



1. Project Name: Laupahoehoe Navigational Improvements
2. Date of Inspection: June 26, 2007
3. Inspection Personnel:

	<u>Name</u>	<u>Agency/Office</u>	<u>Telephone No.</u>
a.	Dan Meyers	COE	438-8875



4. Discussion:

The inspected portion of the project consists of a 60 linear foot (LF) wave absorber and a 200 LF concrete armor unit breakwater. The project is in FAIR condition. The following are deficiencies noted during the inspection:



Wave Absorber (60 LF):



a. Sta. 0+02 to Sta. 0+10, Missing armor stones at the waterline voids.



b. Same as Above, no change since last inspection. Some stones at the waterline are missing and voids are present. Monitor.



Breakwater (200 LF)



a. Sta. 0+00, Oceanside (OS), Overview of breakwater.



b. Sta. 0+30, HS, Remove tree from armor stones.



c. Sta. 0+25, 0+26, and 0+28; Voids and missing armor stones.



d. Sta. 0+40, Void and cracked armor stone.



- e. Sta. 0+70, HS, 1 ea. Perched armor stone.
- f. Sta. 0+75, OS, 1 Flipped armor stone, 3 new flipped stones.



- g. Sta. 0+77, HS, Dislodged armor stones, void present.  
5'L x 20'W x 5'D void from dislodged armor stones; several  
perched stones located adjacent to void. New movement this inspection.



h. Sta. 0+80, HS, Overview of Ribcap / Dolos. Sta. 0+80 to 1+25 (first 6 ribs), HS, 500 pound stones lodged between ribs and dispersed among dolos.



i. Sta. 0+80, OS, Overview of Ribcap / Dolos.



j. Sta. 0+85, HS, missing armor stones adjacent the boat ramp.



k. Sta. 0+90, HS, Small rocks washed up on dolos.



l. Sta. 1+90, OS, Overview.



m. Sta. 1+90, Head.



n. Sta. 1+90, HS, Overview.

**NOTE:** Cells are numbered 1 - 14 starting at the root. Continue to monitor all cells.

5. Note:

There has been a loss of underlayer material in the cells of the rib cap between the ribs and beams. The typical section depicts two layers of 5 to 7 ton stone directly below the concrete cap and 1 to 3 ton stone underneath. Apparently, the specified stones were replaced with greatly undersized stone during construction. The undersized stone is slowly being washed away, creating a more porous structure that allows more energy into the harbor, and could ultimately threaten the stability of the breakwater.

6. Conclusion:

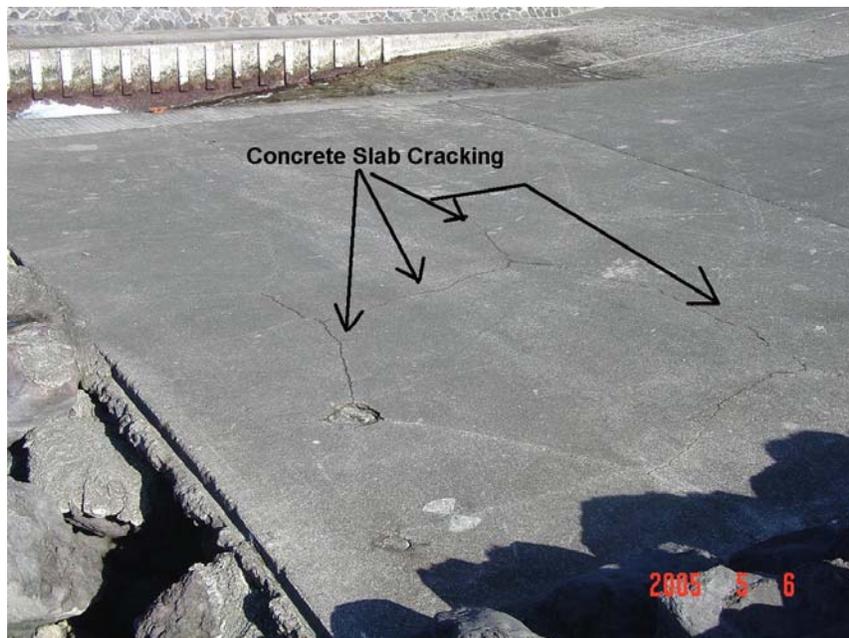
The Breakwater and wave absorber function as designed, however it appears additional material has washed out from under the rib cap cells and should be closely monitored. The void at Sta. 0+77, HS, needs to be monitored, however suggest repairs be planned for the near future as the dislodged armor stones may impact the turning basin. Overall the project is in MARGINAL condition.



