COMMERCIAL HARBORS 2025 MASTER PLAN

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION

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EXECUTIVE SUMMARY

The Kauai Commercial Harbors 2025 Master Plan is a long-range guide to develop, maintain and enhance the island's commercial harbor system to ensure its efficient, safe, accessible and economical operations.

The objectives of the 2025 Master Plan are to: (1) plan the proper development of Nawiliwili Harbor and Port Allen Harbor, facilitating maritime shipments of the essential commodities required by Kauai's citizenry; (2) optimize the utilization of land and water resources committed to marine cargo and passenger operations in an economically responsible manner; (3) provide terminals, other harbor resources, and access to these facilities in locations within Nawiliwili Harbor and Port Allen Harbor in a manner that best relates to and serves Kauai in an efficient, safe, and secure manner; and (4) minimize the impact on environmental quality and recreational opportunities contiguous with Kauai's port facilities.

Lounging idyllically in the midst of the Pacific Ocean, Hawaii enjoys a tranquil separation from continental stresses. Islanders pay for this isolation, however, with a necessary dependence on ocean shipping to supply their everyday needs. Hawaii imports 80 percent of its food and merchandise. Research indicates that 98.6 percent of these imports - food, clothing, building materials, cars, fuel, etc. - are shipped by sea (Lee & Olive, 1994). As there is no feasible alternative to this procurement process, ocean shipping is Hawaii's primary life-sustaining enterprise. Hawaii's maritime cargo operations have evolved from the use of sailing ships and the labor of seamen to incredibly large specialized ships, with a wide array of shipping containers and mechanized cargo-handling methods. This evolution places an urgent demand on the commercial harbor to provide the facilities, space, utilities, roadways, and authorizations necessary to facilitate the receipt of Hawaii's essential cargoes. The State's commercial harbors have become Hawaii's lifeline infrastructure. Ocean cargo carriers, with their specialized requirements, can only deliver their commodities through these commercial harbors.

While attempting to establish the economic importance of the port system, it rapidly became evident that commercial harbor operations are not a normal income-producing activity. The port system does not compete with the revenue streams of industrial warehouses, shopping centers, tourist attractions, or restaurants. Rather, it provides for the construction, supply, and support of these businesses. The port system should not be viewed as an economic activity, but as the State's primary infrastructure, sustaining the quality and modernizations of Hawaii's lifestyles. The commercial harbor is an island's initial facility requirement.

Like the 2010 Master Plan, the *Kauai Commercial Harbors 2025 Master Plan* provides a general, long-range guide for commercial harbor development, based on the knowledge and experience of the users of the facilities and their anticipation of future trends. Detailed technical and environmental studies will be undertaken before these

recommendations are implemented. If these studies prove the recommendations infeasible and result in alterations to the scope of improvements, the Harbors Division will again seek input from the harbor users to validate the proposed modifications.

Nawiliwili Harbor. In 1909, the U.S. Congress passed an act that instructed the Secretary of War to examine the various landing sites for the need for federal improvement projects. Among the various sites that were considered, Nawiliwili Bay seemed to provide the fundamental conditions necessary for a successful port. Although Huleia River flowed into the bay, much of the water was diverted for irrigation purposes. The reduced river flow and sediment production provided ideal harbor conditions. Nawiliwili Bay was Kauai's closest point to Oahu. Nawiliwili Bay was also not far from the island's major sugar production facilities in Koloa Town. Based on these factors, the U.S. Army Corps of Engineers recommended in 1919 that Congress authorize funding to construct Nawiliwili Harbor. Shortly thereafter, construction began on Nawiliwili Harbor was officially opened for deep-draft traffic.

Nawiliwili Harbor in the year 2025 is envisioned with new piers and berthing improvements to better meet the growing needs of Kauai's expanding economy. The cruise ship industry has witnessed tremendous growth in recent years. One of the primary objectives of the Kauai Commercial Harbors 2025 Master Plan was to accommodate the simultaneous berthing of two large cruise ships. The 2025 Master Plan proposes to extend Piers 2 and 3 together into the northwestern corner of the harbor to accomplish this goal. Cruise ships will berth along Piers 1 and 2, or at Piers 2 and 3 when necessary. The 2025 Master Plan also proposes to provide more berthing space by developing a new pier at the jetty pier area. This will accommodate other potential future cargo activities such as exporting of forestry products (e.g., lumber, veneer, and wood chips). The Master Plan also analyzed cargo yard area. Future projections for cargo volume indicate that Nawiliwili Harbor provides the requisite cargo yard acreage. As cargo operations outgrow the available acreage, the Harbors Division will seek to acquire and develop the necessary property. Finally, dry and liquid bulk cargo activities will continue at the present locations (i.e., Piers 1, 2, and 3). The requisite navigational improvements and roadways to support these operations are also included in the Master Plan.

Port Allen Harbor. Hanapepe Bay was a major site of an ancient Hawaiian community until westerners settled into the area. As it was the case for Nawiliwili Harbor, the economic activity of the time defined the eventual form of the harbor. In 1930, Hanapepe Bay's name was changed to Port Allen in honor of Samuel Cresson Allen, an investor who provided much of the money for the port's development.

Port Allen Harbor is a compact commercial harbor. The *Kauai Commercial Harbors* 2025 Master Plan proposes to construct new piers to address the berthing requirements of the cargo, passenger and military vessels calling Kauai's western commercial harbor. Pier 1 is planned as a pier running along the length of the breakwater. Pier 2 is planned as a marginal wharf fronting filled lands, with the northern end forming a finger pier

whose *mauka* face is Pier 3. These proposed piers increase the berthing capacity of the harbor and permit the growth of Port Allen's maritime industries. The 2025 Master Plan also considers the potential for other cargo operations (e.g., timber, coal, agriculture). Military vessels will utilize the berths on the seaward end of the proposed Pier 1. The berths on the *mauka* end of Pier 1 and the southern end of Pier 2 are reserved for cargo vessels. Reclaimed lands provide the requisite yard space for both cargo and military operations. Passenger vessels will berth on Pier 3 and the northern end of Pier 2.

Detailed technical, financial and environmental studies will be undertaken before the recommendations are implemented. If these studies prove the recommendations infeasible and result in changes to the proposed scope of improvements, the Harbors Division will again seek input from the users to validate the modifications.

Almost everything Hawaii uses is imported and practically all of these imported goods are shipped by sea. This statement underscores the importance of the port system to the State and its visitors and justifies the provision of resources for the maritime industry as it evolves in response to the changing needs of the people.

I. INTRODUCTION

The State Department of Transportation (DOT) is composed of three divisions: Airports, Highways, and Harbors. The Harbors Division is responsible for the administration of the State-owned or controlled harbor facilities used by commercial cargo, passenger, and fishing operations. Chapter 266, Hawaii Revised Statues, delineates this responsibility as the control, management, use and regulation of commercial harbors and their improvements.

Nawiliwili Harbor and Port Allen Harbor are two of ten, State-managed, commercial harbors in Hawaii (Figure 1.1). Nawiliwili Harbor is located on the east coast of Kauai and is the island's primary port-of-call, through which most maritime cargo is imported and through which island products are exported. Port Allen Harbor is located on Kauai's southwest coast and serves the military, petroleum suppliers, and tour boat operations.

FIGURE 1.1 Hawaii's Commercial Harbors System

Until approximately 42 years ago, cargo moved in virtually the same break-bulk or bulk form. Cargo was shipped in either the general cargo or bulk cargo carrier, whose only changing characteristics were a relatively slow growth in size. Harbor facilities were fairly simple and standardized for the predominant general cargo vessels, with specialized berths for the few dry and liquid bulk carriers in operation. With few exceptions, the maritime industry was relatively static and predictable.

However, since August 31, 1958, when Matson pioneered the use of 24-foot containers and revolutionized commercial shipping, the industry's development and operations

became dynamic through radical changes. Cargo containers and cargo ships have become highly specialized. Because of these changes, the port industry has implemented significant improvements in its berth and terminal facilities in a relatively short span of time.

Today, ships, cargo and shipping methods continue to evolve, challenging the port industry and placing serious demands on available waterfront properties. This industry-wide concern is reflected in a recent survey by the American Association of Port Authorities, to which responding ports identified facilities development and improvement as their primary strategic planning issue.

In 1989, the State Department of Transportation Harbors Division completed its 2010 Master Plan for Nawiliwili Harbor. The 2010 Master Plan for Port Allen Harbor was completed shortly thereafter. This Master Plan was prepared by the cooperative efforts of the community, private enterprise and government services as a long-range planning guide for Kauai's commercial harbors. The 2010 Master Plan, considered instrumental in the identification of the State's maritime requirements, was reviewed in 1994 to evaluate the progress made in achieving its goals. The adjustments made to the 2010 Master Plan reflected the operational, jurisdictional and societal changes and were published in the Master Plan Update for Nawiliwili Harbor and the Master Plan Update for Port Allen Harbor. Like the normal budgetary period, commercial harbor planning attempts to target five to six year reviews and updates for its master plans. The Kauai Commercial Harbors 2025 Master Plan serves as a periodic review and update of the 2010 Master Plan, utilizing current economic indicators to map out the infrastructure required by the carriers of the State's essential commodities.

Like the 2010 Master Plan, the *Kauai Commercial Harbors 2025 Master Plan* provides a general, long-range guide for commercial harbor development, based on the knowledge and experience of the users of the facilities and their anticipation of future trends. Detailed technical and environmental studies will be undertaken before these recommendations are implemented. If these studies prove the recommendations infeasible and result in alterations to the scope of improvements, the Harbors Division will again seek input from the harbor users to validate the proposed modifications.

The importance of Hawaii's commercial harbor system cannot be overstated. A report prepared for the Department of Business, Economic Development and Tourism, *Size and Growth Potential of Hawaii's Maritime Industry* (Lee & Olive, 1994), cites Hawaii's dependence on ocean shipping for 98.6 percent of its imported goods. This validation of the port system's value also justifies the provision of resources for the maritime industry as it evolves in response to the changing needs of the people.

II. PLANNING OBJECTIVES

The State Department of Transportation Harbors Division's jurisdiction over commercial harbor facilities is primarily directed at the movement of cargo, passenger, and fishing vessels entering, leaving, or traveling within Hawaii, and the facilities and supporting services for loading, off-loading, and handling of these vessels, their cargo, and passengers. The *Kauai Commercial Harbors 2025 Master Plan* therefore supports the port system's primary mission with this long-range planning guide for the development of safe, efficient, economically viable harbor facilities. Developed by a consortium of the maritime industry, other ancillary harbor users, and government agencies, the 2025 Master Plan addresses the need for harbor space by these focal maritime operations that are paramount to the welfare of Hawaii.

Harbor planning in general covers several broad areas of concern:

- Maritime cargo handling including containerized, general, neo-bulk, dry- and liquid-bulk cargo;
- 2. Passenger operations including ferries, charter fishing, cruise and excursion passenger operations;
- 3. Domestic and foreign commercial fishing;
- 4. Shipbuilding, repair, and maintenance operations;
- 5. Navigational concerns;
- 6. Assorted ancillary activities; and
- 7. Environmental and community issues.

Each category is significant in that they need land, water and berths to function. These are resources that the State has traditionally provided.

This maritime planning effort was conducted in accordance with the following objectives:

- 1. Plan the proper development of Nawiliwili Harbor and Port Allen Harbor, thereby facilitating maritime shipments of the essential commodities required by Kauai's citizenry;
- 2. Optimize the utilization of land and water resources committed to marine cargo and passenger operations in an economically responsible manner;
- 3. Provide infrastructure and access in locations within Nawiliwili Harbor and Port Allen Harbor, and other locations in a manner that best relates to and serves Kauai in an efficient, safe, and secure manner;
- 4. Minimize the impact on environmental quality and recreational opportunities contiguous with Kauai's port facilities.

III. IMPORTANCE OF HAWAII'S PORT SYSTEM

The State of Hawaii has come to realize that its economy is fragile and heavily dependent on tourism's revenues. Much emphasis is being afforded the visitor industries with their critical revenue and which employ larger segments of the workforce. While this is a necessary strategy, the State must not neglect the infrastructure on which these industries are all dependent upon - Hawaii's port system.

VALUE OF THE PORT SYSTEM

Economic activity. The State's commercial harbor system is a significant contributor to Hawaii's economy. In 1992, major harbor industries produced \$1.93 billion in direct sales (MacDonald & Deese, 1994 and Lee & Olive, 1994; adjusted by SMS Research for major commercial harbor industries). That year, Hawaii's Gross State Product (GSP) amounted to \$33.0 billion. That same year, \$10.3 billion in imports passed through the State's commercial harbors. This represents a third of the value of goods and services produced in Hawaii. Similarly, a third of the tourists' expenditures in 1992 were on goods that were largely imported through Hawaii's port system.

Commercial harbor activity is best described in these categories: (1) ocean transportation, (2) commercial fishing, (3) ocean recreation, (4) ship building and repair, and (5) other support industries. Harbor users range from the major cargo carriers to commercial fishermen and charter boat operators with a single vessel. Other shipping and manufacturing operations (i.e., cement distribution and foreign trade zones) also occupy harbor lands.

Ocean transportation supports every sector of the State's economy by bringing in 98.6 percent of all imported food, building materials, manufactured goods, and energy products (Lee & Olive, 1994). Ocean transportation activity, understandably, keeps pace with Hawaii's fluctuating economy. Ship building and repair, however, is a slower-growth sector of the harbor industries, impacted by the absence of local parts manufacturers and a lack of sufficient ship repair facilities and skilled labor. Parts for building and repairing ships must be ordered and imported from outside Hawaii, resulting in lengthy delays, additional shipping charges, and higher cost of doing business.

Commercial fishing and ocean recreation are export industries, bringing overseas income to Hawaii. While both have experienced strong growth, ocean recreation's potential appears particularly favorable. Ocean recreation's charter, excursion and cruise vessels, part of the larger visitor industry sector, transport tourists to some of Hawaii's distinctive and popular attractions. While definitive growth analyses are currently not available, the sentiment is that ocean recreation's potential is one of explosive growth.

Employment. Harbor industries directly accounted for 8,298 jobs in 1992 (MacDonald & Deese, 1994 and Lee & Olive, 1994; adjusted for commercial harbor industries by SMS Research). Although the number of jobs is relatively small, the harbor industry employment trend reflects Hawaii's dependence on ocean transportation. For instance, a six-month long dock strike in 1949 led to a surge in unemployment from about 5 percent in 1948 to an annual average of 11 percent in 1949. Reductions in per capita personal income trend of 10 percent and the Gross Territorial Product trend of 12 percent, occurring in both 1949 and 1950, could be attributed to the dock strike.

Commercial harbor industry employment is therefore indicative of Hawaii's dependence on ocean shipping. Major disruptions in harbor employment impact the flow of maritime commerce with serious implications for the State.

Economic Impact Assessment. Commercial harbor facilities have traditionally been developed to satisfy the requirements of harbor users. The Harbors Division convenes user group meetings to solicit their input in order to plan the appropriate improvements. Thus far, Harbors Division's plans and developments have served the users well. Recent slowing economic trends, however, are requiring the justification of Harbors Division's special fund expenditures with the determination of larger economic benefits than project development costs. Because the individual harbor projects do not necessarily generate the income necessary to justify the costs of development, a study entitled *The Economic Impact Assessment of Hawaii's Harbors* (1997) determined the economic value of the entire port system.

The above report establishes the port system's vital function as an integral component of the State's economy. While it is common knowledge that 98.6 percent of Hawaii's imported goods come through the harbors (Lee & Olive, 1994), it has been extremely difficult to quantify this statement with a dollar value.

The economic analysis of Hawaii's harbors reveals that many benefits are derived from investment in the port system, including extra sales realized, tax revenues created, incomes generated, and jobs provided. These values quantify the economic benefits and were compiled with the public service functions performed by the entire system in a concise, accountable analysis. This analysis can be used to:

- Assess the impact of new commercial harbor facilities construction;
- Establish the economic benefits of harbor/channel dredging;
- Assess the impact of intermodal facilities development;
- Allocate harbor investments;
- Rank facilities plans;
- Justify investments in cruise terminal development;
- Determine the impacts of master plan development;
- Develop the harbor's revenue financial model;
- Link the financial model to the impact models;
- Evaluate the effect the port system has on the cost of goods, the consumer, and on the State's overall economy.

HAWAII'S DEPENDENCE ON COMMERCIAL HARBOR ACTIVITY

Lounging idyllically in the midst of the Pacific Ocean, Hawaii enjoys a tranquil separation from continental stresses. Islanders pay for this isolation, however, with a necessary dependence on ocean shipping to supply their everyday needs. Hawaii imports 80 percent of its food and merchandise. Research indicates that 98.6 percent of these imports - food, clothing, building materials, cars, fuel, etc. - are shipped by sea (Lee & Olive, 1994). As there is no feasible alternative to this procurement process, ocean shipping is Hawaii's primary life-sustaining enterprise.

