

H-9983

Diagram No. 4115-2

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Type of Survey .. Hydrographic ..
Field No. RA-20-6-81 ..
Office No..... H-9983 ..

LOCALITY

State Hawaii ..
General Locality .. Island of Hawaii ..
Locality Waipio Bay and Vicinity ..

19 81

CHIEF OF PARTY
CDR R.J. Land

LIBRARY & ARCHIVES

DATE January 20, 1984 ..

☆U.S. GOV. PRINTING OFFICE: 1980-766-230

AREA 6

L-104(82)

CHTS

19386T

19820V

19004K

19010J

19322V

19007V

*to sign off see
Record of Application*

H-9983

HYDROGRAPHIC TITLE SHEET

H-9983

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

RA-20-6-81

State Hawaii

General locality Island of Hawaii

Locality Waipio Bay and Vicinity

Scale 1:20,000 Date of survey Oct. 30 - Dec. 3, 1981

Instructions dated June 11, 1981 Project No. OPR-T126-RA-81

Vessel NOAA Ship RAINIER and Launches 2126, 2125, 2124

Chief of party CDR R. J. Land

Surveyed by LT S. Ludwig; ENS M. Mathwid; ENS R. Koehler

Soundings taken by echo sounder, ~~and lead pole~~ Ross Fathometer (1070, 1040, 1071)

Graphic record scaled by Ship's Personnel

Graphic record checked by Ship's Personnel

Verified ~~Plotted~~ by I. A. Almacen Automated plot by PMC Xynetics Plotter

Evaluation ~~Verification~~ by D. J. Hill

Soundings in fathoms ~~feet~~ at ~~MHW~~ MLLW

REMARKS: This survey is complete and adequate to supersede all prior surveys.

Time Meridian 0° (GMT)

Revisions and marginal notes in black by Evaluator.

STANDARDS OK'D 1-27-84

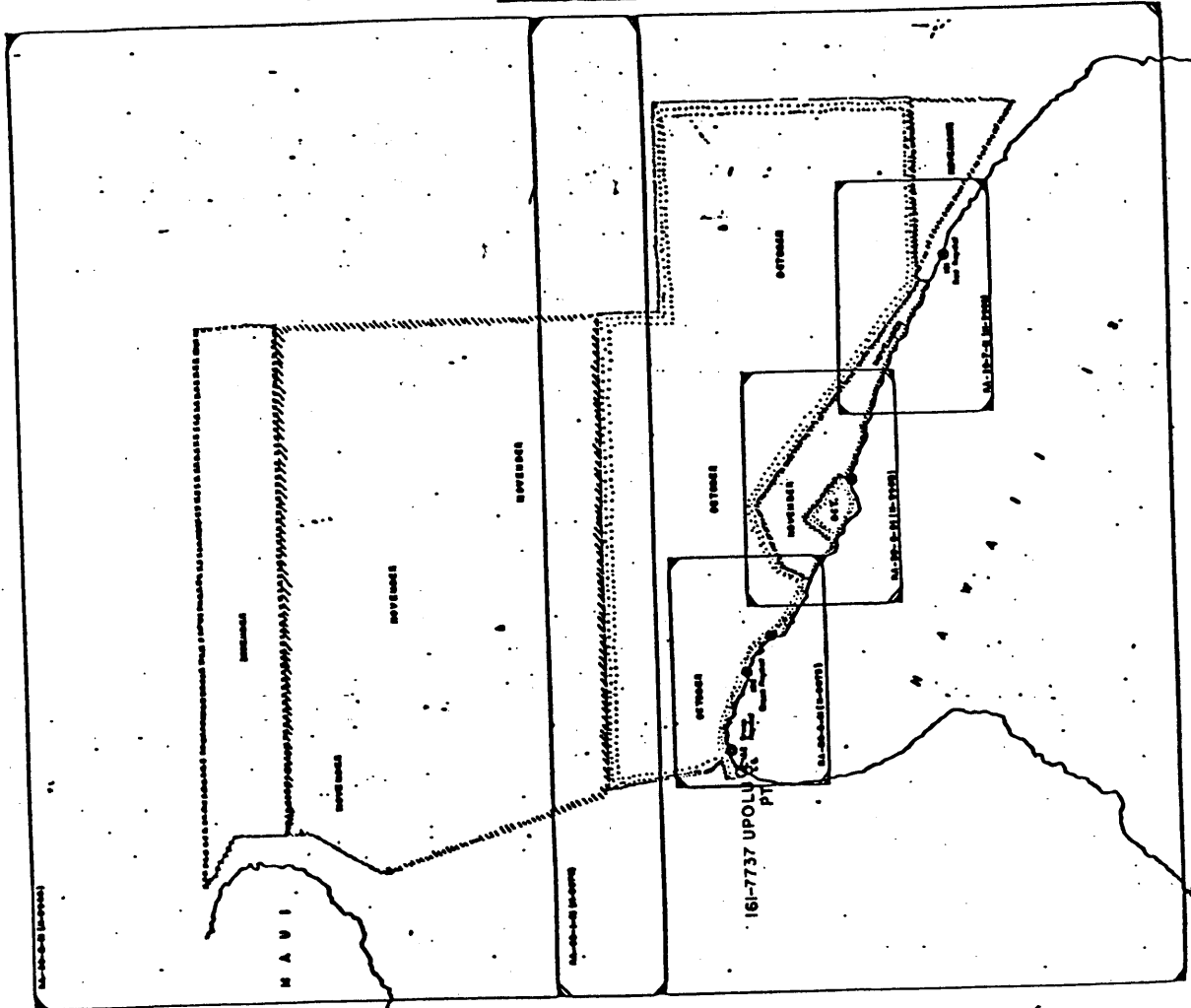
C. Loy

AW 015 ~~check~~ 2/13/84 55V

PROGRESS SKETCH
 OPR - T126 - RA - 81
HYDROGRAPHIC SURVEY
HAWAII, HAWAIIAN ISLANDS
 SEPT. 20 - DEC. 3, 1981
NOAA SHIP RAINIER
RALPH J. LANG, CDR., NOAA
COMD'G

FROM CHART 10330

NO.	DATE	DESCRIPTION
1	9/20	ANCHOR
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3	9/20	ANCHOR
4	9/20	ANCHOR
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7	9/20	ANCHOR
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49	9/20	ANCHOR
50	9/20	ANCHOR



A. PROJECT

This hydrographic survey was conducted in accordance with Project Instructions OPR-T126-RA-81, Hawaii, Hawaiian Islands, dated June 11, 1981; and Change No. 1: Supplement to Instructions, dated July 13, 1981. ✓

B. AREA SURVEYED

This survey took place along the northeastern coast of the island of Hawaii. The survey was bounded on the east by longitude $155^{\circ}27'30''$ W, and on the west by longitude $155^{\circ}40'30''$ W. The southern limit was the Hawaiian shoreline and the northern limit was approximately 1 nautical mile offshore, except for the western portion which extended about two miles offshore. Survey operations began Oct. 30 (J.D. 303) and ended Dec. 3 (J.D. 337). ✓

C. SOUNDING VESSELS

The RAINIER itself (2120) and its aluminum launches RA-6 (2126, Hull 1013), RA-5 (2125, Hull 1003) and RA-4 (2124, Hull 1016) were used to conduct the hydrographic survey. They utilized sounding equipment whose respective serial numbers are found in Section D, "Sounding Equipment." The NOAA Ship RAINIER (2120) was also used to obtain bottom samples. No unusual sounding vessel configuration or problems were encountered. ✓

D. SOUNDING EQUIPMENT

Echo soundings obtained during RA-20-6-81 were taken by the ship RAINIER (2120) and survey launches RA-4 (2124), RA-5 (2125) and RA-6 (2126). The ship is equipped with an EDO model 248 transceiver, a Raytheon model LSR 1811-19 analog trace recorder and a Digitrak model 261-C digitizer. The survey launches used Ross Fineline fathometer systems which include Ross ✓

model 400 transceivers, Ross model 5000 analog trace recorders, Ross model 6000 digitizers and 100 kHz transducers. Table I summarizes the component serial numbers for each vessel.

TABLE I
Echo Sounding Component Serial Numbers

Vessel	2120	2124	2125	2126
Transceiver	202	1097	1040	1080
Analog Recorder	C255	1071	1070	1040
Digitizer	204	1042	1040	1080

SOUND VELOCITY CORRECTIONS

Sound velocity corrections for echo soundings were derived from data obtained from three Nansen casts performed during this project. No Martek casts were taken. Details of the casts are summarized below.

TABLE II
Nansen Cast Data

<u>Date</u>	<u>Location</u>	<u>Velocity Table No.</u>
6 Oct. 81	20° 30.0' N 155° 39.6' W	1 & 2
21 Nov. 81	20° 16.4' N 155° 16.1' W	1 & 2
1 Dec. 81	20° 23.0' N 155° 58.5' W	1 & 2
	20° 03.8' N 156° 00.6' W	1 & 2
	20° 02.2' N 156° 08.3' W	1 & 2

The three Nansen casts on 1 Dec. 81 were conducted with five bottles at each location. This explains the multiple casts for the one date. The water samples collected from the Nansen casts were analyzed for salinity using standard laboratory procedures (see H.O. 607, Instruction Manual for Obtaining Oceanographic Data, Third Edition, U.S. Naval Oceanographic Office, 1968.) The salinometer used for salinity analyses was Beckman model no. RS7B, s/n 59265. The unit was last calibrated May, 1981 by the Northwest Regional Calibration Center, Bellevue, Washington (see separates following text for calibration results). Results from the Nansen casts were input into computer program RK-530 Velocity Correction Computations (10 May 1976 version and run on the RAINIER's PDP-8/e digital computer, s/n 1015, to yield velocity correctors for all surveys in this project). Nansen casts on 21 Nov. 81 and ^{6 Oct.} ~~1 Dec.~~ 81 checked the accuracy and stability of the water column. A list of the computed correctors from the casts are provided in the separates following the text. The velocity correctors from the Nansen casts agreed within 0.2% at each depth listed. The largest corrector difference was 0.5 fathoms at a depth of 1290 fathoms. This indicates an extremely stable water column. Because of the negligible change between Nansen casts, correctors derived from the first Nansen cast were used for all surveys.

*See Eval. Report.
Para. 1*

LAUNCH DRAFT CORRECTORS

Section 4.9.5.1.1., page 4-71 of the Hydrographic Manual (Fourth Edition, 1976) states that "reliable and accurate bar checks can only be made under the most favorable conditions." The windward side of Hawaii seldom, if ever, had such favorable conditions. Rough waters and trade winds encountered during survey H-9983 rendered bar checks unfeasible. No bar checks were done during this survey. The historic value of 0.3 fathoms for the launches' TRA was used. No changes were made on the launches to cause change in draft. All field

sheets were plotted with a launch TRA value of 0.3 fathoms.

SHIP DRAFT CORRECTIONS

The TRA correction for the Ship RAINIER was attempted using leadline comparison. This was done on JD 340 in the calm waters of Hilo Bay, Hawaii. The TRA, corrected for velocity of sound, was found to be negative. This led to speculation that the test depth of 5.2 fathoms was too shallow for the EDO fathometer to function correctly. Since no changes in loading or configuration have been made to cause a change in the draft, the historic TRA value of 2.6 fathoms was used in plotting all ship hydrography.

LAUNCH SETTLEMENT AND SQUAT CORRECTIONS

Settlement and squat characteristics of survey launches RA-3, RA-5, and RA-6 were performed on 15 April, 1981 off of Sand Point Naval Support Activity, Lake Washington. Tests were performed on RA-4 on 27 April, 1981. The maximum speed test of RA-3 was performed at Kawaihae Harbor, Hawaii on 30 October, 1981.

This information is included for reference only since the largest potential error is 0.05 fathoms. The settlement and squat corrections are not on the TC/TI tapes or applied to soundings on field plotted sheets. These correctors are not considered necessary for this project in accordance with PMC OORDER 3-03.06 x 1.

Settlement and squat correction for the ship was also considered insignificant according to paragraph 4.9.2., page 4-67 of the Hydrographic Manual (Fourth Edition, 1976).

SOUNDING EQUIPMENT CORRECTIONS

ROSS SYSTEMS

During survey operations, the "blanking" was usually set at the minimum-plus-one of the scale the fathometer was set (e.g., if the scale was 50-100

fathoms, the blanking was set at 51 fathoms). However, when a launch approached shore and depths were less than 5 fathoms, blanking was 0 fathoms.

The initial trace on the analog recorders was continuously and scrupulously monitored by dedicated and highly trained personnel to prevent any error that might be caused by a drifting initial.

Everyday RAINIER personnel performed phase calibrations to prevent belt length error and stylus/paper misalignment on launch fathometers. This was done in accordance with the calibration procedures contained in the PMC OORDER.

The depth limit of the launch fathometer systems was 200 fathoms. This limit was approached by both RA-5 and RA-6 survey launches during this survey. By adjusting gain and line darkness, analog traces produced by the RA-5 fathometer system were readable. However, the RA-4 fathometer system produced an excess amount of noise when the launch ran at speeds greater than idle. To obtain readable traces, launch personnel carefully adjusted gain and line darkness while the launch ran at idle speed.

MANUAL SOUNDING CORRECTORS

 ✓

The leadline used to determine the ship TRA value was measured against a steel tape and found to be very accurate.

E. HYDROGRAPHIC SHEETS

 ✓

Hydrographic sheets (including smooth field sheets) were prepared using the PDP 8/e hydroplot system on the RAINIER (2120).

A modified transverse mercator projection was used for plotting of hydrographic data. A list of parameters used to define the projection is attached to the separates following the text.

Soundings on the smooth field sheets have been corrected for predicted tides, launch draft, and preliminary velocity corrections. No noticeable

distortion of mylar sheets was observed during smooth field plotting of hydrographic data.

One 1:20,000 scale hydrographic sheet (RA-20-6-81) was used to cover the survey area. An expansion sheet of Waipio Bay is being submitted as an inset. This area was smooth plotted at a 1:5,000 scale for clarity. All data and accompanying field records were transferred to the Pacific Marine Center, Seattle, Washington, for verification.

*Sas Eval. Report
Para. 4.6*

F. CONTROL STATIONS

Horizontal control for RA-20- 6-81 was provided by the recovery of 5 existing stations and establishment of 6 new stations. A copy of the master station list is included in the attachments to this report. The stations used each day are listed in the raw records and found on the master station list. The new stations were established using Third Order, Class I methods, and were monumented and described. The ~~North American Datum of 1927~~ ^{Old Hawaiian Datum} was used in the survey. Details concerning the location and recovery of each station, including the field records and processing computations, are located in the Horizontal Control Report, OPR-T126-RA-81. No unconventional survey methods were used for determining the positions of horizontal control stations. There were no anomalies in the control adjustment or in closure and ties.

However, one day of hydrography (J.D. 336) was run using AKOKOA 1913-1981 RM2, which is less than a Third Order, Class I station. The distance was taped and angles were turned per normal reference mark procedures; the maximum position error is on the order of a centimeter.

G. HYDROGRAPHIC POSITION CONTROL

Range azimuth methods utilizing a Motorola MiniRanger III System were

predominantly used for hydrographic position control. (On J.D. 336, range-range hydrography was done using the Miniranger system).

CALIBRATION METHODS

Two MiniRanger baseline calibrations were performed, one prior to and one after all MiniRanger data collection for this project. Both calibrations took place at Hilo Harbor on JD 287/288 and JD 338, respectively.

The initial and final corrections to electronic position control for each specific R/T-console pair and transponder combination were meant to determine the final correctors used in plotting the smooth sheet. The initial baseline calibration also determined minimum signal strength cutoff values for each system combination. The details and data regarding these calibrations are included in the Electronic Control Report.

DAILY SYSTEM CHECKS

To provide verification of MiniRanger system performance, system checks were performed daily (except on J.D. 337). Threepoint sextant fixes, with check fixes where possible on at least Third Order, Class I stations, were accomplished twice daily in accordance with PMC OORDER, Appendix M. Calibration records are included with the raw data. A calibration summary is provided with the MiniRanger statistics table.

