

F00454

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. BH-5-1-99

Registry No. F00454

LOCALITY

State Maryland

General Locality Baltimore Harbor

Locality Northwest Harbor

1999

CHIEF OF PARTY
LT S. Smith

LIBRARY & ARCHIVES

DATE APR 18 2000

REGISTRY NUMBER:

F-00454

HYDROGRAPHIC TITLE SHEET

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 NUMBER:

BH-5-1-99

State: Maryland

General locality: Baltimore Harbor

Locality: Vicinity of "Transcom Pier" *NORTHWEST HARBOR*

Scale: 1: 5,000 Date of survey: September 14, 1999

Instructions dated: March 26, 1999 Project Number: OPR-E346-BH

Vessel: NOAA Survey Vessel BAY HYDROGRAPHER *EDP # 1107*

Chief of Party: LT Shepard Smith

Surveyed by: LT Shepard Smith, ST Michael Becker

Soundings taken by echo sounder, hand lead-line, or pole: Reson 9001 Multibeam Sonar

Graphic record scaled by: LT Shepard Smith, ST Michael Becker

Graphic record checked by: LT Shepard Smith, ST Michael Becker

Projected by: N/A Automated plot by: *N/A HP DESIGNJET 2500CP*

Verification by: Hydrographic Surveys Branch *ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL*

Soundings in: Feet: Fathoms: _____ Meters: at MLW: _____ MLLW:

Remarks: All times are recorded in UTC

*HAND WRITTEN NOTES IN THE DESCRIPTIVE REPORT
WERE MADE DURING OFFICE PROCESSING.*

AWOIS/SUPF ✓ 4/17/00 SS ✓

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DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-E346-BH
BH-5-1-99
F-00454

NOAA S/V BAY HYDROGRAPHER
LT SHEPARD SMITH, OFFICER IN CHARGE

A. PROJECT

A.1 This basic hydrographic survey was conducted in accordance with Hydrographic Project Instructions OPR-E346-BH, Upper Chesapeake Bay - Calendar Year 1999 operations.

A.2 The original instructions are dated March 26, 1999.

A.3 There has been one change to the original instructions. Change #1 dated October 6, 1999.

A.4 This Descriptive Report covers sheet "01" of OPR-E346-BH. This sheet lies in the vicinity of the "Transcom Pier" in Baltimore Harbor, Maryland. The pier has recently been extended.

A.5 Project OPR-E346-BH, sheet "01" specifically assesses a request from the Association of Maryland Pilots for additional survey coverage in the vicinity of the "Transcom Pier".

B. AREA SURVEYED

B.1 This survey covers the immediate area of the pier seaward to shipping channel.

B.2 This sheet has the following boundaries, starting at the Southwest corner and progressing clockwise (Fig. B1 ,):

1. 39° 16' 10.^{2 00}47"N 076° 34' 23.^{7 00}73"W
2. 39° 16' 24.^{1 00}22"N 076° 34' 24.^{7 00}14"W
3. 39° 16' 24.^{1 00}39"N 076° 34' 20.^{13 00}57"W
4. 39° 16' 10.^{3 00}60"N 076° 34' 19.^{3 00}62"W

B.3 Data collection for this survey began and ended on September 14, 1999 DN 257.

C. SURVEY VESSELS

C.1 The following vessel was used during this survey:

<u>Vessel</u>	<u>EDP Number</u>	<u>Primary Function</u>
NOAA Survey Vessel BAY HYDROGRAPHER	1107	Multibeam Operation Detached Positions

C.2 No unusual vessel configurations were used during this survey.

D. AUTOMATED DATA ACQUISITION AND PROCESSING *SEE ALSO THE EVALUATION REPORT*

D.1 All sounding data acquisition software and data processing software versions are found on the Hydrosoft CD, version 9.4. HYPACK software was used exclusively for data acquisition; no processing modules were used.

D.2 The SEABIRD SBE-19 sound velocity profile unit was utilized with SEASOFT 3.3M and SEACAT 3.1 software. The program VELOCITY 4.0 for Windows was used to process the collected data and calculate velocity corrections.

D.3 CARIS HIPS (Hydrographic Information Processing System) was used to process the multibeam sonar data. HIPS was used to clean multibeam sounding data, check navigation, heave, pitch and roll values, and create work files. All multibeam data was exported into HPS.

D.4 No software problems were encountered in acquisition or processing which would affect the survey datum.

E. SIDE SCAN SONAR EQUIPMENT

E.1 No side scan sonar data was collected during survey F-00454.

