

H11674

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

*Type of Survey* ..... HYDROGRAPHIC

*Field No.* ..... N/A

*Registry No.* ..... H11674

### LOCALITY

*State* ..... Commonwealth of the N. Mariana Islands

*General Locality* ..... Northern Mariana Islands

*Sublocality* ..... Saipan Harbor

2007

### CHIEF OF PARTY

Corey Allen

### LIBRARY & ARCHIVES

DATE .....

**HYDROGRAPHIC TITLE SHEET**

**H11281**

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.  
**N/A**

State **Commonwealth of the Northern Mariana Islands**

General Locality **Northern Mariana Islands**

Sublocality **Saipan Harbor**

Scale **1:5,000** Date of Survey **5/19/2007 -5/24/2007**

Instructions Date **3/15/2007** Project No. **M-T901-AHI-07**

Vessel **R/V AHI**

Chief of Party **Corey Allen**

Surveyed by **Corey Allen, Kurt Brown, Erin Campbell**

Soundings taken by echo sounder, hand lead, pole **Reson 8101**

Graphic record scaled by **N/A**

Graphic record checked by **N/A**

Evaluation by **B. Johnston, P. Holmberg** Automated plot by **N/A**

Verification by **P. Holmberg**

Soundings in **Feet** at **MLLW**

REMARKS: **All times are recorded in UTC**

**Revisions and annotations appearing as endnotes were**

**generated during office processing.**

**All seperates are filed with the hydrographic data**

**As a result, page numbering may be interrupted or non-sequential**

# **Descriptive Report to Accompany Hydrographic Survey H11674**

Project M-T901-AHI-07

Saipan Harbor

Commonwealth of the Northern Mariana Islands

Scale 1:5000

May, 2007

**NOAA Research Vessel AHI**

## **Introduction**

The United States Navy and the Commonwealth of the Northern Mariana Islands (CNMI) Port Authority requested a modern hydrographic survey of Saipan Harbor. The US Navy plans to utilize Saipan as the primary port-of-call in the region for Navy vessels until such a time as Apra Harbor, Guam can be dredged to again support safe entry by Navy ships and submarines; this dredge work is scheduled to occur in FY2008 or later. The CNMI Port Authority has additionally requested modern hydrographic surveys of Tinian Harbor and Rota Harbor to support safe and efficient commerce and transportation in the region.

This project provides contemporary hydrographic data to update the nautical charts in the area and support sound navigational decision-making for both military and civilian mariners entering the ports of Saipan, Rota and Tinian. The data from Saipan Harbor will also be used to analyze the object detection capability of LIDAR data acquired by the Naval Oceanographic Office in 2006 to provide a better understanding of how LIDAR data should be utilized in future surveys in areas with similar environmental parameters.

### **A. AREA SURVEYED**

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions M-T901-AHI-07, dated March 15, 2007<sup>1</sup> and all other applicable direction<sup>i</sup>, with the exception of deviations noted in this report.

The survey area was located in Saipan Harbor on the Island of Saipan, which is part of the Commonwealth of the Northern Mariana Islands. This survey corresponds to Sheet A in the sheet layout provided with the Letter Instructions, as shown in Figure 1 below.

Data acquisition was conducted from May 19 to May 24, 2007 (DN139 to DN144).

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<sup>i</sup> NOS Hydrographic Surveys Specifications and Deliverables (April, 2007), OCS Field Procedures Manual for Hydrographic Surveying (March 2007), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

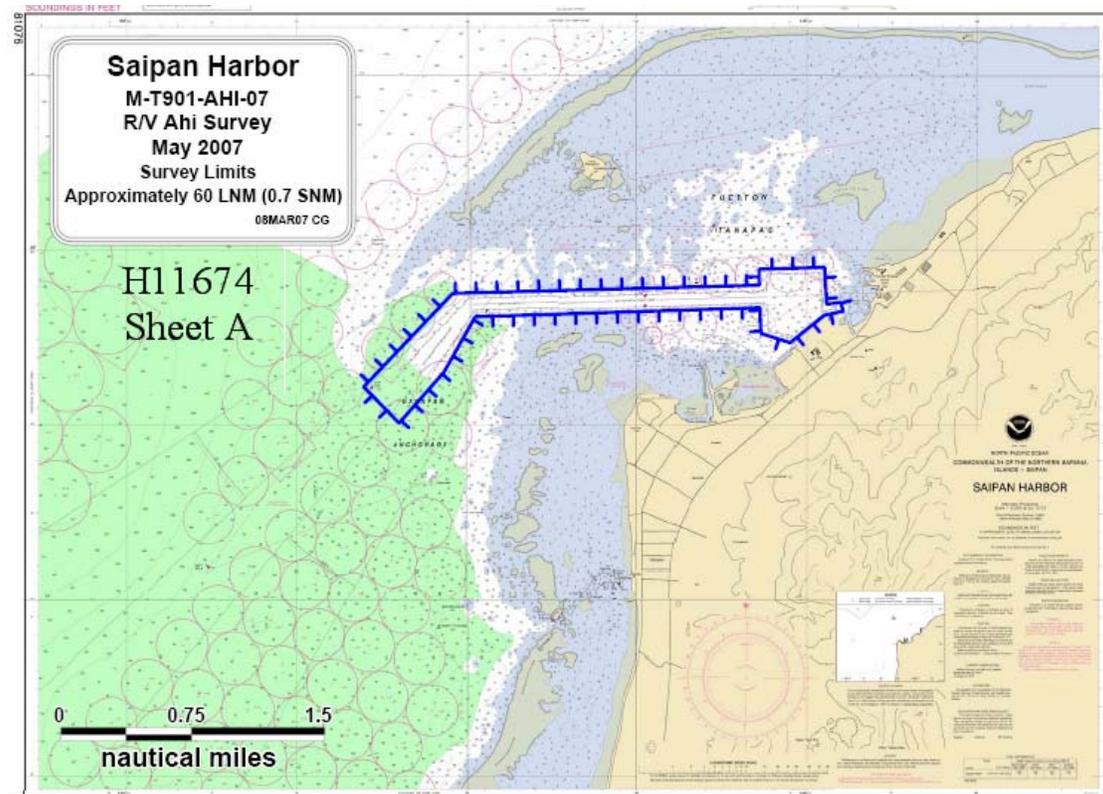


Figure 1: H11674 Survey Area

H11674 Statistics	
Linear Nautical Miles of Mainscheme Multibeam	38.0
Linear Nautical Miles of Side Scan Sonar Lines	26.0
Linear Nautical Miles of Crosslines	6.0
Linear Nautical Miles of Developments	1.6
Total Square Nautical Miles	0.75

Table 1: H11674 Statistics

Object detection coverage was obtained in the survey area by combining complete Reson 8101 MBES coverage and 200% SSS coverage. Complete MBES coverage was obtained with the exception of the shoal areas to the north and south of the main channel. This area was outside the channel limits, dangerously shoal, and not deemed significant to the intent of the survey. At the request of Saipan Port personnel coverage was extended on the eastern side of the survey. 200% Side Scan Sonar (SSS) coverage (using a one hundred meter range scale) was obtained in the survey limits with the exception of the small area near directly north of Pier C. Moored ships and nearby shoaling made towing the SSS towfish difficult in this area and it was decided not to attempt to fill the holiday. The multibeam data was examined and shows no evidence of a significant feature in this area.

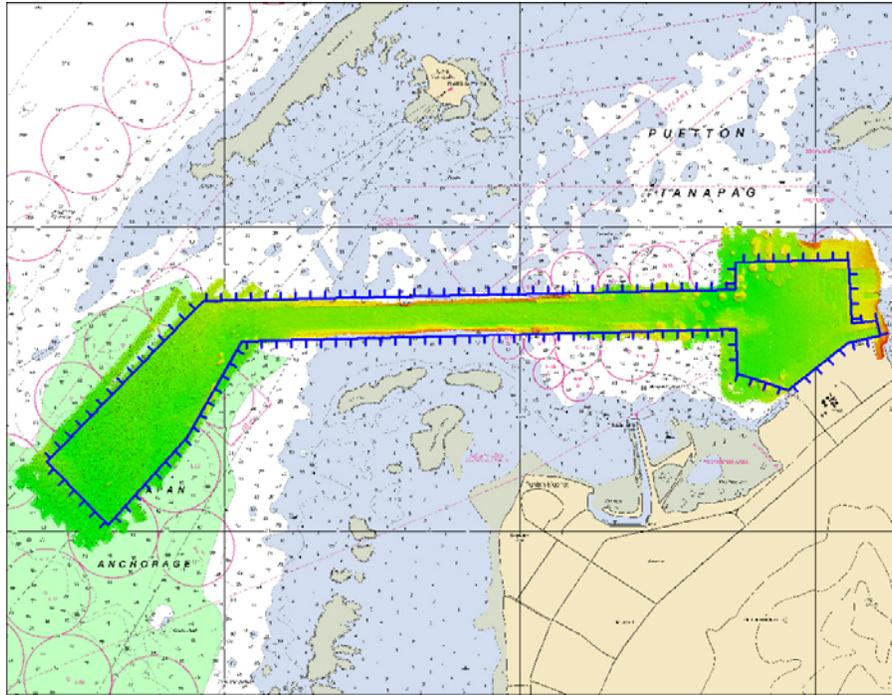


Figure 2: SWMB Coverage

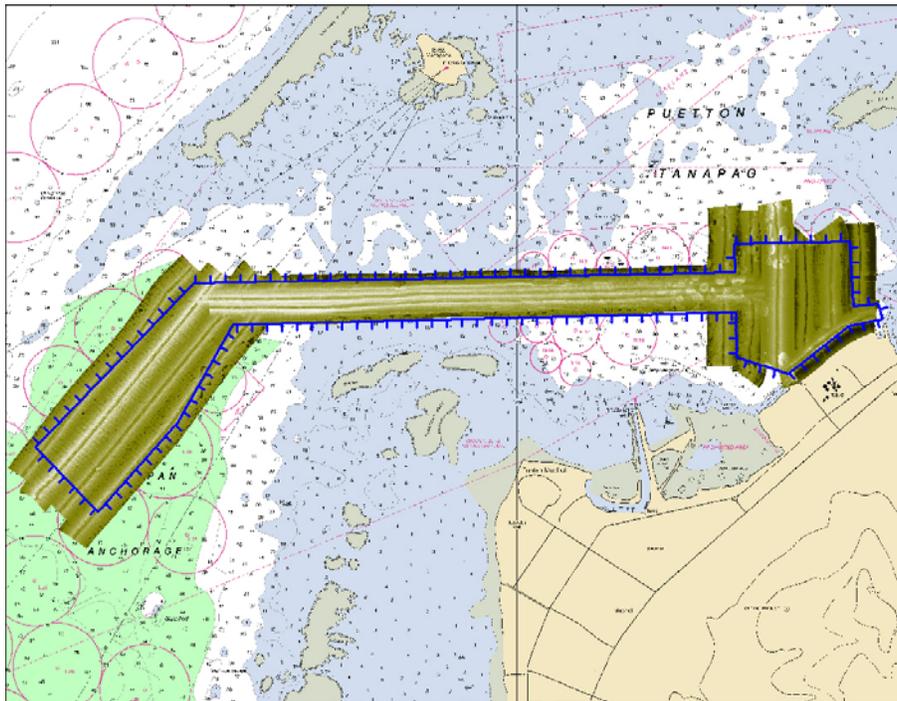


Figure 3: 100% SSS Coverage

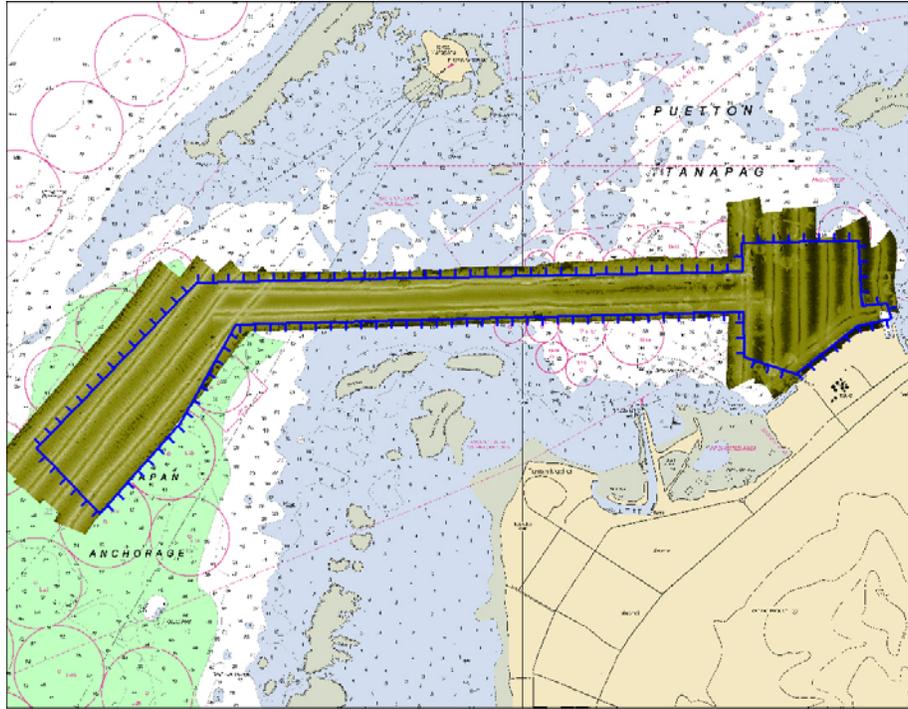


Figure 4: 200% SSS Coverage

## B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, the R/V AHI, quality control procedures and data processing methods are described in the *T-901-AHI-07 Data Acquisition and Processing Report (DAPR)*, submitted under separate cover<sup>2</sup>. Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections.

**Final approved water levels were applied to this survey on June 7, 2007.** See Section C for additional information.

### B1. Equipment

R/V AHI was the only vessel used during survey H11674. Specifications for the AHI are listed in Table 2.