No unusual methods of operating or calibrating were used, nor were any equipment malfunctions or unusual conditions experienced. Signal strengths were generally well above cutoff values. No data utilizing electronic position control was collected at signal strengths below the cutoff value.

On J.D. 336, R/R methods were used to junction the work of this sheet with that of RA-80-1-81 (H-9974). This resulted in arc intersections of 157.5° . Computing d_{rms} resulted in an error of .215 mm at the scale of the survey.

MOBILE SHORE M/R DATA

Electronic stations were positioned over Third Order, Class I geodetic control stations. Power to shore stations was provided by 2 12V batteries connected in series.

Shore station code characteristics are as follows.

<u>Code</u>	<u>S/N</u>	<u>Antenna Type</u>
B	4951	medium gain, directional
C	1628	high gain, directional
D	1569	high gain, directional
* E	911721	medium gain, directional
* F	911615	high gain, directional
* O	911632	medium gain, directional

*Universal Station units

A synopsis of MiniRanger mobile unit/shore unit statistics is in the addenda to this report.

H. SHORELINE

Shoreline detail for this survey was transferred from the following Class III photo manuscripts; TP-00065 at 1:20,000, and TP-00066 at 1:20,000.

The shoreline details have been field edited along the entire sheet, and all corrections noted have been transferred to the field edit sheet and the final smooth field sheets. All shoreline detail (rocks and rocks awash) on H-9983 seaward of the shoreline, being within the surf zone and beyond the capabilities of the hydrographer, was positioned by field edit.

I. CROSSLINES

A total of 38.9 nautical miles of crosslines were run, comprising 24.2% of the mainscheme mileage. Agreement was excellent with over 98% of the comparisons within 2 fms. Those that differed more were either in very deep water or in a steep area:

*See Eval. Report
Para. 3*

172 fm (fix 8034 + 5)	vs.	168 fm (5745 + 3)	20° 10' 43" N	155 36' 55" W
127 fm (6526 + 2)	vs.	124 fm (8096 + 2)	20° 10' 30" N	155 38' 15" W
21 fm (5705 + 3)	vs.	15 fm (6022 + 3)	20° 10' 17" N	155 39' 01" W
50 fm (5974 + 5)	vs.	44 fm (6013 + 4)	20° 09' 15" N	155 37' 03" W
40 fm (5962 + 1)	vs.	44 fm (6014 + 1)	20° 09' 12" N	155 36' 58" W

These agreements include crossings of all launches and the RAINIER.

J. JUNCTIONS

This survey junctions with the following contemporary surveys:

(1) H-9974 (RA-80-1-81) along the northeast or offshore boundary between longitude 155° 40' 30" W and longitude 155° 27' 24" W. Of 17 soundings compared, 15 agreed within 1 fathom and 2 agreed within 2 fathoms. These comparisons required some interpolation in most cases due to differences in line spacing and orientation between H-9974 and H-9983.

(2) H-9975 (RA-20-5-81) along a line normal to shore at longitude 155 40' 30". Only two crossline soundings overlap this junction and both agree within 1 fathom. Since the same vessel and range/azimuth control was used in the junction area, the junctioning mainscheme sounding lines are separated by the normal 200 meter spacing with no overlap. However, the trend of contour lines is consistent over the junction.

(3) H-9986 (RA-20-7-81) at longitude 155 27' 15" W. Of 16 sounding comparisons, 15 agree within 1 fathom and 1 agrees within 2 fathoms.

*See Eval. Report
Para. 5.c.*

K. COMPARISON WITH PRIOR SURVEYS

H-9983 was compared to the following prior surveys: H-4912 at 1:2,500 (1929), H-4913 at 1:2,500 (1929), H-5224 at 1:5,000 (1932) and H-3652 at 1:60,000 (1914).

The contour line positions and overlapping soundings of H-4912 and H-4913 agreed excellently (within 1 fathom) with H-9983. However, much of the inshore detail on H-4912 and H-4913 was not present on H-9983. Due to the scale difference and operational limitations as caused by high surf conditions, no comparisons could be made, generally within 5 to 7 fathoms of the shoreline. These two surveys (H-4912 and H-4913) can be considered more complete than H-9983 from the surf zone to, but not including, the shoreline. The recently field edited shoreline of H-9983 should supercede that of H-4912 and H-4913.

✓
Concur

Concur

Survey H-5224 shared only a small area, from longitude 155 27'45" to 155 27'24", with H-9983. Within this area, contour and overlapping sounding agreement was good, always within 1 to 2 fathoms. Comparisons between H-3652 and H-9983 were also in good agreement with the largest difference, being less than 2 fathoms.

*See Eval. Report
Para. 6*

L. COMPARISON WITH THE CHART

The largest scale charts of the survey area ^{are} 19320, 12th edition, June 17, 1978, at 1:250,000, ^{19322, 5th Ed., June 25, 1977 and 19326, 4th Ed., July 9, 1977.} There were 25 soundings charted on 19320, falling within the survey limits of H-9983; comparisons are made in the following table.

19320	Latitude	Longitude	H-9983	Remarks
36 FM	20° 06.5' ³⁰ N	155° 27.4' ²⁴ W	39 FM	Verified ¹ ₁ See Eval. Report Para. 7.a.
12 FM	20° 06.7' N	155° 28.3' W	34 FM	Replace 12 C
69 FM	20° 07.4' N	155° 29.05' W	81 FM	Replace 69 -
83 FM	20° 07.75' ⁴⁵ N	155° 30.35' ²¹ W	84 FM	Verified?
104 FM	20° 08.3' ¹⁸ N	155° 31.5' ³⁰ W	100 FM	Verified?
89 FM	20° 08.35' ²¹ N	155° 32.5' ³⁰ W	94 FM	Replace 89?
33 FM	20° 08.25' N	155° 33.75' W	43 FM	Replace 33 C
15 FM	20° 08.05' ¹³ N	155° 34.55' ³³ W	25 FM	Replace 15 C
77 FM	20° 08.5' N	155° 34.7' W	76 FM	Verified OK
20 FM	20° 08.05' ⁰³ N	155° 35.45' ²⁷ W	42 FM	Replace 20 -
165 FM	20° 10.25' ¹⁵ N	155° 35.2' ²⁴ W	176 FM	Replace 165 C
92 FM	20° 09.05' ³ N	155° 35.5' ³⁰ W	90 FM	Verified
9 FM	20° 07.75' ⁴⁵ N	155° 35.75' ⁴⁵ W	8.5 FM	Verified?
33 FM	20° 08.6' ³⁶ N	155° 36.3' ¹⁸ W	39 FM	Replace 33 C
9 FM	20° 08.55' ³³ N	155° 37.0' W	7 FM	Replace 9 C
59 FM	20° 09.5' ³⁰ N	155° 37.25' ¹⁵ W	60 FM	Verified OK
179 FM	20° 11.1' ⁶ N	155° 37.1' ⁶ W	180 FM	Verified OK
104 FM	20° 10.25' ¹⁵ N	155° 37.65' ³⁹ W	104 FM	Verified -
7 FM	20° 09.1' ⁶ N	155° 38.25' ¹⁵ W	6.5 FM	Verified?
30 FM	20° 10.0' N	155° 38.3' W	43 FM	Replace 30?
179 FM	20° 11.85' ⁵¹ N	155° 38.6' ³⁶ W	178 FM	Verified OK
8 FM	20° 09.80' ⁴⁸ N	155° 38.95' ⁵⁷ W	4 FM	Replace 8?
37 FM	20° 10.90' ⁵⁴ N	155° 39.2' ¹² W	69 FM	Replace 37 C
4 FM	20° 10.35' ²¹ N	155° 39.55' ³³ W	7 FM	Replace 4 C
26 FM	20° 11.35' ²¹ N	155° 40.0' W	75 FM	Replace 26 C

Due to the scale difference between 19320 and H-9983, transferred positions of rocks along the shoreline on 19320 were considerably further offshore on the H-9983 boat sheet. These rocks were obviously not in their transferred position but were placed further offshore, possibly to make them obvious to the mariner. Inshore positions were established by field edit.

Concur

Even after comparison with field edit and hydrographic data, there were several rocks which could not be verified. In the addenda to this report is a copy of chart 19320 with those rocks denoted. It is suggested that the source of these be investigated.

*See Eval. Report
Para. 7.a.*

A comparison with chart 19322 (the chartlet of Kukuihaele Landing) was also indicated in the project instructions. But it was noted that H-4912 was identical to it; refer to section K of this report for a discussion of that comparison.

Two shoals were found during this survey. A ~~least~~ depth of 72 FM in 80 to 87 FM was located at latitude $20^{\circ} 10' 51.0''$, longitude $155^{\circ} 39' 04.8''$. This shoal was developed with 90 meter line spacing. The second shoal located at latitude $20^{\circ} 07' 27.0''$, longitude $155^{\circ} 32' 06.0''$ had a least depth of ~~2.0~~^{1.8} FM in 5-6 fathoms and was clearly visible beneath the surface with an estimated diameter of 15 meters. It is recommended that these shoals be charted.

Concur

In addition, there were two shoal areas not specifically investigated. The first, at $20^{\circ} 10' 28''$ N $155^{\circ} 39' 16''$ W is a ~~10.5~~⁵ FM sounding in an area of 15 to 26 FM. The fathogram trace shows a rather round feature, which is corroborated by a crossline close by. The second feature, at $20^{\circ} 06' 30''$ N $155^{\circ} 28' 41''$ W, is a ~~3.5~~⁸ FM sounding in an area of 7.8 to 12 FM. This is a sharp feature but is fairly close to shore. These features should also be plotted.

*See Eval.
Report
Para. 3*

*See Eval. Report
Para. 3*

Kukuihaele Light (L.L. #3669) is plotted on chart 19322 (5th Edition, 6/77) as "position approximate." Consult the addenda to this report for a third order position.

Honokaa Sugar Stack has been destroyed (1975) and rebuilt. We recommend it be deleted from chart 19320.

Other charted^d features were adequately positioned.

M. ADEQUACY OF SURVEY

This survey (H-9983) is complete and adequate to supercede all prior surveys for charting, except as noted in section K, where H-4912 and H-4913 are more complete from the surf zone up to, but not including, the shoreline.

✓
Concur

N. AIDS TO NAVIGATION

One fixed aid to navigation was located within the limits of survey H-9983. All information for Kukuihaele Lt., Light List Vol. III, 1981, Number 3669, is correct as published in the Light List. The geographic position of Kukuihaele Lt. was verified by Third Order, Class I surveying methods, and the light was found to adequately serve the apparent purpose for which it was established.

(See section L, comparison with the chart).

✓
Concur

O. STATISTICS

This survey consists of 860 positions in 201 linear nautical miles covering 22.8 square nautical miles.

<u>Vessel</u>	<u>Positions</u>	<u>Linear NM</u>
2126	340	51.8
2125	348	115.2
2124	172	34.0
2120	78	3.8

? 938 ≠ 1123 reported by verifier

The RAINIER (2120) also collected 3 bottom samples within the survey area.

P. MISCELLANEOUS

Investigation of the proposed harbor of refuge survey areas at Waipio Bay, Kukuihaele Landing, and Honakaa Landing revealed that none of the above provided protection from the seas or wind, both of which consistently originated from the east, to which direction this shoreline is exposed.

It is also important to note that it was not feasible to develop the shoreline within the survey area due to the hazardous conditions of approaching the shore in the prevailing high surf. The inshore limit of hydrography run on this survey should be considered the closest safe point of approach to the shoreline, for the surf conditions present at the time of the survey. *Concur*

Q. RECOMMENDATIONS ✓

Further development of the inshore area from the surf zone to the shoreline might be possible if the survey was run during the summer season when the surf is reported to subside.

R. AUTOMATED DATA PROCESSING ✓

Data acquisition and processing were accomplished as per instructions in the Hydrographic Manual (4th edition), Instruction Manual for Automated Hydrographic Surveys, Hydrographic Survey Guidelines, PMC OORDER, and Hydrographic Data Requirements for the 1981 field season.

Soundings and positions were taken by a Hydroplot system using range-azimuth program FA 181 and range-range program RK 111. There are daily master tapes and corresponding corrector tapes which include the TRA, electronic control calibration correctors for Raydist or baseline correctors for Mini-ranger, and all depth corrections. Velocity tapes were generated from Nansen

cast data. The following is a list of all computer programs and version dates used for data acquisition or processing:

<u>PDP 8/e Program</u>	<u>Version Date</u>
RK 111 Range/Range Real-Time Hydroplot	1/30/76
FA 181 Range/Azimuth Hydrolog	2/23/78
RK 201 Grid, Signal and Lattice Plot	4/18/75
RK 211 Range/Range Non-Real Time Plot	2/02/81
RK 212 Visual Station Table Load	4/01/74
RK 216 Range/Azimuth Non-Real Time Plot	2/09/81
RK 300 Utility Computations	10/21/81
RK 330 Reformat and Data Check	5/04/76
PM 360 Electronic Corrector Abstract	2/02/76
RK 407 Geodetic Inverse/Direct Computation	9/25/78
AM 500 Predicted Tide Generator	11/10/72
RK 530 Layer Corrections for Velocity	5/10/76
RK 561 H/R Geodetic Calibration	2/19/75
AM 602 ELINORE - Line Oriented Editor	5/20/75
RK 606 Tape Duplicator	8/22/74
RK 612 Line Printer List	3/22/78

The HP-9815 and HP-97 calculators were used to compute geographic positions of electronic control stations and visual signals used for calibrations.

S. REFERRAL TO REPORTS

The following reports should be referenced for additional data on this survey:

Horizontal Control Report

Field Edit Reports for Field Sheets TP-00065 and TP-00066

Electronic Control Report

Corrections to Echo Soundings Report

Respectfully submitted,

Approved and forwarded,

for *Thomas G. Clark*
Susan J. Ludwig
LT, NOAA

Ralph J. Land
Ralph J. Land
CDR, NOAA
Commanding

INDEX TO ATTACHMENTS FOLLOWING TEXT

Parameter Tape Listings

Field Tide Note

Geographic Names

Velocity Corrector Tape Listing

Velocity Graphs, Table No. 1 *Removed to cabinet*

TC/TI Tape Listings

Abstracts of TC/TI Tape Computations

Settlement and Squat Test Results

Final Baseline Correctors

Mini-Ranger Statistics

Master Station List

Ascii Signal Tape Listing

Abstracts of Positions

Bottom Samples (Log Sheet M)

Nonfloating Aids or Landmarks for Charts (76-40)

Abstracts of Times of Hydro

Chartlet Showing Rocks Not Verified

Correspondence (Hazards)

Approval Sheet

PARAMETER TAPE LISTING
RA-20-6-81(H-9983)

RA-20-6-81
SKEW:342,22,61
FEST=70000
CLAT=2176000
CMER=155/30/0
GRID=60
PLSCL=20000
PLAT=20/09/40
PLON=155/43/20
VESNO=2123
YR=81
ANDIST=0.0

RA-20-6-81
EXPANSION NO. 1
SKEW:0,14,34
FEST=70000
CLAT=2176000
CMER=155/30/0
GRID=15
PLSCL=5000
PLAT=20/07/18
PLON=155/36/12
VESNO=2123
YR=81
ANDIST=0.0

PARAMETER TAPE LISTING
RA-20-6-81(H-9983)

RA-20-6-81
EXPANSION NO. 2
SKEW:90,7,10
FEST=70000
CLAT=2176000
CMER=155/30/0
GRID=15
PLSCL=5000
PLAT=20/10/29
PLON=155/38/46
VESNO=2123
YR=81
ANDIST=0.0

RA-20-6-81
VESSEL 2120
SKEW:342,22,61
FEST=70000
CLAT=2176000
CMER=155/30/0
GRID=60
PLSCL=20000
PLAT=20/09/40
PLON=155/43/20
VESNO=2120
YR=81
ANDIST=33.5

FIELD TIDE NOTE

OPR-T126-RA-81

HAWAII, HAWAIIAN ISLANDS

This report covers the tide data gathered September - December 1981 in support of hydrographic survey OPR-T126-RA-81, along the northeast coast of the Island of Hawaii.

