T-13316

NOAA FORM 76-35
(3-76)
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Map No.  
T-13316

Edition No.  
1

Job No.  
PH-6703

Map Classification  
Final

Field Edited Map

Type of Survey  
SHORELINE

LOCALITY

State  
Hawaii

General Locality  
Hilo Bay, Hawaii Island

Locality  
Honolii Cove

1975 TO 1976

REGISTRY IN ARCHIVES

DATE

*U.S. GOVERNMENT PRINTING OFFICE: 1976-669-248*
**DESCRIPTIVE REPORT - DATA RECORD**

**PHOTOGRAMMETRIC OFFICE**

Coastal Mapping Division, AMC, Norfolk, VA

**OFFICER-IN-CHARGE**

Jeffrey G. Carlen, Cdr.

### I. INSTRUCTIONS DATED

<table>
<thead>
<tr>
<th>1. OFFICE</th>
<th>2. FIELD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerotriangulation 10/6/75</td>
<td>Premarking 1/15/69</td>
</tr>
<tr>
<td>Compilation 12/3/75</td>
<td>Premarking 6/13/72</td>
</tr>
<tr>
<td>Premarking</td>
<td>Supplement I 8/27/75</td>
</tr>
</tbody>
</table>

### II. DATUMS

<table>
<thead>
<tr>
<th>1. HORIZONTAL:</th>
<th>2. VERTICAL:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1927 NORTH AMERICAN</td>
<td>MEAN HIGH-WATER</td>
</tr>
<tr>
<td>Old Hawaiian Datum</td>
<td>MEAN LOW-WATER</td>
</tr>
<tr>
<td>Mean Lower Low-Water</td>
<td>Mean Sea Level</td>
</tr>
</tbody>
</table>

### III. HISTORY OF OFFICE OPERATIONS

<table>
<thead>
<tr>
<th>OPERATIONS</th>
<th>METHOD</th>
<th>BY</th>
<th>NAME</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. AEROTRIANGULATION</td>
<td>Analytic</td>
<td>LANDMARKS AND AIDS</td>
<td>B. Thornton</td>
<td>Nov 1975</td>
</tr>
<tr>
<td>2. CONTROL AND BRIDGE POINTS</td>
<td>Coromat</td>
<td>PLOTTED</td>
<td>Solbeck</td>
<td>Nov 1975</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHECKED</td>
<td>Solbeck</td>
<td>Nov 1975</td>
</tr>
<tr>
<td>3. STEREOSCOPIC INSTRUMENT COMPI</td>
<td>PLANIMETRY</td>
<td>BY</td>
<td>C. Blood</td>
<td>Jan 1976</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHECKED</td>
<td>A. C. Rauck, Jr.</td>
<td>Jan 1976</td>
</tr>
<tr>
<td>4. MANUSCRIPT DELINEATION</td>
<td>Smooth draft</td>
<td>PLANIMETRY</td>
<td>I. Perkinson</td>
<td>Jan 1976</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHECKED</td>
<td>F. Margiotta</td>
<td>Jan 1976</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CONTOURS</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHECKED</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>5. OFFICE INSPECTION PRIOR TO FIELD EDIT</td>
<td>1:5,000</td>
<td>HYDRO SUPPORT DATA</td>
<td>I. Perkinson</td>
<td>Jan 1976</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHECKED</td>
<td>F. Margiotta</td>
<td>Jan 1976</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F. Maudlin</td>
<td>Oct 1976</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F. Margiotta</td>
<td>Nov 1976</td>
</tr>
<tr>
<td>6. APPLICATION OF FIELD EDIT DATA</td>
<td>1:5,000</td>
<td>CHECKED</td>
<td>F. Margiotta</td>
<td>Nov 1976</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F. Margiotta</td>
<td>Nov 1976</td>
</tr>
<tr>
<td>7. COMPIATION SECTION REVIEW</td>
<td>BY</td>
<td>CHECKED</td>
<td>A. L. Shands</td>
<td>May 1978</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A. L. Shands</td>
<td>May 1978</td>
</tr>
<tr>
<td>8. FINAL REVIEW</td>
<td></td>
<td></td>
<td>J. A. Wright</td>
<td>June 1978</td>
</tr>
<tr>
<td>9. DATA FORWARDED TO PHOTOGRAMMETRIC BRANCH</td>
<td></td>
<td></td>
<td>R.T. Cooper</td>
<td>Aug 1978</td>
</tr>
<tr>
<td>10. DATA EXAMINED IN PHOTOGRAMMETRIC BRANCH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. MAP REGISTERED - COASTAL SURVEY SECTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. COMPILATION PHOTOGRAPHY

CAMERA(S)

WILD RC-8

TIDE STAGE REFERENCE

☑ PREDICTED TIDES
☐ REFERENCE STATION RECORDS
☐ TIDE CONTROLLED PHOTOGRAPHY

TYPES OF PHOTOGRAPHY

LEGEND

(C) COLOR
(P) PANCHROMATIC
(I) INFRARED

TIME REFERENCE

ZONE

Hawaii

MERIDIAN

150th

STANDARD

DAYLIGHT

NUMBER AND TYPE

75TNHY(P) 4410-4413

DATE

2/21/75

TIME

10:52

SCALE

1:15,000

STAGE OF TIDE

1.0 ft. above MLLW

REMARKS

Mean high water at Hilo is 1.9 ft.

2. SOURCE OF MEAN HIGH-WATER LINE:

The mean high water line was delineated from the above listed photographs and notes given by the field editor.