Non-Federal Portion:



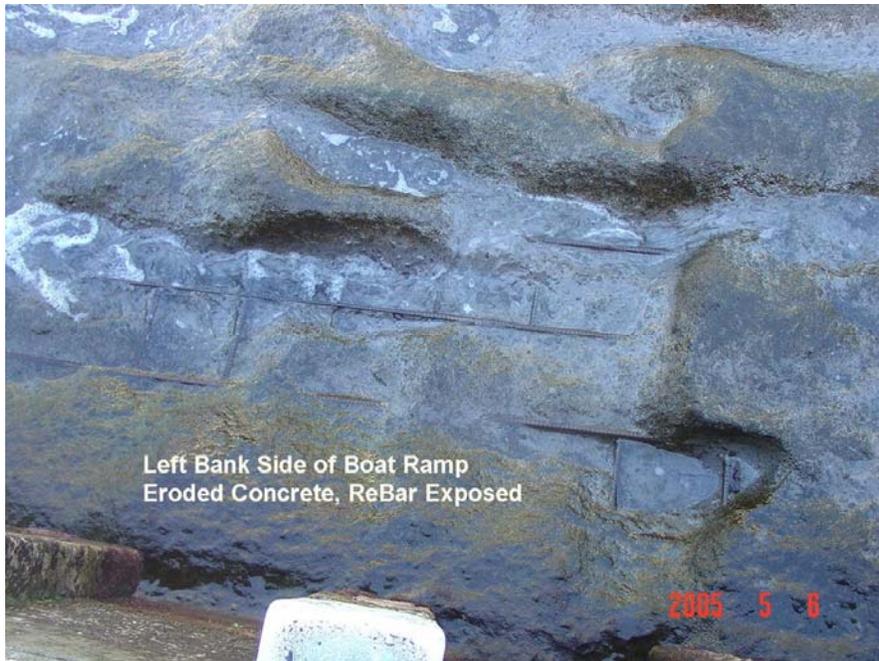
a. Department of Parks and Recreation has placed barriers in front of the concrete slab.



b. Concrete slab adjacent to boat ramp is undermined and cracking due to voids below.



c. Boat Ramp Concrete erosion up to 3 inches.



d. ReBar exposed, left side of poured-in-place slab.  
FY05 photo used due to high surf and poor visibility.



COMMENT: BOAT RAMP - The precast trapezoidal concrete slab originally installed outlasted the cast-in-place broom finished slab. Small stones in the boat ramp's surf zone have accelerated the erosion of the tremie concrete.

