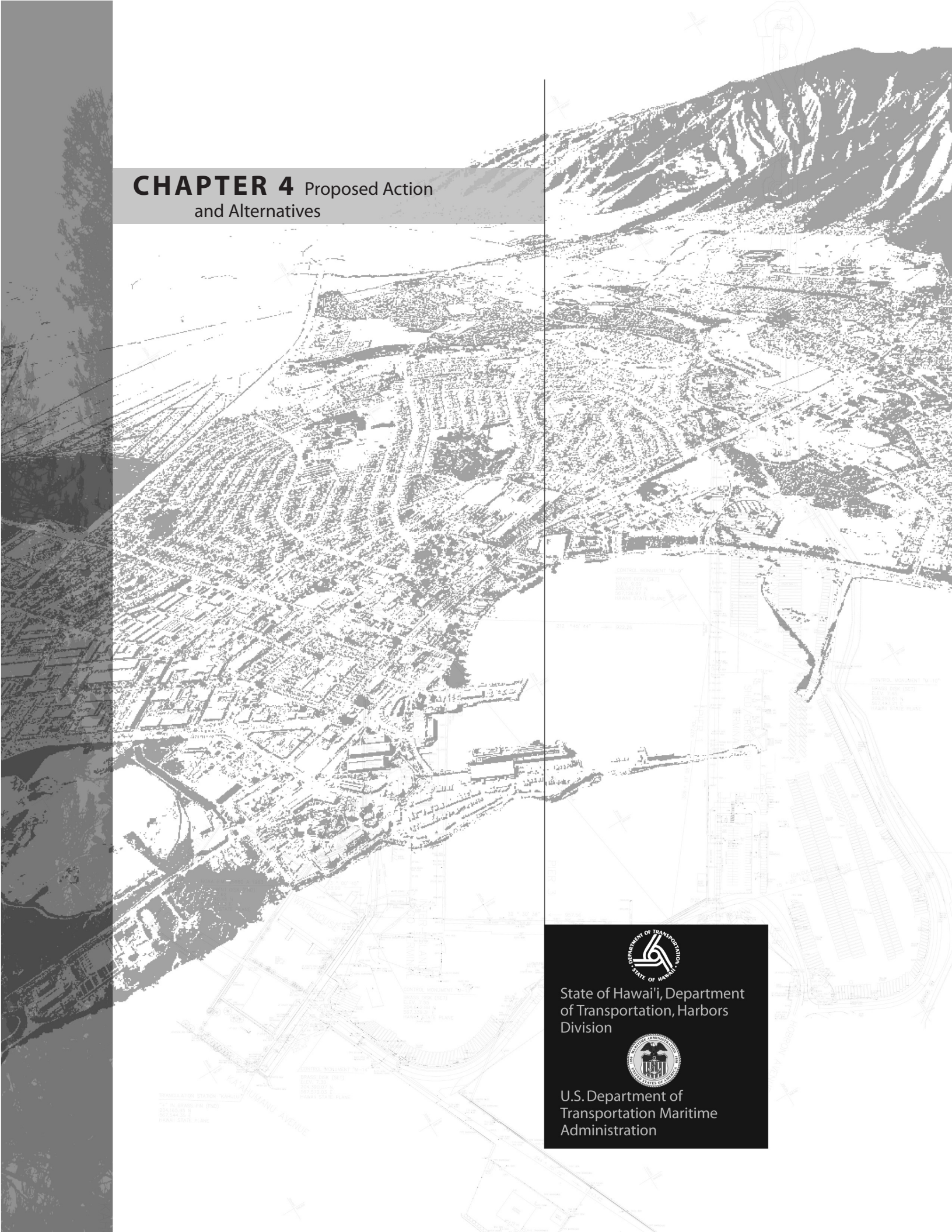
CHAPTER 4 Proposed Action and Alternatives



State of Hawai'i, Department of Transportation, Harbors Division

U.S. Department of Transportation Maritime Administration

CHAPTER 4
PROPOSED ACTION AND ALTERNATIVES

4.1 INTRODUCTION

Kahului Commercial Harbor port facilities and harbor conditions are expected to change in response to greater demands due to population growth, economic growth, and technological and operational changes in the maritime industry. The State of Hawai‘i, Department of Transportation (DOT) Harbors Division (DOT Harbors) has prepared a long-range master plan, incorporated into this document, which serves as a guide for development, enhancement, and maintenance of the harbor through 2030. As part of this *Kahului Commercial Harbor 2030 Master Plan* (2030 Master Plan), several alternatives have been developed to address future requirements for Kahului Commercial Harbor. While these alternatives were crafted with likely users in mind, DOT Harbors will continue its policy of keeping berthing spaces multi-use. Three alternatives are evaluated in this document:

- Alternative A—Develop cruise and inter-island ferry facilities at the West Breakwater Harbor Development; expand Piers 1 and 2 for cargo operations, and build new fuel facility at Pier 3 or 4.
- Alternative B—Develop cruise and inter-island ferry facilities at Pier 2; expand cargo facilities at Piers 1 and 3 and at the West Breakwater Harbor Development.
- No Action Alternative.

4.2 ALTERNATIVES DEVELOPMENT: THE MASTER PLANNING PROCESS

The following were primary influences during the harbor master planning process: (1) *Kahului Commercial Harbor 2025 Master Plan* (2025 Master Plan), (2) *Hawaii Harbor Users Group Report on Port Facilities and Development Priorities,* (3) collaboration with the Maui Harbor Users Group (MHUG) for the 2030 Master Plan, and (4) *Wailuku-Kahului Community Plan.* These are briefly described below.

4.2.1 Kahului Commercial Harbor 2025 Master Plan

Completed in 2000, this plan updated the 2010 Master Plan for Kahului Commercial Harbor. Objectives of the 2025 Master Plan were:

- Plan the proper development of the Kahului Commercial Harbor.
- Optimize the utilization of land and water resources committed to marine cargo and passenger operations in an economically responsible manner.
- Provide terminals, other harbor resources, and access to these facilities in locations within Kahului Bay and other locations in a manner that best relates to and serves Maui in an efficient, safe, and secure manner.
- Minimize the impact on environmental quality and recreational opportunities contiguous with Maui's port facilities.

Additionally, the *Final Environmental Assessment and Finding of No Significant Impact 2025 Master Plan Improvements Kahului Commercial Harbor* (2025 Master Plan Environmental Assessment [EA]) identified short- and long-term improvements for the harbor. The short-term improvements, considered necessary within 10 years (by 2015), included the following:

- Pier 1 extension (Pier 1D).
- Pier 1 comfort stations and sewer line.
- Pier 1 waterline.
- Pier 3 expansion (including dredging between Piers 1 and 2).
- Pier 4 construction (in phases as funds become available).
- Structural pavement, access bridge, and utilities at Pu'unēnē Yard.

To date, approximately half of the comfort station and sewer line project, a portion of the Pier 1 waterline, and the Pu'unēnē Yard improvements have been started or completed. Under the 2025 Master Plan EA, the Pier 1 extension would involve constructing a new 500-foot-long system of breasting dolphins. The single mooring dolphin located 225 feet from the end of Pier 1C, completed in 2005, is not part of the 2025 Master Plan EA improvements.

Long-term projects identified in the 2025 Master Plan EA include:

- Pier 5 (West Breakwater Harbor Development) construction and associated dredging.

- Harbor turning basin dredging and deepening of the existing channel, breakwater improvements, and main channel improvements.
- While Pier 2C was proposed in the 2025 Master Plan, this project will not be constructed in response to comments from canoe clubs and paddlers that use Kahului Commercial Harbor for practices and regattas.[1]

None of these long-term projects has been started.

4.2.2 Hawaii Harbor User Group Report

In 2005, key harbor users in the state formed the Hawai'i Harbor Users Group (HHUG) and funded preparation of a report on port facilities and development priorities. The report evaluated the status of each of the commercial harbors in Hawai'i, identified key operating and capacity issues statewide and at each harbor, and recommended short-, medium-, and long-term developments to relieve existing problems and accommodate anticipated growth. The study identified an impending shortage of port facilities on many of the islands caused by rapid growth of cruise traffic, the introduction of inter-island ferry service, and the continued growth in the transportation of core commodities and consumer goods. The study concluded that the harbor capacity situation on Maui is the most critical of all the neighbor islands; the severity of the problem and the magnitude of the consequences make creation of new port capacity on Maui one of the top strategic priorities for Hawai'i's commercial harbors system. The following were identified as critical facility capacity and access issues at Kahului Commercial Harbor:

- Create a terminal facility for the inter-island ferry.
- Provide additional space for container and cargo operations.
- Relocate cement storage away from the Young Brothers operational area.
- Address competition for berth space between cruise ships, fuel barges, and bulk sugar loading at Pier 1A.
- Separate cruise and cargo operations for safety, security, and operational reasons.
- Dredge adjacent to Pier 3 to allow access by fully-loaded fuel barges.
- Develop a vessel management system for harbor entrance access.

[1] State of Hawai'i, Department of Transportation, Harbors Division. November 2005. *Final Environmental Assessment and Finding of No Significant Impact 2025 Master Plan Improvements Kahului Commercial Harbor.*

The HHUG report identified the following development priorities for Kahului Commercial Harbor:

- Develop the west side of the harbor for cruise and ferry operations (this was the highest identified priority, albeit a long-term strategic goal due to the cost).
- Plan and implement harbor improvements as soon as possible to avoid greater disruptions related to construction operations as the harbor becomes even busier.
- Immediately establish a formal vessel traffic management system to coordinate harbor traffic and improve vessel safety.
- Provide a 24-foot-deep berth for fuel barge operations and expand the number of berths available within the existing port. (The 2025 Master Plan and the HHUG study recommended expansion of Pier 3 towards Pier 1 to create Pier 4. However, because longer barges are coming into service and the nearshore ends of Piers 1 and 2 are actively used, extension of Pier 3 to create Pier 4 would not result in another functional berth. DOT Harbors has commissioned a separate study to investigate options for fuel deliveries.)
- Enhance the cruise passenger facility to improve the ability to turn[2] a vessel on Maui in order to offer three- to four-day cruises.
- Provide a new access route to Pier 2B from Puʻunēnē Avenue, separating traffic from inter-island cargo operations areas.
- Make several improvements to the Pier 2 landside area, including relocating cement tanks elsewhere and closing Ala Luina Street[3] to expand the inter-island cargo terminal.

4.2.3 Maui Harbor User Group (MHUG)

To assist DOT Harbors and the planning team on the 2030 Master Plan, MHUG was formed. The MHUG consisted of representatives of stakeholders in Kahului Commercial Harbor's development, including those concerned with overseas cargo, inter-island cargo, cruise ships, inter-island ferry service, and tug boats, as well as harbor pilots, the U.S. Coast Guard (USCG), major exporters and importers, the U.S. Army Corps of Engineers (USACE), state and county government agencies, non-governmental groups concerned with economic development or tourism, and recreational users of the harbor, including canoe paddlers, surfers, and small boaters. (A list of participants is provided in Appendix A.) The charter of the MHUG was to

[2] *Turn* refers to how long a vessel is at berth.

[3] Ala Luina Street was closed to through traffic in February 2007. Traffic is limited to vehicles going to/from Matson sales office, Harbors Division office and truck traffic for Young Brothers and sand barges.

provide technical guidance to the master planning team. While it was recognized at the outset that reaching group consensus concerning harbor development was probably an unrealistic goal (considering the diverse and sometimes competing interests represented), MHUG proceedings were characterized by sincere efforts to balance interests and accommodate the needs of all user groups. The MHUG met on three occasions; the meeting process, objectives, and work products are summarized below.

MHUG Meeting #1

The first MHUG meeting was held on October 16, 2006. Participants were divided into small groups with major interests represented in each group. Each group identified expectations and issues they felt were important in planning for the future. From this exercise, a list of criteria was developed for use in evaluating future harbor development alternatives. These criteria were then used as the basis for the second MHUG meeting.