3. SOURCE OF MEAN LOW-WATER OR MEAN LOWER LOW-WATER LINE:

None compiled.

4. CONTEMPORARY HYDROGRAPHIC SURVEYS (List only those surveys that are sources for photogrammetric survey information.)

SURVEY NUMBER

DATE(S)

SURVEY COPY USED

SURVEY NUMBER

DATE(S)

SURVEY COPY USED

5. FINAL JUNCTIONS

NORTH

None

EAST

T-13261

SOUTH

T-13315

WEST

No Survey

REMARKS

This map is inscribed in and forms the southwest portion of TP-13261(1:10,000)
### HISTORY OF FIELD OPERATIONS

#### 1. FIELD INSPECTION OPERATION

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>NAME</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CHIEF OF FIELD PARTY</td>
<td>R. Melby</td>
<td>Sep 1975</td>
</tr>
<tr>
<td>2. HORIZONTAL CONTROL</td>
<td>R. Melby</td>
<td>Sep 1975</td>
</tr>
<tr>
<td>3. VERTICAL CONTROL</td>
<td>NA</td>
<td>Sep 1975</td>
</tr>
<tr>
<td>4. LANDMARKS AND AIDS TO NAVIGATION</td>
<td>R. Melby</td>
<td>Sep 1975</td>
</tr>
<tr>
<td>5. GEOGRAPHIC NAMES INVESTIGATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. PHOTO INSPECTION</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>7. BOUNDARIES AND LIMITS</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

#### II. SOURCE DATA

<table>
<thead>
<tr>
<th>PHOTO NUMBER</th>
<th>STATION NAME</th>
<th>PHOTO NUMBER</th>
<th>STATION DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>75TNHY4413(p)</td>
<td>Paukaa Point Light, 1975</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. PHOTO NUMBERS (Clarification of details)

None

4. LANDMARKS AND AIDS TO NAVIGATION IDENTIFIED

<table>
<thead>
<tr>
<th>PHOTO NUMBER</th>
<th>OBJECT NAME</th>
<th>PHOTO NUMBER</th>
<th>OBJECT NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>75TNHY4413(p)</td>
<td>Paukaa Point Light</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. GEOGRAPHIC NAMES: [ ] Report [x] None

6. BOUNDARY AND LIMITS: [ ] Report [x] None

7. SUPPLEMENTAL MAPS AND PLANS

None

8. OTHER FIELD RECORDS (Sketch books, etc. DO NOT list data submitted to the Geodesy Division)

None
# HISTORY OF FIELD OPERATIONS

## I. FIELD EDIT OPERATION

### 1. CHIEF OF FIELD PARTY

- **OPERATION**: Recovered by
- **Name**: R. Spears
- **Date**: Apr 1976

### 2. HORIZONTAL CONTROL

- **OPERATION**: Established by
- **Name**: None
- **Date**: None

### 3. VERTICAL CONTROL

- **OPERATION**: Recovered by
- **Name**: NA
- **Date**: NA

### 4. LANDMARKS AND AIDS TO NAVIGATION

- **OPERATION**: Located (Field Methods) by
- **Name**: J. C. Osborn, Jr.
- **Date**: Apr 1976

### 5. GEOGRAPHIC NAMES INVESTIGATION

- **TYPE OF INVESTIGATION**: Complete
- **Name**: J. C. Osborn, Jr.
- **Date**: Apr 1976

### 6. PHOTO INSPECTION

- **CLARIFICATION OF DETAILS**: Surveyed or Identified by
- **Name**: NA

## II. SOURCE DATA

### 1. HORIZONTAL CONTROL IDENTIFIED

- **None**

### 2. VERTICAL CONTROL IDENTIFIED

- **None**

## III. OTHER FIELD RECORDS

- **SKETCH BOOKS, ETC.**: DO NOT list data submitted to the Geodetic Division
- **Forms 76-40**: 2 Forms
- **Field Edit Report**: 1 Field Edit Report
- **Field Edit Ozalid**: 1 Field Edit Ozalid
## RECORD OF SURVEY USE

### I. MANUSCRIPT COPIES

<table>
<thead>
<tr>
<th>DATA COMPILED</th>
<th>COMPILATION STAGES</th>
<th>DATE MANUSCRIPT FORWARDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compilation complete, pending field edit.</td>
<td>Jan 1976</td>
<td>1/30/76 1/30/76</td>
</tr>
<tr>
<td>Field edit applied, compilation complete</td>
<td>Oct 1976</td>
<td>Class I Manuscript 11/5/76</td>
</tr>
<tr>
<td>Final Review</td>
<td>May 1978</td>
<td>Final May 1978</td>
</tr>
</tbody>
</table>

### II. LANDMARKS AND AIDS TO NAVIGATION

#### 1. REPORTS TO MARINE CHART DIVISION, NAUTICAL DATA BRANCH

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>CHART LETTER NUMBER ASSIGNED</th>
<th>DATE FORWARDED</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>11/8/76</td>
<td>Aids to be charted</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>11/8/76</td>
<td>Landmark to be charted</td>
</tr>
</tbody>
</table>

### III. FEDERAL RECORDS CENTER DATA

1. X BRIDGING PHOTOGRAPHS;
2. X DUPLICATE BRIDGING REPORT;
3. X COMPUTER READOUTS.

### IV. SURVEY EDITIONS

<table>
<thead>
<tr>
<th>SURVEY NUMBER</th>
<th>JOB NUMBER</th>
<th>TYPE OF SURVEY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>REVISED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RESURVEY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MAP CLASS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>II.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FINAL</td>
</tr>
</tbody>
</table>

---

NOAA FORM 76-36D
SUMMARY TO ACCOMPANY

DESCRIPTIVE REPORTS T-13314,
T-13315 and T-13316

This summary covers three of the four maps which comprise Project PH-6703. At this writing the other map in the Project, T-13261, has not been scheduled for compilation. It is anticipated that Map T-13261 will be compiled later in conjunction with Project CM-7712 which is planned to junction with this project. Maps T-13314, T-13315 and T-13316 are each 1:5,000 scale extending two minutes in latitude and two minutes in longitude.

