DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
R. E. Patton, Director

C. & G. SURVEY
I. & A
JAN 21 1930.
Acc. No.

State: T. H.

DESCRIPTIVE REPORT
Topographic Sheet No. 4 4472

LOCALITY
H. W. Coast of Hawaii
Kamahao

1928

CHIEF OF PARTY
K. T. Adams
C. & G. Eng.
DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

TOPOGRAPHIC TITLE SHEET

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

Field Letter C

REGISTER NO. 4472

State TERRITORY OF HAWAIIAN ISLANDS

General locality N.W. COAST OF HAWAII

Locality KAWAIHAE

Scale 1/5000 Date of survey NOV. 17th TO 23rd, 1928

Vessel STEAMER GUIDE

Chief of Party K. T. ADAMS

Surveyed by V. M. GIBBENS

Inked by V. M. GIBBENS

Heights in feet above to ground to tops of trees

Contour Approximate contour Form line interval feet

Instructions dated NOVEMBER 3, 1927

Remarks:
DESCRIPTIVE REPORT

to accompany

TOPOGRAPHIC SHEET NO. "C"
Scale 1/5000

Kawaihae, Hawaii, T.H.

Date of Instructions: November 3, 1927.

Date of Survey: November 17th to 23rd, 1928.

Chief of Party: K.T. Adams, H & G Engineer.

Topographer: W.M. Gibbens, Aid.

LIMITS:

This sheet consists of a complete shoreline survey from Latitude 20° 01' 270 Meters to the north northwest including a detail survey of the Roadstead of Kawaihae, to Latitude 20° 03' 812 Meters.

CONTROL:

Control for this survey was based on three triangulation stations, KAWAIHAE LIGHTHOUSE 1928, KAWAIHAE WIRELESS MAST 1913, and KAMALII2, 1928.

METHOD:

The topographic party consisted of one officer and three men. The usual planetable method was used in this survey. The topography was started by setting up the table at triangulation station KAMALII2, 1928, and orienting with the aid of an azimuth line on the sheet, on triangulation station PUako; and cutting in all the signals that were visible along the shore line. About one fourth of the signals were visible from KAMALII2. The table was next set up at KAWAIHAE WIRELESS MAST orienting on PUako. From here I ran each way to the limits of the topography.

GENERAL DESCRIPTION:

KAWAIHAE is a small roadstead of about 7 or 8 families, all Hawaiians except for one family of Japanese. Nearly all the shipping is for the Parker Ranch. The Parker Ranch ships cattle out usually once a week and sometimes twice a week. Ships can not tie up to the Dock, but anchor off and the freight is taken to the dock in small boats.

From signal FAR to signal RAT, the shoreling is rocky
except for three or four short stretches of sand beach as shown on the top sheet. There is a heavy growth of algeroba trees along the shoreline, and extending down to the waters edge in most places. From signal RAT to DOC the shoreline is low and sandy. When there is heavy southerly weather the swells run water into the road from signal TAL to LIL. From signal DOC to END the coast is rocky and steep in places.

LANDMARKS:

The most prominent Landmarks are:

1. The KAWAIAE LIGHT HOUSE
   Latitude 20° 02' 1243.9 Meters, Longitude 155° 50' 236 Meters.
2. THE KAWAIAE WIRELESS MAST.
   Latitude 20° 02' 1189.4 Meters, Longitude 155° 50' 179.0 Meters
3. The Kawaihae Heiau, which is an old stone Hawaiian Heiau, on a knoll of about 50 or 60 ft elevation, 0.9 miles SSE of the Dock, and shows black against the green background.

Respectfully submitted,

V.M. Gibbens

Approved.