R/V AHI	
Hull Registration Number	F-2505
Builder	Safe Boat International
Length Overall	25 feet
Beam	10 feet

<b>Draft, Maximum</b>	3.3 ft
<b>Cruising Speed</b>	15 knots
<b>Max Survey Speed</b>	6 knots
<b>Primary Echosounder</b>	RESON 8101 & Klein 5500 lightweight
<b>Sound Velocity Equipment</b>	SBE 19
<b>Attitude &amp; Positioning Equipment</b>	POS/MV V4
<b>Type of operations</b>	MBES & SSS

**Table 2: AHI Specifications**

No vessel configurations used during data acquisition deviated from the DAPR.

## **B2. Quality Control**

Data quality for survey H11674 was evaluated through examination of CUBE surfaces that were generated from raw soundings. Internal consistency and integrity of the data were manually examined by the Hydrographer in CARIS subset mode. Soundings and surfaces in overlapping coverage and outer beams were reviewed for systematic errors and excessive noise. The data were found consistent in comparisons between day-day, and line-line coverage.

### **Data Logging**

At the location of the Survey in the Mariana Islands, midnight UTC occurred at 10 am local time. DNs on acquisition logs and in CARIS are named according to the DN occurring after midnight UTC. For example, if data was logged beginning on DN139, prior to 10am local time, and continued past 10am local into DN140, data for both days were converted into DN140 in CARIS and the log sheet for that day is labeled DN140<sup>3</sup>.

Due to the way data was logged in the ISS-2000 system, separate commands were required to stop data logging and change line names. The command to change lines names was missed on several lines so that what should have been two separate lines appear as a single line in CARIS. These single lines do not contain data in the section connecting the line segments as logging had stopped in between lines. An example of a line collected without changing line names is show in Figure 5<sup>4</sup>.

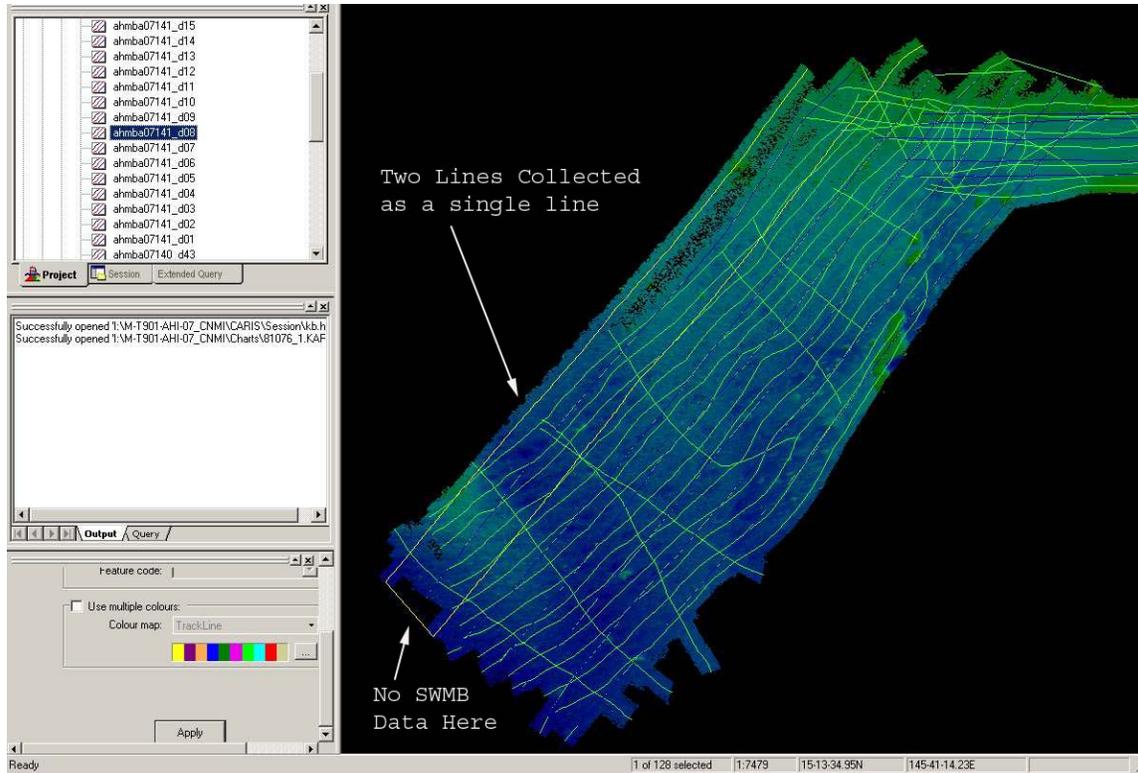


Figure 5 – Example of error in line logging.

**Crosslines**

Multibeam crosslines totaled 6 linear nautical miles (lnm), comprising 15.7% of the 38 lnm of total MBES hydrography. The mainscheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode and agreed well with differences of 0.2 meters or less.

Crossline agreement with main scheme data meet the vertical accuracy requirements as stated in the *NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSDM)*.

**Junctions**

No contemporary surveys junction with H11647.

**Coverage Assessment**

Coverage assessment was determined using a half meter resolution BASE surface.

There are several small holidays throughout the surface in depths near 14 meters. The gaps are the result of the high (half meter) resolution BASE surface, and are in the outer beam area between lines. The SSS data was examined in these areas for small features. All features in the SSS data are reflected in the multibeam data and therefore the holidays were not deemed significant<sup>5</sup>. Other holidays exist in areas outside the survey limits and were created by the collection of multibeam data on SSS lines at the edge or just outside the survey limits. The holidays are shown in Figures 6 and 7.

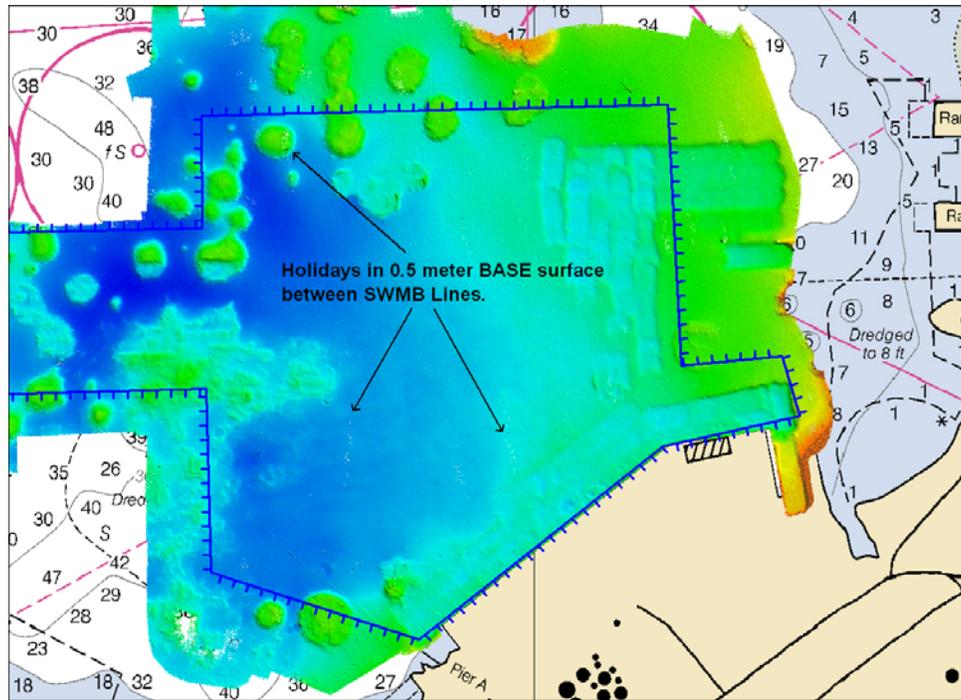


Figure 6 – Holidays in Surface at outer beams

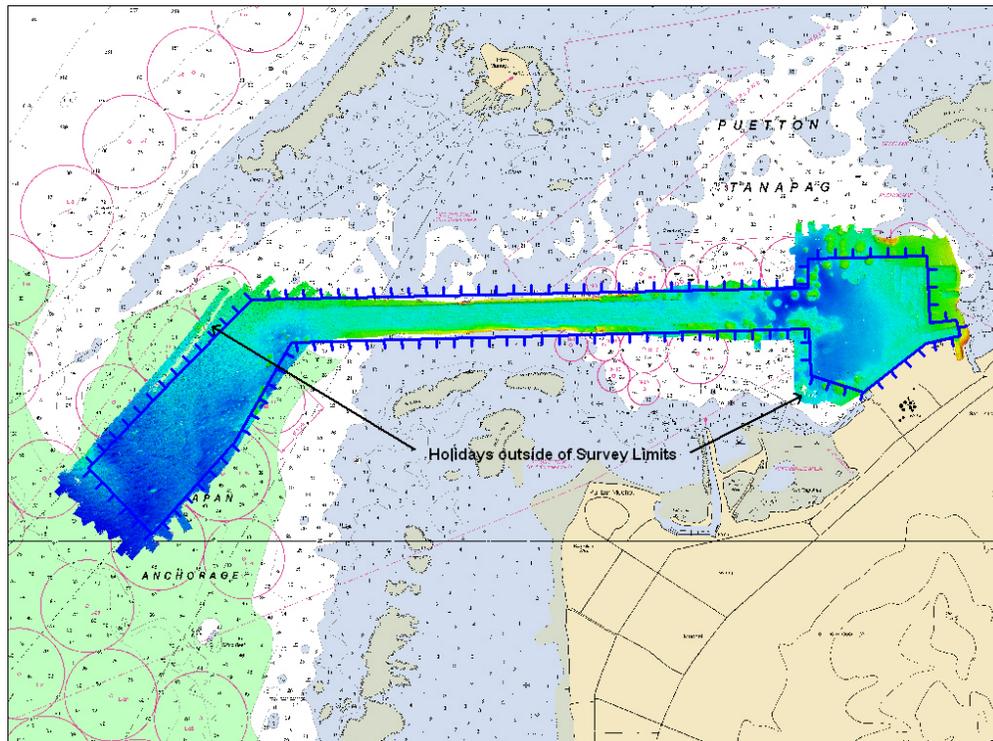


Figure 7 – Holidays outside of Survey Limits

**Trueheave**

Data collected on DNs 140 and 141 were corrected for true heave using a "fixed" TH file. This file is generated using the CARIS utility fixtrueheave and generates a TH file with a .fixed extension. Due to a bug in the CARIS software related to logging TH past midnight, Saturday, the TH file collected on DN 140 had to be split into two separate files before loading in CARIS. The second TH file was given the extension .fixed2. See Trueheave.eml.txt in Appendix V for details on splitting DN140's TH file.

**Sound Velocity**

All sound velocity data were applied during data collection as described in the M-T901-AHI Data Acquisition and Processing Report. Sound velocity was not applied in CARIS and no CARIS .svp files exist for the survey. Sound velocity data remains in converted file (.cnv) format. The ISS-2000 software did not allow the extension of the sound velocity data based on the slope of the curve. As a result, CTDs were only taken in the deeper areas of the turning basin and outer channel where depths were deeper than the expected survey depth. The sound velocity names, positions and times are shown below.

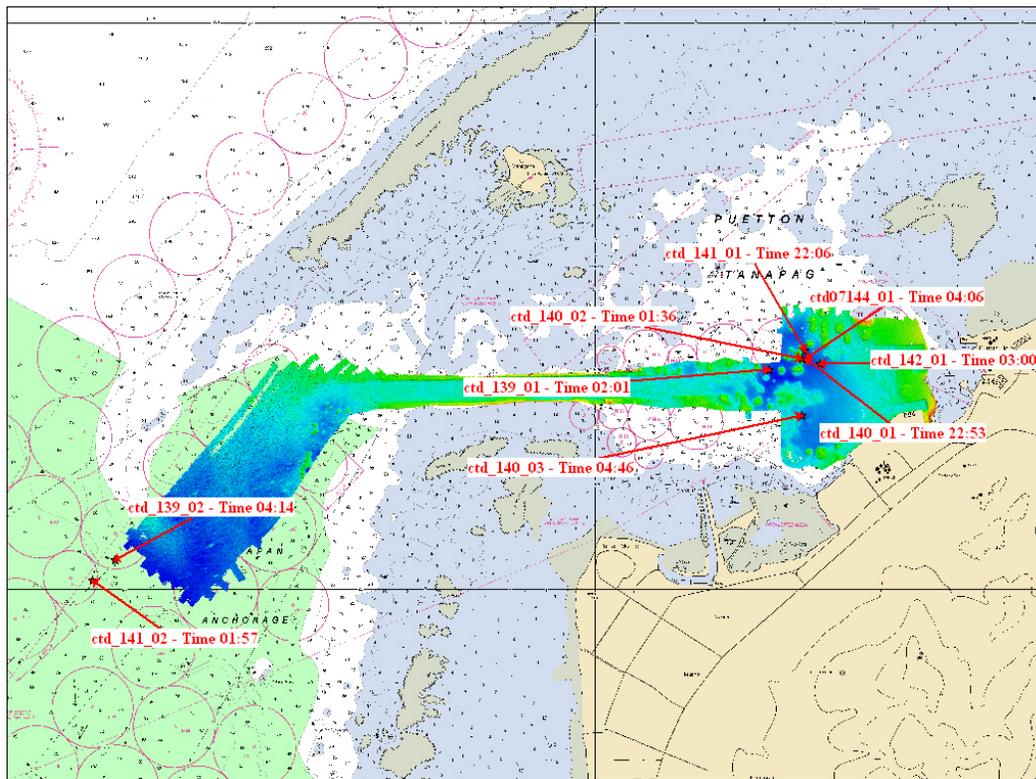


Figure 8 – Sound Velocity Positions, Names and Times

Raw Seacat (.hex) files and the .cnv files are located in Separate II - Sound Speed Data in the Separates for this report<sup>6</sup>.