Field tide reduction of soundings was based on predicted tides from Honolulu, Hawaii, corrected to Hilo, Hawaii, and were interpolated by PDP 8/e computer utilizing AM 500 (version dated 11/10/72). All times of both predicted and recorded tides are GMT.

In addition to the permanent Hilo, Hawaii tide gage (161-7760) used for the project, one Metercraft bubbler tide gage was installed in the project area. Its location and period of operation are as follows:

<u>Site</u>	<u>Location</u>	<u>Period</u>
Upolu Point	20° 15.2' N 155° 53.4' W	65 days* (28 September - 4 December)

*(see discussion in next section)

UPOLU POINT (161-7737)

Gage (S/N 7601-753634) was installed on September 26 and began operation on September 28, 1981.

The first staff support structure was knocked out by high surf on October 7, 1981 at approximately 1700 GMT (Although data after 0600Z on 10/7 was not retrievable). A much heavier, stronger structure was installed on October 10, 1981 and data collection resumed at 0206 GMT on that date. This does not seriously affect the data because, as per section 5.8.2. of Project Instructions OPR-T126-RA-81, the hydrography run on these days was ship hydro done in greater than 100 fathoms (with the exception of 4 soundings, none of which was shoaler than 77 fathoms). This new staff and orifice support structure withstood occasional high surf batterings which completely inundated the entire structure.

It should be noted here that, when the gage and staff support structure were removed on December 4, 1981, the U-bolt which secured the orifice to the

angle iron support was missing. It is not known when the U-bolt broke off. The next point of attachment to the support was roughly 20 inches higher along the tubing. (See illustration on next page). This would have permitted movement of the orifice with the surge. The motion would tend to dampen the wave action, resulting in a tide height lower than it should be. An inspection of the marigrams yields no apparent evidence of the degree of this motion.

Similarly, an inspection of the gage/staff difference shows no differences indicative of significant orifice movement.

During the period of September 28 to October 7, the original staff read 13.2 ft. greater than the marigram. During the remaining period of October 10 through December 4, the new staff read 7.6 ft. greater than the marigram. The marigram speed of the gage proved to be somewhat erratic, calling for the tide observer to almost continually reset the chart at each observation. Additionally, the observer tried to adjust the speed of the marigram drive on October 31, Nov. 2, Nov. 3, and Nov. 7 with little or no success.

HILO (161-7760)

This gage (S/N 7601 A1469M11) is a primary gage installed and maintained by the Pacific Tides Party. It is permanently installed at $19^{\circ}44.0' N$, $155^{\circ}3.5' W$. Levels were run before and after the project but, aside from that, there was no work done with the gage.

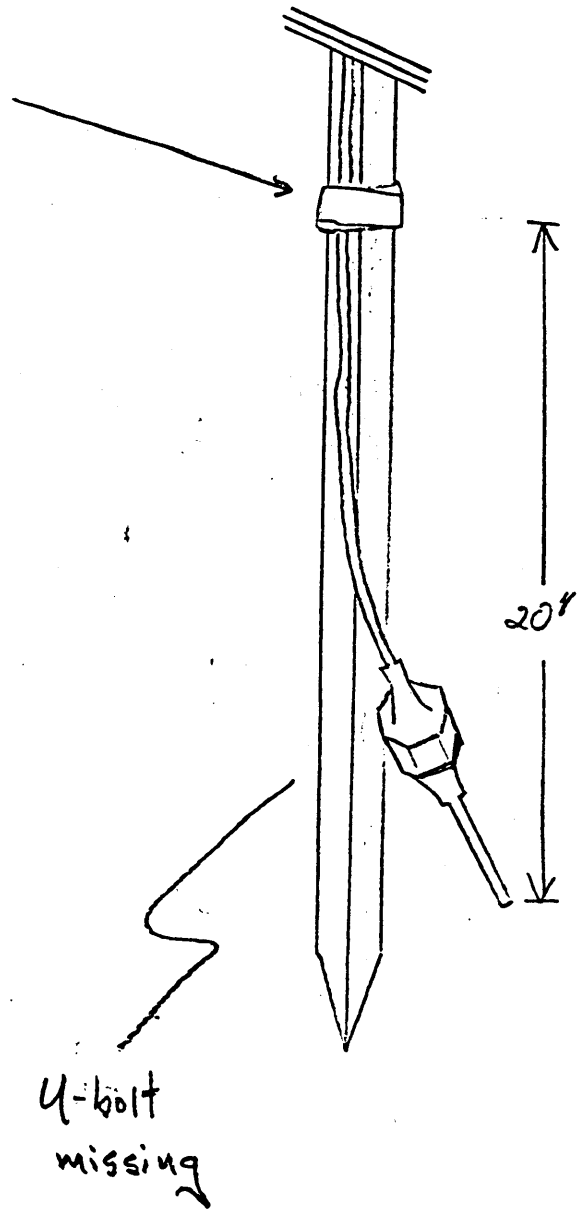
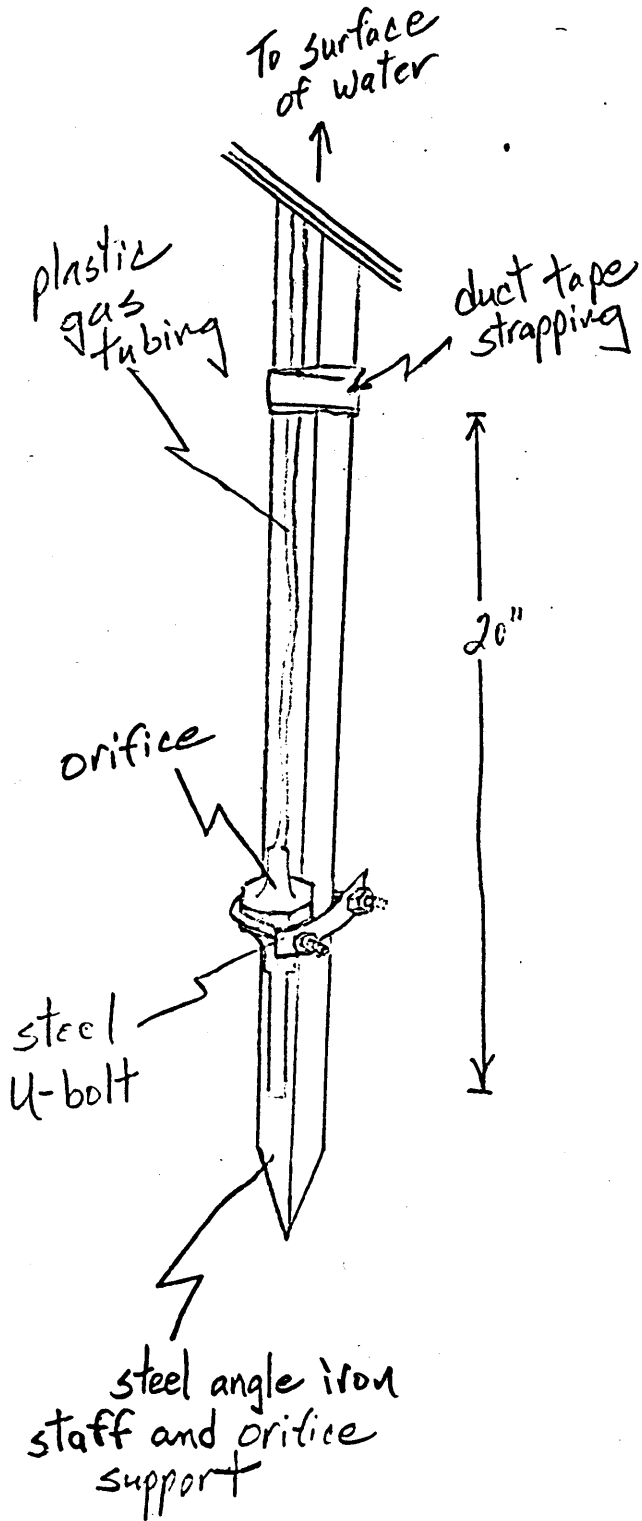
LEVELS

UPOLU POINT

An inspection of the gage levels run at installation and at removal yields the following:

AT INSTALLATION

UPON REMOVAL



Height Between Benchmarks

<u>Height Measured</u>	<u>2 Nov. 80</u>	<u>17 Dec. 80</u>	<u>23 Sept. 81</u>	<u>5 Dec. 81</u>	<u>Mean</u>	<u>Mean-Excluding 23 Dec. 81</u>
	Staff Stop - BM Pier 3	4.341 ft.	4.337 ft.	4.331 ft.	4.327 ft.	4.334 ft.
BM Pier 3 - BM F	.091 ft.	.099 ft.	.075 ft.	.092 ft.	.089 ft.	.094 ft.
BM F - BM 5	.006 ft.	.007 ft.	.006 ft.	.006 ft.	.006 ft.	.006 ft.
BM 5 - BM 4	2.510 ft.	2.506 ft.	2.523 ft.	2.497 ft.	2.509 ft.	2.504 ft.

Height Between Benchmarks

<u>Height Measured</u>	<u>At Installation</u>	<u>At Removal</u>	<u>Difference</u>
BM A - BM B	4.612 ft.	4.619 ft.	2.1 mm
BM B - BM C	16.162 ft.	16.158 ft.	1.2 mm
BM C - BM D	10.988 ft.	10.991 ft.	0.9 mm
BM D - BM E	.728 ft.	.728 ft.	none

	<u>New Staff Installation</u>	<u>Removal</u>	<u>Difference</u>
Staff Stop - BM A	.787 ft.	.781 ft.	1.8 mm

Total Cumulative Difference: 6.0 mm

HILO

An inspection of the gage levels run prior to and after completion of the project yields the following:

Height Between Benchmarks

<u>Height Measured</u>	<u>23 Sept. 81</u>	<u>5 Dec. 81</u>	<u>Difference</u>
Staff Stop - BM Pier 3	4.331 ft.	4.327 ft.	1.2 mm
BM Pier 3 - BM F	.075 ft.	.092 ft.	5.2 mm
BM F - BM 5	.006 ft.	.006 ft.	none
BM 5 - BM 4	2.523 ft.	2.497 ft.	7.9 mm

Total Cumulative Difference: 14.3 mm

The large differences here are believed to be the result of leveling errors during the 23 Sept. 81 leveling. Indications of that lies in a comparison of levels run on 2 Nov. 80 and 17 Dec. 80 with the 1981 levels (see following page).

Levels were run twice on 23 Sept. 81, due to the disparity in results with previous levelings. Still, it seems there was a problem on the Pier 3 -

BM F and the BM 5- BM 4 sections.

Further, it appears there is a slumping of the dock. The Staff Stop - Pier 3 section shows a trend, as does the BM 5 - BM 4 section (if we ignore the 23 September levels).

These results should be compared with the levels run by the Pacific Tides Party.

Respectfully submitted,

Richard L. Hastings, SST
for Michael J. Kretsch
LT, NOAA

Approved and Forwarded,

Ralph J. Land
Ralph J. Land
CDR, NOAA
Commanding

GEOGRAPHIC NAMES

H-9983

Name on Survey	Source of Name										
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST			
Waimanu Bay											1
Waimanu Stream											2
Waipio											3
Waipio Bay											4
Waiulili Stream											5
											6
											7
											8
											9
											10
											11
											12
											13
											14
											15
											16
											17
											18
											19
											20
											21
											22
											23
											24
											25

Approved:

Chas. E. Harrington

Chief Geographer - N/CG 2x5

5 April 1983

VELOCITY CORRECTION TABLES

TABLE#: 01 YR: 81 FM

TABLE#: 02 YR: 81 FM

DEPTH	VEL COR
3.00	.00
5.50	.10
7.50	.20
9.00	.30
11.00	.40
13.00	.50
15.00	.60
16.50	.70
18.50	.80
20.00	.90
22.50	1.00
28.00	1.20
31.00	1.40
35.50	1.60
39.20	1.80
43.00	2.00
47.00	2.20
51.00	2.40
55.00	2.60
59.30	2.80
63.50	3.00
67.60	3.20
71.90	3.40
76.20	3.60
80.90	3.80
85.40	4.00
89.90	4.20
94.50	4.40
99.80	4.60
104.60	4.80
109.10	5.00
114.10	5.20
119.00	5.40
124.40	5.60
129.70	5.80
135.00	6.00
192.00	7.00
250.00	8.00
318.00	9.00
384.00	10.00
452.00	11.00
520.00	12.00
99999.99	12.00

DEPTH	VEL COR
1.30	.00
3.20	.10
5.00	.20
7.00	.30
8.80	.40
10.80	.50
12.50	.60
14.50	.70
16.80	.80
18.00	.90
20.00	1.00
25.80	1.20
29.50	1.40
33.20	1.60
37.00	1.80
40.80	2.00
44.50	2.20
48.30	2.40
52.80	2.60
57.00	2.80
60.90	3.00
65.00	3.20
69.00	3.40
73.50	3.60
78.00	3.80
82.50	4.00
87.20	4.20
91.80	4.40
95.50	4.60
101.00	4.80
105.90	5.00
111.00	5.20
115.00	5.40
121.30	5.60
126.80	5.80
132.50	6.00
187.00	7.00
245.50	8.00
99999.99	8.00

VELOCITY-TRANSDUCER FILE: V09983

TRANSDUCER CORRECTION TABLES

VESSEL: 2120 YR: 81 FM

DAY	TIME	TRA COR	VEL TABLE
302	225100	2.60	1
337	235959	2.60	1

VESSEL: 2126 YR: 81 FM

DAY	TIME	TRA COR	VEL TABLE
303	200214	.30	2
305	235959	.30	2

LISTING MADE: 12-23-82 12:09:16

VESSEL: 2124 YR: 81 FM

DAY	TIME	TRA COR	VEI TABLE
318	192848	.30	2
320	235959	.30	2

VESSEL: 2125 YR: 81 FM

DAY	TIME	TRA COR	VEL TABLE
303	224900	.30	2
320	235959	.30	2

RA-20-6-81
(H-9983)

LSR

FATHOMETER S/N C 255 YR 81 PAGE 1 OF 1

TRA (TC/PI) TAPE: VESSEL 2120(RAINIER) SURVEY

From TIME	TRA CORR.	DAY	VEL. TBL.	TRA corr. is the algebraic sum of these columns			COMMENTS
				INITIAL	DRAFT	S./ SQUAT	
225100	^{2.6} 0.0	302	0	0.0	0.0	N/A	BOTTOM SAMPLES
222050	^{2.6} 0.0	336	1	0.0	0.0	N/A	HYDRO BEGINS
191800	^{2.6} 0.0	337	1	0.0	0.0	N/A	HYDRO ENDS

3-32

TRA (TC/TT) TAPE: **RA-20-6-81**
 VESSEL **2124 (RA-4)** SURVEY **(H-9983)**

FATHOMETER S/N **1071** YR **81** PAGE **1** OF **1**

From TIME	TRA CORR.	DAY	VEL. TBL.	TRA corr. is the algebraic sum of these columns				COMMENTS	
				INITIAL	SCALE-PHASE	DRAFT	F. ARC S./ SQUAT		
192848	0.3	318	1	0.0	N/A	0.3	N/A	0.0	HYDRO BEGINS
193200	0.3	320	1	0.0	N/A	0.3	N/A	0.0	HYDRO ENDS

3-32

TRA (TC/TT) TAPE: VESSEL 2125 (RA-3) SURVEY (H-9983) RA-20-6-81

FATHOMETER S/N 1070 YR 81 PAGE 1 OF 1

From TIME	TRA CORR.	DAY	VEL. TBL.	TRA corr. is the algebraic sum of these columns			COMMENTS		
				INITIAL	SCALE-PHASE	DRAFT F. ARC		S. / SQUAT	
224900	0.3	303	1	0.0	N/A	0.3	N/A	0.0	HYDRO BEGINS
005000	0.3	320	1	0.0	N/A	0.3	N/A	0.0	HYDRO ENDS

3-32

RA-20-6-81
(H-9983)

TRA (TC/ETI) TAPE: VESSEL 2126 (RA-6) SURVEY

FATHOMETER S/N

1040 YR 81

PAGE 1 OF 1

From TIME	TRA CORR.	DAY	VEL. TBL.	TRA corr. is the algebraic sum of these columns				COMMENTS	
				INITIAL	SCALE-PHASE	DRAFT	F. ARC		S./
200214	0.3	303	1	0.0	N/A	0.3	N/A	0.0	HYDRO BEGINS
230900	0.3	305	1	0.0	N/A	0.3	N/A	0.0	HYDRO ENDS

3-32

NOAA Ship RAINIER

Launch Settlement and Squat Tests

1981

The settlement and squat tests on RA-3, RA-5, and RA-6 were performed on 15 April 1981 off Sand Point Naval Support Activity, Lake Washington. Tests were performed on RA-4 on 27 April 1981. The full-speed test of RA-3 was performed at Kawaihae Harbor, Hawaii, on 3 October 1981.