F. MULTIBEAM SONAR EQUIPMENT. & SOUNDING EQUIPMENT.

F.1 The BAY HYDROGRAPHER conducted all multibeam sonar operations using a RESON Seabat 9001 sonarhead, S/N 214019, 455 kHz, and a Seabat 9001 processor S/N 3314. The sensor head is mounted vertically (0° mount) at a depth of

approximate 6ft below the water line on the end of a pole secured to the stern.

A stern mounted sensor head required the BAY HYDROGRAPHER to orient the sensor's projector aft, creating an azimuthal offset of 180°.

The 9001's combined transmit and receive beams yield sixty (60) soundings per ping, with each beam being 1.5° alongtrack x 1.5° crosstrack.

F.2 Multibeam operations were limited to a speed-over-ground of 5.5 knots. Line spacing for item investigations was established by multiplying two times the water depth over an item investigation. Coverage was determined on-line using the coverage tools in Isis.

F.3 Seabat depth data were monitored using Isis during acquisition and processed using CARIS HIPS multibeam data cleaning programs. Digital multibeam depth profiles were visually reviewed and fliers were identified and manually flagged as "rejected". Vessel navigation data from DGPS and attitude data from heave, pitch, roll, and gyro sensors were displayed and manually cleaned.

After review and cleaning, the data was then merged with sound velocity, tide, and vessel configuration data to compute the true depth and position of each beam footprint. Shoal biased, line-by-line binning with a 1-meter grid was used to import processed soundings into workfiles. Finally, processed soundings were exported to HPS where final zoned tides were applied. Final review of soundings and least depth determination was accomplished in MapInfo.

G. CORRECTIONS TO SOUNDINGS.

G.1 a. Sound Velocity Correctors

The velocity of sound through water was measured using SEABIRD ELECTRONICS, INC. SEA-BIRD 19 profiler (s/n 285). Seacat Data Quality Assurance Tests were conducted after each respective velocity cast to ensure that the unit was operating within tolerance. A DQA (Data Quality Assurance) was taken with each velocity cast using an Odom Digibar (S/N 168).

All sound velocity data was processed using program

VELOCITY 4.0/5.0 for Windows. Sound velocity data for cast 1 was loaded and applied to the multibeam data in HIPS exclusively.

Cast #	DN Taken	DN Applied To:
01	257	257

b. Leadline Comparison

A leadline comparison was taken February 24, 2000 (DN 055) at Point Lookout Marina, MD for the Reson Seabat multibeam sonar. The bottom was very soft, and, as expected, the 455khz Seabat read 0.2m shoaler than the leadline.

c. Static Draft

When the multibeam pole was installed in July 20, 1998, measurements were taken on the pole to determine static draft for the Seabat transducer. Sensor offsets were stored in the HIPS Vessel Configuration File for use in multibeam data processing. Refer to Separate III* the vessel configuration file used in HIPS.

d. Dynamic Draft (Settlement and Squat Correctors)

Settlement and squat correctors for the BAY HYDROGRAPHER were determined on the Chesapeake Bay, Maryland on February 26, 1998 using on the fly GPS for relative measurements. An Ashtech M12 receiver was set up on a mark on the pier at Atlantic Marine Center, Norfolk, VA and a second was setup on the BAY HYDROGRAPHER. Both receivers' logged data for two continuous hours as the ship ran a series of runs and their reciprocal courses at varying speeds. The data was then run through a GPS processing program to yield a relative vertical change versus time and speed table. The values obtained were applied to soundings through the HPS Offset Table #1. Dynamic draft correctors were stored in the HIPS Vessel Configuration File for use in data processing of multibeam data. Refer to Separate IV* for data records.

e. Heave, Roll, and Pitch Correctors

A TSS DMS-05 (S/N 002066) dynamic motion sensor collected heave, roll and pitch data.

* DATA FILED WITH ORIGINAL FIELD RECORDS

f. Heading data were acquired with Sperry SR-50 Gyrocompass and were used to determine multibeam transducer azimuth and position.

g. Multibeam Calibration

On June 8, 1999 (DN 159), the BAY HYDROGRAPHER conducted the multibeam calibration (patch test) for the RESON system. The patch test measured the residual pitch and roll offsets, positioning time delay and azimuthal offset. All values obtained from the patch test and sensor offsets were entered in the HIPS Vessel Configuration File (VCF). See the VCF in Separate III* for data records.

f. Tide Correctors

The tidal datum for this project is Mean Lower Low Water. Correctors were applied to all data using the reapply HPTools tides utility in HPS.

Upon completion of F-00454, actual verified tides were applied from Baltimore, MD 857-4680.