Hawaii's maritime cargo operations have evolved from the use of sailing ships and the labor of seamen to incredibly large specialized ships, with a wide array of shipping containers and mechanized cargo-handling methods. This evolution places an urgent demand on the commercial harbor to provide the facilities, space, utilities, roadways, and authorizations necessary to facilitate the receipt of Hawaii's essential cargoes. The State's commercial harbors have become Hawaii's lifeline infrastructure. Ocean cargo carriers, with their specialized requirements, can only deliver their commodities through these commercial harbors.

While attempting to establish the economic importance of the port system, it rapidly became evident that commercial harbor operations are not a normal income-producing activity. The port system does not compete with the revenue streams of industrial warehouses, shopping centers, tourist attractions, or restaurants. Rather, it provides for the construction, supply, and support of these businesses. The port system should not be viewed as an economic activity, but as the State's primary infrastructure, sustaining the quality and modernizations of Hawaii's lifestyles. The commercial harbor is an island's initial facility requirement.

Harbor development and improvement. To determine the importance of harbor development and improvement, models of the State's economy were used to estimate the impact of constraints on commercial harbor developments/improvements. Preliminary findings from an input/output model developed for Harbors Division (SMS Research, based on 1992 data and the State's input/output models maintained by DBEDT) suggest that the negative impacts of curtailed harbor industry growth are substantial.

Imposing restraints on commercial harbor development/improvement will in turn limit the growth of harbor industries by the aggravation of: (1) chronic problems (e.g., lower efficiencies of cargo movements), (2) threshold problems (i.e., a harbor cannot provide enough space for neo-bulk cargo operations), and (3) emergencies that arise at unforeseen moments and temporarily affect cargo operations. If the result of limiting harbor development/improvement reduces harbor industry growth by even one percent per year less than the estimated two percent annual increase in the real value of the GSP through the year 2020:

- 1. Sales and employment of the major harbor industries would realize only 76.6 percent of their potential.
- 2. Hawaii's GSP would be 2.1 percent lower.
- 3. Estimated statewide employment would be reduced by 0.5 percent.

Harbor development constraints that limit annual industry growth to one percent would impact the State's economy by a combined loss of \$11.7 billion through 2020. While the one percent per annum reduction in growth is only an assumption, it is plausible to expect that harbor industries would not grow as quickly without the planned improvements. Ignoring the importance of harbor development and improvement and thus allowing current harbor facilities to fade into obsolescence will prove to be a highly imprudent action.

IV. HARBOR OPERATIONS AND HISTORY

Kauai is served by two deep-draft commercial harbors, Nawiliwili Harbor and Port Allen Harbor. Nawiliwili Harbor is the island's primary commercial and transportation center located one mile from the county seat Lihue. All of Kauai's containerized cargo is received here and is the preferred destination for cruise ships. Other commodities handled include: raw sugar and molasses; construction materials such as lumber, rebars and cement; petroleum products such as gasoline, jet fuel and propane; scrap metal and cruise ship passengers. Port Allen Harbor is Kauai's second commercial harbor and is located on the south coast of Kauai. Port Allen Harbor is a smaller facility that serves the military, petroleum suppliers, and more recently, small charter/excursion boat operators.

NAWILIWILI HARBOR

Nawiliwili Harbor is located on the southeast coast of Kauai and is nestled within Nawiliwili Bay. The bay is fed by the Huleia River and is surrounded to the northwest by Kauai's principal towns of Lihue, Nawiliwili and Niumalu. Nawiliwili Harbor is located about 96 nautical miles northwest of Honolulu Harbor.

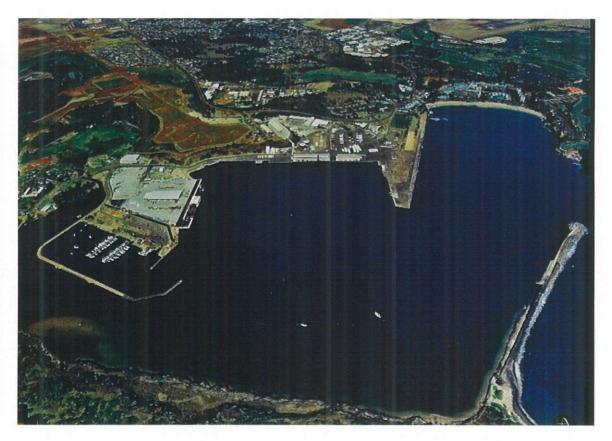


FIGURE 4.1 Aerial View of Nawiliwili Harbor

Nawiliwili Harbor is one of ten commercial harbors (eight deep-draft and two medium-draft) in Hawaii. Because of Hawaii's geographic isolation, nearly all of its imported goods arrive via island ports. Honolulu Harbor, located on Oahu, serves as the hub of Hawaii's commercial harbor system where inter-island cargo distribution branches out to serve the neighbor islands. As the population and commercial activities increase on Kauai, Nawiliwili Harbor's role in the inter-island distribution system is expected to grow as well.

Nawiliwili Harbor is a manmade port, dredged from naturally formed Nawiliwili Bay. Harbor facilities include three piers providing over 1,800 feet of berthing space. Specifically, Piers 1 and 2 total 1,214 feet long with a depth of 34 feet at pier side. Pier 3, completed in 1994, is 625 feet long and contains over 16 acres of paved yard. The harbor basin is 1,540 feet wide by 1,950 feet long and is protected by a rock-faced jetty and a 2,150-foot long breakwater. The entrance channel is 600 feet wide and 2,400 feet long with a controlling depth of 40 feet (Figure 4.2). Adjacent to the commercial harbor is the Nawiliwili Small Boat Harbor managed by the Department of Land and Natural Resource's Division of Boating and Ocean Recreation (DOBOR).



FIGURE 4.2 Piers 1, 2, and 3 at Nawiliwili Harbor

Harbor Operations. Nawiliwili Harbor's Pier 0 (the jetty pier area) is used as a yard for scrap metal storage export, sand, light cargo storage (including empty containers storage), overflow cargo yard, and recreational fishing.

Pier 1 is used by:

- 1. Matson's overseas container operations.
- 2. Hawaiian Cement.

More specifically, Pier 1 is the home of Matson who operates a hub-and-spoke transit system where containers are shipped to Honolulu from the west coast on long-haul ships. From there, cargo is separated and distributed to the individual islands barges. These barges can be unloaded and loaded without the use of large shoreside gantry cranes. Currently Matson has three barges that service Kauai. The *Haleakala* and the *Maunaloa* are crane barges with a 200-container capacity. These two barges also transport bulk molasses back to Honolulu for shipment to the mainland. The *Waialeale* is a roll-on and roll-off (RO/RO) barge that is used to transport automobiles, trucks, trailers, containers and oversize equipment. Hawaiian Cement also uses Pier 1 to unload cement from Oahu. Cement is brought over to Kauai in the barge called *Punapau* once every 3 to 4 weeks. Cement is transferred pneumatically through pipelines to the storage silos near the terminal. The silos have a storage capacity of 1,600 tons.

Pier 2 is utilized by:

- 1. American Hawaii Cruises' passenger ships and the foreign cruise ships.
- 2. Equilon and Kauai Petroleum.
- 3. Sugar barge Moku Pahu.

Specifically, Pier 2 is utilized by both the domestic and international cruise industry. The domestic carrier is American Classic Voyages with two ships in service -- the MS Patriot and the SS Independence. Each ship visits Nawiliwili Harbor once a week. The foreign cruise ships tend to be larger and visit Kauai between their Caribbean and Alaska schedules. Another user is Equilon (formerly Shell Oil) who brings in petroleum products to Hawaii on a biweekly basis. The *Huimana* is the fuel barge. The final operator that uses Pier 2 is the sugar barge. Sugar is delivered from the plantations to the warehouse and is then transported via conveyor to the gantry at Pier 2. The HSTC-1 and *Moku Pahu* is the articulated tug and barge that transports raw sugar produced on the island to the mainland. The HSTC-1 has a 17,000-ton capacity but carries 10 percent less than full capacity because of the depth of the harbor.

Pier 3 services:

- 1. Young Brothers' inter-island barge cargo operations.
- 2. The Gas Company.
- 3. Foreign cruise ships.

More specifically, Pier 3 serves Kauai's inter-island cargo operation. Pier 3 is used by Young Brothers to load and unload cargo barges (containers, break-bulk, small boxes, and RO/RO cargo) two times-per-week. The *Kamaluhia* is the primary barge. Another user of Pier 3 is The Gas Company who brings in liquid propane on its *Huki Kai* barge. A new supply is shipped every four to six weeks. Finally, Pier 3 also serves as a second cruise ship berth for those times when Pier 2 is in use.

Nawiliwili Harbor's current berthing schedule is summarized below (Table 4.1).

Pier	Name of Vessel	Type of Vessel	Length of Vessel	Length of Stay	Frequency of Visit
1 1/3 1/3 1/3 1/3 1/3 2 2 2/3 2 2 3 3	Mauna Loa Puna Pau Billie K Aukai Kahoku Skipanon JI-340 Patriot Independence Various Huimana HSTC-1 and Moku Pahu Kamaluhia Huki Kai	Inter-island Barge Cement Barge Bulk Carrier Bulk Carrier Bulk Carrier Bulk Carrier Bulk Carriers Cruise Ship Cruise Ship Foreign Cruise Ship Gas Barge Sugar Tug and Barge Inter-island Barge	350' 184' 250' 226' 260' 242' 330' 702' 682' 600'-850' 276' 685' 285' 229'	12 hours 10 hours 24 hours+ 24 hours+ 24 hours+ 24 hours+ 24 hours+ 24 hours 12 hours 12 hours 10 hours 14 hours	Once a week Once a week Once a week Once a week 40+ per year Every two weeks Twice a week Every two weeks

TABLE 4.1 Nawiliwili Harbor Berthing Schedule

The level of sophistication in Kauai's port facilities helps determine the island's economic potential. Since its humble beginnings as a trading port for the sugar industry in the late-1800s, Nawiliwili Harbor has experienced firsthand the extent of technological and operation changes of the maritime industry. As a consequence of the harbor users' changing needs over time, there have been numerous infrastructural improvements to Kauai's commercial port.

Nawiliwili Harbor is characterized by a multitude of activities in and around the port. Originally, the harbor was designed to handle only general and bulk-cargo operations. Today, it has special equipment such as refrigerator plugs used by terminal users and operators. Further, the recent increase in cruise ship activities has created a need for it to expand its passenger service operations.

Early history. As is the case for most harbors in the state, it is the nature and volume of cargo that determines location and form of a harbor. For Kauai, its main agricultural export product, sugar, was the impetus that defined the outline of its harbors. So Kauai is a typical example of a region with sufficient economic potential to justify the construction of a harbor but a place without many obvious port sites. To better

understand the relationship of Kauai's major commercial harbor to the island's development, a more through understanding of the history of the area is required.

Nawiliwili Bay and its surrounding area provided an ideal home and fertile grounds for an ancient native Hawaiian settlement. Their economy was subsistence-based, cultivating *Taro* and raising fish in ponds for their food source. In 1778, Captain James Cook landed in Waimea located on the southwest coast of Kauai and the lifestyle of the indigenous people was about to be radically altered. Over time, as more westerners moved in, all traces of the original settlement vanished as the bay was transformed into a general port for the area. By 1898, two piers were constructed: a Government landing on the west side of the bay and a privately built landing to the north.

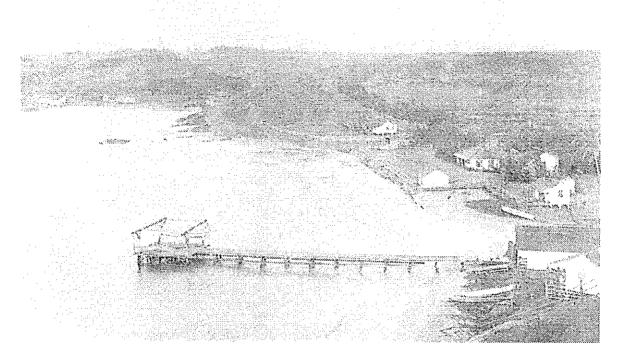


FIGURE 4.3 Nawiliwili Landing about 1900 (State Achieves)

In 1909, the U.S. Congress passed an act that instructed the Secretary of War to examine the various landing sites for the need for federal improvement projects. The U.S. Army Corps of Engineers report of 1911 to Congress concluded that based on burgeoning export agricultural production of the island, improved harbor facilities were warranted. Their findings concluded that ports on the south and west coasts were calm during trade wind weather periods while the opposite was true on the north and east shores. These conditions reversed during wind shifts. Because of the unsafe conditions found at these ports at one time or another, no attempt was made to improve the facilities that would accommodate large vessels. Instead, they would anchor offshore and transfer their cargo by shuttle boats, raising costs and slowing the transport of agricultural goods from Kauai. This made the need for a modern deep-draft harbor apparent if Kauai was to grow inline

with the rapidly expanding local economy.

A number of small boat landings used by the plantations were investigated as potential sites for a new harbor that could accommodate larger ships. Some of them were:

Wharf Landings	Ownership		
Nawiliwili west Nawiliwili north Hanamaulu Ahukini Kapaa Kilauea Waimea Makaweli Eleele Hanapepe Koloa	Government W. H. Rice Lihue Plantation Co. Lihue Plantation Co. Makee Sugar Co. Kilauea Sugar Co. Government private private private private		

TABLE 4.2 Kauai Ports Considered for Development, 1898

Of the various ports and landings that were investigated, it was concluded that three locations were worthy of further consideration: Nawiliwili Bay, Koloa and Hanapepe Bay.

Koloa was a small indentation in the coast with no natural protective element of a bay. Because of this, Koloa was removed from further consideration when it was determined that the cost to construct a harbor there would be cost prohibitive. It would have been necessary to build large breakwaters to enclose the area that would rendered the endeavor financially infeasible.

Hanapepe Bay was also removed from consideration despite the fact that it was the only port that had direct shipments of sugar to the U.S. mainland. Because Hanapepe Bay's facilities were already developed, the savings per ton of improving Nawiliwili Bay would be greater than improving Hanapepe Bay. Further, because Hanapepe Bay could not accommodate any passengers because of its lack of facilities, it was reasoned that the comfort and safety of passengers would be better improved if Nawiliwili Bay received federal funding.

The survey revealed that Nawiliwili Bay seemed to provide the fundamental conditions necessary for a successful port. First, Huleia River flowed into the bay but because much of the water was diverted for irrigation purposes, the reduced river flow and sediment production provided ideal harbor conditions. Second, Nawiliwili Bay was the site on

Kauai that would be the closest to the other islands adding to the convenience of the

location. Finally, Nawiliwili Bay was not far from the island's major sugar production facilities located in Koloa Town.

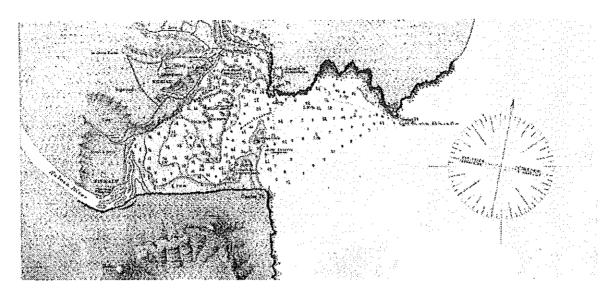


FIGURE 4.4 Nawiliwili Bay Survey (Department of Navy Harbors, 1891)

Despite the ideal fundamental conditions, there was one major development limitation. As mentioned previously, Nawiliwili Bay was located where trade-wind swells that entered the bay created rough conditions for its users. The opposite was true during Kona storm (i.e., when the prevailing winds are from the south) periods where calm conditions were seen. To remedy this situation, a large breakwater that protected nearly the entire harbor entrance would be required to absorb the energy produced by these swells.



FIGURE 4.5
Rough Sea Conditions at Nawiliwili Harbor (State Achieves)
In 1919, it was recommended by the U.S. Corps of Engineers that Congress authorize construction funding to improve Nawiliwili Harbor. This occurred despite the fact that

many argued that the facilities at Hanapepe Bay were the most developed because of the presence of Kauai Railroad Company and their sugar transport operations. They argued that Hanapepe Bay would provide the most benefits after improvements were completed. A study completed in 1912 provided an estimate to develop Nawiliwili Harbor with the following construction costs:

- 1. Breakwater construction, 190,000 tons at \$2 per ton, total: \$380,000.
- 2. Dredging of harbor basin, 1.84 cubic yards at .33¢ per cubic yard, total: \$607,200.
- 3. Superintendent and contingencies: \$98,800.

Figure 4.6 shows the proposed development. A new peninsula was created by filling in with spoil materials from the dredging of the harbor basin.