Tests were conducted as follows: One man with a leveling rod stood over the transducer while another on shore sighted through a level to read the mark. The boats were run to the observer at the following RPM: 0, 800 (idle), 1000, 1200, 1500, 1800, 2000, 2200, and 2400. Launch RA-4 was also run at 2600 and full throttle, 2800, and Launch RA-3 at full-speed, 2750 RPM. At each speed there were at least two readings which agreed within 0.1 feet.

RPM	RA-3 (1007)		RA-4 (1016)		RA-5 (1003)		RA-6 (1013)	
	FT	FM	FT	FM	FT	FM	FT	FM
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
800	0.0	0.0	+0.1	0.0	0.0	0.0	0.0	0.0
1000	+0.1	0.0	+0.1	0.0	+0.1	0.0	0.0	0.0
1200	+0.2	0.0	+0.1	0.0	+0.1	0.0	+0.1	0.0
1500	+0.2	0.0	+0.2	0.0	+0.2	0.0	+0.1	0.0
1800	+0.3	0.0	+0.1	0.0	+0.2	0.0	+0.1	0.0
2000	+0.2	0.0	0.0	0.0	+0.2	0.0	0.0	0.0
2200	+0.1	0.0	-0.2	0.0	+0.1	0.0	-0.2	0.0
2400	0.0	0.0	-0.4	-0.1	-0.1	0.0	-0.3	0.0
2600	--	--	-0.5	-0.1				
Full RPM	-0.4 (2750)	-0.1	-0.6 (2800)	-0.1				

ELECTRONIC CORRECTOR ABSTRACT

VESSEL : 2120

SHEET : RA-20-6-81

TIME	DAY	PATTERN 1	PATTERN 2
225100	302	+00000	+00000
230500	318	+00000	+00000
222050	336	-00001	-00003
181920	337	+00000	-48026
191800		+00000	+00000

ELECTRONIC CORRECTOR ABSTRACT

VESSEL : 2124

SHEET : RA-20-6-81

TIME	DAY	PATTERN 1	PATTERN 2
192848	318	-00001	-02446
000016	319	-00001	-30185
002500		-00001	+00000
192414	319	-00003	+94199
235000		+00000	+00000
190025	320	-00004	-18061
193200		+00000	+00000

ELECTRONIC CORRECTOR ABSTRACT

VESSEL : 2125

SHEET : RA-20-6-81

TIME	DAY	PATTERN 1	PATTEFN 2
224900	303	+00000	-67054
001100	304	+00000	-62237
002000		+00000	+00000
174100	304	-00001	-94590
000000	305	-00001	-61303
005100		-00001	+00000
173300	305	-00001	+80532
000800	306	-00001	+82047
003800		+00000	+00000
183042	318	-00001	+74432
001200	319	-00001	+94583
005000		+00000	+00000
181730	319	+00000	-26205
000120	320	-00002	-52186
005000		+00000	+00000

ELECTRONIC CORRECTOR ABSTRACT

VESSEL : 2126

SHEET : RA-20-6-81

TIME	DAY	PATTERN 1	PATTEEN 2
201632	303	-00001	-67072
000016	304	-00001	-74210
003000		+00000	+00000
190405	304	-00004	-69433
001907	305	-00004	-75000
025000		+00000	+00000
184130	305	-00004	-78139
230900		+00000	+00000

FINAL BASELINE CORRECTORS

OPR-T126-RA-81

CODE	CONSOLE R/T			
	715 1660	711 1646	30269 1636	720 2710
B	N/A	-3	N/A	N/A
C	N/A	-4	-3	N/A
D	-1	-4	0	N/A
E	0	0	0	N/A
F	-2	N/A	-1	N/A
O	0	-1	0	0

SURVEY RA-20-6-8 (H-9983)

MINIKAMBER STATISTICS

ELECTRONIC CONTROL TYPE R/A

J.D.	MOBILE UNIT LAUNCH EDP No.	CONSOLE	R/T	SHORE STATION	UNIT CODE	SYSTEM CHECK A.M. P.M.		B/E	COMMENTS
303/304	2126	711	1646	207	0	-5.21	-2.75	-1	
303/304	2125	715	1660	207	0	-4.36	-4.09	0	
304/305	2125	715	1660	121	D	-4.16	+3.23	-1	
304/305	2126	711	1646	207	e	-5.69	-5.01	-4	
305/306	2125	715	1660	116	D	-11.27	-6.15	-1	
305	2126	711	1646	207	e	-6.02	-1.75	-4	
318/319	2125	715	1660	116	D	-7.49	-9.81	-1	
318/319	2124	711	1646	118	0	-3.89	-11.54	0	
319/320	2125	715	1660	116 117	0 F	-5.52 -7.76	+2.01 -3.48	0 -2	Sta. 116 POS. 8139-8134 Sta. 117 POS. 8135-8262
319	2124	711	1646	118	B	-3.83	-4.14	-3	
320	2124	711	1646	123	D	-5.31	-4.26	-4	
336	2120	30269	1636	116 & 134	F & G			-1 -3	REFER TO BASELINE CALIBRATION
337	2120	30269	1636	117	C	NO SYSTEM CHECK, SEE BASELINE		-3	CALIBRATION

OCEANOGRAPHIC LOG SHEET - M
BOTTOM SEDIMENT DATA

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

VESSEL	DATE	PROJ. NO.		YEAR	DEPTH (Fathoms)	WEIGHT OF SAM- PLER	AP. PROX. PENE- TRA- TION	LENGTH OF CORE	COLOR OF SEDI- MENT	FIELD DESCRIPTION	REMARKS (Unusual conditions, cohesiveness, dented cutter, stat. no., type of bottom relief i.e., slope, plain, disposition, etc.)	OBS. (INIT.)
		LATITUDE	LONGITUDE									
2120/RAINIER		20° N	155° W	1981								
	10/29	20° 09' 48"	155° 36' 30"	104	5016				gy	M S		AC6
	10/29	20° 11' 42"	155° 39' 30"	130	"				gy	M S		"
	11/14	20° 07' 28"	155° 30' 00"	73	"				bK	fine S, brk Sh		"

MASTER STATION LIST
OPR-T126-RA-81
HAWAII, HAWAIIAN ISLANDS

FINAL VERSION

*Revisions made to indicate
stations actually used and
to update positions to NGS
preliminary adjusted values.*

101 3 20 01 40714 155 18 23484 254 0000 329649
/RED RAYDIST 1981 VOL.1 PAGE 10

102 3 20 14 52767 155 46 19068 250 0000 329649
/KAUHOLA AZ. 1981 ~~GREEN RAYDIST NO. 1~~ VOL.1 PAGE 1

~~103 3 20 13 14204 155 44 01327 250 0000 000000
/AKOKOA AZ MARK 1981 VOL.1 PAGE 36~~

~~104 2 20 13 21203 155 44 03002 250 0000 000000
AKOKOA 1913-1981 RM 1 VOL.1 PAGE 35~~

~~105 3 20 16 06465 155 52 02252 250 0000 000000
/CITABRIA 1981 VOL.1 PAGE 14~~

~~106 3 20 16 15523 155 51 15525 250 0000 000000
/EVELYN 1981 VOL.1 PAGE 20~~

~~107 7 20 01 40612 155 18 23458 250 0000 000000
/KAHOLO AZ MARK 1981 VOL.1 PAGE 10~~

108 3 20 13 55873 155 44 50012 250 0020 000000
/KALALAE 1981 VOL.1 PAGE 31

~~109 2 20 01 40509 155 18 23786 250 0000 000000
/KAHOLO AZ "A" PT 1981 VOL.1 PAGE 11~~

~~110 3 20 16 10289 155 50 40551 250 0000 000000
/TULLY 1981 VOL.1 PAGE 23~~

~~111 3 20 15 40246 155 51 35859 250 0000 000000
/TULLY'S SILO 1981 VOL.1 PAGE 23~~

~~112 3 20 16 02598 155 50 01229 139 0022 000000
/KEPUHI 2 1948 201553(1042)~~

~~113 3 20 14 18619 155 45 22464 139 0023 000000
/KAPAAIKI 1913 201553(1021)~~

~~114 7 20 14 52767 155 46 19068 250 0000 000000
/KAUHOLA AZ 1981 VOL.1 PAGE 8~~

115	4	20	14	57863	155	46	27251	250	0010	000000
/KAUHOLA 1881-1967								201553(1023)		
116	3	20	07	51742	155	33	31020	250	0045	000000
/KUKUIHAELE LT ECC 1981								VOL.1 PAGE 41		
117	3	20	07	47710	155	33	10370	250	0025	000000
/LIAT 1981								VOL.1 PAGE 44		
118	3	20	06	54100	155	29	56600	250	0012	000000
/KAMAKAMAKAA 1981								VOL.2 PAGE 1		
119	6	20	06	22300	155	28	31000	250	0020	000000
/MONGOOSE 1981								VOL.2 PAGE 4		
120	3	20	05	40777	155	27	34247	250	0152	000000
/IKI 2 1966								201552(1008)		
121	3	20	07	44515	155	33	58879	250	0123	000000
/WAIKOEKOE 3 1948								201553(1083)		
122	3	20	15	55900	155	51	54038	254	0042	329649
/AIRPORT RAYDIST GREEN 2 1981								VOL.1 PAGE 37		
123	5	20	05	42300	155	26	25800	250	0008	000000
/ALAPII 1981								VOL.2 PAGE 23		
124	5	20	04	42150	155	24	17701	250	0053	000000
/MAILE 1981								VOL.2 PAGE 27		
125	6	20	03	06912	155	20	54001	250	0011	000000
/PAENA 1981								VOL.2 PAGE 29		
126	3	20	01	16370	155	17	02522	243	0094	000000
/TP 3 1981								VOL.2 PAGE 33		
127	3	20	05	39637	155	26	56160	243	0100	000000
/TP 2 1981								VOL.2 PAGE 14		
128	3	20	00	57443	155	16	27981	243	0000	000000
/TP 4 1981								VOL.2 PAGE 38		
129	3	19	59	48781	155	14	33862	250	0000	000000
/LAUPAHOEHOE 2 1981								VOL.2 PAGE 39		
130	3	19	58	43362	155	13	08612	243	0000	000000
/TP 5 1981								VOL.3 PAGE 7		

131	3	19	58	15784	155	13	52047	250	0280	000000	191551(1129)
/PAPAALO A 1877											
132	3	19	57	18174	155	11	30481	250	0122	000000	VOL.3 PAGE 16
/LONE HALE 2 1981											
133	3	20	00	05515	155	16	47981	250	0331	000000	201552(1006)
/HOKUULA 1877											
134	3	20	13	21333	155	44	03383	250	0000	000000	VOL.1 PAGE 34
/AKOKOA 1913- 1961 RM 2											
000	3	20	15	01276	155	53	17859	139	0187	000000	201553(1051)
/LORAN C TOWER 1964											
201	0	20	14	22440	155	49	55371	139	0024	000000	201553(1011)
/HIND STACK 1948											
202	3	20	14	13643	155	46	55121	139	0041	000000	201553(1044)
/KOHALA MILL STACK 1948											
203	7	20	07	517 ³⁷ 42	155	33	31 ⁵⁸⁶ 619	139	0046	000000	VOL.1 PAGE 41
/KUKUIHAELE LIGHT 1981											
204	6	20	14	57687	155	46	27 1 46	139	0025	000000	201553(1026)
/KAUHOLA POINT LIGHT 1948											
205	3	20	04	50792	155	28	00315	139	0045	000000	201552(1004)
/HONOKAA HAWAIIAN TEL MICROWAVE 1967											
206	3	20	05	24916	155	26	16037	139	0000	000000	201552(1025)
/PAAUHAU SUGAR CO STACK 1913											
207	7	20	13	21424	155	44	03232	139	0028	000000	201553(1001)
/AKOKOA 1913											
208	6	19	59	48364	155	14	35963	139	0008	000000	VOL.2 PAGE 39
/LAUPAHOEHOE PT LT 1981											
209	3	20	01	01963	155	18	32630	139	0291	000000	201552(1011)
/KAHOLO 1877											
210	3	20	03	14546	155	38	18626	139	1214	000000	201553(1017)
/KAALA 1877											
211	3	20	02	40827	155	22	35995	139	0253	000000	201552(1022)
/OPIHILALA 1881											