Photography of the area was flown in February, 1975, by private contractor. Scale is 1:15,000 and 1:30,000. Panchromatic film was used with the RC-8 camera. Coverage and quality are adequate. The breakwater forming Hilo Bay was not covered entirely by the photography. Its position was determined by the field editor using field methods.

The area covered is that of Hilo Bay located on the northeast coast of the island of Hawaii. This project originally consisted of seventeen (17) maps at 1:10,000 scale and seven (7) maps at 1:5,000 scale covering the entire northeast coast of the island of Hawaii from Halauna on the north to Waiakahiula on the south. All but four of those maps were cancelled. See correspondence dated April 29, 1977.

Field work prior to compilation was limited to the recovery and identification of horizontal control necessary for bridging.

Bridging was done by analytic methods at the Washington Science Center. The maps were compiled at the Atlantic Marine Center in January, 1976, by stereo instrument method.

Field edit was performed in April, 1976, concurrent with hydrography and applied to the maps at the Atlantic Marine Center in October, 1976.

All maps were final reviewed at the Atlantic Marine Center in May, 1978. Pertinent data was forwarded to the Washington Science Center for reproduction and final registration.
FIELD INSPECTION

T-13316

There was no field inspection prior to compilation. Field work accomplished was limited to the recovery and identification of horizontal control necessary for bridging.
PHOTOGRAMMETRIC PLOT REPORT
HILO BAY, HAWAII
Job PH-6703
November 14, 1975

Area Covered: The area covered in this project is the east coast area of the island Hawaii. This area is covered by four 1:10,000-scale sheets, T9-13259 thru T9-13262 and three 1:5,000-scale sheets, T9-13314 thru T9-13316. Note: T-13259, T-13260, & T-13262 are cancelled. A.L.S. 5/25/78

Method: Two strips of 1:15,000 scale black-and-white photography were bridged by analytic aerotriangulation methods. The two strips of bridging photography were controlled by field-identified control.

Common points were located on the bridging photography for ratio purposes. Tie points were used to insure an adequate junction of the strips during the adjustment.

All manuscripts were plotted on the Coradi and the photo requisition for the ratios has been submitted to the photo lab.

Adequacy of Control: The control checked well within map accuracy standards and is more than sufficient for its intended use. See attached sheet for accuracy of control in strip adjustment.

Supplemental Data: USGS quadrangles were used to provide vertical control for the adjustment.

Photography: The coverage, overlap, and quality of the photography was adequate for the job.

Submitted by,

Brian Thornton

Approved and forwarded:

John D. Perrow, Jr.
Chief, Aerotriangulation Section
### List of Accuracy of Control Used In Strip Adjustment

<table>
<thead>
<tr>
<th>Strip #1</th>
<th>Point</th>
<th>X-error</th>
<th>Y-error</th>
</tr>
</thead>
<tbody>
<tr>
<td>416101</td>
<td>-0.153</td>
<td>0.071</td>
<td></td>
</tr>
<tr>
<td>416102</td>
<td>2.098</td>
<td>2.736</td>
<td></td>
</tr>
<tr>
<td>426101</td>
<td>0.476</td>
<td>0.187</td>
<td></td>
</tr>
<tr>
<td>426102</td>
<td>0.419</td>
<td>-0.749</td>
<td></td>
</tr>
<tr>
<td>428110</td>
<td>-0.772</td>
<td>-0.898</td>
<td></td>
</tr>
<tr>
<td>429101</td>
<td>-0.675</td>
<td>0.198</td>
<td></td>
</tr>
<tr>
<td>431101</td>
<td>0.372</td>
<td>-0.082</td>
<td></td>
</tr>
<tr>
<td>431102</td>
<td>0.614</td>
<td>-0.886</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strip #2</th>
<th>Point</th>
<th>X-error</th>
<th>Y-error</th>
</tr>
</thead>
<tbody>
<tr>
<td>405100</td>
<td>-0.259</td>
<td>-0.569</td>
<td></td>
</tr>
<tr>
<td>405101</td>
<td>0.020</td>
<td>-0.002</td>
<td></td>
</tr>
<tr>
<td>409101</td>
<td>-0.045</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>409102</td>
<td>0.490</td>
<td>0.093</td>
<td></td>
</tr>
<tr>
<td>412100</td>
<td>-0.325</td>
<td>0.564</td>
<td></td>
</tr>
<tr>
<td>412101</td>
<td>0.035</td>
<td>-0.008</td>
<td></td>
</tr>
<tr>
<td>416101</td>
<td>-0.031</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>416102</td>
<td>2.203</td>
<td>2.786</td>
<td></td>
</tr>
</tbody>
</table>
## DESCRIPTIVE REPORT CONTROL RECORD

**MAP NO.** T-13316  
**JOB NO.** PH-6703  
**GEODETTIC DATUM** Old Hawaiian  
**ORIGINATING ACTIVITY** Coastal Mapping Division, AMC