K.T. Adams
Commanding
Steamer Guide.
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statute miles at high waterline</td>
<td>4.0</td>
</tr>
<tr>
<td>Statute miles of road and trails</td>
<td>2.4</td>
</tr>
<tr>
<td>Statute miles of shoreline of ponds</td>
<td>0.3</td>
</tr>
<tr>
<td>Square statute miles of area</td>
<td>0.6</td>
</tr>
<tr>
<td>Working days</td>
<td>7</td>
</tr>
<tr>
<td>Number of men in party</td>
<td>3</td>
</tr>
<tr>
<td>STATION</td>
<td>LATITUDE</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>FAR</td>
<td>20 01</td>
</tr>
<tr>
<td>SAM</td>
<td>20 01</td>
</tr>
<tr>
<td>BAY</td>
<td>20 01</td>
</tr>
<tr>
<td>NEW</td>
<td>20 01</td>
</tr>
<tr>
<td>NAV</td>
<td>20 01</td>
</tr>
<tr>
<td>MAY</td>
<td>20 01</td>
</tr>
<tr>
<td>BEL</td>
<td>20 01</td>
</tr>
<tr>
<td>ERN</td>
<td>20 01</td>
</tr>
<tr>
<td>NEST</td>
<td>20 01</td>
</tr>
<tr>
<td>RAT</td>
<td>20 01</td>
</tr>
<tr>
<td>TREE</td>
<td>20 01</td>
</tr>
<tr>
<td>ON</td>
<td>20 02</td>
</tr>
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<td>CUP</td>
<td>20 02</td>
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<tr>
<td>TAL</td>
<td>20 02</td>
</tr>
<tr>
<td>MAG</td>
<td>20 02</td>
</tr>
<tr>
<td>POL</td>
<td>20 02</td>
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<td>BOX</td>
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<tr>
<td>WAV</td>
<td>20 02</td>
</tr>
<tr>
<td>MIN</td>
<td>20 02</td>
</tr>
<tr>
<td>STU</td>
<td>20 02</td>
</tr>
<tr>
<td>LIL</td>
<td>20 02</td>
</tr>
<tr>
<td>REX</td>
<td>20 02</td>
</tr>
<tr>
<td>SHA</td>
<td>20 02</td>
</tr>
<tr>
<td>JIM</td>
<td>20 02</td>
</tr>
<tr>
<td>DOC</td>
<td>20 02</td>
</tr>
</tbody>
</table>
List of signals to accompany Topo Sheet No. "C"
Kawaihae, Hawaii.

<table>
<thead>
<tr>
<th>STATION</th>
<th>LATITUDE</th>
<th>METERS</th>
<th>LONGITUDE</th>
<th>METERS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAN</td>
<td>20 02</td>
<td>1098.0</td>
<td>155 50</td>
<td>108.0</td>
<td>W.W. tree</td>
</tr>
<tr>
<td>CUR</td>
<td>20 02</td>
<td>1324.5</td>
<td>155 50</td>
<td>357.1</td>
<td>W.W. on rock</td>
</tr>
<tr>
<td>PAT</td>
<td>20 02</td>
<td>1421.0</td>
<td>155 50</td>
<td>449.5</td>
<td>W.W. carin and flag</td>
</tr>
<tr>
<td>JET</td>
<td>20 02</td>
<td>1576.5</td>
<td>155 50</td>
<td>615.5</td>
<td>W.W. on rock</td>
</tr>
<tr>
<td>HEN</td>
<td>20 02</td>
<td>1679.0</td>
<td>155 50</td>
<td>640.0</td>
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</tr>
<tr>
<td>MUR</td>
<td>20 02</td>
<td>1757.0</td>
<td>155 50</td>
<td>724.6</td>
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</tr>
<tr>
<td>FEP</td>
<td>20 03</td>
<td>103.5</td>
<td>155 50</td>
<td>824.1</td>
<td>W.W. on rock</td>
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<tr>
<td>MAS</td>
<td>20 03</td>
<td>271.5</td>
<td>155 50</td>
<td>797.5</td>
<td>W.W. carin and flag</td>
</tr>
<tr>
<td>GIN</td>
<td>20 03</td>
<td>358.5</td>
<td>155 50</td>
<td>842.0</td>
<td>W.W. rock</td>
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<tr>
<td>BOY</td>
<td>20 03</td>
<td>451.0</td>
<td>155 50</td>
<td>1010.3</td>
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</tr>
<tr>
<td>HI</td>
<td>20 03</td>
<td>514.0</td>
<td>155 50</td>
<td>1153.0</td>
<td>W.W. carin and flag</td>
</tr>
<tr>
<td>DOG</td>
<td>20 03</td>
<td>530.5</td>
<td>155 50</td>
<td>1211.0</td>
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</tr>
<tr>
<td>CAT</td>
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<td>572.0</td>
<td>155 50</td>
<td>1216.0</td>
<td>W.W. on cliff</td>
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<tr>
<td>HUF</td>
<td>20 03</td>
<td>612.0</td>
<td>155 50</td>
<td>1308.5</td>
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<tr>
<td>DUB</td>
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<td>1321.0</td>
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<tr>
<td>COP</td>
<td>20 03</td>
<td>735.0</td>
<td>155 50</td>
<td>1416.3</td>
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<tr>
<td>END</td>
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<td>812.5</td>
<td>155 50</td>
<td>1400.3</td>
<td>W.W. on rock</td>
</tr>
<tr>
<td>HEIAU</td>
<td>20 01</td>
<td>1569.0</td>
<td>155 49</td>
<td>800.5</td>
<td>Cross banner</td>
</tr>
</tbody>
</table>
The following determined objects are prominent, can be readily distinguished from seaward from the description given below, and should be charted:

<table>
<thead>
<tr>
<th>Description</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Method of determination</th>
<th>Charts affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kawaiho Light House</td>
<td>20 02</td>
<td>1243.9 155 50 236.0</td>
<td>Triang.</td>
<td>4102, 4115</td>
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<tr>
<td>Kawaiho Wireless Mast</td>
<td>20 02</td>
<td>1169.4 155 50 179.0</td>
<td>Triang.</td>
<td>4102, 4115</td>
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<tr>
<td>Kawaiho Reina</td>
<td>20 01</td>
<td>1569.0 155 49 800.8</td>
<td>Topo.</td>
<td>4102, 4115</td>
</tr>
</tbody>
</table>

A list of objects which are of sufficient prominence for use on the charts, together with a description of the same, must be furnished in a special report on this form, and a copy of such report must be attached by the Chief of Party to his descriptive report. The selection, determination, and description of these points are of primary importance.

The description of each object should be short, but such as will identify it; for example, standpipe, water tower, church spire, tank, tall stack, red chimney, radio mast, etc. Generally, flagstaffs and like objects are not sufficiently permanent to chart.
The only cartographic problems raised by this survey is the lack of agreement in shoreline with the old surveys T. 3393 and T. 3422 surveyed in 1913. As the differences were not due to any natural changes or different interpretations of the same shoreline, the problem presented was of more than ordinary importance, particularly in view of the fact that the new survey was not controlled by a sufficient number of triangulation stations to permit closed traverses to be run. Furthermore, the large scale of the proposed chart would require that no marked discrepancies exist in the shoreline.

In the following paragraphs I have explained at great length my analysis of the situation in order that my treatment of the shoreline on T. 3422 between the new survey T. 4471 and T. 4472 will be justified. (See memo attached to descriptive report, T. 3422.)

Comparison with T. 3393 Considerable time and study was spent in an attempt to reconstruct the situation in 1913 so as to enable the fitting of the new shoreline to the old. No absolute solution is possible, that is, one that would fit the conditions on the two old topographic sheets. There is no doubt that a great amount of confusion was occasioned by the fact that the position of Kawaihae Light sent by the office to the field party in 1913 was the position of the old light as it existed prior to 1906 (see descriptive report T. 3422 and page 203, Special Publication 156, "Triangulation in Hawaii", and not the position of the light as it existed in 1913. The explanation given by the topographer on the 1913 survey as to adjustment made on T. 3393 and the reason therefor (see descriptive report T. 3422) are not entirely clear and leave room
for doubt as to just what happened, but since the shoreline on T. 3393 agrees very closely with the shoreline on the new survey except in the immediate vicinity of Kawaihæ Light where there can be no doubt as to correctness of the new survey, no further comments are necessary regarding the comparison between these two sheets.

Comparison with T. 3422. The new survey shows a good agreement with the old work from the vicinity of the Lighthouse down to approximately lat. 20° 02'. From here there is an almost uniform difference of about 60 meters between the two, the old shoreline falling to the southeast of the new. It should be said that while the shoreline on the new survey was an open traverse from the wireless station at Kawaihæ to the southern limit of the sheet, and might therefore be subject to some error, the fact that the same discrepancy noted above is also noted on the lower sheet in the vicinity of Puako (T. 4471) would tend to discredit the old survey rather than the new.