**Accuracy Standards**

Uncertainty values in the CUBE surface were generally close to 0.2 meters. Uncertainty values exceeding 0.3 meters exist in isolated spots throughout the finalized CUBE surface and are the result of high

standard deviation from steeply sloped bottom features such as the side of dredged areas or coral heads. Data from survey H11674 meet data accuracy specifications as stated in the *HSSDM*.

### **B3. Corrections to Echo Soundings**

Data reduction procedures for survey H11674 conform to those detailed in the DAPR.

### **B4. Data Processing**

Data processing procedures for survey H11674 conform to those detailed in the DAPR

A single fieldsheet was created to encompass survey H11674, and contains a single half meter CUBE surface, H11674\_0p5\_0to20m, one finalized surface, H11674\_0p5m\_0to20m\_Final, along with SSS mosaics for 100% and 200% coverage. The fieldsheet area of coverage is shown in Figure 9.

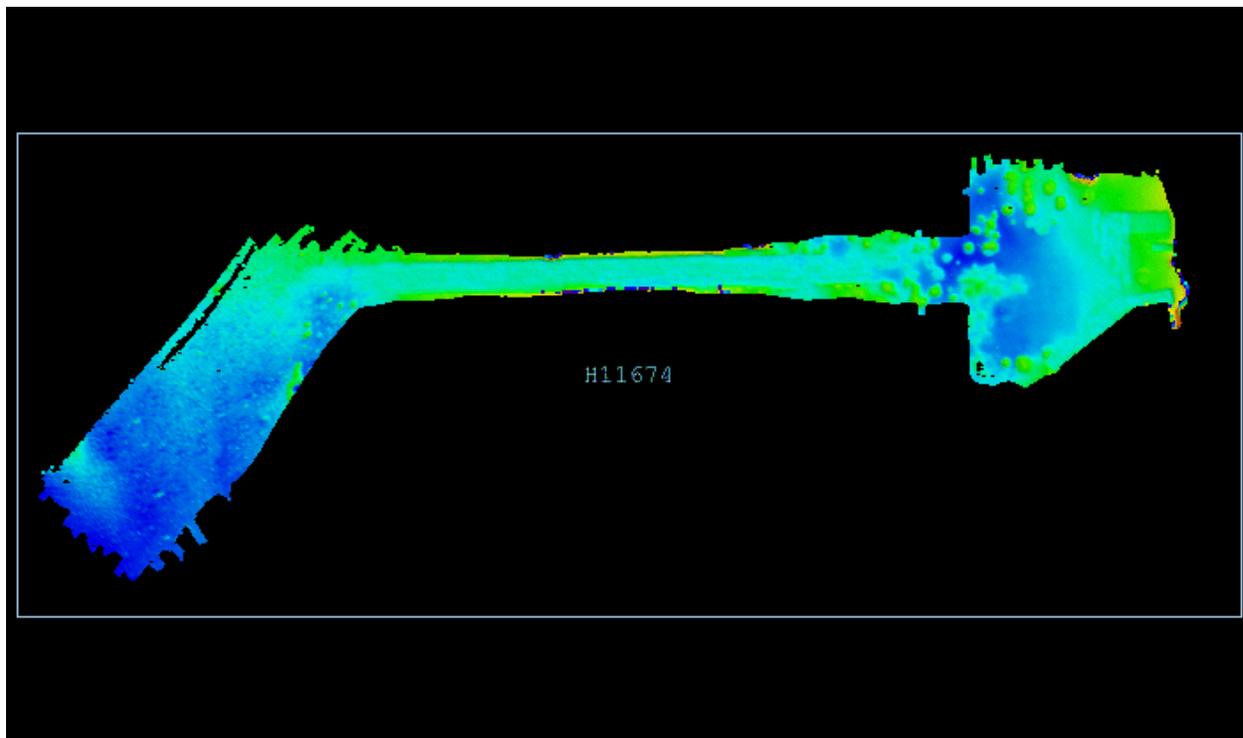


Figure 9 - Fieldsheet H11674

A half meter resolution BASE surface was chosen as the highest resolution surface the data would support without creating significant gaps in coverage. In addition, the half meter resolution was chosen to increase the likelihood of the surface representing the shoal points on the numerous coral heads of various shapes and sizes scattered throughout the survey area.

### **Designated Soundings**

Soundings were designated on many of the coral heads in the survey area, but not all<sup>7</sup>. The most significant coral heads in a particular area were selected for designated soundings reflecting their shoal point. Many other coral heads with less shoal depths were examined in the multibeam data but no sounding designated on their shoal point. In these cases the least depth on the coral head was adequately represented in the BASE surface or, if not, the least depth was not deemed significant in relation to nearby coral heads whose shoal depths were designated. Several of the features contained outer beam noise that made judging the least depth difficult. In these cases the SSS data was closely reviewed for contact height and a least depth selected based on this and detailed examination of the multibeam data in subset mode. In general, noisy outer beam data was not selected as a designated sounding unless supported by a contact height in the SSS data.

### **Side Scan Sonar Processing**

Side Scan Sonar contacts were selected in CARIS SIPS based on location, contact height, depth, and surrounding bottom conditions. Due to time constraints, in areas with numerous coral heads only the most significant item was selected for investigation. Large coral heads, unlikely to be missed in the SWMB data, were not selected. Items outside the main channel or outside the survey limits were generally not selected as contacts. Of the contacts selected, only those that did not have adequate SWMB coverage or where noise in the SWMB data made the shoal depth unclear were developed. During office processing additional less significant contacts in the SSS were selected to ensure the least depth on these features were reflected in the BASE surface.

SSS contacts were correlated in Pydro and contacts on the same feature categorized as primary and secondary contacts. If a designated sounding was selected over a feature, the sounding was selected as the primary feature and any SSS contacts were secondary. The comments for each primary SSS contact state whether the contact was adequately covered by SWMB and the shoal point reflected in the half meter BASE surface or whether a sounding was designated on the feature. A listing of SSS contacts was generated in Pydro and is located in Separate V<sup>8</sup>.

## **C. HORIZONTAL AND VERTICAL CONTROL**

Horizontal control work was not done during Survey H11674 and a Horizontal and Vertical Control report was not written for this survey.

### **Horizontal Control**

The horizontal datum for this project is the World Geodetic System of 1984 (WGS84). Differential GPS (using a C-Nav SF-2050G DGPS receiver to supply the POS/MV with differential correctors) was the sole method of positioning<sup>9</sup>.

### **Vertical Control**

The vertical datum for this project is Mean Lower-Low Water (MLLW). The primary tide station at Apra Harbor, Guam (163-0000) served as control for datum determination and as the primary source for water level correctors for survey H11674 during acquisition.

A request for delivery of final approved water level data (smooth tides) for survey H11674 was forwarded via email to N/OPS1 on May 30, 2007. A copy of the request is included in Appendix IV<sup>10</sup>.

The Tide Note for Hydrographic Survey H11674 was received on June 18, 2007. The Tide Note for Hydrographic Survey H11674 states that preliminary zoning is accepted as the final zoning correctors. Therefore, verified water levels applied on June 7, 2007, prior to the tide note, are the final water levels. Final approved water levels consist of verified water level data downloaded from the CO-OPS website for station Guam in file 1630000.tid, and the tide zoning information in file T901AHI2007CORP.zdf. The Tide Note for Hydrographic Survey H11674 and ancillary correspondence are included in Appendix IV<sup>11</sup>.

It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during the survey acceptance review.

## **D. RESULTS AND RECOMMENDATIONS**

### **D.1 Chart Comparison**

Survey H11674 was compared only with charts 81076 (11th Ed.; December, 2004, 1:12,000), and 81067 (7<sup>th</sup> Ed.; December, 2004, 1:75,000). All charts have been updated with Notice to Mariners through April 7, 2007.

#### **Chart 81076**

Depths from survey H11674 generally agreed within one to three feet with depths on chart 81076 with the specific exceptions described below<sup>12</sup>. None of the charted soundings are located in the delineated 32 ft. channel.

The charted 33 ft. sounding at 15/13/53N, 145/43/42E<sup>13</sup> is located in depths of approximately 48 ft.

The charted 25 ft. sounding at 15/13/56N, 145/44/03E<sup>14</sup> is located in an area with a depth of 32 ft. This sounding most likely represents the 25ft. shoal point (submitted as a DTON) on the object located approximately 50 meters to the southeast. See Figure 10.

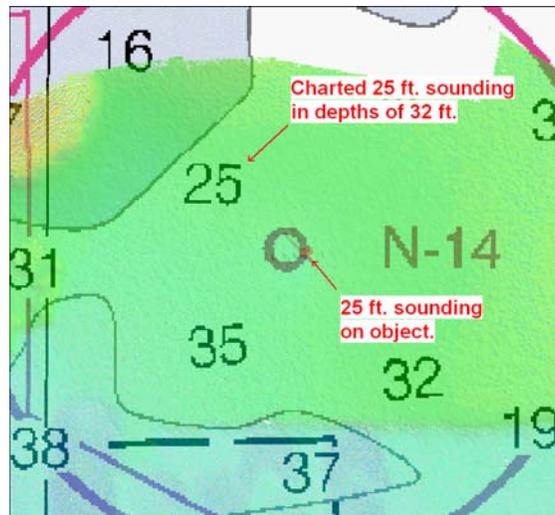


Figure 10

The charted 19 ft. sounding at 15/13/52N, 145/44/08E<sup>15</sup> is located on the slope of a dredged area with depths ranging from 28 to 38 ft. See Figure 11.

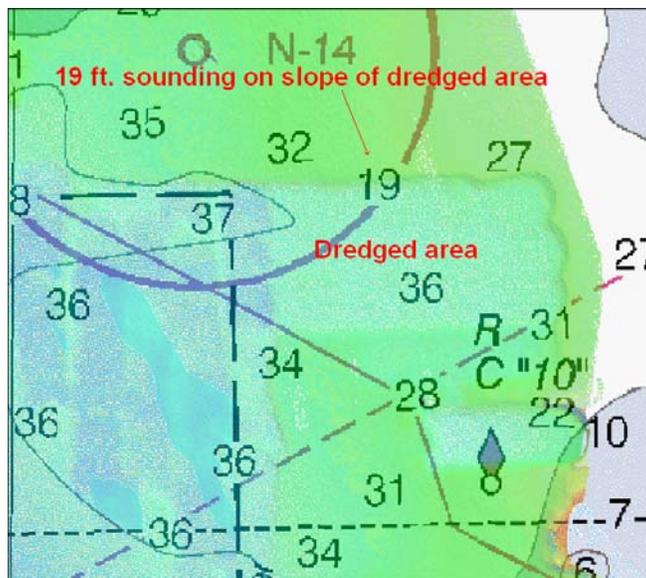


Figure 11

A 22 ft. sounding was found on an object at 15/13/48N, 145/44/09E<sup>16</sup>, over a charted 28 ft. sounding. This sounding was submitted as a DTON. See Figure 12.

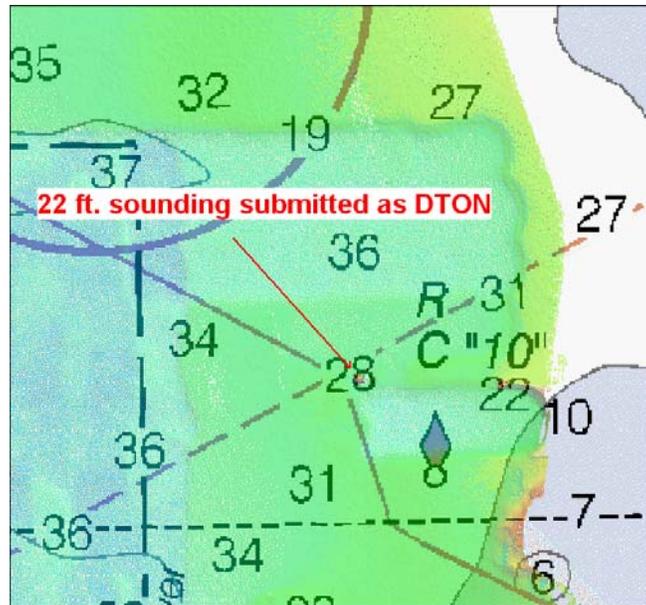


Figure 12

A 26 ft. sounding was found on an object at 15/13/53.6N, 145/43/55.6E<sup>17</sup> in the N-13 anchorage area. This sounding was submitted as a DTON and should be charted as an obstruction. See Figure 13.

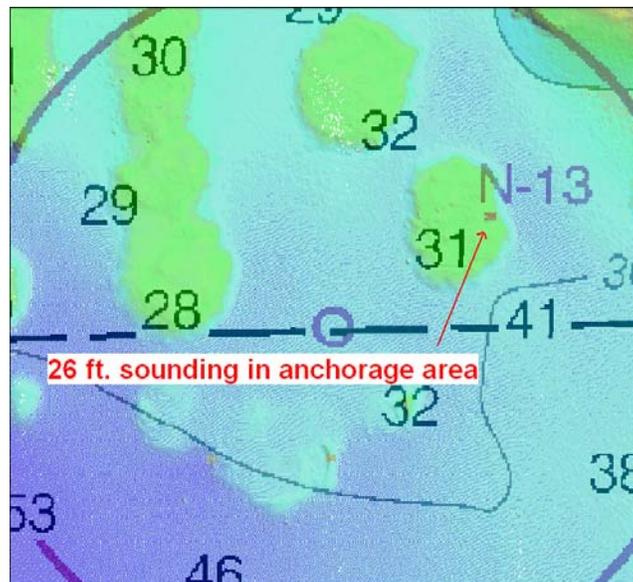


Figure 13

A 31 ft. sounding was found in the outer channel over the charted 32 ft<sup>18</sup> shoal inside of buoy R"2". See Figure 14.