Verified tides from station 857-4680 were applied without zoning to HIPS data. The hydrographer used a line-by-line thinning process at a 1-meter cell size in Caris HIPS. No reprocessing of multibeam data in HIPS should be necessary.

Tide correctors were reapplied to all multibeam data in HPTools tide utility upon completion of F-00454.

A request for Smooth Tides was submitted on March 27, 2000. See Appendix V* for request for Smooth Tides.

APPROVED TIDES AND ZONING HAVE BEEN APPLIED DURING OFFICE PROCESSING
The BAY HYDROGRAPHER employed no additional, unusual or unique methods or instruments to correct echo soundings.

H. CONTROL STATIONS. *SEE ALSO THE EVALUATION REPORT*

The horizontal datum for this survey is the North American Datum of 1983 (NAD 83). No horizontal control stations were used or established for this survey.

** DATA FILED WITH ORIGINAL FIELD RECORDS*

I. HYDROGRAPHIC POSITION CONTROL.

I.1 This survey was conducted exclusively using the Global Positioning System (GPS) corrected by the U.S. Coast Guard Differential GPS reference station network. Differential correctors were supplied from USCG radio beacon transmitters, precluding the need for shore-based horizontal control stations.

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual (FPM). The Horizontal Dilution of Precision (HDOP) and Expected Position Error (EPE) specified by the FPM were monitored during on-line data collection. If the positioning degraded beyond the acceptable limits while on-line, the data were either smoothed or rejected, depending on the extent of the affected data. The position of the vessel was verified in its slip at the start and end of each working day.

I.3 Differential GPS Equipment:

<u>Unit A</u>	<u>Unit B</u>
Starlink GPS Receiver DNAV-212	Trimble GPS Receiver DSM212L
Ashtech OEM Sensor II Starlink MRB-2A s/n 835	s/n 0220177299 Trimble Sensor m/n 27207-00

I.4 Correctors were received from the Cape Henry, VA, and Cape Henlopen, DE radiobeacons for the entire survey.

I.5 There were no unusual methods used to operate or calibrate electronic positioning equipment and no unusual atmospheric conditions affected data quality.

I.6 Antenna positions were corrected for offset and layback, and referenced to the position of the Odom Echotrac echo sounder transducer. These correctors are located in HPS Offset Table #1. A copy of Offset Table #1 is contained in Separate III.*

Offsets for the GPS antenna were applied from the HIPS Vessel Configuration File (VCF) to compute the position of the Seabat transducer and the towpoint. See Separate III*

* DATA FILED WITH ORIGINAL FIELD RECORDS

for data records.

J. SHORELINE. *SEE ALSO THE EVALUATION REPORT*

J.1 Shoreline from chart 12281 was compared to survey data. Detached positions were taken on new or modified items. See Figure J.1 for chart recommendations. Five items were addressed. The hydrographer recommends these items be updated on the next edition of chart 12281.

J.2 Charted dolphin verified at position of Fix 7990. Hydrographer recommends retaining dolphin as charted. *CONCUR*
39° 16' 19.48" N 076° 34' 21.97" W

J.3 A new concrete dolphin and private light were positioned with a detached position. The hydrographer recommends adding a new dolphin at the position of Fix 7991. *CONCUR WITH CLARIFICATION - CHART DOLPHIN WITH NOTATION*
DOL (LIGHTED) IN 39° 16' 18.90" N 076° 34' 20.51" W

J.4 A new dolphin was positioned at Fix 7992. The hydrographer recommends adding a new dolphin at the position. *CONCUR - CHART DOL IN 39° 16' 18.91" N 076° 34' 19.84" W*

J.5 Southwest and northwest seaward extent of "Transcom Pier" was positioned at Fix 7854 and 7850. The hydrographer recommends increasing pier length to that of detached positions. *CONCUR - 39° 16' 17.14" N 076° 34' 21.18" W*
39° 16' 17.82" N 076° 34' 21.13" W

J.6 Charted building on pier in ruins disproved. The hydrographer recommends removing this symbol from chart 12281. *CONCUR - 39° 16' 12.0" N 076° 34' 15.0" W*

J.7 Submerged pier ruins south of the Transcom Pier were disproved with multibeam within the survey area. The hydrographer recommends reducing the extent of pier ruins to the edge of the survey area. See Figure O.3. *CONCUR WITH*
CLARIFICATION - REVISE PIER RUINS IN 39° 16' 16.67" N, 076° 34' 14.76" W

K. CROSS LINES. *AS SHOWN ON PRESENT SURVEY.*

No crosslines were required for survey F-00454.