MHUG Meeting #2

The second MHUG meeting was held on November 13, 2006. For this meeting, the MHUG was divided into small groups with similar interests. Interests represented were cargo, cruise, and ferry operations, recreational users, and landside agencies. Participants were provided a list of assumptions and criteria developed from the first meeting, and each group was asked to accept, reject, or modify them as appropriate. Each group was also provided with a "menu" of potential harbor developments for cargo, cruise, ferry, and recreational uses. The groups were tasked with developing an alternative harbor configuration that met the assumptions and criteria they felt were most important. From this exercise, a total of five different alternatives were generated. Three of the alternatives were similar, to the extent that passenger operations (cruise and ferry) were moved to the West Breakwater Harbor Development, and cargo operations were concentrated at Piers 1, 2, and 3. The other two alternatives expanded the harbor, one to the northwest of the West Breakwater, and one to the northeast of the East Breakwater.

While there were clearly differences between the small groups and their alternative solutions, the group as a whole approved of two criteria. The majority of the MHUG agreed that (1) one dedicated cruise berth would be sufficient for the harbor, even though the projections indicate a second cruise berth would be needed by 2030; and (2) that cargo would have highest priority in developing the 2030 Master Plan.

MHUG Meeting #3

The final MHUG meeting was held on January 10, 2007. The working list of assumptions and criteria developed in the previous meeting was distributed at the outset of the third meeting. The list is presented in Figure 4-1.

Based on the various alternatives developed in the second MHUG meeting, along with the set of assumptions and criteria above, four primary alternatives and two long-range alternatives were presented by the planning team for review and discussion. Each participant was asked to select a preferred alternative from among the four primary alternatives. Modifications to any alternative could be proposed and all alternatives could be rejected. Although a complete consensus was not reached, there was overwhelming support for the eventual preferred alternative, Alternative A (Section 4.3 provides detailed descriptions of the alternatives).

4.2.4 Wailuku-Kahului Community Plan

The Community Plan "reflects current and anticipated conditions in the Wailuku-Kahului region and advances planning goals, objectives, policies and implementation considerations to guide decision-making in the region through the year 2010. The Wailuku-Kahului Community Plan provides specific recommendations to address the goals, objectives and policies contained in the [Maui] General Plan, while recognizing the historic values and unique spiritual significance of island cultures of Wailuku-Kahului, in order to enhance the region's overall living environment."

This 2030 Master Plan was developed recognizing (1) the critical importance of Kahului Commercial Harbor to all of Maui's residents and visitors, (2) its particular cultural and recreational value to residents of Central Maui, and (3) the disproportionate impacts that harbor development could have on the residents, infrastructure, and environment of the region. To better understand the aspirations of the Central Maui community, the planning team reviewed the Wailuku-Kahului Community Plan for guidance on future development of Kahului Commercial Harbor. The goals and objectives of the community are formalized in this plan which tiers from the Maui County General Plan, the State Functional Plans, and the Hawai'i State Plan.

At the two Maui Harbor Users Group meetings held in 2006, participants agreed on the following assumptions:

- Maui needs the harbor space—berth space and land area—to move commercial cargoes to and from the island. This is a priority now and as the economy expands in the future.
- We need solutions that can be implemented soon and a plan that will address current needs. The solution for 2030 must be one that can be reached step by step over the coming years, not a vision that would take so much work and money to implement that it will never be realized.
- We have to co-exist in the harbor as a community. This means both that it's important to accommodate commercial and recreational uses, and that broad community support is wanted for improvements in the harbor area.
- Consider navigational issues—notably surge—seriously.
- Consider safety and security. Plan for security zones.
- Ships and barges are getting bigger. If we plan just for current sizes, we may face serious problems of congestion with new vessels.

These additional assumptions had strong support:

- Separate cargo and passenger activities.
- Organize berthing as efficiently as possible, with multiple uses in mind. Don't dedicate berths to one use, leaving some areas underused and others congested.

The consultants presented the results of demand studies to the Users Group. The Users Group then identified minimal criteria:

- 7 cargo berths (although one group had plans to make do with 6).
- 1 cruise berth (although the projections study indicated demand for 2).
- Land area for these activities:
  - 52 acres open space for containers and general cargo;
  - 10 acres for autos.
  - Approximately 63,000 square feet of warehouse space.
  - Dry bulk and liquid bulk storage outside the port area.
  - Approximately 11 acres for cruise and ferry logistics, and parking.
  - A cruise terminal (approximately 36,000 square feet).

Figure 4-1
MHUG ASSUMPTIONS AND CRITERIA FOR KAHULUI COMMERCIAL HARBOR

Belt Collins

The Community Plan provides specific guidance for the future of Kahului Commercial Harbor. Generally, the Community Plan states "…the commercial port of Kahului Commercial Harbor is viewed as inadequate and approaching capacity. In the long term, a new commercial harbor facility may be needed, given the limited area of the existing harbor." As described in Section 4.6.2, several previous studies have investigated possible sites for a second Maui commercial harbor, but costs, environmental constraints, and community opposition have forestalled this initiative. The 2030 Master Plan recognizes the eventual need for expansion of commercial harbor facilities, alongside Kahului Commercial Harbor or elsewhere in Maui. It concludes, however, that such a development is outside the planning horizon of the 2030 Master Plan, especially given that utilization of the West Breakwater Harbor Development would alleviate a great deal of the congestion now being experienced in Kahului Commercial Harbor.

The Wailuku-Kahului Community Plan offers other guidance on future development of Kahului Commercial Harbor and its environs. Specific aspirations of that plan are:

- Support the expansion of Kahului Commercial Harbor, the island's primary commercial harbor, to accommodate long-term needs. DOT should be encouraged to allow recreational uses by canoe clubs or provide an alternative site for such uses in its long-range master plan. The harbor master should also incorporate safe bicycle and pedestrian access (to be part of a "greenway" connecting Kahului to Paia). Support the investigation of alternative sites for a second commercial harbor facility on the island of Maui. Further, DOT should be strongly encouraged to mitigate its traffic impacts prior to, or in conjunction with the Harbor expansion, including but not limited to the following:
    - Improve the intersections between Ka'ahumanu Avenue and Wharf Street and Hobron Avenue;
    - Provide alternative and bypass routes for vehicular traffic, possibly including a direct route to Kahului Airport;
    - Provide safe (possibly underpass) routes for pedestrian traffic;
    - Acquire pockets of land for more efficient facility location within Kahului Commercial Harbor; and
    - Work with the community to plan a second commercial harbor.
- Encourage joint government action in the investigation of seaweed build-up in Kahului Commercial Harbor and other affected areas and the implementation of coordinated clean-up and other mitigative actions.

- Place high priority on updating plans for Keopuolani Park, including enhancement of the Kahului Commercial Harbor shoreline.

4.3 DESCRIPTION OF ALTERNATIVES

The final set of alternatives for the 2030 Master Plan and Draft Environmental Impact Statement (EIS) for Kahului Commercial Harbor is based in large part on the discussions and output generated during the MHUG meetings. These alternatives are:

- Alternative A—Develop cruise and inter-island ferry facilities at the West Breakwater Harbor Development; expand Piers 1 and 2 for cargo operations, and build new fuel facility at Pier 3 or 4.
- Alternative B—Develop cruise and inter-island ferry facilities at Pier 2; expand cargo facilities at Piers 1 and 3 and at the West Breakwater Harbor Development.
- No Action Alternative.

4.3.1 Alternative A (Proposed Action)

Develop cruise and inter-island ferry facilities at the West Breakwater Harbor Development; expand Piers 1 and 2 for cargo operations, and build new fuel facility at Pier 3 or 4.

Under Alternative A, terminals for the cruise ship and inter-island ferry operations would be developed at the West Breakwater Harbor Development. Passenger operations would be relocated from Piers 1 and 2 to relieve existing congestion, improve passenger safety and security, and provide capacity for cargo handling growth through FY30.[4] Figure 4-2A shows Alternative A1 with a new Pier 4. Figure 4-2B shows Alternative A2 with a new Pier 3.[5]

The existing harbor basin would be widened approximately 800 feet to allow safe navigation and access to the proposed cruise and ferry berths at the West Breakwater Harbor Development. An inner breakwater extension or bulkhead structure is required to limit wave action and surge at the West Breakwater Harbor Development. An extension of the East Breakwater is also required to limit wave action and surge currently affecting vessels navigating within the entrance channel and harbor turning basin, as well as vessels at berth.

[4] Space for a transit stop could be incorporated in terminal design.

[5] There are other fuel pier options that are being actively considered for Pier 3, along with the variants that would locate fuel operations at Berths 1C and 1D.

The proposed West Breakwater Harbor Development passenger terminals would include two new piers (a 500-foot pier and a 1,200-foot pier) and approximately 22 acres of backup area for cruise passengers, inter-island ferry passengers, and future markets to be determined. The West Breakwater Harbor Development would be filled, graded, paved to support heavy loads, and bounded by perimeter security fencing. Support facilities (such as offices, roads and staging areas, infrastructure improvements, utilities, and security measures) would be constructed as part of this alternative.

Note that the configuration of the filled area (Pier 2) and breakwater extension in the figures are conceptual. The conceptual design is intended to help determine the land area deemed necessary in the master plan forecasts. The final design and configuration of the improvements are dependent on further development plans or engineering studies.

Pier 1 would be lengthened from 1,658 feet to 2,400 feet and the backup area enlarged to 20.5 acres. Primary cargoes for Pier 1 would include overseas containers, autos, sugar, molasses, sand, gravel, pineapple, tin plate, scrap material, coal, petroleum products, and future markets to be determined.

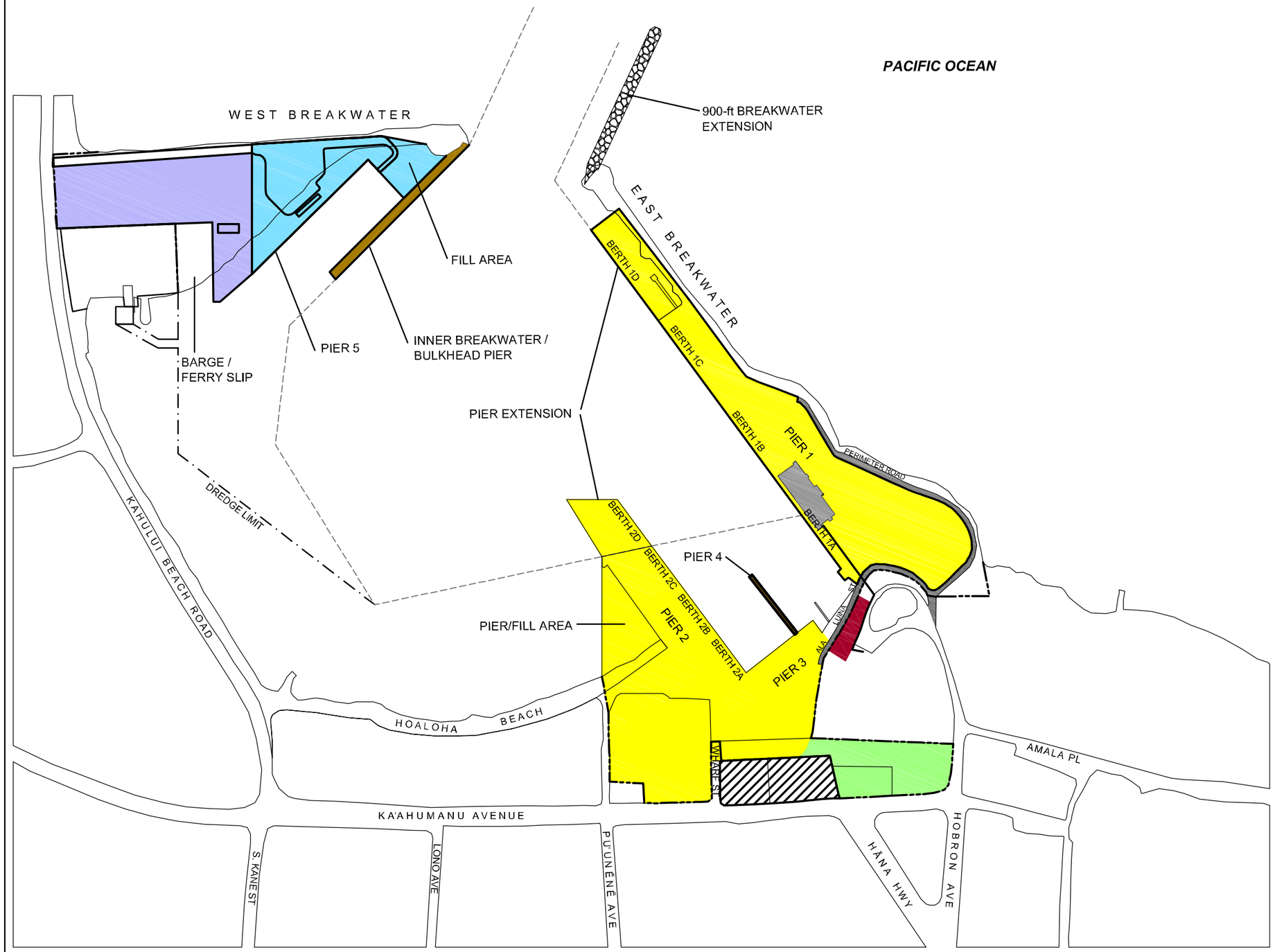
Pier 2 would be lengthened from 894 feet to 1,200 feet and the backup area enlarged to 28.9 acres. Primary cargoes for Pier 2 would be inter-island containers, autos, roll-on/roll-off (RO/RO) operations, petroleum products, dry cement, and future markets to be determined.

