of HECO's Downtown power plant and the relocation of other industrial sources will contribute to lower emissions and improved air quality in the Waterfront area. Possible closure or relocation of other existing stationary sources such as concrete batch plants would also have a positive effect on air quality in the waterfront.

Intensified use of the waterfront will also result in increases in demand for electrical energy and increases in solid waste generation. Subsequently, these will have offsite impacts at the locations where power is generated (Kahe/Waiau) and where municipal solid waste is burned (Waipahu/HPOWER). Air polluting emissions from these stationary sources will increase, thereby contributing to the deterioration of air quality in this location.

In the Barbers Point Harbor area, emissions from industrial sources at the nearby Campbell Industrial Park have a significant negative impact on air quality. Besides the existing sources, a large gas turbine, a coal-fired power plant, and refinery expansions are being planned. Unless future emissions are monitored, air pollutants from these sources will significantly contribute to the degradation of air quality in this area.

Increasing Numbers of Mobile Sources

As the number of mobile sources in the waterfront area continue to grow, control of emissions will be increasingly difficult.

While mobile source emissions have declined sharply in Hawaii since the early 1970's due largely to the federal motor vehicle control program, they can be expected to start rising again in the future as the increasing volumes of motor vehicle traffic overcomes previous improvements in per vehicle emission standards. Evidence of this impending scenario may already exist in the Department of Health's air quality monitoring data. The number of violations of the State's 1-hour carbon monoxide (CO) standard has dropped sharply since 1971, but has leveled off in the last 3 years. At present, no new motor vehicle emission standards are scheduled to take effect.

Less polluting alternative means of moving people within the area, such as a rapid transit and other high occupancy vehicle systems, would need to be developed. The net result of such actions would be a reduction in the number of vehicles on the road at any given time, and thus, there would be a reduced occurrence of CO emissions from individual vehicles. Also, as new parking facilities are planned for the waterfront, careful consideration should be given to designs that minimize motor vehicle operation. Many of the proposed people-oriented facilities in the waterfront would be located downwind (relative to prevailing northeasterly tradewinds) of air pollution sources. Adequate buffer zones and strict enforcement of air pollution control rules will be necessary to minimize impacts on future users of these waterfront facilities.

6.5 NOISE

6.5.1 Existing Conditions

Noise indices are commonly used to deal with fluctuating noise from traffic and aircraft. For example, equivalent noise levels over a one-hour sample of traffic noise provides a single number in decibels (dB) to express the complicated time-

varying situation. Also day-night noise level (Ldn) is used to define a single number for traffic and aircraft noise averaged over 24 hours, including a 10 dB penalty for the noise sensitive period between 10:00 p.m. and 7:00 a.m.

Traffic

Noise from traffic on the Ala Moana/Nimitz artery is shown to cause maximum hourly noise levels of 65 dB to persons on lanais in highrises at distances of 250 to 350 feet from the roadway. During evenings, when traffic volumes decrease by about one-third, the average hourly noise levels would be about 5 dB less.

Aircraft

Figure 23 provides the most recent Ldn noise contours for 1987 and 1992. The noise contours were generated using the FAA's Integrated Noise Model (INM) computer program which takes into account the flight tracks, the frequency and time of operations, as well as the noise and flight profiles of each type of aircraft. The noise levels take into account the measured single event noise levels obtained over the years from fixed Remote Monitoring Stations (RMS) in the HIA Noise Monitoring System (NMS). RMS's in the project area are located at the Sand Island Wastewater Treatment Plant, Aloha Tower, and Kewalo Basin.

In the Kaka'ako Makai area away from Ala Moana Boulevard, aircraft noise contributed 22 to 41 percent of the total noise environment due to the higher relative contributions from traffic and machinery (e.g., reefer vans) noise sources.

Industrial and Commercial Activities

Examples of industrial activities that can not reasonably have acoustic enclosures are container handling facilities; ship and boat maintenance and repair operations; truck terminals; salvage, scrap and junk storage; concrete batch plants; large saw mills; etc. Noise compatibility criteria provided by many Federal agencies generally assume that buildings are closed for heating or air conditioning. Because of our favorable climate, many industrial activities here are open or are naturally ventilated. This condition makes these facilities both

susceptible to noises from surrounding areas as well as not being quiet or compatible neighbors themselves.

As a benchmark, workplace activities which involve the use of powered tools or machinery, will generate noise levels in excess of 65 dB at the operator position. Hearing damage criteria for the workplace is approximately 85 db. Naturally ventilated residential units and other naturally ventilated noise-sensitive uses should not be planned where the day-night noise levels are greater than Ldn 60 when taking aircraft noise into account.

6.5.2 Future Conditions without the Project

The population in urban Honolulu is expected to increase by approximately 25 percent and employment by about 30 percent by the year 2010 even without the waterfront project. With this projected growth, estimated vehicle trips in the waterfront area would probably increase by 34 percent. Such increases imply greater levels of noise pollution which would be inevitable in areas of the urban core where major employment centers and services are located.

6.5.3 Future Conditions with the Project

Traffic

If, in the future, the projected increased traffic volumes can move at today's speeds, then it can be shown that the increase in hourly traffic noise levels should rise from 0.7 to 1.5 dB, depending on the location along the traffic routes.

The actual increase in noise level will probably be less if congestion along the road causes the effective average operating speed of the vehicles to be reduced. Moreover, unlike aircraft noise, buildings will effectively block traffic noise to listeners at lower elevations. Thus, the makai regions behind structures on Ala Moana Boulevard should be substantially shielded from traffic noises.

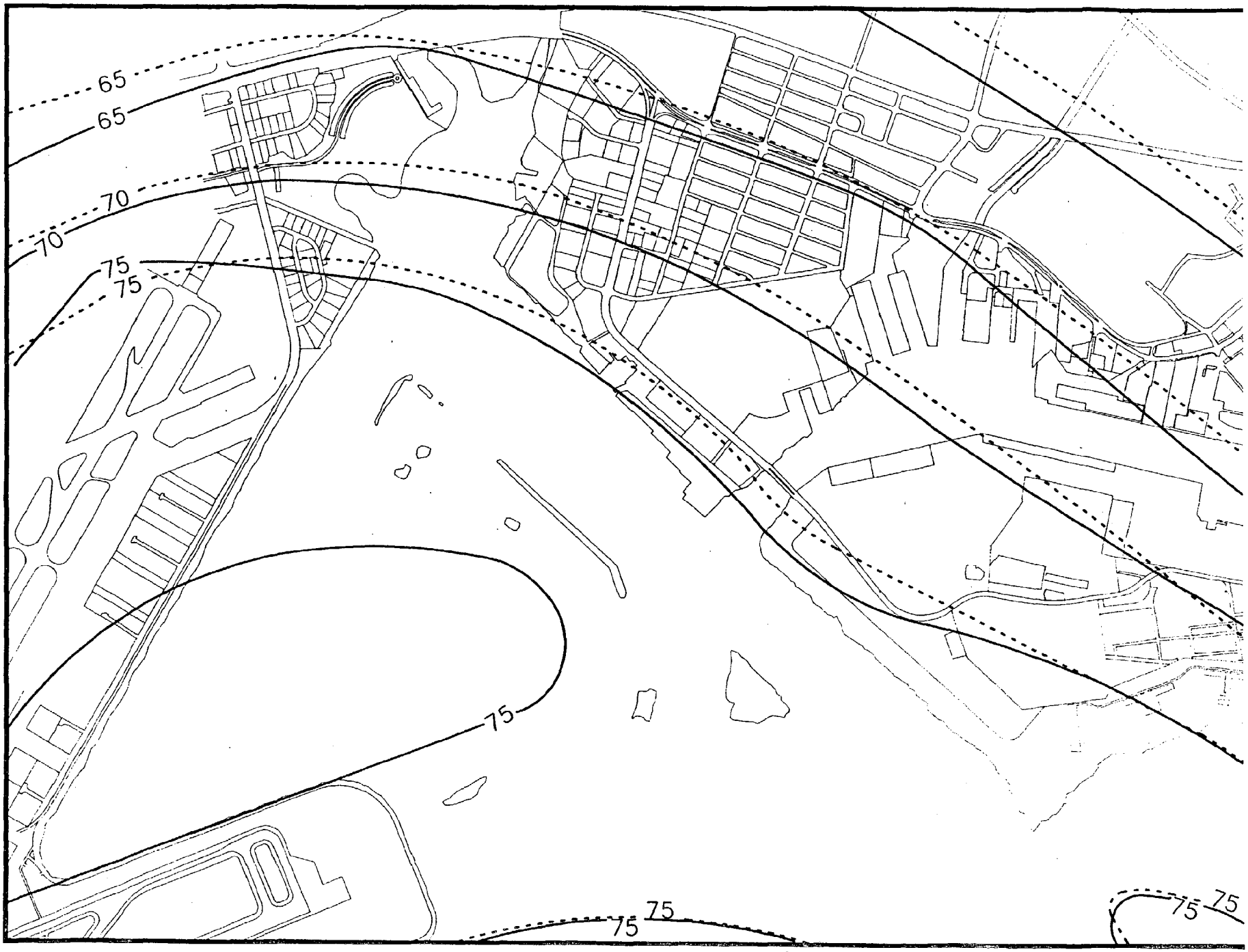

65
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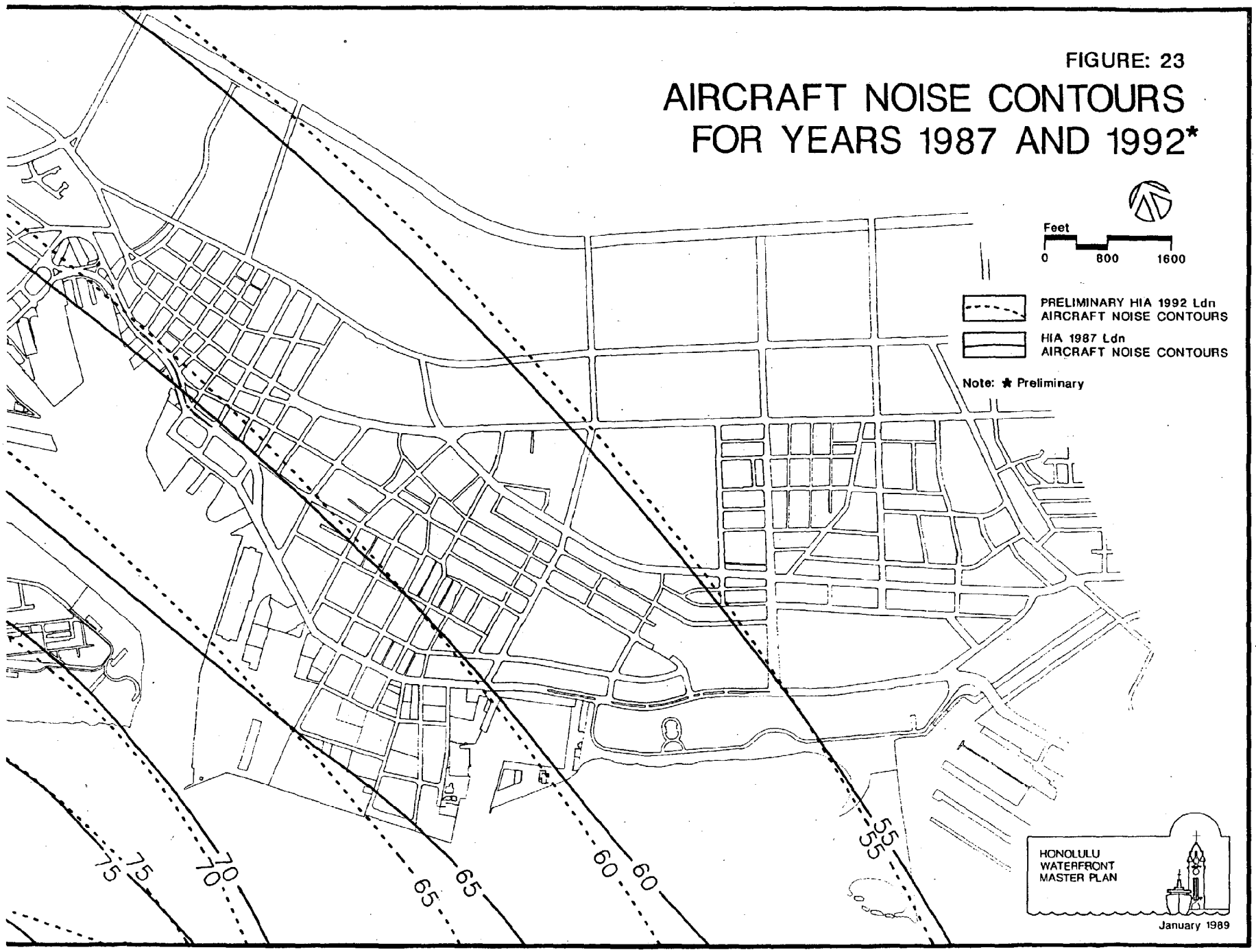
FIGURE: 23

AIRCRAFT NOISE CONTOURS FOR YEARS 1987 AND 1992*



A new major arterial crossing Sand Island with a tunnel to the Fort Armstrong area could cause a significant increase in noise levels in the existing park areas, including camping sites located on Sand Island.