From a reading of the descriptive report, T. 3422 it would appear that the discrepancy between the positions of the lights mentioned above was discovered before topography was begun on this sheet and that the triangulation determination of the later light at Kawaihæ was plotted on the sheet and then the shoreline run in. This, however, did not explain a 60 meter adjustment of the shoreline made by the field party for almost a mile south of Kawaihæ. If the traverse began at Kawaihæ and ran southward (this would have been the logical procedure and is borne out generally by the monthly report of occupation) no such discrepancy can be explained since the adjustment begins with the first setup. On the other hand, if the traverse began at Δ Puako and ran northward, the topography in Puako Bay should agree with the new survey which, however, is not the case (see review T.4471). The conclusion which I have come to is, therefore, as follows:

The topography on T. 3422 was begun at Kawaihæ Light with the assumption that the light as it existed in 1913 was identical with the position obtained from the office, so that while distances were measured from the new light they were plotted on the sheet from the old light which was approximately 55 meters to the southeast of the new light. The result, of course, would be to shift everything bodily to the southeastward by this amount. The traverse from this erroneous position of the light was probably carried as far as Δ Puako and it would have been expected that the discrepancy would have been picked up here in the traverse closure but no mention is made of this in the report. When the field party in 1913 relocated Kawaihæ Light they found that it plots about 55 meters to the northwest of the position which they had on the topographic sheet. The shoreline and signals
were therefore shifted by this amount to the northwest, but why
the shoreline for only a portion of the way was considered affected
I do not know, unless it was thought the area in the vicinity of the
light the most important one. The adjustments on the old topograp-
graphic sheet of stations O Heiau and O Pai appear due to another
cause since the correction here is not the same. Hence if the bal-
ance of the shoreline on T. 3422 that falls within the limits of
T. 4472 were shifted about 55 meters to the northwest a good agree-
ment is had between the two surveys. Furthermore, the position of
O Heiau (a conspicuous ruins, the identity of which there can be
no question) were shifted by this amount it would agree perfectly
with the latest determination on T. 4472.

The old work on T. 3422 should therefore be superseded by the
new work within the limits of the new work. If it is decided to
add contours on the new large scale chart the contours as shown on
the old survey between Puu Kamalii and the shoreline down to lat.
20° 02' can be used, since the position of this peak was adjusted
by the field party and agrees closely with 1926 determination by
triangulation. Below lat. 20° 02' the salient contours should be
shifted to the northwestard about 55 meters.

Adjustment of old hydrography. Since an adjustment of the old
topography will be necessary between the southern limits of T. 4472
and the northern limits of T. 4471 (see memo. attached to descrip-
tive report, T. 3422 regarding this) the topographic signals used
in the hydrographic survey of 1914 (H. 3650) will be shifted which
in turn will affect the hydrography. The area affected is, however,
not considered of sufficient importance to warrant any changes in the
hydrography and will in all probability fall outside the limits of
the large scale chart.

Reviewed by A. L. Shalowitz, March 1931.

Approved:

K.T. Atwoods
Chief, Section of Field Records

Chief, Section of Field Work

* As several of the lines on H. 3650 fall within the limits of the large
scale chart that was not covered by H. 3007 an adjustment was made
in the topographic signals affecting these lines and the lines
replotted on a tracing which is attached to H. 3650.


* This tracing has been superseded by a new tracing on which all hydrography needed
for new chart 4167 has been plotted H.C.L. 2/14/41.
DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY

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General locality N.W. COAST OF HAWAII

Locality KAWAHAE

Scale 1/5000 Date of survey NOV.17th TO 23rd 1928

Vessel STEAMER GUIDE

Chief of Party K.T. ADAMS

Surveyed by V.M. GIBRENS

Inked by V.M. GIBRENS

Heights in feet above to ground to tops of trees

Contour Approximate contour Form line interval feet

Instructions dated NOVEMBER 3 1927

Remarks
Chief of Party, H. T. Adams

Surveyed by V. M. Gibbens

Inked by V. M. G.

The only cartographic problems raised by this survey is the lack of agreement in shoreline with the old surveys T. 3385 and T. 3422 surveyed in 1815. As the differences were not due to any natural changes or different interpretations of the same shoreline, the problem presented was of more than ordinary importance, particularly in view of the fact that the new survey was not controlled by a sufficient number of triangulation stations to permit closed traverses to be run. Furthermore, the large scale of the proposed chart would require that no marked discrepancies exist in the shoreline.

In the following paragraphs I have explained at great length my analysis of the situation in order that my treatment of the shoreline on T. 3422 between the new survey T. 4471 and T. 4472 will be justified. (See maps, attached to descriptive report, T. 3422.)