L. JUNCTIONS *SEE ALSO THE EVALUATION REPORT*

This sheet does not junction with current survey sheet limits.

M. COMPARISON WITH PRIOR SURVEYS. *SEE ALSO THE EVALUATION REPORT*

The Atlantic Hydrographic Branch as part of the office verification process will perform a comparison with prior surveys.

N. ITEM INVESTIGATION REPORTS.

N.1 No item investigations are submitted with this report.

O. COMPARISON WITH THE CHART. SEE ALSO THE EVALUATION REPORT

O.1 One chart is affected by this survey:

Chart 12281
"Baltimore Harbor"
48th Ed. 17 April 1999

O.2 Comparisons were made between F-00454 and chart 12281. In general, the survey is consistent with the chart. See Fig. O.3 for Field Chart Compilation.

P. ADEQUACY OF SURVEY SEE ALSO THE EVALUATION REPORT

This survey is complete and fully adequate to supersede prior survey data within common areas.

Q. AIDS TO NAVIGATION

The survey limits for this project contain no navigational aids.

R. STATISTICS.

R.1 a. Number of Positions.1415
R.2 a. Nautical Miles of Hydrography using multibeam coverage2.68
b. Days of Production1
c. Detached Positions7
d. Bottom Samples0
e. Tide Stations	1
g. Velocity Casts.	1

S. MISCELLANEOUS. *SEE ALSO THE EVALUATION REPORT*

S.1 b. No evidence of anomalous tides or tidal current conditions was found during this survey.

S.2 Bottom samples were not required for survey F-00454.

T. RECOMMENDATIONS.

T.1 None.

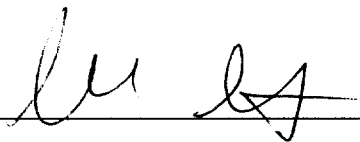
U. REFERRAL TO REPORTS

No reports or data are referred to in this Descriptive Report that are not included with this survey.

This report is respectfully submitted.



Michael Ian Becker
Survey Technician
NOAA Survey Vessel BAY HYDROGRAPHER



LT Shepard M. Smith, NOAA
Officer-in-Charge,
NOAA Survey Vessel BAY HYDROGRAPHER

APPENDIX III

LIST OF HORIZONTAL CONTROL STATIONS

No horizontal control stations were needed for this survey since Differential GPS was employed exclusively for all positioning control. The geographic positions for the two Differential GPS radio beacons used during this survey are as follows:

Cape Henry, VA	36°55'37.580"N
289 KHz	76°00'23.884"W
Cape Henlopen, DE	38°46'36.421"N
298 KHz	75°05'15.667"W

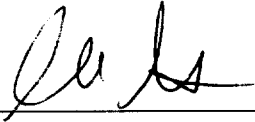
APPENDIX VII

LETTER OF APPROVAL

REGISTRY NO. F-00454

Field operations contributing to the accomplishment of this Navigable Area survey were conducted under my direct supervision with frequent personal checks of progress and adequacy. All field sheets and reports were reviewed in their entirety and all supporting records were checked as well.

This survey was completed with multi-beam sonar and is more than adequate to supersede all prior surveys in common areas. The survey is considered complete and adequate for nautical charting.



Shepard M. Smith, LT, NOAA
Officer-in-Charge
NOAA Survey Vessel BAY HYDROGRAPHER

GEOGRAPHIC NAMES

F00454

Name on Survey	A CHART NO.		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
	12281																
BALTIMORE (title)	X		X														1
MARYLAND (title)	X		X														2
NORTHWEST HARBOR	X		X														3
																	4
																	5
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Dennis J. Roseberry
Chief Geographer

APR 10 2000

04/19/2000

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: F00454

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	21761
NUMBER OF SOUNDINGS	21761

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	6.0	03/31/2000
VERIFICATION OF FIELD DATA	45.0	04/12/2000
QUALITY CONTROL CHECKS	0.0	
EVALUATION AND ANALYSIS	11.0	
FINAL INSPECTION	10.0	04/12/2000
COMPILATION	9.0	04/14/2000
TOTAL TIME	81.0	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		04/13/2000

N/CS33-24-00

LETTER TRANSMITTING DATA

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY
(Check)

- ORDINARY MAIL AIR MAIL
- REGISTERED MAIL EXPRESS
- GBL (*Give number*) _____

DATE FORWARDED

4-14-0

NUMBER OF PACKAGES

One Tube

Chief, Data Control Group, N/CS3x1
 NOAA/National Ocean Service
 SSMC3, Station 6815
 1315 East-West Highway
 Silver Spring, MD 20910-3282