~~212 6 20 15 57506 155 51 53076 139 0057 000000
/HAWI UPOLU AIRPORT BEACON 1981 VOL.1 PAGE 17~~

~~213 0 20 16 04160 155 52 14446 139 0016 000000
/KEALAHEWA 2 1948 201553(1037)~~

~~214 4 20 13 59178 155 51 51643 139 0290 000000
/PUU ULA HTS 1913 201553(1075)~~

~~215 3 20 03 15155 155 21 47630 139 0030 000000
/PAAUILO STACK 1948 201552(1027)~~

~~300 6 20 00 04277 155 16 48514 139 0000 000000
/OOKALA MICROWAVE TWR 1981 VOL.3 PAGE 5-6~~

~~301 3 20 35 10963 156 24 53462 139 0022 000000
/HANAMANIOA POINT LIGHT 1969 201561(1033)~~

~~302 3 20 38 01599 156 30 01091 139 0057 000000
/MOLOKINI LIGHTHOUSE 1950 201564(1104)~~

~~303 3 20 46 50428 156 31 32652 139 0022 000000
/MC GREGOR PT. LIGHT 1950 201564(1099)~~

ASCII SIGNAL TAPE LISTING
 OPR-T126-RA-81
 HAWAII, HAWAIIAN ISLANDS.
 FINAL VERSION

101	3	20	01	40714	155	18	23484	254	0000	329649
102	3	20	14	52767	155	46	19068	250	0000	329649
103	3	20	13	14204	155	44	01327	250	0000	000000
104	2	20	13	21203	155	44	03002	250	0000	000000
105	3	20	16	06465	155	52	02252	250	0000	000000
106	3	20	16	15523	155	51	15525	250	0000	000000
107	7	20	01	40612	155	18	23458	250	0000	000000
108	3	20	13	55873	155	44	50012	250	0020	000000
109	2	20	01	40509	155	18	23786	250	0000	000000
110	3	20	16	10289	155	50	40551	250	0000	000000
111	3	20	15	40246	155	51	35859	250	0000	000000
112	3	20	16	02598	155	50	01229	139	0022	000000
113	3	20	14	18619	155	45	22464	139	0023	000000
114	7	20	14	52767	155	46	19068	250	0000	000000
115	4	20	14	57863	155	46	27251	250	0010	000000
116	3	20	07	51743	155	33	31620	250	0045	000000
117	6	20	07	47719	155	33	10379	250	0025	000000
118	3	20	06	54111	155	29	56689	250	0012	000000
119	3	20	06	22352	155	28	31412	250	0020	000000
120	3	20	05	40777	155	27	34247	250	0152	000000
121	3	20	07	44515	155	33	58879	250	0123	000000
122	3	20	15	55907	155	51	54038	254	0042	329649
123	5	20	05	42395	155	26	25816	250	0008	000000
124	5	20	04	42150	155	24	17701	250	0053	000000
125	6	20	03	06912	155	20	54001	250	0011	000000
126	3	20	01	16370	155	17	02522	243	0094	000000
127	3	20	05	39637	155	26	56167	243	0100	000000
128	3	20	00	57443	155	16	27981	243	0000	000000
129	3	19	59	48781	155	14	33861	250	0000	000000
130	3	19	58	43362	155	13	08612	243	0000	000000
131	3	19	58	15784	155	13	52047	250	0280	000000
132	3	19	57	18174	155	11	30481	250	0122	000000
133	3	20	00	05515	155	16	47981	250	0331	000000
134	3	20	13	21333	155	44	03383	250	0000	000000
200	3	20	15	01276	155	53	17859	139	0187	000000
201	0	20	14	22440	155	49	55371	139	0024	000000
202	3	20	14	13643	155	46	55121	139	0041	000000
203	7	20	07	51742	155	33	31619	139	0046	000000
204	6	20	14	57687	155	46	27146	139	0025	000000
205	3	20	04	50792	155	28	00315	139	0045	000000
206	3	20	05	24916	155	26	16037	139	0000	000000
207	7	20	13	21424	155	44	03232	139	0028	000000
208	6	19	59	48364	155	14	35963	139	0008	000000
209	3	20	01	01963	155	18	32630	139	0291	000000
210	3	20	03	14546	155	38	18626	139	0000	000000
211	3	20	02	40827	155	22	35995	139	0000	000000
212	6	20	15	57506	155	51	53076	139	0057	000000
213	0	20	16	04160	155	52	14446	139	0016	000000
214	4	20	13	59178	155	51	51643	139	0290	000000
215	3	20	03	15155	155	21	47630	139	0030	000000
300	6	20	00	04277	155	16	48514	139	0000	000000
301	3	20	35	10963	156	24	53462	139	0022	000000
302	3	20	38	01599	156	30	01091	139	0057	000000
303	3	20	46	50428	156	31	32652	139	0022	000000

ABSTRACT OF POSITIONS

RA-20-6-81
(H-9884)

VESSEL: 2124 (RA-4)

ANDIST: 0.0

<u>Day</u>	<u>Positions</u>	<u>Control</u>	<u>Sl,M,S2</u>	<u>Remarks</u>
318/319	4000-4082	03	118 R/Azi	Mainscheme
319	4084-4094	03	118 R/Azi	Crossline
319	4095-4139	03	118 R/Azi	Mainscheme
320	4140-4172	03	123 R/Azi	Crossline

Duplicate Positions: None.

Rejected Positions: None.

RA-20-6-81 (Cont.)

VESSELL: 2120 (SHIP RAINIER)

ANDIST: 33.5

<u>Day</u>	<u>Positions</u>	<u>Control</u>	<u>S1,M,S2</u>	<u>Remarks</u>
302	1000-1001	04	101-122	Bottom Samples
318	1002	04	101-122	Bottom Samples
336	673-677	04	116-134	Mainscheme
337	683-774	03	117 R/Azi	Crossline

Duplicate Positions: None.

Rejected Positions: 678,679,680,681,682,738,740.

RA-20-6-81 (Cont.)

VESSEL: 2126 (RA-6)

ANDIST: 0.0

<u>Day</u>	<u>Positions</u>	<u>Control</u>	<u>S1,M,S2</u>	<u>Remarks</u>
303/304	6484-6546	03	207 R/Azi	Mainscheme (mainscheme inside Exp. #2 pos. 6540-6542)
304	6000-6007	03	207 R/Azi	Crossline (crossline inside Exp. #2 pos.6005-6007)
304	6008-6020	03	207 R/Azi	Development,Expansion #2 *(N.P.)
304	6021-6045	03	207 R/Azi	Crossline (crossline inside Exp. #1 pos. 6040-6045)
304/305	6046-6157	03	207 R/Azi	Development,Expansion #1 *(N.P.)
305	6518-6523	03	207/R/Azi	Mainscheme
305	6524-6546	03	207 R/Azi	Crossline (crossline inside Exp. #1 pos.6545-6546)
305	6547-6632	03	207 R/Azi	Development,Expansion #1 *(N.P.)

Duplicate Positions: 6518,6519,6520,6521,6522,6523,6524,6525,6526,6527,6528
6529,6530,6531,6532,6533,6534,6535,6536,6537,6538,6539,6540,6541,6542,6543
6544,6545,6546,6010,6078,6079,6000,6001,6002,6003,6004,6005,6006,6007,6008
6009,6010,6011,6012,6013,6014,6015,6016,6017,6018,6019,6020,6021,6022,6023
6024,6025,6026,6027.

Rejected Positions: 6493,6494,6495.

*(N.P.) = Positions are not plotted on the Smooth Sheet.

RA-20-6-81 (Cont.)

VESSEL: 2125 (RA-5)

ANDIST: 0.0

<u>Day</u>	<u>Positions</u>	<u>Control</u>	<u>S1,M,S2</u>	<u>Remarks</u>
303/304	5702-5726	03	207 R/Azi	Mainscheme (mainscheme inside Exp. #2 pos. 5703-5704,5724-5725)
304	5744-5760	03	121 R/Azi	Crossline (crossline inside Exp. #1 pos. 5757-5760)
304/305	5761-5886	03	121 R/Azi	Mainscheme (mainscheme inside Exp. #1 pos. 5761-5772,5775-5778 5780-5781, 5788-5794 5804-5810, 5823-5827 5837-5841, 5842-5847 5858-5860, 5861-5862 5865-5868, 5883-5886)
305	5887-6011	03	116 R/Azi	Mainscheme
305/306	6012-6027	03	116 R/Azi	Crossline (crossline inside Exp. #1 pos.6023-6026)
318	8028-8118	03	116 R/Azi	Mainscheme
318/319	8119-8138	03	116 R/Azi	Crossline (crossline inside Exp. #1 pos. 8135-8138)
319	8141-8169	03	116 R/Azi	Mainscheme
319	8170-8174	03	116 R/Azi	Crossline
319	8175-8210	03	117 R/Azi	Mainscheme
319	8211	03	117 R/Azi	Detached Position
319	8213	03	117 R/Azi	Detached Position
319/320	8214-8253	03	117 R/Azi	Mainscheme
320	8254-8262	03	117 R/Azi	Crossline

Duplicate Positions: 5865,5866,6000,6001,6002,6003,6004,6006,6006,6007
6008,6009,6010,6011,6012,6013,6014,6015,6016,6017,6018,6019,6020,6021
6022,6023,6024,6025,6026,6027.

Rejected Positions: 5716,5739,5740,5741,5742,5743,5773,5779,8049,8050
8139,8140,8212.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
NOAA Ship RAINIER S221
1801 Fairview Avenue East
Seattle, Washington 98102

August 13, 1981 OA/CPM221:TGC

~~102-19~~

Hawaii Project

1703-13

Department of the Army
Pacific Ocean Division
Corps of Engineers
Building 320
Ft. Shafter, Hawaii 96858

Dear Sir:

The NOAA Ship RAINIER will be conducting surveying operations off the Island of Hawaii this fall. The project area is from Hakalou to Upolu Pt. on the northeast coast. The ship is scheduled to be working in this area from September 24 through December 1.

In going through our files, we noted your request for a 1:1,000 scale survey off Laupahoehoe. Are there any other areas you are interested in?

Our project instructions call for investigation of possible harbors of refuge in the following areas:

Laupahoehoe Landing
Paauhau Landing
Honokaa Landing
Kukuihaele Landing
Waipio Bay
Kaewaeli Bay

We would appreciate any information on the above, such as approximate level of use and size of vessel that uses any of the above areas for landing and/or protection in rough weather.

Sincerely,

Ralph J. Land
Commander, NOAA
Commanding Officer



10TH ANNIVERSARY 1970-1980

National Oceanic and Atmospheric Administration

A young agency with a historic
tradition of service to the Nation

PODED-PH

3 September 1981

SUBJECT: Hydrographic Surveys, East Coast Island of Hawaii

Commander Ralph J. Land
Commanding Officer
NOAA Ship RAINIER S221
1801 Fairview Avenue East
Seattle, Washington 98102

1. This is in response to your letter of 13 August 1981 concerning information on the following possible harbors of refuge areas on the northeast coast of the island of Hawaii:

a. Laupahoehoe Landing. This landing has the only boat ramp located in the NOAA project area. The ramp is unusable most of the time due to severe wave and surge conditions. Vessels that generally use the area are trailered motor boats (fiber glass) up to 20 feet in length. We have been requested by the State of Hawaii to evaluate the feasibility for navigation improvements at this site. The proposed 1: 1000 scale for surveys is adequate. Since we expect to initiate our studies in Fiscal Year 1982, early completion of your survey for this site will be appreciated.

b. Paauhau, Honokaa and Kukuihaele Landings. These landings are shown on NOAA charts 1926 and 1922. Historically, these launching sites were old freight landings where livestock and goods were transferred from barge to shore using longboats and outboard motorboats. We have no present plans for studies associated with these landing sites.

c. Waipio and Kaewaeli Bays. Boaters have reported beaching their boats in these bays in extreme emergencies. Otherwise, we do not have any information on present level of use and size of vessel that uses these areas. We do not expect any studies in these bays in the near future.

2. If there are any questions, please contact Mr. Earl Nagasawa of my staff at (808) 438-1907. We appreciate your cooperation in this matter.

FOR THE COMMANDER:

KISUK CHEUNG
Chief, Engineering Division

APPROVAL SHEET

DESCRIPTIVE REPORT TO ACCOMPANY

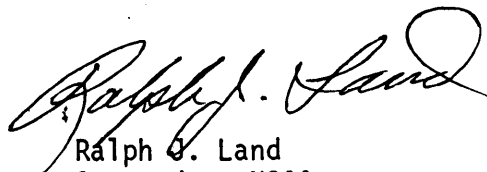
HYDROGRAPHIC SURVEY

H-9983

OPR-T126-RA-81

In producing this sheet standard procedures were observed in accordance with the Hydrographic Manual, PMC OORDER, and the Instruction Manual for Automated Hydrographic Surveys. The data was examined daily during the execution of the survey.

The boatsheet and the accompanying records have been examined by me, are considered complete and adequate for charting purposes, and are approved.



Ralph G. Land
Commander, NOAA
Commanding Officer

HYDROGRAPHIC SURVEY STATISTICS

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS		2	
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS. ARC, EXCESS		16	
DESCRIP-TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES						
CAHIERS		1				
VOLUMES	1					
BOXES						

T-SHEET PRINTS (List) TP-00065, TP-00066

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS		
	PRE-VERIFICATION	VERIFICATION	TOTALS
POSITIONS ON SHEET			1123
POSITIONS CHECKED		1123	
POSITIONS REVISED		269	
SOUNDINGS REVISED		358	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	4	* (VER)/(EVAL)	
VERIFICATION OF CONTROL		03/06	9
VERIFICATION OF POSITIONS		39/01	40
VERIFICATION OF SOUNDINGS		78/03	81
COMPILATION OF SMOOTH SHEET		08/03	11
APPLICATION OF TOPOGRAPHY		10/00	10
APPLICATION OF PHOTOBATHYMETRY		00/00	00
JUNCTIONS		02/02	04
COMPARISON WITH PRIOR SURVEYS & CHARTS		00/31	31
VERIFIER'S REPORT		01/26	27
OTHER		04/07	11
TOTALS		145/79	224

Pre-Verification by J. S. Green	Beginning Date 3/1/82	Ending Date 3/1/82
Verification by I. A. Almacen	Beginning Date 5/24/82	Ending Date 3/3/83
Evaluated by D. J. Hill		
Verification Check by S. H. Otsubo, J. S. Green	Time (Hours) 30	Date 3/3/83
Marine Center Inspection by HIT	Time (Hours) 7	Date 3/18/83
Quality Control Inspection by	Time (Hours)	Date
Requirements Evaluation by	Time (Hours)	Date

PACIFIC MARINE CENTER
EVALUATION REPORT

REGISTRY NO: H-9983

FIELD NO: RA-20-6-81

Hawaii, Island of Hawaii, Waipo Bay and Vicinity

SURVEYED: October 30 - December 3, 1981

SCALE: 1:20,000

PROJECT NO: OPR-T126-RA-81

SOUNDINGS: Ross Fineline 5000

CONTROL: Motorola Mini-
Ranger III
Range-Azimuth, Range-Range

Chief of Party.....CDR R. J. Land

Surveyed By.....LT S. Ludwig
ENS M. Mathwig
ENS R. Koehler

Automated Plot By.....PMC Xynetics Plotter

Verified By.....I. Almacen

Evaluated By.....D. J. Hill

1. INTRODUCTION

H-9983 is a basic survey conducted in accordance with Project Instructions OPR-T126-RA-82, Hawaiian Islands, dated June 11, 1981 and Change No. 1 dated July 13, 1981.

This survey is an inshore, open coastline survey, extending west approximately 15 nautical miles from Paauhau. The area is typically rocky inshore with depths greater than 100 fathoms approximately 1 nautical mile offshore.

Field tide reductions are based on predicted tides from Honolulu, Hawaii, corrected to Hilo, Hawaii. Tides used for reduction of final soundings are based on observations at Upolu Point (16-7737).

Velocity corrector tables were revised during processing for two reasons:

a. A 2.6 fathom draft correction was not used by the field in computing Table I.

b. Nansen cast data from 3 separate days and areas were averaged to result in correctors more representative than those derived in the field from casts on a single day in one area.

The signal list was revised during processing and corrected information is available in the descriptive report and smooth printout.

2. CONTROL AND SHORELINE

Hydrographic position control is adequately discussed in paragraphs F and G of the Descriptive Report, Horizontal Control Report OPR-T126-RA-81 and Electronic Control Report OPR-T126-RA-81. The smooth sheet was plotted utilizing preliminary adjusted positions.

The following unreviewed Class I manuscripts were used as the source of the shoreline shown on the smooth sheet:

<u>Number</u>	<u>Scale</u>	<u>Date of Photography</u>	<u>Date of Field Edit</u>
TP-00065	1:20,000	Dec. 1976, Jan & Mar 1977	Nov. 1981
TP-00066	1:20,000	Dec. 1976, March 1977	Nov. 1981

3. HYDROGRAPHY

Soundings at 98% of the crossings are in good agreement. Discrepancies exceeding specifications in section 4.6.1 of the Hydrographic Manual have been determined to be the result of sounding displacement on steep, irregular slopes.

Standard depth curves have been completed with the exception of the 0-, 1-, 2-, 3-, and 5-fathom curves where hydrography was insufficient.

The development of bottom configuration is adequate except inshore where surf conditions precluded hydrography in depths generally less than 5 fathoms.

The hydrographer's development of a 10.5 fathom depth at latitude 20°10'28"N, longitude 155°39'16"W and a 3.8 fathom depth at latitude 20°06'30"N, longitude 155°28'41"W is inadequate for least depth (see paragraph 9).

4. CONDITION OF SURVEY

The smooth sheet and accompanying hydrographic records adequately conform to the requirements of the Hydrographic Manual with the following exceptions:

a. The capability to digitize line data into the hydro file is not available at PMC at present. Therefore, the following categories are not in digital format:

- (1) Registered shoreline manuscript source data
- (2) Prior survey source data
- (3) Changes to the high water line originating from the hydrographic record
- (4) Ledges, reefs, foul or submerged ledge limit lines, and other line data originating from the hydrographic record
- (5) All depth curves
- (6) Bottom sample descriptions

See
Addendum

(7) Annotations, descriptions, and geographic names

(8) High water line data shown for orientation only

b. A 1:5000 scale inset of Waipio Bay was added to the smooth sheet to permit plotting of soundings acquired at that scale. This larger scale hydrography adequately defines the bottom but does not conform to specifications in sections 1.4.5.1 and 1.4.6 of the Hydrographic Manual. The interval between position fixes and soundings is excessive.

c. The hydrographer did not compare the survey results with chart 19326. The comparison was accomplished during evaluation.