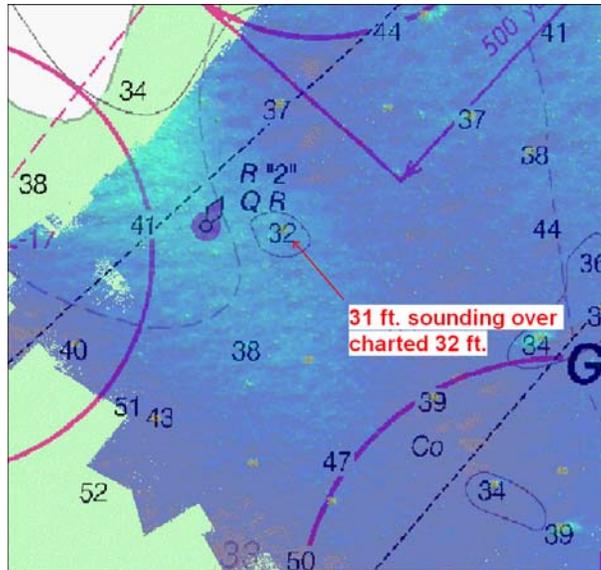


Figure 14

The charted 31 ft. sounding and the 35 ft. sounding located directly north of Pier C at approximate position 15/13/39N, 145/44/08E<sup>19</sup> are located in an area with 40 ft. depths. See Figure 15.

The 18 ft. contour should be shifted to the east at position 15/13/43N , 145/44/11E<sup>20</sup>. See Figure 15.

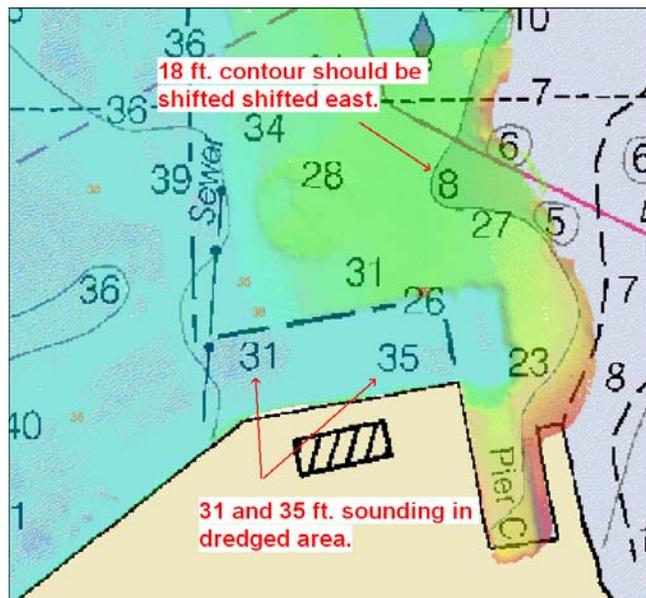


Figure 15

Least depths in the part of the main channel delineated by the dashed line are 33 ft. The 33ft. soundings are located in the NW corner of the channel where it turns to the south and at the edge of the channel at 15/13/40N, 145/42/15.7E<sup>21</sup>. See Figure 16.

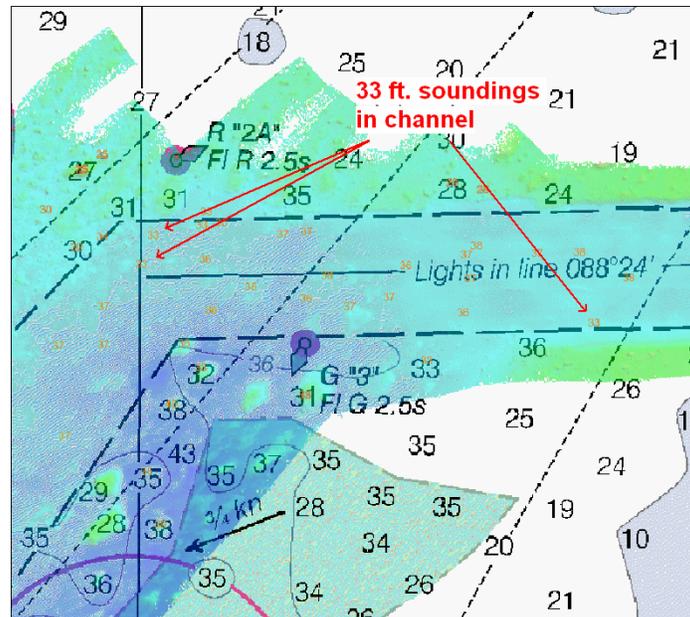


Figure 16

### Chart 81067

Chart 81067 contains four soundings in the survey area. Due to the scale of the chart, sounding comparison is imprecise, but the soundings in generally agree within two feet of surveyed depths<sup>22</sup>.

### Chart Comparison Recommendations

The controlling depth in the main channel delineated by the dashed lines should be increased to 33 ft.<sup>23</sup>.

The green tint at the approaches to the outer channel, representing a wire drag area cleared to 33 ft., should be removed from the chart in the area common to the present survey<sup>24</sup>.

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the *HSSDM*. **The surveyed soundings are adequate to supersede prior surveys in their common areas**<sup>25</sup>. Based on the application of verified water level data, final chart comparisons are not required by the Pacific Hydrographic Branch<sup>26</sup>.

### Automated Wreck and Obstruction Information System (AWOIS) Investigations

There were no AWOIS items located within the limits of H11674<sup>27</sup>.

## **Dangers to Navigation**

Three Dangers to Navigation were found in the survey area. The DTON reports and copies of the DTON emails to MCD are located in Appendix 1<sup>28</sup>.

## **D.2 Additional Results**

### **Shoreline Verification and Processing**

Shoreline verification was not performed for survey H11674<sup>29</sup>.

### **Prior Survey Comparison**

Survey H11674 was compared to the 2003 AHI survey, W00113. Depths from survey H11674 generally agree with this prior survey to within two feet, except where soundings were designated in H11674. In these areas the designated sounding was generally shoaler by 1 to 3 feet. General trends in the bathymetry were the same for both surveys.

Many DTONs were reported during survey W00113 and approximately half of these were verified or a shoaler depth was found. In the other half, depths from the present survey were deeper than the previously reported DTON depth. In three cases, the previously reported DTONs were removed by Port of Saipan personnel (see Saipan Channel DTON Removal Report April 2007 in Appendix I). In other cases, the least depth previously reported may be shoaler due to noisy data that was not fully cleaned of flyers which were picked up by the uncertainty weighted BASE surface, whereas in the present survey the CUBE surface did not pick up the noise.

The survey was not compared to the lidar surveys listed in the project instructions as a comparison to these surveys will be done by Hydrographic Surveys Division personnel at a future date<sup>30</sup>.

### **Aids to Navigation**

All aids to Navigation were positioned accurately and found to serve their intended purpose.

### **Bottom Samples**

Bottom samples were not required for survey H11467<sup>31</sup>.

### **Submarine Cables and Pipelines**

The survey area for H11674 includes an uncharted submerged communications cable connecting Saipan, Tinian and Rota. NTT Engineering (Japanese Telecom Company) has contracted PTI to perform maintenance on the cable for several weeks beginning June 10, 2007. PTI should be able to provide GPS coordinates of the cable location at the completion of the maintenance work. See Section V of the Appendices for correspondence on this subject<sup>32</sup>.

**DTON Removal Items**

Three DTONs were located during a prior survey with the R/V AHI in 2003. During April 11<sup>th</sup> to 18<sup>th</sup> two of the DTONs were reduced to a 39 foot depth by divers using jackhammers and the third was pulled out of the channel using a tug. See the Saipan Channel DTON Removal Report April 2007.pdf located in Appendix 1. Examination of the SWMB data confirms that the DTONs were removed.

**E. APPROVAL**

As team leader, field operations for hydrographic survey H11674 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2007 edition), Field Procedures Manual (March 2007 edition), and all HSD Technical Directives issued through March 2007. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
AHI_HSRR_Memorandum	April 23, 2007	N/CS34
M-T901-AHI-07 Data Acquisition and Processing Report	June 14, 2007	N/CS34

Approved and Forwarded:

\_\_\_\_\_  
Corey Allen, Physical Scientist, NOAA

In addition, the following individuals were also responsible for overseeing data acquisition and processing of this survey:

\_\_\_\_\_  
Kurt Brown  
Physical Scientist, NOAA

\_\_\_\_\_  
Erin Campbell  
Physical Scientist, NOAA

- 
- <sup>1</sup> Concur.
  - <sup>2</sup> Filed with project records.
  - <sup>3</sup> This is a data acquisition software issue that has no affect on data quality.
  - <sup>4</sup> This is a data acquisition software issue that has no affect on data quality.
  - <sup>5</sup> Concur, 200% SSS coverage in the absence of small SWMB holidays is acceptable for object detection.
  - <sup>6</sup> Filed with hydro records.
  - <sup>7</sup> Not all designated soundings were selected for charting, However all designated soundings are included in the survey scale density sounding set.
  - <sup>8</sup> Filed with hydro records.
  - <sup>9</sup> Stand alone system that doesn't require shore stations. Refer to DAPR filed with project records.
  - <sup>10</sup> Filed with hydro records.
  - <sup>11</sup> Attached to this report.
  - <sup>12</sup> Concur.
  - <sup>13</sup> Chart sounding as shown in the HCell.
  - <sup>14</sup> Chart obstruction as shown in the HCell
  - <sup>15</sup> Chart sounding as shown in the HCell.
  - <sup>16</sup> Chart obstruction as shown in the HCell.
  - <sup>17</sup> Charted obstruction as shown in the HCell.
  - <sup>18</sup> Chart a 31 ft. sounding as shown in the HCell.
  - <sup>19</sup> Chart the soundings as shown in the HCell
  - <sup>20</sup> Concur with clarification. A charted 8 ft. sounding at 15/14/43.3N, 145/44/11.0E was disproved by 100% multibeam coverage. Chart the area as shown in the HCell.
  - <sup>21</sup> One additional 33 foot sounding within the channel was discovered and selected for charting at 15-13-43.283N, 145-42-02.170E.
  - <sup>22</sup> Concur.
  - <sup>23</sup> After discussion among NOAA, Navy, and the USACOE, it has been agreed that the channel will have a controlling depth of 34 feet. However four 33 foot soundings will be charted inside the channel.
  - <sup>24</sup> Concur. Chart the area as shown in the HCell
  - <sup>25</sup> Concur.
  - <sup>26</sup> Concur.
  - <sup>27</sup> Concur.
  - <sup>28</sup> Attached to this report.
  - <sup>29</sup> Survey extents disprove charted shoreline in the vicinity of Pier C. Refer to section 6 of the HCell supplemental report.
  - <sup>30</sup> Examination of DTONs submitted from W00113 was performed by the compiler. No DTONs from W00113 fall within the boundaries of H11674 .
  - <sup>31</sup> Five SBDAREs were digitized from the BASE surface depicting the coral on the bottom.
  - <sup>32</sup> Attached to this report.

# H11674 DTON Report

**Registry Number:** H11674  
**State:**  
**Locality:** North Pacific Ocean  
**Sub-locality:** Saipan Harbor  
**Project Number:** M-T901-AHI-07  
**Survey Dates:** May 19, 2007 - May 24, 2007

## Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
1.1	2384/100	Shoal	6.66 m	015° 13' 47.747" N	145° 44' 09.018" E
1.2	3534/6	Shoal	7.64 m	015° 13' 55.034" N	145° 44' 04.309" E

**1.1) Profile/Beam - 2384/100 from h11674 / ahi\_f2505\_reson8101\_07 /  
2007-140 / ahmba07140\_d11**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 015° 13' 47.747" N, 145° 44' 09.018" E  
**Least Depth:** 6.66 m  
**Timestamp:** 2007-140.02:12:19.641 (05/20/2007)  
**Survey Line:** h11674 / ahi\_f2505\_reson8101\_07 / 2007-140 / ahmba07140\_d11  
**Profile/Beam:** 2384/100  
**Charts Affected:** [no CHAPP data available]

**Remarks:**

22 ft. sounding over a charted 28 ft. sounding 100 meters outside NE edge of turning basin.

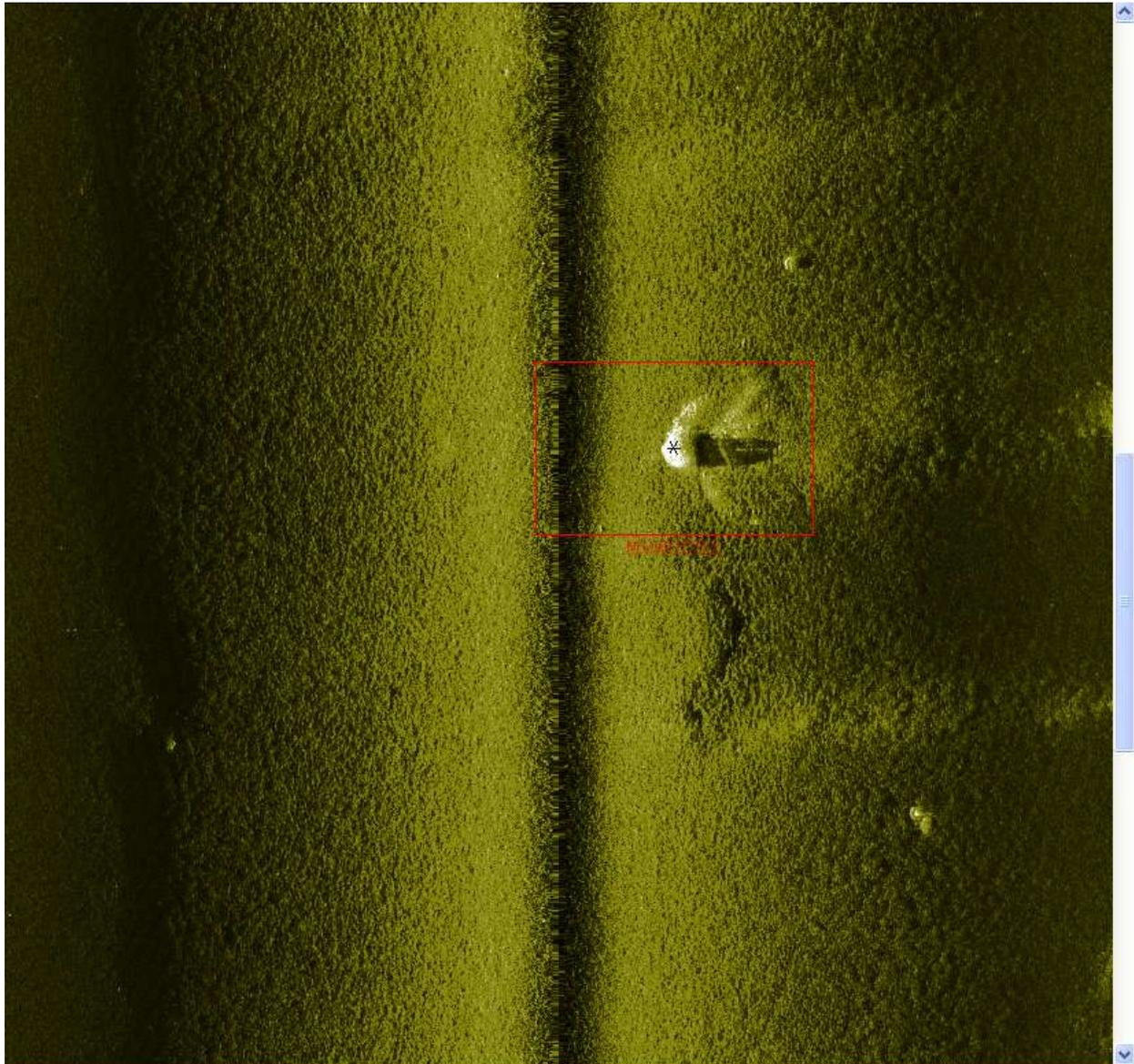
**Hydrographer Recommendations**

Chart 22 ft. sounding.