The walkways and commercial complexes along the proposed waterways as well as the parks and special uses in the Fort Armstrong area should be reasonably quiet except for noises from slower moving local traffic. It is shown that the elimination of fully-developed containerized cargo handling facilities in the Fort Armstrong area will reduce the contribution of noise from heavy diesel trucks and buses on Ala Moana Boulevard from about 71 percent to 57 percent of the total traffic noise.

Aircraft

The noise contours contained in Figure 23 may reflect extreme future cases where the 1992 contours show some increased noise exposure over the existing condition in Keehi Lagoon and no significant changes in the Kakaako Makai despite an increase in operations. This is primarily due to the assumption that some quieter Stage 3 aircraft would be in use. The 2007 contours are not indicated but do reflect a case where the majority of the aircraft are Stage 3 and significant noise reductions are seen in most of the project area despite even greater operations than in 1992. The amount of the projected noise reduction varies from zero to more than 10 dB at the various locations within the planning area.

Industrial and Commercial Activities

Noise levels from industrial/commercial activities such as these will more than likely continue to increase as demand for such services and products increase with economic growth and diversification on the Honolulu Waterfront.

6.5.4 Probable Impacts and Mitigating Measures

Traffic

Noise from traffic on Ala Moana Boulevard and Nimitz Highway is not expected to increase significantly. The increase in the hourly noise level (Leq(60 minutes)) or the day-night noise level (Ldn) ranges from 0.7 to 1.5 dB depending on the location along the arterial. The actual increase in noise level will probably be less if congestion along the road causes the effective average operating speed of the vehicles to be reduced.

The new major Sand Island Bypass crossing Sand Island with a tunnel to the Fort Armstrong area could have a significant traffic noise impact on existing park areas including camping sites located on Sand Island. Earth berms with noise barrier walls along the southern side of the roadway could be used to reduce traffic noise impact on the park.

Aircraft Noise

There should be significant reduction in aircraft noise impact within many portions of the study area when the older, noisier Stage 2 aircraft are phased out. Noise from military aircraft also contributes to the impact in portions of the project area. Changes in the type of military aircraft and operations also can affect the Ldn contours. Thus, predictions of HIA noise impact into the future can show great variability.

The Ldn aircraft noise contours in the study area caused by Honolulu International Airport (HIA) can change when aircraft types and operations are modified. There should be significant reduction in aircraft noise impact within many portions of the study area when the older, noisy Stage 2 aircraft are phased out. Presently, task forces comprised of government and airline officials are working on the development of an economically feasible plan to determine the rate of

phase-out for the older aircraft which now comprise about 80 percent of the U.S. commercial fleet.

The following are comments pertaining to specific waterfront project features. As benchmarks, the DOH, Kakaako Community Development Plan (KCDP), and LUO noise regulations are: for apartment districts DOH and KCDP noise limits are about 60 Ldn; LUO noise limits for residential/apartment uses are about 59 Ldn; for industrial or non-dwelling areas, DOH noise limits equate to 76 Ldn and LUO limits equate to 69 Ldn.

- The Triangle Industrial/Commercial Park in Keehi Lagoon will experience noise reductions from 75 Ldn and greater to less than 70 Ldn.
- The Keehi Lagoon Triangle Yacht Race Facilities and Ocean Sports Complex will have reductions from about 80 Ldn to the range of 70-75 Ldn.
- The authorized mooring area in Keehi Lagoon will have reductions from the range of 75-80 Ldn to about 70-73 Ldn.
- The Pier 60 Marina and the Canoe Race Course should experience a reduction of about 5 Ldn.
- The northern portion of the proposed Sand Island Beach Park should have a reduction, but less than 5 Ldn.
- The existing Sand Island Park should experience no, or very little, noise reduction.
- Much of the Sand Island container/cargo area should experience a 5 Ldn reduction.
- The proposed container cargo area, the interisland barge service area, the general cargo, fueling, and miscellaneous harbor activities should all have a 5 Ldn reduction.
- The proposed Kaka'ako landfill peninsula park should experience no change.

- The majority of the Kakaako Makai peninsula and Ala Moana Beach Park will experience a reduction of less than 5 Ldn.
- Barbers Point would not have any significant reduction of noise impact from aircraft.

Maritime, Industrial and Commercial Operations, Probable Impacts and Mitigating Measures

Because of our favorable climate, many industrial activities here are open or are naturally ventilated, whereas the same businesses on the mainland would have to be closed for heating or cooling purposes. Simple walls of metal decking or single plywood panels often would provide adequate noise containment. The major cost is the installation and operation of the air conditioning or mechanical ventilation systems, not heavy sound retardant building elements, such as walls, windows, and doors.

Change in Use at Fort Armstrong

It is shown that the elimination of fully-developed container handling facilities in the Fort Armstrong area will reduce the contribution of noise from heavy diesel trucks and buses on Ala Moana Boulevard from about 71% to 57% of the total traffic noise.

Noise Sensitive Land Uses

The amphitheater proposed for the Kakaako Waterfront Park is to be located on 6 to 8 acres and would accommodate between 10,000 to 12,000 people. The location and design of the amphitheater would minimize potential noise impacts on surrounding properties by directing sound towards the ocean as much as possible. Modern design and construction techniques would equip a facility suitable for a variety of performances.

Two acoustical issues associated with this complex are: (1) noise from aircraft overflights interfering with performances, and, (2) sounds from the amphitheatre possibly causing annoyance to residents in the area.

Tradewind departures from HIA represent about 95 percent of the annual departures from the airport. Currently there are about 21 scheduled departures during the evening between 7:00 p.m. and 11:00 p.m. when concerts may occur. Six of the departures are interisland jet aircraft from runway 08L and typically would cause a maximum noise level of about 79 dBA in the area.

Fifteen departures would be transoceanic air carriers from the reef runway causing about 70 dBA maximum levels. Military light tactical jet aircraft takeoffs with afterburners could cause maximum levels in excess of 90 dBA.

Kona-wind flight patterns, which represent 5 percent of the annual arrivals for HIA, schedule about 30 arrivals of commercial jet arrivals between 7:00 p.m. and 11:00 p.m. These arrivals would impact concerts during Kona weather. Typical maximum noise levels of 74 to 78 dBA would occur for Boeing 747 aircraft on the nearest flight track. Military aircraft landing on the same flight track can cause 90 dBA maximum levels.

From these flight patterns and noise levels, it can be seen that loud music passages generally would not be masked by commercial jet activity, but more subdued passages could be disturbed. Military aircraft operations would often be detectable even during loud passages.

In the future when quieter Stage 3 aircraft are deployed into the interisland fleet, maximum noise levels should be reduced substantially during tradewind departures, perhaps typically by 7 to 10 dBA. However, there probably will be more departures during a given period of time. During Kona-wind flight patterns, there probably will be approximately the same maximum noise levels since approach noise levels are not substantially decreased in Stage 3 aircraft. Also, somewhat more aircraft landings are predictable in the future during concert times.

It is difficult to predict annoyance to potential nearby residents due to sounds from performances in the proposed amphitheater. This is primarily because the actual sound sources are loud speaker systems which belong to the entertainment groups and are considered a part of their artistic expression. If sponsors

of events at the proposed facility were required to use the house sound system and a resident sound engineer, the control of intrusive noise to neighbors could be accomplished.

However, recently the U.S. Supreme Court ruled that New York City's effort to control sound levels at a bandshell in Central Park was a violation of the performers' freedom of expression (Ward vs. Rock Against Racism, USSupCt No. 88-226). Another complication is the trend to use large sub-bass amplifiers and speakers which produce essentially omni-directional sound that cannot be effectively directed away from residential areas.

Another important factor is the ambient or background noise level that normally exists in the neighborhood of the amphitheater. If a quiet ambient noise condition usually exists, then people get accustomed to enjoying outdoor areas and lanais in the evening. If buildings have lanais overlooking the boulevard, many people would tend not to utilize them because of uncomfortably high motor vehicular traffic noise.

In light of aircraft and amphitheatre noise, residential uses are not recommended for the Kakaako Makai area.

6.6 OCEAN ENGINEERING

6.6.1 Existing Conditions

The coastal reach of the Honolulu Waterfront study area which stretches from Magic Island/Ala Moana Park westward to the Reef Runway has been significantly modified by human activity during this century. Dredging and filling of shoreline and reef areas have physically altered the coastal characteristics, and the marine environment has been stressed by inland development, channelization of streams, and urbanization of the watershed.

Wave Climate

The south shore of Oahu is sheltered from the predominant northeast tradewind-generated waves as well as the winter North Pacific swell. Thus, wave activity at the shore is relatively mild except during the summer months when southern swell can produce moderately high surf conditions. The south shore is also exposed to infrequent Kona storms and hurricane waves approaching from the southeast through southwest directions.

The west shore of Oahu (Barbers Point area) is sheltered from the predominant northeast tradewind-generated waves, but is somewhat exposed to the winter North Pacific swell and summer southern swell. The west shore is also exposed to infrequent Kona storms and hurricane waves approaching from the southwest.

Nearshore Bathymetry

Nearshore bathymetry is highly variable along the Honolulu Waterfront due to the extensive modifications by dredging and filling of the coastal area. Wide shallow fringing reefs front portions of this shoreline, while other shoreline areas have been created by filling out over the shallow reefs. Numerous harbor basins and navigation channels have been dredged through the nearshore zone and throughout Keehi Lagoon.

Opportunities exist for seaward extension of existing shoreline fill areas where the nearshore ocean bottom is relatively flat and does not provide marine habitat of high or unique value. These areas are located off Sand Island and the Kakaako Peninsula. The nearshore bathymetry in the vicinity of Barbers Point Harbor is not ideally suited for shoreline fill extension due to the relatively steep nearshore bottom and the high unit costs for land reclamation in deep waters. But long-range maritime requirements may prove that offshore expansion of the harbor is a viable option to accommodate larger ships if the interior land areas are not available for harbor expansion.

Littoral Processes

There is little sand movement along the south shore within the study area since much of the shoreline has been filled over the fringing reefs and the numerous navigation channels through the nearshore areas effectively cut off any continuous longshore movement at the shoreline.

The Ala Moana Park shoreline is the only extensive recreational beach within the study area. This beach was augmented by artificial beach fill and is not presently replenished naturally because of the deep dredged channel fronting the entire park shoreline. The Barbers Point shoreline is comprised of hard coral limestone or beach rock material and the nearshore ocean bottom is a fairly uniform hard coral and rubble surface. There is no significant sand beach in the vicinity and negligible littoral drift along the shoreline.

Nearshore Currents

Coastal currents are predominantly tidal with velocities typically about 1/2 knot along the Honolulu Waterfront coastal area and somewhat higher off the coast of Barbers Point. The Ala Moana Park dredged area is an example where the local shoreline alterations have influenced the circulation patterns. In its present configuration, this dredged area is poorly flushed.

Coastal Flood Hazard

Coastal flood hazards include tsunamis, hurricane wave-induced coastal inundation, extreme stream flows or storm drainage flows, and long-term consequences due to rising sea level. Tsunami heights within the project area have been reported to be 6 feet or less, and no shoreline reach is within a Zone V (high velocity tsunami wave flood zone) as delineated by the Flood Insurance Rate Maps (FIRMs). Shoreline areas within FIRM flood zones are designated Zone AE (base flood elevations determined) or Zone A (undetermined base flood elevations).

Zone AE base flood elevations are typically +5' Mean Sea Level (MSL) or less along the Honolulu Waterfront, and +8' MSL along the Barbers Point Harbor shoreline. The areas designated Zone A are susceptible to hurricane-induced coastal inundation.

Estimated maximum stillwater level due to hurricanes is about +6' MSL or less along the Kewalo-Kakaako shoreline reach. Major streams for which the 100-year flood characteristics have been determined by the Federal Emergency Management Act (FEMA) include Kalihi Stream and Moanalua Stream which discharge into Keehi Lagoon.

Shore Protection Structures

Most of the shoreline within the study area is provided with some method of shore protection due to the fact that much of this coastal reach has been altered by dredge and fill activities. The types of shore protection structures vary, depending on the use of the shoreline area and the ocean bottom characteristics. Rubblemound breakwaters protect an artificial beach at Magic Island, rubble masonry seawalls protect portions of the shore that are not exposed to high wave activity, rubble revetments protect other reaches that are exposed to higher levels of wave activity, and various types of vertical bulkheads are found within the interior harbor basins.

In some cases, the existing structures which were built to retain the fill material have deteriorated over the years due to lack of maintenance, leaving shoreline reaches vulnerable to erosion damage. The seaward shore of Sand Island is such a case, where the U.S. Army Corps of Engineers is undertaking the construction of 2,000 feet of new shore protection structures to protect the eastern coastal reach. The seawall along the Kakaako Peninsula shorefront is also in various stages of disrepair, requiring improvements to prevent future erosion damage. No erosion problems are evident along the Barbers Point Harbor shoreline.

6.6.2 Future Conditions Without the Project

Rising Sea Level

Long-term consequences due to the global rise in sea level are relatively insignificant in the near future. It is estimated that the relative sea level rise for Honolulu by the year 2010 will be 0.3 feet or less. However, it is expected that the sea level will rise at an accelerated rate in the distant future due to general global warming, with possible relative rise of about 1.8 feet by the year 2050 and 5 feet by the year 2100.