5. JUNCTIONS

a. H-9974 (1981) 1:80,000, joins the survey to the north. Soundings agree to within 1 fathom and the curves are in coincidence. The junctional note is inked in red.

b. H-9975 (1981) 1:20,000 joins the survey to the northwest. Soundings agree to within 1 fathom and the curves are in coincidence. The junctional note is inked in violet.

c. H-9986 (1981-82) 1:20,000 joins the survey to the southeast. ~~Curves and the junctional note have been left in pencil, since H-9986 has not been processed.~~ *has not been accomplished* 9

6. COMPARISON WITH PRIOR SURVEYS

H-3651 (1914) - 1:20,000
 H-3652 (1914) - 1:60,000
 H-4912 (1929) - 1:2,500
 H-4913 (1929) - 1:2,500
 H-5224 (1932) - 1:5,000

Localized differences of as much as 20 fathoms are evident offshore on H-3652 while inshore differences with other larger scale surveys generally do not exceed 6 fathoms. Overall, prior survey soundings tend to be slightly deeper than those on the present survey but there is no apparent natural change occurring to this part of the coast to explain the variance. It is suspected that the depth differences are attributable to the better capability of present survey techniques to locate shoal depths in areas of rugged bottom. Comparison with H-4912 and H-4913 is difficult due to the large scale differences; however, these surveys provide much nearshore information, especially in depths less than 5 fathoms. This nearshore area has not been fully developed on the present survey due to surf conditions. To supplement H-9983 the limit line demarcating the offshore extent of breakers and rocky, foul areas has been extended seaward in the vicinity of latitude 20°06'24"N; longitude 155°28'30"W and latitude 20°07'46"N; longitude 155°34'15"W to include rocks shown on the prior surveys. In addition, the following features have been carried forward at the listed locations:

	<u>Latitude</u>	<u>Longitude</u>
Source: H-4912		
2 ⁶ Rk	20°07'50.6"N	155°34'10.7"W
15-fathom sounding	20°08'01.4"N	155°33'29.8"W
10-fathom sounding	20°07'57.7"N	155°33'25.0"W
Submerged obstruction	20°07'52.2"N	155°33'45.4"W
Source: H-4913		
2 ² -fathom sounding	20°06'27.4"N	155°28'31.3"W

The submerged obstruction originated as a feature identified with a note as a messenger cable. While the nature of this feature is unknown, its continued existence as visible at high water is considered doubtful. This feature has been transferred to the inset due to the small scale of the main sheet.

There are no presurvey review items within the limits of the survey.

With the addition of the transferred data, H-9983 is adequate to supersede the prior surveys within the common area. However, should larger scale charting become necessary, the compiler should refer to H-4912 and H-4913 for additional information in nearshore areas.

7. COMPARISON WITH CHART

19320	12th Ed.	June 17, 1978
19322	5th Ed.	June 25, 1977
19326	4th Ed.	July 9, 1977

Comparison was made with the listed editions of the charts. Comparison with subsequent editions of 19322 and 19326 as required by the project instructions was not possible since they have not been issued as scheduled.

a. Hydrography - With the exception of 3 soundings, all charted information originates with the previously discussed prior surveys (see enclosed chart sections) and is considered superseded by the present hydrography.

Hydrography inshore does not specifically address many of the scattered rocks. The prior surveys originating these rocks used rock symbols randomly to delimit areas presently shown with dashed limit lines. All charted rocks fall between the high water line and present limit lines and are considered superseded.

Due to the large scale differences between Chart 19320 and the survey (1:20,000 vs. 1:250,000) the hydrographer's tabulation of point-by-point comparisons does not result in a valid determination of differences in hydrography. Differences noted in the hydrographer's comparison are scale related and are not indicative of true differences between chart and survey. Accordingly, the table included as part of paragraph L of the descriptive report has not been updated and should not be used to revise charts.

b. Controlling Depths - There are no controlling depths within the limits of the survey.

c. Aids to Navigation - There is one fixed aid to navigation, Kukuihaele Light, presently charted with an approximate position. A Third Order, Class I position was determined as reported on the NOAA Form 76-40 enclosed with the descriptive report. The light adequately serves its intended purpose.

8. COMPLIANCE WITH PROJECT INSTRUCTIONS

H-9983 adequately complies with the project instructions.

9. ADDITIONAL FIELD WORK

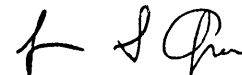
H-9983 is a good hydrographic survey. Additional field work, however, is recommended to develop inshore areas with specific development of shoaling as noted in paragraph 3. The timely accomplishment of this work shall not be considered critical but rather should be assigned an as-time-is-available priority.

Respectfully submitted,



Dennis J. Hill
Cartographer

This survey has been verified and evaluated. I have examined the survey and it meets Charting and Geodetic Services survey standards and requirements for use in nautical charting except as noted in the Evaluation Report. The survey is recommended for approval.



James S. Green
Supervisory Cartographer

DATE: May 21, 1982

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific Marine Center:

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): 161-7737 Upolu Point, HI

Period: October 29 - December 3, 1981

HYDROGRAPHIC SHEET: H-9983

OPR: T126

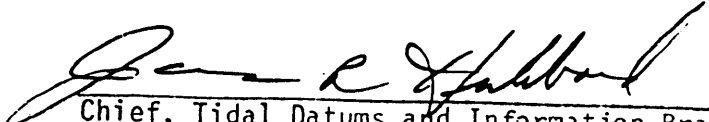
Locality: Northeast Coast, Island of Hawaii

Plane of reference (mean lower low water): 3.8 ft.

Height of Mean High Water above Plane of Reference is 1.6 ft.

REMARKS: Recommended Zoning:

1. East of longitude 155°35' apply +20 minute time correction and x1.22 range ratio.
2. West of 155°35', zone direct.


Chief, Tidal Datums and Information Branch

ATTACHMENT TO DESCRIPTIVE REPORT FOR H-9983

A. I have reviewed the smooth sheet, accompanying data, and reports of this hydrographic survey. Except as noted in the Evaluation Report, the hydrographic survey meets or exceeds Charting and Geodetic Services (C&GS) standards, complies with instructions, and is accurately and completely represented by the smooth sheet and digital data file for use in nautical charting.

B. I recommend reconsideration of charting plans for 1:5000 scale insets of Waipio Bay, Kukuihaele Landing, and Honakaa Landing (see project instructions section 6.3.2) as a result of information in the Descriptive Report (see RAINIER Descriptive Report, section P and attachment: Letter from K. Cheung, Corps of Engineers, September 3, 1981).

H. C. Austin 3/21/83
Chief, Nautical Chart Branch (Date)

CLEARANCE:

N/MOP2:KWJeffers

SIGNATURE AND DATE:

K. W. Jeffers 3/21/83

After review of the smooth sheet and accompanying reports, I hereby certify this survey is accurate, complete, and meets appropriate standards with only the exceptions as noted above. The above recommendation is forwarded with my concurrence, except that additional field work is not justified to investigate specifically the two depths discussed in the Evaluation Report, sections 3 and 9.

Charles Townsend 3/21/83
Director, Pacific Marine Center (Date)

ADDENDUM TO DESCRIPTIVE REPORT FOR SURVEY H-9983

Digital records for this survey have been updated and are in conformance with the requirements contained in N/CG letter, Policy For Certification and Delivery of Hydrographic Surveys, dated December 17, 1982.

This statement supersedes the statement made on page 2 of the Evaluation Report, section 4, Condition of Survey.

Charles K. Townsend 4/17/83
Director, Pacific Marine Center (Date)

ADDENDUM TO EVALUATION REPORT FOR H-9983

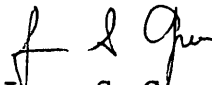
The Evaluation Report for this survey is supplemented by the following statement:

The digital records for this survey have been updated to include categories of information required to comply with N/CG2 Hydrographic Survey Guideline No. 23, Completion of Digital Hydrographic Surveys, September 7, 1983. Certain descriptive information, however, may not be included in the digital record due to the restrictions of the presently available cartographic codes. The user should refer to the smooth sheet for complete information.

Paragraph 7.c, Aids to Navigation, is supplemented by the following:

Aids to navigation shown in the control file have been updated from field positions to preliminary adjusted positions. The Form 76-40's, NonFloating Aids or Landmarks for Charts, attached to this Descriptive Report are also updated to reflect these improved positions.

Respectfully submitted,



James S. Green
Supervisory Cartographer
December 2, 1983

APPROVED:



Ned C. Austin
Chief, Nautical Chart Branch

NOAA FORM 76-40
(8-74)

Replaces C&GS Form 567.

TO BE CHARTED
 TO BE REVISED
 TO BE DELETED

REPORTING UNIT
(If field party, ship or office)

NOAA Ship RAINIER

STATE

HAWAII

LOCALITY

NE Coast, Island of Hawaii

DATE

1/12/82

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY

- HYDROGRAPHIC PARTY
- GEODETIC PARTY
- PHOTO FIELD PARTY
- COMPILATION ACTIVITY
- FINAL REVIEWER
- QUALITY CONTROL & REVIEW GRP.
- COAST PILOT BRANCH

(See reverse for responsible personnel)

The following objects HAVE HAD NOT been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.

OPR-T126-RA-81

JOB NUMBER

H-9983

DATUM

Old Hawaiian

Old Hawaiian

METHOD AND DATE OF LOCATION

(See instructions on reverse side)

OFFICE

FIELD

CHARTS
AFFECTED

CHARTING
NAME

STACK

DESCRIPTION
(Record reason for deletion of landmark or aid to navigation.
Show triangulation station names, where applicable, in parentheses)

HONOKAA SUGAR CO. MILL, STACK, 1966
(Reported Destroyed)

SEE L-104(84)

POSITION

LATITUDE

LONGITUDE

° /

//

° /

//

D.M. Meters

D.P. Meters

20 05

47.6544

155 28

13.8910

..

19320

RESPONSIBLE PERSONNEL	
TYPE OF ACTION	NAME
OBJECTS INSPECTED FROM SEAWARD	LTJG JAMES R. GORDON, NOAA
POSITIONS DETERMINED AND/OR VERIFIED	LTJG DAVID J. KRUTH, NOAA
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES	<input type="checkbox"/> PHOTO FIELD PARTY <input checked="" type="checkbox"/> HYDROGRAPHIC PARTY <input type="checkbox"/> GEODETIC PARTY <input type="checkbox"/> OTHER (Specify)
	FIELD ACTIVITY REPRESENTATIVE
	OFFICE ACTIVITY REPRESENTATIVE
	<input type="checkbox"/> REVIEWER <input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'

(Consult Photogrammetric Instructions No. 64,

OFFICE

I. OFFICE IDENTIFIED AND LOCATED OBJECTS

Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.

EXAMPLE: 75E(C)6042
8-12-75

FIELD

I. NEW POSITION DETERMINED OR VERIFIED

Enter the applicable data by symbols as follows:

F - Field
L - Located
V - Verified
1 - Triangulation
2 - Traverse
3 - Intersection
4 - Resection
5 - Field Identified
6 - Theodolite
7 - Planetable
8 - Sextant

A. Field positions* require entry of method of location and date of field work.

EXAMPLE: F-2-6-L
8-12-75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

FIELD (Cont'd)

B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.

EXAMPLE: P-8-V
8-12-75
74L(C)2982

II. TRIANGULATION STATION RECOVERED

When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.

EXAMPLE: Triang. Rec.
8-12-75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH

Enter 'V-Vis.' and date.

EXAMPLE: V-Vis.
8-12-75

**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

RESPONSIBLE PERSONNEL	
TYPE OF ACTION	NAME
OBJECTS INSPECTED FROM SEAWARD	LTJG JAMES R. GORDON, NOAA
POSITIONS DETERMINED AND/OR VERIFIED	LTJG DAVID J. KRUTH, NOAA
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES	

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'
(Consult Photogrammetric Instructions No. 64,

OFFICE	FIELD (Cont'd)
<p>I. OFFICE IDENTIFIED AND LOCATED OBJECTS Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75</p>	<p>B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982</p>
<p>FIELD</p> <p>I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows: F - Field L - Located V - Verified 1 - Triangulation 2 - Traverse 3 - Intersection 4 - Resection</p> <p>A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75</p> <p>*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.</p>	<p>II. TRIANGULATION STATION RECOVERED When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75</p> <p>III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75</p> <p>**PHOTOGAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.</p>

NOAA FORM 76-40
(8-74)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

LANDMARKS FOR CHARTS

Replaces C&GS Form 567.

TO BE CHARTED
 TO BE REVISED
 TO BE DELETED

REPORTING UNIT
(If field Party, Ship or Office)
NOAA Ship RAINIER

STATE
HAWAII

LOCALITY
NE Coast, Island of Hawaii

DATE
1/12/82

ORIGINATING ACTIVITY
 HYDROGRAPHIC PARTY
 GEODETIC PARTY
 PHOTO FIELD PARTY
 COMPILATION ACTIVITY
 FINAL REVIEWER
 QUALITY CONTROL & REVIEW GRP.
 COAST PILOT BRANCH

The following objects HAVE HAVE NOT been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.
OPR-T126-RA-81

JOB NUMBER
H-9983

DATUM
Old Hawaiian

METHOD AND DATE OF LOCATION
(See instructions on reverse side)

CHARTS
AFFECTED
19320

CHARTING
NAME
MICRO
TR

DESCRIPTION
(Record reason for deletion of landmark or aid to navigation.
Show triangulation station names, where applicable, in parentheses.)
HONOKAA, HAWAIIAN TEL. CO.
MICROWAVE TOWER, 1967

POSITION

LATITUDE	LONGITUDE
° / ' "	° / ' "
D.M. Meters	D.P. Meters
50.7922	155 28
20 04	00.3146

OFFICE

FIELD
Triang. Rec.
10/81

CURRENT CHARTED PDS.
NO/dep file

RESPONSIBLE PERSONNEL	
TYPE OF ACTION	NAME
ORIGINATOR	<input type="checkbox"/> PHOTO FIELD PARTY <input checked="" type="checkbox"/> HYDROGRAPHIC PARTY <input type="checkbox"/> GEOGETIC PARTY <input type="checkbox"/> OTHER (Specify)
OBJECTS INSPECTED FROM SEAWARD	LTJG JAMES R. GORDON, NOAA
MISSIONS DETERMINED AND/OR VERIFIED	LTJG DAVID J. KRUTH, NOAA
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES	<input type="checkbox"/> REVIEWER <input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE
FIELD ACTIVITY REPRESENTATIVE	
OFFICE ACTIVITY REPRESENTATIVE	

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'
 (Consult Photogrammetric Instructions No. 64,

OFFICE	FIELD (Cont'd)
I. OFFICE IDENTIFIED AND LOCATED OBJECTS Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75	B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982
FIELD I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows: F - Field L - Located V - Verified 1 - Triangulation 2 - Traverse 3 - Intersection 4 - Resection 5 - Field Identified 6 - Theodolite 7 - Planetable 8 - Sextant A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75 *FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.	II. TRIANGULATION STATION RECOVERED When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75 III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75 **PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