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 5/24/2007  
SORIND - US,US,Graph,H11674  
TECSOU - 3:found by multi-beam  
VERDAT - 12:Mean lower low water

## Feature Images



*Figure 1.1.1*



## 1.2) Profile/Beam - 3534/6 from h11674 / ahi\_f2505\_reson8101\_07 / 2007-140 / ahmba07140\_d13

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 015° 13' 55.034" N, 145° 44' 04.309" E  
**Least Depth:** 7.64 m  
**Timestamp:** 2007-140.02:28:55.485 (05/20/2007)  
**Survey Line:** h11674 / ahi\_f2505\_reson8101\_07 / 2007-140 / ahmba07140\_d13  
**Profile/Beam:** 3534/6  
**Charts Affected:** [no CHAPP data available]

#### Remarks:

25 Ft. sounding in center of Anchorage N-14, north of the turning basin.

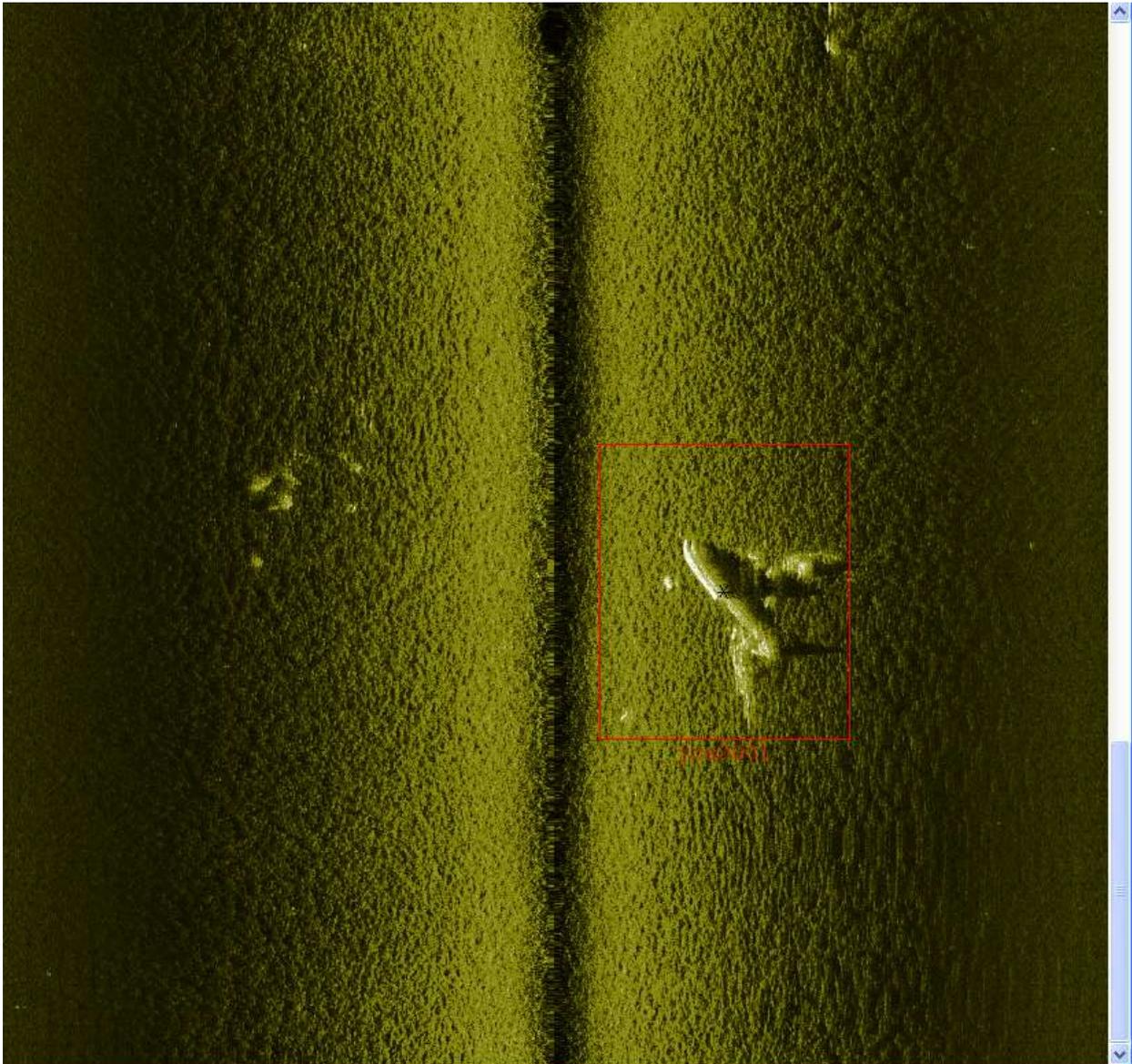
#### Hydrographer Recommendations

Chart 25 ft. sounding.

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 5/24/2007  
SORIND - US,US,Graph,H11674  
TECSOU - 3:found by multi-beam  
VERDAT - 12:Mean lower low water

## Feature Images



*Figure 1.2.1*

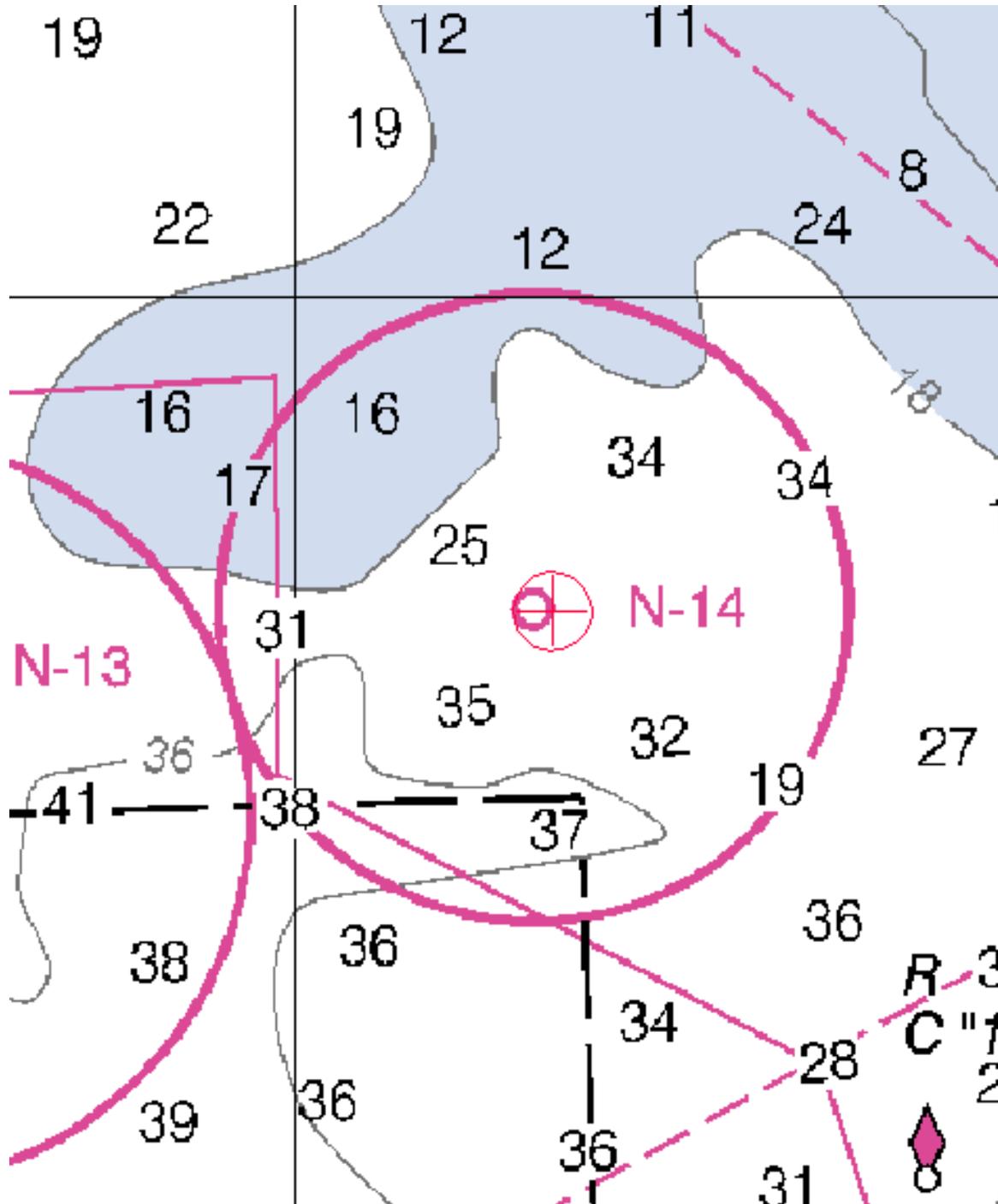


Figure 1.2.2

# H11674 DTON Report

**Registry Number:** H11674  
**State:**  
**Locality:** North Pacific Ocean  
**Sub-locality:** Saipan Harbor  
**Project Number:** M-T901-AHI-07  
**Survey Dates:** May 19, 2007 - May 24, 2007

26 Ft. sounding on obstruction in anchorage N-13, north of Saipan turning basin.

## Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
1.1	1045/2	Obstruction	7.94 m	015° 13' 53.616" N	145° 43' 55.626" E

**1.1) Profile/Beam - 1045/2 from h11674 / ahi\_f2505\_reson8101\_07 / 2007-141 / ahmba07141\_d15****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 015° 13' 53.616" N, 145° 43' 55.626" E  
**Least Depth:** 7.94 m  
**Timestamp:** 2007-141.05:34:52.346 (05/21/2007)  
**Survey Line:** h11674 / ahi\_f2505\_reson8101\_07 / 2007-141 / ahmba07141\_d15  
**Profile/Beam:** 1045/2  
**Charts Affected:** [no CHAPP data available]

**Remarks:**

Designated Sounding on narrow contact. Contact appears to be on slope and leaning over the mound.

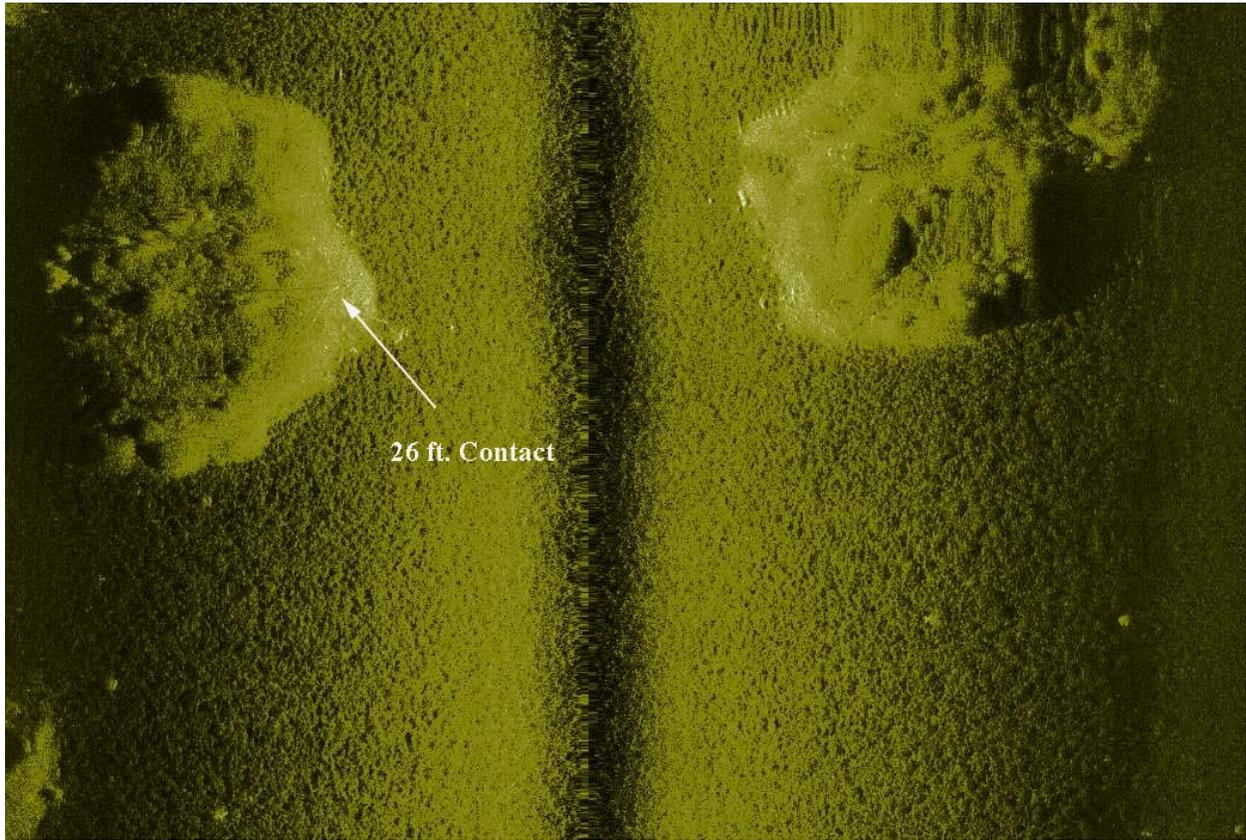
**Hydrographer Recommendations**

Chart 26 Ft. obstruction at position of designated sounding.