<table>
<thead>
<tr>
<th>STATION NAME</th>
<th>SOURCE OF INFORMATION (Index)</th>
<th>AEROTRIANGULATION POINT NUMBER</th>
<th>COORDINATES IN FEET</th>
<th>STATE</th>
<th>OLD HAWAIIAN</th>
<th>GEODETIC POSITION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPAKOU STACK (USGS) 1975</td>
<td>Field pos. Form 28D</td>
<td>30</td>
<td>x= 1658.8</td>
<td>y= 186.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bridge Form 76-41 Pg. 2 of 4</td>
<td>412100</td>
<td>x= 640 109.00</td>
<td>y= 338 588.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAPA KAA POINT LIGHT, 1975</td>
<td></td>
<td></td>
<td>x= 109.00</td>
<td>y= 1891.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COMPUTED BY** A. C. Rauck, Jr.  
**DATE** 12/3/75  
**COMPUTATION CHECKED BY** F. Mauldin  
**DATE** 12/8/75

**LISTED BY** A. C. Rauck, Jr.  
**DATE** 12/3/75  
**LISTING CHECKED BY** F. Mauldin  
**DATE** 12/8/75

**HAND PLOTTING BY** None  
**DATE**

**SUPERSEDES NOAA FORM 76-41, 2-71 EDITION WHICH IS OBSOLETE.**
COMPILATION REPORT
T-13316

31. **DELINEATION:**

Delineation was by the Wild B-8 stereoplotter, using the 1:15,000 scale compilation photography. This was adequate for details and coverage.

32. **CONTROL:**


33. **SUPPLEMENTAL DATA:**

None.

34. **CONTOURS AND DRAINAGE:**

Contours are not applicable to the project. Drainage was delineated by office interpretation of the photographs.

35. **SHORELINE AND ALONGSHORE DETAILS:**

The shoreline and all alongshore details were delineated by office interpretation of the photographs.

36. **OFFSHORE DETAILS:**

These consisted of rocks, and/or coral heads. A clarification and identification of these features must be made during the field edit.

37. **LANDMARKS AND AIDS:**

Appropriate copies of Forms 76-40, Landmarks and Non-floating Aids to Navigation, were forwarded to the field editor and/or hydrographer for further processing.

38. **CONTROL FOR FUTURE SURVEYS:**

None.
39. JUNCTIONS:

   See Form 76-36B, Item #5 of this Descriptive Report concerning junctions.

40. HORIZONTAL AND VERTICAL ACCURACY:

   No Statement.

46. COMPARISON WITH EXISTING MAPS:

   A comparison has been made with USGS Quadrangle Papaikou, Hawaii, scale 1:24,000, dated 1966.

47. COMPARISON WITH NAUTICAL CHARTS:


ITEMS TO BE APPLIED TO NAUTICAL CHARTS IMMEDIATELY

None.

ITEMS TO BE CARRIED FORWARD

None.

Submitted by:

Irene Perkinson
Cartographic Technician

Approved:

Albert C. Rauck, Jr.
Chief, Coastal Mapping Section
April 18, 1978

GEOGRAPHIC NAMES
FINAL NAME SHEET
PH-6703 (Hilo, Hawaii)
T-13316

Hilo Bay
Honolii Cove
Honolii Stream
Kapue Stream
Lau Hue Point
Maili Stream

Maumau Point
Pacific Ocean
Pahoehoe Stream
Papaikou
Paukaa
Paukaa Point

Approved:

Charles E. Harrington, C3x8
Chief Geographer
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>FM</td>
<td>FM</td>
<td>FM</td>
</tr>
</tbody>
</table>

**Control Stations**

<table>
<thead>
<tr>
<th>5. Horizontal Control Stations of Third-Order or Higher Accuracy</th>
<th>6. Recoverable Horizontal Stations of Less Than Third-Order Accuracy (Topographic stations)</th>
<th>7. Photo Hydro Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Bench Marks**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>FM</td>
<td>FM</td>
<td>FM</td>
</tr>
</tbody>
</table>

**Alongshore Areas (Mentional Chart Data)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>FM</td>
<td>FM</td>
<td>FM</td>
</tr>
</tbody>
</table>

**Aids to Navigation**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>FM</td>
<td>FM</td>
<td>FM</td>
</tr>
</tbody>
</table>

**Physical Features**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>FM</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Stereoscopic Instrument Contours**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>FM</td>
</tr>
</tbody>
</table>

**Cultural Features**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>FM</td>
<td>FM</td>
<td>FM</td>
</tr>
</tbody>
</table>

**Boundaries**

<table>
<thead>
<tr>
<th>31. Boundary Lines</th>
<th>32. Public Land Lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Miscellaneous**

<table>
<thead>
<tr>
<th>33. Geographic Names</th>
<th>34. Junctions</th>
<th>35. Legibility of the Manuscript</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>FM</td>
<td>FM</td>
</tr>
</tbody>
</table>

**Discrepancy Overlay**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>FM</td>
<td>FM</td>
<td>FM</td>
</tr>
</tbody>
</table>

**Reviewer**

- F. Margiotta

**Supervisor, Review Section or Unit**

- Albert C. Rauck, Jr.