While long-term planning and policy decisions should consider the probability of future increased rates of sea level rise, there is no cause for alarm or action regarding engineering of structures to mitigate the effects. Any action to protect against sea level rise can be carried out in a relatively short time period relative to the rate of potential rise in relative mean sea level.

6.6.3 Future Conditions With the Project, Probable Impacts and Mitigating Measures

Ala Moana Park

The present circulation and flushing of the dredged area fronting Ala Moana Park is inadequate to maintain good water clarity. Therefore, any shoreline or offshore development should not further restrict the exchange of water over the reef. Any offshore development at the reef edge is also likely to obscure the ocean views from the beach and park areas. Opportunities exist for improving the circulation and flushing aspects within the Ala Moana Park dredged area by dredging of a circulation channel through the reef to provide a direct opening to the sea for positive circulation.

Consideration must be given to balancing the degree of channelization with the increased wave energy levels at the shoreline and the potential for increased currents due to return flows through the channel. Also, if protection of existing surf

sites is the priority consideration, siting and alignment of any circulation channel through the reef may be restricted.

A curved channel alignment will minimize the possibility of increased wave energy levels entering through the circulation channel. Gross estimates indicate that the circulation channel can be designed to enhance circulation and flushing of the Ala Moana Park dredged area without significant adverse effects due to increased wave energy or high velocity flows.

Kewalo Basin and Peninsula

Opportunity exists for minor filling and shoreline extension of the basin peninsula in conjunction with dredging of a circulation channel to improve water quality within Ala Moana Beach. Any additional filling of the peninsula should not extend substantially seaward of the present channel "jetty" due to potential impacts to the surfing sites at the edge of the fringing reef. The peninsula could be "squared off" by filling the southeastern part of the triangle peninsula without affecting the surf sites.

The dredged material from the circulation channel could be used to supplement the fill requirements for the Kewalo Basin peninsula fill extension. The peninsula expansion will require shore protection measures to contain the fill material and prevent storm wave damage.

Marine Research Complex

The combination of the master plan development activities together with the proposed artificial reef sanctuary and research area, as well as the existing U.H. research facilities and offshore test range, could result in a world class ocean research center within metropolitan Honolulu. A visitor's center could be provided as part of the U.H. research complex to enhance the concept and use of this ocean park.

Possible Kaka'ako Fill Extension

The Kakaako Peninsula shoreline and offshore areas provide an opportunity to expand the Kakaako Park seaward by augmenting the makai end of Ft. Armstrong with new fill for fast land. Shoreline fill extension to the -12' contour will require substantially more massive shore protection structures than that necessary for the existing shoreline. Because of the deeper water depth, larger waves can be expected to impact the shore during extreme storm conditions.

For a maximum breaking wave height of about 17 feet, the non-overtopping crest elevation would be on the order of about 25-30 feet. The wave protection structure fronting the west end of the Reef Runway is a good example of the necessary shore protection requirements for possible shoreline fill extension to the 12-foot depth contour.

Mitigating Measures

Planned uses and activities in the shoreline area need to be considered from the standpoint of selecting appropriate shore protection measures that are compatible with the planned uses and that provide an acceptable level of protection to the landside improvements. Wave overtopping could be expected during extreme storm wave conditions, and damageable structures should be set back about 50 feet or so from the ocean front with provision for adequate drainage of overtopping water. A landscaped promenade would be a compatible land use within this setback zone.

While a recreational beach could be considered as part of the Kakaako fill extension it will require stabilization with breakwaters or with a submerged shoal. A submerged shoal structure is preferable since it would not block the seaward views, and can be designed to enhance the surfing conditions. The submerged offshore reef will provide wave protection to the Diamond Head-facing shoreline, while the seaward and Ewa-facing shore will require revetment protection. For the purposes of this stage of the conceptual planning effort, it is assumed that the shoal is comprised of a designed artificial reef of rocks.

The submerged reef is intended to serve as a surf shoal as well as to provide shore protection. If intended merely as shore protection, the reef breakwater crest would not have to be as wide and the fill volume could be significantly reduced. However, the surf shoal concept is recommended since it would enhance the existing surf site known as "Flies." It would provide a surf site away from the Kewalo Basin entrance channel with convenient access from the Kakaako Park, and would enhance recreational snorkeling and diving opportunities during calm wave conditions. This reef breakwater/surf shoal would not interfere with the existing Point Panic body surf site, nor the University of Hawaii Look Lab offshore test range area.

By locating a new beach area off Ft. Armstrong, body surfers and surf boarders would have improved access to the water at the Ewa end of the Kaka'ako Peninsula. This would enhance the use and safety factors of the surf sites in this area by enabling, for the first time, a beach entrance to these sites at the Ewa end of the Peninsula. Currently, due to the adverse conditions of the deteriorating Kakaako shoreline, surfers enter the water through the Kewalo Basin entrance channel (where waters are calmer) which often conflicts with vessel passage in and out of the Basin.

Also, the proposed artificial reef sanctuary would be located sufficiently close to the shore such that divers and others using this feature should be a safe distance from the transit routes of the harbor cruise and recreational type vessels. These types of ships currently are traveling from the Ewa end of Mamala Bay to points Diamond Head of the Kaka'ako Peninsula-- the Kaka'ako stretch is basically a transit route for these vessels rather than a planned part of a tour.

Pier 6

The proposed Pier 6 intra-island ferry landing site will be subject to occasional surge conditions from southern storms due to its exposure to the entrance of the Honolulu Harbor channel. This would probably require the availability of an alternate, more protected landing in the vicinity of Piers 8 to 13 during conditions of severe surge. Depending on the vessel's structural character, those ships

with appropriate response characteristics would be able to utilize Pier 6 as a landing site under most surge conditions.

Sand Island

The entire east, south and west shores of Sand Island are designated as the Sand Island State Park Recreation area. Park improvements have been completed along the south shore and plans are underway to complete the remaining west shore bordering Keehi Lagoon. While the 2,700 feet of shoreline along the western end will be unprotected, this reach appears to be relatively stable due to the shallow reef flat and present shoreline configuration.

Creation of a sheltered swimming beach was proposed at the west tip of Sand Island as part of the Keehi Lagoon Recreation Plan Update Study. The recommended plan includes construction of a shore-connected breakwater at the seaward edge of the reef fronting the seaplane channel, placement of beach sand fill on the lagoon side of the breakwater, and minor dredging of the reef flat adjacent to the seaplane channel. This shallow reef flat could also be used to create new "nesting islands" for shorebirds displaced from Keehi Lagoon.

A narrow undredged strip of reef flat would separate the shallow swimming area from the deep seaplane channel with large boulders placed on the reef strip to visually mark the boundary. The breakwater would serve multiple uses by sheltering the water area within the seaplane channel, preventing continued erosion along the Keehi Lagoon shore of Sand Island, and improving opportunities for shoreline fishing from the breakwater.

Keehi Lagoon

Marinas along the Kalihi-Kai and Lagoon Drive shoreline, a canoe race complex in the northeast corner of the lagoon, and a multi-purpose development in the shallow central triangle portion of the lagoon are proposed. Any significant alteration to the fringing reef fronting Keehi Lagoon is not recommended because this reef area provides shelter to the interior water areas and is a significant natural resource.

Additional constraints to development on the fringing reef include the need to maintain water flow over the reef and through the channels to prevent further degradation of water quality within the lagoon, FAA height and use restrictions within the clear zone and approach zone to the Reef Runway, Mokauea Island's protected use status under lease from the State until the year 2043, and the need to provide unrestricted vessel traffic through the Kalihi Channel since it is the only functional access to the ocean for the boats within Keehi Lagoon.

An opportunity for enhancing public use of the shallow reef flat area is to provide an elevated walkway from Sand Island across the reef to the Kalihi Channel. An elevated pedestrian causeway could be designed to allow adequate circulation over the reef, and could be an extension of the protected swimming beach proposed for the west tip of Sand Island.

6.7 MARINE BIOLOGICAL RESOURCES

6.7.1 Existing Conditions

The study area extends roughly from the mouth of Ala Wai Canal to Keehi Lagoon and encompasses the majority of Honolulu's commercial, industrial, and urban centers. It is an area with a long-term history of direct and indirect degradation of the marine environment. The nearshore waters demonstrate low biological diversity and density and, in the case of Honolulu Harbor and Keehi Lagoon in particular, a prevailing poor water quality. Despite a history of man-made environmental abuse and neglect, certain areas within the Honolulu Waterfront support a number of water-dependent activities, including recreational fishing, limu collecting, surfing, and skin and scuba-diving.

Ala Moana to Kaka'ako

The waters off Ala Moana Beach to Kewalo Basin and Kakaako and Ft. Armstrong are classified Class "A" according to the State Department of Health Water Quality standards.

Class "A" waters are to be protected "for recreational purposes and aesthetic enjoyment." These are not to act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class. Further, no new industrial or sewage discharges will be permitted within embayments (Section 11-54-03(c)(2), Department of Health Water Quality Standards).

The shoreline and offshore areas of the Ala Moana park complex are heavily fished, with most activities occurring along the breakwater, the rock walls forming the boundaries of the Ala Wai Yacht Harbor, and on the shallow reef flat fronting the ocean side of the dredged channel off the park. The breakwater is also a popular location for limu collecting during calm seas. Nearshore waters fronting Ala Moana Beach Park demonstrate a prevailing high turbidity because the dredged channel fronting the park is inadequate to promote an exchange of water over the reef. Eight species of coral and at least sixty-five species of fish have been recorded within the nearshore waters fronting the park.

A shallow reef fronts Kewalo Basin and coral cover ranges from 17 to 30 percent. Nearshore there is a rubble and boulder bottom grading to larger boulders over sand toward the reef margin. The margin and reef front are composed of consolidated reef rock, broken in places by depressions and sand patches. The reef platform slopes gradually offshore to a depth of about 30 feet, then drops to 40 feet. The reef front is largely consolidated limestone, massive coral heads and coral rubble. Sea urchins and nudibranchs are abundant and sea cucumbers, starfish and lobsters are present throughout the area. Fishes are abundant in the nearshore waters with between 40 and 106 species routinely observed.

A surfing break known as Point Panic, located outside the Kewalo Basin entrance channel, is used by both board and body surfers. It is one of the finest bodysurfing sites in Hawaii. A second, equally popular surfing area called "Kewalos" is on the immediate southeast side of the channel entrance. This site like Point Panic is heavily used during the summer south swell conditions.

A shallow, disturbed reef fronts the present rock seawall along the Kakaako shoreline. The reef margin and reef front are composed of consolidated reef rock, broken by depressions and sand patches. The reef platform slopes gradually offshore to a depth of about 30 feet, then drops to 40 feet. Coral cover ranges from 17 to 30 percent. Fish are abundant and sea cucumbers, starfish and an occasional lobster are present. The reef flats support a large number of water-dependent recreational and commercial activities, such as fishing, skin and scuba diving.

Interisland tugboats with barges in tow, utilize the nearshore waters off Kakaako for alignment and mobilization when proceeding into or out of Honolulu Harbor. Pole fishing is popular from the seawall fronting Kakaako and from boats and specially equipped surfboards in adjacent offshore waters.

Honolulu Harbor

Honolulu Harbor is located in Mamala Bay. While the Mamala Bay coastline is designated Class "A" under the Department of Health standards, the immediate harbor area is designated Class B.

Class "B" waters are to be protected for small boat harbors, commercial and industrial shipping, bait fishing, compatible recreation, the support and propagation of aquatic life, and aesthetic enjoyment.

The harbor is a receiving basin for a number of pollution sources which account for its generally poor water quality. Sedimentation from upland sources is one of the primary pollution sources within the harbor.

Burrowing shrimp, polychaete worms, crabs, and a few hydroids and sponges comprise the major faunal elements in areas with unconsolidated bottom sediments. Ten species of coral have been identified within close proximity to the HECO power plant intake and outfall basins. The waters provide limited habitat for at least forty-seven species of common reef fishes which seem to be abundant in the vicinity of the thermal effluent outfall of the power plant. The area is used by recreational fishermen.

Sand Island

A fringing reef flat lies immediately seaward of the island. Algal coverage averages 30 percent on the inner reef, but is likely to vary seasonally. Corals are sparse and relatively few fish inhabit the reef flat. Much of the shoreline is part of the Sand Island State Park. Only small or very poor beaches occur along the shore, and these are subject to ongoing erosion which has exposed old landfill material in the intertidal and subtidal zones. Pole and net fishing are major activities along the southwestern side of the island. Limu is collected on the reef flat west of Sand Island, and surfing is a popular activity off of this area.

Keehi Lagoon

Keehi functions as the only baiting site on the south side of Oahu when Pearl Harbor is closed for military security purposes. Harbor development, storm drainage, urbanization of upland areas, stream channelization, and dredging of seaplane runways have impacted the marine communities of the lagoon. One of the greatest recent alterations occurred when the Honolulu International Airport Reef Runway was developed.