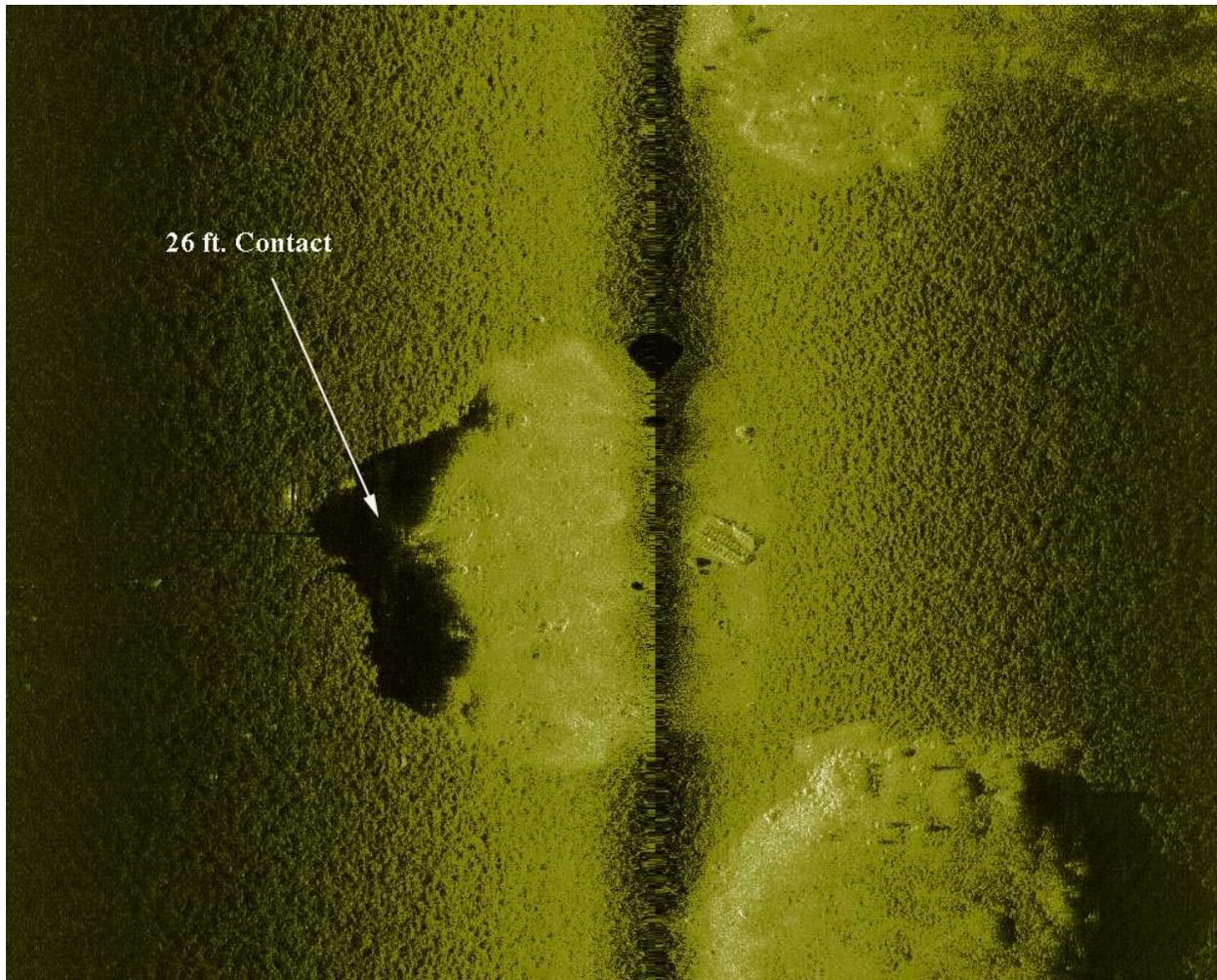
**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** SORDAT - 20070524  
SORIND - US,US,Graph,H11674  
TECSOU - 2:found by side scan sonar  
VALSOU - 7.944 m  
WATLEV - 3:always under water/submerged

## Feature Images



*Figure 1.1.1*



*Figure 1.1.2*

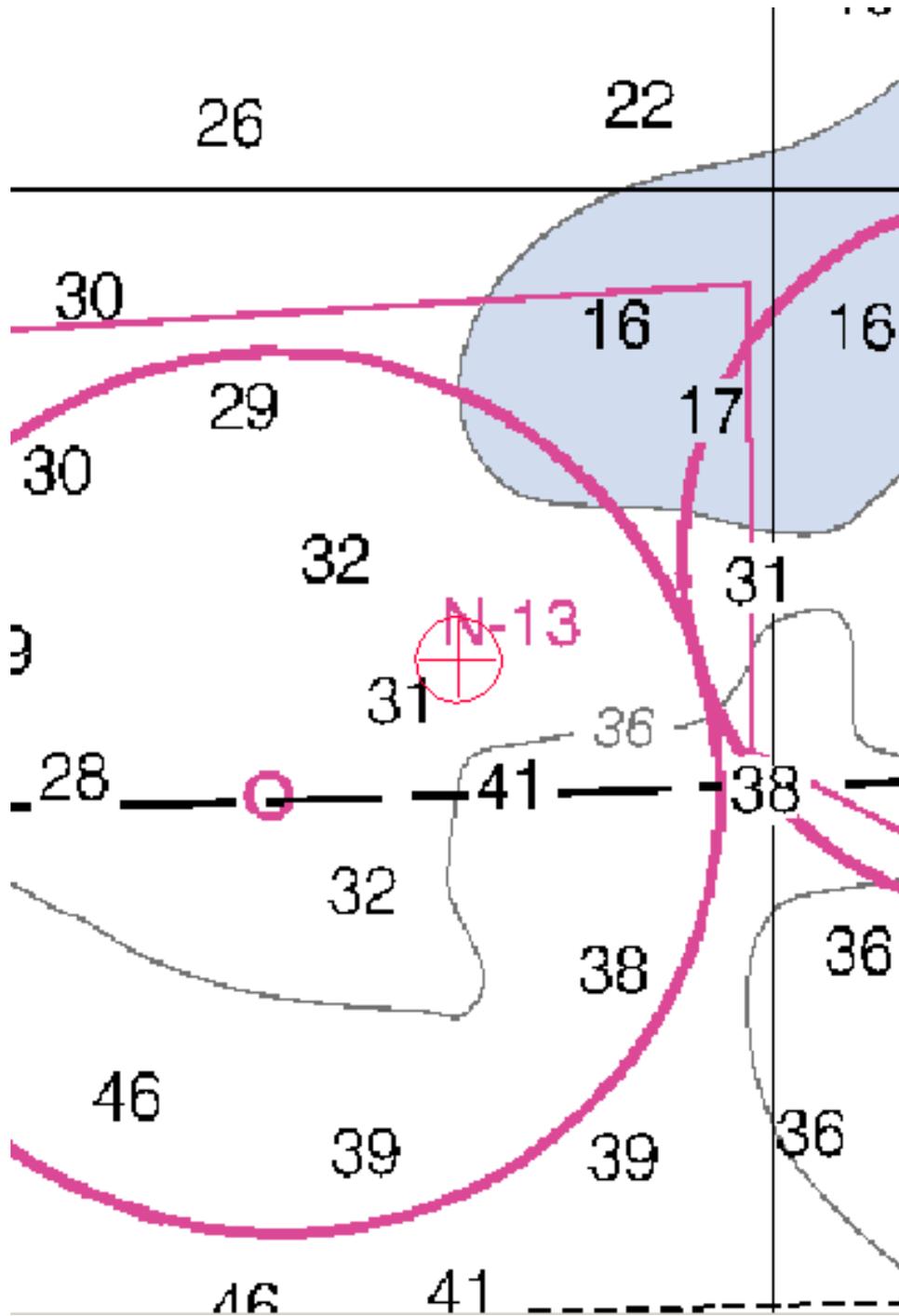


Figure 1.1.3

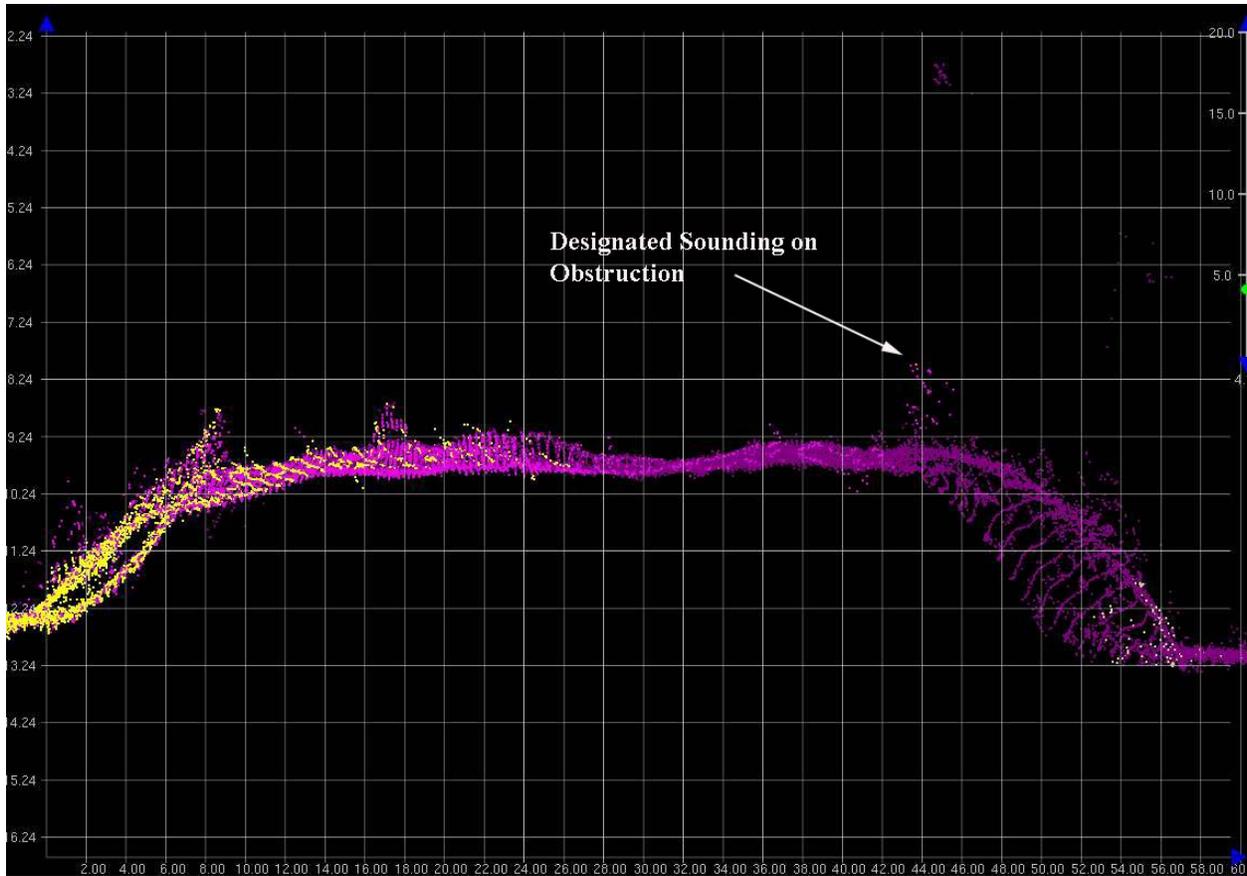


Figure 1.1.4



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
National Ocean Service  
Silver Spring, Maryland 20910

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** June 18, 2007

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** M-T901-AHI-2007  
**HYDROGRAPHIC SHEET:** H11674

**LOCALITY:** Saipan Harbor, North Pacific Ocean,  
Commonwealth of the Northern Mariana Islands  
**TIME PERIOD:** May 19 - May 24, 2007

**TIDE STATION USED:** 163-0000 Guam-Aprra Harbor  
Lat. 13° 26.6'N Long. 144° 39.4' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 0.678 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project M-T901-AHI-2007 during the time period between May 19 to May 24, 2007.

Please use the zoning file "T901AHICORP" submitted with the project instructions for M-T901-AHI-2007. Zone MAR309 is the applicable zone for H11674.