**Remarks**

- See Form 76-36C, Detroit, MI, A.L.S.
FIELD EDIT: HILO HARBOR

JOB PH-6703

OFR-419-RA-76

MANUSCRIPT NO. TP-13314-13316

RAYMOND L. SPEER
CDR., NOAA

COMMANDING OFFICER
INTRODUCTION & METHODS

Field Edit operations began first in the inner Hilo Harbor region near the port piers on T-Sheet TP-13315 in order to facilitate commencement of hydrographic survey operations on H-9612. Field work on TP-13315 then began at its northernmost limits and progressed south to the junction with TP-13315. Field Edit operations began first in the inner Hilo Harbor region near the port piers on T-Sheet TP-13315 in order to facilitate commencement of hydrographic survey operations on H-9612. Work on this sheet progressed westward and then north to its completion at the junction with T-Sheet TP-13316. Field work on TP-13316 then began at its northernmost limits and progressed south to the junction with TP-13315. TP-13316 was the second priority so survey operations could begin on H-9613. After completion of photogrammetric support for initial hydrography, field edit was accomplished for the Wailoa River, Pond, and Park area in order that survey work could be undertaken in this shallower region of H-9612. Finally, work began on T-Sheet TP-13314, at its junction with TP-13315, and progressed eastward to its completion at the manuscript limits. In conjunction with shoreline verification and location of aids, landmarks, and dangers to navigation, simultaneous photo signal inspection and location for visual hydrography on H-9612 was accomplished on TP-13314 and 13315. Questions from the Master Field Sheets requiring geodetic observations for locations were answered during the initial two weeks of RAINIER combined operations.

All deletions, additions, and corrections to the final shoreline appear on the Master Field Edit Sheets and on the processed cronapaque photographs. With the exception of photo-located signal work, the Master Field Edit Sheets are indices of all field edit work carried out. Numerous Field notes, all necessary for proper compilation, required that the photo signal location work be excess as it would have excessively cluttered the Masters. Separate film ozalids are being submitted that contain the photo signal work with proper references. These separates will be discussed in greater detail later in the text. All discrepancies and questions listed on the Master Field Edit Sheets are completely and thoroughly answered on the Master. Proper references are included for each. Special violet ink field notes on the Master Field Sheets are items that have been verified by field edit. The photograph number for each particular item is given as a reference. Special red ink was used on the Masters to indicate changes or additions found during field edit. Position or location references are included. Finally, those field notes inked in green are deletions from the Manuscripts. References again are included. All notes on the Master Field Edit Sheets which are verified on the cronapaque photographs include the descriptions
or explanation of the feature verified and the photo number on which it was located. All Field Edit information on the smooth boatsheets for H-9612 and H-9613 which was verified by field edit was inked in black. Changes, which include deletions, and (or) additions were inked in special red. Blue, the smooth boatsheet color for unverified items, was not used due to the completeness of verification for all manuscripts.

For a reference of photograph numbers - T-Sheet Manuscripts, refer to "Separates Following the Text". Height data on rocks was estimated to plus or minus 1 foot and on the bluffs of T-Sheet TP-13316 to plus or minus 10 feet. All times are referenced to 0° Longitude.

Adequacy of Compilation

The compilation of the Manuscripts for JOB PH-6703 were adequate in accuracy for most regions, and generally complete. Two regions, however, appeared to be inadequately compiled. The first is the region between the Hilo Sugar Mill Stack and the Wailuku River on T-Sheet TP-13315. Excessive distortion is viewed when the manuscript is overlaid with the appropriate photographs of that area (21 FEB 75, 4414, 4415, 4416, 4424, and 4425). Realignment of passpoints and subpoints must be carried out constantly, more than believed should be necessary, to maintain continuity between the shore line of the photographs and the compiled shoreline of the manuscript. This same excess distortion is noted in a second region surrounding the piers on T-Sheet TP-13314. Again, excessive alignment is required to maintain reasonable continuity between the manuscript and photographs (21 FEB 75, 4426 and 4427). It is believed that this lack of continuity is due to excessive compilation from the more distorted outer regions of the photographs. This could be caused by a lack of adequate overlap on the flight lines that cover these areas. This problem will be discussed in greater detail in the PHOTO SIGNALS, ADDITIONAL INFORMATION, and RECOMMENDATIONS sections of the text of this report. The inadequate compilation regions are not gross or in excess, however the reasons for this inadequacy warrant further explanation and discussion.

Compilation of the MHWL was adequate. Changes verified by Field Edit are noted on the Master and on the processed cronapque photographs. The MLLWL was compiled, wherever physically possible, by Hydrographic Survey Operations. Heavy surf zones on T-Sheets TP-13314 and 13316, and shallow and foul regions on TP-13315 made this a difficult task. For further information on survey operations, Descriptive Reports, H-9612 and H-9613 should be consulted.
SHORELINE SUMMARIES

TP-13314: Field Edit commenced at the tip of Pier I at latitude 19°44'12" N, Longitude 155°03'20" W, and initially progressed south, then west to the manuscript's junction with TP-13315 at longitude 155°04' W. Photogrammetric support was given to this particular region so that survey operations could begin here with knowledge regarding dangers to navigation. Later in the project, field work on this manuscript resumed at Pier I, and continued east to the manuscript limits. Field Edit is complete and thorough for TP-13314.

The Hilo Harbor Breakwater has been geodetically located as per instructions. Geographic positions were determined using field survey methods (triangle computations with checks) for five stations. Four of the stations were located at the four bends in the breakwater's shape while the fifth was located at the tip. At each station, measurements were then taped to determine the breakwater's width at the MH WL and at the top, perpendicular to the edge to determine the width at the top. The measurements were taped in meters, and are accurate to one tenth of a meter. In addition, a measurement was taped from the station at the tip to the MH WL. The stations were plotted and distances were scaled. Finally the points were connected. The breakwater location is thorough. For further information, refer to the Master Field Edit Sheet and to the "Separates Following the Text", BREAKWATER STATION COMPUTATIONS AND MEASUREMENTS. For a further discussion of geodetic survey techniques used, refer to Horizontal Control Report: Hilo Harbor, OPR-419-RA-76.

