

H110665

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. .... PHP-10-1-96  
Registry No. .... H-10665

### LOCALITY

State ..... Washington  
General Locality ..... Puget Sound  
Sublocality ..... Shilshole Bay

1996

CHIEF OF PARTY  
LT Richard A. Fletcher, NOAA

### LIBRARY & ARCHIVES

DATE ..... OCT 10 1996

**HYDROGRAPHIC TITLE SHEET**

H-10665

**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.

PHP-10-1-96

State Washington

General locality Puget Sound

Locality Shilshole Bay

Scale 1:10,000 Date of survey Feb. 7 - April 25, 1996

Instructions dated November 1, 1995 \* Project No. OPR-N210-PHP

Vessel Jensen Launch 1101 (EDP 0651), MonArk Launch 1102 (EDP 0652)

Chief of party LT Richard A. Fletcher, NOAA

Surveyed by Pacific Hydrographic Party Personnel

Soundings taken by echo sounder, hand lead, Dives Side Scan Sonar, DSF 6000N, Innerspace 448, EG&G Model 260, MOD III Diver Depth Gauge

Graphic record scaled by PHP Personnel

Graphic record checked by PHP Personnel

Evaluation by: L. Deodato Automated plot by HP Design Jet 650C

Verification by J. Stringham, D. Doles, R. Mayor, L. Deodato

Soundings in ~~fathoms~~ feet at ~~MLW~~ MLLW

REMARKS: All times are UTC, revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.

All depths listed in this report are referenced to mean lower low water unless otherwise noted.

\* Change #1, Change #2, 3/5/96

OCT 10 1996 *SC*

*AWMS/SNEF ✓ by MSH 10/15/96*

*GKM 10/19/96*

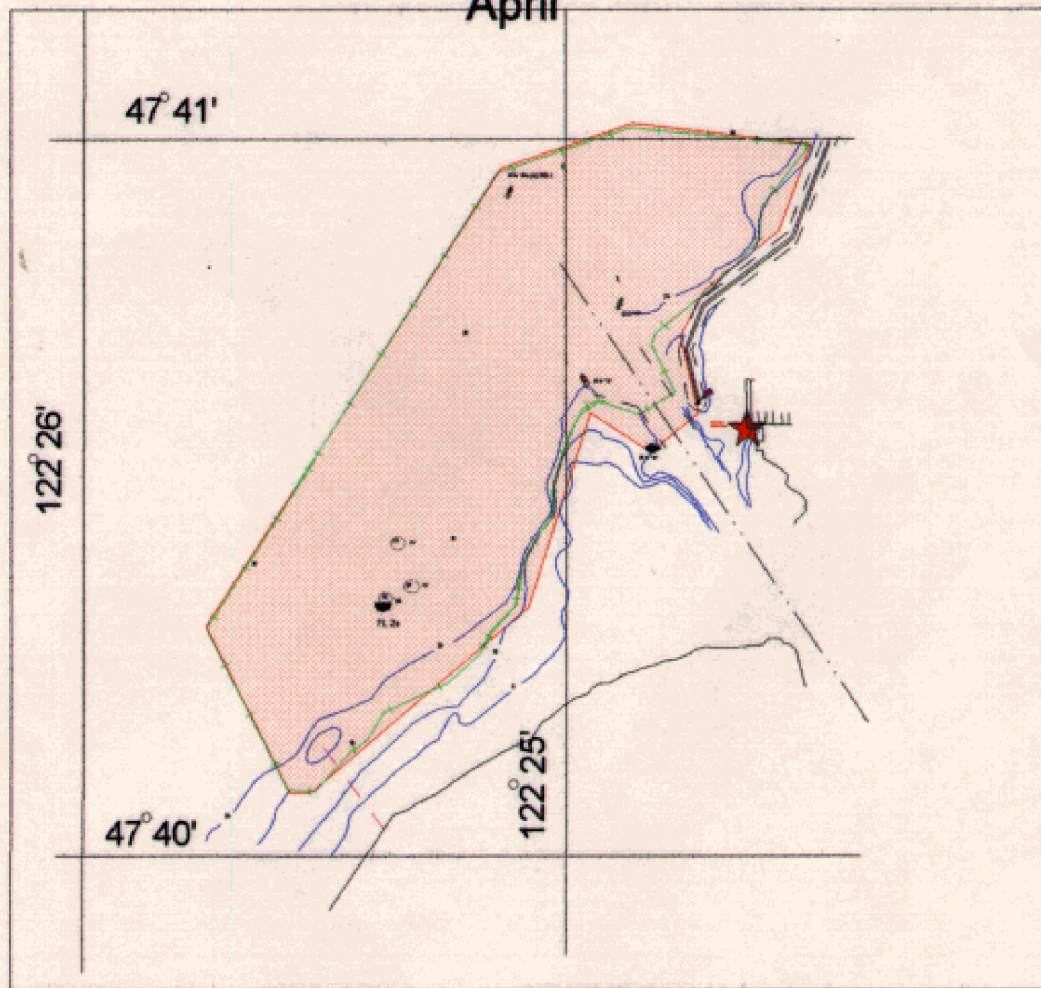


# Pacific Hydrographic Party

LT Rick Fletcher, NOAA  
Chief

OPR-N210-PHP  
PHP-10-1-96  
H-10665

Progress Sketch  
April



Started	Est. Completion	Completed	Submitted
02/07/1996		04/25/1996	5/9/96

Month	Weather	Mechanical	Electronics
Feb	2	0	0

Type	January	February	March	April
LNM Hydro	0.0	17.0	0.0	0.3
LNM SSS	0.0	13.0	0.0	0.0
Sq. NM	0.0	1.0	0.0	0.0
DP	0.0	11.0	0.0	1.0
Dives	0.0	3.0	0.0	1.0
BS	0.0	7.0	0.0	0.0
AWOIS	0.0	4.0	0.0	0.0
Control St	3.0	0.0	0.0	0.0

**Descriptive Report to Accompany Hydrographic Survey H-10665**

Field Number PHP-10-1-96

Scale 1:10,000

Pacific Hydrographic Party

Chief of Party: LT Richard A. Fletcher

**A. PROJECT** ✓

A navigable area survey was accomplished in accordance with project instructions OPR-N210-PHP, Southern Puget Sound, Washington dated November 1, 1995.

This survey (H-10665) responds to requests from the Puget Sound Pilot Association, and the Thirteenth Coast Guard District. This area is considered significant due to the high volume of maritime traffic and the environmental consequences of a grounding. The primary concern is to update the charted hydrography in the vicinity of Shilshole Bay, an open bight from which Lake Washington Ship Canal is entered. The federal project depth for the canal is 30 feet. As an example, during 1993 1,919,000 tons of freight (mineral products, forest products, food and agricultural products, petroleum products, and manufactured goods) moved through the canal. The area assigned by this project is the approach from Puget Sound to the dredged Lake Washington Ship Canal.

This survey's sheet letter is "D". The field sheet number is PHP-10-1-96. This sheet is the first survey for project OPR-N210-PHP.

**B. AREA SURVEYED** ✓ *See Eval Report, Section B*

The area surveyed for H-10665 extends from latitude 47°40'05" N, north to latitude 47°41'15" N, and from longitude 122°24'22"W west to longitude 122°25'50"W. Hydrography for H-10665 are within the limits required by the Hydrographic Manual (Section 1.2.3), and the project instructions. Data acquisition began

February 7, 1996 (DN 038) and continued through to April 25, 1996 (DN 116).

**C. SOUNDING VESSELS** ✓

NOAA VN 1101 (EDP No. 0651), a 29-foot Jensen, and NOAA VN 1102 (EDP No. 0652), a 21-foot SeaArk, were used for all hydrography and velocity casts.

No unusual vessel configurations were used.

**D. AUTOMATED DATA ACQUISITION AND PROCESSING** ✓

Survey data acquisition were accomplished using HYPACK software. Data collected with HYPACK was converted to HDAPS format using conversion programs written by Hydrographic Surveys Division, Systems Support Branch, N/CS3. The HDAPS program was used for post-processing procedures. HDAPS Program names and versions are listed in appendix VI.\*

The following non-HDAPS computer programs were used:

<i>Program Name</i>	<i>Date</i>	<i>Version</i>
VELOCITY	1994	2.21
NADCON	1989	1.01
MONITOR	1994	3.00
GEOID93	1993	1.00
SMLGAUGE	1994	2.20
DAILYDQA	1994	2.20
HYPACK	1995	5.20
HYPNOAA	1995	2.41
SVP	1994	2.30
INVERS3D	1991	1.00

Raw data files were collected and plotted on HDAPS sheet 7 (1:10,000).

There were no nonstandard acquisition or processing methods used.

\* Filed with the survey data.

On DN 039, while conducting Diver Operations on AWOIS #'s 52246 & 52247, a computer malfunction of the data acquisition system resulted in the loss of the detached position's acquired during these procedures. However, because the least depth\*reduction using the diver depth gauge was the same as the hydrographic data, the geographic position's for both of these items were acquired from the hydrographic development data collected on DN 038. During office processing, least depth measurements using the diver depth gauge were compared to the shoalest depth using the DIF GOGON for developments on AWOIS items 52246 and 52247. After application of 2000 ved tides, the shoalest depth on AWOIS 52246 is 1 foot shaller than dive investigation. During hydrographic operations on February 21, 1996 (DN 052), a conversion problem was detected with fix number's 4267 & 4270. These two positions were incorrect and the geographic position's for these data were edited manually to match the correct geographic position in the HYPACK Raw Data. Positions 4267 and 4270 are detached positions for bottom samples. Both positions appear to plot according to the HYPACK Raw Data.

Reference  
AWOIS Investigation  
Form attached to  
this report.

#### E. SONAR EQUIPMENT ✓

Side scan sonar (SSS) operations were conducted using an EG&G model 260 slant-range corrected SSS Recorder and an EG&G 272-T dual-channel (single frequency) towfish. The towfish was operated on the 100 kHz frequency and was configured with a 20° beam depression.

The following sonar equipment was used throughout the survey:

Type	S/N
Towfish	015598
260 Recorder	015602

The SSS towfish was towed with a 55 meter EG&G lightweight towcable. The towfish was deployed from a Superwinch Winch Model W115 from an adjustable davit arm on the starboard quarter of the launch. The length of towcable deployed was determined by measured markings on the towfish cable. The SSS towfish was maintained at a height off the bottom of 8 to 20 percent of the range scale. The measured towpoint is found in the offset tables. Three range scales were used 75-, 100-, and 150-meters. SSS operations were conducted at or less than the maximum speed of five knots while operating with the 75-, or 100-meter range scales and four knots while operating with the 150-meter range

scale.