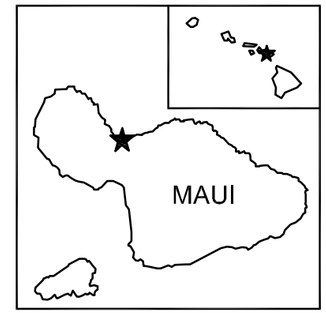
The surface of Pier 2 would be strengthened to support 1,000 pounds per square foot (psf) loads. The pier area would be enlarged to the north by filling the triangular area between the current end of the pier and the beach near Puʻunēnē Avenue.

As of this writing, the *Statewide Fuel Facilities Development Plan* (Fuel Plan) has identified three ways to alter Pier 3 to create a new fuel pier:

- One option would be to create a new Pier 4 perpendicular to Pier 3 (Figure 4-2A). The new Pier 4[6] would provide berthing and transmission facilities for liquid and dry-bulk cargoes. Primary cargoes would include fossil fuel and biofuel products, propane, and cement. The pier could also be used for the handling of cargoes now at Pier 3 (sand and gravel). RO/RO cargo barges would be able to berth at Pier 4 and unload cargo at the south end of Pier 3. Once Pier 4 is built, Pier 3 would only be useable for berthing small vessels, such as tugboats.

[6] This new Pier 4 plan is different from the one proposed in the 2025 Master Plan.





- EXISTING CHANNEL & TURNING BASIN
- NEW CHANNEL/DREDGE LIMIT
- DOT PROPERTY LINE
- CONVEYOR
- POSSIBLE EXPANSION AREA
- ADMINISTRATION
- AUTO STORAGE
- COVERED STORAGE / SHED
- CRUISE OPERATIONS
- INTER-ISLAND FERRY
- NEW PIER / CONSTRUCTION
- OPEN STORAGE
- ROADWAY

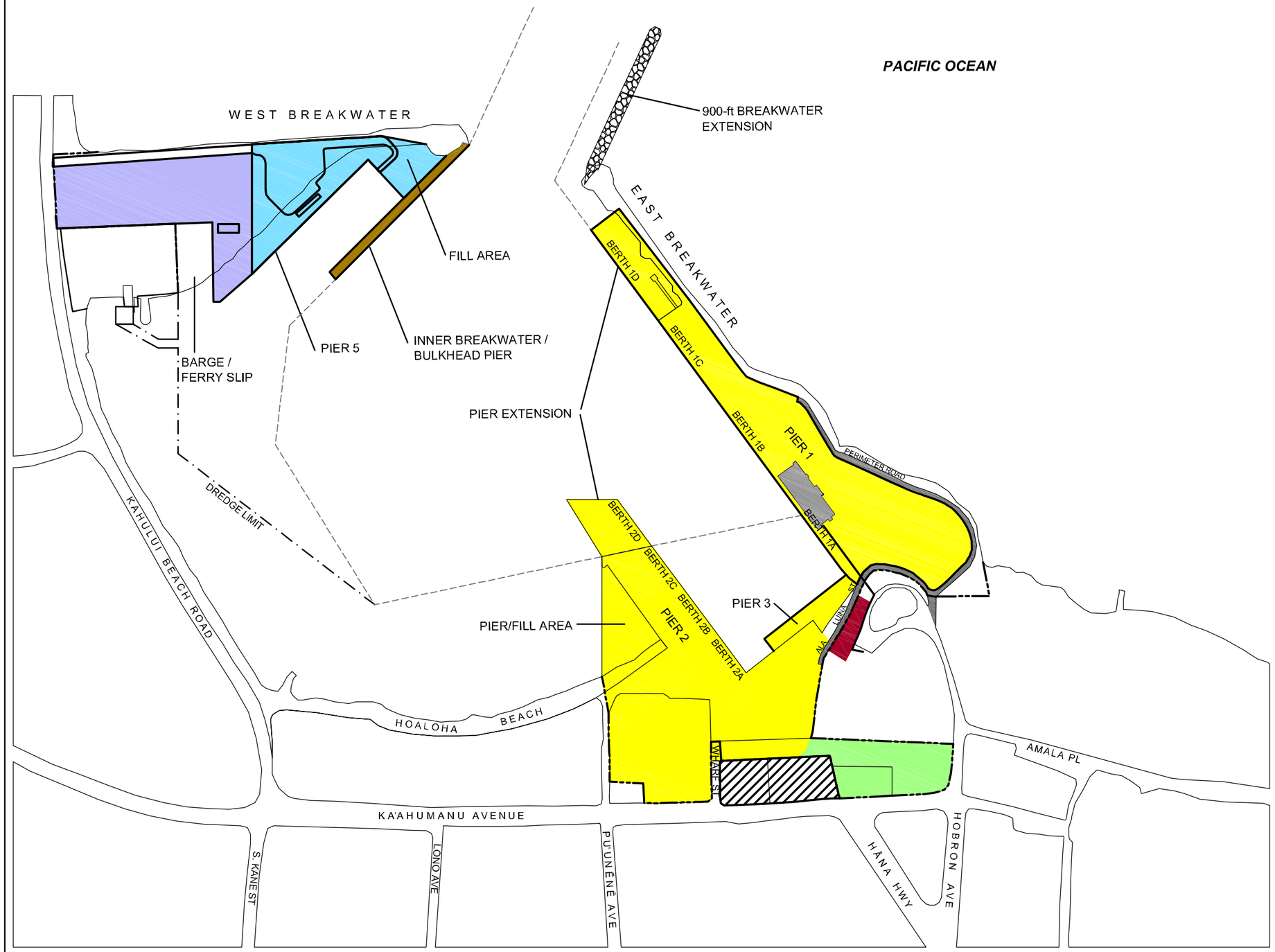
BeltCollins

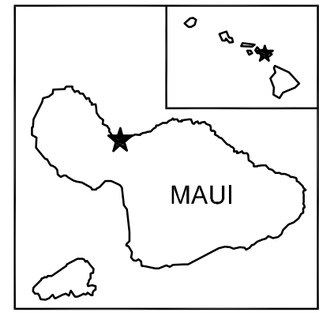
NORTH

0 150 300 600
SCALE IN FEET

FIGURE 4-2A
ALTERNATIVE A1 AT KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007





- EXISTING CHANNEL & TURNING BASIN
- NEW CHANNEL/DREDGE LIMIT
- DOT PROPERTY LINE
- CONVEYOR
- POSSIBLE EXPANSION AREA
- ADMINISTRATION
- AUTO STORAGE
- COVERED STORAGE / SHED
- CRUISE OPERATIONS
- INTER-ISLAND FERRY
- NEW PIER / CONSTRUCTION
- OPEN STORAGE
- ROADWAY

BeltCollins

NORTH

0 150 300 600
SCALE IN FEET

FIGURE 4-2B
ALTERNATIVE A2 AT KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007

- Alternatively, Pier 3 could be extended to the south and into the harbor area, creating a berth for fuel barges (Figure 4-2B).
- Finally, a new bulkhead could be constructed in front of Pier 3 using sheet piles and the area under the piers filled.

New fuel transmission lines would be needed along with dredging of the area between Piers 1 and 2 to accommodate fully loaded cargo barges. Figure 4-2A and Figure 4-2B show two fueling options. (Demand projections indicate a need for 1.93 berthing spaces by the year 2030, one for a fuel barge and another for a small fuel ship. These two variants concentrate fuel operations at Piers 1 and 3, while the other fueling variant, discussed as part of Alternative B, moves those operations to Pier 1 at Berths 1C and 1D.)

Support facilities (such as roads, offices, infrastructure improvements, utilities, and security measures) would be constructed as part of this alternative. To handle increasing demand for fuel, loading arms (at Berth 1B) and new transmission pipelines may be needed (to both fuel berths). Additional fire suppression equipment would be needed. Fuel storage would be accommodated outside the commercial harbor due to the limited available land area.

Development of the two parcels acquired from Alexander and Baldwin Properties (A&B Properties) is included in Alternative A; the parcels are described in Section 2.1. They provide suitable space for cargo handling and storage and associated uses. The historic Kahului Railroad Building could be used for offices with interior and no exterior modification.

When the Kahului Railroad Building becomes available for offices, the dockside space currently used for DOT Harbors' Maui District office could become available for cargo handling and storage. DOT Harbors proposes to allot part of that space for a cement silo, allowing more efficient handling of this cargo at Pier 3 or 4. Removal of the cement silos from their current site at the base of Pier 2 would improve general cargo movement and storage at that area.

4.3.2 Alternative B

Develop cruise and inter-island ferry facilities at Pier 2; expand cargo facilities at Piers 1 and 3 and at the West Breakwater Harbor Development.

In Alternative B (refer to Figure 4-3), the West Breakwater Harbor Development would be developed for cargo operations, and Pier 2 would accommodate inter-island ferry and cruise operations.

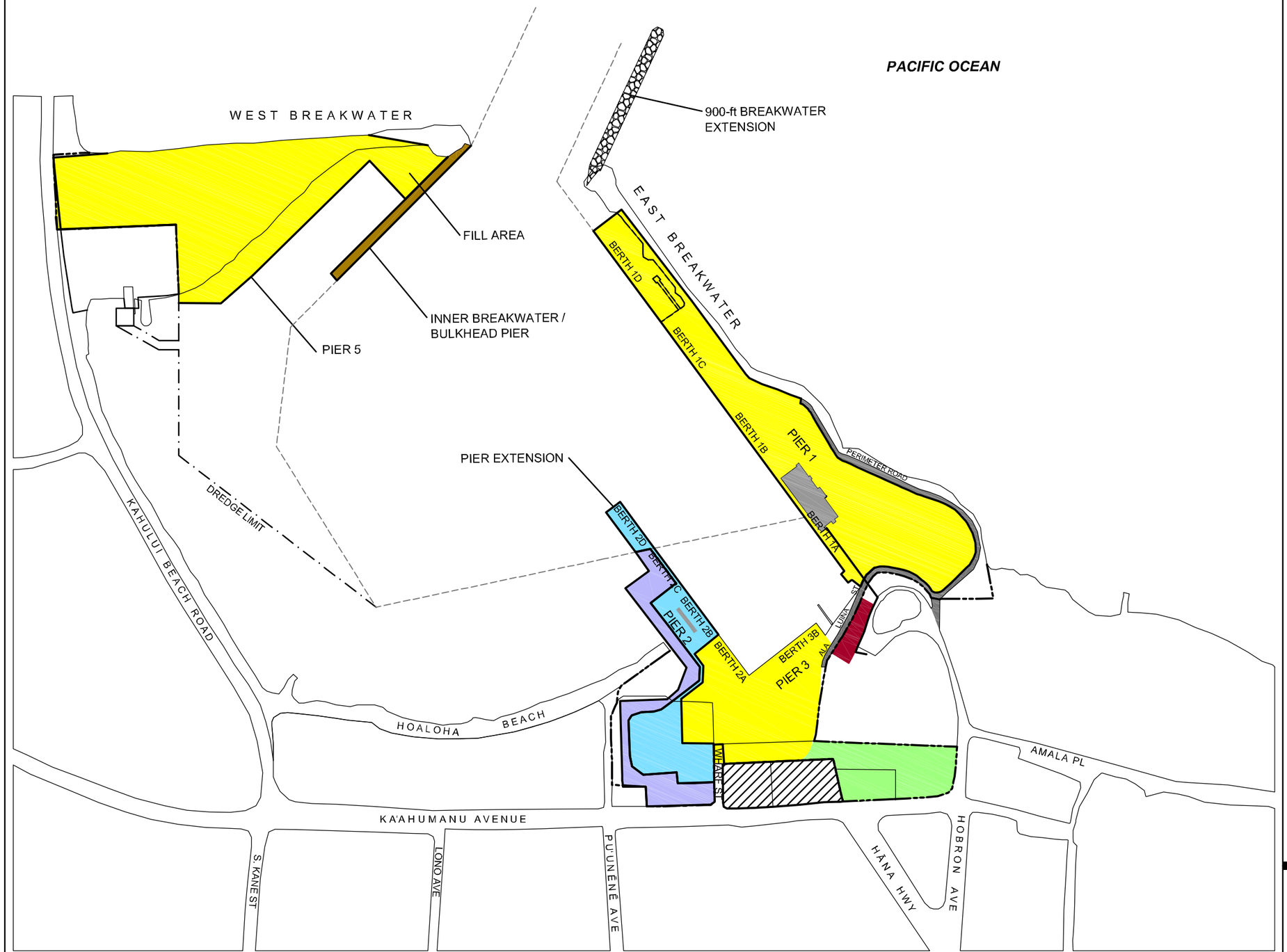
As in Alternative A, the existing harbor basin would be widened approximately 800 feet to allow safe navigation and access to the proposed cargo berths at the West Breakwater Harbor Development. Other improvements would be the same as in Alternative A to limit wave action and surge: an inner breakwater extension or bulkhead structure and an extension of the East Breakwater.