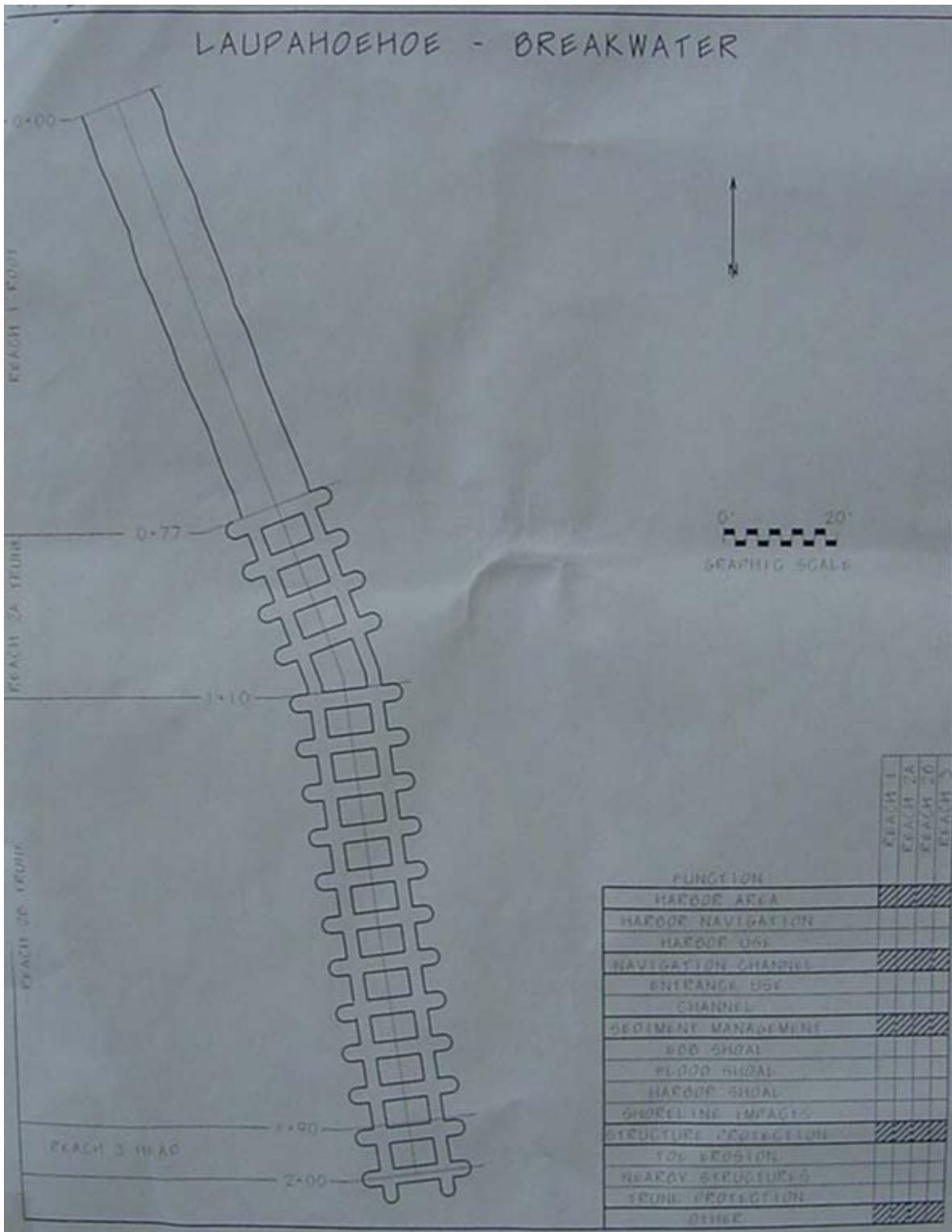
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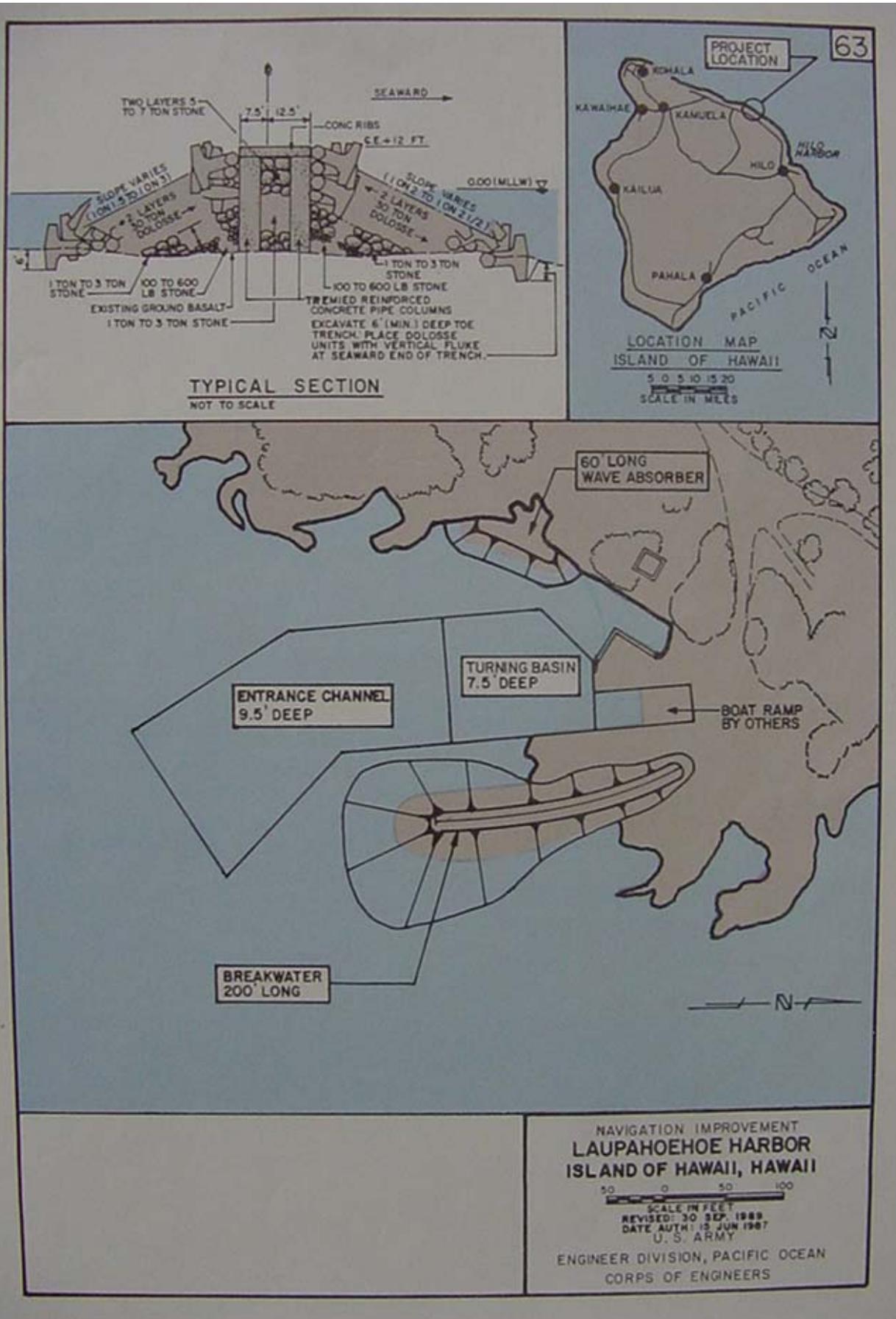
Dan Meyers, CEPOH-EC-T

Signed: \_\_\_\_\_

Jim Pennaz P.E., Ch, CEPOH-EC-T

Enclosures  
B/W Reach Plan  
Index Map  
Write-up







## LAUPAHOEHOE HARBOR, HAWAII, HAWAII

### CONDITION OF IMPROVEMENT 30 SEPTEMBER 1991

PREVIOUS PROJECTS: None.

EXISTING PROJECT: Authorized for construction on 15 June 1987 under Section 107 of the River and Harbor Act of 1960, as amended. Provides for a breakwater 200 feet long, a wave absorber 60 feet long, an entrance channel 9.5 feet deep, and a turning basin 7.5 feet deep.

### PROGRESS OF WORK

Completed and Under Maintenance: A construction contract awarded in November 1987 was completed in August 1988 for \$3,074,948. Modification to the harbor under a separate contract, awarded in September 1989, was completed in February 1990 for \$251,000.

Work Remaining: None

### COST OF CONSTRUCTION:

	<u>New Work</u>
<u>Completed Works:</u>	
United States Funds	
Corps of Engineers	\$3,511,809
Coast Guard	6,747
Contributed Funds	
Required	364,757
Other	<u>105,151</u>
Total Costs	\$3,988,467