The inshore limit of SSS collection was the 5-meter curve, the safe navigation with a SSS towfish, or the limit of collecting acceptable sonargrams. The recorder gain setting was set for the best return on the most prevalent bottom material. Contacts or identifiable features, such as a change in bottom texture, or scours, were seen in the outer portion of the usable sonargram and are an indication of proper SSS recorder tuning and were periodically marked as confidence checks. Degraded sonargrams were rejected and rerun, or the acceptable swath width was adjusted. Two 1:10,000 scale swath plots depicting adjusted SSS bottom coverage indicate that 200% coverage was completed.

Side scan sonargrams were manually scanned for significant contacts in accordance with section 7.2.2 of the project instructions and entered into HDAPS contact tables. In areas of numerous contacts only the <sup>Side Scan</sup> highest contacts were entered. PHP entered 70 contacts into 3 contact tables\* in confile 1.

PHP used the sifter and grouper programs to help determine which contacts appeared to be significant and may need further investigation. Because the COE controlling depths within the Shilshole Bay Entrance is 28.2 feet, based on tabulated depths from a 1983 survey by the COE, a threshold depth of 13.0 meters (43.0 feet) and a radius of 33 meters, based on 3.3 mm at the scale of the largest scale chart (18447), were used with the sifter program. A total of 24 significant contacts were developed by echosounder or dive investigation. The corresponding contact development record reports, with charting recommendations, can be found in Separate V\*. Any contacts remaining significant on the sifter printout are discussed on the printout itself and may also be found in Separate V\* of this report.

*\* Filed with the hydrographic data.*



## F. SOUNDING EQUIPMENT ✓

The following sounding equipment was used throughout this survey:

<u>Vessel #</u>	<u>Model</u>	<u>Serial #</u>	<u>Day #'s</u>
1101	DSF-6000N	A121N	038-057
1102	IN-448	263	039-040, 116

Digitized soundings displayed on line were compared in the field with the analog trace to ensure reasonable agreement. No on-line calibration adjustments can be performed on the IN-448 or DSF-6000N.

The DSF-6000N and the IN-448 performed well during the course of this survey.

The hydrographer does not consider occasional breaks in the continuity of the echogram significant unless greater than 6 mm at survey scale (Section 1.4.6, Hydrographic Manual), or if they occurred over a shoaling trend (potential missed peak), in which cases the section or line was resurveyed.

A MOD III Divers Least Depth Gauge (S/N 68335) was used on DN 039, DN 052, and DN 116. The gauge was operated in accordance with section 7.2.2.1 of the Field Procedures Manual.

Metric lead lines were used for depth comparisons with the echosounder. PHP fabricated the lead lines following Hydrographic Survey Guideline (HSG) 69, calibration forms are included in Separate IV\* of this Descriptive Report.

## G. CORRECTIONS TO SOUNDINGS ✓

### Velocity of Sound

Sounding data were collected with an assumed speed of sound through the water of 1500 m/s. Corrections for the speed of sound through the water column were computed from data obtained with an Applied Microsystems Laboratories (AML) Velocity of Sound

\* Filed with the hydrographic data.

Profiler, S/N 3042. Program VELOCITY was used to determine sounding correctors which were applied to all high and low frequency soundings during post-processing procedures.

The following casts were used:

<u>Cast</u>	<u>Extrapolated</u>		<u>DN</u>	<u>HDAPS</u>	<u>Cast Position</u>	
	<u>DN</u>	<u>Depth</u>	<u>Range</u>	<u>Tables</u>	<u>Latitude</u>	<u>Longitude</u>
1	038	96.5	038-051	1	47°41'00"N	122°25'30"W
2	052	35.6	052-057	2	47°40'23"N	122°25'25"W
3	116	24.8	058-116	3	47°40'20"N	122°24'45"W

Separate IV\* contains copies of all velocity cast data and HDAPS Velocity Corrector Tables.

The AML instrument (S/N 3042) was calibrated by Northwest Regional Calibration Center on April 15, 1994 (DN 105). A copy of this calibration report is included in Separate IV\* of this Descriptive Report.

Depths encountered in the survey area ranged from 66.8 meters (fix number 10306) to 0.6 meter (fix number 474) based on preliminary tides. Depths on the smooth sheet are plotted in Feet. After application of approved tides, depths range from 1 to 205 Feet.

Lead line Comparisons ✓

Lead line comparisons were periodically conducted to confirm proper digitization of echosounder depths. These are annotated on the echograms.\*

Static Draft ✓

Static draft for VN 1102 was determined on 4/12/94. First, the depth of the transducer face from a reference mark on the hull was measured. Next, with the launch in the water, fuel tanks half full and two crewmen aboard, the depth from this reference mark to the launch's waterline was measured. Combining the two measurements, a static draft of 0.4 meters was calculated.

A static draft of 0.5 meters was determined for VN 1101 on 3/20/95 (DN 179), using a method similar to the one above.

Supporting data are included in Separate IV.\*

\* Filed with the hydrographic data.

Dynamic Draft ✓

Settlement and squat correctors are applied on line to all survey data. Settlement and squat correctors are reapplied during field processing using the REAPPLY program in HDAPS.

VN 1101 settlement and squat measurements conducted on 3/20/95 were applied using Offset Table 1\*(DN 038-057).

VN 1102 settlement and squat measurements conducted on 1/10/96 were applied using Offset Table 2\*(DN 039-040, DN 116).

Supporting field records are included in Separate IV\* of this Descriptive Report. *Filed with the hydrographic data.*

Tide Correctors ✓

Real tides from the primary station at Seattle, 944-7130, were downloaded from NESDIS. Then the highs and lows were manually entered into HDAPS Tide Table's # 2 & # 4 and then applied to soundings during field processing. One tidal zone was established for this survey. All times for this tidal zone were direct. All heights were corrected by a factor of 0.98 for this tidal zone. Final correctors will be applied from data collected by this station. *Tide Notes dated April 29, 1996 and July 11, 1996 have been attached to this report.*

**H. CONTROL STATIONS** ✓

Horizontal Datum ✓

The horizontal datum for this project is North American Datum of 1983 (NAD 83). A copy of the HDAPS Control Station Table is included in Appendix III\*\* (List of Horizontal Control Stations). A separate Horizontal Control Report OPR-N210-PHP, Southern Puget Sound, Shilshole Bay was submitted to PHS in January of 1996.

One DGPS fixed point performance station was positioned to third order class 1 standards at the SW corner of the southernmost pier within the Shilshole Bay Boat Basin in Ballard.

*\*\* Copy is attached to this report.*

## I. HYDROGRAPHIC POSITION CONTROL ✓

### Position Control ✓

Differential GPS (DGPS) was used for position control throughout this survey. The following beacons were used during hydrographic operations:

<u>Location</u>	<u>Frequency</u>
Robinson Pt., Maury Is., WA	323 kHz ✓

MONITOR results for this station are found in Separate III.\*

An Ashtech Sensor GPS Receiver with a Communications Systems International Inc. (CSI) GPS corrector receiver linked to the acquisition system was used for positioning. DGPS positioning was accomplished in accordance with the FPM, section 3.4. When the beacon signal was lost for more than 30 seconds, the survey line was broken by the HDAPS system and the line was rerun where control had been unacceptable. *Data was analyzed during office processing and found to contain no significant problems.*

The HYPACK system does not record data if the signal is lost. The operator can easily determine the signal integrity by monitoring the echosounder and SSS traces for fix annotations. The operator can also monitor the GPS with an on screen window which displays the HDOP and the number of satellites used.

Survey lines were rerun where control was unacceptable. *Data was analyzed during office processing and found to contain no significant problems.*

The accuracy requirements as stated in section 3.4 of the Field Procedures Manual were met during the course of this survey.

### GPS Performance Checks ✓

DGPS performance checks using the fixed point method were obtained per FPM Section 3.4.4.1, using the site established at the southernmost pier at Shilshole Bay Boat Basin. Performance check forms are included with the data files.

*\* Filed with the hydrographic data.*

Positioning Equipment ✓

The unique numbers for all equipment serial numbers are annotated on the daily echograms\*. Antenna offsets for each vessel are listed in the corresponding offset tables\*. Supporting data is included in Separate III\*.

The following sensors were used throughout the survey:

	<u>Device</u>	<u>Serial Number</u>
Launch 1101	Ashtech Sensor	B1042
	Ashtech Antenna	A0272
	CSI Receiver	x1112 ✓
Launch 1102	Ashtech Sensor	B1043
	Ashtech Antenna	B0402
	CSI Receiver	x1212

**J. SHORELINE** ✓ *See Eval Report, Section J.*

No significant shoreline changes were evident during the course of this survey. A field digitized shoreline, based on NOS Chart 18447, depicting the charted shoreline and some changes to the buoys within the survey limits, are submitted in both Mapinfo format and DXF format.

**K. CROSSLINES** ✓

Crosslines were run in accordance with Section 1.4.2 of the 4th Edition of the Hydrographic Manual. Crosslines totaled 19.7% of the total hydrography. A SSS buffer line conducted on DN 038 was classified as crossline data. Crosslines showed good agreement with the mainscheme hydrography. *Concur*

\* Filed with the hydrographic data.

L. JUNCTIONS ✓

There are no contemporary surveys that junction with H-10665.

M. COMPARISON WITH PRIOR SURVEYS *See Eval Report, Section M.*

A cursory comparison between current hydrographic soundings and those from Prior survey H-5724 soundings were conducted by PHP personnel. Several cultural changes have occurred since the 1936 survey. Most notable of these changes is the Shilshole Bay Marina and breakwater, which are not identified on the prior survey. Therefore, the soundings in and around the immediate area of the breakwater and the marina are not in congruence with the 1936 survey soundings. Current soundings within the offshore end of a sewer outfall at latitude 47°40'11"N, longitude 122°25'25"W do not coincide with the prior soundings shown in and around the outfall area. Refer to AWOIS Item # N4 for a more detailed description of this area. The current hydrographic contours south of the entrance channel are generally in good agreement with the contours found on H-5724. A 39' sounding (Wk) found during the current survey at latitude 47°41'03" N, longitude 122°24'39" W is not present on H-5724. <sup>2.51</sup> The 28' soundings (Wk) of the same wreck, <sup>19.08</sup> found during the current survey centrally located at latitude 47°40'23" N, longitude 122°25'20" W are not present on H-5724. <sup>2.71</sup> These two soundings (Wk) <sup>is</sup> are explained in AWOIS Item # N1 (52146).

A cursory comparison between the current hydrographic soundings and Prior Survey FE-No. 1(64) 1948 was conducted by PHP personnel. A 17' sounding found during the course of the current survey, at latitude 47°40'10.50" N, longitude 122°25'31.00" W does not appear on FE-No. 1(64) 1948. Refer to AWOIS Item # N4 (52149)

## N. ITEM INVESTIGATION REPORTS ✓

The following AWOIS Reports and Item Investigation Report are included in ~~Separate VI~~ <sup>this report</sup>. For additional details see the individual AWOIS reports.