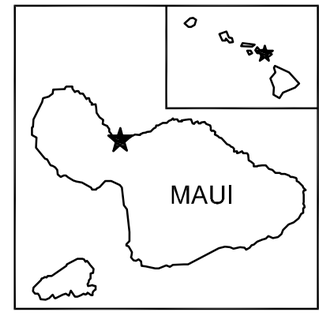
The West Breakwater Harbor Development would include a new 1,200-foot pier and approximately 24 acres of backup area for inter-island containers, autos, RO/RO, other containerized break-bulk cargo operations, and future markets to be determined. Support facilities (such as roads, offices, infrastructure improvements, and security measures) would be constructed as part of this alternative. The West Breakwater Harbor Development would be graded, filled, and paved. Pavement would be strengthened to support 1,000 psf loads for all areas where cargo could be moved.

Note that the configuration shown in Figure 4-3 is conceptual. The conceptual design is intended to help determine the land area deemed necessary in the master plan forecasts. The final design and configuration of the improvements are dependent on further engineering studies.

Pier 1 would be lengthened to 2,400 feet, with 20.5 acres for cargo operations and storage and a 1.2-acre shed. Primary cargoes at Pier 1A and 1B would include overseas containers, autos, sugar, molasses, sand, gravel, pineapple, tin plate, scrap material, coal, petroleum products, and future markets to be determined. Berth 1C and/or 1D would have transmission pipelines to allow use as a fuel dock. Primary cargoes would include fossil fuel and biofuel products, as well as propane. If Berth 1D were to be dedicated for use as a fuel pier, it could be narrower than the rest of Pier 1. With such a recessed structure, the wave climate at Berth 1D might be tolerable for fuel transfer operations even without the new breakwater extension proposed for the East Breakwater. Further wave climate modeling will be needed before breakwater extensions are designed.

Pier 2 would be lengthened from 894 to 1,200 feet to berth a cruise ship, and a passenger shed would be constructed on the pier for cruise passenger processing. A total of 6.2 acres would be dedicated for cruise operations, including staging areas for busses, taxis, and rental cars. A portion of Pier 2 would be demolished to allow berthing of the ferry at the end of the pier while minimizing impacts on navigation within the existing harbor basin. The total area proposed for the ferry terminal is 4.4 acres. Access to the ferry would be provided by a ramp. The remaining backup area adjacent to Piers 2 and 3, comprising 10.6 acres, would be utilized for cargo operations and storage.





- OLD CHANNEL & TURNING BASIN
- NEW CHANNEL/DREDGE LIMIT
- DOT PROPERTY LINE
- CONVEYOR
- POSSIBLE EXPANSION AREA
- ADMINISTRATION
- AUTO STORAGE
- COVERED STORAGE / SHED
- CRUISE OPERATIONS
- INTER-ISLAND FERRY
- NEW PIER / CONSTRUCTION
- OPEN STORAGE
- ROADWAY

BeltCollins

NORTH

0 150 300 600
SCALE IN FEET

FIGURE 4-3
ALTERNATIVE B AT KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007

Pier 3 would remain unchanged at 500 feet long. The backup area would be included with the total for Pier 2 above. Primary cargoes for Pier 3 would be cement, sand, gravel, and petroleum products.

Alternative B also covers development of the parcels acquired from A&B Properties, including cargo handling and storage facilities, offices, and associated uses.

Alternative B was not selected as the preferred alternative for several reasons. First, it does not effectively separate passenger operations from cargo operations. The cruise/ferry terminals on Pier 2 are still in close proximity to cargo operations on Piers 1 and 3 and the associated open storage areas. Secondly, separating cargo operations on the existing harbor and West Breakwater Harbor Development limits the ability of the overseas and inter-island container operators to work together and transfer cargo between their operations.

4.3.3 No Action Alternative

The No Action Alternative (Figure 4-4) assumes no expansion of existing facilities except for projects already planned and approved under the 2025 Master Plan EA, as well as other actions such as programmed maintenance. Exceptions to this are noted below.

The Pier 1 extension (Pier 1D) has already been approved in the 2025 Master Plan EA.[7] The 2025 Master Plan EA shows Pier 1D as a 500-foot-long breasting dolphin system extending from Pier 1C. Currently, a single mooring dolphin and catwalk extend from Pier 1C out to approximately 225 feet. The dolphin and catwalk were constructed in 2005.[8] This existing mooring dolphin is not part of the original Pier 1D extension alternative. Under this No Action alternative, the pier extension could be accomplished in several ways. The existing dolphin/catwalk could either be extended to 500 feet or replaced entirely with a new 500-foot-long series of breasting dolphins. Additionally, Piers 1C and 1D could also be adapted for use as fuel docks.

While construction of Pier 4 has already been approved under the 2025 Master Plan EA, this Pier 4 is currently not being considered by DOT Harbors as a practical option—longer barges, along with increased activity at Pier 1A, would limit the functionality of Pier 4. A new Pier 4 option is discussed in Alternative A, and this option would only be constructed under Alternative A. However, harbor operations,

[7] In 2005, OEQC published the FONSI for the 2025 Master Plan EA. In July 2007, JudgeJoel August of the Third Circuit Court ruled that the 2025 Master Plan EA was acceptable except for the traffic analysis portion was found deficient. The traffic analysis is being expanded in a supplemental EA.

[8] Funding for the dolphin was provided by the Matson Navigation Company, under HRS Section 266-19.5 Private Financing of Harbor Improvements. An EA for the mooring dolphin was completed in 2004.

economic, technological, and funding situations could change by 2030 to warrant reconsidering using the 2025 Master Plan Pier 4 option.

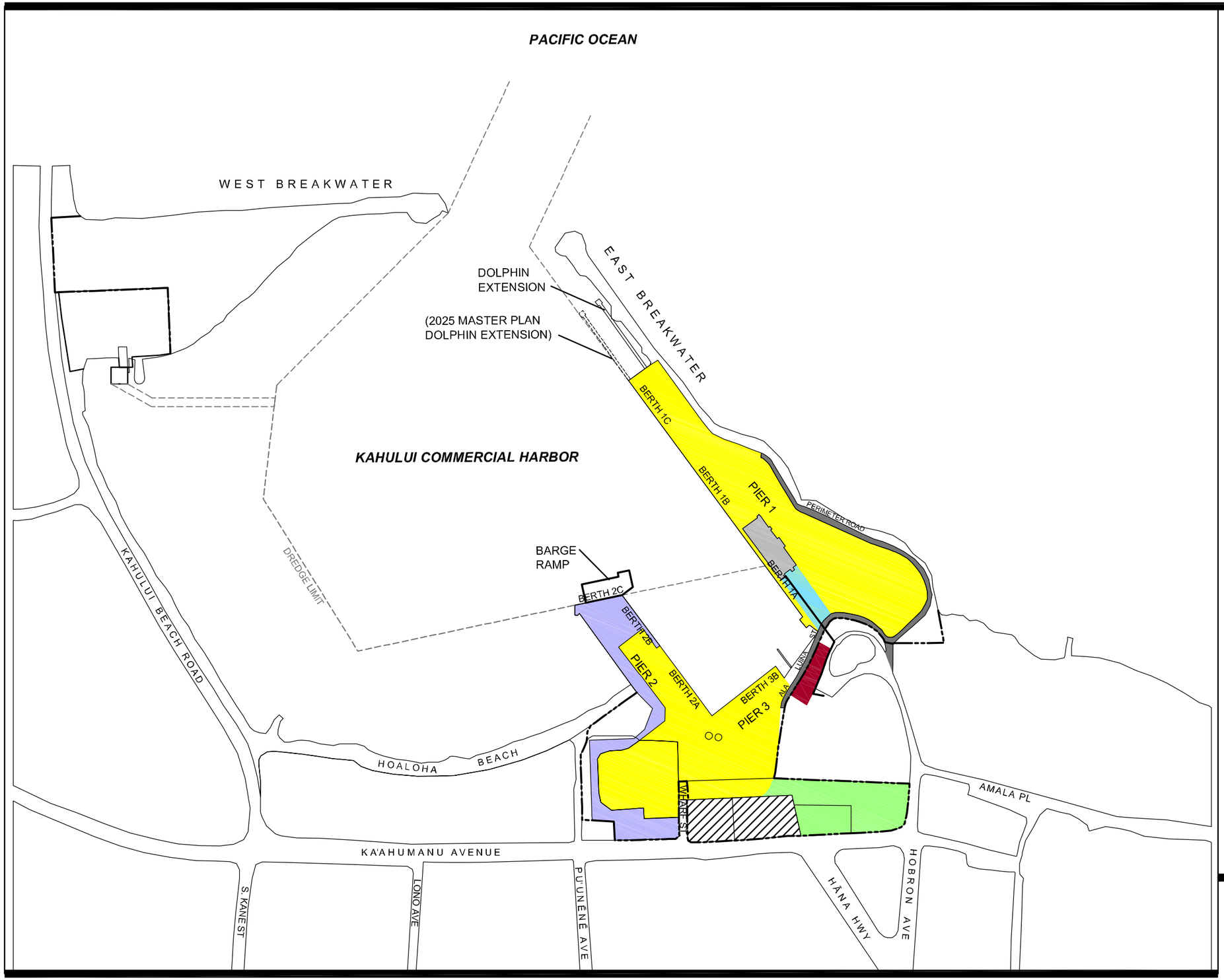
The No Action Alternative does not cover any development, renovation, demolition, or special use of the parcels acquired from A&B Properties. Under No Action, with limited additional acreage available for cargo handling and storage, it is presumed that DOT Harbors would need to allocate as much space as possible on these parcels to help meet growing demand for cargo yard space.

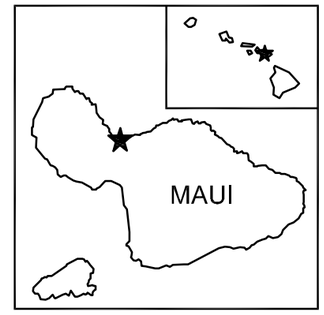
4.4 PHASED DEVELOPMENT OF PROPOSED ACTION

Facility improvements would be accomplished over the course of several years to coincide with growing demands and increases in cargo throughput. Some of these improvements are required more immediately, as the commercial harbor is already at or near its capacity in terms of available berthing and cargo storage areas. Phased development would be planned to allow operations to move into the newly constructed areas in a logical manner. Finally, phasing would be coordinated with other project-related issues, including availability of funding, permitting, safety, and security.