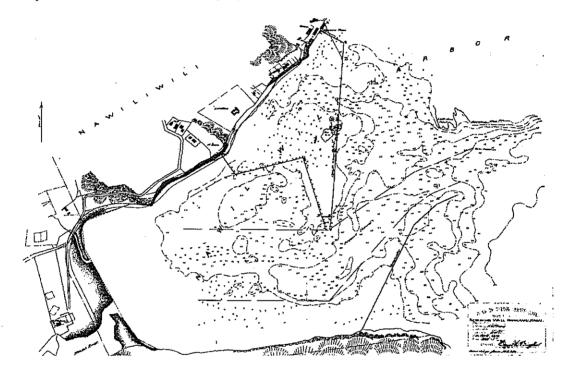


FIGURE 4.6 Jetty Pier Construction (Board of Harbor Commissions, 1919)

Congress agreed with the U.S. Corps of Engineers recommendation and construction began shortly thereafter at a cost of \$1.086 million. The price was astronomical for the time. But it was reasoned that if the federal government improved the harbor as proposed, 90 percent of the island's commerce would pass through it and the resulting decrease in transportation costs would encourage further development of the island's economy. The increase in export volume would lead to additional revenues for the territorial government.

In 1930, Nawiliwili Harbor was officially opened for deep-draft traffic.

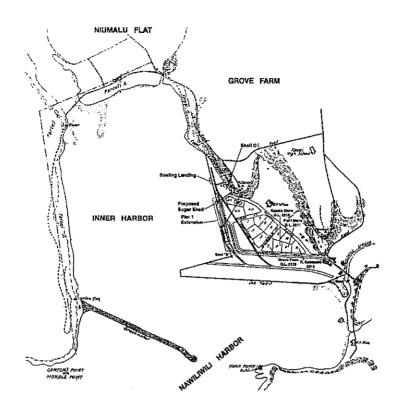


FIGURE 4.7 Nawiliwili Harbor (Hawaii Territory Survey, 1930)

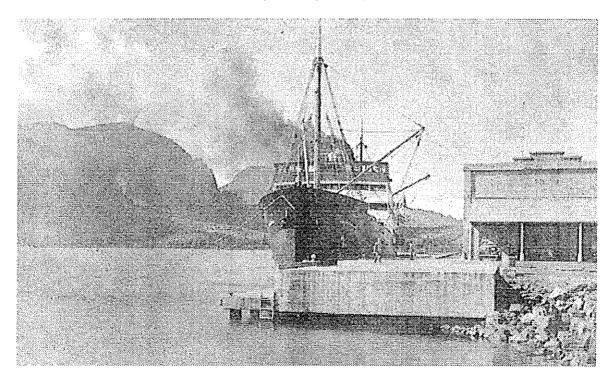


FIGURE 4.8 Nawiliwili Harbor Pier 1 Opens for Business (State Achieves)

Over the years, numerous other improvements were made. In 1935, a 2,000-foot breakwater was completed and dredging done to increase the controlling depth to 35 feet. The total cost of these improvements was \$1.197 million paid by the federal government. When the projects were completed, these improvements to Nawiliwili Harbor were considered adequate for the time. Over time, it became apparent that as ships became larger, that additional improvements were warranted.

In 1948, the U.S. Corps of Engineer's report was reviewed by the U.S. House of Representatives' Committee on Public Works and revealed several undesirable conditions. First, hazardous conditions brought forth by large swells was found at the approach entrance. This made navigation around the breakwater and the seawall difficult under windy conditions. Second, the pier itself proved too short as it could accommodate either one large and one small or two small vessels at any one time. Finally, the harbor turning basin provided little maneuvering room for larger vessels.

Consequently, the U.S. Army Corps of Engineers recommended that the harbor entrance be dredged to a controlling depth of 40 feet, that the harbor basin be expanded to 600 feet in width and 1,230 feet in length, and that an area of 21 acres on the west side of the harbor be reclaimed by fill to provide for additional pier frontage (Figure 4.9).

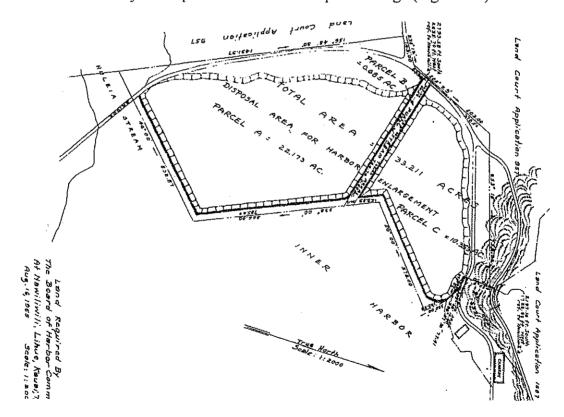


FIGURE 4.9
Dredged Spoils Disposal Area (Hawaii Territory Survey, 1955)

In 1954, the U.S. Congress authorized construction at a cost of \$1.160 million. This work was completed in 1956 and the area has become Pier 3 today.

As sugar industry flourished and provided the impetus to expand Nawiliwili Harbor, the cruise ship industry also developed a presence. In 1910, approximately 15,000 passengers arrived and departed through Nawiliwili Harbor. Because of its proximity close to Honolulu Harbor, Nawiliwili Harbor handled about 90 percent of the incoming inter-island passenger traffic.

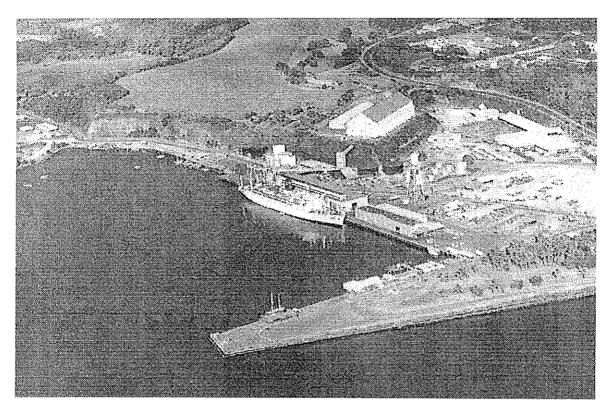


FIGURE 4.10 Nawiliwili Harbor in 1978 (State Achieves)

There are many reminders of Nawiliwili Harbor's involvement in the sugar and shipping industries, but technological and economic changes have since radically altered the people's way of life. Technological advances in the area of mechanized labor also has significant impacts on Kauai's way of life. Increasing labor costs and competition from foreign producers in the 1930s forced plantations to layoff workers and increase efficiency through the mechanization of operations. As young people left in search for economic opportunities on Oahu or the mainland, Kauai experienced a decline in population from 35,818 in 1940 to 29,905 in 1950 to 28,116 in 1960. However, with the emergence of tourism as the island's base industry, Kauai's population has rapidly rebounded recently. By 1980, Kauai's population had risen to 39,082 and by 1990, it reached 51,117, a 30 percent increase during this period.

Nawiliwili Harbor today. Because of the rapid increase of Kauai's population and economy, harbor improvements have occurred at a more rapid pace in recent years. In order to meet the growing needs of overseas and inter-island cargo handlers, in 1991, a \$4 million, five-acre expansion of the cargo handling area was completed at the Pier 1

area.

In 1994, the inter-island container-handling yard at Pier 3 was completed to facilitate efficient cargo handling operations. Consisting of a new 625-foot pier, dredging of the harbor basin, 15 acres of reinforced concrete pavement, and a 37,500 square feet covered storage, it was constructed under two separate contracts totaling \$28.7 million.

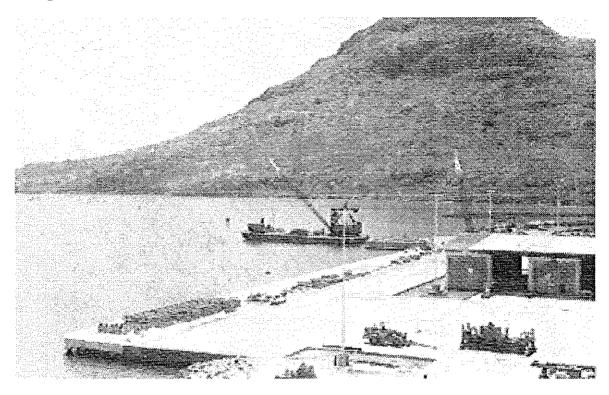


FIGURE 4.11 Nawiliwili Harbor Pier 3 Nearly Completed (Harbors Division)

In 1996, Pier 1 reconstruction and cargo yard hardening projects were completed at a cost of \$10.6 million. Also completed was the construction of a supplemental storage yard on the jetty at a cost of \$2.1 million.

In 1998, the Harbors Division's new administration building was completed at a cost of \$2.1 million. The complex consists of the Harbors Division's Kauai District Office, maintenance shops, a garage, a storage yard and parking. Also completed in the same year was the realignment of Waapa Road near Pier 3 at a cost of \$0.69 million. This project was necessary to improve sight distance along Waapa Road which was impeded by an adjacent hillside.

Today, most of the bulk-sugar facilities have remained even though sugar wanes on Kauai. However, landside activities that remain profitable include: Hawaiian Cement silos and packing plant, petroleum suppliers' Equilon and Kauai Petroleum storage services, and The Gas Company's storage facilities. Because of Nawiliwili Harbor's growing needs, the Harbors Division is constantly improving on its existing

infrastructure. The only current harbor improvement project is drainage improvements on Waapa and Jetty Roads, H.C. 7254.

Nawiliwili Harbor tomorrow. Recently, there has been an increase in local and foreign passenger ship activities statewide. Nawiliwili Harbor will have to accommodate this additional passenger traffic in order to ensure economic health on Kauai. In addition to servicing the needs of increasing resident and tourist populations, the harbor will be required to meet the demands of the growing diversified agriculture industry as well.

Another consideration for harbor planners is that they project what future demands may be placed on Nawiliwili Harbor's cargo handling facilities. In light of these challenges for Nawiliwili Harbor, it is important that the facilities of Nawiliwili Harbor be constantly re-examined and modified to meet the needs of the growing population and economy, as well as the inevitable future technological and operational changes in the maritime industry.

PORT ALLEN HARBOR

Port Allen Harbor is located on the south coast of Kauai nestled within the naturally formed Hanapepe Bay. Hanapepe River flows into the bay but because much of the water has been diverted for irrigation purposes, sediments deposited by the river are minimal. The bay is surrounded by the old plantation communities of Hanapepe and Eleele to the north. Port Allen Harbor is Kauai's second commercial harbor and is the western most harbor in the state located some 106 nautical miles from Honolulu Harbor.



FIGURE 4.12 Aerial View of Port Allen Harbor

Harbor facilities include two 600-foot long piers located on opposite sides of the primary pier structure. The north pier has a depth of 25 feet while the south pier has a depth of 35 feet. There are roughly 1.5 acres of shed and open storage space within the facility. The dimension of the harbor basin is 1,200 feet by 1,500 feet and is protected by a 1,200-foot breakwater. The entrance channel is 500 feet wide with a depth of 35 feet. Adjacent to the commercial harbor is the Port Allen Small Boat Harbor managed by the DOBOR.

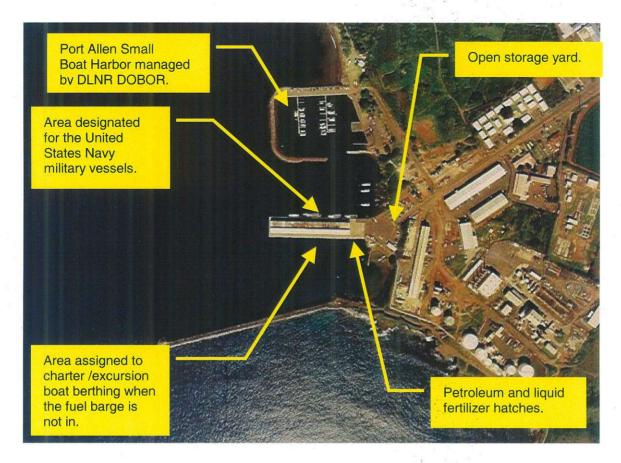


FIGURE 4.13 Port Allen Harbor

Harbor Operations. Port Allen Harbor's pier is utilized by:

- 1. Chevron's fuel barge.
- 2. A liquid fertilizer barge.
- 3. United States Navy/Pacific Missile Base Facility (PMRF).
- 4. Various excursion/charter boat operators.

More specifically, the United States Navy/PMRF uses almost the entire length of the north side of the pier to berth their military vessels. Also, they have offshore mooring for their target boats in the area between the pier and the Port Allen Small Boat Harbor. The United States Navy considers Port Allen Harbor vital to their operations because it is the only deep-draft harbor in close proximity to their base in Barking Sands.

Because of the increasing tourist numbers Kauai is witnessing, the last few years has seen strong growth in the passenger industry. The south side of the pier is bustling with activity as it used by a number of charter boat operators to moor and load passengers. Every other Friday, Chevron brings in the *Pepeekeo* barge for 15 hours to off-load fuel. They supply the west side's gasoline, diesel for the local power generating plant and jet fuel needs. Because of the need for a safety zone separating passengers from fuel off-loading operations, all charter boats vacate the south side of the pier during fuel

operations. Instead, they load passengers at the very end of the northern pier face, well away from the fuel hatches. Finally, the liquid fertilizer barge calls twice a year.

Port Allen Harbor's current berthing schedule is summarized below (Table 4.2).

Type of	Name of	Length of	Length of	Frequency of
Vessel	Vessel	Vessel	Stay	Visit
Fuel Barge Fertilizer Ship Military Weapons Retriever Military Recovery Boat Military Recovery Boat Military Septar Boat Military Target Boat Charter Catamaran Charter Catamaran Charter Catamaran Charter Catamaran Charter Catamaran Charter Catamaran Charter Boat Charter Boat Charter Ribs Charter Ribs Fishing Boat Charter Boat Charter Boat Charter Ribs Fishing Boat Charter Boat	Pepeekeo JI340-2 TWR-833 WRB-101 WRB-102 QST-35 8207 QST-35 9304 QST-35 9501 QST-35 9203 ST-73 Blue Dolphin Tropic Bird HoloHolo Leila Hula Kai Spirit of Kauai Kahanu Adventuress Hokua Lucky Lady Loihi Explorer I Explorer II Libra Northwind	273' 330' 120' 85' 85' 56' 56' 56' 62' 51' 61' 48' 64' 36' 32' 40' 60' 23' 24' 43' 49' 42'	15 hours 24 hours Continuous	Every other Friday Twice a year Continuous

TABLE 4.3
Port Allen Harbor Berthing Schedule

Early history. Hanapepe of the 1820s was a site of a Hawaiian community of approximately 700 inhabitants. However, as the westerners moved in, their numbers dwindled down to just a few hundred just 20 years later because of diseases that were introduced and the general disruption of life. By the mid-1870s, Chinese rice farmers moved in until the town itself was almost entirely Chinese. As it was the case for Nawiliwili Harbor, the economic activity of the time has defined the eventual form of the harbor and the surrounding area. With an abundant labor force in the form of Japanese immigrants, the sugar industry flourished. In 1899, McBryde Sugar Company built a 200-foot long wooden pier west of Hanapepe River to export sugar products.

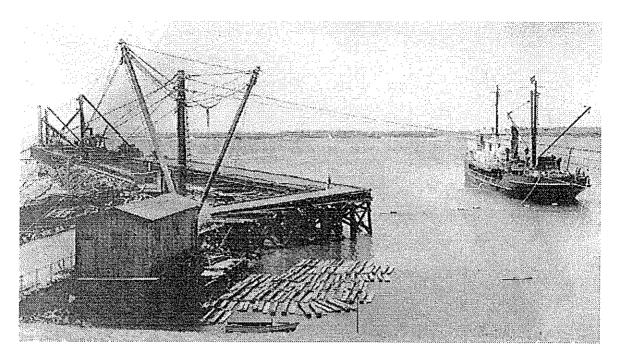


FIGURE 4.14 Port Allen Landing (State Achieves)

Starting in 1907, the Kauai Railway Company provided additional improvements in the form of a 280-foot breakwater and built a number of small reinforced-concrete wharves because of the need for increased shipping capacity through a 40-year contract with McBryde Sugar Company.

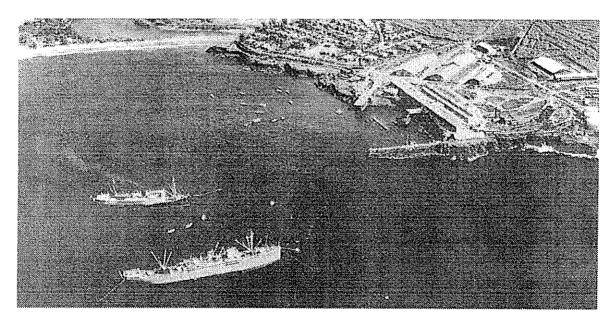


FIGURE 4.15 Port Allen Harbor in the Early Years (State Achieves)

In 1909, the name of the Hanapepe Bay landing was changed by the Board of Directors of the Kauai Railway Company to honor Samuel Cresson Allen, a principal investor who provided much of the money necessary to improve the port. Hence, the name Port Allen Harbor as it is known today.

The sugar industry continued to flourish because the south and southwest coast of Kauai provided ideal agronomic conditions for the growth of the crop. Because of the high transit cost to truck sugar to Nawiliwili Harbor from this region due to the mountainous conditions between the two locations, there was a strong desire by local businesses to convert Port Allen Harbor into a second deep-draft facility. Business numbers from that time supported the need: 53 percent of the island's population was located there, 59 percent of the sugar and 50 percent of the pineapple were produced there, and 47 percent of the total island imports was received there.