N1	52246 Wreck (barge)
N2	52247 Wreck (barge)
N3	52248 Rock
N4	52249 Sounding (Sewer Outfall)
N5	Wreck "OMAR"
N6	Obstruction (barge-like wreck)

## O. COMPARISON WITH THE CHART *See Eval Report, Section O.*

PHB will conduct a sounding comparison with the chart after smooth tides are applied.

Comparison of sounding data and charted soundings were made throughout the survey in accordance with section 6.11. of the Project Instructions and sections 4.5.15. and 5.3.4. of the Hydrographic Manual.

PHP made a cursory comparison between the current hydrography collected during this survey and Chart 18447, 25th Ed., August 15, 1992. Current hydrography shows indications of inconsistent depth comparisons with the chart within the limits of sheet "D", with the average difference being approximately 5% of the charted depth.

Additionally, soundings within the middle of the COE maintained channel, range from 32'-36'. The charted tabulation, from COE surveys of April, 1983, tabulate a middle half of the channel with a depth of 28.2 feet, the left outside quarter with a depth of 8.0<sup>0</sup> feet, and the right outside quarter with a depth of 6.9<sup>0</sup> feet. Current hydrographic soundings indicate a depth of 37.0 feet in the middle half of the channel, a depth of 24.0 feet along the left outside quarter, and a depth of 23.0 feet along the right outside quarter, as per Chart 18447. See remarks written in Section S. MISCELLANEOUS, of this report. @ channel has shoaled along the left/right edges. Depths of 28 feet and 15.5 feet were available in the inside half of the left/right quarter, respectively based on COE surveys of April, 1983.

A disapproval DP was taken on DN 052 (Fix No. 4281) of the charted COE north mooring buoy (LLN 16780). A DP of an uncharted sea lion pen (NOAA Fisheries) was taken on DN 052 (Fix No. 4279). *Pos # 4279 plots at Lat. 47/40/55.050 Long. 122/24/44.709. Pos 4281, latitude 47/41/08.183W, longitude 122/24/39.836W, was taken to disapprove charted mooring buoy. Delete mooring buoy from chart.*  
~~Danger To Navigation~~

One Danger to Navigation was submitted by PHP. The results of the findings can be found in Appendix I\* and is explained in Item Investigation-N6 found in Separate VI\* of this report.  
*\* Copies attached to this report.*

**P. ADEQUACY OF SURVEY** ✓

This survey is complete and adequate to supersede prior surveys within their common areas. *Concur*

**Q. AIDS TO NAVIGATION** *See Eval Report, Section Q*

All aids to navigation, private aids and landmarks within the limits of H-10665 were positioned as specified in Section 4.2 of the project instructions. Changes found during the course of this survey can be found in Appendix II\* of this report.  
*\* Copies attached to this report.*

**R. STATISTICS** ✓

<u>Description</u>	<u>Quantities</u>
Total Positions	2402
Total Number of Selected Soundings	2599
Total Detached Positions	10
Total Bottom Samples	7
Total Nautical Miles 200% SSS	26.24
Total Nautical Miles Hydrography	31.08
Square Nautical Miles Hydrography	1.0
Velocity Casts	3
Days of Production	9



**S. MISCELLANEOUS ✓**

Bottom samples were obtained but not submitted to the Smithsonian Institution. No differences in charted bottom characteristics were noticed. *Concur*

No unusual magnetic variations, tidal conditions or submarine features were observed during the course of this survey.

Correspondence for Item Investigation #N5 found in Section N of this report was attained through the 13th District of USCG. LT(jg) Kevin Matthews, USCG, gave PHP information concerning this item. Matthews forwarded a report issued to the USCG on 11/12/95 of a 50' wood tugboat "OMAR" that sank while the vessel was moored to the COE south lighted buoy. LT(jg) Matthews can be reached at 206-217-6232, ext. 6290.

It is recommended to contact the COE for updated tabulated channel depths within the confines of the Washington Ship Canal. PHP contacted Dennis Mahr, Survey Chief, USCOE at 206-764-3413. Mr. Mahr confirmed that a more recent survey of the Canal has been completed and that the tabulated depths are yet to be released. Mr. Mahr said that as soon as the results of their survey are finalized they will furnish NOAA with the data. Information can be obtained by contacting Jack Earlandson Chief, Field Operations, Survey Branch, USCOE at 206-764-3535. *Concur*

**T. RECOMMENDATIONS ✓**

None.

U. REFERRAL TO REPORTS ✓

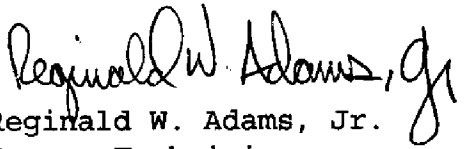
Coast Pilot Report

TBA

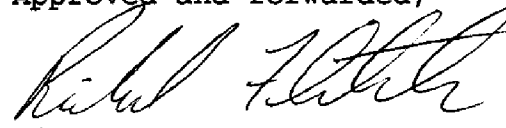
Horizontal Control Report

January, 1996

Submitted for approval,

  
Reginald W. Adams, Jr.  
Survey Technician  
Survey, OIC

Approved and forwarded,

  
Richard A. Fletcher  
Lieutenant, NOAA  
Chief of Party



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Coast and Geodetic Survey  
Seattle, Washington 98115-0070

Pacific Hydrographic Party  
900 47th Avenue  
Olympia, WA 98506  
voice (360) 956-7079  
fax (360) 956-7138

**ADVANCE  
INFORMATION**

April 26, 1996

Commander  
Thirteenth Coast Guard District (OAN)  
Federal Building, Room 3410  
915 Second Avenue  
Seattle, WA 98174-1067

Dear Sir:

The NOAA Pacific Hydrographic Party has discovered a potential danger to navigation while conducting survey operations in Shilshole Bay in Puget Sound. A Danger to Navigation Report is enclosed along with a chartlet showing the affected portion of Chart 18447.

I recommend this Danger to Navigation be included in the next Local Notice to Mariners.

Sincerely,

Lieutenant Richard A. Fletcher, NOAA  
Chief

Enclosures

cc: DMAHTC  
N/CG221  
N/CG245



**REPORT OF DANGER TO NAVIGATION**

**Hydrographic Survey Registry Number:** H-10665

**Survey Title:** South Puget Sound

**State:** WA

**General Locality:** Puget Sound

**Sublocality:** Shilshole Bay

**Project Number:** OPR-N210-PHP

The following item which is a potential danger to navigation was discovered during hydrographic survey operations by the NOAA Pacific Hydrographic Party.

**Object Discovered:** An steel object which measures approximately 20' X 40' and rises 3.3-meters (11-feet/1<sup>3</sup>/<sub>4</sub>-fathom) off of the bottom, located at latitude 47°41'02.313"N, longitude 122°24'34.371"W. Least depth of this feature is 12.1 meters ( 39-feet/6-<sup>1</sup>/<sub>2</sub> fathoms). Sounding corrected to MLLW based on preliminary observed tides.

**Affected nautical charts:**

Chart Number	No.	<i>Edition</i> Date	Horizontal Reported Datum	Depth
18447	25th	August 15, 1992	NAD83	39 feet
18445	26th	June 3, 1995	NAD83	39 feet
18440	21st	August 29, 1992	NAD83	6 <sup>1</sup> / <sub>2</sub> fathoms

**Charting Recommendation:** Chart a 39-foot obstruction at latitude 47°41'02.313"N, longitude 122°24'34.371"W .

Questions concerning this report should be directed to NOAA, Pacific Hydrographic Branch, NCS34, 7600 Sand Point Way NE, Bin C15700, Seattle, WA 98115-0070, telephone number (206) 526-6853.