Kahului Commercial Harbor currently lacks the landside area needed to efficiently handle the mix of commercial vessels it serves, and pier space is limited. To address both issues, immediate action to expand working areas is proposed.

The initial phase of development (Alternative A, Phase 1) would focus on the development of the two former A&B Properties' parcels for cargo operations and the West Breakwater Harbor Development (Figure 4-5). Construction in the A&B properties could involve structural paving, interior modifications to existing buildings, and utility improvements. Construction at the West Breakwater Harbor Development would likely involve clearing and grading the existing land area, dredging approximately 400,000 cubic yards within the harbor, filling in the inner side of the breakwater to create berths, and construction of a new inner breakwater/bulkhead structure. Section 4.7.2 provides specific construction methods which may be used. Construction of new berths and acquisition of additional land could be accomplished with minimal disruption to existing facilities and operations. As this phase of the work is completed, the passenger operations could be shifted to the West Breakwater Harbor Development to separate cargo and passenger operations and to free up valuable berth space and open storage at Piers 1 and 2. Alternatively, the West Breakwater Harbor Development could be used for cargo operations.





- CHANNEL & TURNING BASIN
- DOT PROPERTY LINE
- CONVEYOR
- AUTO STORAGE
- COVERED STORAGE / SHED
- CRUISE OPERATIONS
- INTER-ISLAND FERRY
- OPEN STORAGE
- ROADWAY
- ADMINISTRATION
- POSSIBLE EXPANSION AREA

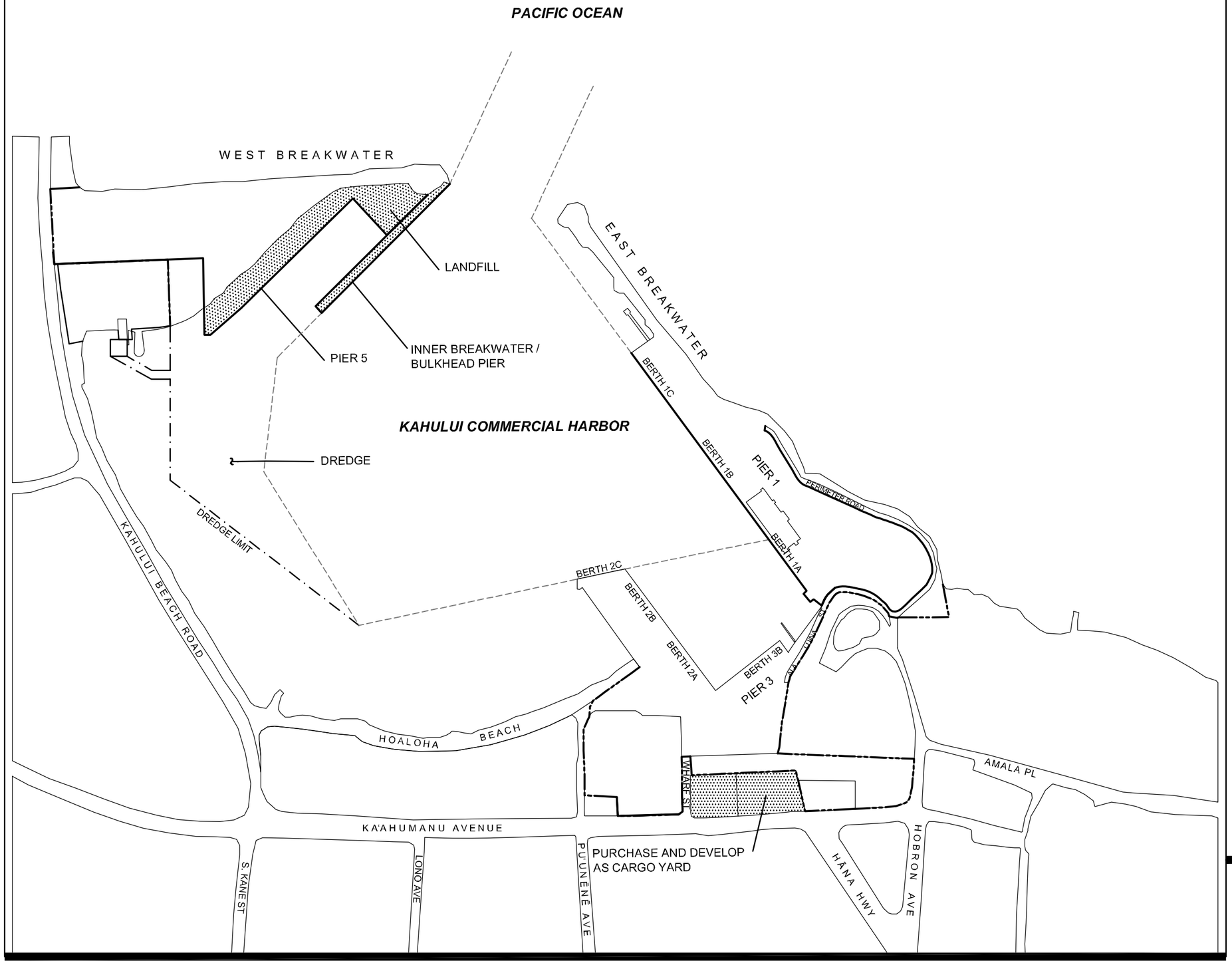
BeltCollins

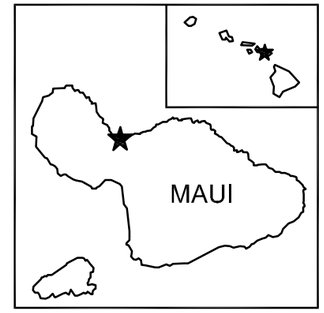
NORTH

0 150 300 600
SCALE IN FEET

FIGURE 4-4
NO ACTION ALTERNATIVE AT KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007





OLD CHANNEL & TURNING BASIN

NEW CHANNEL/DREDGE LIMIT

DOT PROPERTY LINE

NEW CONSTRUCTION (CONCEPTUAL)

BeltCollins

NORTH

0 150 300 600

SCALE IN FEET

FIGURE 4-5
ALTERNATIVE A - PHASE 1 AT KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007

The second phase of development under Alternative A would include an extension of Pier 2 and associated fill area adjacent to the pier and construction of Pier 4 (Figure 4-6). This would provide additional capacity for cargo operations at Pier 2 and liquid- and dry-bulk operations, including fuel, at Pier 4.

The third phase of development would include an extension of Pier 1 and construction of the East Breakwater extension (Figure 4-7). The extension would provide additional capacity for cargo operations, berthing larger vessels, and accommodating additional vessel calls.

Phasing priorities could change if funds were available for extensive work in the first phase. DOT has developed a Harbors Modernization Plan in collaboration with HHUG. It will submit funding requests to the 2008 State Legislature for work at harbors throughout Hawai‘i, over and above the work that can be supported by current harbor funding sources. If the State Legislature approves, work at Kahului Commercial Harbor in the next few years could include land acquisition, the West Breakwater Harbor Development, the East Breakwater extension, dredging, and Pier 2 strengthening.

4.5 ORDER-OF-MAGNITUDE COST ESTIMATES

Order-of-magnitude cost estimates were developed for Alternatives A and B. The opinions of probable cost were segregated by in-water work (dredging and breakwaters) and terminal development. All costs are in 2007 dollars and do not include any escalation costs. A contingency factor of 30 percent was used to account for the conceptual nature of the alternatives and other unforeseen conditions. Unit prices for the various work elements were derived from bid results supplied by DOT Harbors and experience with other terminal development projects. The cost estimate details are included in Appendix E.

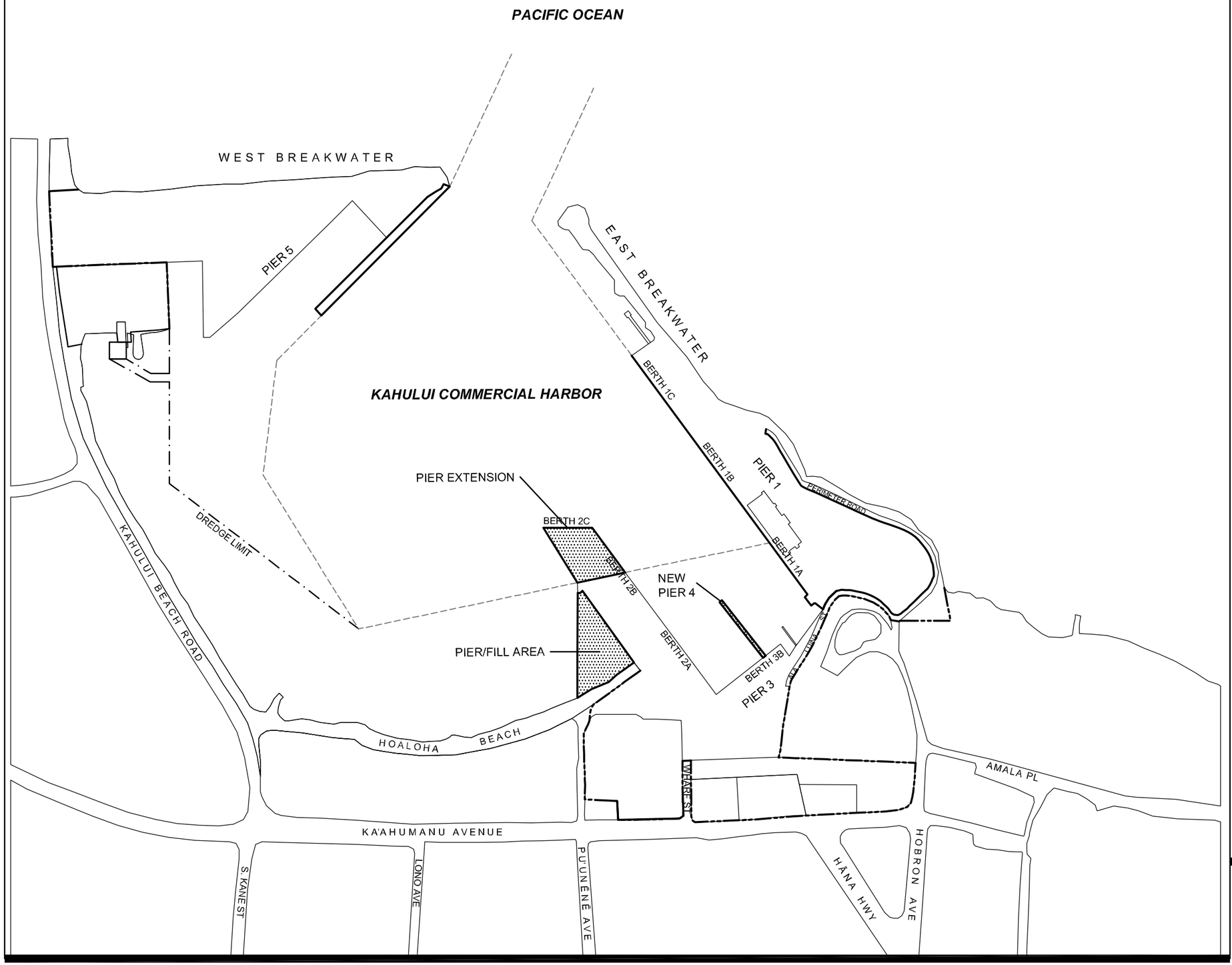
The order-of-magnitude cost estimates for Alternatives A and B are approximately $390 million and $359 million, respectively. For both estimates, the largest items of work include extension of the East Breakwater, extension of the West Breakwater, dredging, property acquisition for new terminal areas, and construction of new wharves and piers.

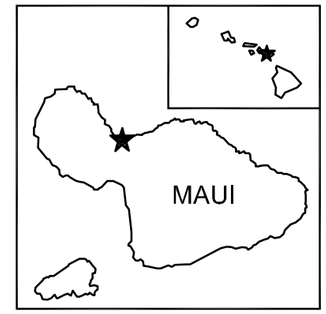
4.6 ALTERNATIVES CONSIDERED BUT ELIMINATED

4.6.1 Expansion of Existing Harbor Beyond the Breakwaters

As part of the process of developing alternatives for the 2030 Master Plan, MHUG considered two options for expanding the commercial port beyond its current footprint as possible long-term solutions to alleviate congestion—a "New West Harbor" and/or a "New East Harbor." Both options were removed from consideration due to substantial financial costs (dredging and construction), land use compatibility issues, and cultural and environmental impacts.