In 1933, with recommendations by the U.S. Corps of Engineers, the U.S. Congress authorized a number of construction projects including a 1,200-foot breakwater on the east side of the bay, a new turning basin measuring 1,000 feet wide and 1,500 feet long with an entrance channel of 500 feet, and dredging to a controlling depth of 35 feet. Cost of these improvements was \$0.88 million. It was agreed that the construction of the pier itself would be done by the Territory of Hawaii. In 1939, Port Allen Pier and all of the associated improvements were completed.

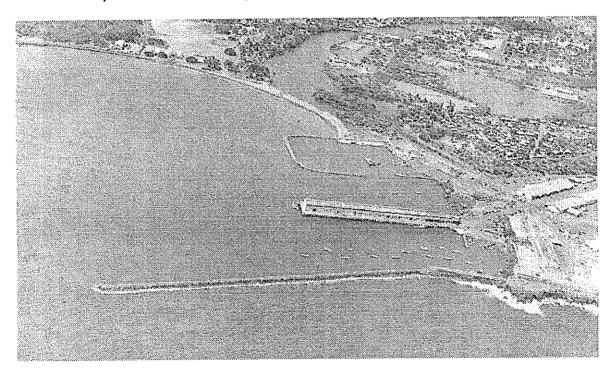


FIGURE 4.16
Port Allen Harbor Improvements Completed (State Achieves)

Despite the improved turning basin, shippers encountered difficulty in maneuvering their vessels under adverse weather conditions. Consequently, in 1945, the U.S. Congress

V. METHODOLOGY

The Harbors Division operates in consideration of the users of its facilities. With this in mind, the Harbors Division hosts periodic user group meetings to discuss the operations, deficiencies, designs, progress, and modification of harbor projects. The *Kauai Commercial Harbors 2025 Master Plan* was constructed in this consultative manner. Developing a proper long-range plan for the State's intricate port system is a complex undertaking. The vast number of interests concerned with either the workings of the life-sustaining commercial harbor or the prime waterfront locations occupied by harbor facilities present a wide and often conflicting array of desires. In the belief that an organized forum of these interests would be able to ferret out the best solution, a task force was assembled to state the problem, resolve the conflicts, and plan the critical future of Nawiliwili Harbor and Port Allen Harbor.

TASK FORCE

The *Kauai Commercial Harbors 2025 Master Plan* is a concerted effort of the maritime industry, associated harbor users, government service and community interests. Representatives of these interests met as a task force in the initial orientation meeting on September 6, 2000. Maritime industries and their affiliated enterprises represented in the initial and subsequent task force meetings included: inter-island and overseas cargo carriers, petroleum companies, an oil spill response agency, a cement company, a timber industry representative, cruise ship operators, shipping agents, stevedores, tour operators and electrical power generators, various county, State and federal government agencies, a farmer/rancher, a surfer, boaters, local businesses, a canoe club representative and watershed council representatives.



FIGURE 5.1 A Typical Nawiliwili Harbor Phase Users Group Meeting

authorized additional funding to dredge an additional 200-feet wide by 1,200-feet long area on the northern side of the harbor. In 1951, the slips of both sides of the pier were re-dredged.

By 1954, just as the necessary improvements were completed to the satisfaction of local interests, all sugar shipments ceased from Port Allen Harbor because of the trend in centralizing shipping agricultural products due to the construction of modern bulk storage and loading facilities at Nawiliwili Harbor and the decrease in trucking costs for the growers to haul their products to Nawiliwili Harbor. The economic impact was felt deeper than just at the harbor. The surrounding community's streetscape appeared to have stopped in time as an indicator of the death it was suffering from.

Port Allen Harbor today. Much of what is left today was constructed in anticipation of increased commerce from sugar. Relocation of these facilities would be expensive and infeasible as it serves as a reminder of how quickly a change in the market can impact the need for harbor facilities. Since the centralization of sugar operations to Nawiliwili Harbor during the 1950s, there has been no major harbor construction project except for small maintenance work. For example, in 1991, a \$0.69 million dredging project was completed that increased the south side depth of the pier to 35 feet.

Recently, Port Allen Harbor has witnessed a renaissance in its activity with a new type of business enterprise -- charter boat tours. Because of the overall improvement in Kauai's tourist economy, this little niche market has flourished. As a result, demand for pier space has exceeded the limited supply of berthing that is available as the tourist market expands on Kauai. The need for additional commercial facilities has prompted other State agencies to build new infrastructure. Kikialoa Small Boat Harbor is located in west-Kauai between the towns of Waimea and Kekaha and is managed by DOBOR. According to DOBOR, they are planning to improve the existing harbor by providing additional berths for recreational boats and a new facility for cruise ship tendering operations. Further, they plan to construct a limited number of berths for commercial boats. This is an important consideration when planning for the future of Port Allen Harbor.

Port Allen Harbor tomorrow. In the coming years, in order to better use its facilities, harbor planners will need to determine what future demands may be placed on Port Allen Harbor's cargo-handling facilities. Or to adapt to new market conditions by accommodating the presence of charter boat tour operations. It appears that to ensure economic health on west-Kauai, Port Allen Harbor will have to accommodate additional passenger traffic.

USER REQUIREMENTS

The following list of maritime requirements was determined by extensive discussions among the members of the user groups. The harbor users are respected as the maritime industry's operational experts. Their suggestions and requests for improvements are thus treated with deference. While this practice of conferring with harbor users is standard procedure for Harbors Division, the varying interests and long-range projections of the individual members complicated the effort. The users' requirements are summarized in the following categories.

NAWILIWILI HARBOR

Passenger:

- Extend Piers 2 and 3 and connect together in corner
- Notch out corner of Pier 1 and Jetty Pier to provide more lineal feet of berthing along Piers 1 and 2
- Employ a series of floating camels at Pier 3
- Remove Pier 3 RO/RO stub out and notch into yard area for a new barge berth
- Build new Pier 0 (located at the jetty pier area) to accommodate a smaller cruise ship
- Use of Tahitian mooring at Pier 3
- Employ tendering operation to transfer passengers to shore side
- Provide more shore-side amenities
- Safety separate passengers from cargo

Navigational:

- Widen entrance channel to smooth out "S" turn
- Widen turning basin to accommodate large cruise ships
- Deepen harbor draft to allow Moku Pahu's full loading of sugar

Overseas cargo:

- Construct new heavy-lift at the jetty pier yard area
- Convert existing warehouse near Harbors administration building to a new maintenance facility
- Acquire DLNR's triangle property for expansion of yard
- Remove abandoned Coast Guard building in the jetty pier area
- Landscape and beautify area

Inter-island cargo:

• Expansion of Pier 3 covered storage

Dry-bulk cargo:

· Possible need for a woodchip facility

Liquid-bulk cargo:

- Build additional fuel storage tanks
- Safety issue -- separate passengers from fueling operations
- Relocate fuel hatches to corner of Piers 2 and 3
- Move all storage tanks to the jetty pier area
- Construct piers on fill so that petroleum pipelines can be buried
- Should have contingency/alternative fuel hatches

General comments:

- Introduction of alien species into Hawaiian waters from overseas vessels
- Gill net fishing in Nawiliwili Harbor depletes the entire school of Mallets
- Roadway improvement to provide westward egress from Nawiliwili Harbor
- Improve water quality in Nawiliwili Bay area
- Land for Children's Museum
- Home for Hokuleia canoe

PORT ALLEN HARBOR

Passenger:

- Safety issue -- separate passengers from fueling operations
- Pier height is too high for transferring passengers safely

Liquid-bulk cargo:

- Deepen harbor draft to allow Pepeekeo's full loading of fuel
- New fuel hatches should not be located where it is exposed to damaging elements
- New fuel lines are costly to construct especially over long-distances

Dry-bulk cargo:

- Possible need for a woodchip facility
- Interest expressed for importing coal for a new power generating plant

Military:

May need more covered storage space in the future

Navigational:

• Breakwater improvements to minimize wave energy

General comments:

- Need to be aware of surf areas and other sensitive systems like wetlands
- Affects of global warming and the rise of sea level

DATA GATHERING

Investigations and data gathering efforts in support of the planned harbor developments included personal interviews, telephone inquiries and extensive research. Research was conducted on the prior studies, related planning documents, current and historical wharfage statistics, associated data compilations, and socio-economic studies. Data collected and documented through this research was valuable in establishing past trends and methods of operation. Efforts to ascertain current market and operating data were conducted in part through the plenary sessions and interviews.

The users were assured that any confidential information provided would not be divulged, therefore, the technical data analyses are being set aside as a separate study and are not being included as part of this Master Plan report.

2025 PROJECTIONS

Container yard analysis. A number of statistical studies were conducted to validate the cargo carriers' requirements for cargo yard acreage at Nawiliwili Harbor. Future (2025) cargo volumes, for instance, were produced by the establishment of a statistical correlation between Kauai's cargo volumes and the island's resident population counts, and then applying the correlatives to accepted 2025 projections of the resident population. These statistical analyses are important components of the planning process. They provide a means of quantifying the harbor users' requests for facilities.

This quantification of the users' requests is particularly important when validating cargo yard requirements. The cargo carriers' use of the cargo yard is not continuous. Prior to a cargo ship's arrival, the cargo yard may be fully staged with the containers and breakbulk cargo destined for export. Imported containers and cargo may fill and occupy the cargo yard for a few days following the ship's departure. The cargo yard may then appear empty until the next shipment of cargo is again readied for export. Yet, due to the volume of a typical shipment, the cargo yard may be considered statistically filled to capacity. The statistical studies explain this deceptive nature of the cargo yard and establish the cargo yard's capacity measurement standards.

The statistical analyses were divided into two phases -- supply and demand. The determination of supply or land availability was derived from Harbors Division's land records and engineering charts. The Pier 1 overseas cargo yard provides a total of 13.2 acres while the Pier 3 inter-island cargo yard provides 16.8 acres (Figure 5.2).

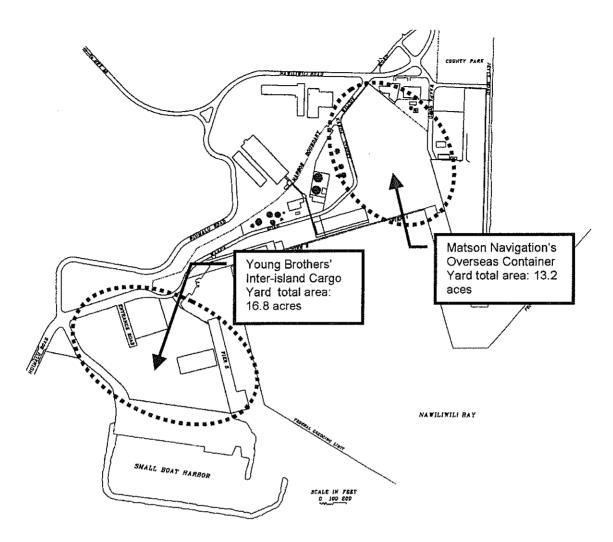


FIGURE 5.2 Nawiliwili Harbor Cargo Yard Area

Quantifying the demand for cargo yard acreage proved a much more difficult task. The abundance of available cargo statistics was complicated by a wide range of categories and units. In an attempt to standardize the assortment, the initial efforts focused on making sense of the weights of the cargo commodities by calculating each commodity's weight in short tons (2,000 pounds). Cargo commodities' weights are estimated in the Harbors Division's wharfage statistics. Valid socio-economic indices from a collection of DBEDT's *The State Data Book* were then compared to the history of cargo tonnages.

The Harbors Division's wharfage statistics have evolved over the years. The statistics have been reported in various quantities – revenue tons, metric tons, short tons and long tons. The most consistent period of reporting occurs during State fiscal years (beginning July 1 and ending June 30) 1986 through 1999, with the exception of 1996, which is noted for significant errors and is thus not included in the study. Hurricane *Iniki*, September 11,1992, appears to have caused a major disruption in the island's economy. Kauai's economy has been depressed in the years following the hurricane, and has only recently started to recover. Cargo volumes, on the other hand, experienced a tremendous

surge immediately after the hurricane, then receded to pre-1986 volumes by 1997, and are now beginning to rebound. The wide fluctuations in cargo volumes and the economic disruptions of Hurricane *Iniki* made it difficult to establish valid correlations.

The solution was found in an alternate unit of measurement. Some overseas and interisland cargo, however, are not reported by tonnage, but by containerized units. Each container, regardless of its size, is reported as one unit. Automobiles, again regardless of size, are also reported by the number of units shipped rather than tonnage. The effort to estimate the 2025 quantity of container cargo was thus redirected to compiling the historical record of containers, standardized by Twenty-Foot-Equivalent-Units (TEU). A twenty-foot container equals one TEU, a twenty-four foot container equals 1.2 TEU, a forty-foot container equals 2 TEU, and a forty-five foot container equals 2.25 TEU, etc. Kauai's record of TEU shipments evidences a correlation with Kauai's resident population.

The correlatives between the island's resident population and TEU were thus applied to the DBEDT's economic projections for the State of Hawaii to produce the estimated 2025 volume of container cargo in incremental baseline forecasts. The spatial requirements for handling the forecast cargo volumes were determined by the application of these projected cargo quantities to commonly used port planning formulae.

The analysis produced through the application of the above referenced methodology indicates that Nawiliwili Harbor's Pier 1 and Pier 3's acreage is sufficient for the projected volume of cargo until the year 2025.

Because Port Allen Harbor has no current cargo operations that require yard space and future operations are speculative at this time, no analysis was made for that harbor.

Berthing analysis. Berthing facilities within Nawiliwili Harbor are limited. Kauai's dependence on Nawiliwili Harbor as its primary commercial port makes this limitation even more pronounced, as unlike other major Hawaiian Islands, Kauai has no alternative berths for its cargo vessels. These factors serve to emphasize the critical task of planning additional berths for Nawiliwili Harbor.

Balancing the need for these essential facilities, however, is the finite budget for berth construction included in the Harbors Special Fund Capital Improvement Program. The berthing analysis thus attempts to validate the planned pier construction projects, permitting financial prioritization and expediting critical projects.

The first step in the development of the berthing analysis was the establishment of a base line vessel schedule and berth assignment. The Harbors Division's Kauai District Office provided the following information that serves as the 1999 base line schedule and berth assignment.

Pier	Name of Vessel	Type of Vessel	Length of Vessel	Length of Stay	Frequency of Visit
1	Mauna Loa	Inter-island Barge	350'	12 hours	Once a week
1	Puna Pau	Cement Barge	184'	10 hours	Once a month
1	Catherine Ross	Harbor Tug	80'	Permanent	Permanent
1/3	Billie K	Bulk Carrier	250'	24 hours+	Ten times-a-year
1/3	Aukai	Bulk Carrier	226'	24 hours+	Ten times-a-year
1/3	Kahoku	Bulk Carrier	260'	24 hours+	Ten times-a-year
1/3	Skipanon	Bulk Carrier	242'	24 hours+	Ten times-a-year
1/3	J1-340	Bulk Carriers	330,	24 hours+	Ten times-a-year
2	Patriot	Cruise Ship	702'	24 hours	Once a week
2	Independence	Cruise Ship	682'	24 hours	Once a week
2/3	Various	Foreign Cruise Ship	600'-850'	12 hours	40+ per year
2	Huimana	Gas Barge	276'	12 hours	Every two weeks
2	Moku Pahu	Sugar Barge	685'	24 hours+	Four times-a-year
3	Kamaluhia	Inter-island Barge	285'	10 hours	Twice a week
3	Huki Kai	Propane Barge	229'	14 hours	Every two weeks

TABLE 5.1 Nawiliwili Harbor Berthing Schedule

The Harbors Division's Wharfage Statistics provided the historical record of cargo volumes. In the *Oahu Commercial Harbors 2020 Master Plan*, this history of cargo volumes was shown to have a strong correlation to Hawaii's Gross State Product. Assuming that: (1) the correlation of cargo and Gross State Product continues; (2) maritime industries minimize the number of sailings by carrying near-capacity loads; (3) the frequency of sailings increase with an increase in volumes of cargo transported; and (4) vessels' L.O.A. remain unchanged; the berths proposed by the 2025 Master Plan are validated by the berthing analysis.

The State Department of Economic Development and Tourism's projected Gross State Product growth rate (Page 2, Table A-1, Population and Economic Projections for the State of Hawaii to 2025, DBEDT 2025 Series, February 2000) was applied to the above berthing frequencies.