All discrepancies, questions, and notes to the field editor on the Master, as well as all non-floating aids to navigation and landmarks for charts have been thoroughly researched and answered for this manuscript. Refer to the Master and "Separates" FORM 76-40's.

The shoreline compilation west of the harbor piers was generally very good, with only minor changes revised by field edit. The large spit, located on the Hotel Row waterfront at latitude 19°43'51" N, longitude 155°03'52" W is actually a smaller spit with an island off its tip. The region between the two is awash.

The three privately maintained daybeacons A, B, and C, in Reeds Bay, were located by 3 point sextant fix. Geographic Positions were then computed for each fix using the Ship PDP-8e computer and program RK-300, UTILITY COMPUTATIONS, VERSION 2/10/76. Printouts of those computations are being submitted. Refer to "Separates Following the Text".
The passage that opens into the small lagoon at latitude 19°43'37" N, longitude 155°03'54" W is extremely shallow and foul at low tide. Small skiffs were seen tied up in the lagoon, however none were seen making the transit. It did appear possible that at high tide a small craft could be poled or paddled, if not powered into the lagoon. Upon inspection from a distance, it appeared that the inlets on the northeast corner of the lagoon extend further under the growth than could be compiled. Due to physical limitations, the area was inaccessible and the recommendation is for retention of the shoreline as compiled on the Master.

The questionable wreck at T-Sheet position 19°43'54" N, 155°03'36" W, was dove on by the RAINIER diving officer and found to be nonexistent. Instead, rocks were discovered that are submerged from 4 to 6 feet. The recommendation is for deletion of the wreck and substitution of the hydrographic data. Reference the Master Field Edit Sheet and Descriptive Report, H-9613 for further information.

The pier region, as has been previously mentioned, shows excess distortion when the appropriate photographs and the manuscript are overlaid. The general shapes are correct. In photographic processing of this area, a more than reasonable number of passpoint and subpoint realignments between photograph and T-Sheet were required to maintain acceptable continuity between the photograph and manuscript shoreline. A rushed compilation and lack of sufficient overlap in photographs on the flight line that covered this area is a possible explanation for the distortion viewed. The recommendation is for acceptance of the compiled shoreline unless more detailed examination of the photographs and field notes produces any changes to the MHWL compiled in the field. More discussion on this subject will be forthcoming in a later section of the text.

The tank fields along Kalanianaole Drive contain both fences and walls for security. The outer perimeter is surrounded by mesh wire fence approximately 10 feet in height. Individual tanks or clusters of tanks, however, are surrounded by gray brick fire retaining walls that are 10 feet in height and 1 to 2 feet in thickness. Reference the Master for further information.

The shoreline east of the breakwater to the manuscript limits shows numerous minor revisions to the compiled shoreline. They are too great in number to mention individually. Generally the MHWL is more seaward than was compiled and there are numerous rock spits, ledges, ridges, and clusters awash. The shoreline is lava rock that is being constantly pounded by surf and is highly intricate. Reference the Master and the field notes on the cronapaque photographs for a more
complete understanding. All shoreline for this region, whether from the original compilation or newly compiled, is inked in red for ease in interpretation.

TP-13315: Shoreline verification for this manuscript began its junction with TP-13314 at longitude 155°04' W, and progressed west then north to the manuscript's junction with TP-13316 at latitude 15°45' N. Here again, this was done to give the necessary photogrammetric support for hydrographic survey operations on H-9612. At a later date, field work on this manuscript was carried out in the Wailuku and Wailoa Rivers, and in Waiakea Pond. Field Edit is complete and thorough for TP-13315.

All non-floating aids to navigation and landmarks for charts have been thoroughly researched and discussed. Questions, discrepancies, and notes to the field editor have been completely answered. Refer to the Master Field Edit Sheet and "Separates"; FORM 76-40's for the manuscript for further information.

The region between Cocoanut Island and the Hotel Row, in the vicinity of the footbridge, is extremely shallow and foul in nature. Passage at low tide is next to impossible due to the twisted nature of the small passage, the numerous ledges awash and submerged, and the lack of visibility in milky brown waters.

Waiakea Creek Daybeacon has been located by 3 point sextant fix as per instructions. A Geographic Position was computed using RK-300 UTILITY COMPUTATIONS, as previously discussed. A printout of the computation is being submitted. Refer to the "Separates Following the Text".

Waiakea Pond is fresh water in nature although there is inflow from the Wailoa River and it is affected by the tides. The pond is restricted to public fishing use only and is used by local inhabitants. No motors are allowed south of the island in the center of the channel at latitude 19°43'18" N, longitude 155°04'37" W. The waters are generally very shallow in nature. The earthen spits protruding into the center are accurate.

As has been previously discussed, the Wailuku River shows excessive distortion between photograph and manuscript. The general contours of the MHWL are accurate but they require constant readjustment of successive passpoints to maintain a continuous nature to the shoreline and to evenly distribute the excess in distortion to the shoreline of the surrounding area. Here too the error is not gross, and the general shoreline contours are correct as noted on the manuscript. The reasons for this distortion are discussed later in the text. Two changes to the
shoreline were observed in this region. One change is that the river region extends further inland than is shown, and second is the narrow channel that passes underneath the tree growth. This channel was not previously compiled on the manuscript nor was it shown on the chart. Refer to the Master for further information.