Marine surveys conducted following construction of the reef runway suggest that marine communities continue to exist in highly disturbed environments. Five marine environments occur within Keehi Lagoon: fluvial, lagoonal, barrier reef, Kalihi Channel, and the outer reef. Examination of invertebrates, fixed algae, and sediments have indicated long-term high organic loading of the lagoon. Seventy-six species of invertebrates were inventoried during one study of the benthic environment of the lagoon. Urban stormwater runoff constitutes a water quality problem with Kalihi Stream representing a major pollution source.

Barbers Point Harbor

The nearshore environment fronting the harbor receives a considerable amount of scouring due to wave activity. Coral coverage is high offshore of the scoured area. Fish diversity is high and macroinvertebrates other than corals are scarce.

Bodysurfing, pole, line, and net fishing are popular recreational activities on either side of the harbor entrance.

6.7.2 Future Conditions Without the Project

There will probably be continued direct and indirect degradation of the resources without the project.

6.7.3 Future Conditions With the Project, Probable Impacts and Mitigating Measures

The Honolulu Waterfront Master Plan projects are expected to improve the conditions of the overall marine environment in the long run. The following outlines the conditions anticipated by project area.

Ala Moana Beach Park Circulation Channel

A circulation channel between Ala Moana Beach Park and the existing Kewalo Basin peninsula is proposed for the purpose of improving the flushing action through the reef which would enhance water quality.

Marine Science and Research Center

The development of a Marine Science and Research Center in the Kakaako Peninsula Park near Kewalo Basin would require seawater intake and outfall pipelines. This development proposes to consolidate and centralize the ongoing but scattered marine research activities in the Kewalo Basin and Kakaako Peninsula areas, such as the U.H. Marine Mammals Lab, National Marine Fisheries Service, Pacific Biomedical Research Center (PBRC), and Look Laboratory.

Stabilization of Kaka'ako Waterfront Park Shoreline and Man Made Surf Shoals Offshore

Offsetting the minor adverse consequences of the ocean intake/outfall structures at Kewalo and the stabilization of the Kakaako shoreline would be the provision

of manmade nearshore surf shoals and man-made offshore reef habitats. Topographic relief provided by new man-made marine habitats would increase the appeal of the area to skin and scuba divers. Such structures are likely to be colonized eventually by a greater diversity of marine organisms than presently occurs in the area.

In the short-range, construction in the waters off Kewalo Basin and Kakaako would result in silt, sediment, and nutrient loading in the water column. This would reduce water quality in the immediate and surrounding areas. Fishermen, divers, and surfers who may presently utilize the area would be displaced during the construction phase of the projects.

Siltation curtains would be used to minimize the amount of turbidity caused by underwater construction work. Long-term impacts would be positive however. Improved circulation would reduce the prevailing high turbidity levels associated with the existing channel and swimming area fronting Ala Moana Beach Park and improve overall water quality. Over the long run, improved circulation and flushing is expected to increase the biological diversity within the existing channel and adjacent reef flats and add appreciably to the aesthetic quality of nearshore waters fronting Ala Moana Beach Park.

Various Dock and Shoreside Facilities in Honolulu Harbor

Construction of various dock and shoreside facilities would cause short-term disturbance of the benthic environment in the harbor. However, Honolulu Harbor has a history of periodic maintenance dredging, and significant long-term adverse environmental consequences have not been associated with these past dredging events.

Extension of Sand Island State Park

The long-term environmental consequences of shoreline park development on the marine environment are expected to be positive, despite minor short-term impacts related to construction. Stabilization of the shoreline would also prevent the recurring exposure of landfill materials which pose a potential public safety

hazard. Any improvements in water circulation associated with the shoreline upgrades would improve water quality along the makai reaches of the park and facilitate flushing within the Keehi Lagoon area.

Keehi Lagoon Triangle

Filling the Keehi Lagoon triangle to create the industrial/recreational park could potentially eliminate most benthic marine life and habitats in this chronically disturbed, heavily silted embayment. The proposed filling could have a short term disturbance of the baiting (e.g., nehu) sites. However, in the long-term, its is expected that some of these would be restored through the natural resettling process.

Possible impacts on shorebirds could be mitigated by construction of new nesting islands on the shallow reef flat adjacent to the Sand Island State Park. The presence of various new industrial, commercial, and maritime users of the lagoon would probably result in additional point-source and non-point-source pollution of the lagoon waters.

Fishing opportunities on the shallow reef flats, channel slopes, and channel basins would be lost as would the habitat for the various fishes and invertebrates of recreational, subsistence and commercial fishing importance. Filling of the shallow reef flats would also eliminate limu collection in the filled areas.

The new breakwater constructed off the southwest corner of Sand Island to protect the proposed swimming beach would serve several uses by sheltering the water area within the seaplane channel, preventing continued erosion along the Keehi Lagoon shore of Sand Island, and improving opportunities for shoreline fishing from the breakwater.

It should be noted here that a full environmental impact statement is currently underway for the Keehi Lagoon Recreational development project. This EIS will be addressing impacts and mitigating measures discussed above in the Ocean Engineering and Marine Biological Resources sections.

6.8 INFRASTRUCTURE AND PUBLIC SERVICES

6.8.1 Existing Conditions

Wastewater Systems

The waterfront area is serviced by major sewer lines on Ala Moana Boulevard and Nimitz Highway. Another major sewage line runs down Ward Avenue to Auahi Street and enters the Ala Moana Sewage Pump Station off of Keawe Street. The sewer line on Nimitz Highway from Kalihi Stream to the Hart Street Sewage Pump Station is inadequate. Preliminary engineering studies are underway for a portion of this sewer line from Waiakamilo Road to the Hart Street Sewage Pump Station with construction of the proposed improvements to be completed by mid-1990.

The sewer line from the Ala Moana Park Sewage Pumping Station along Ala Moana Boulevard to the Ala Moana Sewage Pumping Station is adequate and no plans exist for any major upgrades. The 72 - inch x 72 - inch sewer line on Auahi Street from Ward Avenue to the Ala Moana Sewage Pump Station is planned for replacement by a new relief sewer line. A portion of the sewer line on Auahi Street from Koula Street to Keawe Street will be constructed as part of the Kakaako Improvement District 2. The remainder from Koula Street to Ward Avenue will be constructed as the East End Relief Sewer Project. The existing line will be maintained as a relief line.

All of the primary sewer lines in the City and County of Honolulu are presently being analyzed for adequacy in the Islandwide Sewer Adequacy Study for the Department of Public Works of the City and County of Honolulu. The study is ongoing and is not expected to be completed until mid-1989. There are two major force mains that transmit the raw sewage from the Hart Street and Ala Moana Sewage Pumping Stations to the Sand Island Wastewater Treatment Plant.

From the Hart Street Sewage Pumping Station, a 48-inch force

main carries the sewage from Pier 33 across the harbor to Pier 52 and on to the wastewater treatment plant. From the Ala Moana Sewage Pumping Station, a 78-inch force main carries the sewage from Pier 1 under the Honolulu Harbor Entrance Channel to the Sand Island Park and on to the treatment plant. The original 60-inch Ala Moana sewage force main under the harbor entrance channel is maintained as a backup to the 78-inch force main.

For the fiscal year 1987-88 the Hart Street Pumping Station pumped an average of 15.5 mgd while the Ala Moana Pumping Station pumped an average of 57.3 mgd. The two sewage pumping stations have capacities of 68 mgd and 107 mgd, respectively. The capacities of the two pumping stations are not expected to be exceeded by the year 2010.

Water Supply Systems

The water system in Downtown Honolulu is within the Low Service System of the Board of Water Supply of the City and County of Honolulu. This system extends from Makapuu Point in the east to the Moanalua Drainage Divide in the west. The primary sources of the Low Service System are the Punanani, Kalauao, Kaamilo, Moanalua, and Wilder Wells, the Halawa and Kalihi Shafts, and he Kalihi, Beretania, and Kaimuki Pumping Stations. Pump demands are met by source pumps or by pump reservoir systems. These sources are presently pumping to near full capacity.

The Low Service System presently distributes water from the Moanalua area toward Makapuu Point. The system is a combined transmission and distribution system. The sources are primarily located in the western portion of the system while the majority of the reservoirs in the system are located in the eastern portion of the system.

In 1988 an average of approximately 57.7 mgd of potable water demand was met by the Low Service System. Of this amount, 32 mgd flowed through Downtown Honolulu to the demand centers in the east. Booster pumps in the

Kaimuki and Kapahulu areas are utilized to maintain the water levels in the reservoirs in the area from Waialae to Hawaii Kai. The filling of these eastern reservoirs by the water sources in the western portion of the system is a major factor in the operation of the Low Service System.

The water supply system of the Downtown Honolulu area includes water mains over 60 years old. Some water lines are still smaller than the Board of Water Supply's present minimum diameter of 8 inches.

Drainage Systems

The drainage system of the waterfront area contains some drain lines constructed as long ago as 1921. Since then, the design standards for drainage have undergone many changes as more information and experiences were gathered by the design community. The majority of the existing systems were not designed to the new City and County Drainage Standards and are no longer considered adequate. In the waterfront area, the land is rather flat and low in elevation which accentuates the drainage problems because there are large tributary areas upstream. Most of the drainage systems cannot accommodate the 50-year flood except for a portion of the Kakaako area drainage system recently upgraded by the Kakaako Improvement District 1.

Electrical Power and Communications Systems

Electric, telephone and cable television (CATV) demands in the waterfront area are presently served via existing overhead pole lines and underground duct systems. The overhead and underground facilities are within road right-of-ways or easements granted to the utility companies. Hawaiian Electric Company's generation capacity is approximately 1,300 MW, with a present peak demand of approximately 1,000 MW. Existing on-site facilities include the Honolulu Power Plant which is located in the Aloha Tower area. The power plant is capable of generating approximately 120 MW of electricity and is currently used during peak loading periods. Existing substations serving the waterfront include: Keehi substation, Mapunapuna substation, Kapalama substation, Sand Island substation,

Iwilei substation, the Honolulu Power Plant, Kakaako substation, Kewalo substation, Makaloa substation, and Ena substation.

Existing telephone facilities in the Waterfront area are served from the Hawaiian Telephone Company central office located on Bishop Street and the Kalihi central office. Facilities from Kakaako to the area mauka of Nimitz Highway by the Kapalama Canal are served from the central office, and the areas ewa of the Kapalama Canal are served from Kalihi. Also, Hawaiian Telephone Company presently maintains a base yard in the Ft. Armstrong area, adjacent to the Gold Bond Building. The site is leased from the Bishop Estate until the year 2022.

CATV service in the Waterfront area is currently provided by Oceanic Cable. Existing CATV facilities are served from Oceanic Cable's headquarters studio located on Waimanu Street.

The Barbers Point Harbor site is essentially without utilities. Electric, telephone and CATV requirements for the areas in the vicinity of the harbor are presently served via existing overhead pole lines and underground duct systems. The overhead and underground facilities are within road right-of-ways or easements granted to the utility companies.

Existing telephone facilities for areas in the vicinity of the harbor are served from the Hawaiian Telephone Company Waipahu central office via the Barbers Point remote office.

6.8.2 Future Conditions Without the Project

Wastewater Systems

The sewage collection system along Nimitz Highway and Ala Moana Boulevard will require major improvements in order to meet the increased sewage flow if the Honolulu area by the year 2010. The 54 inch line on Nimitz Highway from Kalihi Stream to Waiakamilo Road will require a relief line as will the 32 and 34 inch sewer lines on Ala Moana Boulevard from Nuuanu Stream to the Ala Moana Sewage Pump Station. The Kamehameha Highway Sewage Pump Station will

require upgrade and other sewer lines mauka of the Nimitz Highway and Ala Moana Boulevard corridor will be over capacity. The capacities of the two pumping stations are adequate with or without the project.

However, the Sand Island Wastewater Treatment Plant with a design capacity is 82 mgd, is expected to be near capacity within 5 to 10 years even without the project. Land has been set aside next to the treatment plant for expansion. The Division of Wastewater Management of the Department of Public Works is presently studying the situation but cannot prepare definite plans until a Waiver of Secondary Treatment Permit is approved or denied by the Federal Environmental Protection Agency.

Water Supply Systems

The sources for the existing Low Service System are presently pumping to capacity. There is very little additional water supply available for major developments in the Honolulu area. The Board of Water Supply is aware of the situation and is making every effort to develop new groundwater sources throughout the Island of Oahu as well as investigating the potential of alternative means of potable water development, such as effluent reclamation and desalinization.

Relative to transmission of water in order to meet the greater water requirements of areas, such as Waikiki, where demand is expected to increase, the Low Service System must be improved with the construction of larger distribution and transmission mains.

To meet the future requirements of Kakaako Mauka, further improvement is planned for construction with Improvement District 2 and the other Improvement Districts to follow. The Board of Water Supply is presently planning a new transmission main from Liliha Street through the downtown area to Kuhio Avenue in Waikiki with a preliminary alignment along Ala Moana Boulevard. These planned and future improvements will allow the Board of Water Supply to maintain water system pressures in the downtown area within the 170-foot to 180-foot head

range. These improvements will minimize the occurrence of broken water mains associated with high operating pressures.