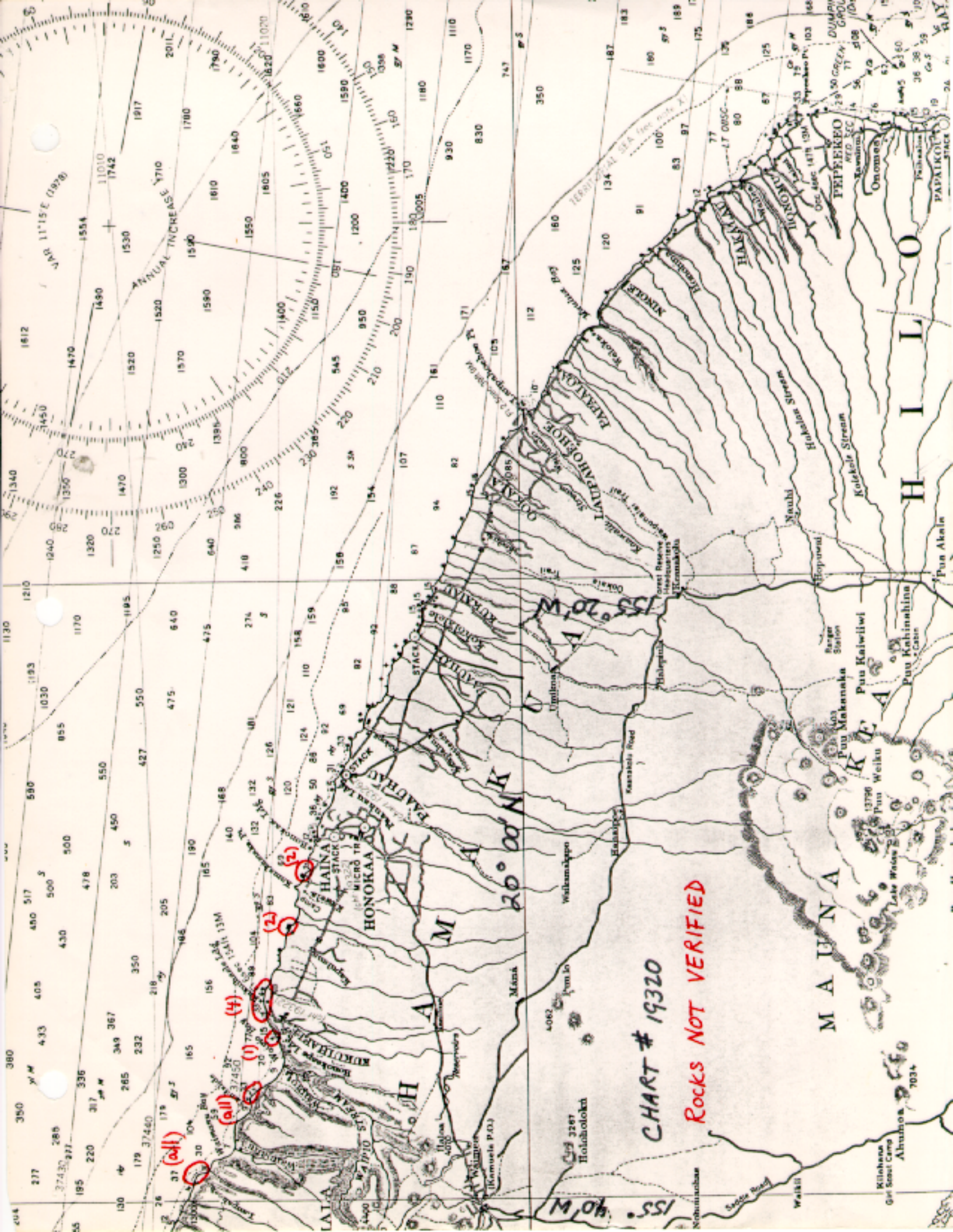


CHART # 1930
ROCKS NOT VERIFIED

- (all) 37
- (all) 38
- (all) 39
- (all) 40
- (all) 41
- (all) 42
- (all) 43
- (all) 44

Dimensions in feet when Survey Code is 37

Number	Hydrographer	Scale	Date	Number	Hydrographer	Scale	Date
8958	W. L. Mobley	80,000	1978				
8957	W. L. Mobley	80,000	1978				
8953	W. L. Mobley	10,000	1978				
FE-228	W. L. Mobley	50,000	1980				
FE-230	W. L. Mobley	80,000	1980				
8924	W. L. Mobley	10,000	1978				
8926	W. L. Mobley	80,000	1978				
9918-77		80,000	1980				
9914		20,000	1980				
8912	A. J. Patrick	80,000	1980				
9919	H. A. Mobley	20,000	1980				
9882	A. J. Lovel	80,000	1981				
8974		80,000	1981				
8920	W. F. Forster	10,000	1980				
8921	A. J. Patrick	20,000	1980				
9883	A. J. Lovel	20,000	1981				

**UNITED STATES
HAWAII**

ISLAND OF HAWAII

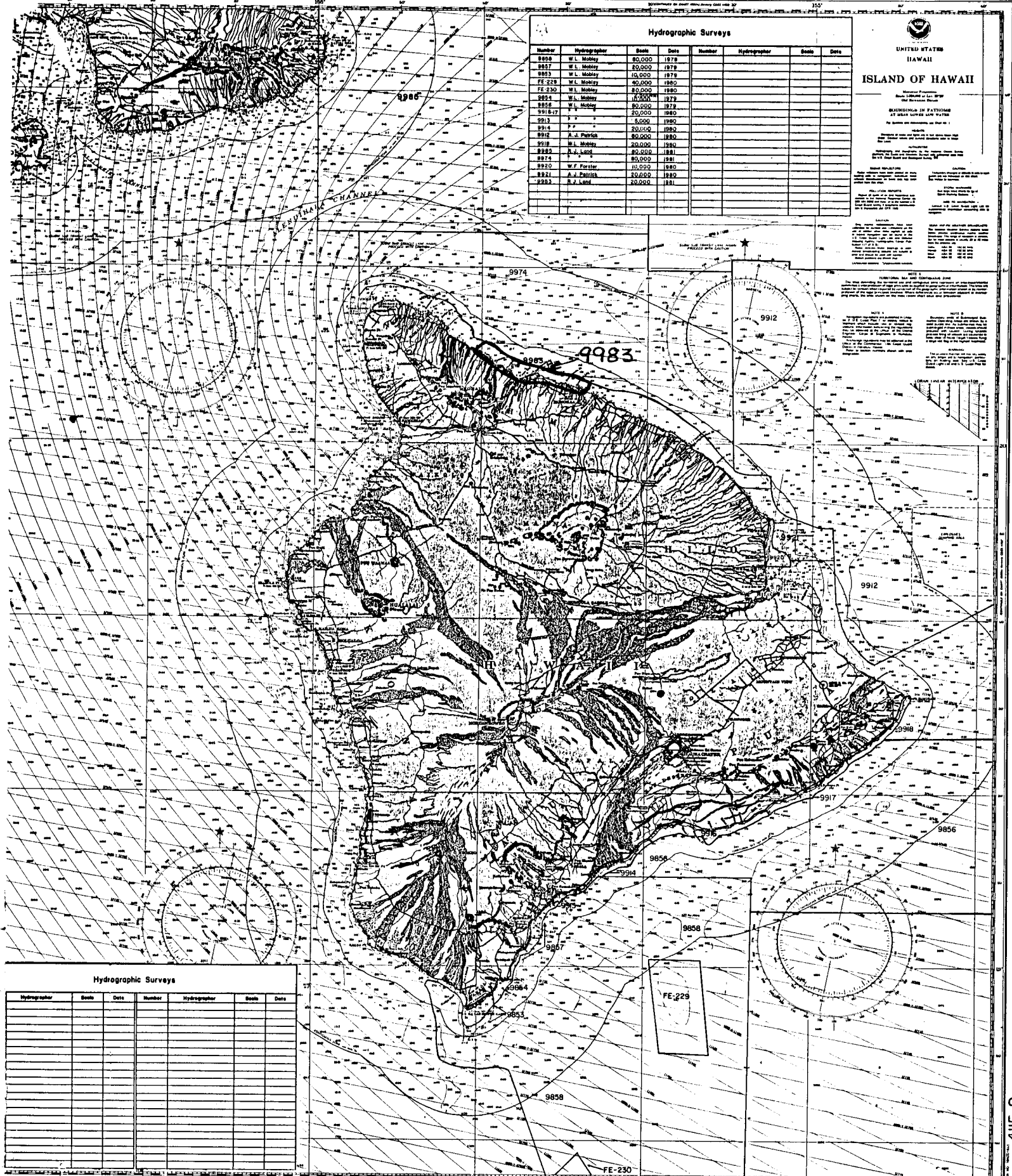
Scale: 1 inch = 1 mile

**SOUNDINGS IN FATHOMS
AT MEAN LOW WATER**

For Soundings see Chart No. 11502

NOTES:

- The soundings on this chart are based upon a datum of Mean Low Water of the Neap Tides.
- For information concerning this chart and other charts published by the U.S. Navy Hydrographic Office, see the back cover of this publication.
- This chart is a reproduction of the original chart as published, and is not intended to be used as a substitute for the original chart.
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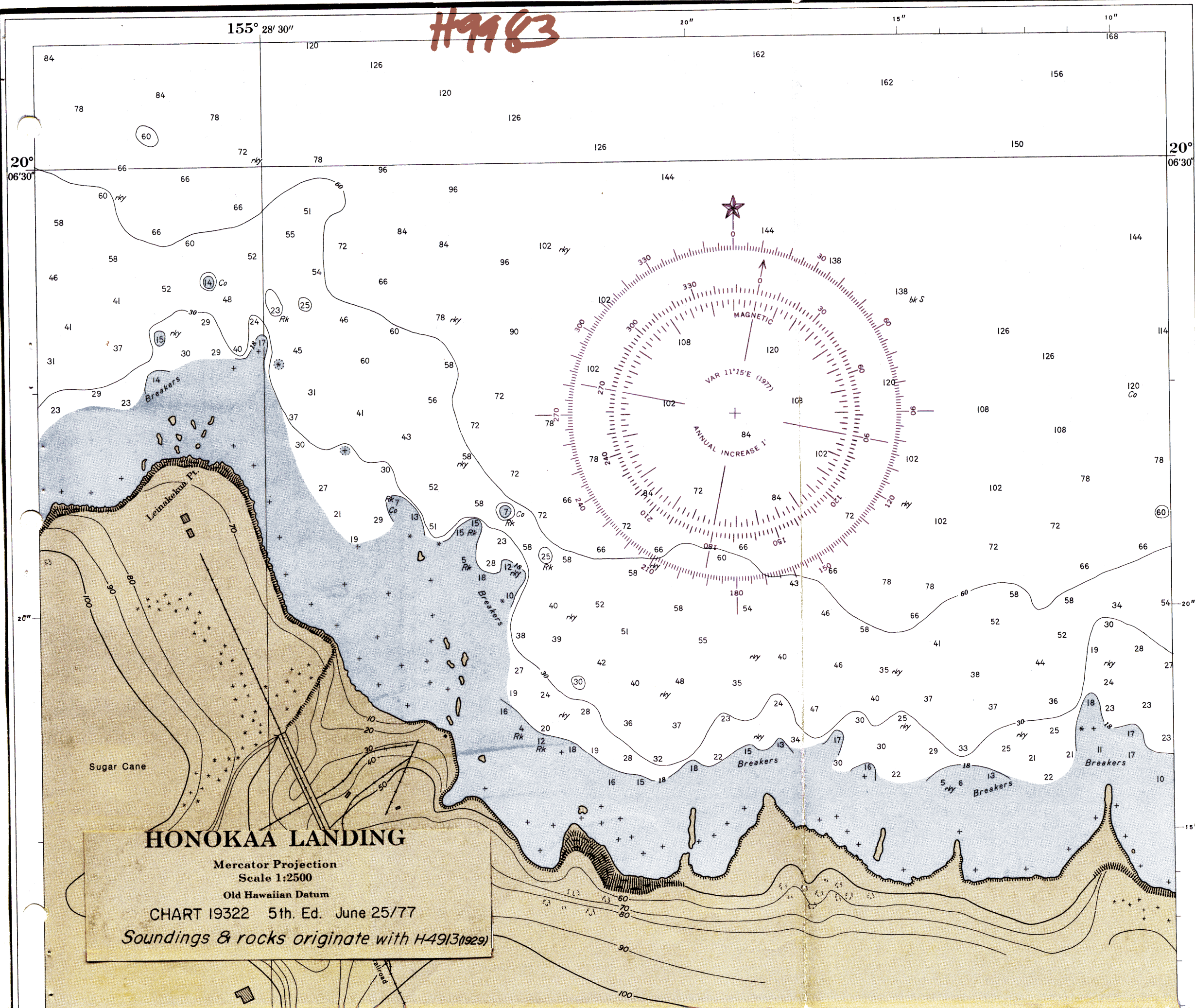


Hydrographer	Scale	Date	Number	Hydrographer	Scale	Date



4115-2 (2 sheets) LUMMAN-C OVERPRINTED

H4913



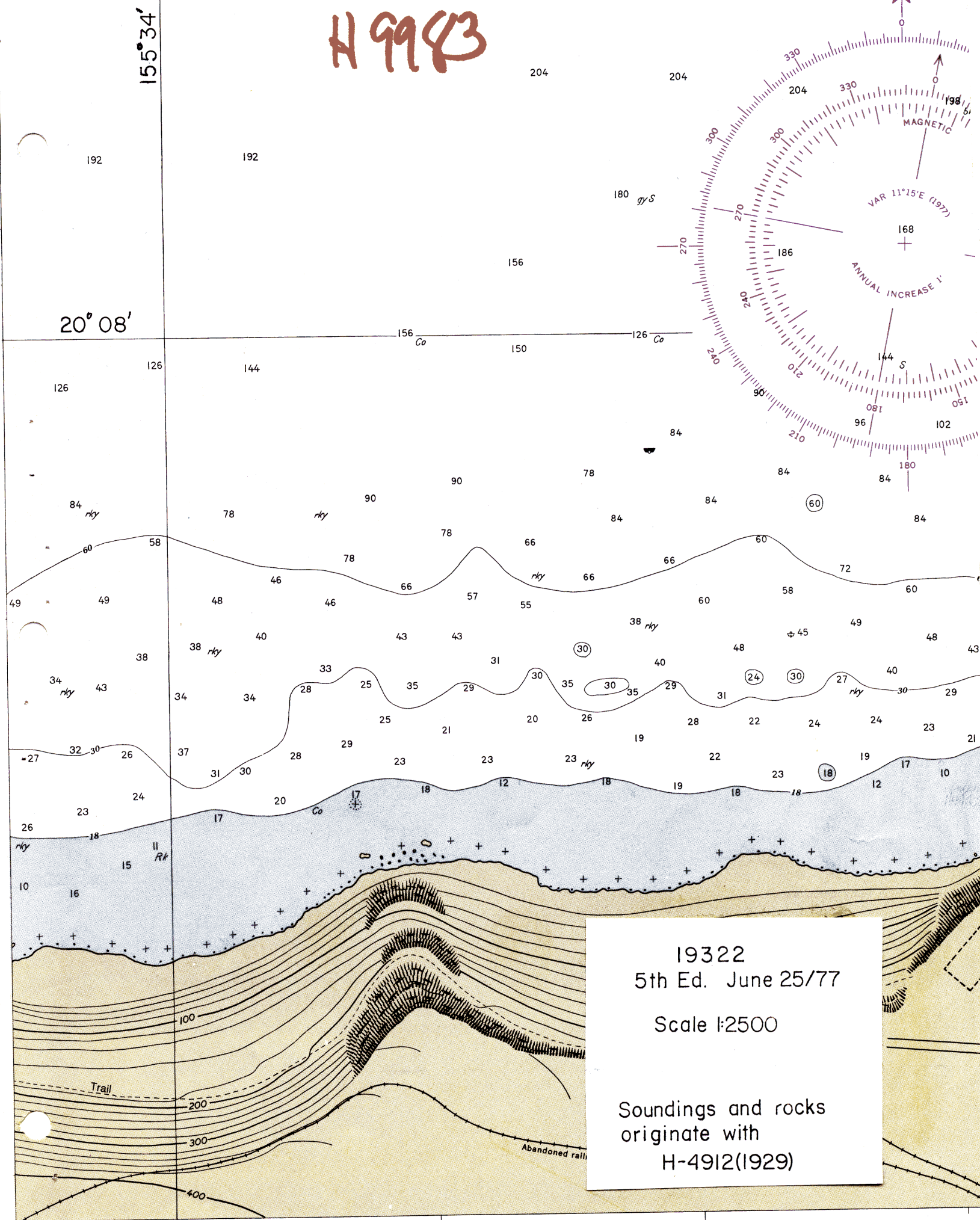
HONOKAA LANDING

Mercator Projection
Scale 1:2500
Old Hawaiian Datum

CHART 19322 5th. Ed. June 25/77
Soundings & rocks originate with H4913(1929)