	'98-'00	'00'05	'05-'10	ʻ10-ʻ15	'15-'20	'20-'25
		0.4	0.4		2.0	1.9
GROSS STATE PRODUCT	2.0	2.1	2.1	2.0	2.0	
FINAL SALES	0.5	1.9	2.0	2.0	2.0	1.8
CONSUMPTION	0.5	1.5	2.0	2.2	2.2	1.9
INVESTMENT IN STRUCTURES	0.8	1.5	1.5	1.4	1.3	1.3
OTHER INVESTMENT	2.8	2.5	2.2	1.9	1.8	1.7
STATE AND LOCAL EXPENDITURES	1.0	1.8	2.0	1.9	1.8	1.7
STATE AND LOCAL CONSTRUCTION	0.5	1.0	8.0	8.0	0.5	0.5
FEDERAL DEFENSE EXPENDITURES	2.3	1.6	1.3	1.4	1.6	1.6
FEDERAL DEFENSE CONSTRUCTION	0.2	0.5	0.5	0.5	0.5	0.5
FEDERAL CIVILIAN EXPENDITURES	2.5	1.7	1.3	1.5	1.7	1.7
VISITOR EXPENDITURES	2.4	3.0	2.5	2.0	2.0	2.0
EXPORTS	1.9	1.7	1.9	1.9	1.9	1.8
IMPORTS	0.1	1.4	1.9	1.9	1.8	1.7

TABLE 5.2 Hawaii Gross State Product Projected Annual Percentage Growth Rate

By the year 2025, Nawiliwili Harbor's anticipated vessel schedule and berthing assignments, including berthing at the newly proposed piers, increases to the following.

Pier	Type of	Year 2025	Year 2025
	Vessel	Length of Stay	Frequency of Visit
1 1 1 1/3 1/3 1/3 1/3 1/3 1/3 2 2/3 2 2 3	Inter-island Barge Cement Barge Harbor Tug Bulk Carrier Bulk Carrier Bulk Carrier Bulk Carrier Bulk Carriers Cruise Ship Foreign Cruise Ship Gas Barge Sugar Barge Inter-island Barge Propane Barge	12 hours 10 hours Permanent 24 hours+ 24 hours+ 24 hours+ 24 hours+ 24 hours 12 hours 12 hours 10 hours 14 hours	Twice a week Twice a week Permanent 15 times-a-year 15 times-a-year 15 times-a-year 15 times-a-year 15 times-a-year Three times-a-week 200+ per year Once a week Four times a year at best Four times a week Once a week

TABLE 5.3 Nawiliwili Harbor 2025 Berthing Schedule

The next step in the process of validating berth construction projects planned by the *Kauai Commercial Harbors 2025 Master Plan* was the computation of the berth utilization factors. The berth utilization factor is the computed berth-foot-days use of the pier by specified vessels. An 800' L.O.A. ship berthing at a 1,000' pier every day of the year results in a berth utilization factor of 1.0. This is because a ship this size typically requires 100' fore and aft for mooring lines, taking up the full 1,000' pier availability 365 days of the year.

If any of the berth utilization factors fall below 0.5, the berth would not be considered fully utilized, and proposed pier construction projects to alleviate berth congestion would not be warranted. The *Oahu Commercial Harbors 2020 Master Plan* advocates the use of a 0.5 berth utilization factor for a fully utilized berth. This is due to the difficulty overseas vessels (with the exception of cruise passenger ships) have in keeping an exact schedule. Rough seas, equipment malfunctions/breakdowns, cargo loading problems, delays in other ports and other problems play havoc with overseas vessels' schedules. Arrivals are usually scheduled within a range of dates rather than on a specific date. As the overseas vessel steams closer to the port, the arrival schedule and length of stay are updated. Because these overseas vessels' reservations for berths are made months in advance, however, the intended pier may actually sit idle fifty percent of the time due to the stated problems in scheduling. Inter-island sailings and schedules are understandably more precise, and the berth utilization factors for inter-island vessels can therefore be significantly higher than 0.5.

At Nawiliwili Harbor, the overseas container and cement operations are assigned to Pier 1. Some bulk cargo operators such as scrap metal recyclers operate out of the corner of Pier 1. Because Pier 1 contains only 500 linear feet of pier front, it does not take much to maximize the utilization factor at this pier. Once Pier 2 is extended, Pier 1 is seen as a second berth during two cruise ships days in Nawiliwili Harbor that would increase the utilization factor even more. For the calendar year 2000, the berth utilization factor at Pier 1 was 0.438. The projected 2025 berth utilization factor is 0.721.

Cruise ships and petroleum product shipments are expected to be directed to Pier 2. Domestic and foreign cruise ships would dock almost exclusively at Pier 2, but Pier 3 would also be available for two cruise ships days in Nawiliwili when Pier 1 is unavailable. The projected frequency of calls of cruise ships will result in a high berth utilization factor. Petroleum barges and their tug boats are expected to continue berthing at Pier 2, either at the current fuel hatches or at the possible new hatches to be constructed at the corner of Piers 2 and 3. In 2000, the berth utilization factor for Pier 2 was 0.376. Pier 3 is projected to experience a berth utilization factor of 0.680 by the year 2025.

Pier 3 will serve inter-island cargo operations, propane product shipments, and any overflow foreign cruise ships. The protruding RO/RO stub at the end of this pier limits any extension except to the Pier 2 corner. Harbors Division's analysis indicates that the berth utilization factor in 2000 was 0.357. The projected 2025 berth utilization factor for Pier 3 is 0.916.

Based on the projected 2025 berth utilization projections, and assuming that no other operations are introduced to the harbor, an additional 1,043 linear feet of pier will have to be constructed in order to meet the projected 2025 demand. However, it should be mentioned that the projected berth-utilization factors will be affected by imbalances in cargo supply and demand, sizes of vessels, cargo-handling technology, and by construction/demolition of berths. These changes notwithstanding, the berthing analysis validates the need for the master-planned berths.

It is difficult, however, to generate a berthing analysis for Port Allen Harbor that projects future demand for space that is correlated to an economic index (e.g., population growth, gross state product, etc.) because of the nature of operations present. Rather, projecting Port Allen Harbor's berthing needs will be developed using the following assumptions. First, the military's fleet size is relatively static. A representative from Pacific Missile Range Facility has informed Harbors Division's staff that they do not anticipate any growth in number of vessels into the foreseeable future except for the addition of one 120-foot LOA boat. Second, there appears to be significant pent-up demand for additional berthing for charter boats that can be met if space was available. All of the existing operators have indicated on a recent survey that they would like to increase their fleet size by an average of one boat. Further, according to the Kauai District Office, there are three other operators on the wait list wanting to establish operations in Port Allen Harbor if space were available. So the projected demand for passenger berthing could easily double and is reflected as such in the analysis below. Finally, regarding liquid and dry bulk cargo operations, fuel suppliers have indicated the possibility of changing to a larger 330-foot LOA double-hull barge in the future and increasing the frequency of calls to meet future demand. For dry bulk cargoes such as wood chips and coal, a berthing analysis projecting their future demand for berths is difficult because of the uncertainty surrounding their status. For this analysis, the aforementioned dry bulk cargoes future berthing needs will not be included until such time that their operations can be determined with greater certainty.

The projected 2025 berthing for each user is calculated as follows:

Type of Industry	Current Requirement plus mooring allowance	Length of Stay	Frequency of Visit	Projected 2025 Requirement plus mooring allowance
Military Charter Boats Liquid-bulk: fuel Liquid-bulk: fertilizer Tugs	579' + 225' 640' + 275' 273' + 100' 330' + 100' 100' + 20'	Continuous Continuous 15 hours 24 hours Varies	Continuous Continuous Every two weeks Twice a year At least every two weeks	699' + 250' 640' + 260 330' + 100' 330' + 100' 100' + 20'
Total	1,719 ^{,1}			2,399' ²

TABLE 5.4 Port Allen Harbor 2025 Berthing Schedule

This berthing analysis is based on known variables and attempts to reflect the minimum expected future demand. Based on these assumptions, a minimum total 2,399 feet of berth is projected by the year 2025. Because most of the boats berthed in Port Allen

¹ Total includes military vessels and charter/excursion boats only.

² Total includes projected military vessels, charter/excursion boats assuming a no growth policy and the fuel barge with its tugboat.

Harbor are permanently assigned, no berthing utilization was calculated because pier space is always fully utilized.

VI. RECOMMENDATIONS THROUGH THE YEAR 2025

The discussions, recommendations, and alternatives of this chapter are organized by the major facility improvements suggested, discussed, and agreed upon by members of the 2025 Master Plan's task force. The facilities that satisfy these recommendations will be designed and constructed when the projects' financial and environmental concerns are properly addressed.

NAWILIWILI HARBOR

OVERSEAS CONTAINER CARGO TERMINAL(S)

DISCUSSION

Hawaii depends almost entirely on the ocean shipping industry to transport its essential commodities (food, clothing, fuel, building materials, automobiles, etc.) and export local products (sugar, molasses, pineapple, livestock, diversified agriculture, etc.) to and from the neighbor islands, the mainland, and various foreign countries. Developed island economies are typically dependent on ocean shipping for their sustenance.

The importance of cargo shipping to Kauai cannot be overstated. This Master Plan therefore begins with the facilities and services required by the cargo carriers. While the economic value of commercial fishing, passenger cruises, excursions and ferries, etc. cannot be denied, commercial harbor planning must first address Hawaii's life-sustaining cargo operations. The requirements of the ocean cargo carriers must be given priority.

Based on the throughput of containers (counted in 20-foot equivalent units or TEUs) the American Association of Port Authorities ranked Honolulu Harbor as the sixteenth busiest of all United States container ports in 1998. Yet, in a selected study of thirteen of these comparable ports (SMS Research, 1999), Honolulu Harbor's cargo acreage places it in the lower 31 percent of this range. This discrepancy between the large number of containers handled and the limited cargo acreage available suggests that Honolulu Harbor's cargo handling efficiencies are constrained by a lack of space. Nawiliwili Harbor and Port Allen Harbor are similarly constrained by finite boundaries. Both harbors will probably experience saturation by the end of the 2025 planning period.

A recent evolution in the method of retail inventory management further exacerbates the cargo movement problem. Supplies are now ordered and scheduled to arrive "just in time" to replenish depleted stocks. This practice reduces the need for individual storage facilities, but places the burden of timely delivery on the cargo carriers. The commercial harbor cargo yards, therefore, have been transformed into the State's "warehouses," further complicating the orchestration of cargo movements.

"Just in time" shipping also limits the potential for direct overseas cargo shipments to the neighbor islands. Container vessels have such large capacities that it would take weeks to fill a ship with a neighbor island's orders and justify a direct shipment. Merchants (especially grocers) will not tolerate such infrequent deliveries of their merchandise.

An integral step in the development of a valid 2025 plan was the substantiation of the cargo carriers' facility requirements. This was accomplished by projecting cargo volumes through the year 2025 and conceptualizing the facilities necessary to support this cargo.

The estimates of space required by the year 2025 exhaust Nawiliwili Harbor and Port Allen Harbor's maritime lands. Developable maritime property on Kauai is a valuable and scarce commodity, and cargo carriers will have to make do with the lands that are available. Suggestions for commercial harbor expansion were discussed during the 2025 Master Plan's plenary sessions, but no definite solutions were derived. Alexander & Baldwin Properties, Inc. has agreed to investigate possible expansion opportunities to resolve the shortage of cargo acreage at Port Allen Harbor. The State Department of Land & Natural Resources' property adjacent to Nawiliwili Harbor may offer a viable expansion opportunity. Until a suitable solution is achieved, the Harbors Division will continue to adjust space allocations and the cargo carriers must continue to make the best use of allotted space, devising appropriate operational schemes and attempting to deal with the inefficiencies associated with this lack of space.

Plans to expand cargo terminals are largely determined by the demand for shipping, and the demand for shipping is dictated by the local economy. Current projections for the State's economy in the year 2025 dictate the development of significant, consistently well-planned commercial harbor facilities. Otherwise, competition for scarce resources, such as berthing and backup lands for cargo handling, can slow industry growth, cause congestion in the harbor and on the roadways, and raise the costs of merchandise.

RECOMMENDATIONS

In 1986, 12,009 TEUs of overseas containers were shipped through Nawiliwili Harbor. The volume of container shipments grew to 23,213 TEUs by 1990, and reached 33,490 TEUs in 1993. The surge of TEUs in 1993 was probably due to the influx of construction materials in response to Hurricane *Iniki*, September 11, 1992. The overseas container volume is projected to top 29,000 TEUs by the year 2025. When computed into acreage requirements, the 29,073 TEUs, the 28,773 possible automobile shipments and 19,835 short tons of neobulk cargo amount to approximately 13 acres of overseas container cargo yard. Nawiliwili Harbor's Pier 1 and 13.2 acres of cargo yard should accommodate the overseas container operations through 2025. A possible expansion area for overseas cargo terminal operations would be directly adjacent to the existing terminal, on State Department of Land & Natural Resources land designated by the *Nawiliwili Harbor 2010 Master Plan*.

INTER-ISLAND CARGO TERMINAL

DISCUSSION

This classification is used for inter-island cargo as well as for neobulk commodities moving in large, unitized loads. Although inter-island and neobulk cargo are increasingly shipped in containers, certain commodities such as newsprint, lumber, steel, construction components, heavy equipment and vehicles can be efficiently loaded and transported without containerization, and continue to move in unitized form.

The inter-island system of cargo distribution is the principal means by which neighbor island communities receive and export their cargo. This system has Honolulu Harbor as its hub or point of distribution and consolidation. Because of Oahu's large population and the corresponding high demand for goods, container vessels are used to reduce the costs of shipping to Honolulu. In Honolulu Harbor, containers are off-loaded by destination. Oahu's cargo is loaded onto trucks for delivery. Cargo destined for Kauai is transferred onto barges for shipment. This system will continue until Kauai's demand for commerce or volumes of exports qualify for direct overseas shipments.

Operating and capital costs also influence the trend of more container use in the interisland trade. Inter-island shipping's operational and capital investment costs are leading to larger vessels and larger capacity handling equipment. The growth of diversified agriculture and forestry products could lead to more inter-island cargo traffic in terms of frequency as well as tonnage, due to the time sensitiveness of agricultural products. Growth of the neighbor islands' populations, tourist industries, construction activities and general economies will affect inter-island shipping in a similar manner. Facility improvement plans for inter-island operations consider these trends.

RECOMMENDATIONS

The 2025 projections for inter-island cargo total 59,027 TEUs, which, when added to the anticipated breakbulk volumes, neobulk volumes and projected automobile shipments and computed into acreage requirements, result in 17 acres of inter-island cargo yard. The current location of the inter-island cargo terminal at Pier 3 provides the requisite cargo yard acreage. As inter-island cargo operations outgrow the available acreage, the Harbors Division will seek to acquire and develop the necessary property.

If the cruise passenger industry continues to inundate Nawiliwili Harbor, a long-term alternative configuration for the inter-island cargo terminal includes the relocation of the RO/RO berth to the corner of Piers 2 and 3. Pier 3 will then be able to accommodate the larger cruise ships when the cargo terminal is not in operations. The Harbors Division will continue to consult with the inter-island cargo carrier in determining the appropriate terminal areas for additional covered storage areas and other necessary improvements.

PASSENGER TERMINAL

DISCUSSION

In anticipation of a "boom" in the number of ocean cruise passengers, the international cruise industry is building a record number of new passenger ships. The cruise industry, reportedly experiencing saturation of the Caribbean market and the Alaskan market's approach of its limit, is reaching out to new markets. As these cruise lines investigate new destinations, Hawaii's ship agents are receiving increased inquiries for new and additional cruise ship calls. The Norwegian Cruise Lines, in December 2001, will be relocating an 880-foot, 2,000-passenger ship to Hawaii for seven-day voyages through the Hawaiian Islands.

Hawaii's inter-island (domestic) cruise line, acting on internal market studies and near-capacity bookings of its existing ship, has acquired a second vessel which will shortly enter Hawaiian service as the MS Patriot, and has contracted with an American shipyard to construct two new vessels for cruises within the Hawaiian Islands. These two new domestic cruise ships are projected to occupy Nawiliwili Harbor's berths two days-per-week. However, it is the anticipated increase in foreign calls that is expected to have the greatest impact on Nawiliwili Harbor. According to the *Statewide Cruise Facilities Study* (Leo A Daly, 1999), cruise ship visitor counts are projected to increase at a rate of 7.9 percent per week into the 2020 time horizon. If this projection holds true, an additional five plus days-per-week of foreign cruise ship calls at Nawiliwili Harbor is expected. The total number of calls for both domestic and foreign market is thus anticipated to reach seven plus days-per-week by the year 2025.

RECOMMENDATIONS

The cruise industry's voiced concern during the plenary sessions was for sufficient berthing for the growing number of cruise ships visiting Kauai. Kauai is a preferred destination for cruise passengers, but Nawiliwili Harbor's limited berthing facilities are viewed as the inhibiting factor for the growing industry. The concern for safety and the separation of passenger and cargo operations were also discussed during the plenary sessions. The separation was requested both for the efficiency of cargo operations and for the safety of the passengers disembarking or boarding the ships.

The cruise passenger terminal will continue at Pier 2. Other locations (e.g., Pier 0, Pier 1, Pier 3) will be utilized whenever berthing conflicts require the use of this area. Other berthing alternatives include stern berths at Pier 3 and off-shore moorings with shuttles to the passenger terminal. Though it was requested, the restrictive physical configuration of Nawiliwili Harbor makes it difficult to provide simultaneous berths for two 965-foot ships.