Drainage Systems

The major drainage system upgrade project is the Kakaako Improvement District 2. The Improvement District construction is scheduled to start in early 1989. .Upon completion of Improvement District 2 the area from Keawe Street to Cooke Street near the waterfront will have the adequate drainage facilities to accommodate the 50-year flood. Improvement District 1 improved the drainage system from Punchbowl Street to South Street. The major project of future Improvement Districts will be the Ward Avenue Relief Drain which will be constructed along Kamakee Street and discharge into Kewalo basin.

Electrical Power and Communication Systems

HECO anticipates that the Honolulu Power Plant will be required until 1994-1995. Shortly thereafter, when substitute power generation is available, HECO intends to shut-down and dismantle the power plant. While HECO does not have any firm plans to develop the power plant site and/or to relocate the substation to another site, an opportunity exists for a highrise mixed-use office complex on this site because of its prime downtown waterfront location.

This potential re-use of the site seems to indicate that a substitute power generation facility would be necessary within five to six years.

Hawaiian Telephone Company is planning to upgrade their facilities to accommodate the Kakaako Mauka redevelopment project. Major improvements include obtaining a site midway between Alakea Street and Atkinson Boulevard, and constructing a new central office. Anticipated completion of this effort is 1990.

In the Barbers Point Harbor area, HECO will be upgrading their facilities to accommodate the Ko Olina Resort. Major improvements include providing a new

substation and constructing 46-KV overhead lines along a utility corridor paralleling the OR & L right-of-way.

Similarly, Hawaiian Telephone will be upgrading their facilities to accommodate the Ko Olina Resort. Major improvements include constructing a new central office which it expects to complete by 1990.

6.8.3 Future Conditions With the Project

Wastewater Systems

The proposed waterfront developments will require new sewer lines, force mains, and pumping stations in the Kakaako and Keehi Lagoon areas, and possibly require upgrades to the existing collection, treatment, and disposal system as well. The sewage generated by the developments will be brought either to the Hart Street and or to the Ala Moana Sewage Pumping Stations.

Water Supply Systems

The proposed development will not increase the water demand within the study area when compared to the projected ultimate demand of the area as presently zoned, except for the Keehi Lagoon area. The development of the waterfront area will increase the demand for water in the downtown and Kakaako areas when compared to the existing demand. The development of the waterfront area will probably require participation in the source development and transmission main construction plans of the Board of Water Supply.

Drainage Systems

As the Waterfront area is developed according to the Master Plan, new enlarged drainage outlets can be constructed to improve the existing systems. New larger drainage structures will also be required eventually upstream of these outlets.

Electrical Power and Communications System

Kewalo Basin. Based on the loads forecasted for the activities programmed for the area, it is anticipated that a new substation will be required to serve the project demands if a substation is not provided in the Kakaako redevelopment plan. 12-KV distribution feeders from the substation will be connected to service transformers located adjacent to project facilities via switching vaults provided along the 12-KV distribution feeder routes.

Hawaiian Telephone plans to upgrade their facilities to accommodate the Kakaako redevelopment project. Major improvements are expected to be capable of serving the activities programmed in the proposed Kewalo Basin redevelopment plan. Existing overhead facilities may be relocated underground.

Fort Armstrong Area. The substation at the Honolulu Power Plant presently provides power to the downtown area. Spare capacity available at the substation is not adequate to serve significant developments in the Aloha Tower and Ft. Armstrong areas. It is anticipated that a new substation will be required to serve the project demands. A substation provided in the Ft. Armstrong area may allow removal of the substation adjacent to the Honolulu Power Plant.

In addition, existing overhead facilities in the Ft. Armstrong area may be relocated underground; a network of underground ducts and handholes should be provided in the redeveloped areas to facilitate cable installation.

Based on the activities programmed for the Ft. Armstrong and Aloha Tower areas, there are no probable impacts which would require upgrades to telephone and CATV facilities to accommodate the demands of the master plan projects.

Keehi Recreational Area. Based on the forecasted loads for this area, a new substation would probably be required. 12-KV distribution feeders from existing substations would be extended to service transformers located adjacent to project facilities via switching vaults provided along the 12-KV distribution feeder routes.

Existing overhead facilities may be relocated underground; a network of underground ducts and handholes should be provided in the redeveloped areas to facilitate cable installation.

Based on the activities programmed for the area, there are no probable impacts on the existing capacities of the telephone and CATV services.

Sand Island. Based on the forecasted loads for this area, a new electric substation would be required. 12-KV distribution feeders from existing substations will be extended to service transformers located adjacent to project facilities via switching vaults provided along the 12-KV distribution feeder routes.

Hawaiian Telephone would probably require a remote office to accommodate the demands of this area. General requirements *forthe remote office include: a site approximately 60' x 90', site approval by Hawaiian Telephone, and appropriate easement corridors for line extension to the office site.

There would probably be no impact on the existing CATV facilities that would call for substantial upgrades, except for providing additional ducts and cabling.

6.8.4 Probable Impacts and Mitigating Measures

Wastewater System

The proposed Waterfront development will probably not greatly impact the existing and planned sewerage systems of Honolulu, except in the Keehi Lagoon area. The future development in this area has been planned in the Keehi Lagoon Recreation Plan Update. The Hart Street and Ala Moana Sewage Pumping Stations have adequate capacity to deliver the future sewage flows to the Sand Island Treatment Plant, but, as stated earlier, the treatment facility is nearing capacity. The upgraded treatment plant must be sized and have adequate capacity to treat the sewage generated by the proposed Waterfront development.

Water Supply System

The development of the Waterfront area will probably increase the demand for water in the downtown and Kakaako areas when compared to the existing demand. This increase in water demand will impact the Low Service System which will soon have difficulty delivering water to major demand centers in the east, such as Waikiki. This anticipated increased demand poses problems with transmission and storage and with the capacity of the existing sources.

The development of the waterfront area will probably require participation in the source development and transmission main construction plans of the Board of Water Supply of the City and County of Honolulu. In the Kakaako area such development arrangements have already been made with the Board. The waterfront development will also require coordination with the Water Commission and the Division of Water and Land Development of the Department of Land and Natural Resources.

Drainage System

The proposed developments will probably improve the drainage system of the area. The study area contains many of the outlets of the major drainage systems of downtown Honolulu and the Kakaako area. Except for the two newly designed Kakaako drainage systems described above, these drainage systems cannot adequately accommodate the 50-year flood.[o] As the area is developed, new enlarged drainage outlets can be constructed to improve these systems. New larger drainage structures will also eventually be required upstream of these outlets. Construction of the necessary infrastructure improvements will cause temporary traffic congestion on Nimitz/Ala Moana Boulevard corridor. However, this inconvenience will be short-term.

Electrical Power and Communications System

Relocated overhead lines and underground cable installations

will be installed similar to the existing facilities, following standard utility company practices. HECO, Hawaiian Telephone, and Oceanic Cable are responsible for maintenance of the lines and facilities for their best and efficient use, therefore it is expected that these facilities would have minimal negative impact on the surrounding areas.

All offsite work will be constructed and maintained following the utility company's standard practices.

Inland Waterways

The planned network of canals or waterways in the inland area of Kakaako Peninsula will be integrated into the existing drainage system. There are three sources of energy which may cause a positive flow or circulation in the waterway system. One is tidal action, the second is wind-induced currents; and the third is freshwater inflow. The Ala Wai Canal would be a close example of what is envisioned for the Kakaako inland waterway system. A depth of -6 feet Mean Sea Level (MSL) for the waterways is reasonable based on the following considerations:

- Because there would be no apparent driving force for positive circulation flows through the waterway system, the tidal prism is the major influence in flushing of these water areas. The flushing efficiency is determined by the proportion of water removed over a tidal cycle. The proportion of water removed on the ebb tide is equal to the ratio of the theoretical flow into the waterways (tidal prism) to the total volume of water (tidal prism + MLLW volume). For a 2-foot tide range over a water depth of -5 feet MLLW (-6 feet MSL), the proportion of water removed over one tidal cycle is 28%. Thus, a gross assumption of the residence time is about 2 days, whereby the waters would be completely turned over within the 4 tidal cycles of the 2-day period. The deeper the canals, the less the flushing efficiency.

- A depth of about 1.5 feet should be allowed below the maximum vessel draft to account for extreme low tides, vessel behavior, and uncertainties in the bottom characteristics. Thus, for a design depth of -5 feet MLLW,

the maximum allowable vessel draft is 3.5 feet, which is more than adequate for small motorboats at less than 35 feet in length.

- The top elevation of the shoreline bordering the canals should have enough freeboard to prevent overtopping and inundation during extreme high water levels. The design still water level (SWL) should consider hurricane setup effects plus storm drainage flows. An average top-of-bank elevation of about +5 feet MSL would probably be appropriate. Maximum recorded tsunami height at Fort Armstrong was 5 feet.

- The prevailing tradewinds can be utilized to some extent to aid in flushing of the waterways. Wind data from the Honolulu Airport show that the tradewinds blow from the northeast with a speed of approximately 15 mph during 50% of the year. A wind blowing across the water surface can produce a surface flow out of the waterway having a velocity of approximately 2% of the wind speed. The wind-induced flow could be particularly useful for aiding in the exchange of the stratified surface layer which may not be exchanged by tidal action.

- The net freshwater inflow to the waterways due to land drainage is a possible additional flushing mechanism. The degree to which the freshwater inflow will influence the waterway flushing is indicated by the ratio of the freshwater inflow during a half tidal cycle to the tidal prism. In most cases the direct effect of freshwater inflow to a large tidal waterway is relatively unimportant. However, for the relatively small volume waterways proposed the freshwater inflow may be important.

The proposed interior drainage systems for the Kakaako Makai area can flow directly into the proposed waterways, thereby reducing the size of the required drain lines. The waterways will be at least 100 feet and have a depth of 6 feet below mean sea level. The mauka-makai waterway branch will replace the new 30-foot wide concrete channel to be constructed by the Kakaako Improvement District 2 project. The new waterway will provide over twice the cross sectional area of flow, reducing the velocity of the storm waters, so no loss in flow capacity is expected as long as the proposed waterways are properly maintained.

Public Services:

Fire Protection

The Pawaa, Kakaako, and Kalihi Kai Fire Stations service the project area. The Kakaako station, located near the intersection of Queen and South Streets, services the area from Punchbowl Street to Kamakee Street. The Pawaa Station provides service to the area between Kamakee and Piikoi Streets. The Kalihi Kai Station located on Waiakamilo Road and Nimitz Highway services the areas from Downtown going Ewa to Lagoon Drive and Sand Island.

The City and County of Honolulu staffs and maintains the Pier 15 fireboat station in Honolulu Harbor. Waterside activities and vessels are serviced by this station.

Probable Impacts

Adequacy of existing fire protection has yet to be determined for specific development projects. Adequacy of services will be determined in future, project-specific environmental impact statements.

Police Protection

The Waterfront project area is located within the Honolulu Metropolitan District I which extends from Hawaii Kai to Pearl City. District I headquarters are currently located in Pawaa, but are in the process of relocating to a site on Hotel Street between Beretania and Alapai Streets. This new proposed location would be closer to the project area. Currently, there are 2.5 police employees per 1,000 population on Oahu. Additional police service for the projects will depend on demand (calls for service), and the rate of development within the District.

The DOT Harbor Patrol provides protective services to the Honolulu Harbor waterside vessels and activities.

Probable Impacts

Adequacy of existing services will be determined in future environmental impact statements for specific projects in the Waterfront.

Parks and Parks Maintenance

Additional urban park space is proposed for development in the Waterfront Master Plan. The new park is to be located in the Kakaako Peninsula. Greenbelts along the waterfront pedestrian promenades will be developed to link shoreline parks and to enhance the shoreline corridor. These projects will require additional operating funds for parks maintenance. Based on actual operating costs for Honolulu urban parks (Magic Island and Sand Island State Park), annual costs for parks maintenance would be approximately $4,000 to $4,500 per acre (1988 estimates).

6.9 PETROLEUM FACILITIES

6.9.1 Existing Conditions

At present the petroleum-oils-lubricant (POL) facilities occupy 23 acres of privately-owned land fronting Piers 30 and 31. The landside area is used as storage and distribution of POL. Bunkering of ships occurs along Piers 30 to 34.

Due to the recurring community concern over the potential health and safety hazards associated with the proximity of POL facilities to Downtown Honolulu and Kalihi-Palama, a special study was commissioned as part of the Waterfront project to explore the feasibility of relocating and consolidating the POL storage and distribution facilities and some of the jet fuel tankage.

Current Petroleum Distribution Systems

The Honolulu Harbor petroleum complex represented by the marketing divisions of Chevron USA, Shell Oil Company, Pauley Petroleum, Pacific Resources Inc., Aloha Petroleum, and Unocal consists of storage tanks and transhipment

facilities through which 90 percent of all the state's petroleum passes. Storage tanks hold three grades of diesel, commercial jet fuel, residual oil, and asphalt.

Honolulu markets consume over 75 percent of the total throughput and are serviced by tanker trucks loading at five truck racks. The remaining 25 percent passing through this complex is loaded onto petroleum barges for transport to the neighbor islands. Approximately 80 percent of these products are piped from the Campbell Industrial Park refineries together with Gasco synthetic natural gas.