**ADVANCE INFORMATION**

**Chart 18447**  
**25th Edition**  
**August 15, 1992**  
**Scale: 1:10,000**  
**NAD83**  
**Soundings in Feet**

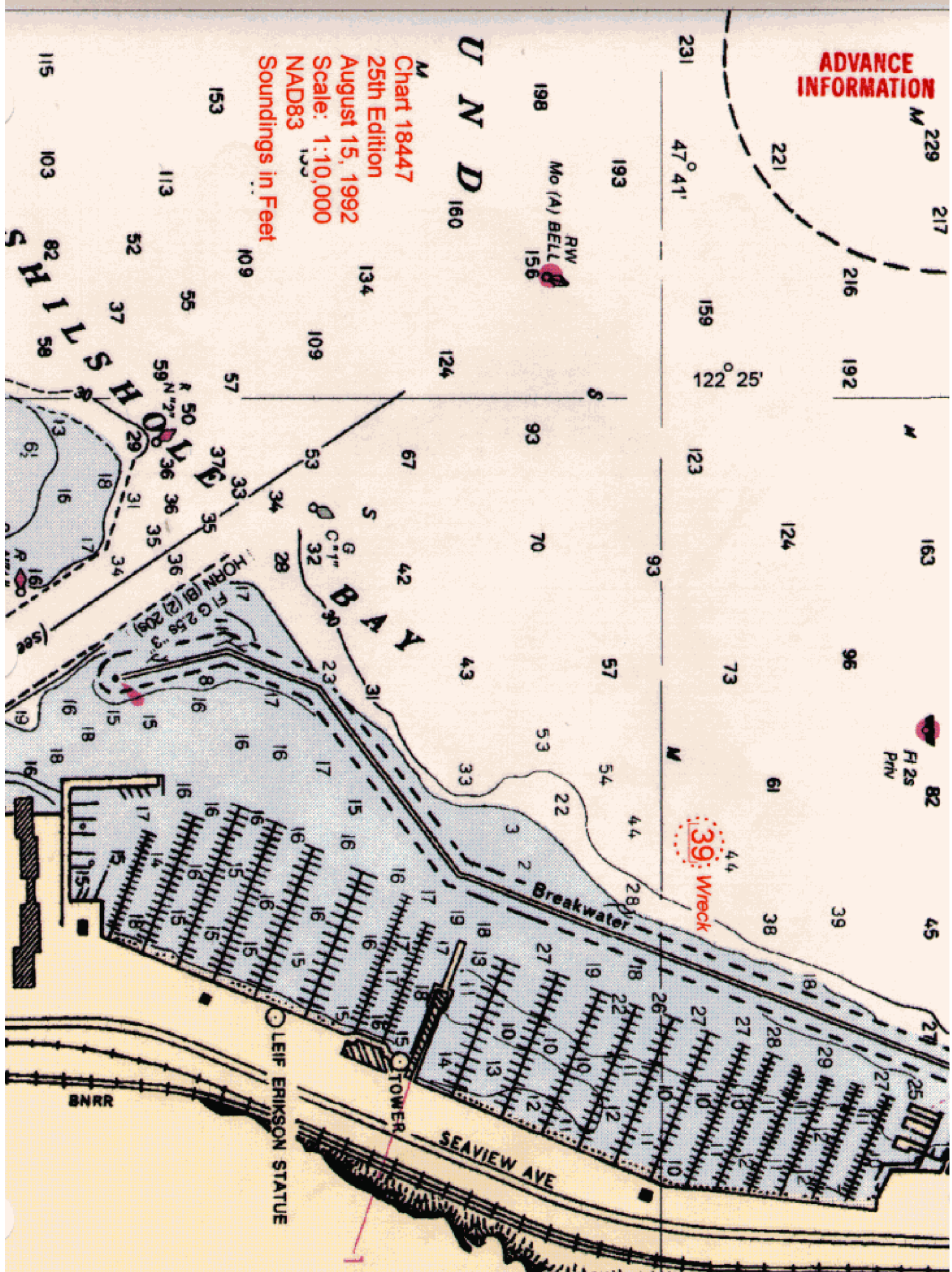
**U N D**  
160

M 229 217  
231 47° 41'  
193 159 122° 25'  
221 216 192  
124 96 123

198 Mo (A) BELL RW 156

82 FI 25 Pnw

39 Wreck





RESPONSIBLE PERSONNEL	
TYPE OF ACTION	NAME
ORIGINATOR	<input type="checkbox"/> PHOTO FIELD PARTY <input checked="" type="checkbox"/> HYDROGRAPHIC PARTY <input type="checkbox"/> GEODETIC PARTY <input type="checkbox"/> OTHER (Specify)
OBJECTS INSPECTED FROM SEAWARD	LT RICHARD A. FLETCHER, NOAA, CHIEF PAKEL HYDROGRAPHIC PARTY
POSITIONS DETERMINED AND/OR VERIFIED	ST REGINAID W. ADAMS, JR, NOAA, SURVEY OIC
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES	<input type="checkbox"/> REVIEWER <input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

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

**OFFICE**

**I. OFFICE IDENTIFIED AND LOCATED OBJECTS**  
Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.  
EXAMPLE: 75E(C)6042  
8-12-75

**FIELD**

**I. NEW POSITION DETERMINED OR VERIFIED**  
Enter the applicable data by symbols as follows:  
P - Photogrammetric  
L - Located  
V - Visually  
1 - Triangulation  
2 - Traverse  
3 - Intersection  
4 - Resection

A. Field positions\* require entry of method of location and date of field work.  
EXAMPLE: F-2-6-L  
8-12-75

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

**FIELD (Cont'd)**

**B. Photogrammetric field positions\*\* require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.**  
EXAMPLE: P-8-V  
8-12-75  
74L(C)2982

**II. TRIANGULATION STATION RECOVERED**  
When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.  
EXAMPLE: Triang. Rec.  
8-12-75

**III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH**  
Enter 'V-Vis.' and date.  
EXAMPLE: V-Vis.  
8-12-75

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

NOAA FORM 76-40  
(8-74)

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

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

Replaces C&GS Form 567.

TO BE CHARTED  
 TO BE REVISED  
 TO BE DELETED

REPORTING UNIT  
If field party, ship or office

PACIFIC HYDROGRAPHIC PARTY WASHINGTON

STATE

WASHINGTON

LOCALITY

PUGET SOUND

DATE

3-15-96

OPR PROJECT NO.

OPR-N210-PHP

JOB NUMBER

PHP-10-1-96

SURVEY NUMBER

H-10665

DATUM

NAD 83

POSITION

LATITUDE

47-40

LONGITUDE

122-24

DESCRIPTION

NOAA SEA LION CAGE

CHARTING NAME

N/A

REASON FOR DELETION

YELLOW LIGHT PRIV MAINTD

REASON FOR DELETION

REASON FOR DELETION

REASON FOR DELETION

REASON FOR DELETION

REASON FOR DELETION

REASON FOR DELETION

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REASON FOR DELETION

- ORIGINATING ACTIVITY
- HYDROGRAPHIC PARTY
  - GEODETIC PARTY
  - PHOTO FIELD PARTY
  - COMPILATION ACTIVITY
  - FINAL REVIEWER
  - QUALITY CONTROL & REVIEW GRP.
  - COAST PILOT BRANCH
- (See reverse for responsible personnel)

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

OFFICE

FIELD

F-L-DGPS  
1996

CHARTS  
AFFECTED

18447



RESPONSIBLE PERSONNEL	
TYPE OF ACTION	NAME
OBJECTS INSPECTED FROM SEAWARD	LT RICHARD A. FLETCHER, NOAA, CHEIE PADELE HYDROGRAPHIC PARTY
POSITIONS DETERMINED AND/OR VERIFIED	ST REGINALD W. ADAMS, JR, ADAA, SURVEY O.I.C.
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES	
<p>INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION' (Consult Photogrammetric Instructions No. 64.)</p>	
<p><b>OFFICE</b></p> <p><b>I. OFFICE IDENTIFIED AND LOCATED OBJECTS</b> Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object. EXAMPLE: 75E(C)6042 8-12-75</p> <p><b>FIELD</b></p> <p><b>I. NEW POSITION DETERMINED OR VERIFIED</b> Enter the applicable data by symbols as follows: F - Field L - Located V - Verified 1 - Triangulation 2 - Traverse 3 - Intersection 4 - Resection</p> <p>A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75</p> <p>*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.</p>	<p><b>FIELD (Cont'd)</b></p> <p>B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object. EXAMPLE: P-8-V 8-12-75 74L(C)2982</p> <p><b>II. TRIANGULATION STATION RECOVERED</b> When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery. EXAMPLE: Triang. Rec. 8-12-75</p> <p><b>III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH</b> Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75</p> <p>**PHOTOGAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.</p>
<p>ORIGINATOR</p> <p><input type="checkbox"/> PHOTO FIELD PARTY</p> <p><input checked="" type="checkbox"/> HYDROGRAPHIC PARTY</p> <p><input type="checkbox"/> GEODETIC PARTY</p> <p><input type="checkbox"/> OTHER (Specify)</p> <p>FIELD ACTIVITY REPRESENTATIVE</p> <p>OFFICE ACTIVITY REPRESENTATIVE</p> <p><input type="checkbox"/> REVIEWER</p> <p><input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE</p>	



AWOIS INVESTIGATION-N1 ✓

ITEM # 52246

DN: 039, Dive OPS ✓  
038-Geo-Pos.

CHART # 18447

VN: 0651

DESCRIPTION: Wreck, 200-FT Barge

SOURCE: CL 468/80--7/25/78 & 1/27/80-2/11/80

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	047°40'22.45"N	122°25'19.47"W	
OBSERVED:	047°40' <sup>23.34</sup> 22.53"N	122°25'19. <sup>08</sup> 10"W	3089+1 3040

*Least depth by hydro. Reference comments below regarding geographic position.*

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Dive OPS for least depth, Echosounder for geodetic position on DN 038.

FINDINGS: Divers located a sunken barge. Least depth (MLLW) = 28.0'. A problem with the data acquisition system resulted in a loss of the geodetic position during dive operations on DN 039. Therefore, the geodetic position <sup>and least depth</sup> was attained from development procedures conducted on DN 038 (3089+1)

\*\*\*\*\*

DIVING INVESTIGATION

See attached report.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: Retain as charted.

*Do not concur Chart correct at surveyed position.*

.....COMPILATION USE ONLY

CHART

APPLIED

DIVE INVESTIGATION REPORT  
PROJECT NUMBER OPR-NZK-PHP  
SURVEY PHP-10-1-96  
FIELD NUMBER H-10665 (D)

DIVE NUMBER 1

DIVE DATE 8 FEB 96

**I. AREA OF INVESTIGATION**

- A. State/Country WA Sub-locally Shilshole
- B. Position: Latitude 47° 46' 22.53" N Longitude 122° 25' 19.10" W
- C. Method of Positioning DGPS

**II. PURPOSE OF INVESTIGATION**

- A. AWOIS item number: AWOIS 52246
- B. Source of item being investigated (if other than AWOIS listing): \_\_\_\_\_
- C. Contacts (e.g., USCG, CoE, Harbor Masters, Owners, etc.) \_\_\_\_\_
- D. Names, Addresses and Phone Numbers etc. of contacts: \_\_\_\_\_

**III. SURVEY PROCEDURES**

- A. Determination of dive site (e.g., wire drag, side scan development): \_\_\_\_\_
- B. Search Procedures (e.g., following a groundwire, circle search, sweep along known features, etc.)  
DROPPED ANCHOR ON SSS POSITION. NO SEARCH WAS NEEDED. ITEM WAS VISIBLE ON DESCENT DIVE
- C. Known reference to features nearby:  
SPACING ON DN 038

**VI. D. Areas and depths covered:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

IV DIVE DATA

- A. Divers: Fletcher Berkowitz
- B. Time of Dive (in UTC) - Real 1957-2021  
Elapsed 24 MIN
- C. General bottom Depth (units and methods of determination):  
Dive Console 65'
- D. Current and conditions: 0.5 KTS VIS 15'
- E. Visibility (number of feet - horizontally and vertically):  
15' Horizontally
- F. Bottom type (mud, sand, rocks, etc.): Broken Shell MJO

V. RESULTS

- A. Detached Positions Number (s): GOOD LOST COMPUTER MALFUNCTION  
Time of D.P.'s (UTC): Describe if other time zone LD 2018  
Least Depth and Fix Numbers (raw depth): \_\_\_\_\_  
Method of determining depth (The raw sounding should be recorded. The reduced least depth should be plotted on the field sheet.)  
MOD 3 DIVER L.D. GAUGE P<sub>in</sub> = 14.35 P<sub>LO</sub> = 29.3023
- B. Description of findings: Barge laying on its SIDE HT OFF BOTTOM 30' LIVING NE-SW (030° M. From Stem to Stern) (Base)
- C. Dimensions of item or feature (attach sketch if appropriate): 30'
- D. Unusual conditions: NONE

VI. CHARTING RECOMMENDATIONS

RETAIN AS CHARTED. Do not concern Chart correct at surveyed position.