This "New West Harbor" concept (Figure 4-8) would be a deep-water harbor west of the proposed West Breakwater Harbor Development. It would require extensive dredging, construction of two breakwaters, and construction of berths for a cruise ship and ferry vessel. This option could provide calmer berths for a cruise ship and ferry than corresponding facilities on the opposite side of the breakwater, but at a substantial financial cost and with significant cultural and environmental impacts. Dredging for the new harbor would affect an existing surf site. The concept would locate commercial harbor operations closer to residential areas than at present. The "New East Harbor" concept (Figure 4-9) would be an expansion east of the Pier 1 breakwater. A new breakwater and extensive dredging would be required, and the east side of the East Breakwater would be filled and developed. The prevailing northeast winds and large seasonal swells from the north must be considered in designing a properly sheltered harbor. The large amount of dredging would elevate the cost of this option above the cost of the West Harbor option. The well-developed coral reefs in this area pose significant environmental concerns. Finally, this concept would locate commercial harbor operations close to a wildlife refuge and a recreational area, Kanahā Beach Park.





OLD CHANNEL & TURNING BASIN

NEW CHANNEL/DREDGE LIMIT

DOT PROPERTY LINE

NEW CONSTRUCTION

BeltCollins

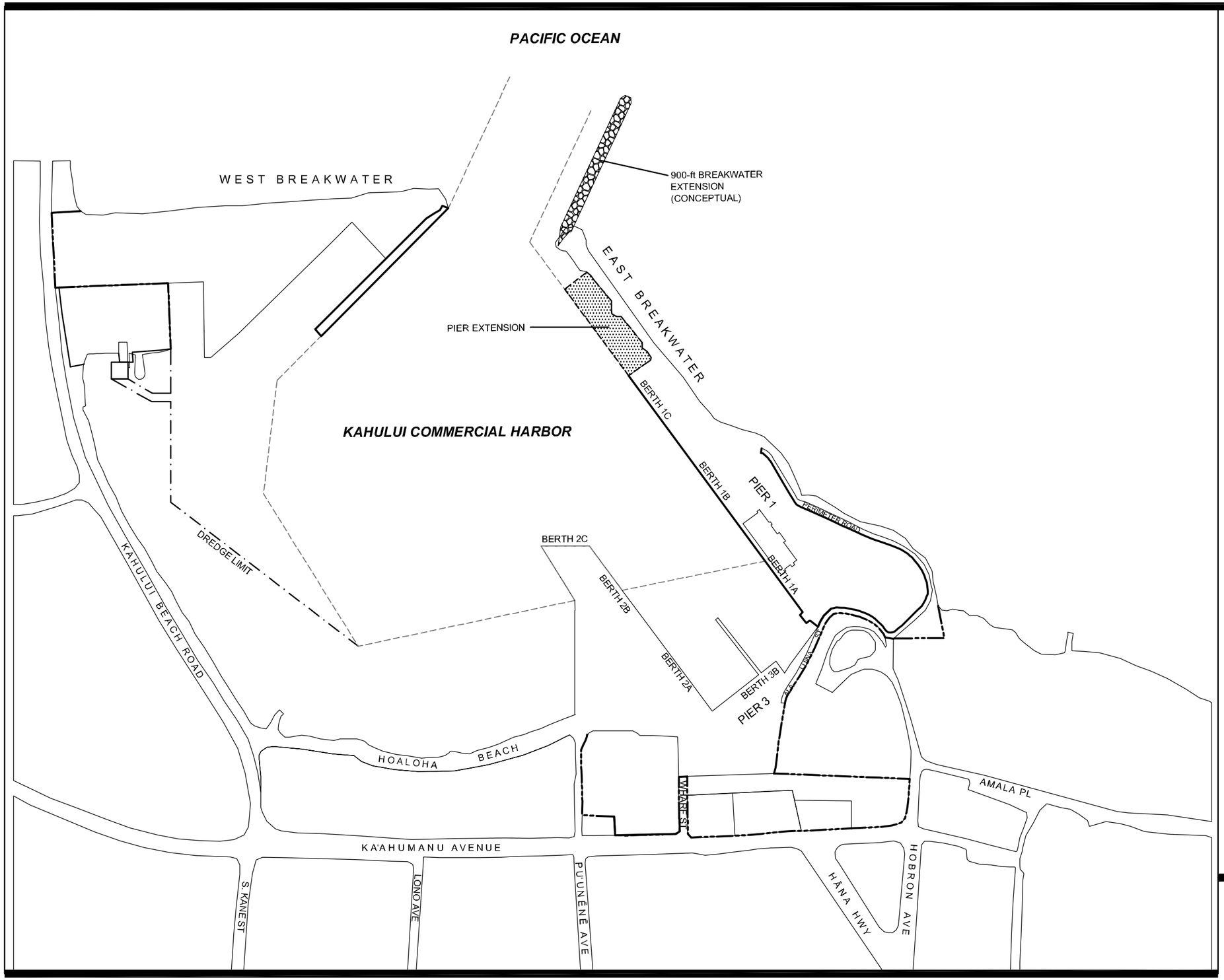
NORTH

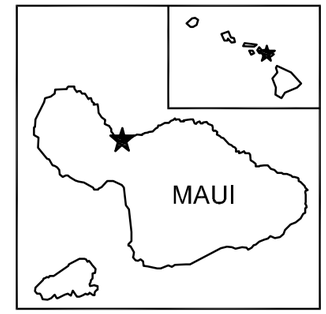
0 150 300 600

SCALE IN FEET

FIGURE 4-6
ALTERNATIVE A - PHASE 2 AT
KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007





OLD CHANNEL & TURNING BASIN

NEW CHANNEL/DREDGE LIMIT

DOT PROPERTY LINE

NEW CONSTRUCTION

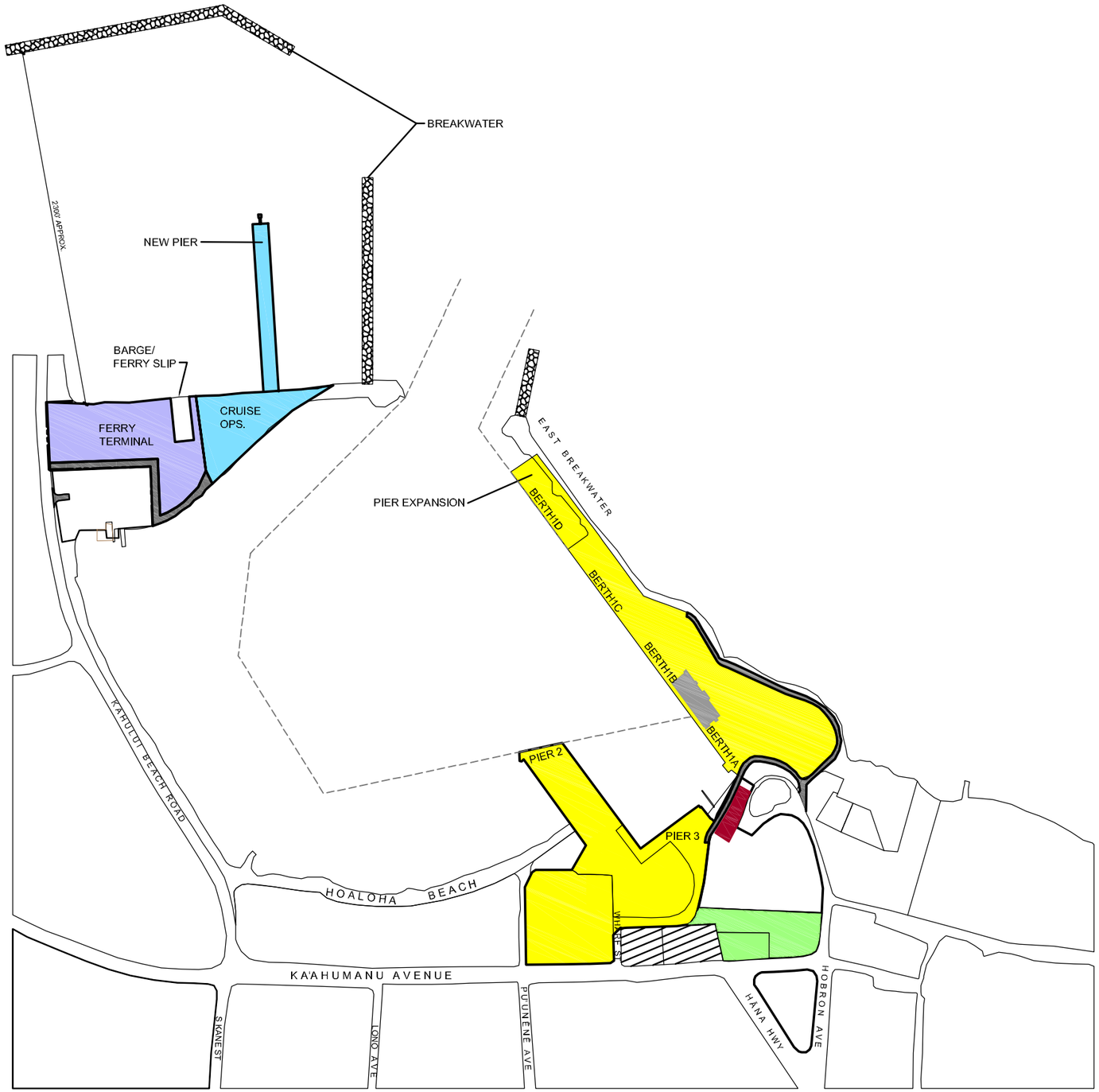
BeltCollins

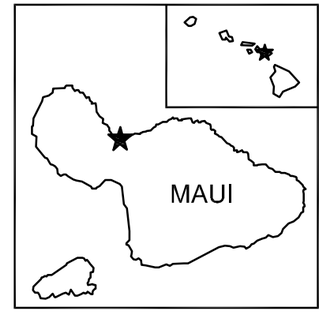
NORTH

0 150 300 600
SCALE IN FEET

FIGURE 4-7
ALTERNATIVE A - PHASE 3 AT
KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007





- CHANNEL & TURNING BASIN
- POSSIBLE EXPANSION AREA
- AUTO STORAGE
- COVERED STORAGE / SHED
- CRUISE OPERATIONS
- OPEN STORAGE
- ROADWAY
- INTER-ISLAND FERRY
- ADMINISTRATION