The Master Plan further supports the *Statewide Cruise Facilities Study*, which surveyed Hawaii's cruise passenger facilities, determined their adequacies or shortfalls, and estimated the industry's future growth and infrastructure requirements. Nawiliwili

Harbor and Port Allen were two of the established ports-of-call that were evaluated for their potential for cost-effective passenger terminal investments. Whenever feasible, the recommendations of the *Statewide Cruise Facilities Study* will be used to guide passenger terminal developments at Nawiliwili Harbor.

DRY-BULK CARGO TERMINAL(S)

DISCUSSION

Dry bulk cargo includes sugar, cement, sand, scrap metal and forestry products, and constitutes a significant percentage of the island's total cargo tonnage. Sugar is Hawaii's primary export product. Cement, concrete products and lumber are the construction industry's "building blocks." Scrap metal recycling operations remove unsightly abandoned vehicles. Forestry products, including lumber, veneer and wood chips, may supplement and eventually replace sugar as an agricultural export product.

RECOMMENDATIONS

The cement terminal will continue at its present site. The current .8-acre facilities are expected to carry cement operations through the year 2025. Sugar will continue to be stored in the existing warehouse and loaded via the sugar conveyor and gantry. Scrap metal, sand and forestry products will be staged on the jetty, and are allocated two and five acres respectively.

LIQUID-BULK CARGO TERMINAL(S)

DISCUSSION

Kauai's liquid bulk cargo industries provide the island with its gasoline, jet fuel, fuel oil (all three unloaded at Pier 2) for electrical power, and propane (unloaded at Pier 3). Molasses (loaded at Pier 1), like sugar, is one of Kauai's few export products. The Clean Islands Council have indicated that the corner of Piers 2 and 3 provides an ideal location for spill response equipment because of the natural tenancy for contamination to consolidate into that corner.

RECOMMENDATIONS

A 6.1-acre bulk storage parcel, bounded by Waapa, Kanoa and Wilcox Roads, accommodates the petroleum and molasses terminals. The Liquified Petroleum Gas (LPG) terminal remains on a 1.6-acre lot leased from the State Department of Land & Natural Resources. A two-acre lot will be made available on the jetty should the LPG terminal operators decide to relocate to this area. A possible expansion area for the LPG terminal is within the 6.1-acre bulk storage parcel (e.g., JMB tanks, molasses tanks). Piers 1, 2 and 3 are currently locations of liquid bulk transfer facilities and may remain.

BERTHS

DISCUSSION

Berthing is becoming more of a concern as the number of calls to each harbor continues to increase while the number of berths remains static. The overseas container cargo carrier, the inter-island cargo carrier, the liquid bulk cargo carriers, the dry bulk cargo carriers and the cruise ship operators share Nawiliwili Harbor's existing berths. Whenever an existing berth is removed from service due to damages, repairs, modifications, upgrades, demolition or unplanned, long-term occupancies, Kauai's maritime industries experience operational difficulties. The remaining berths become congested and berthing schedules require immediate adjustment. Even with the new berths recommended for construction, vessels will continue to share the commercial harbor facilities in Nawiliwili Harbor.

RECOMMENDATIONS

To accommodate the wide variety of commercial harbor operations, the following are recommended: 1

- Overseas container berths at Pier 1. Alternate berths for the overseas container industry will be provided at Piers 0 and 2. Inter-island cargo berths at Pier 3. Whenever unscheduled inter-island cargo shipments require the use of additional/alternate berths, Pier 2 can be used to supplement the Pier 3 facilities.
- Dry bulk cargo (sugar, sand, cement, scrap metal, forestry products) berths at Piers 0 and 2. Liquid bulk cargo (i.e., molasses and petroleum products) berths at Piers 1, 2, and 3.
- Pier 0 could be constructed as another liquid bulk cargo berth.
- Passenger berths at Piers 1, 2 and 3. The highest priority will be afforded the Piers 2 and 3 extension projects. The 2025 Master Plan recommends that Pier 2 be extended westward to connect with the northern extension of Pier 3. A possible passenger berth may be constructed at Pier 0. The wind conditions should be mild if Pier 0 is to be used as cruise ship berths, and the cruise ship should not extend beyond Pier 0 into the federal project area.

ROADWAYS

DISCUSSION

Roadways are an integral component of the commercial harbor infrastructure. Sufficiently-sized entrances/exits to cargo yards, convenient accesses to major thoroughfares, and the reduction or elimination of traffic congestion are all necessary for efficient cargo movement between ship and store.

¹ Berthing within the State's commercial harbors is generally not permanently assigned. Vessels entering port are directed to their berths according to the shore-side facilities required and the availability of such berths

RECOMMENDATIONS

The Kauai Commercial Harbors 2025 Master Plan supports the improvement of the roadway network serving Nawiliwili Harbor's existing facilities and planned improvements. The interface between harbors, county roadways and State highways are considered intermodal facilities and are of increasing concern as critical transportation facilities. The Harbors Division will continue to coordinate its plans with the County of Kauai Department of Public Works and Planning Department, and the State Department of Transportation's Statewide Transportation Planning Office and Highways Division.

The Kauai Long-Range Land Transportation Plan, May 1997, recommends a Poipu-Nawiliwili Connector Road. This roadway is proposed as a new two-lane roadway makai of the existing Kaumualii Highway at an estimated cost of \$92.4 million. The first phase of this project, planned for the 2001-2005 time period, connects Nawiliwili to Kipu. The permanent alignment would be formally selected and the temporary western bypass route would be upgraded. The second phase, 2006-2020, connects Kipu to Poipu.

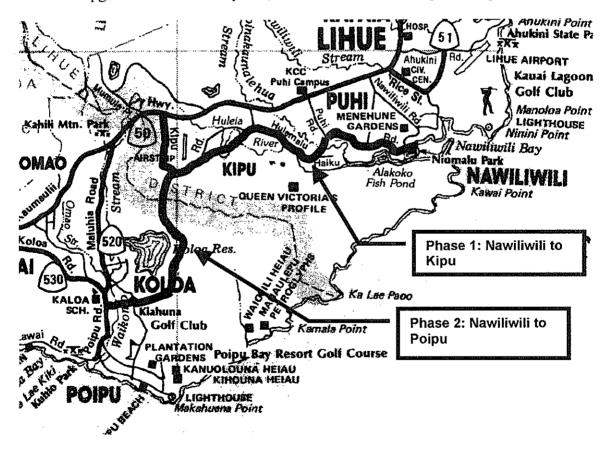


FIGURE 6.1 Nawiliwili to Poipu Connector Roadway

The County of Kauai, along with the State Department of Transportation, is monitoring the efforts of the Grove Farm Company to construct a roadway connecting Nawiliwili to Nuhou Road. The construction of the State Department of Transportation and the Grove Farm Company roadways provides two desired western accesses to Nawiliwili Harbor. The Master Plan's task force considers the construction of western harbor accesses high priority infrastructure requirements.

The mix of commercial, residential and recreational traffic on harbor roadways results in dangerous driving conditions and many near-accidents. Through the next planning period (2000-2006), the Harbors Division will consider restricting Nawiliwili Harbor roadways to commercial traffic. A requisite condition prior to the enactment of such a restriction is the construction of alternate routes for residential and recreational traffic.

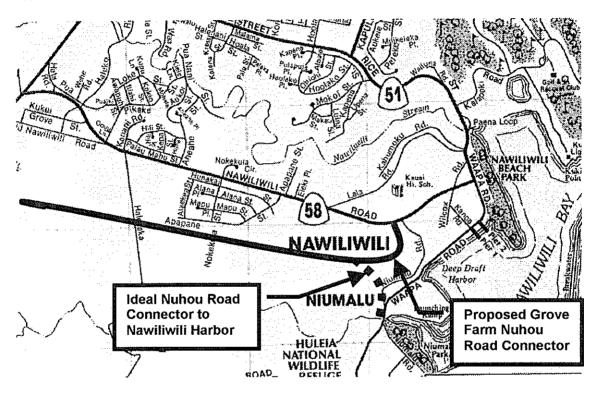


FIGURE 6.2
Western Access Road: Nawiliwili to Nuhou Road Connector Roadway

NAVIGATIONAL IMPROVEMENTS

DISCUSSION

Harbor surge, the size and depth of the harbor turning basin, and the configuration of the harbor channel were the navigational concerns stated by the task force members. The Harbors Division will coordinate the efforts of the U.S. Army Corps of Engineers to remedy the problems.

RECOMMENDATIONS

The following alterations are recommended to ease the harbor's navigational problems.

Modification of the entrance channel to permit the safer navigation of the larger cruse ships and turning basin improvements to allow the full loading of the sugar barge *Moku Pahu*.

MISCELLANOUS RECOMMENDATIONS

The Harbors Division's commercial harbor master plans provide general, long-range development guides and spatial allocations for its commercial harbors. Specific facilities (sheds, offices, lighting, parking, etc.) are usually omitted from these master plans' maps. Likewise, operational concerns and non-maritime considerations are not included as recommendations. For example, the following suggestions are for operational improvements and are not dependent on the master planning process for their enactment:

- Restriction/limitation of gill-net fishing within the harbor or Federal project limits.
- Restriction/limitation of commercial fishing within the harbor or Federal project limits
- Restriction/limitation of jet skis, kayaks and other recreational watercraft within the harbor or Federal project limits.
- A site for the Kauai Children's Discovery Museum.
- Employ lightering system (for cruise ship passengers) and professional traffic control services in consultation with the Harbors Division Kauai District Office.
- Remove the old Marine Patrol building.
- Landscape and beautify area.
- Improve water quality in the area.
- Consult the Office of Planning on native Hawaiian gathering rights during the Environmental Impact Statement phase of the planning project.

PORT ALLEN HARBOR

BERTHS

DISCUSSION

Port Allen Harbor is a compact commercial harbor. The commercial harbor's berths are inundated with cargo, passenger and military vessels. Other than offshore anchorages, all vessels berth on the harbor's only pier. The 124-foot x 600-foot pier was completed in 1939 as a concrete pier on concrete piles. The concrete piles, however, only extend a few feet below the mudline and are supported by pilings made of wood. This design results in a lack of lateral rigidity and renders the pier incapable of handling large ships during adverse weather conditions (i.e., strong wind). This design further complicates the determination of the pier's lifespan. The costs of projects to remedy the pier's problems are prohibitive. An engineering analysis estimates the cost of strengthening the pier as

being more than the cost of replacing the pier.

RECOMMENDATIONS

The Kauai Commercial Harbors 2025 Master Plan proposes to construct new piers to address the berthing requirements of the cargo, passenger and military vessels calling Kauai's western commercial harbor. Pier 1 is planned as a pier running along the length of the breakwater. Pier 2 is planned as a marginal wharf fronting filled lands, with the northern end forming a finger pier whose mauka face is Pier 3. These proposed piers increase the berthing capacity of the harbor and permit the growth of Port Allen Harbor's maritime industries. The 2025 Master Plan also considers the potential for other cargo operations (e.g., timber, coal, produce).

Military vessels will utilize the berths on the seaward end of the proposed Pier 1. The berths on the *mauka* end of Pier 1 and the southern end of Pier 2 are reserved for cargo vessels. Reclaimed lands provide the requisite yard space for both cargo and military operations. Passenger vessels will berth on Pier 3 and the northern end of Pier 2.

CARGO TERMINAL

DISCUSSION

Port Allen Harbor was once a bustling commercial port. The savings realized by the shorter transit times between Nawiliwili and Honolulu Harbor, however, resulted in the relocation of most of the cargo operations from Port Allen Harbor to Nawiliwili Harbor. Liquid-bulk shipments of fertilizer and petroleum products are Port Allen Harbor's two remaining cargo operations. Petroleum products shipped to Port Allen Harbor include gasoline, diesel and jet fuel. Current fuel demands result in shipments of petroleum products every other week. The fertilizer barge calls twice a year.

The future of Kauai's struggling sugar industry is uncertain. A potential replacement crop for the sugar plantation lands is timber. Timber (or forestry) products, including wood chips, lumber and veneer, would help to diversify Kauai's agriculture industry. While Nawiliwili Harbor is the primary site for a forestry products terminal, Port Allen Harbor is designated as an alternate location for this dry bulk cargo operation.

As Kauai's population grows, its demands for power will increase. A local business is reportedly investigating the possibility of building a coal-burning power plant on the west side of the island. As on Oahu, coal would be imported. Port Allen Harbor is the logical port-of-call for the coal supply ship delivering fuel for a power plant on Kauai's west side. During the plenary sessions, a local farmer and rancher stated that he and others would like to ship their produce and livestock exports out of Port Allen Harbor rather than Nawiliwili Harbor.

RECOMMENDATIONS

To satisfy current and potential cargo requirements, the *Kauai Commercial Harbors 2025 Master Plan* recommends that Pier 1 be constructed along the inner length of the breakwater. The proposed Pier 1 should be sufficiently sized to accommodate the fuel barge, the fertilizer barge and their tugboats. The petroleum industry representatives request that sheet piles and fill support the pier. This design would allow pipelines to be "buried" for their protection.

For safety precautions, passenger loading and unloading will be relegated to the passenger terminal's northwest finger pier during fueling operations. The approximately 80 feet of the passenger terminal along the marginal wharf shall be utilized for berthing only when this rule is in effect.

The U.S. Army Corps of Engineers' assistance in reinforcing the breakwater will be requested, thus ensuring the protection of Pier 1 and its occupants. Reclaimed lands will provide the requisite cargo yards for cargo staging and operations. With the concurrence of Alexander & Baldwin Inc., the shoreline parcels necessary for development of the proposed cargo terminal will be acquired. Alexander & Baldwin Properties, Inc.'s *Port Allen/Eleele Lands Development Strategy* (August, 1999) sets aside additional maritime lands in four parcels, (M-1 through M-4) directly above the proposed Pier 2.

PASSENGER TERMINAL

DISCUSSION

As Kauai's economy continues to improve, excursion/charter boat operators are realizing increasing business. In fiscal year 2000, the gross receipts of the various charter operators in Port Allen Harbor totaled over \$10.1 million with passenger counts approximating 125,000 (Harbors Division records). The operators, believing that the business potential justifies additional boats, plan to expand their fleets and are requesting more berthing/operational facilities. The excursion/charter boats include catamarans, trimarans and other shallow draft vessels capable of accessing scenic locations like the Na Pali Coast. The Na Pali Coast is quite a distance for these vessels to travel, however, and the operators have expressed their desires for harbor facilities closer to that area of the island. Unfortunately, it does not appear likely that such facilities will be available in the foreseeable future. Charter boat operators are therefore anxious for Port Allen Harbor's planned passenger terminal.

During the 2025 Master Plan's plenary sessions, many discussions focused on the need to separate passenger activities from the industrial operations. Such a separation is deemed necessary for the safety of the passengers. Furthermore, the industrial maritime operations will be able to focus on their operations without worrying about errant passengers compromising their product transfer procedures.

RECOMMENDATIONS

Berths for the excursion/charter boats will be located on the proposed Pier 3 and the northern end of Pier 2. The charter/excursion boat operators have offered to construct passenger terminal facilities and suggest that a loading dock and a boat ramp be included in the terminal design. The proposed Piers 2 and 3 will not impede boaters' safe passage from the Port Allen Small Boat Harbor entrance.

Until such time that an environmental analysis determines the impacts of the excursion/charter boat industry on the affected environment, the Harbors Division will adopt a no-growth policy for the number of charter/excursion boats within Port Allen Harbor. The Master Plan also recommends avoiding the construction of any structure that blocks the vista of the proposed Alexander & Baldwin Inc. restaurant complex.

The luxury cruise passenger industry is experiencing and enjoying an explosive surge of demand for its services. Kauai's port-of-call for the new generation of luxury cruise ships is Nawiliwili Harbor. Nawiliwili Harbor's entrance channel, however, is not designed for the larger cruise ships that are already voyaging throughout the State. While Port Allen Harbor's diminutive size and overwhelming berthing requirements currently preclude calls by these ships, the Harbors Division will continue to investigate modifications that may eventually permit cruise ship calls at Port Allen Harbor.

MILITARY TERMINAL

DISCUSSION

The Pacific Missile Range Facility (PMRF) provides training, testing and evaluation facilities for the U.S. Navy. The base is located in Barking Sands on the extreme western end of Kauai and enjoys the climatic conditions (i.e., clear skies and open oceans) that are conducive to its operations. The PMRF is a critical contributor to the west Kauai economy. It is the largest employer in the area with a work force of about 1,000.

The PMRF has also established a presence within Port Allen Harbor, where it berths a number of its support vessels. These vessels are used in daily military training and operations. Port Allen Harbor, being the only deep-draft harbor in close proximity to its base, is deemed a crucial component of PMRF's operations.

RECOMMENDATIONS

The Kauai Commercial Harbors 2025 Master Plan recommends that PMRF's future terminal be established on the seaward end of the proposed Pier 1. The 2025 Master Plan further recommends that reclaimed lands satisfy PMRF's spatial requirements, including a shed for PMRF's operations. Acknowledging the overwhelming cost of pier construction, PMRF representatives have offered to propose the use of federal funds to construct the military pier and terminal.