- Position Lat. \_\_\_\_\_ Long. \_\_\_\_\_
- Reduced depth 8.9 (29.0') 2.5 METERS (28.0') least depth after application of approved tides is 27 feet (Pos 3009+1)
- Type of feature (Reference Chart No. 1) \_\_\_\_\_

LEAST DEPTH USING SMLGAUGE PROGRAM, VERSION 2.2

NOAA UNIT: PACIFIC FIELD PARTY YEAR 1996  
AWOIS NUMBER: 52246 CONTACT NUMBER:  
DAY-OF-THE-YEAR 039 LATITUDE 47/40/26 N  
START TIME 21:45 LONGITUDE 122/25/21 W

CAST MEASUREMENT INSTRUMENT AML S/N:03042  
LEAST DEPTH DIVER GAUGE, SERIAL NUMBER 68335

DIVER'S PREDIVE GAUGE PRESSURE 14.35 psia  
DIVER'S GAUGE PRESSURE AT DESIGNATED LEAST DEPTH 29.23 psia

COMPUTED PRESSURE AT DESIGNATED LEAST DEPTH 10.28 decibars  
COMPUTED LEAST DEPTH 10.36 meters

Time of LD Measurement (UTC): 2018

LD Measurement (m): 10.3 m

Tide Corrector (m): ~~2.1~~ +.8 +.4 1.8

Corrected Least Depth (m): ~~8.2~~ ~~8.5~~ ~~8.9~~ 8.5 = 27.974 (28)

Comments: DIVERS LOCATED A SUNKEN BARGE. HOWEVER,  
A COMPUTER MALFUNCTION WITH THE DATA ACQUISITION  
SYSTEM CAUSED THE D.P. COLLECTED DURING DIVE OPERATIONS  
TO BE LOST. THEREFORE, DEVELOPMENT HYDROGRAPHY FOR  
THIS ITEM, CONDUCTED ON DN 038, WAS USED FOR THE  
GEODETIC POSITION OF THE BARGE. L.D. (MLLW) = ~~28.0~~ 28.0'  
Least depth after application of approved tides is 27 feet (3009+1)

Recommendation: RETAIN WRECK AS CHARTED. Do not Concur

Chart wreck at surveyed position.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

AWOIS INVESTIGATION-N2 ✓

ITEM # 52247

DN: 039, Dive OPS ✓  
038-Geo-Pos. ✓

CHART # 18447

VN: 0651

DESCRIPTION: Wreck, sunken barge, 22 ft beam, ENE direction.

SOURCE: CL 468/80--7/25/78 & 1/27/80-2/11/80

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	047°40'26.08"N	122°25'21.17"W	
OBSERVED:	047°40'26.12"N	122°25'22.19"W	148 + 1
POSITIONED BY:	DGPS		

*Reference comments below regarding geographic position.*

METHOD OF INVESTIGATION: Dive OPS for least depth, Echosounder for position on DN 038.

FINDINGS: Divers located a sunken barge with a least depth (MLLW) = 70.0'. A problem with the data acquisition system resulted in a loss of the geodetic position during dive operations on DN 039. Therefore, the geodetic position was attained from development procedures conducted on DN 038 (pos 148 + 1) *Depth and positioning used to plot this feature is from hydro development (148+1).*

\*\*\*\*\*

DIVING INVESTIGATION

See attached report.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: Retain as charted.

*Do not concur Chart wreck at surveyed position.*

.....COMPILATION USE ONLY

CHART

APPLIED

Fix	Day	Time	Latitude	Longitude	Easting	Northing	Raw D	Tide	Drift	Suel	Hue	Corr'd	Exc	Carlo
0000148+1	+0	38 20:50:55	047:40:26.122	122:25:22.192	1537.1	2659.8	23.0	-1.5	+1.5	-1.5	+0.00	21.5	0	211



DIVE INVESTIGATION REPORT  
PROJECT NUMBER OPR-WAIC-PHP  
SURVEY PHP-10-1-96  
FIELD NUMBER H-10665 (D)

DIVE NUMBER 2

DIVE DATE 8 FEB 96

**I. AREA OF INVESTIGATION**

- A. State/Country WA Sub-locally Shilshole
- B. Position: Latitude 47° 40' 26.12" N Longitude 122° 25' 22.19" W
- C. Method of Positioning DGPS

**II. PURPOSE OF INVESTIGATION**

- A. AWOIS item number: AWOIS 52247
- B. Source of item being investigated (if other than AWOIS listing): \_\_\_\_\_
- C. Contacts (e.g., USCG, CofE, Harbor Masters, Owners, etc.)

D. Names, Addresses and Phone Numbers etc. of contacts:

**III. SURVEY PROCEDURES**

- A. Determination of dive site (e.g., wire drag, side scan, development): ISSS & AWOIS LISTING POSITION
- B. Search Procedures (e.g., following a groundwire, circle search, sweep along known features, etc.)  
ANCHOR LINE TO POSITION  
CONDUCTED CIRCLE SEARCH
- C. Known reference to features nearby:

VI. (D) Areas and depths covered:

## IV DIVE DATA

- A. Divers: Fletcher/Wernicke
- B. Time of Dive (in UTC) - Real 2123-2141  
Elapsed 18
- C. General bottom Depth (units and methods of determination):  
90'
- D. Current and conditions: NE 0.5 KTS
- E. Visibility (number of feet - horizontally and vertically):  
15-20'
- F. Bottom type (mud, sand, rocks, etc.): S&S

## V. RESULTS

- A. Detached Positions Number (s): 6001 LOST COMPUTER MALFUNCTION  
Time of <sup>LD.</sup> D.P.'s (UTC): Describe if other time zone 2131  
Least Depth and Fix Numbers (raw depth): 6001  
Method of determining depth (The raw sounding should be recorded. The reduced least depth should be plotted on the field sheet.)  
P<sub>10</sub> = 19.40 P<sub>001</sub> = 47.60
- B. Description of findings: Barge covered with Fishing NET
- C. Dimensions of item or feature (attach sketch if appropriate): HT = 20.15' LAYING ON ITS KEEL ON BOTTOM ON N-S HEADWIND
- D. Unusual conditions:

## VI. CHARTING RECOMMENDATIONS

RETAIN AS CHARTED. Do not concur

Position Lat. 22° 00' 00" N Long. 172° 00' 00" W

Reduced depth 21.4 METERS (70')

Type of feature (Reference Chart No. 1) (70')

Chart wreck at surveyed position

LEAST DEPTH USING SMLGAUGE PROGRAM, VERSION 2.2

NOAA UNIT: PACIFIC FIELD PARTY YEAR 1996  
AWOIS NUMBER: 52247 CONTACT NUMBER:  
DAY-OF-THE-YEAR 039 LATITUDE 47/40/26 N  
START TIME 21:45 LONGITUDE 122/25/21 W

CAST MEASUREMENT INSTRUMENT AML S/N:03042  
LEAST DEPTH DIVER GAUGE, SERIAL NUMBER 68335

DIVER'S PREDIVE GAUGE PRESSURE 14.40 psia  
DIVER'S GAUGE PRESSURE AT DESIGNATED LEAST DEPTH 47.60 psia

COMPUTED PRESSURE AT DESIGNATED LEAST DEPTH 22.92 decibars  
COMPUTED LEAST DEPTH 23.01 meters

Time of LD Measurement (UTC): 2131  
LD Measurement (m): 23.0  
Tide Corrector (m): -1.8 ~~1.6~~ 1.0 1.6  
Corrected Least Depth (m): 21.2 ~~21.4~~ 22.0 meter 21.4

Comments: DIVERS LOCATED A SUNKEN BARGE. HOWEVER,  
A COMPUTER MALFUNCTION WITH THE DATA ACQUISITION  
SYSTEM CAUSED THE D.P. COLLECTED DURING DIVE OPERATIONS  
TO BE LOST. THEREFORE, <sup>SSS</sup> ~~DEVELOPMENT~~ HYDROGRAPHY FOR THIS  
ITEM, CONDUCTED ON DN 038, WAS USED FOR THE GEODETIC  
POSITION OF THE BARGE. L.D. (MLLW) = ~~70.0~~ 72.0 - 70.0'

Position 148+1 reflects 70 FT shallowest depth of wreck and is in agreement with dive least depth. Depth and positioning used to plot this feature is from hydro development (148+1). Do not ~~concur~~ chart wreck at sunken position.  
Recommendation: RETAIN WRECK AS CHARTED.

AWOIS INVESTIGATION-N3 ✓

ITEM # 52248

DN: 046

CHART # 18447

VN: 0651

DESCRIPTION: Rock, rising 20' off the bottom with a L.D. = 45.9'.

SOURCE: CL 468/80--7/25/78 & 1/27/80-2/11/80

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	047°40'21.20"N	122°25'21.80"W	
OBSERVED:	047°40'22.493"N	122°25'22.752"W	3552.05

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Echosounder development.

FINDINGS: A large rock was found with the SSS, contact #'s 606.06S, 117.05S, & 135.04P. During echosounder development of contact # 606.06S a least depth of 15.7 meters (51.50 feet) was found for this obstruction. The average SSS computed least depth was determined to be 15.3 meters (50.00 feet) and the average geodetic position derived was latitude 047°40'22.771"N, longitude 122°25'22.527"W. PHP failed to find or adequately disprove the reported least depth of 45.9 feet.

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: Retain as charted.

*conductor* See Amendment dated 1/13/97.