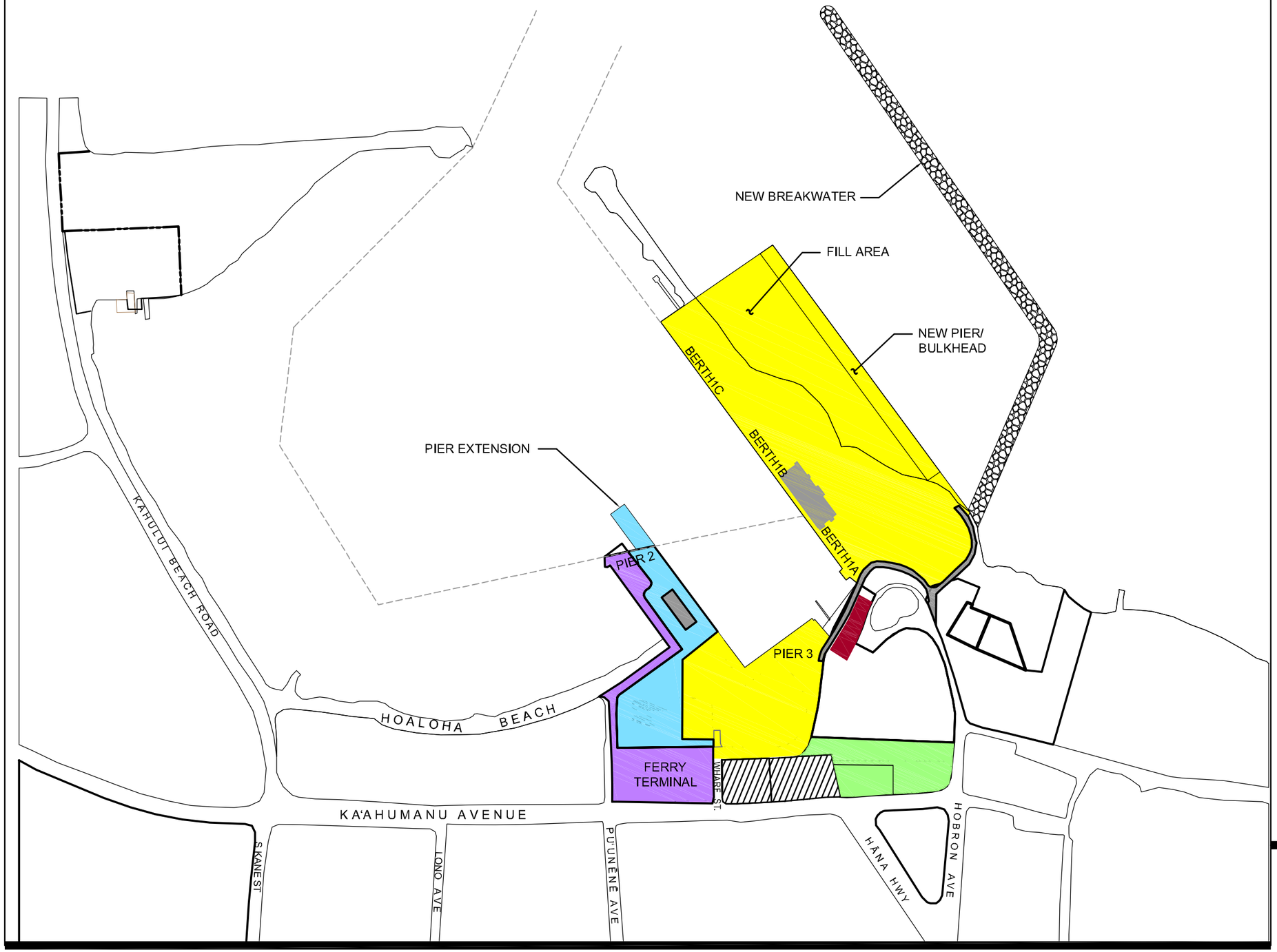
BeltCollins

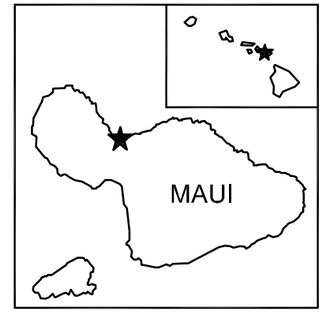
NORTH

0 200 400 800
SCALE IN FEET

FIGURE 4-8
NEW WEST HARBOR AT
KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007





- CHANNEL & TURNING BASIN
- POSSIBLE EXPANSION AREA
- AUTO STORAGE
- COVERED STORAGE / SHED
- CRUISE OPERATIONS
- OPEN STORAGE
- ROADWAY
- INTER-ISLAND FERRY
- ADMINISTRATION

BeltCollins

NORTH

0 150 300 600
SCALE IN FEET

FIGURE 4-9
NEW EAST HARBOR AT KAHULUI COMMERCIAL HARBOR

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
State of Hawai'i, Department of Transportation, Harbors Division
December 2007

4.6.2 Second Commercial Harbor

Alternative sites for a second commercial harbor on Maui were considered to help alleviate the congestion at Kahului Commercial Harbor. These alternatives were rejected for the following reasons: substantial dredging, high construction costs, land use compatibility issues, and significant environmental impacts. These study locations are shown on Figure 4-10.

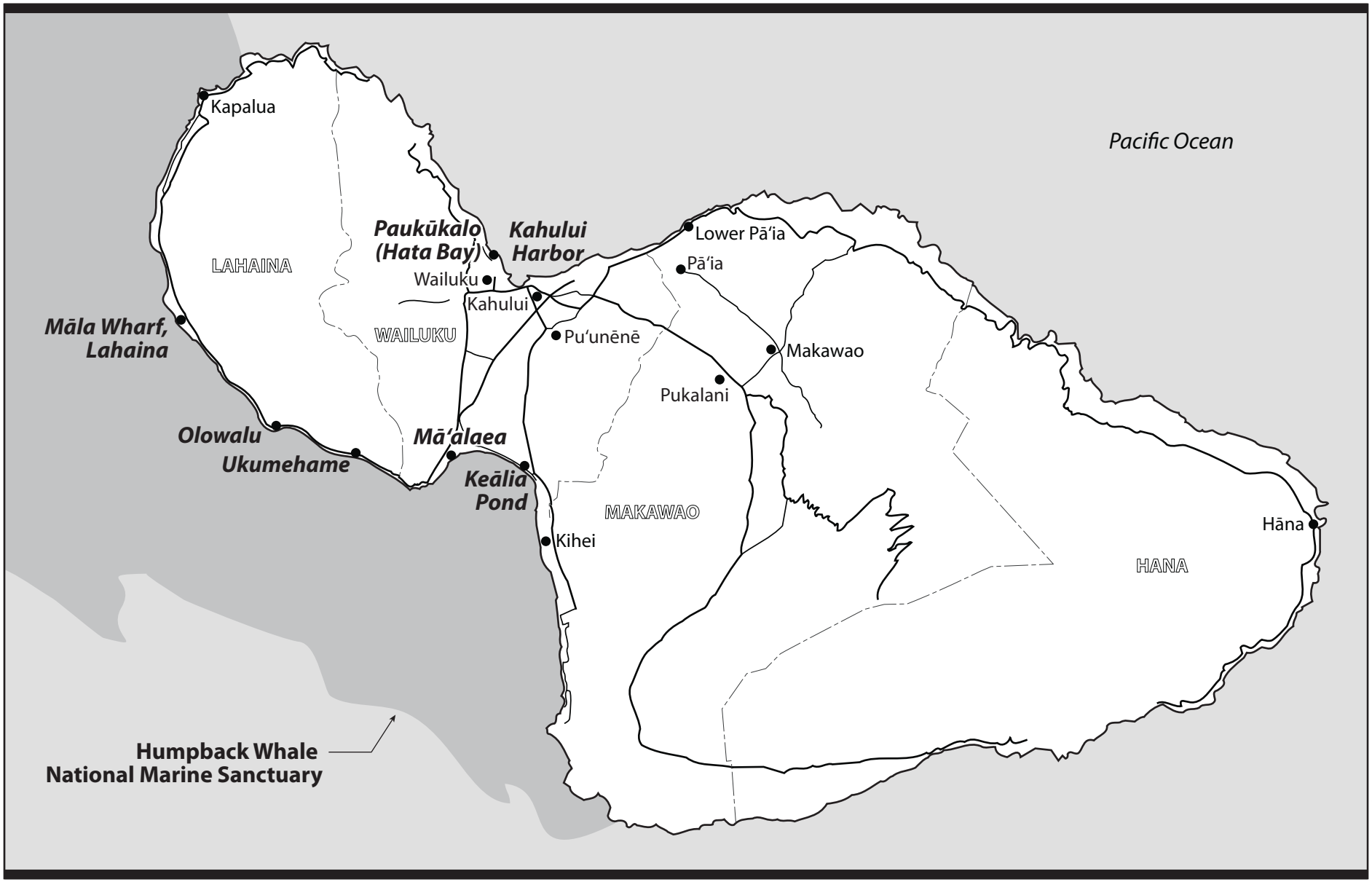
Since the late 1960s, the USACE has completed several investigations on the feasibility of establishing a second commercial harbor on the island of Maui. However, due to environmental concerns, land use incompatibility, and economic issues, the alternatives examined were determined to be too difficult and/or costly to implement, with a marginal economic justification (low return on investment or a benefit to cost ratio less than one). Following is a brief description of studies undertaken to determine the feasibility of various second harbor sites.

Section 109 of Public Law (PL) 86-645, the River and Harbor Act of 1960, mandated a feasibility study for a second commercial harbor on Maui. A study in 1967 looked at Mala Wharf in Lahaina, Kalepolepo in Kīhei, and Māʻalaea small boat harbor. The latter was identified as the most desirable and practicable site for a second deep-draft harbor on Maui. In what has become a recurring theme, however, environmental concerns and the lack of local support resulted in the abandonment of this investigation.

In 1979, USACE revisited the issue. This study's area of interest was between Māʻalaea small boat harbor and Kīhei. Areas further toward Lahaina and south of Kīhei were excluded from the study at Maui County's request. This effort ended due to lack of government support, local resident opposition, environmental issues, and lack of economic justification.

In 1989, USACE reviewed Hawaiʻi's statewide navigation facilities to identify potential harbor projects. A West Maui harbor (Lahaina/Olowalu) was one of four projects in the state that passed the first two screening processes. This study was subsequently terminated due to marginal economic justifications and potential social and environmental issues.

In 1991, the Hawaiʻi State Legislature appropriated funds contributing to the most recent (1995) DOT Harbors and USACE study to evaluate potential impacts of a second commercial harbor on Maui's environmental, economic, social, cultural, and recreational resources. A comprehensive screening of potential harbor locations resulted in the elimination of the following sites from further consideration:



BeltCollins

NORTH

0 2 4 8

SCALE IN MILES

Figure 4-10
SECOND HARBOR SITES CONSIDERED IN PAST STUDIES

Kahului Commercial Harbor 2030 Master Plan
Draft Environmental Impact Statement
December 2007

- *MĀLA WHARF* was dismissed due to relatively high development costs, as well as impacts to cultural resources and a cemetery.
- *LAHAINA* was eliminated due to high backland and breakwater costs and incompatibility with the historic district.
- *KALEPOLEPO* was dismissed because of high construction costs for dredging a long entrance channel and turning basin, as well as the sea conditions at the site.
- *KEĀLIA POND* was eliminated due to its designation as a National Wildlife Refuge.
- *AREAS SOUTH OF LAHAINA AND NORTH OF KĪHEI* were eliminated due to prior County objections to development of a commercial harbor in those areas.
- *AREAS NORTH OF LAHAINA AND SOUTH OF KĪHEI* were eliminated, as these locations are too remote and inaccessible to allow efficient harbor operations.

The 1995 study focused on four areas under six development scenarios. The following alternatives were considered:

- *HATA BAY BREAKWATER HARBOR* (immediately west of the proposed West Breakwater passenger terminals at Kahului Commercial Harbor) consisting of two breakwaters, a dredged entrance channel, turning basin, berthing area, dock, and ten-acre backland area.
- *MĀ'ALAEA PIER* (just west of Maui Electric Company's [MECO's] Mā'alaea generating station) consisting of an elevated causeway (pier), dock, mooring dolphins, and ten-acre backland area.
- *UKUMEHAME PIER* (about four miles west of Mā'alaea) consisting of an elevated causeway (pier), dock, mooring dolphins, signalized intersection with Hono'apiilani Highway, and ten-acre backland area.
- *OLOWALU PIER* (about one mile west of Ukumehame) consisting of an elevated causeway (pier), dock, mooring dolphins, and a ten-acre backland area.
- *OLOWALU DOCK* consisting of a dredged turning basin, dock, and ten-acre backland area.
- *OLOWALU DREDGED HARBOR* consisting of a dredged entrance channel and turning basin, revetted mole, and ten-acre backland area.

revetted mole: *a massive solid-filled structure (generally revetted) of earth, masonry, or large stone.*

These past investigations indicate the absence of an ideal site for a new maritime facility. Every location studied to date has significant environmental, land use compatibility, and/or economic issues. In the long run, economic constraints may be less of an issue than environmental constraints. The 1995 USACE study included a feasibility level benefit-to-cost analysis of the alternatives. Commercial harbor development is an extremely costly undertaking, requiring the State's receipt of federal assistance. Federal involvement in commercial harbor development is limited to general navigation features such as an entrance channel, turning basin, or breakwaters, and is dependent on the project's generation of sufficient economic benefits. The standard for economic evaluation in a federal navigation improvement study is a net positive benefit to national economic development (NED) through improving the efficiency of waterborne transportation services. NED benefits are calculated as reductions in the cost of transporting goods and increases in the value of goods transported by implementation of the development. For example, reducing harbor congestion would improve efficiency and reduce the cost of transporting goods. The resulting cost savings are project benefits. Likewise, reducing the cost of cargo delivery (e.g., the difference in cost to deliver fuel to the Mā'alaea Generating Station from a harbor at Mā'alaea, compared to the cost to deliver fuel from Kahului Commercial Harbor) would result in a net benefit to NED.