The bluffs that cover the entire western shore of Hilo Harbor begin at approximate position 19°44'02" N X 155°05'26" W. In general the bluffs are delineated correctly on this manuscript. They are, however, quite steep and should not be set back as far as previously compiled. The base of the bluffs is in most cases the MHWL.

There is a massive bulkhead located just south of Alealea Point at Latitude 19°44'25" N, longitude 155°05'35" W. It is approximately 30 feet in height and is of definite landmark value. It is recommended that it be charted as a 30 foot high bulkhead.

The hydrographic investigation of the region centered around position 19°44'57" N X 155°05'16" W is complete. For results and discussion, refer to Descriptive Report H-9613.

TP-13316: Shoreline verification for this manuscript commenced at its northern limits at latitude 19°47' N and progressed south to its junction with TP-13315 at latitude 19°45' N. Field Edit is complete and thorough for this manuscript.

The MHWL does carry up into Honolii Stream and portions of the stream are navigable, but not from seaward. The entrance from sea is dangerous due to extensive and heavy surf at the mouth of the stream. This area appears to be a very popular beach for local surfers.

Bluffs cover the entire expanse of this manuscript. The delineation appears correct. They should, however, be shifted seaward due to their high vertical nature and the fact that in most cases the bluffs' base is the MHWL. Bluff heights were verified for the entire length of the manuscript. In general, heights compiled averaged approximately 10 feet greater than those estimated by the field editor. Refer to the Master Field Edit Sheet for further information.

The MHWL carries up into the limits of Kapue Stream. There is an extensive sand bar that covers 90% of the stream's mouth, and navigation, except at high tide, is doubtful.

All non-floating aids to navigation and landmarks for charts as well as questions and discrepancies on TP-13316 not previously mentioned in the text have been thoroughly researched and discussed on the Master Field Edit Sheet and in "Separates" (FORM 76-40's) which
can be referenced for further information.

**DATA PROCESSING**

With the exception of the Geographic Position computations for Daybeacon locations using RK-300, UTILITY COMPUTATIONS, VERSION 2/10/76, no other computer programs were used for automated or non-automated processing of field edit data. For further information on WANG, SERIES 700 and PDP-8e programs used for geodetic location computation and processing, Horizontal Control Report: Hilo Harbor, OPR-419-RA-76, can be referenced.

Some location of rocks submerged and awash that are dangers to navigation was done during the course of hydrographic survey operations. They will not be discussed in this text. For information on hydrographic surveying techniques, data processing, and results, reference Descriptive Reports H-9612 and H9613, and the accompanying smooth boatsheets.

**PHOTO-IDENTIFIED SIGNALS**

Photo-identified signal inspection and location was a highly integral part of the Hilo Harbor portion of OPR-419-RA-76, H-9612, which was run as a visual survey using digital sextants. Photo identification was also important in regions too shallow for survey launches where whalers and skiffs ran standard visual hydrography and obtained detached positions with 3 point sextant fixes. Separate film ozalids for photogrammetrically located signals are being submitted for T-Sheets TP-13314 and 13315. They are the manuscripts whose shoreline covers H-9612. Information contained on the ozalids are: the number of the signal on the master list, the photograph number used for each ray transferred, and a reference to the "Separates Following the Text", PHOTO SIGNAL COMPUTATIONS. Under the corresponding Master Signal List number will be found the field computations such as: the meters forward and backward that were scaled, conversion to seconds, and latitude and longitude computations. Signal locations are not noted on the Master Field Edit Sheet. The numerous notes necessary for proper field compilation made the addition of Photo Signal notes excess. The Photo Signal Film Ozalids contain all necessary information, with proper references, for the verification of Photogrammetrically located signals.

Individual photograph quality was generally good. There did seem to be more than usual distortion around the perimeters of the photograph.
The clarity and contrast in the central regions facilitated adequate photo identification of objects for signals. Coverage was lacking in some areas, however, most noticeably the upper Wailoa River area of TP-13315, and the Reeds Bay region of TP-13314. Lack of sufficient number of photographs in flight lines, and lack in adequate overlaps forces numerous visual signals to be located with only two positioning rays and others with the third ray being in the excessive distortion regions of the photograph perimeter. Further, the lack of coverage was so evident in the previously mentioned areas that some of the intersections for two rays were less than 10°. These, as well as all other two ray signal locations were made by choosing signals that were easily identifiable on the manuscript and could be located even with poor intersection. It is the belief of the field editor that the Geographic Positions for all photo-identified signals are accurate to the scale of the survey. The lack of adequate photographic coverage is believed to be one of the reasons for the poor compilation noted in the Wailuku River and Hilo Harbor Piers region.

ADDITIONAL INFORMATION AND DISCUSSION

A lack of sufficient overlap in photographic coverage appears to be the most striking direct or indirect reason for the four photogrammetric problem areas previously discussed.

In the first case, this lack directly leads to problems in locating photogrammetrically recoverable points for visual hydrographic signals. With only two photographs to cover a region like the Upper Wailoa River and Reeds Bay, two ray intersection coupled with positive identification on the manuscript was required for photo picking of visual hydrographic signals. Refer to the Photo Signal Film Ozalids, TP-13314 and 13315 for examples of signals with only 2 positioning rays and weak intersection.