.....COMPILATION USE ONLY

CHART

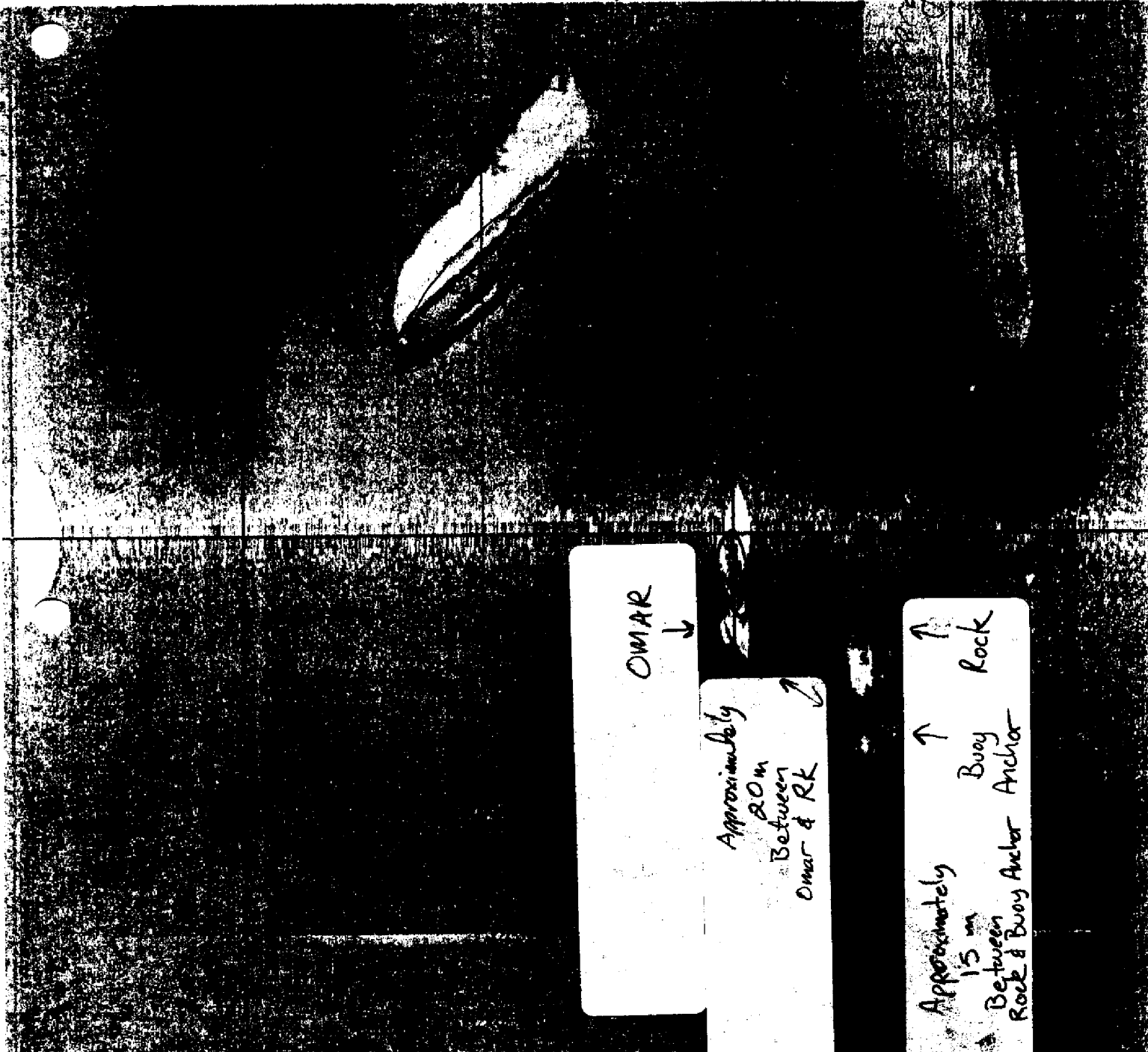
APPLIED

*AKM*  
*1/21/97*

N ↗

605.00P Barge ↘

607.00P ↘



OMAR ↘

Approximately  
20m  
Between  
Omar & RK ↘

Approximately  
15m  
Between  
Rock & Buoy Anchor ↗

18:34:44 0603 100M 3 100K

18:35:09 0604 100M 3 100K

18:35:34 0605 100M 3 100K

18:35:59 0606 100M 3 100K

18:36:23 0607 100M 3 100K

110.3  
33ft ↗  
30ft ↗  
60.00P ↗

CL

AWOIS INVESTIGATION-N4 ✓

ITEM # 52249

DN: 040

CHART # 18447

VN: 0652

DESCRIPTION: Sounding(10-ft L.D. MLLW).

SOURCE: CL 931/86--7/86

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	047°40'10.80"N	122°25'25.00"W	
OBSERVED:	047°40' <sup>10 76</sup> 09.75"N	122°25'30. <sup>07</sup> 50"W	10197.08

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Echosounder development, from PN 10168-10319.

FINDINGS: Preliminary soundings for H-10665 indicate a shoal sounding of 12.0 feet presently exists within the confines of the charted sewer outfall area. PHP located the offshore end of the sewer pipe by using the SSS contact observed on DN 038. The contact is named SEWEREND and it's geographic position is latitude 47°40'10.703"N, longitude 122°25'28.503"W.\* This position is approximately 200' (~75 meters) NE of the charted position. \* offshore end of sewer pipe. See least depth (12') by hydrodevelopment (see 10197.08)

\*\*\*\*\*

DIVING INVESTIGATION

None.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: None. *Delete charted 10' SOG, chart 12 ft. from present survey.*

.....COMPILATION USE ONLY

CHART

APPLIED

ITEM INVESTIGATION-N5 ✓

ITEM # N/A

DN: 044<sup>6</sup> Geop-Position  
052, Dive OPS

CHART # 18447

VN: 0651

DESCRIPTION: Wreck-Tugboat-"OMAR"

SOURCE: USCG-13th District

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	N/A		
OBSERVED:	047°40'23. <sup>490</sup> <del>927</del> "N	122°25'22. <sup>3 145</sup> <del>834</del> "W	<sup>3534</sup> 605 + 1

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: The least depth for this obstruction was derived from dive OPS on DN 052. The geodetic position for the obstruction was derived from hydrography conducted on DN 44 at fix number <sup>3534</sup>~~605~~ + 1.

FINDINGS: Divers located an uncharted sunken tugboat "OMAR", with a least depth (MLLW) = 16.<sup>4</sup>~~3~~ meters (53.<sup>19</sup>~~50~~') : 54 FT. Based on approved tides.

\*\*\*\*\*

DIVING INVESTIGATION

See attached report.

\*\*\*\*\*

CHARTING RECOMMENDATIONS: Chart a submerged wreck with a least depth of 16.<sup>4</sup>~~3~~ meters (53.<sup>19</sup>~~50~~') : 54 FT. at latitude 047°40'23.<sup>490</sup>~~927~~"N, longitude 122°25'22.<sup>3 145</sup>~~834~~"W. *concur*

.....COMPILATION USE ONLY.....

CHART

APPLIED

LEAST DEPTH USING SMLGAUGE PROGRAM, VERSION 2.2

NOAA UNIT: PACIFIC FIELD PARTY YEAR 1996  
AWOIS NUMBER: Omar CONTACT NUMBER:  
DAY-OF-THE-YEAR 052 LATITUDE 47/40/23 N  
START TIME 12:01 LONGITUDE 122/25/25 W

CAST MEASUREMENT INSTRUMENT AML S/N:03042  
LEAST DEPTH DIVER GAUGE, SERIAL NUMBER 68335

DIVER'S PREDIVE GAUGE PRESSURE 14.27 psia  
DIVER'S GAUGE PRESSURE AT DESIGNATED LEAST DEPTH 39.44 psia

COMPUTED PRESSURE AT DESIGNATED LEAST DEPTH 17.38 decibars  
COMPUTED LEAST DEPTH 17.48 meters

Time of LD Measurement (UTC): 2020  
LD Measurement (m): 17.5  
Tide Corrector (m): 1.2  
Corrected Least Depth (m): 16.3

Comments: BOTTOM CHARACTERISTICS INCLUDE MUD, SHELL, AND  
ROCKS. CURRENTS WERE FLOWING APPROXIMATELY ONE  
KNOT AT THE SURFACE AND WERE SLACK ON THE BOTTOM.  
VISIBILITY AT WRECK SITE WAS 12'-15'. A LEAST DEPTH  
OF 57' WAS TAKEN ON A STACK OF SUBMERGED TUGBOAT  
'OMAR' AT 20:50:00 GMT (UTC). THE WRECK LIES IN AN E-W  
DIRECTION, BOW POINTING W AND IS SITTING ON ITS KEEL.  
A PORTION OF THE SUPERSTRUCTURE IS ON THE STARBOARD SIDE OF  
THE VESSEL.

Recommendation: "CHART A SUBMERGED WRECK WITH A ~~57~~ 927  
LEAST DEPTH OF ~~17.4~~ <sup>16.3</sup> METERS (~~57~~ <sup>53.5</sup> FEET) AT LATITUDE 47° 40' ~~22.5~~ <sup>3.2</sup> "N,  
LONGITUDE 122° 25' ~~22.9~~ <sup>22.045</sup> ~~W~~ <sup>W</sup>,  
~~2.834~~ <sup>2.834</sup> " W."



ITEM INVESTIGATION-N6 ✓

ITEM # N/A

DN: 116

CHART # 18447

VN: 0652

DESCRIPTION: Submerged obstruction

SOURCE: Pacific Hydrographic Party

\*\*\*\*\*

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	N/A		
OBSERVED:	047°41'02.313"N	122°24'34.371"W ✓	10406

POSITIONED BY: DGPS

METHOD OF INVESTIGATION: Dive OPS on DN 116.

FINDINGS: Divers located an uncharted sunken <sup>wreck</sup> obstruction, with a least depth (MLLW) = <sup>12.0</sup>~~12.2~~ meters (39.0'). <sup>Based on approved tides.</sup>

\*\*\*\*\*

DIVING INVESTIGATION

See attached report.

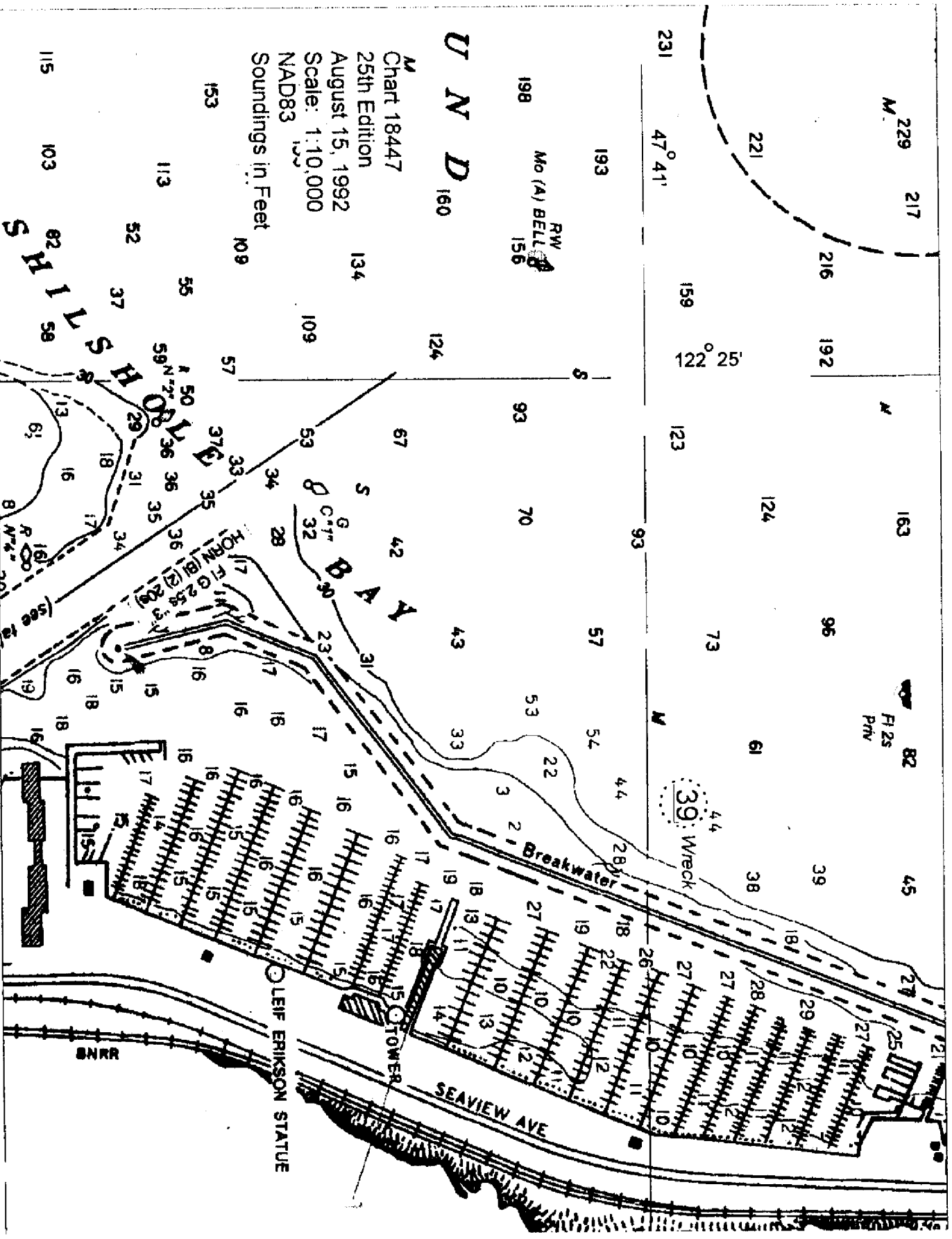
\*\*\*\*\*

CHARTING RECOMMENDATIONS: "Chart a submerged <sup>wreck</sup> obstruction with a least depth of <sup>12.0</sup>~~12.2~~ meters (39.0') at latitude 047°41'02.313"N, longitude 122°24'34.371"W." *our*

.....COMPILATION USE ONLY.....