Comparison with T. 3385 Considerable time and study was spent in an attempt to reconstruct the situation in 1815 so as to enable the fitting of the new shoreline to the old. No absolute solution is possible, that is, one that would fit the conditions on the two old topographic sheets. There is no doubt that a great amount of confusion was occasioned by the fact that the position of Kawaihae Light sent by the office to the field party in 1913 was the position of the old light as it existed prior to 1906 (see descriptive report T. 3422 and page 265, Special Publication 156, "Triangulation in Hawaii", and not the position of the light as it existed in 1915. The explanation given by the topographer on the 1915 survey as to adjustments made on T. 3385 and the reason therefor (see descriptive report T. 3422) are not entirely clear and leave room
for doubt as to just what happened, but since the shoreline on T. 3393 agrees very closely with the shoreline on the new survey except in the immediate vicinity of Kawaihae Light where there can be no doubt as to correctness of the new survey, no further comments are necessary regarding the comparison between these two sheets.

Comparison with T. 3422. The new survey shows a good agreement with the old work from the vicinity of the Lighthouse down to approximately lat. 20° 02'. From here there is an almost uniform difference of about 60 meters between the two, the old shoreline falling to the southeast of the new. It should be said that while the shoreline on the new survey was an open traverse from the wireless station at Kawaihae to the southern limit of the sheet, and might therefore be subject to some error, the fact that the same discrepancy noted above is also noted on the lower sheet in the vicinity of Puako (T. 4471) would tend to discredit the old survey rather than the new.

From a reading of the descriptive report, T. 3422 it would appear that the discrepancy between the positions of the lights mentioned above was discovered before topography was begun on this sheet and that the triangulation determination of the later light at Kawaihae was plotted on the sheet and then the shoreline run in. This, however, did not explain a 60 meter adjustment of the shoreline made by the field party for almost a mile south of Kawaihae. If the traverse began at Kawaihae and ran southward (this would have been the logical procedure and is borne out generally by the monthly report of occupation) no such discrepancy can be explained since the adjustment begins with the first setup. On the other hand, if the traverse began at Puako and ran northward the topography in Puako Bay should agree with the new survey which, however, is not the case (see review T.4471). The conclusion which I have come to is, therefore, as follows:

The topography on T. 3422 was begun at Kawaihae Light with the assumption that the light as it existed in 1913 was identical with the position obtained from the office, so that while distances were measured from the new light they were plotted on the sheet from the old light which was approximately 55 meters to the southeast of the new light. The result, of course, would be to shift everything bodily to the southeastward by this amount. The traverse from this erroneous position of the light was probably carried as far as Puako and it would have been expected that the discrepancy would have been picked up here in the traverse closure but no mention is made of this in the report. When the field party in 1913 relocated Kawaihae Light they found that it plots about 55 meters to the northwest of the position which they had on the topographic sheet. The shoreline and signals
were therefore shifted by this amount to the northwest, but why
the shoreline for only a portion of the way was considered affected
I do not know, unless it was thought the area in the vicinity of the
light the most important one. The adjustments on the old topog-
graphic sheet of stations o Heiau and o Fai appears due to another
cause since the correction here is not the same. Hence if the bal-
ance of the shoreline on T. 3422 that falls within the limits of
T. 4472 were shifted about 50 meters to the northwest a good agree-
ment is had between the two surveys. Furthermore, the position of
o Heiau (a conspicuous ruins) the identify of which there can be
no question) were shifted by this amount it would agree perfectly
with the latest determination on T. 4472.

The old work on T. 3422 should therefore be superseded by the
new work within the limits of the new work. If it is decided to
add contours on the new large scale chart the contours as shown on
the old survey between Puu Kamalii and the shoreline down to lat.
20° 02' can be used, since the position of this peak was adjusted
by the field party and agrees closely with 1928 determination by
triangulation. Below lat. 20° 02' the salient contours should be
shifted to the northwestward about 50 meters.

Adjustment of old hydrography. Since an adjustment of the old
topography will be necessary between the southern limits of T. 4472
and the northern limits of T. 4471 (see memo. attached to descrip-
tive report, T. 3422 regarding this) the topographic signals used
in the hydrographic survey of 1914 (H. 5560) will be shifted which
in turn will affect the hydrography. The area affected is, however,
not considered of sufficient importance to warrant any changes in the
new hydrography and will in all probability fall outside the limits
of the large scale chart.

Reviewed by A. L. Shalowitz, March 1931.

Approved:

Chief, Section of Field Records

Chief, Section of Field Work