Secondly, the lack of complete coverage and efficient photograph overlap is one of the reasons for the less adequate shoreline compilation in the Wailuku River and Hilo Harbor Piers region as mentioned earlier in the text. By forcing compilation to extend out of the central regions of the photographs and in to the perimeter areas, the general shape of the shoreline may be adequate but the photographic distortion remains mirrored in the manuscript. With adequate overlap between photographs, compilation can always remain in the central photograph regions.

The horizontal control work and initial photo location by the compilers was excellent because there was a sufficient number of pass-points and subpoints, as well as the photograph centers, for adequate realignment when the distortion was in excess.
Three other topics are worthy of discussion here. The first is that no flight line manuscript was submitted to the RAINIER as a part of the field edit package. This prevented us from making more definitive statements as to the adequacy of flight lines and photographic coverage.

Secondly, another possible reason for the less than adequate compilation in the Wailuku River and Harbor Piers area could be explained by rushing the compilation. Because this was a critical job, in terms of time, RAINIER is most appreciative of having received both the Hilo Harbor JOB PH-6703, as well as JOB CM-7215 for Kaneohe Bay, early. However, we believe that it was known far enough in advance that the RAINIER’s approved schedule called for her to go to Kaneohe first, and then to move on to Hilo Harbor and yet RAINIER received the Hilo data two weeks before the Kaneohe data. Transmittal letters show both jobs as being transmitted on January 30, 1976. With complete knowledge of our schedule of operations perhaps the Hilo Harbor field edit package could have been held for a less hurried compilation, and mailed to the RAINIER in Hawaii.

Finally, another possible reason for the difficulty in locating visual hydrographic signals by photogrammetric techniques was that all photographs taken for JOB PH-6703 may not have been submitted to the field editor. It is our belief that this is not a good policy, especially where visual hydrography will be undertaken as a part of combined operations.

RECOMMENDATIONS

Specific recommendations for shoreline features have been either stated previously in the text or can be referenced on the Master Field Edit Sheet. General recommendations are as follows:

A) Closer supervision of private photogrammetric contracts and/or more specific instructions for future jobs to insure complete coverage. The cost and results of contracts to private firms should continue to be weighed critically against the cost and results of having NOAA fly the photographic jobs themselves. JOB PH-6703 showed a definite lack of complete photographic coverage. Nowhere in the photographs received was there the two thirds photographic overlap that is deemed necessary by our operations.

B) All photographs that are taken in the job should be submitted as a part of the package for the field editor. This is especially necessary where visual hydrography will be undertaken.
C) Closer communication between Coastal Mapping Division and PMC on matters of ship's schedules, the nature of surveying operations and in the long run, for better standardization of field edit data. Improvements have already been observed in new Instructions for Data Requirements, 1976, and the continual updating of the Provisional Photogrammetry Instructions.

D) Submission of Flight Line information in manuscript form so judgements can be made by the field editor in his Recommendations as to the adequacy of coverage.

E) A method of notation on the compiled manuscript is needed to inform the field editor which photograph was used to compile a certain section of the shoreline. It is believed that this might increase the continuity between office compilation and field edit verification.

Respectfully submitted,

[Signature]

John C. Osborn, Jr.
ENS, NOAA
The following objects HAVE been inspected from seaward to determine their value as landmarks.

**LIGHT** *(Paukaa Point Light, 1975)*

<table>
<thead>
<tr>
<th>CHARTING NAME</th>
<th>DESCRIPTION</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIGHT</td>
<td>(Paukaa Point Light, 1975)</td>
<td>19 ° 45' 54.93&quot; N</td>
<td>155 ° 05' 33.04&quot; W</td>
</tr>
<tr>
<td>CHARTING NAME</td>
<td>DESCRIPTION</td>
<td>LATITUDE</td>
<td>LONGITUDE</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>STACK</td>
<td>(Papaikou Stack (USGS), 1975)</td>
<td>19°46'55&quot;N</td>
<td>158°05'05&quot;W</td>
</tr>
</tbody>
</table>

**CHARTS AFFECTED:** 19040
REVIEW REPORT
T-13316
SHORELINE
May 23, 1978

61. GENERAL STATEMENT:

See Summary, page 6 of this Descriptive Report.

62. COMPARISON WITH REGISTERED TOPOGRAPHIC SURVEYS:

No comparison was made.

63. COMPARISON WITH MAPS OF OTHER AGENCIES:

No detailed comparison was made.

64. COMPARISON WITH CONTEMPORARY HYDROGRAPHIC SURVEYS:

Comparison was made with a copy of Final Verified Smoothsheet H-9613 (RA-5-2-76). There are no significant differences. Inshore hydrography was limited apparently by rough water. Breakers are labeled along the shoreline on the smoothsheet. Hiathuses of more than 300 ft. exist between the most shoreward sounding line and the outer limit of the foul line given by the field editor.

65. COMPARISON WITH NAUTICAL CHARTS:

Comparison was made with Charts 19324, 1:10,000 scale, 18th edition, dated May 7, 1977 and 19040, 10th edition, dated October 13, 1973. There are no significant differences.

66. ADEQUACY OF RESULTS AND FUTURE SURVEYS:

This map complies with the Project Instructions and meets the requirements for Bureau Standards and the National Standards of Map Accuracy.

Submitted by:

A. L. Shands
Final Reviewer
Approved for forwarding:

Ang X. Matsushige

for Jeffrey G. Carlen
Chief, Coastal Mapping Division

Approved:

John D. Berreman
Chief, Photogrammetric Branch

Chief, Coastal Mapping Division