CHART

APPLIED



**U N D**  
160

**M**  
Chart 18447  
25th Edition  
August 15, 1992  
Scale: 1:10,000  
NAD83  
Soundings in Feet

198  
Mo (A) BELL  
RW  
156

231  
47° 41'  
193  
159  
122° 25'  
123

M 229 217

M 163

82  
F 25  
P 14

115 103 82 58  
S H I L S

59 N 77° 00'

**H O R N S B A Y**

Breakwater

TOWER

LEIF ERIKSON STATUE

SEAVIEW AVE

BNRR

39 Wreck

HORN (B) (2) (20)

(see 12)

8 N 74° 00'

65

13

16

17

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**Pacific Hydrographic Party  
Dive Plan/Investigation Form**

Date: 4-25-96 DN: 116 Survey: PHP-<sup>10</sup>-1-96-Shilshole

Dive Location: OFF OF Shilshole MARINA

Name, Location and Phone Number of Chamber Contacted: Virginia Mason HOSPITAL, 1000 Seneca St. Seattle WA 206-583-6543

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_ Divemaster: Berkowitz

Diver in Charge: Berkowitz Launch: 0651 (0652) Coxswain: \_\_\_\_\_

Tenders: ADAMS Equipment Used: OPEN CIRCUIT SCUBA

Dive Plan: Divers descend ANCHOR line. Conduct & Search obtain least depth & measurements, surface.

Weather: Wind: SE 5 (Kts/dir)  
 Seas: 0-1 (ft)  
 Swell: 0 (ft)

Diver	Surface Interval	Rep Group	P <sub>in</sub>	T <sub>in</sub> GMT	P <sub>out</sub>	T <sub>out</sub> GMT	Bottom Time	Max Depth	Group
<u>Fletcher</u>	<u>-</u>	<u>-</u>	<u>2200</u>	<u>1657</u>	<u>1400</u>	<u>1403</u>			
<u>Berkowitz</u>	<u>-</u>	<u>-</u>	<u>DA</u>						

Current: Slack Visibility: 20' Bottom Type: SAND

**Description & Dimensions:**

Diver located A 20'w by 40' L steel Barge like wreck. Barge was not lying flat on the bottom. Barge was draped in fishing nets. Barge was in a SW to NE DIRECTION.

**Diver Gauge Information**

P<sub>in</sub>: 14.64 P<sub>LD</sub>: 35.60 P<sub>out</sub>: \_\_\_\_\_

Time of Least Depth Measurement: 1900 UTC

1,0722  
9.0 °C

**APPROVAL SHEET**

for

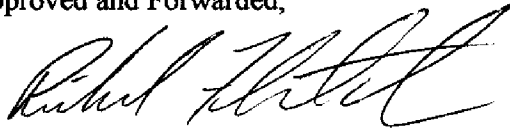
SURVEY H-10665

Standard field surveying and processing procedures were followed in producing this survey in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Guidelines; and the Field Procedures Manual, as updated for 1996. The data were reviewed daily during acquisition and processing.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

Approved and Forwarded,

Date: May 7, 1996



Richard A. Fletcher  
Lieutenant, NOAA  
Chief, Pacific Hydrographic Party

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 1844, 1845, 1846, 1845 B ON PREVIOUS SURVEY C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G RAND McNALLY ATLAS H U.S. LIGHT LIST K											
	PUGET SOUND	X		X								
SHILSHOLE BAY	X		X									2
WASHINGTON (title)	X		X									3
WEST POINT	X		X									4
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Approved

*Chris Colby*  
Chief Geographer

AUG 14 1996



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Rockville, Maryland 20852

1062

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: April 29, 1996

ORIGINAL

MARINE CENTER: Pacific

HYDROGRAPHIC PROJECT: OPR-N210-PHP

HYDROGRAPHIC SHEET: H-10665

LOCALITY: Washington, Puget Sound, Shilshole Bay

TIME PERIOD: February 7 - 26, 1996

TIDE STATION USED: 944-7130 Seattle, Wa.  
Lat. 47° 36.3'N Lon. 122° 20.3'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 7.77 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 10.5 ft.

REMARKS: RECOMMENDED ZONING

Times are direct, and apply a X0.98 range ratio to heights using Seattle, Wa. (944-7130).

Note: Times are tabulated in Greenwich Mean Time.

*William M. Helton*  
CHIEF, DATUMS SECTION





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Silver Spring, Maryland 20910

2082

TIDE NOTE FOR HYDROGRAPHIC SURVEY

ORIGINAL

DATE: July 11, 1996

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: OPR-N210-PHP

HYDROGRAPHIC SHEET: H-10665

LOCALITY: Washington, Puget Sound, Shilshole Bay

TIME PERIOD: April 25, 1996

TIDE STATION USED: 944-7130 Seattle, Wa.  
Lat. 47° 36.3'N Lon. 122° 20.3'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 7.77 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 10.5 ft.

REMARKS: RECOMMENDED ZONING

Times are direct, and apply a X0.98 range ratio to heights using Seattle, Wa. (944-7130).

Note: Times are tabulated in Greenwich Mean Time.

*William M. Gibson*  
CHIEF, DATUMS SECTION







UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Silver Spring, Maryland 20910

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE:** March 14, 1997

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-N210-PHP  
**HYDROGRAPHIC SHEET:** H-10665

**LOCALITY:** Washington, Puget Sound, Shilshole Bay

**TIME PERIOD:** November 13, 1996

**TIDE STATION USED:** 944-7130 Seattle, Wa.  
Lat. 47° 36.2'N Lon. 122° 20.3'W

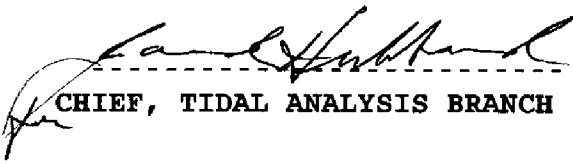
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 m  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 3.198 m

**REMARKS:** RECOMMENDED ZONING

Use zone(s) identified as: PS1

Refer to attachment(s) for zoning information.

**Note:** Provided time series data are tabulated in metric units  
(meters) and on Greenwich Mean Time.

  
CHIEF, TIDAL ANALYSIS BRANCH



**HYDROGRAPHIC SURVEY STATISTICS**

H-10665

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT
SMOOTH SHEET		1	SMOOTH OVERLAYS: POS., ARC, EXCESS		NA
DESCRIPTIVE REPORT		1	FIELD SHEETS AND OTHER OVERLAYS		NA
DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/SOURCE DOCUMENTS
ACCORDION FILES	2				
ENVELOPES					
VOLUMES					
CAHIERS					
BOXES					

**SHORELINE DATA**

SHORELINE MAPS (List): NA

PHOTOBATHYMETRIC MAPS (List): NA

NOTES TO THE HYDROGRAPHER (List):

SPECIAL REPORTS (List):

NAUTICAL CHARTS (List): Chart 18447 25th ED, Aug 15, 1992

**OFFICE PROCESSING ACTIVITIES**

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

PROCESSING ACTIVITY	AMOUNTS			
	VERIFICATION	EVALUATION	TOTALS	
POSITIONS ON SHEET			2402	
POSITIONS REVISED				
SOUNDINGS REVISED				
CONTROL STATIONS REVISED				
	TIME-HOURS			
	VERIFICATION	EVALUATION	TOTALS	
PRE-PROCESSING EXAMINATION				
VERIFICATION OF CONTROL				
VERIFICATION OF POSITIONS				
VERIFICATION OF SOUNDINGS				
VERIFICATION OF JUNCTIONS				
APPLICATION OF PHOTOBATHYMETRY				
SHORELINE APPLICATION/VERIFICATION				
COMPILATION OF SMOOTH SHEET	120		120	
COMPARISON WITH PRIOR SURVEYS AND CHARTS		6	6	
EVALUATION OF SIDE SCAN SONAR RECORDS				
EVALUATION OF WIRE DRAGS AND SWEEPS				
EVALUATION REPORT		10	10	
GEOGRAPHIC NAMES				
OTHER				
*USE OTHER SIDE OF FORM FOR REMARKS	TOTALS	120	16	136
Pre-processing Examination by <b>J. Stringham</b>	Beginning Date 5/9/96	Ending Date 5/14/96		
Verification of Field Data by <b>J. Stringham, D. Doles, R. Mayor, L. Deodato</b>	Time (Hours) 120	Ending Date 9/3/96		
Verification Check by <b>B. Olmstead</b>	Time (Hours) 6	Ending Date 9/19/96		
Evaluation and Analysis by <b>L. Deodato</b>	Time (Hours) 16	Ending Date 9/6/96		
Inspection by <b>B. Olmstead</b>	Time (Hours) 16	Ending Date 10/2/96		

## **EVALUATION REPORT**

**H-10665**

### **A. PROJECT**

Project information is discussed in the hydrographer's report.

### **B. AREA SURVEYED**

This survey was conducted in Washington, southern Puget Sound and inside Shilshole Bay. Depths range from 1 foot to 205 feet.

### **C. SURVEY VESSELS**

Survey vessel information is found in the hydrographer's report.

### **D. AUTOMATED DATA ACQUISITION AND PROCESSING**

Survey data were processed using the same Hydrographic Data Acquisition/Processing System (HDAPS) software used by the hydrographer, the Hydrographic Processing System (HPS) and AutoCad, Version 12.0.

At the time of the survey certification the format for transmission of digital data had not been formally approved. In the interim, digital data for this survey exists in the standard HPS format which is a database format using the .dbf extension. In addition, the sounding plot was created with .dbf (extension) and enhanced using the AutoCad system, are filed both in the AutoCad drawing format, .dwg (extension); and in the more universally recognized graphics transfer format, .dxf (extension). Copies of these files will be retained at PHS until data transfer protocols are developed and improved.