Nearly 70 percent of the deliveries from the five truck loading racks in this petroleum complex occur between Pearl City and Hawaii Kai. Chevron and Unocal service stations, the largest suppliers of retail gasoline, are clustered in this region. Tanker truck deliveries to trucking, bus, and contractor company underground storage tanks are also concentrated in this region, and these account for most of the automotive diesel consumed in Honolulu. Hotel and institutional sales account for a lesser, but important, market for diesel fuels.

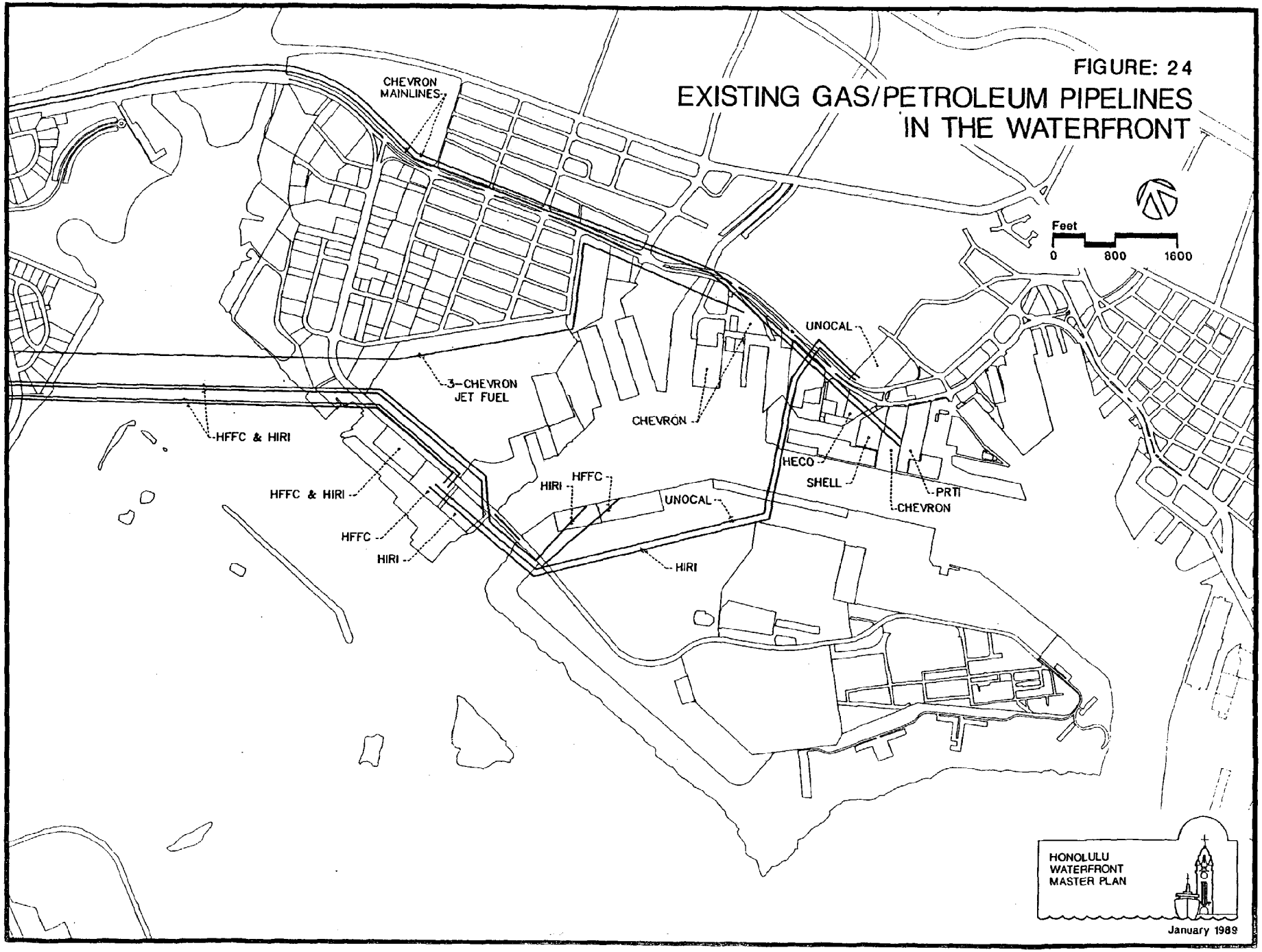
The central area for petroleum distribution is at Piers 29 (PRTI), 30 (Chevron), 31 (Shell Oil) and the Unocal terminal. Other than tanker deliveries of gasoline and diesel to Unocal from its West Coast refineries to augment purchases from Chevron or HIRI, all gasoline (3 grades) and diesel fuels are supplied by the two local refineries to bulk fuel facilities.

The established bulk fuel facilities in Hawaii's harbors have changed little since 1960. Figure 24 delineates the harbor petroleum complex along Nimitz Highway together with jet fuel storage facilities on Sand Island Access Road.

The major consumption centers of the state are on Oahu. The Honolulu International Airport furnishes facilities for refueling aircraft departing Hawaii for the mainland and for Far East destinations, as well as for most interisland flights. Over 40 commercial air carriers and several non-scheduled airlines make regular use of the airport. Also, the nearby Hickam Air Force Base provides services to home-based and visiting military aircraft. These aircraft utilize the same runways

FIGURE: 24

EXISTING GAS/PETROLEUM PIPELINES IN THE WATERFRONT



and conform to flight patterns used by commercial airlines. A network of pipelines supplies the airport fueling facilities.

The largest single user of black oil is the Hawaiian Electric Company which burns approximately 28,000 barrels per day (BPD) at its Kahe and Waiau power plants situated on the leeward coast of the island. These plants are supplied by Chevron from its Campbell Industrial Park refinery through heated pipelines. To supply this demand, Chevron imports fuel oil from the mainland to augment its production at the Campbell Industrial Park refinery.

Of the daily average consumption of approximately 24,000 barrels of all grades of gasoline in the state, Oahu drivers consume nearly 74 percent.

In addition to the petroleum pipelines carrying gasoline, jet fuel and diesel products from the refineries at Campbell Industrial Park to distribution facilities in Honolulu, the gas utility maintains a synthetic natural gas pipeline for services to its customers along its route from Barbers Point to Honolulu. Four large main lines consisting of Chevron clean and black oil pipelines, one HIRI clean product line and the gas utility SNG pipeline run nearly parallel to each other from Campbell Industrial Park to the Honolulu POL complex.

The State-owned energy corridor as delineated in Figure 24 contains the HIRI 10-inch clean products pipeline and the Gasco 16-inch SNG pipeline, and has three additional slots for other corridor leases. Pipelines running from these bulk storage facilities to the satellite terminals at Honolulu International Airport are as follows:

- Chevron's three 4-inch pipelines running along Nimitz Highway across Keehi Lagoon and along the airport service road to its airport terminal.
- HFFC maintains a single, 10-inch pipeline, formerly owned by Shell Oil, running along Sand Island Access Road, crossing Keehi Lagoon and along the service road to its airport terminal.

- Texaco has sold its two 6-inch lines, which follow closely the route taken by the HFFC 10-inch pipeline, to HIRI and to the HFFC.
- Union Oil utilizes one of the 6-inch pipelines to which it connects its 12-inch line on Sand Island after crossing Kapalama Channel.
- HIRI maintains three 22,000-barrel tanks and the two 13,000- barrel tanks acquired from Union Oil at the airport.

6.9.2 Future Conditions

The recommended option is to allow the existing POL facility to remain at Iwilei, but to ensure enhanced safety and fire protection systems and training practices, and to minimize the visual impacts of the terminals. The long term goal should remain one of relocating all petroleum facilities (with the exception of bunkering fuels) to the Barbers Point/Campbell Industrial Park area.

Each terminal would be expected to include the following minimum standards for fire protection systems, with additional equipment as may be indicated by on-site surveys:

- A five-thousand gallon foam system (capacity to suit tankage);
- A vapor recovery system for volatile products;
- Bottom loading equipment at truck racks;
- High level alarms and computerized product transfer controls and data acquisition;
- Fire protection training and response drills;
- Mutual support agreements for fire-fighting equipment and materials;
- Cooperation with the Honolulu Fire Department in upgrading inspection procedures and fire drills;
- A public education program.

An integrated facility improvement program would be required to screen the terminals from street levels to include landscaping along the Nimitz Highway frontages and intersecting streets. The improvement features would include:

- Construction of a system of attractive 10-15 foot high walls and landscaping along the Nimitz Highway frontages.
- Providing setbacks to permit landscaping and plantings strategically located along the walls and at entrances;
- The program will be coordinated with other business associations in the vicinity.
- Elimination of unnecessary facilities, i.e., unused tankage and enhancing the visual appearance of remaining facilities.

6.9.3 Probable Impacts and Mitigating Measures

Analysis and improvement of the fire protection systems would reassure the public that the risks of fires have been reduced. The aesthetically upgraded complex can be expected to become more compatible with the changing environment in this district. The improved fire prevention systems with vapor recovery and bottom loading features will also measurably reduce the air pollutants which are normally associated with petroleum storage and transfer operations.

6.10 SOCIAL/RELOCATION IMPACTS

6.10.1 Existing Community

The project area encompasses approximately 1,550 acres extending from the Ala Wai Yacht Harbor westward to Ala Moana Park, Kewalo, Kakaako Peninsula, including Honolulu Harbor, and to Keehi Lagoon. The project area is physically separated from the inland areas by a major roadway system which includes Ala Moana Boulevard/Nimitz Highway and Lagoon Drive.

This physical boundary, coupled with practical barriers and safety precautions, contributes to the isolation of portions of the waterfront from the general community. Generally, the community uses the major parks in the area-- Ala Moana, Sand Island and Keehi Lagoon Parks, but does not venture into other waterfront areas unless there is a specific maritime, commercial or industrial need to do so. Thus, the community is not exposed to or is unaware of large areas fronting the ocean.

The Honolulu Waterfront consists mainly of three different neighborhoods which are represented by the following neighborhood board areas: Ala Moana-Kakaako Neighborhood Board No. 11; Downtown Neighborhood Board No. 13; and Kalihi-Palama Neighborhood Board No. 15.

These neighborhoods currently have separate identities, distinct aspirations and problems, and different expectations of how their communities will change. These mauka neighborhoods share common characteristics of higher-than-average unemployment rates, relatively low median income and a high proportion of people below the poverty level. Their differences, however, are equally important in understanding how these neighborhoods may be affected. The 1980 census shows that:

- Kalihi-Palama has the largest residential community with over 40,000. Downtown had approximately 9,000; Ala Moana-Kakaako, over 10,000.
- Ala Moana-Kakaako and Downtown have older populations and very small households and families. Kalihi-Palama, on the other hand, is reflective of the island population in household size.
- Downtown's community was the most mobile, with less than a quarter of its residents living in the same house five years prior to the census. On the other hand, almost 60 percent of Kalihi-Palama residents were in this category. On Oahu, 48 percent fit this description.
- Kalihi-Palama was the only area which experienced a decrease in housing units.

The Neighborhood Board minutes over the past 12 months also indicate differences and similarities:

The Ala Moana-Kakaako Neighborhood Board has tended to discuss matters with two underlying themes: (1) establishing better compatibility between residents and commercial establishments, and (2) roadway and traffic safety. Community concerns often focus around noise, traffic and parking problems caused by some commercial establishments. The Board was interested in eliminating adult entertainment establishments. Also, many of the specific issues involved the elderly in some way.

The Downtown Neighborhood Board has dealt primarily with problems linked to the presence of many people and diverse activities in a restricted area. Concern was expressed with safety, with beautification, with illegal activities and suspicious loiterers, and with street people. It appears that the most pervasive issue was noise. Although this Board is open to the community changes, this support is increasingly tempered by a need to accommodate the growing community.

The Kalihi-Palama Board's basic concern was improving the general quality of life for current residents. Board members often express apprehension if changes occurring in the area do not directly contribute to the eventual improvement of the area. Proposals to provide housing for the elderly and homeless were viewed favorably, though after much discussion of potential problems. This Board also expresses frustration with the existing infrastructure and the current delivery of public services; it is felt that these services are not adequately accommodating the existing population.

6.10.2 Future Conditions Without the Project

Issues and concerns documented in these Neighborhood Board meetings indicate future expectations and concerns as these urban communities grow even without the project. The Ala Moana-Kakaako community has been undergoing a slow shift from a light industrial/residential mixed use community to a commer-

cial/residential mixed use area, particularly with major redevelopment in Kakaako. This trend is certain to continue for this community in transition.

Kalihi-Palama will continue to function as a relocation site for the industrial/residential mixed uses from the Ala Moana-Kakaako neighborhood as well as a first home to many newcomers to Oahu. This community will have to cope with its aging infrastructure, and growing industrial uses around the Honolulu Harbor.

Downtown Honolulu will, like other large metropolitan cities, continue to experience problems associated with the increasing and diverse needs for such things as services by a growing residential community and environmental conflicts between such things as traffic and noise, and downtown residents.

6.10.3 Future Conditions With the Project/Probable Impacts

Probable Statewide Impacts

The Honolulu Waterfront planning process has an island wide and statewide orientation. Such a planning focus makes every effort to ensure that the social impacts of a successful waterfront development are generally positive.