19322
(formerly C&GS 4162)

H 9983

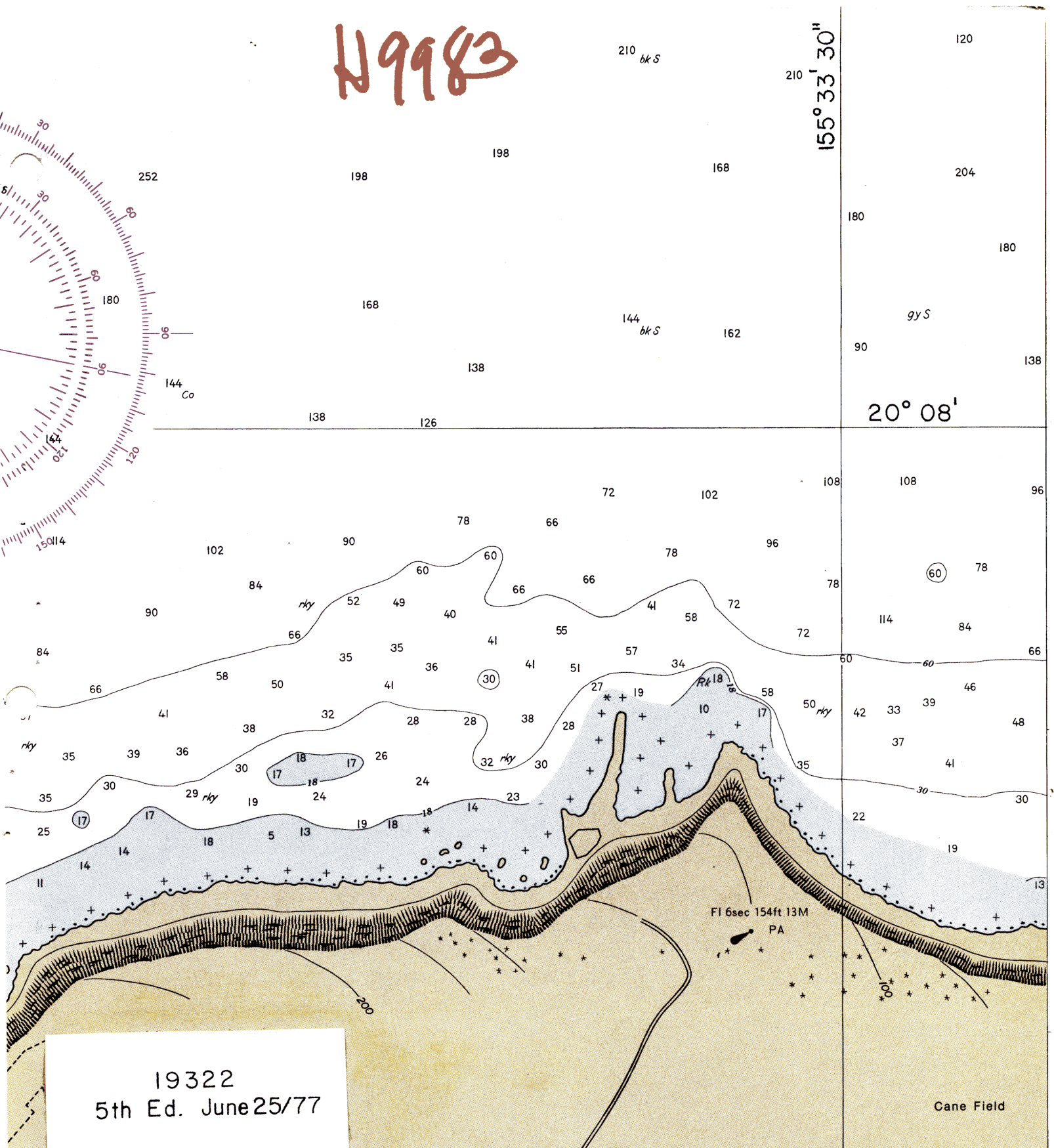
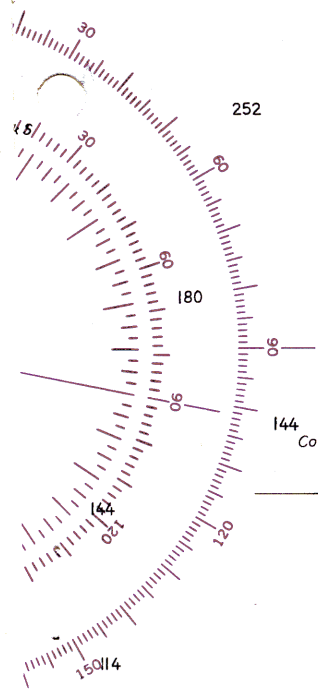


19322
5th Ed. June 25/77
Scale 1:2500
Soundings and rocks
originate with
H-4912(1929)

$155^{\circ} 34'$

50"

H9983



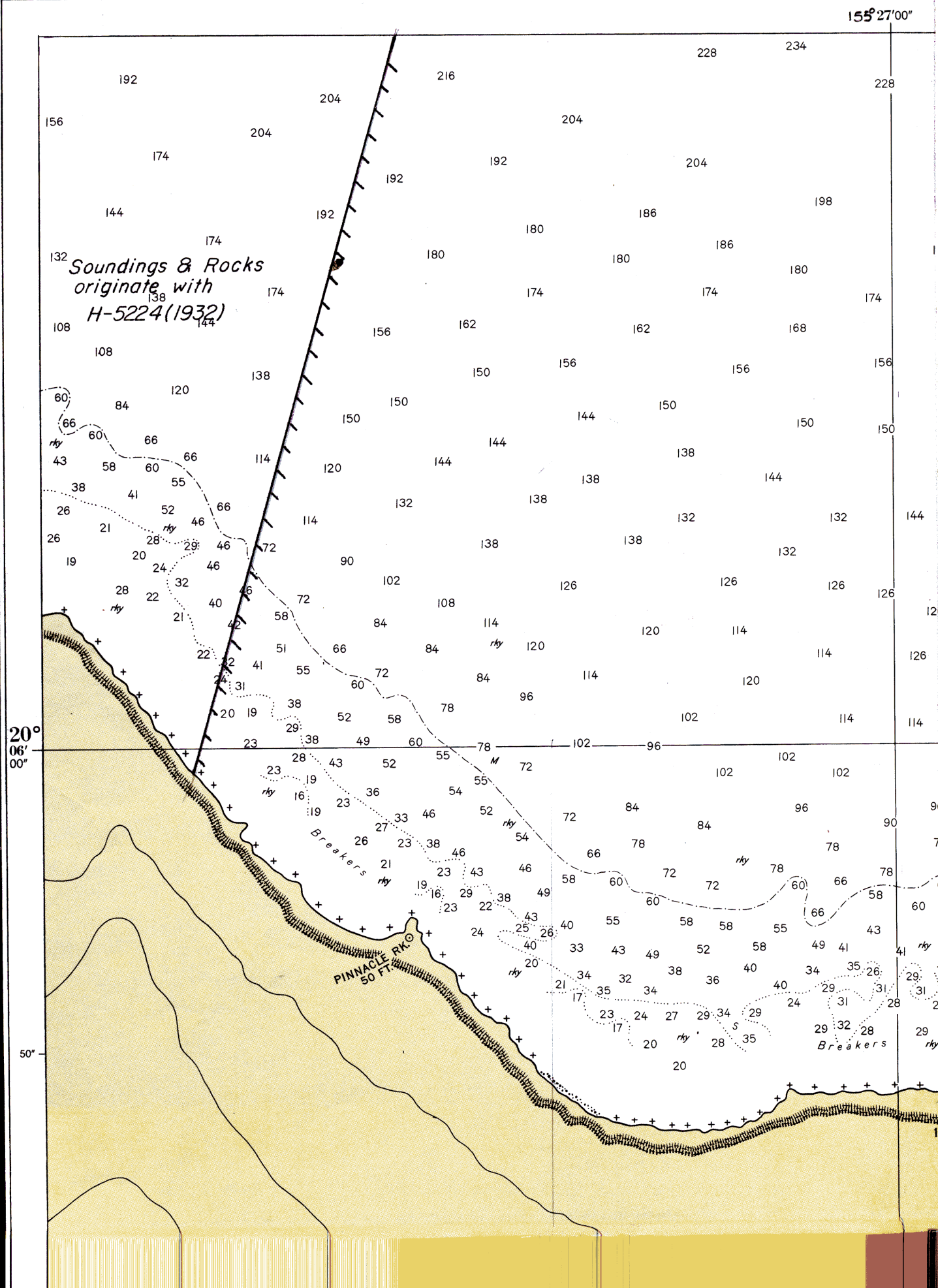
19322
5th Ed. June 25/77
Soundings and rocks
originate with
H-4912(1929)

KUKUIHAELE LANDING

Mercator Projection
Scale 1:2500
Old Hawaiian Datum

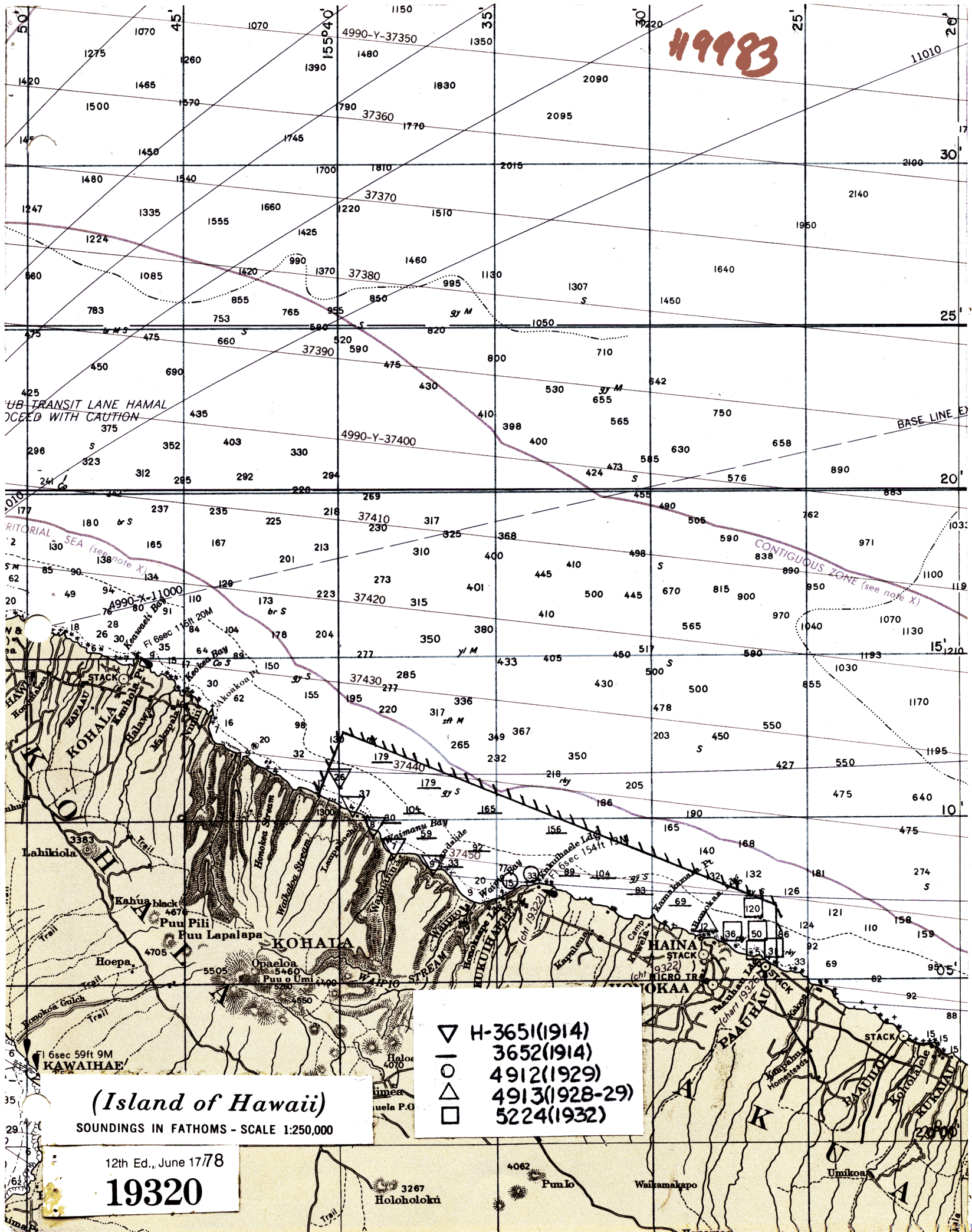
H 9983

19326 (formerly C&GS 4161)
4th ED. July 9/77



SOUNDINGS IN FEET
SCALE 1:5000

49983



UB TRANSIT LANE HAMAL
CEED WITH CAUTION
375

BASE LINE E

TERITORIAL SEA (see note X)

CONTIGUOUS ZONE (see note X)

A990-X-11000
Keawala Pt. Fl 6sec 115ft 20M
Keawala Pt. Fl 6sec 9.35

Lahikiola
Kahua black
Puu Pili
Puu Lapalapa
Hoopa
Opaeloa
Puu o Umi

Fl 6sec 59ft 9M
KAWAIIAE

(Island of Hawaii)
SOUNDINGS IN FATHOMS - SCALE 1:250,000

12th Ed., June 1778
19320

▽	H-3651(1914)
○	3652(1914)
△	4912(1929)
□	4913(1928-29)
□	5224(1932)

3267
Holoholoku

4062
Puu Lo

Waikamapo

Umikoa

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9983

INSTRUCTIONS

- A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
 1. Letter all information.
 2. In "Remarks" column cross out words that do not apply.
 3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
19010	9-24-84	^{JOE} B. Fernandez	Full Part Before After Verification Review Inspection Signed Via Drawing No. 15 Exam for crit. Corr. Only, No Corr
19320	7-18-88	Charles E. Jones	Full Part Before After Verification Review Inspection Signed Via Drawing No. 16
19326	11-24-89	John Pierce	Full Part Before After Verification Review Inspection Signed Via Drawing No. 8 Examined, no corrections applied
19332	8-27-90	Lin Akman	Full Part Before After Verification Review Inspection Signed Via Drawing No. Applied subm abstr, ADEQUATELY APPLIED
19004	7/11/90	Aruscent	Full Part Before After Verification Review Inspection Signed Via Drawing No. full application of sdgs from 55 thru 19326
19010	7/31/90	Blair B. Dominguez	Full Part Before After Verification Review Inspection Signed Via Drawing No. Full application of sdgs from 55 thru 19002
19007	8/30/90	Blair B. Dominguez	Full Part Before After Verification Review Inspection Signed Via Drawing No. Full application of sdgs from 55 thru 19002
19320	7/11/90	Stanley O'Brien	Full Part Before After Verification Review Inspection Signed Via Drawing No. Full application of sdgs from 55
19320	2-7-91	W Ed Martin	Full Part Before After Verification Review Inspection Signed Via Drawing No. 17 agree with 19322 dgs, improve sdgs & curves shoal sdgs
			Full Part Before After Verification Review Inspection Signed Via Drawing No.