Avoiding the costs associated with a harbor closure can also be counted as a benefit. One of the primary rationales for a second commercial harbor on Maui is the impact of a closure of Kahului Commercial Harbor on Maui's economy, due to a natural disaster or an incident such as grounding of a large vessel in the entrance channel.

The 1995 USACE study calculated the net NED benefits of each of the six alternatives with Kahului Commercial Harbor's experiencing 23- and 39-day closures. These savings were added to the cost savings resulting from improved efficiencies in transportation of cargoes to derive the total benefit of each alternative. This sum was converted to an annual benefit amount, then divided by an average annual cost to produce a benefit-to-cost ratio. A benefit-to-cost ratio greater than 1.0 indicates a net positive benefit of the scenario. None of the 12 scenarios (six alternatives, two closure periods) showed a benefit-to-cost ratio greater than 1.0.

In addition to the lack of apparent economic justification for the alternatives in the 1995 study, each of the locations has serious environmental constraints. The Hata Bay location would be subject to the same offshore wave and weather climate as Kahului Commercial Harbor and could be affected similarly by natural disasters and vessel groundings. Potential impacts to Hata Bay's cultural and recreational resources would generate public opposition to the project. The West Maui sites would involve construction in the Hawaiian Islands Humpback Whale National Marine Sanctuary, loss of areas of coral reefs, and loss of access for surfing and other recreational uses.

During the 2030 Master Plan MHUG meetings, an off-shore mooring site for fuel delivery was proposed for Māʻalaea. The primary customer of the fuel would be MECO's Māʻalaea generating plant. Environmental and economic factors have eliminated this option. Wave climate in the area and the location within the Humpback Whale Sanctuary made the site infeasible. The economic benefits will be reduced as MECO, the primary customer for the fuel, is planning to convert the Māʻalaea generating plant to using biodiesel fuel.[9] The Māʻalaea generating plant will be converted entirely to biodiesel. A biodiesel production facility ("refinery") is expected to be built in 2009 in Waena, providing a local source of biodiesel, thus reducing the need for importing fuels.

4.7 PROPOSED 2030 MASTER PLAN PROJECTS

Table 4-1 provides a summary of planned improvement at Kahului Commercial Harbor as described in the three alternatives.

Table 4-1. Summary of Planned Projects

Project	Phase	New Pier/Berth	New Breakwater	Dredging	Filling	Clearing, Grading, and Paving	Building Construction	Roadway Improvements
Alternative A								
Pier 1D Extension (Pier or Mooring Dolphin)	3	×			×	×		×
Pier 2 Extension	2	×		×	×	×		
Pier 2 Widening	2				×	×		
Pier 3	2			×				
Pier 4	2	×						
East Breakwater Extension	3		×					
West Breakwater Harbor Development	1	×	×	×	×	×	×	×
Pier 5 (2 berths)	1	×				×	×	×
Inner Breakwater/ bulkhead	1		×					
Passenger Terminals (Ferry/Cruise)	1						x	
Former A&B Parcels	1					×		×
Harbor Basin	1			×				

[9] The Hawaiian Electric Company (MECO's parent company) is in the process of reducing their dependence on petroleum diesel fuel throughout the state by moving toward using more biodiesel in their generating plants.

Table 4-1. Summary of Planned Projects *(continued)*

Project	Phase	New Pier/Berth	New Breakwater	Dredging	Filling	Clearing, Grading, and Paving	Building Construction	Roadway Improvements
Alternative B								
Pier 1D Extension (Pier/Mooring Dolphin)	3	×			×	×		×
Pier 2 Extension	2	×			×			
Pier 3	2							
Pier 4	2							
East Breakwater Extension	3		×					
West Breakwater Harbor Development	1	×	×	×	×	×	×	×
Pier 5 and Shed (Cargo)	1						×	×
Inner Breakwater	1		×					
Former A&B Parcels	1					×		x
Harbor Basin	1			×				
No Action								
Pier 1D Extension (Pier or Mooring Dolphin)		×			×	×		
Pier 3				×				
Former A&B Parcels						×		×

NOTE: As discussed in the text, support facilities such as roads, offices, infrastructure improvements, utilities and security measures could be included throughout the commercial harbor area for Alternative A or B. Programmed maintenance would be included under all three alternatives.

The 2030 Master Plan is a conceptual land use plan outlining future harbor development. This section provides a general discussion of the types of improvements proposed at Kahului Commercial Harbor to accommodate growth in the cargo handling and passenger vessel operations. The various cargo carriers and cruise vessels share berths (the inter-island ferry uses a dedicated berth). Construction activities required for proposed improvement projects are described in the following sections.

4.7.1 Construction of Piers and Dolphins

A new pier area should contain minimum protuberances in order to provide an open area for cargo off-loading. Water, fire protection, and sewage outlets are generally

inset into the deck and electrical and communications outlets placed adjacent to the pier curbing. Bollards are devices on the pier around which mooring or berthing lines from vessels are fastened to. They typically are placed every 100 feet on center along the pier intermittently with cleats at the same spacing. Two additional bollards are placed on the seawall at the breakwater head to accommodate stern lines. Structural design of piers should take into account such a potential future installation. Similar consideration should be given to a future stern load platform for RO/RO type cargo in locating utilities, bollards and pump stations. Pier areas include container staging areas.

Pier design must satisfy oceanographic design criteria and serve the functional cargo movement requirements. Numerous solid structures need to be evaluated in selection of a pier construction type. Types of pier construction include the following:

- *BULKHEAD WITH SHEET PILES AND BACKFILLING.* Sheet piles are interconnected steel circular cells filled with fill or dredge material. This method of pier construction requires driving sheet piles and backfilling it with suitable material such as crushed rock.
- *CONCRETE PILES AND CONCRETE DECK.* This type of pier construction requires the driving of concrete piles to support a concrete deck used for terminal space.
- *COMBINATION DESIGN.* Using this method of pier construction entails driving sheet piles and backfilling behind them. The seaward side is a concrete deck supported by piles.
- *DOLPHINS.* Dolphins are structures that jut out of the water and can be used for either tying down ships (mooring dolphin) or providing a structure to which ships can abut and dock along side (breasting dolphin). Both mooring and breasting dolphins effectively extend berthing space without having to construct a new pier. Dolphins consist of reinforced concrete caissons where basalt is encountered as the foundation material or concrete piles where coral is the substratum.

4.7.2 Construction of Terminals

Terminal facilities proposed for the subject harbor improvements include dry-bulk and liquid-bulk cargo terminals and passenger terminals. These are briefly described below.

CARGO TERMINALS. Dry-bulk cargo terminals include areas for storage and loading and unloading dry- and liquid-bulk cargo. The facilities generally include a paved loading area and covered storage (usually an industrial shed). Liquid-bulk cargo

facilities generally include above-ground storage tanks, a system of pumps, and transmission pipelines. Pipelines can be placed either under the pavement or above ground and lead to the piers where liquid-bulk cargo is transferred from vessels.

PASSENGER TERMINALS. At a minimum, passenger terminals require open paved areas for passenger embarking and disembarking activities. Passenger terminals often also include special-purpose sheds which provide amenities catering to passenger comforts, including restrooms and concession areas.

New terminal facilities would require the following construction elements:

- *CLEARING, PAVING AND GRADING OF TERMINAL AREAS.* The design of each paved area would be consistent with the proposed use. For example, areas slated for overseas terminal development should be designed consistent with requirements for heavy industrial pavement areas utilized for container storage and handling.
- *FENCING.* New perimeter security fencing segregate the various uses. Typical dimension is an eight-foot high fence with three strands of barbed wire at the top.
- *UTILITIES.* New utility lines, such as sewer lines, drain lines, water lines, and electrical duct trenches for utilities, would be excavated in the surface fill materials encountered at each harbor site. In addition, below-ground transmission pipelines for liquid-bulk cargo (e.g., petroleum products and biofuels) would be installed within new paved areas.
- *SHEDS.* Sheds in harbors are for industrial uses and are generally of steel and concrete construction.
- *ACCESS ROADS.* Internal roadway improvements are planned to serve the newly developed terminal areas. These roads would generally be 40 feet in width. Access roads would be subjected to heavy vehicles. Based on heavy truck traffic, flexible pavement sections consisting of asphalt concrete over asphalt treated base may be used for design of the access roads. For other areas that would be light duty (for passenger cars, light trucks and occasional heavy trucks) as opposed to heavy duty, pavement can be constructed with a thinner layer of asphalt concrete over an aggregate base. To prevent drainage problems, new pavement would be slightly sloped to carry surface water off the pavement into appropriate drainage structures.

4.7.3 Dredging

Dredging activities would be undertaken as required during construction of proposed berths to provide the necessary pier-side depth at the West Breakwater Harbor Development, Pier 2, and Pier 3.

DREDGING METHODS. Conventional methods of dredging include mechanical dredging (removal of loose or hard compacted material typically using a grab or bucket), hydraulic dredging (lifting material in suspension through a pipe section connected to a pump), or a combination of the two.[10] A type of hydraulic dredge method commonly used consists of a cutterhead (a device that uses rotating blades or teeth to break up or loosen bottom material similar to a chisel pile driver) and a centrifugal pump to remove the material from the harbor bottom through a discharge pipeline. The proper dredging method would have to be determined during the design phase of each project by analyzing conditions in the specific area of the harbor to be dredged, as well as dewatering and disposal constraints. Mechanical dredging is often preferred for removal of hard packed material since dredging buckets have difficulty retaining loose, fine material. Hydraulic dredging is most efficient when working with fine materials and sands which stay in suspension. The water content of mechanically dredged material is typically lower than hydraulically dredged material. Controlled blasting may be required to remove underlying coral surfaces as part of the dredging methods. In-water construction management constraints identified in Section 2.3.1 would apply for dredging activities regardless of the dredging methods used.

DISPOSAL OF DREDGE MATERIALS. Once materials have been dredged, the dredged material would require reuse and/or disposal. Coral and basalt may be used in pier construction and pavement construction, respectively. The ability to reuse dredged materials on-site would depend on the nature of the fill material, the substratum in the dredging area, and the staging area space available to stockpile the spoils on-site. For excess dredged materials requiring off-site disposal, DOT Harbors intends to dispose of the dredged material at a landfill, where it could serve as cover material. County permission to dispose would be contingent on the characterization of the material as not hazardous.[11] Alternatively, DOT Harbors could negotiate with Hawaiian Commercial & Sugar Company (HC&S), owner of extensive lands around Kahului, for a disposal site. That landowner has areas with minimal agricultural value which could be put to such use.[12] Prior to disposal of dredged material, laboratory testing and proper permitting by the USACE would be required. Dewatering of dredged material may be required depending on dredging methods used. On-shore construction

[10] MEC Analytical Systems. March 2005. Phase I Dredged Materials Management Plan COMNAVMARIANAS, Guam. Prepared for Department of the Navy, Pacific Division, Naval Facilities Engineering Command. In association with Hawaii Pacific Engineers, Inc.

[11] Personal communication. Mr. Tracy Takamine, Solid Waste Division Director, Maui County Department of Environmental Management, and Belt Collins Hawaii. October 10, 2007.

[12] Personal communication. Mr. Steve Holaday, President, HC&S., and Belt Collins Hawaii. September 27, 2007.

management constraints specific to dewatering of dredged material described in Section 2.3.2 would apply regardless of the ultimate disposal or reuse location.

DOT Harbors is responsible for dredging the area from the pier face up to the Federal Project Line (FPL), at which point the jurisdiction of the USACE begins. USACE is responsible for maintaining dredge depths of the harbor channel and turning basin area within the harbors delineated by the FPL. It should be noted that new dredging (not considered maintenance dredging) in navigable waters would require either a USACE Section 10 or 404 permit as described in Section 1.8. Proposed dredging limits and depths beyond the conceptual areas outlined in this master plan and exact breakwater location and configuration will not be determined until detailed analysis has been completed by USACE. Specific dredging and breakwater construction locations and methods will be evaluated during the USACE permitting process.