Maritime Provisions. These give people a sense of confidence that the State's dependency on maritime activities is being addressed on a long-term basis. Hawaii's residents are very aware of the State's dependency on ocean transportation, and a consistent sentiment in earlier focus group discussions was a desire to make sure that Hawaii's present and future maritime needs are accommodated.

Economic Opportunities. A goal of the Master Plan is to increase Hawaii's economic opportunities. This would be achieved by: (1) diversifying land uses to provide more commercial and office spaces; (2) identifying sites for new activities promoting ocean-related business ventures; (3) consolidating maritime and research facilities; (4) encouraging private sector redevelopment to minimize public costs and maximize public benefits; and (5) reducing private sector risks

by providing sufficient off-site infrastructure and establishing partnerships. Significant new employment opportunities are expected to be provided as a result of Master Plan implementation.

Probable Islandwide and Regional Impacts and Mitigating Measures

Recreational Provisions. The waterfront's recreational potential will be realized through: (1) the expansion of Ala Moana and Sand Island Parks; (2) the implementation of the Keehi Lagoon Recreation Plan; (3) the development of the Kakaako Waterfront Park which will include an amphitheatre for performances; and (4) the development of an urban park area at Pier 15.

General Waterfront Access. Shoreline access is a critical issue, and much of the existing waterfront is currently physically, visually and phychologically inaccessible to the general public. The master plan is positively addressing this community concern by: (1) providing shoreline access through the expansion of existing on-site parks and the development of new recreational areas; (2) increasing people's visual awareness of the water; (3) designing a continuous promenade; and (4) encouraging more people-oriented facilities.

Consideration of Compatibility Needs. The master plan attempts to avoid future incompatibility among maritime, recreation, industrial and commercial users. However, a study commissioned to address community concerns regarding safety and the desire to relocate storage fuel containers from Iwilei yielded that the fuel facility in the short-term may remain in place but with conditions. In the long-term, relocation to Campbell Industrial Park is recommended.

Probable Neighborhood Impacts and Mitigating Measures

Ala Moana/Kaka'ako. The magnitude of planned community changes suggests the community's makeup, urban landscape and people systems will probably change as the Kakaako Community District Plan is implemented. With the revitalization of many existing uses and the infusion of new uses, the area will become more diverse and populated.

Potential social impacts on this community include increased traffic congestion (already a problem for most communities) mixed with new forms of circulation, some noise impacts due to intensifying uses, and increased employment in reasonable proximity to existing and proposed residential areas. Residential incompatibility is expected to be minimized because of separation of uses by Ala Moana Boulevard.

Downtown. This area is already experiencing ongoing change, including new and proposed Downtown residential complexes and office structures and Chinatown revitalization efforts. Thus, the master plan is likely to be viewed as a continuation of already occurring development. Both the residential and business communities may view the waterfront development as providing support facilities and activities for their respective existing communities.

Potential social impacts of the project on the Downtown neighborhood include enhancing the business climate, diversifying Downtown activities for the Downtown and Chinatown residents, creating a more active, people-oriented atmosphere, increased traffic congestion, plus new forms of transportation, and increased noise levels for nearby residences.

Kalihi-Palama. This area is probably the least likely to undergo planned development changes because of the predominance of small, individually-owned parcels. Current revitalization attempts are isolated, and many of them are publicly sponsored. The area is home to over three times the population as the other two neighborhoods and part of Kalihi-Palama's residential community - Kalihi Kai - is located within the planning area. Kalihi-Palama is thus most likely to have a sense of ownership over the waterfront.

Other potential social impacts include increasing most forms of vehicular traffic because of a continuance of industrial and maritime uses, increased noise levels, park improvement and expansion, and improvement of the Sand Island industrial area. Industrial relocations will probably cause an increase in vehicular traffic, and impact existing traffic patterns.

Kalihi-Kai will most directly experience the potential neighborhood impacts resulting from maritime and industrial development because of its proximity to the planned changes. This area is already housing more light industrial and commercial businesses, however, and the proposed plan may quicken the current trend towards non-residential uses.

Mitigation Measures:

It is anticipated that the expansion of recreational activities and park lands in Keehi Lagoon would provide positive impacts which would offset other impacts considered to be burdens on the community. The Kalihi-Palama community may value increased employment opportunities in their neighborhood because of their relatively high unemployment rate.

Displacement and Relocation Impacts

Development of the Honolulu Waterfront will result in displacement and/or relocation of some current activities and facilities. Displacement is defined as any direct or indirect action, public or private, which forces households or businesses to move either temporarily or permanently. Temporary displacement is defined as a condition where households or businesses may return to the neighborhood or district after improvements are completed.

Thus far, three general categories of potential displacees have been identified:

1. Specific businesses which will be displaced solely because of the master plan. These are primarily in the Kewalo and Kakaako subareas, and include restaurants, research facilities, government agencies, tour-related companies, food distribution and warehouse operations, and light industrial uses.

2. Businesses or activities which may relocate anyway because they are currently planning changes. These are also in the Kewalo and Kakaako subareas and include facilities housing research and marine supply activities, as well as the City's Corporation Yard.

3. Businesses or activities which may be displaced as a result of existing redevelopment efforts. Some redevelopment efforts are already initiating or implementing a plan for change, which will also cause displacement independent of the master plan.

Relocation Program

The relocation program proposed for the Waterfront is made up of the following components: (1) identification and assessment, (2) relocation payments, (3) relocation sites, and (4) relocation services.

Identification Assessment. Early identification of businesses and households that will be affected by planned improvements is an important element to the overall success of the relocation program. The governmental agency with the jurisdictional authority over a planning area shall be responsible for identifying all business and residences affected by development.

Once identified, the responsible governmental agency shall notify all owners, lessees, and tenants of the impending improvement project. Once identified, an assessment should be made to determine the type of assistance to which each impacted business or resident would be entitled.

Relocation Payments. Relocation payments include payments made to households and businesses displaced by public land acquisition and development. The size and nature of relocation payments by public agencies are generally limited throughout the state to standards established in 1970 by Chapter 111, HRS. The State Legislature in 1982 authorized the HCDA to administer relocation services to residents and businesses who are displaced by governmental development activities with the Kakaako area.

If Federal actions are involved that require relocation of businesses or residents, then the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) would be applicable.

Eligible displacees are defined as residents and commercial or industrial activities, which have been displaced in the waterfront as a result of redevelopment. Priority should be given to those displaced through government action.

Equitable relocation assistance payments to displaced persons, facilities, and businesses should be established to include payments to displacees for moving costs, a displacement allowance, replacement payments to owner-occupants who purchase, rent subsidy to owner-occupants, replacement payments to tenant-occupants who purchase or rent, and replacement housing subsidy for tenants.

As part of the waterfront plan, provisions will be made to accommodate displaced business at new locations. Improvements to certain parcels will include the construction of new buildings, renovations to existing structures, and certain utility improvements.

Note that displacement does not automatically lead to relocation. Some displaced businesses, particularly the smaller establishments, may be unable to successfully relocate due to financial and other constraints. The business owners may find that the relocation payments are insufficient, or that the relocation site is inappropriate for their needs.

Relocation Sites. The following criteria may be used to identify possible relocation sites:

- The site should be on land that is government owned, being purchased by the government, or on private lands leased for relocation purposes.
- The site should have a land use designation appropriate to the displaced use.
- The land and structures on the sites should be deemed vacant by the public agency having jurisdiction or made available by the private landowner.
- Site improvements shall be the responsibility of the government.

Probable Relocation Sites. Relocation sites identified for the Waterfront plan were divided into two major land use groups -- industrial and marine-related. Industrial uses include: warehousing and general storage, repair and maintenance functions, light manufacturing and assembly activities, open storage, etc. Marine-related activities include those uses that require proximity to the waterfront (piers, wharves, etc.).

Light industrial relocation sites will be phased according to the plan. Within the short-term the Kapalama Military Reservation and the Keehi Triangle will be available for the relocation of displaced industrial activities.

Marine relocation sites are limited in scope to areas currently available within Honolulu Harbor. For the most part, the relocation of uses within the harbor will provide for a more efficient arrangement of land uses.

Relocation Services. To the extent possible, households and businesses displaced by private actions in the waterfront project area should receive assistance services. The governmental agency with jurisdiction in the area of the proposed displacement shall have the primary responsibility for providing assistance. These services include counseling, information and referral services to displacees affected by private sector actions, induced or stimulated by governmental planning decisions. These services should be provided to minimize or mitigate any serious negative impacts of displacees, such as loss of employment or business, imminent loss of shelter, and monetary losses.

Advisory services to displacees of private sector actions, or to persons or businesses occupying property adjacent to any property acquired for public improvement, who are caused substantial economic injury because of the public improvements should also be eligible for relocation services.

6.11 HISTORIC RESOURCES

6.11.1 Existing Conditions

As a primary goal of the Waterfront Master Plan, existing historical landmarks would be protected and historical features and themes would be incorporated into waterfront redevelopment programs. Figure 25, Honolulu Waterfront Historic Sites shows the historic resources within the study area.

There are four sites of historic-cultural significance in the waterfront study area. They are:

Kaka'ako Sewage Pumping Station

This is a good example of Hawaiian cut bluestone construction, built in an industrial Romanesque style. Besides being placed on the National and Hawaii Registers of Historic Places for its architectural merit, this structure has historic significance for its association with Honolulu's first professionally designed sewage disposal system in the late 1890's.

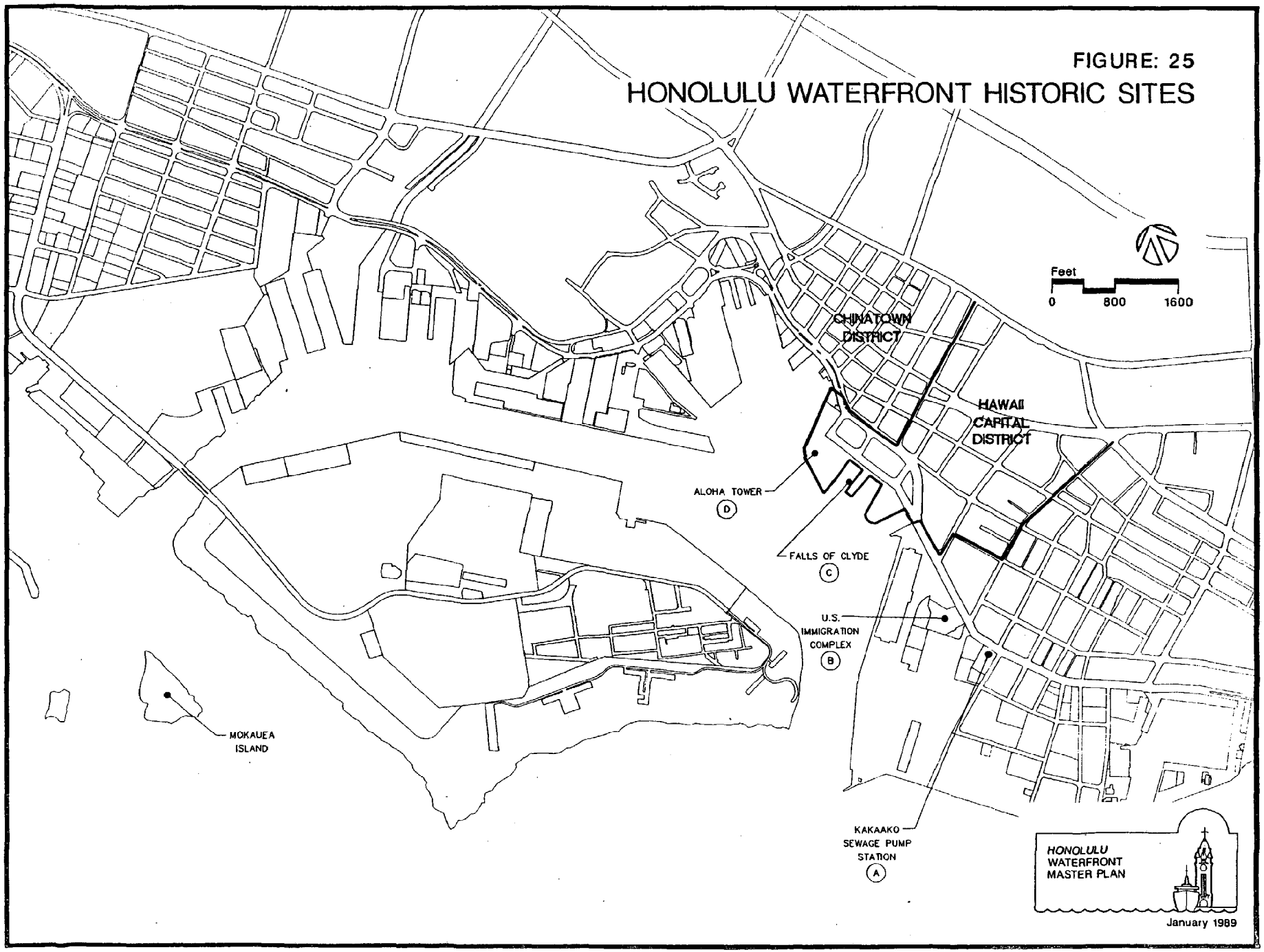
U.S. Immigration Station

The U.S. Immigration complex constructed in 1905 consists of five buildings: (1) the administration building (most visible and important in the complex); (2) detention building (used to detain those immigrants waiting for proper clearance to enter Hawaii); (3) lounging shed; and (4) garage and waiting shed. A gardener's cottage, originally part of the complex, has been demolished. Presently, the administration building continues to serve as the Immigration and Naturalization Service District Office, while the detention building has been converted to house offices of the Department of Health.