NAVIGATIONAL IMPROVEMENTS

DISCUSSION

Harbor surge, improvements to the existing breakwater and silt conditions were the navigational concerns stated by the task force members. As the U.S. Army Corps of Engineers is responsible for construction and maintenance of navigable waterways, the Harbors Division will coordinate the efforts of the Corps of Engineers to study and remedy the problems.

RECOMMENDATIONS

The following alterations are recommended to ease the harbor's navigational problems:

- 1. Breakwater improvements (i.e., strengthening and raising the height) to protect the proposed Pier 1 facilities and occupants from high surf conditions.
- 2. An analysis of surge problems and installation of surge-attenuating structures, particularly in the proposed Pier 2 area.
- 3. An analysis and recommendations to control Hanapepe River siltation.

EXPANSION AREA

DISCUSSION

Port Allen Harbor's compact size limits its potential. The existing cargo, military and passenger operations are already realizing conflicts between their operational requirements. These conflicts compromise safety precautions and result in operational inconveniences. Port Allen Harbor's spatial constraints make it difficult to envision any growth of the maritime cargo, military or passenger industries.

RECOMMENDATIONS

Cargo operations typically require cargo yards for staging the cargo transferred between wheeled vehicles and maritime vessels. PMRF similarly requires landside operational areas. Harbors Division, however, has very little land available under its jurisdiction for expansion at Port Allen Harbor. The *Kauai Commercial Harbors 2025 Master Plan* thus recommends that Harbors Division acquire Alexander & Baldwin Inc.'s shoreline parcels and reclaim lands to create the necessary cargo and military terminals.

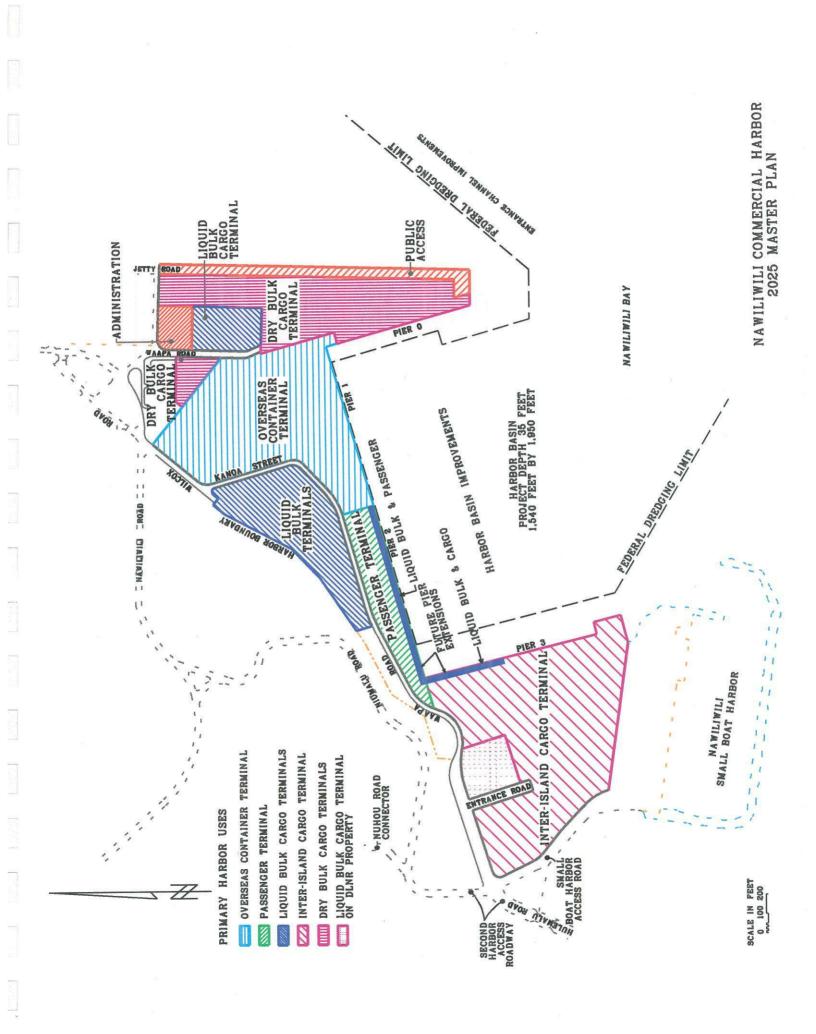
The 2025 Master Plan further supports Alexander & Baldwin's Port Allen/Eleele Lands Development Strategy (August, 1999), which allocates four parcels of its property for maritime operations. The combined area of these parcels, M-1 through M-4, Tax Map Keys 2-1-03: 28, 29 and 30, totals 5.7 acres. The total acreage provided by Alexander & Baldwin's maritime lands and by the Harbors Division's proposal to reclaim land is deemed sufficient for the potential cargo and military operations at Port Allen Harbor.

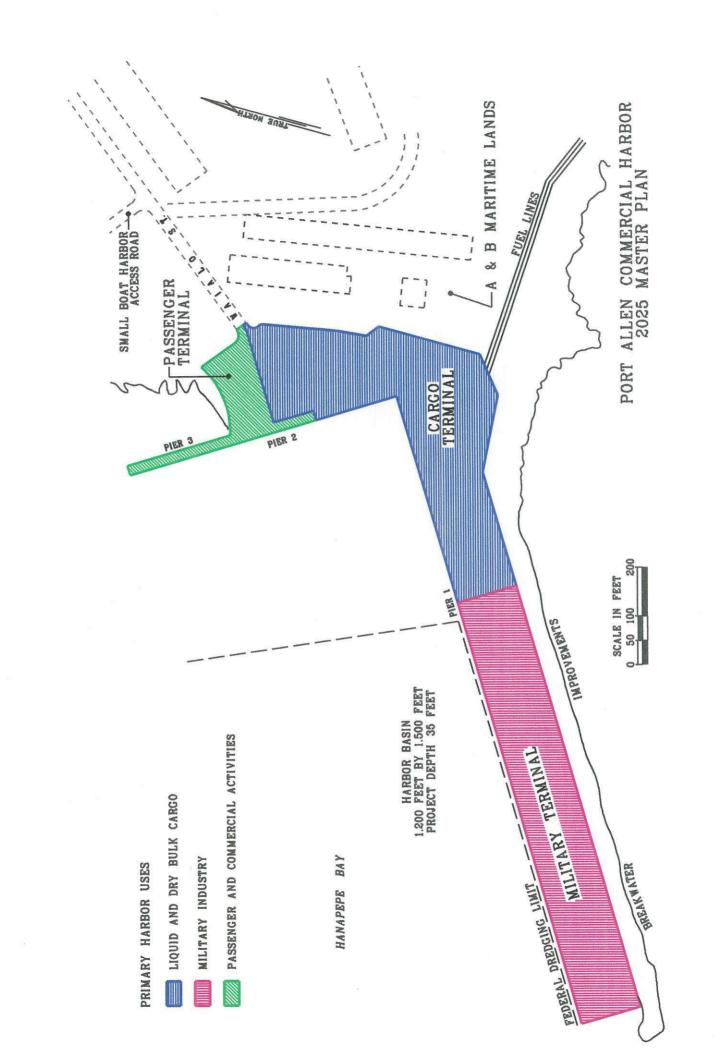
During the early discussions of the 2025 Master Plan's development, the task force proposed an expansion of Port Allen Harbor's commercial and recreational harbors. The State Department of Land & Natural Resources' Division of Boating and Ocean Recreation is not considering any expansion of its recreational boating facilities at Port Allen Harbor, nor any transfer of shoreline parcels to the Harbors Division. The 2025 Master Plan's task force believes that an expansion of both commercial and recreational harbors will be necessary in the future. As Port Allen Harbor's spatial constraints do not provide adequate growth potential, the Harbors Division will continue to pursue a partnership with the Department of Land & Natural Resources to effect an expansion of Port Allen Harbor's facilities for additional maritime operations.

In closing, following the Governor's approval/acceptance of the *Kauai Commercial Harbors 2025 Master Plan*, the Harbors Division will initiate an Environmental Impact Statement to study and mitigate the cumulative environmental impacts of the proposed master-planned projects.

Detailed technical, financial and environmental studies will be undertaken before the recommendations are implemented. If these studies prove the recommendations infeasible and result in changes to the proposed scope of improvements, the Harbors Division will again seek input from the users to validate the modifications.

VII. KAUAI COMMERCIAL HARBORS 2025 MASTER PLAN MAPS





VIII. REFERENCES

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IX. ENVIRONMENTAL CONSIDERATIONS

APPLICABLE ENVIRONMENTAL LAWS, RULES, REGULATIONS & PERMITS

Any project that proposes work or discharges material in U.S. navigable waters must demonstrate compliance with a number of Federal laws and Executive Orders, which include:

- Section 10 of the Rivers and Harbors Act, Sections 401 and 404 of the Federal Clean Water Act Amendments (PL 95-217), and applicable implementing regulations. These laws stipulate that a permit is required for work performed in or affecting navigable waters that will have an impact on navigable capacity and for certain discharges of dredged or fill material into waters of the U.S. This is of particular concern to the Federal Government.
- Section 307 of the Coastal Zone Management (CZM) Act (P.L. 92-583), as amended and applicable implementing regulations;
- Noise Pollution and Abatement Act (P.L. 91-604) and applicable implementing regulations;
- Clean Air Act (P.L. 90-148), as amended, and applicable implementing regulations;
- Section 208 of the Federal Water Pollution and Control Act Amendments (P.L. 92-500), Safe Drinking Water Act (P.L. 93-523), and applicable implementing regulations;
- National Historic Preservation Act (P.L. 89-665), and applicable implementing regulations.

A number of State plans, policies, and controls provide guidelines for development within the State of Hawaii. These guidelines include the Hawaii State Plan, State Functional Plans, State Land Use Plan, Kakaako Community Development District Plan, and Conservation District Law.

The Hawaii State Plan was developed to serve as a guide for future development of the State of Hawaii in the areas of population growth, economic benefits, enhancement and preservation of the physical environment, facility systems maintenance and development, and socio-cultural advancement. The Plan identifies, in general, the goals, objectives, policies and priorities for the development and growth of the State. Guidelines have been provided in the Plan to give direction to the overall development of the State. The following describes the relationship and compatibility of the proposed project with the overall plans for the State of Hawaii as set forth in The Hawaii State Plan, Chapter 226 of

the Hawaii Revised Statutes, as amended:

Population (HRS Section 226-5);

Economy (HRS Section 226-8, -8, and -10);

Physical Environment (HRS Section 226-11, -12, and -13);

Facility Systems (HRS Section 226-14 through -18);

Socio-Cultural Advancement (HRS Section 225-20, -21, -23, -24, -25, -26 and -27).

The State Legislature adopted twelve State Functional Plans in April 1984. These plans were formulated to specify in greater detail the policies, guidelines, and priorities set forth in *The Hawaii State Plan*. The twelve functional plans include: Energy, Transportation, Water Resources, Historic Preservation, Recreation, Health, Education, Housing, Conservation Lands, Higher Education, Agriculture and Tourism.

Except for the *Housing Functional Plan*, which is a part of the *Kakaako Mauka Area Plan*, and the *Agricultural Function Plan*, all of the plans relate directly to the proposed *Makai Area Plan*.

The purpose of the Kakaako Makai Area Rules is to enable the Hawaii Community Development Authority (HCDA) to implement the policies and programs relating to the Kakaako District. The current makai area rules have been developed as a separate document, which supports the recommendations of the *Honolulu Waterfront Master Plan* and the revised *Makai Area Plan*.

The Honolulu Waterfront Master Plan is a result of the 1988 Legislative Session's tasking of the Office of State Planning to prepare a comprehensive master plan for development and improvement of 1,550 acres – a six-mile coastal stretch of the Honolulu waterfront, from Ala Wai Yacht Club to the Honolulu International Airport.

The State Land Use Commission designates land use. Projects will be developed in accordance with rules and regulations thereof.

The Conservation District Use Law consists of five subzones which include: (1) "Protective" (P), (2) "Limited" (L), (3) "Resource" (R), (4) "General" (G), and (5) "Special" (S). The conservation area of the Kakaako waterfront is seaward of the shoreline and is categorized as "Resource" subzone. The objective of this subzone is "to develop, with proper management, areas to ensure sustained use of the natural resources of those areas." Permitted uses in this subzone include all permitted uses stated in the Protective and Limited subzones: aquaculture; artificial reefs; and commercial fishing operations.

Other County or State approvals that may be required for individual projects include:

- Building Permit County Department of Public Works;
- Special Management Area (SMA) Permit -County Department of Planning;
- Grading/Grubbing Permit County Department of Public Works;
- Approval of Drainage Outfall State Department of Health;
- Conservation District Use Permit State Board of Land and Natural Resources (BLNR):
- Use of State Land BLNR and State Department of Transportation;
- Shorewaters Construction Permit State Department of Land and Natural Resources;
- Permit for Industrial Wastewater Discharge –County Department of Public Works;
- Shoreline Variance Permit County Department of Planning.

The Coastal View Study was prepared to identify significant views from within the SMA boundary island wide. The focus of this report is the scenic and open space objective of the CZM Act and SMA Permit, and elaborates on implementation of the objectives and policies.

The Office of Environmental Quality Control, State Department of Health, requires that Environmental Assessments be prepared to determine whether proposed projects produce significant environmental impacts. The eight conditions which stipulate the preparation of an EA and which may trigger the resultant need for an Environmental Impact Statement (EIS) Preparation Notice are:

- Use of State or County lands or funds.
- Use within Conservation District Lands:
- Use within the Shoreline Setback area:
- Use within any Historic Site or District;
- Use within the Waikiki Special District;
- Amendments to a County General Plan (except for those initiated by the County);
- Reclassification of Conservation Lands; and
- Construction or modification of helicopter facilities.

The following permits and approvals may be required prior to project construction.

FEDERAL

U.S. Army Corps of Engineers

• Department of the Army Permit (Section 10 or Section 404) for construction of structures or work in navigable waters.

STATE OF HAWAII

Department of Land and Natural Resources

- Conservation District Use Application (CDUA) and Permit;
- Concurrence of this Department regarding historic sites;
- Notice of Intent to Drill;
- Right of Entry approval for planning and construction work on State-owned lands;
- Dewatering Permit.

Department of Transportation

- Written permit for any project involving permanent or temporary construction;
- Approval for utilities and traffic rerouting.

Office of Planning, Department of Business, Economic Development and Tourism

• Compliance with the Coastal Zone Management Program guidelines.

Department of Health

- National Pollutant Discharge Elimination System (NPDES) Permit;
- Noise Variance Permit;
- Variance for 24-hour construction;
- Permit for Air Emissions;
- Notification of work on sewer lines; (Wastewater generated by harbor activities
 must be collected and transmitted to the City's wastewater facilities. All
 wastewater plans must conform to applicable provisions of the Department of
 Health's Administrative Rules, Chapter 11-62, "Wastewater Systems.")
- Section 401 Water Quality Certification.

COUNTY OF KAUAI

Department of Public Works and Waste Management

- Building Permit
- Driveway Permit
- Grading Permit
- Electrical Permit
- Plumbing Permit

Department of Planning

- General Plan Amendment
- Zoning Amendment
- County Special Use Permit
- State Land Use Commission Special Permit
- Special Management Area Use Permit
- Project Development Use Permit
- State Land Use District Boundary Reclassification
- Variance
- Use Permit
- Shoreline Setback Variance
- Zoning Permits (Class I, II, III, and IV)
- Subdivisions

Board of Water Supply

• Notification of drilling project area.

OTHERS

Hawaiian Telephone Company

Permit or concurrence regarding work on utility lines.

Kauai Electric Company

• Permit or concurrence regarding work on utility lines.

Gas Company

• Permit or concurrence regarding work on utility lines.

Cable TV

• Permit or concurrence regarding work on utility lines.

Energy Corridor

• Fuel easement crossings.

POTENTIAL ENVIRONMENTAL IMPACTS

In today's environmentally sensitive society, major construction projects are construed as the perpetrators of harmful, environmental actions. Because the recommendations contained in the 2025 Master Plan have the potential for adverse environmental impacts,

a cursory environmental assessment of the 2025 proposals is provided in this section. This informational assessment further serves to establish the plan's feasibility by addressing potential regulatory constraints.

Harbor development projects are typically regulated by both Federal and State environmental policies, and occasionally by specific city/county permit procedures. While none of the 2025 Master Plan's recommendations appear to be overwhelmingly intrusive and thus infeasible, the environmental laws, rules, regulations and permits listed under section A of this chapter will be addressed before the Harbors Division proceeds to construct the proposed 2025 projects.

Many of the anticipated environmental impacts are temporary and short-term. Natural processes restore these temporary conditions to their original states. In most cases, it is possible to mitigate adverse environmental impacts and construct the projects within acceptable tolerance levels. The remaining, long-term, adverse environmental impacts are counterbalanced by the essential benefits provided to the general public by the construction of these harbor projects.