**Refer to attachments for zoning information.**

**Note 1:** Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

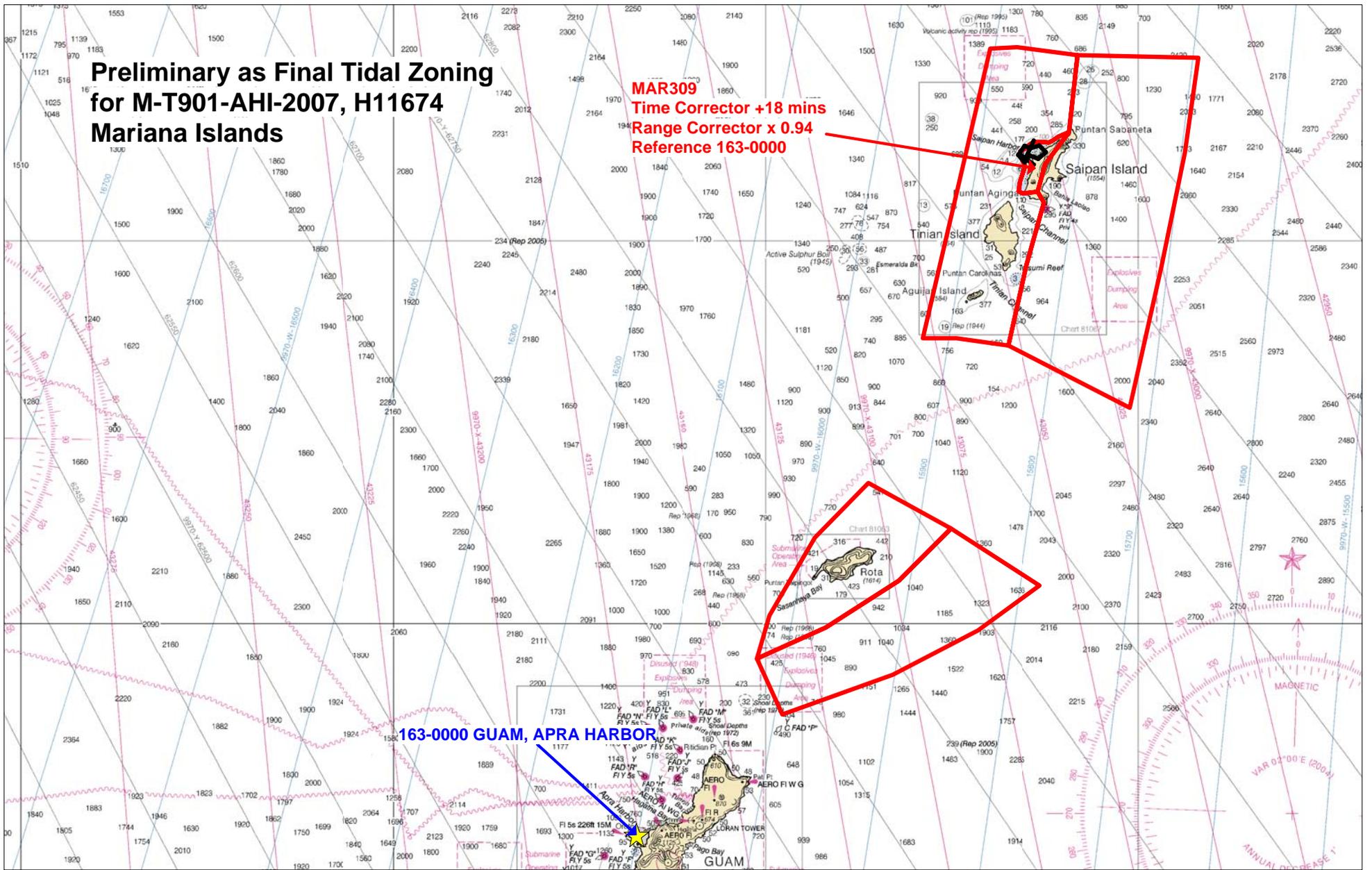
  
\_\_\_\_\_  
CHIEF, PRODUCT AND SERVICES DIVISION



**Preliminary as Final Tidal Zoning  
for M-T901-AHI-2007, H11674  
Mariana Islands**

**MAR309**  
**Time Corrector +18 mins**  
**Range Corrector x 0.94**  
**Reference 163-0000**

**163-0000 GUAM, APRA HARBOR**



**ORIGINAL**



V.S. / P. DC

Date: 23 April 2007  
To: Commonwealth Ports Authority (CPA)  
Attn: Port Manager, Lee Cabrera  
Fr: Dick Riddle, Operation Chief  
Ref: Trip Report for Removal of Danger to Navigation (DTON) Boulders in Saipan Channel

1. The following is a report of the remedial plan for three DTON's in the Saipan channel during the period 11<sup>th</sup> to 18<sup>th</sup> April, 2007. The remedial team consisted of Dick Riddle (Operations Chief), Dan Horvath (Master Diver), Chris Echeverry, Patrick Senecal and Christopher Hebison. Support craft utilized was the Motor Vessel came from SAICREW Inc., boats namely MICRONESIAN, and the Tugboat TAGA.
2. During this period two (2) DTON's were reduced to a 39 foot depth measured at low tide and one DTON was relocated from the channel.
3. The team was initially requested by Saipan Crewboats to remove or reduce four DTON's but the fourth was cancelled by Mr. Lee Cabrera of the Commonwealth Ports Authority on 18<sup>th</sup> April, 2007. The DTON's affected on the contract were numbers 20, 32, 76 and an un-identified high spot adjacent to Charlie wharf of 31.6 feet. All spots were referenced to NOAA National Marine Fisheries Service Research vessel AHI dated September 3<sup>rd</sup> to September 6<sup>th</sup>. 2003. Global Positioning System (GPS) coordinates were available for DTON's 20, 32, 76, but not for the 31.6 high spot near Charlie Pier.
4. Preparation work commenced on Wednesday 11 April with the loading of the MICRONESIAN and the acquisition of special equipment and tools. Word was received from Mr. Manibusan late on 11 April 2007 that the Emergency Maintenance Dredging contract was approved by CPA and work can start immediately.
5. Thursday, 12<sup>th</sup> and Friday, 13<sup>th</sup> April 2007 - Located DTON #20 using GPS coordinates and confirming by the presence of wire rope wrapped around the DTON from previous attempts to remove it. Commence reducing DTON #20 by about 1 foot using air compressor with the pneumatic jack hammers.
6. Saturday, 14 April - Completed DTON #20 demolition after accomplishing 39 feet draft at low tide. Shifted to DTON #32 (GPS location and old wire) at 1500 and commenced work.
7. Sunday, 15 April - Returned to DTON #32 and commenced demolition. Reduced the DTON to 39 feet at low tide.
8. Monday, 16 April - Met with Mr. Cabrera at 0730 and discussed progress to date. He was pleased with the results. Underway later in the morning to DTON #76. This was not the typical DTON observed in the channel but appeared to be a solitary boulder that had drifted into the channel.



9. Tried hammering and chiseling on the rock with no effect. Returned to port to re-group and determine a way ahead. Proposed to Mr. John Manibusan that we use chain and the tug Taga to "pull" the DTON out of the channel. Mr. Manibusan requested permission from CPA for boulder and obtained Mr. Cabrera's consent. Prepared rigging and towing gear with Saipan Crewboat personnel and delivered to the MICRONESIAN and TAGA for staging.

10. Tuesday 17 April - Underway early on MICRONESIAN. Located #76 and divers wrapped with two chains. Divers secured the tow chain from Tug TAGA to the DTON and TAGA pulled #76 out of the channel and about 50 yards beyond navigational buoy #3. This was witnessed by both the Saipan police and 3 members of the Fish and Game commission. DTON #76 new coordinates is:

Lat. 15 13.028'N

Long. 145 42.128'E

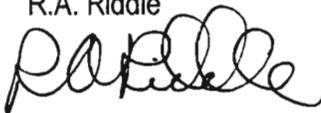
Positioned roughly about 200 ft. south of lighted green buoy #3.

11. At 1300 returned to Charlie wharf in search of the 31.6 spot. Water was very murky and divers did not have enough scuba air to search for this spot. Tried locating the spot with the depth sounder of the MICRONESIAN but this proved futile. Developed a plan to lay out a grid with blocks and line that the divers would swim the next day after we acquired sufficient scuba equipment to conduct the search. Noted that the Saipan police were swimming the 31.6 area, ostensibly to locate the mound.

12. Wednesday, 18 April - Received word from Mr. Manibusan that CPA was canceling dive ops. Secured operations and commenced restoration of systems and turn in of leased equipment.

13. This was a good operation with two DTON's (20 & 32) reduced to hard rock at a depth of 39 feet at low tide, and #76 completely removed from the channel to an area roughly around the 32 foot mark near navigational buoy #3. All depths were verified by multiple diver depth consoles and wrist depth computers. Fish and Game members quite frequently visited all of the work areas and did not note or report any concerns neither to any member of the remedial team nor to a crew member of the MICRONESIAN. I strongly feel the 31.6 mark is a problem and recommend it be located and removed or reduced to allow deeper draft ships to safely moor at Charlie wharf.

R.A. Riddle



Submerged Communications Cable.txt

Subject:  
Re: Submerged Communications Cable  
From:  
"Gerry. Wheaton" <Gerry.Wheaton@noaa.gov>  
Date:  
Mon, 21 May 2007 10:00:18 -0700  
To:  
Lee Cabrera <cpa.portmanager@pti.com.com>  
CC:  
Caleb.Gostnell@noaa.gov, Corey.Allen@noaa.gov, cpa.jrsablan@pti.com.com,  
cpa.seaport@pti.com.com,  
cpa.sctorres@pti.com.com, Kurt.Brown@noaa.gov, Erin.Campbell@noaa.gov,  
Michael.Riddell@noaa.gov,  
Doug.Baird@noaa.gov, Lyn.Preston@noaa.gov

Good Morning Lee,

I will take this item for action. Will contact and remind you of this issue at a later date. It appears that you have a great deal on your plate with AHI in the area. Looks like the survey is going well from all of the emails.

Regards to you and your family.  
Gerry

Lee Cabrera wrote:

> > To all,  
> >  
> > Kindly request to defer this item until such time that the cable maintenance  
> > work has been completed.  
> >  
> > FYI, the NTT WE vessel is ETA Saipan 10 June and estimated completion of  
> > work is end of July.  
> >  
> > Thanks,  
> >  
> > Lee  
> >  
> > -----Original Message-----  
> > From: cpa.portmanager@pti.com.com [mailto:cpa.portmanager@pti.com.com]  
> > Sent: Saturday, May 19, 2007 6:49 AM  
> > To: Caleb.Gostnell@noaa.gov; cpa.portmanager@pti.com.com  
> > Cc: Corey.Allen@noaa.gov; Gerry.Wheaton@noaa.gov; cpa.jrsablan@pti.com.com;  
> > cpa.seaport@pti.com.com; cpa.sctorres@pti.com.com; Kurt.Brown@noaa.gov;  
> > Erin.Campbell@noaa.gov; Michael.Riddell@noaa.gov; Doug.Baird@noaa.gov;  
> > Lyn.Preston@noaa.gov  
> > Subject: Re: Submerged Communications Cable  
> >  
> > Caleb,  
> >  
> > Noted and thanks.  
> >  
> > Will contact PTI locally and request to meet re: this subject. For purposes  
> > of submission, will direct to the email address you provided.  
> >  
> > Lee  
> >  
>> > >----- Original Message -----  
>> > > >From: Caleb.Gostnell@noaa.gov  
>> > > >To: cpa.portmanager@pti.com.com  
>> > > >Subject: Re: Submerged Communications Cable  
>> > > >Date: Fri, 18 May 2007 11:27:02 -0400  
>> > >

Submerged Communications Cable.txt

>>> > >>Lee,  
>>> > >>  
>>> > >>NOAA would definitely like the cable route information so that it  
>> > >can  
>>> > >>be added to the chart. As I understand it this simply requires the  
>>> > >>submission of a standard Route Position List (RPL). It would  
>> > >probably  
>>> > >>be simplest to provide the RPL directly to Lyn Preston in our Marine  
>> > >  
>>> > >>Charting Division (Lyn.Preston@noaa.gov) and she can forward it to  
>> > >the  
>>> > >>appropriate person. If there is uncertainty as to what the RPL  
>> > >should  
>>> > >>contain Gerry should be able to obtain the details for you. I will  
>> > >be  
>>> > >>out of the office for the next few weeks without access to e-mail  
>> > >but  
>>> > >>Corey will be able to obtain answers to any other questions that  
>> > >come  
>>> > >>up. Hope all is well there.  
>>> > >>  
>>> > >>Best Regards,  
>>> > >>  
>>> > >>Cal eb  
>>> > >>  
>>> > >>  
>>> > >>  
>>> > >>  
>>> > >>----- Original Message -----  
>>> > >>From: cpa.portmanager@pti.com.com  
>>> > >>Date: Thursday, May 17, 2007 4:21 pm  
>>> > >>Subject: Submerged Communications Cable  
>>> > >>  
>>>> > >>> Gerry and Corey,  
>>>> > >>>  
>>>> > >>> We were visited by NTT Engineering (Japanese Telecom Company) re:  
>>>> > >>> their upcoming project in the CNMI.  
>>>> > >>>  
>>>> > >>> NTT has recently been contracted by PTI (local telecom firm and  
>>>> > >>> formerly Verizon) for the maintenance of the submerged cables  
>>>> > >>> connecting Saipan, Tinian and Rota. It reviewing the existing  
>>>> > >>> nautical charts, they noted that the cable is not shown on the  
>>>> > >>> charts and inquired if  
>> > >such  
>>>> > >>> should be included. I advised that we will inform NOAA about it.  
>> > >  
>>>> > >>>  
>>>> > >>> FYI, their Cable Ship VEGA will be arriving the CNMI on 10 June  
>> > >for  
>>>> > >>> several weeks of maintenance work. Also, I recall that they have  
>> > >the  
>>>> > >>> GPS coordinates for the entire cable lines.  
>>>> > >>>  
>>>> > >>> Would appreciate your advise if such item is required by NOAA to  
>> > >be  
>>>> > >>> on the charts and if so, what you would need from either NTT  
>> > >and/or  
>>>> > >>> PTI.  
>>>> > >>>  
>>>> > >>> Thanks,  
>>>> > >>>  
>>>> > >>> Lee  
>>>> > >>>

Submerged Communications Cable.txt

>>>> > >>>

>>> > >>

> >

> > --

> > I am using the free version of SPAMfighter for private users.