For over one hundred years immigrants arriving in Hawaii have had their initial processing in the area of the present immigration complex at the entrance of Honolulu Harbor. The immigration complex, one of the last remaining works of

FIGURE: 25

HONOLULU WATERFRONT HISTORIC SITES



Charles Dickey, reflects Hawaii's role as a bridge between East and West. It was placed on the National Register of Historic Places primarily due to its architectural significance and the fact that its construction utilized terra cotta in Hawaii for the first time.

Aloha Tower

Completed in 1926, the Aloha Tower was at one time the tallest and most prominent building in Honolulu. It has stood as a symbol of Hawaii's investment in tourism and of a time when sea travel was the primary link with the rest of the world. It was placed on the National and State Registers of Historic Places because of its history and architecturally significant attributes. The Aloha Tower is a ten-story, 184-foot, concrete structure which can best be described as a modernistic interpretation of a Gothic tower.

The Tower served as a symbol of welcome for visitors arriving by ship, while for local citizens it was a representation of their ties with the sea and of the importance of sea transport to Hawaii's economy. With the advent of air travel, the Tower's role has diminished as a tourist arrival point and now serves primarily harbor related activities and as a historic landmark. Aloha Tower remains as an important architectural element on the Honolulu skyline.

Falls of Clyde

Moored at Pier 7, the Falls of Clyde is the only iron hulled, four-masted, full-rigged sailing ship still afloat. Since her completion in 1878 the Falls of Clyde has served a variety of functions ranging from a tramp freighter to an oil tanker. From the late 1800's to the early 1900's the ship had several owners. In 1959, a private individual bought the Falls of Clyde as an investment and attempted to sell her to a number of cities as a museum ship. When it appeared that this effort had failed by 1962, the owner decided to sell her to Vancouver, British Columbia, for use as a sunken breakwater. When these plans were revealed, a group in Hawaii raised $25,000 to purchase her, and was successful in bringing her to Hawaii for restoration as a museum ship.

Possible Impacts:

The four historic sites described above are recommended in the master plan to be preserved, and in the case of the Sewage Pumping Station, possibly re-used as a museum.

Special Cultural Areas

Special activity areas are those which do not necessarily point to one particular site but rather to a multitude of sites which contribute, in total, to its significance. Historic District or Special Design District Ordinances are the strongest form of local regulation for historic preservation. The project area includes three such areas:

Chinatown Historic District

The Chinatown District is listed on the State and National Registers of Historic Places. It is bounded by Beretania Street at the mauka end, Nuuanu Avenue at the Waikiki end, and River Street or Nuuanu River at the Ewa end. This area covers 15 blocks or 36 acres of what was commonly known as the Chinese Quarter. Today, Chinatown remains as one of the few areas of Honolulu whose character and context have not altered significantly.

Although Chinatown is composed of a mixture of activities and buildings, it is the people of Chinatown who form its sense of community and give it true importance. It serves as a gathering place for residents and friends, many of whom reside outside the community. The human scale orientation provides the resident and visitor alike with a pleasing atmosphere which serves social ends with easily accessible facilities and services. The self-identity that Chinatown has provided for many people is being perpetuated by new immigrant groups (Laotians, Vietnamese, Korean, Filipino) as well as Oahu residents.

Capitol District

The Hawaii Capitol District, designated by the Honolulu City and County Land Use Ordinance as an area to protect, preserve, enhance, and to provide for orderly development and growth, is located between Honolulu Harbor and Punchbowl, east of the Central Business District. The scale and texture of the district has maintained its historic character throughout history. The Capitol District symbolized an area of ruling and political power from the days of the mighty ali'is to the present governor. Its significance lies in its association with events that have made a significant contribution to the broad patterns of our history; and because of its association with the development of Hawaii's political system.

Mokauea Island

Historically Mokauea Island was occupied by Hawaiians undertaking traditional fishing practices. Today, this fishing community lifestyle is perpetuated by a number of multi-ethnic families living on the island. Because of the importance of fishing to the Hawaiians, and the scarcity of existing fishing villages, Mokauea Island is an area of historic significance.

6.11.2 Possible Impacts

Two special cultural activity areas (Chinatown District and the Capitol District) would be enhanced through the Waterfront Master Plan. For example, the Chinatown waterfront area, Piers 12 to 15 along Nimitz Highway, presents an opportunity to create a unique style of development which captures the essence of the historic waterfront. The proposed Ala Makai walking tour will also bring special attention to these historic aspects of the waterfront.

6.12 GEOTECHNICAL CONSIDERATIONS

6.12.1 Overall Existing Conditions

Historically, the Honolulu Waterfront area has been developed and expanded by the reclamation of low-lying areas and the creation of new land by filling. The quality of these fills is variable and depends upon the material used, the technol-

ogy available at the time of the reclamation, and the intended purpose of the reclaimed land.

The natural stratigraphic history of Honolulu Harbor is quite complex due to its large areal extent, the number of streams, drainageways and springs entering it, and a complex series of sea level fluctuations which influenced erosional and depositional processes in the area.

6.12.2 Overall Future Conditions

Development of the Honolulu Waterfront area is feasible from a geotechnical engineering viewpoint provided that the plans for the development take into consideration the complex geological conditions existing within the Master Plan district and the constraints which may be imposed by these subsurface conditions. Site-specific geotechnical explorations will be required as part of the formal design phase of each element of the waterfront development.

It is most likely that new structures which are proposed in the development will need to be supported by deep foundations such as piles or caisons. It may be possible to support small flexible structures on spread foundations if the site conditions will permit.

Landfilling or reclamation will more than likely require special construction techniques and/or materials for underwater fill placement and may require bulkheading of the boundaries of the fill.

Excavation for canals and similar water features will probably also require bulkheading to minimize sloughing and/or erosion of the banks.

Kaka'ako Peninsula Landfill Investigation

A preliminary environmental site investigation of the 10-acre Kewalo Incinerator Landfill along the shoreline of the Kaka'ako Peninsula was conducted by the hazardous waste consultant firm of Woodward-Clyde Consultants of Oakland, California, for the Honolulu Waterfront Master Plan.

Existing Conditions

The site was first operated as a dump for incinerator ash from incinerators used to burn municipal trash. The first incinerator began operation in 1927. A second was constructed in 1946. Up to 1960 refuse which exceeded the incinerator's capacity was burned at the disposal site. After 1960 excess waste was disposed of without open burning. Pesticides were applied to the landfill for vector control. Use of the second incinerator was curtailed in the early 1970s. However the site continued to serve as a waste transfer station until 1977. The landfill is currently used, in part, as a vehicle storage and maintenance yard and principally as a site for receiving, storage, and screening of clean fill and demolition debris.

Landfill Investigation Process

The purpose of this investigation was to determine the potential health risks and physical hazards, if any, which may result from the development of this site. The investigation components included the drilling of 5 soil borings (locations are shown in Figure 26), sample collection and classification, groundwater and gas monitoring well installations, and chemical analysis of select soil, groundwater and gas samples.

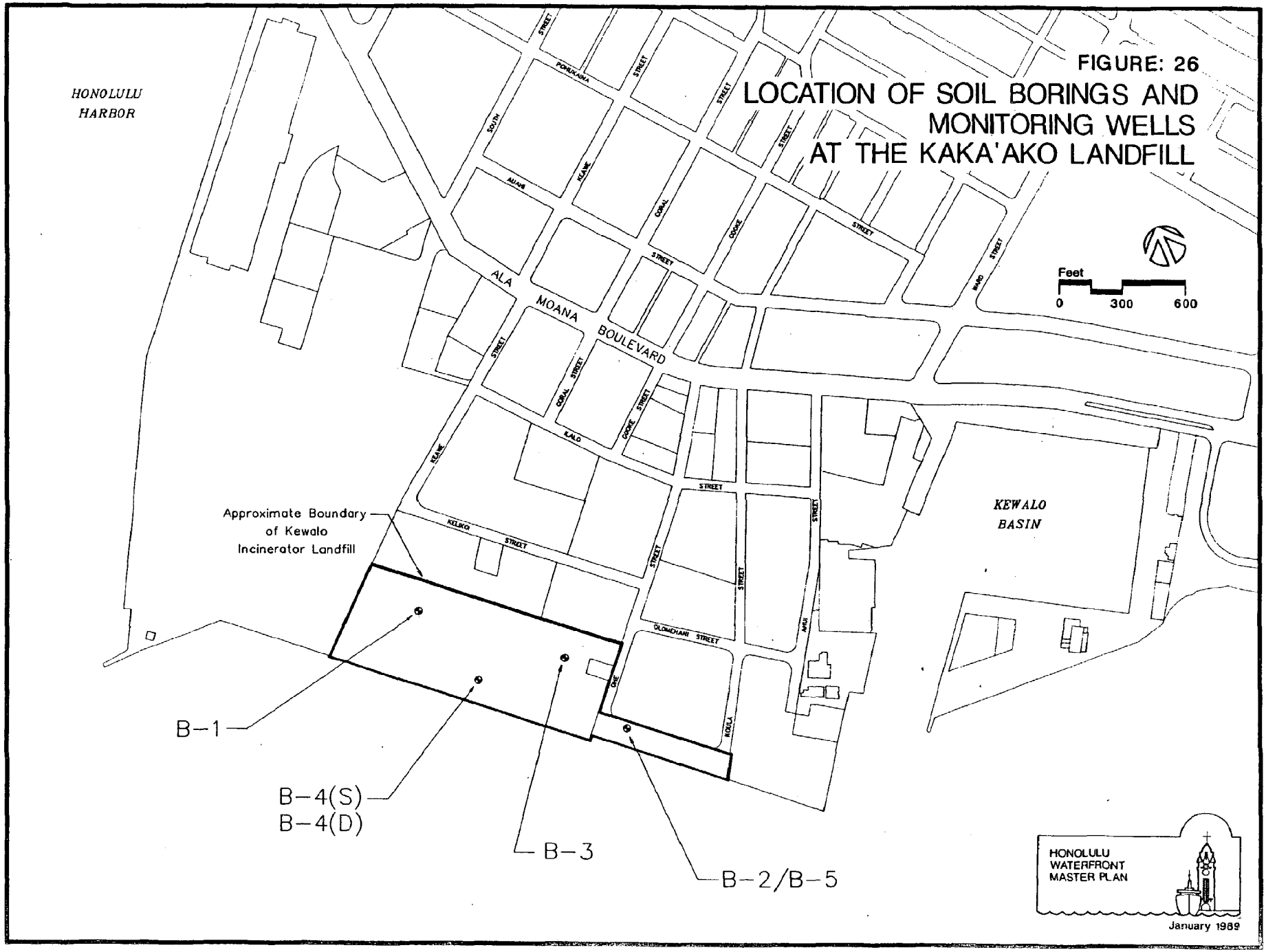
Two of the borings (B-1 and B-4) had a approximate depth of 50 feet below grade, one (B-3) had a depth of about 40 feet below grade, and the two remaining soil borings (B-2 and B-5) had an approximate depth of 20 feet below grade. Samples were collected at 5-foot intervals below grade to the maximum drilled depth. Each soil boring was analyzed either as a solitary groundwater monitoring well, a nested gas monitoring well, or a combination of solitary groundwater and gas monitoring well.

The following summarizes the findings and recommendations of the preliminary landfill investigation by Woodward-Clyde Consultants of Oakland, California:

- The site was closed as a municipal sanitary landfill in 1977.

FIGURE: 26

LOCATION OF SOIL BORINGS AND MONITORING WELLS AT THE KAKA'AKO LANDFILL

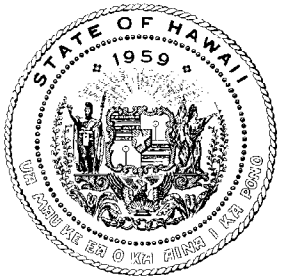


- Access to the landfill site and materials redeposited there should be restricted inasmuch as some hazardous materials were identified by the preliminary investigation.

- The level of proposed development of the landfill site will be dependent on the potential risk to human health and welfare or the environment imposed by the contents of the landfill.

- The preliminary investigation of the landfill identified the cap material as having variable thickness with respect to geographic location. According to State regulations, a cap of at least 2 feet of acceptable material must be maintained. The use of excess cap material as fill elsewhere in the redevelopment area may be permissible if the material is non-hazardous. Any material classified as hazardous should not be removed from the landfill site.

The State Department of Health follow-up to the preliminary investigation will include a remedial investigation by a qualified consultant. The purpose of this process is to define the extent of contamination and to develop the site specific data required for a quantitative risk assessment which will determine the types of safeguards appropriate for the landfill's integration into the Waterfront Park plan.



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