The drawing files necessarily contain information which is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes, remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 75.

The field sheet parameters have been revised to center the hydrography on the office plot. The data is plotted using a Modified Transverse Mercator projection and are depicted on a single sheet.

## **E. SONAR EQUIPMENT**

Side scan sonar was used on survey H-10665. Refer to section E of the hydrographer's report concerning set-up, operation and processing of survey data.

## **F. SOUNDING EQUIPMENT**

Sounding equipment is discussed in the hydrographer's report.

## **G. CORRECTIONS TO SOUNDINGS**

The sounding data have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for an actual tide, dynamic draft, and sound velocity. These reducers have been reviewed and are consistent with NOS specifications. Actual tide reduction is derived from the Seattle, Washington, gage 944-7130.

## **H. CONTROL STATIONS**

Control stations are discussed in the hydrographer's report and separates. A list of control stations used on survey H-10665 is attached to this report.

The positions of horizontal control stations used during hydrographic operations are field values based on NAD 83. The geographic positions of all survey data are based on NAD 83. The smooth sheet is annotated with an NAD 27 adjustment tick based on values determined with the NGS program NADCON.

Data based on NAD 27 may be referenced to this survey by applying the following corrections:

Latitude: -0.649 seconds (-20.034 meters)  
Longitude: 4.468 seconds (93.198 meters)

## **I. HYDROGRAPHIC POSITION CONTROL**

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations. The quality of several positions exceeds limits in terms of horizontal dilution of precision (HDOP). These positions are isolated and occur randomly throughout the survey area. A review of the data, however, suggests that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable.

## **J. SHORELINE**

There are no photogrammetric source data for this survey. The shoreline shown in brown on the smooth sheet was taken from the raster of chart 18447 and is for orientation only.

## **K. CROSSLINES**

Crosslines are discussed in the hydrographer's report.

## **L. JUNCTIONS**

There are no contemporary surveys which junction survey H-10665.

## **M. COMPARISON WITH PRIOR SURVEYS**

H-5724 (1934-35) 1:10,000

FE-1(64) (1948) 1:10,000

The prior surveys listed above cover the entire area of the present survey. Sounding agreement with the present survey generally reveals 1-6 foot differences. There appears to be no consistent pattern of shoaling or an increase in depths and the configuration of depth curves common to the present and prior surveys depict little change. Present survey depths at the entrance to the Lake Washington Ship Canal are generally within 1 foot of the depths surveyed in 1934-35. However, there are two areas of larger depth differences along the Shilshole Bay Marina and breakwater centered at latitude 47/40/45N, longitude 122/24/30W. A depth comparison with H-5724 (1934-35) reveals present survey depth differences of over twenty feet shoaler along the face of the breakwater and twenty feet deeper at the south entrance to the marina.

The Shilshole Bay Marina and breakwater and the breakwater existing approximately 400 meters northeast of West Point have been built since the prior surveys. These cultural changes have drastically altered the shoreline configuration that existed between 1934-48.

Significant changes with the prior surveys are primarily attributed to cultural activity which has taken place the past sixty years while better acquisition systems and natural processes account for the smaller changes.

With the exception of the following, survey H-10665 is adequate to supersede the prior surveys within the common area. A charted 37-foot sounding at latitude 47/40/38.108N, longitude 122/25/05.908W, originates from H-5724 and was not found during survey operations. This prior depth was not adequately investigated and has been transferred to the present survey.

**N. ITEM INVESTIGATIONS**

There were 4 AWOIS items assigned to this survey. These items have been adequately addressed and disposed of in the hydrographer's report. Two additional items ,N5 and N6, found during the survey were investigated and have been adequately addressed by the hydrographer.

*See Amendment  
dated 1/13/97  
GEM.*

**O. COMPARISON WITH CHART**

Survey H-10665 was compared with the following chart.

<u>Chart</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>	<u>Datum</u>
18447SC	25th	August 15, 1992	1:10,000	NAD83

a. Hydrography

Charted hydrography originates with the above mentioned prior surveys and miscellaneous sources. Prior surveys are discussed in section M and require no further discussion. All miscellaneous source data has been satisfactorily addressed during survey operations except as follows: A rock covered 45-feet (45Rk) charted at latitude 47/40/21.20N, longitude 122/25/21.80W originates from CL 468/80 and was investigated by side scan sonar and echo sounder development. The shoalest depth as found by this survey was 51 feet. A dive was not conducted to determine a least depth. The charted 45 Rk should remain as charted. Reference discussion of AWOIS item 52248 in the hydrographer's report.

Except as stated above, survey H-10665 is adequate to supersede charted hydrography within the common area.

b. Dangers to navigation

The hydrographer reported one danger to navigation during survey operations. This danger was reported to the local United States Coast Guard District, DMAHTC, and N/CS261. Copy of this report is attached. No additional dangers were submitted during office processing.

c. Controlling depths

The Lake Washington Ship Canal is a federally maintained channel with its entrance located within the area of this survey. The depths found during this survey are consistent with or deeper than the charted controlling depths. However, it should be noted that a 14-foot depth at latitude 47/40/31.5N, longitude 122/24/46W and a 10-foot depth at latitude 47/40/28, longitude 122/24/36W plot very near the channel edge. It is recommended that these areas be periodically monitored for possible shoaling. The controlling depths are adequately discussed in section O and S of the hydrographer's report.

## **P. ADEQUACY OF SURVEY**

Hydrography contained on survey H-10665 is adequate to:

- a. delineate the bottom configuration, determine least depths, and draw the required depth curves;
- b. reveal there are no significant discrepancies or anomalies requiring further investigation; and
- c. show the survey was properly controlled and soundings are correctly plotted.

Except as follows, the hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, April 1994 Edition.

West Point Light and Shilshole Boat Basin Light 2 were not located during survey operations. In accordance with project instructions, Section 4.2, Aids to Navigation, major lights and lights on breakwaters/jetties are to be located to Third Order Class I positioning. If a Third Order Class I position already exists than its position should be verified with accuracy at least commensurate with hydrographic position fixes. Neither requirement was met.

The 37-foot depth originating from prior survey H-5724 was not adequately investigated. A systematic set of development lines would have provided more confidence to either verify or disprove this charted depth.

A least depth on AWOIS item 52248 should have been obtained by diver unless conditions would have prevented such operations. There was no documentation in the hydrographer's report to substantiate any problems. It is noted that a dive was conducted on the tugboat "OMAR" which plots only forty meters north of the charted 45 Rk.

## **Q. AIDS TO NAVIGATION**

Five buoys and one light were located by the hydrographer. These aids were located during survey operations and adequately mark the features intended. West Point Light (Light #16800) and Shilshole Boat Basin Light 2 (Light #16770) were not located by the hydrographer. The existence of these lights were visually verified by the hydrographer and should be retained as charted.

## **R. STATISTICS**

Statistics are itemized in the hydrographer's report.

## **S. MISCELLANEOUS**

Miscellaneous information is discussed in the hydrographer's report. It is noted that the Marine Chart Branch be aware of recent surveys by the Corps of Engineers and new tabulated depths not yet released which will effect the Lake Washington Ship Canal. No additional items were noted during office processing.

## **T. RECOMMENDATIONS**

This is a good hydrographic survey.

## **U. REFERRAL TO REPORTS**

Referral to reports is discussed in the hydrographer's report.

*Leonardo T. Deodato*  
Leonardo T. Deodato  
Cartographer



APPROVAL SHEET  
H-10665

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Bruce A. Olmstead Date: 10/2/96  
Bruce A. Olmstead  
Senior Cartographer, Cartographic Section  
Pacific Hydrographic Branch

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Kathy Timmons Date: 10/4/96  
Kathy Timmons  
Commander, NOAA  
Chief, Pacific Hydrographic Branch

\*\*\*\*\*

Final Approval

Approved:

Andrew A. Armstrong III Date: Oct 17, 1996  
Andrew A. Armstrong III  
Captain, NOAA  
Chief, Hydrographic Surveys Division



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL OCEAN SERVICE  
OFFICE OF COAST SURVEY  
Pacific Hydrographic Branch  
Seattle, Washington 98115-0070

January 13, 1997

MEMORANDUM FOR: Captain Andrew A. Armstrong III, NOAA  
Chief, Hydrographic Surveys Division

FROM: *Kathy Timmons*  
Commander Kathy Timmons, NOAA  
Chief, Pacific Hydrographic Branch

SUBJECT: Amendment to Survey H-10665 Descriptive Report

The attached document is an amendment to the previously approved survey, H-10665. This amendment revises the recommendations contained within survey descriptive report pertaining to the depiction of a submerged rock on nautical charts.

This amendment should be inserted into the descriptive report for the survey and appropriate marginal notations added to the descriptive report as required.

Attachment

Approved — *Andrew A. Armstrong III*  
Jan 17, 1997



### Amendment to H-10665

The Pacific Hydrographic Parties (PHP) conducted an additional investigation of AWOIS Item No. 52248. This additional work was conducted on November 13, 1996 at the request of Pacific Hydrographic Branch. The results of the investigation have been evaluated and the following information amends the descriptive report and accompanying evaluation report.

AWOIS No. 52248,

Source: Hydrographic Survey conducted by NOS training class in 1980. (CL 468/80)

An NOS hydrographic training class conducted a dive investigation and found a rock approximately 20 feet in height with a least depth of 45.9 feet (field reduced to MLLW using predicted tides). The observed position of the AWOIS item is latitude 47-40-21.68N, longitude 122-25-22.80W.

#### Present survey findings:

During the normal course of survey H-10665, PHP conducted 200-percent side scan sonar coverage over the required search radius of 100 meters and found a significant obstruction. PHP then conducted a thorough echosounder investigation and found an obstruction approximately 14 feet in height with a least depth of 51 feet at latitude 47-40-22.493N, longitude 122-25-22.752W. This observed position is 25 meters north of the charted position of the rock. PHP returned on November 13, 1996 and conducted an additional investigation and verified the position and depth of the 51-foot sounding believed to be a rock. A dive investigation was conducted but the rock was not observed.

#### Evaluation:

With the following exception the survey methods, records and digital data comply with NOS requirements. The echosounder depth over the feature is deeper than that of the diver-supported depth from the prior survey. During the present survey divers did not locate the rock or verify the least depth, therefore, PHB does not concur with PHP's recommendation to simply retain the rock as charted. Instead, PHB recommends retaining the charted 45-foot depth but depicting it at the position of the 51-foot sounding observed during the present survey. No further work is required.

**Charting Recommendation:**

Delete the charted rock covered by 45 ft at latitude 47-40-21.68N, longitude 122-25-22.80W.  
Chart a rock covered 45 ft (MLLW) at latitude 47-40-22.493N, longitude 122-25-22.752W  
(easting 1525.4 northing 2547.7).