Dredging is proposed to widen Nawiliwili Harbor's entrance channel in order to accommodate the largest cruise ships and turning basin improvements to allow the full loading of the sugar barge *Moku Pahu*. Environmental considerations for these dredging projects include surface water quality, hydrology, vibration, biological impacts, groundwater contamination and disposal of dredged spoils. Most of the environmental impacts are short-term and can be mitigated.

In Port Allen Harbor, periodic strong surge occasionally restricts maritime activities. The possible construction of a "dog leg" jetty at the end of the existing breakwater or other surge attenuating structures, if found feasible by the U.S. Corps of Engineers study, requires that attention be given to surface water quality, hydrologic and biological impacts. The jetty or other structures will allow commercial vessels continuous access to the harbor for essential operations and is thus justified by an overall benefit to the public. Short-term, temporary impacts will be mitigated.

Construction of other improvements within harbor waters, e.g., marginal wharves, finger piers and moorings, must consider water quality, vibration, noise and biological impacts, which have historically been mitigated. Landside development projects must address air, water, noise, vibration, dust, emissions, traffic and biological impacts, water quality, land use issues, and site contamination. Mitigation of these environmental impacts is possible and necessary.

As the Harbors Division does not foresee any overwhelming adverse environmental impacts resulting from the pursuit of the 2025 recommendations, no insurmountable regulatory obstacles are expected. Approvals through the normal regulatory processes are therefore anticipated. Such approvals have already been granted for similar projects, setting the appropriate precedents. Comprehensive environmental studies of each site will be completed and the necessary approvals secured before individual projects are started.

X. ACKNOWLEDGEMENT OF PARTICIPANTS

The tenants and users of Nawiliwili Harbor and Port Allen Harbor were invited to participate in this cooperative effort with the gamut of involved government agencies to establish a long-range planning guide for the development of Kauai's essential harbor facilities. We proudly wish to acknowledge the outstanding participants who are responsible for this plan. For those we have inadvertently left out, we proffer our express apologies.

A & B Properties: Tom Shigemoto.

American Hawaii Cruises/United States Lines: Bill Anonsen.

Charter/excursion Boat Industry: Stan Cole, Terry Donnelly, Andrew Evans, Dave Kalthoff, Ronnie Grover, Kevin Millet, Don O'Malley and Debbie Swain.

Chevron USA Products Co.: Paul Coon, Keith Takekawa, Al Mosser, Paul Liang, and Rick Schonberg.

Clean Islands Council: David Carter.

County of Kauai, County Council Representatives: Ron Kouchi, Daryl Kaneshiro, and Kanani Doi.

County of Kauai, Department of Planning: Keith Nitta.

CSX Lines: Clint Taylor.

Department of Health: Gary Ueunten.

Department of Land & Natural Resources, Division of Boating & Ocean Recreation:

James Schoocraft, Howard Gehring, John Hino, Manuel Emilianio, Vaughan

Tyndzik,, Randall Honjo, and Bill Bow (Bow Engineering).

Department of Transportation, Harbors Division: Thomas Fujikawa,

Robert Crowell, Carolyn Kouchi, Jon Nekomoto, Nelson Keller, Fred Pascua,

Glenn Soma, Arnold Liu, Dean Watase and Iris Ishida.

Department of Transportation, PBB: Craig Nosse.

Equilon (formerly Shell Oil Co.): Keith Belknap and Wayne Conoit.

Garden Island RC&D: Stephen Smith.

Gas Company: Robert Miyasaki and Glen Takenouchi.

Hawaiian Cement: Jeff Ching.

Hawaii Pilots Association: David Lyman.

ITT Industries: Dawn Vegas and Keith Correa.

Kauai Electric: Debbie Santiago, Juan Lorenzo, Jr., and Samisoni Tupon.

Kauai Petroluem: Baltazar Manibog and Dwight Yama.

Kauai Westside Watershed Council: Rhoda Libre.

Kerr Norton Marine: Joseph Tabisola.

KUAI Radio: Bill Dahle.

Matson Navigation Company: Gary Moniz and Paul Douglass.

McCabe, Hamilton and Renny Co.: Dane Oda and Roy Morita.

Nawiliwili Watershed Council: Cheryl Lovell-Obatke and David Martin.

Office of Hawaiian Affairs: Donna Santos.

Pacific Missile Base Facility: Dan Momohara, CWO3 Lester Stevenson Jr., Scott Zenger, and Chris Martino.

Port Allen Fishing Club: Melvin Kauahi.

Sause Brothers Ocean Towing: Doug Won and Brad Rimell.

State Legislature: Representative Ezra Kanoho, Representative Bertha Kawakami and Sab Yoshida.

Transmarine Navigation Corp.: Kevin Kinerney.

University of Hawaii Sea Grant representing the Children's Museum): Adam Asquith.

Waldron Steamship: Bill Thayer.

Westside Enterprises: Steven Niau.

Young Brothers: Jeffery Low and Wendell Kam.

Concerned citizens: Joseph Manini, Attwood Makanani, Alvin Freitas, Richard Wheelock, Bruce Pleas, Don Moses, Teddy Rewtrop, Elsie Godbey, Nolan and Olga Holi, Emma Kali DeCosta, Kamalino Wedemeyer and Lori Cabral.

XI. GLOSSARY

ABSORPTION (OR CHARGES): Accrued charges, such as cartage and storage. Sometimes assumed by the carrier for some purpose.

ACCESSORAL SERVICES: Service rendered by a terminal operator or carrier that is subordinate to the principal function of transportation or movement of freight across a terminal (includes weighing, packing, warehousing, etc.)

AD VALOREM (AD VAL): According to value. Usually applied to a custom's duty charged upon the value only of goods that are dutiable.

AISLE SPACE: Space in cargo sheds or warehouses found necessary by operating experience; also usually required by fire safety regulations.

ANCHORAGE: That portion of a harbor (or designated area outside of the harbor) in which ships are permitted to lie at anchor.

APRON: That portion of a wharf or pier between the waterfront edge and the (transit) shed. Strictly speaking, from the viewpoint of construction, that portion o the wharf carried on piles beyond the solid fill. Also called Apron Wharf and Wharf Apron.

BALE CLAMP: See Cotton Squeezer

BARGE-ON-BOARD: LASH/SEABEE/BACAT – Use of specially designed barges or lighters, in which cargo is loaded directly in the barge. The barge is then moved via river and canal networks to a port area to await arrival of an ocean-going barge-carrying ship, then hoisted aboard the ship by cranes or elevators.

BASE: (1) Home depot of container or trailer. (2) The floor of a container.

BASIN, TURNING: An area of water or enlargement of a channel used for turning vessels around.

BAY, TERMINAL: An area in a transit shed or warehouse between posts or columns or the area between lateral ceiling beams or trusses projected downward to the wharf or warehouse floor, the beams, trusses, columns or posts being numbered or lettered and used to designate the location of goods in the warehouse.

BERTH: The water area at the waterfront edge of a wharf, reserved for a vessel, including wharf accessories such as bollards.

BOOKINGS: The reservations or assignments of space or accommodations aboard a vessel for specific cargo or passengers.

BOX (BX): Slang term for container, RO/RO – enclosed container. LASH barge designed with square bow and stern.

BREAK-BULK CARGO: General cargo conventionally stevedored and stowed as opposed to bulk, unitized or containerized cargo.

BREAKWATER: An engineering structure to afford shelter from wave action; may also be called mole, jetty.

BROKEN STOWAGE: The waste in any given stowage space or container caused by irregularity in the size and shape of packages.

BULK CARGO: Cargo stowed without benefit of package or container, i.e., shipped loose, as in grains or liquid.

BULK CONTAINER: Containers of various lengths designed for carriage of liquid or dry commodities in bulk. See Container Types.

BULLRAIL: A guard (wooden, concrete or metal) placed along the outer edge of a pier or wharf to prevent operating equipment from sliding.

CARRIED-ON and CARRIED-OFF (CO/CO): Break-bulk cargo which is carried on and off the ship by fork-lifts as opposed to LO/LO or RO/RO or bulk loading techniques.

CARTAGE: The trucking, draying or carting of freight.

CELLULAR CONTAINER VESSEL: Ship specially constructed for the stowage of containers in vertical stacks or cells. Normally 6-7 high below decks and 3-4 high above decks.

CHANNEL: The buoyed, dredged and policed fairway through which ships proceed from the sea to their berths or from one berth to another within a harbor.

CHASSIS: Special trailer or undercarriage on which containers or RO/RO cargoes are moved over-the-road.

CONSIGNEE: Person or company to whom goods are sent, often the owner of the cargo, when purchase is made F.O.B. country of export.

CONSIGNOR: Person who consigns or sends goods to another.

CONSOLIDATED CARGO: To combine more than one shipment in a container unit, or pallet for more than one consignee.

CONTAINER: A single, rigid, non-disposable cargo box and as the case may be: ventilated, insulated, reefer, flat rack, vehicle rack or open top container with/without wheels or bogies attached not less than 20 feet in length, having a closure or permanently-hinged door, that allows ready access to the cargo. All types of containers will have construction fittings and fastenings able to withstand, without permanent distortion, all the stresses that may be applied in normal service use of continuous transportation.

CONTAINER EQUIVALENTS (FEU/TEU): Forty-foot equivalents; twenty-foot equivalents. The internationally recognized standard conversion basis enabling to make the number of containers of a lot (only as number and not as weight) comparable with other lots.

CONTAINER FREIGHT STATION (CFS): The physical facility where goods are received by carrier for loading into containers or unloading from containers and where the carrier assembles, holds or stores its containers or trailers.

CONTAINER YARD (CY): The open-yard, container storage locations at all container terminals designated by the carrier in the port.

CONTAINER (TYPES): DRY CARGO CONTAINERS: (1) End-loading, fully enclosed: basic container, equipped with end doors; suitable for general cargo not requiring environmental control while en route. (2) Side loading, fully enclosed: equipped with side doors for use in stowing and discharge of cargo where it is not practical to use end doors. (3) Open top.

CONTAINERIZED CARGO: Cargo that can fit physically, conveniently and economically into a container.

COTTON SQUEEZER: (1) Specialized attachment that enables a forklift to pick up four bales of cotton at a time. (2) Also called Bale Clamp and is used for handling of wool.

CRANE: A machine for hoisting weights or cargo moving them vertically/horizontally for limited distances and lowering them to new locations.

CRANE, CARGO: A crane especially adapted to the transferring of cargo between a vessel's hold and a wharf or lighter.

CRANE, GANTRY: A crane or hoisting machine mounted on a frame or structure spanning an intervening space.

CRANE, WHARF: Any crane, located on a wharf or pier designed to serve the vessel alongside.

DEAD HEADING: Moving containers in one direction without revenue cargo in container. Standard term throughout U.S. transportation industry.

DELIVERY: Transfer of care and custody of containers (full or empty) and/or cargo from carrier to shipper/consignee and/or their legal representative.

DEMURRAGE: Penalty charged shippers or receivers of freight, usually at a stated sum per day for detention beyond the free time provided for loading or unloading.

DISCHARGE: To remove or unload cargo from a vessel.

DOCK: The water area alongside a pier or wharf.

DOCK, FLOATING: Submersible platform taking ships on board, enabling the repairing of ships.

DOCK, **DRY**: Basin enabling the repairing of ships by pumping the water outside of the dock, lifting the dock and vessel out of the water.

DOCKAGE: Charge levied against the vessel for the use of berthing area.

DOLPHIN: An isolated cluster of piles used as a support of mooring devices or marker lights.

DRAFT: The depth of a vessel below the waterline, measured to the lowest point of the hull, the bottom of the propeller, or other reference point.

DREDGE: (1) To excavate material from the bottom of a body of water. (2) A machine for excavating material from the bottom of a body of water classified by types of excavating equipment used thereon, as bucket, dipper, hopper, hydraulic dredges.

DREDGE SPOILS: Byproduct of the dredging process; the residual accumulated silt that must be disposed of.

DRY CONTAINER: Containers of various lengths designed for carriers of general cargo (See container types), other than for liquid cargo.

DRY FREIGHT: Non-liquefied cargo not requiring controlled temperature protection.

DUNNAGE: Material used in stowing cargo within a container to prevent movement.

FENDER PILE: A pile driven close to a structure of the pier to prevent movement.

FLAT CONTAINER (FLAT RACK): (1) Open-sided container, usually designed with corner posts for structural supports. Used for carriage of special commodities, such as lumber, tractors, etc. (2) Collapsible container.

FORK PACKETS: Opening in the bottom supports of containers for the entry of the forks of lift truck.

FORKLIFT (FL): Unit used for lifting and handling container units, etc.

FREE ON BOARD (FOB): Delivered (by the seller) aboard the train, ship, etc. at the point of shipment, without charge to the buyer.

FREIGHT HANDLING AREA: Square meters (or feet) of surface floor space between the waterfront edge of the wharf and the line where freight is customarily piled, plus the area of lanes or roadways reserved for the trucking or handling of cargo to and from shipside.

FREIGHTLINER: Name first employed by British Railways for their container hauling operation now being used by the Transportation Industry generally to denote a fast, specialized container cartage service.

FULL CONTAINER LOAD (FCL): Where the load carried in a container equals one of the two operating maximums in weight or volume.

HARBOR: An area of water affording a natural or artificial haven for ships. In a proper and more limited sense, an area separated by natural or artificial indentations of shore line from the main body of water, as the area within two headlines or points between which run the main ship channels leading to an open sea.

HOPPER: A temporary container for bulk material shaped like a funnel, but with four flat tapering sides arranged like an inverted truncated pyramid, with the large end up and generally open and the small end down and generally closed by a gate or valve.

INSULATED CONTAINER: Container possessing protective insulation to minimize effects of external temperatures on the cargo.

INTERMODAL: Used to denote ability of containers to change from rail to truck to ship in any order.

JETTY: An engineering structure at the mouth of a river of harbor or elsewhere to control the water flow and currents, to maintain depth of channel, to protect harbor or beach.

LIFT-ON/LIFT-OFF (LO/LO): Cargo loaded/unloaded by either ship or shore cranes.

LIGHTER: A barge or other small craft used in transferring cargo from ship to ship, ship to shore, or vice versa.

LIGHTERING: A process in which a barge or smaller vessel transfers cargo between

ship and shore.

MAKAI: Hawaiian term for "towards the ocean."

MAUKA: Hawaiian term for "towards the ocean."

MOORING: A place or an object to which a craft can be moored, or made fast.

NEOBULK: Cargo or commodities that move in large unitized loads such as newsprint, lumber, steel, construction components, etc.

PALLET: Basic feature in the mechanized handling of freight. Standard size platform, on which loads can be stacked, constructed for easy movement by forklift or sling. In Europe 1,200 X 1,000 mm pallet is in general use. The English equivalent is 48 in. X 40 in. Growing in popularity is the 48 in. X 48 in. pallet.

PALLETIZED CARGO: Individual items of cargo loaded on a pallet.

PAYLOAD: The carrying capacity of a container.

PIER: The location in a seaport at which cargo arrives or departs. A dock for loading or unloading ships or vessels. A type of wharf, running at an angle with the shoreline of the body of water.

PORT OF ENTRY (U.S.): Point designated by the President, Secretary of Treasury or Act of Congress at which a Customs Officer is assigned with authority to accept entries of merchandise, to collect duties and enforce various provisions of the Customs and Navigation Laws.

PUSH TUG/BOAT: Towboat with square shaped bow and push knees used to push barges in tow and to load/discharge mother vessels.

ROLL-ON/ROLL-OFF (RO/RO): Cargo that is rolled or driven on and off the ships, as opposed to CO/CO, LO/LO or bulk loading methods.

STERN RAMP: RO/RO and ferry-ramp enters into or protrudes from the stern aperture along the centerline or at an angle to the centerline of the vessel.

STORAGE, WHARF: Goods given warehouse accommodations and warehousing rates and conditions on same are in the wharf or the shed set aside for that purpose.

STRADDLE CARRIER (STRAD): A vehicle on wheels, open in the middle, which can straddle a container or container on chassis and move it from one place to another in a container yard. Capable of straddling rows of containers, two to three high.

STUFFING: Loading containers.

TEU: Twenty-foot-equivalent unit. The common unit used in indicating the capacity of a container vessel or terminal. A 40-foot container is equal to two TEUs.

TERMINAL: (1) A berth side area where cargo is loaded to and discharged from vessels. (2) A depot usually inland where containers are brought for devanning.

TON (T) (Tn): A unit of measure, may be short ton (ST), (2,000 pounds), long ton (LT) (2,240 pounds); metric ton (Met. Ton) (2,204.6 pounds); measurement ton (MT) (40 cubic feet of space); revenue ton (RT) (any combination above, as manifested or producing the greatest revenue).

TOW TRACTOR: A tractive unit used to tow containers.

TRANSIT TIME: A time period for cargo to move between two points (e.g. from a consignor to a consignee). Total transit time is usually calculated by adding the sea time between two given ports, the port handling time, the inland movement time and half of the service frequency.

TRANSIT SHED: Wharf structure for the short-time storage of merchandise in transit.

TRIPLE STACKER (TS): Forklift capable of handling containers three high.

TURN-AROUND TIME: The period during which a transport vehicle is confined to port, terminal or warehouse loading or unloading.