> > It has removed 765 spam emails to date.

> > Paying users do not have this message in their emails.

> > Get the free SPAMfighter here: <http://www.spamfighter.com/en>

# H11674 HCell Supplemental Report

Peter Holmberg, Physical Scientist

Pacific Hydrographic Branch

## Introduction

The primary purpose of the HCell is to directly update NOAA ENC's with new survey information in International Hydrographic Organization (IHO) format S-57. HCell compilation of survey H11674 utilized Office of Coast Survey HCell Specifications Version 2.0, April 2, 2007. HCell H11674 will be used to update charts 81076, 1:12,000 (10th Ed.; August, 2003, NM 6/23/2007), and 81067 1:75,000 (7<sup>th</sup> Ed.; December, 2004, NM 6/23/07). There is no ENC for this area.

## 1. Compilation Scale

The density of soundings in the HCell are compiled as appropriate to emulate those soundings of Chart 81076, 1:12,000. Position and density of non-bathymetric features included in the HCell have not been generalized from the scale of the hydrographic survey, 1:5,000.

## 2. Soundings

### 2.1 Source Data

A 0.5 m resolution Combined BASE surface, **H11674\_0p5m\_0to20m\_Final\_Office**, was used as the basis for HCell production following Branch certification. This surface contained 158 designated soundings, three of which were submitted as DtoNs.

A survey-scale sounding (SOUNDG) feature object source layer was built from the **H11674\_0p5m\_0to20m\_Final\_Office** surface in CARIS BASE Editor. A shoal-biased selection was made at 1:5,000 survey scale using a radius table with values shown in **Table 1**.

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	3
10	20	4

**Table 1**

## **2.2 Sounding Feature Objects**

In CARIS BASE Editor soundings were manually selected from the high density sounding layer, **H11674\_soundings\_SS**, and imported into a new layer created to accommodate chart density depths, **H11674\_soundings\_CS**. Manual selection was used in lieu of an automated routine to accomplish a density and distribution that more closely represents the seafloor morphology. The hand selection also more closely emulates density and distribution of soundings on chart 81076 than is possible using automated methods. See section 10.1, Data Processing Notes, for details about the use of manual sounding selection for H11674. The sounding feature object source layer was exported as **H11674\_soundings\_CS**, and imported into HOM.

## **3. Depth Areas**

### **3.1 Source Data**

The BASE surface **H11674\_0p5m\_0to20m\_Final\_Office** was used to generate both an all encompassing depth area, and, for survey evaluation and verification purposes only, a set of chart equivalent contours. No actual depth contours were delivered per OCS HCell Specifications ver.2.0.

### **3.2 Depth Area Feature Objects**

One all-encompassing depth range, 0 meters to 20 meters, was used for all depth area objects. Upon conversion to NOAA charting units, this depth range is 0 feet to 65.6 feet.

## **4. Meta Areas**

The following Meta object areas are included in HCell 11674:

M\_QUAL  
M\_COVR  
M\_NSYS

Meta area objects were constructed on the basis of perimeter lines delineating the hydrographic limits. These perimeters were first used to create the Skin of The Earth (SOTE) layer, then were duplicated to the Meta object layers and attributed per the HCell Specifications, ver. 2.0.

## 5. Survey Features

No bottom samples were collected with the survey, however the high resolution of the BASE surface made it clear where coral is abundant. Using the BASE surface five points were digitized to represent areas of coral.

The three DTONs discussed in section D.1 of the descriptive report were charted as obstructions.

A 250m long underwater pipe or cable extending from 15-13-29.72N, 145-43-51.47E to 15-13-34.24N, 145-43-45.71E was identified in the survey data (figure 1). The pipeline or cable appears to rise approximately 1-2 meters above the surveyed sea floor. There is an e-mail chain in project records alluding to planned maintenance on submerged communication cables connecting Saipan, Tinian and Rota. It is unclear if the cable visible in the data is included in the communication network or of an alternate origin, such as a sewer outfall. According to the e-mail communications, the company responsible for cable maintenance will submit the GPS coordinates for the entire cable lines directly to the Marine Charting Division at a later date.

For the time being a digitized line of the feature has been included in blue notes of the survey.

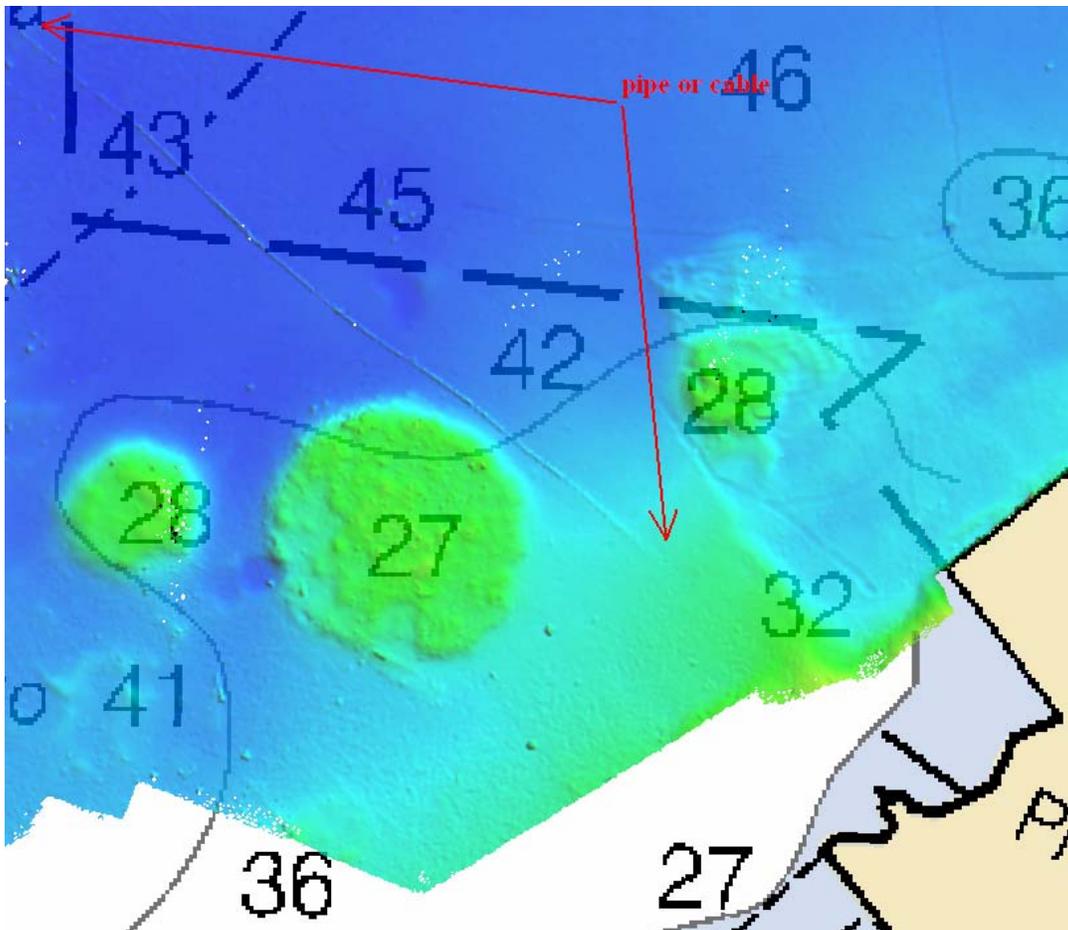


Figure 1. Submerged pipeline or cable

## 6. Shoreline / Tide Delineation

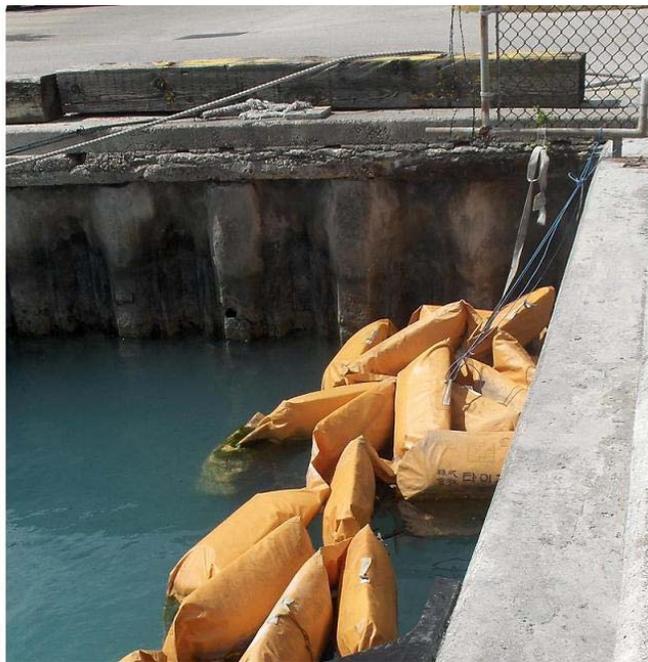
Per section D.2 of the descriptive report no shoreline verification was conducted. All depths were below MLLW. No tide delineation is necessary.

Extents of the slip and the pier charted as Pier C located at 15-13-36.4N, 145-44-12.6E were shown to be inaccurate by the survey coverage (figure 2). The survey coverage extending inland is not data underneath the pier. The wharf is not built on pilings, it is a solid bulkhead made of corrugated steel (figure3).

Since no shoreline data was collected the actual extents of the shoreline are not known.



*Figure 2. Survey extents.*



*Figure 3. Corrugated steel bulkhead.*

## 7. Attribution

All S-57 Feature Objects have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with OCS HCell Specifications, ver. 2.0.

## **8. Layout**

### **8.1 CARIS HOM Layering Scheme**

100	Soundings (chart scale)
101	Soundings (survey scale)
200	Group 1 objects (Skin of the Earth)
300	Point objects (SBDARE)
600-602	Meta layers
700	Channel boundary
800	Blue Notes

### **8.2 Blue Notes**

Notes regarding data sources are in CARIS HOM layer 800 and as Shapefile sets, **H11674bluenotes\_p** and **H11674bluenotes\_l** (with the appropriate extensions) for point and line features, respectively.

## **9. Spatial Framework**

### **9.1 Coordinate System**

All spatial map and base cell file deliverables are in an LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and MLLW (1983-2001 NTDE) sounding datums.

## 9.2 Horizontal and Vertical Units

During creation of sounding sets in CARIS BASE Editor, and creation of the HCell in CARIS HOM, units are maintained as metric with millimeter resolution. NOAA rounding is applied at the same time that conversion to chart units is made to the metric HCell base cell file, at the end of the HCell compilation process.

A CARIS environment variable, `uslXsounding_round`, controls the depth at which rounding occurs. Setting this variable to NOAA feet displays all soundings as whole units.

In an ENC viewer feet display in whole feet. Soundings round to the deeper foot if the decimals of the foot are .75000 or greater.

### HOM Units

Sounding Units:	Meters rounded to the nearest millimeter
Spot Height Units:	Meters rounded to the nearest meter

### Chart Unit Base Cell Units

Depth Units (DUNI):	Feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

## 10. QA/QC

### 10.1 Data Processing Notes

Manual chart scale sounding selections were made for this survey. None of the default sounding suppression options offered in CARIS BASE Editor or HOM yields an acceptable density and distribution of depths, generally bunching soundings nearshore with too sparse coverage seaward. While the customized options are more practical for this type of terrain, an inordinate amount of time must be spent in experimentation with variations on the algebraic terms in order to devise the most suitable formula, and manual adjustments are still required to the resulting sounding set.

## 10.2 ENC Validation Checks

H11674 was subjected to QA and Validation checks in HOM prior to exporting to the HCell base cell (000) file. Full millimeter precision was retained in the export of the metric S-57 base cell data set. This data set was converted to a chart unit 000 file. dKart Inspector 5.0 (Service Pack 1) was then used to further check the data set for conformity using the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and errors investigated and corrected where necessary.

## 11. Products

### 11.1 HSD, MCD and CGTP Deliverables

- H11674 Base Cell File, Chart Units, Soundings compiled to 1:12,000
- H11674 Base Cell File, Chart Units, Soundings compiled to 1:5,000
- H11674 Descriptive Report including end notes compiled during office processing and certification
- H11674 HCell Supplemental Report
- Blue Notes shape files
- BAG (Bathymetry Attributes Grid)
- 000 Features File

### 11.2 File Naming Conventions

HOM file set prefix: *H11674\_HC*

MCD Chart units base cell file: *US511674\_CU.000*

MCD Chart units base cell file, survey scale soundings: *US511674\_SS.000*

BAG (for CGTP): *H11674\_50cm.bag*

Features File (for CGTP): *H11674\_Features.000*

### **11.3 Software**

HIPS 6.1:	Management and inspection of Combined BASE surfaces
BASE Editor 1.0:	Combination of Product Surfaces and initial creation of the S-57 bathymetry-derived features
BASE Editor 2.0:	Creation of BAG deliverable
HOM 3.3:	Assembly of the HCell, S-57 products, QA
GIS 4.4a:	Setting the sounding rounding variable
dKart Inspector 5.0:	Validation of the base cell file

### **12. Contacts**

Inquiries regarding this HCell content or construction should be directed to:

Peter Holmberg, Physical Scientist, PHB, Seattle, WA; 206-526-6843;  
Peter.Holmberg@noaa.gov.

APPROVAL SHEET  
H-11674

Initial Approvals:

The survey evaluation and verification has been conducted according to branch processing procedures and the H-Cell compiled per the latest OCS H-Cell Specifications.

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or disproval of charted data within the survey limits. The survey records and digital data comply with OCS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

I have reviewed the H-Cell, accompanying data, and reports. This survey and accompanying digital data meet or exceed OCS requirements and standards for products in support of nautical charting except where noted in the Descriptive Report.