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

F00454

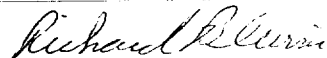
Maryland, Baltimore Harbor, Northwest Harbor

One tube containing the following:

- 1 Smooth Sheet For F00454
- 1 Original Descriptive Report
- 1 Drawing History Form (NOAA Form #76-71) For NOS Chart 12281
- Record of Application to chart Form (NOAA FORM #75-96) for Survey F00454
- 1 H-Drawing for NOS Chart 12281
- 1 Composite Drawing for NOS Chart 12281

Approved Smooth Tide Note to follow under separate letter
 Statistics Sheet to follow under separate letter

FROM: (Signature)


 Richard Blevins

RECEIVED THE ABOVE
 (Name, Division, Date)

Return receipted copy to:

Richard Blevins
 Atlantic Hydrographic Branch
 439 West York Street
 Norfolk, VA 23510

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR F00454 (1999)**

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

Hydrographic Processing System
NADCON, version 2.10
MicroStation 95, version 5.05
I/RAS B, version 5.01
Caris Hips/ Sips

The smooth sheet was plotted using a Hewlett Packard DesignJet 2500CP plotter.

H. CONTROL STATIONS

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). Office processing of this survey is based on these values. One page size plot was annotated with a tick mark showing the computed mean shift between NAD 83 and the North American Datum of 1927 (NAD 27).

To place on NAD 27, move the projection lines 0.386 seconds (11.915 meters or 2.38 mm at the scale of the survey) north in latitude, and 1.125 seconds (26.970 meters or 5.38 mm at the scale of the survey) east in longitude.

J. SHORELINE

The brown shoreline shown on the smooth sheet originates with NOS chart 12281, 48th Edition, Apr. 17, 1999 and is for orientation purposes only. Shoreline revisions originating with the present survey are shown in red on the smooth sheet.

L. JUNCTIONS

This survey does not junction with any contemporary surveys. Present survey depths are in harmony with the

charted hydrography to the north, south, east and west.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not done during office processing in accordance with section 4. of the memorandum titled "Changes to Hydrographic Survey Processing", dated May 24, 1995.

O. COMPARISON WITH CHART 12281 (48th Edition, Apr. 17/99)

Hydrography

The charted hydrography originates with the prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in sections J. and O. of the Descriptive Report. Attention is directed to the following:

1) A charted dolphin, in Latitude 39°16'19.30"N, Longitude 76°34'22.82"W, originates with an unknown source. During office processing of the survey, multibeam record examination revealed the dolphin no longer existed. It is recommended that the dolphin, in Latitude 39°16'19.30"N, Longitude 76°34'22.82"W, be removed from the chart.

2) Charted submerged ruins, in Latitude 39°16'19.42"N, Longitude 76°34'20.48"W, originate with an unknown source. The present survey did not investigate nor address this feature. It is recommended that the submerged ruins, charted in Latitude 39°16'19.42"N, Longitude 76°34'20.48"W, be retained.

3) A charted submerged dolphin, in Latitude 39°16'20.03"N, Longitude 76°34'19.83"W, originates with an unknown source. The present survey did not investigate nor address this feature. It is recommended that the submerged dolphin, charted in Latitude 39°16'20.03"N, Longitude 76°34'19.83"W, be retained.

4) A charted pier, in the vicinity of Latitude 39°16'12.00"N, Longitude 76°34'15.00"W, originates with an unknown source. The present survey indicates that its current condition is in ruins. It is recommended that the charted pier in the vicinity of Latitude 39°16'12.00"N, Longitude 76°34'15.00"W, be revised to ruins.

The present survey is adequate to supersede the charted

hydrography within the common area.

P. ADEQUACY OF SURVEY

This is an adequate hydrographic/multibeam survey. No additional work is recommended.

S. MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

The following NOS Chart was used for compilation of the present survey:

12281 (48th Ed., Apr. 17/99)

Richard Blevins

Richard Blevins

Cartographer

Verification of Field Data

Evaluation and Analysis

APPROVAL SHEET
FE00454

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Robert R. Hill Date: 4-13-00
Robert R. Hill Jr.
Cartographer
Atlantic 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.

Andrew L. Beaver Date: 13 APR 00
Andrew L. Beaver
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch

Final Approval:

Approved: [Signature], LCDR, NOAA Date: 18 Apr 00
for Samuel P. De Bow, Jr.
Captain, NOAA
Chief, Hydrographic Surveys Division

Figure B1
Survey Limits

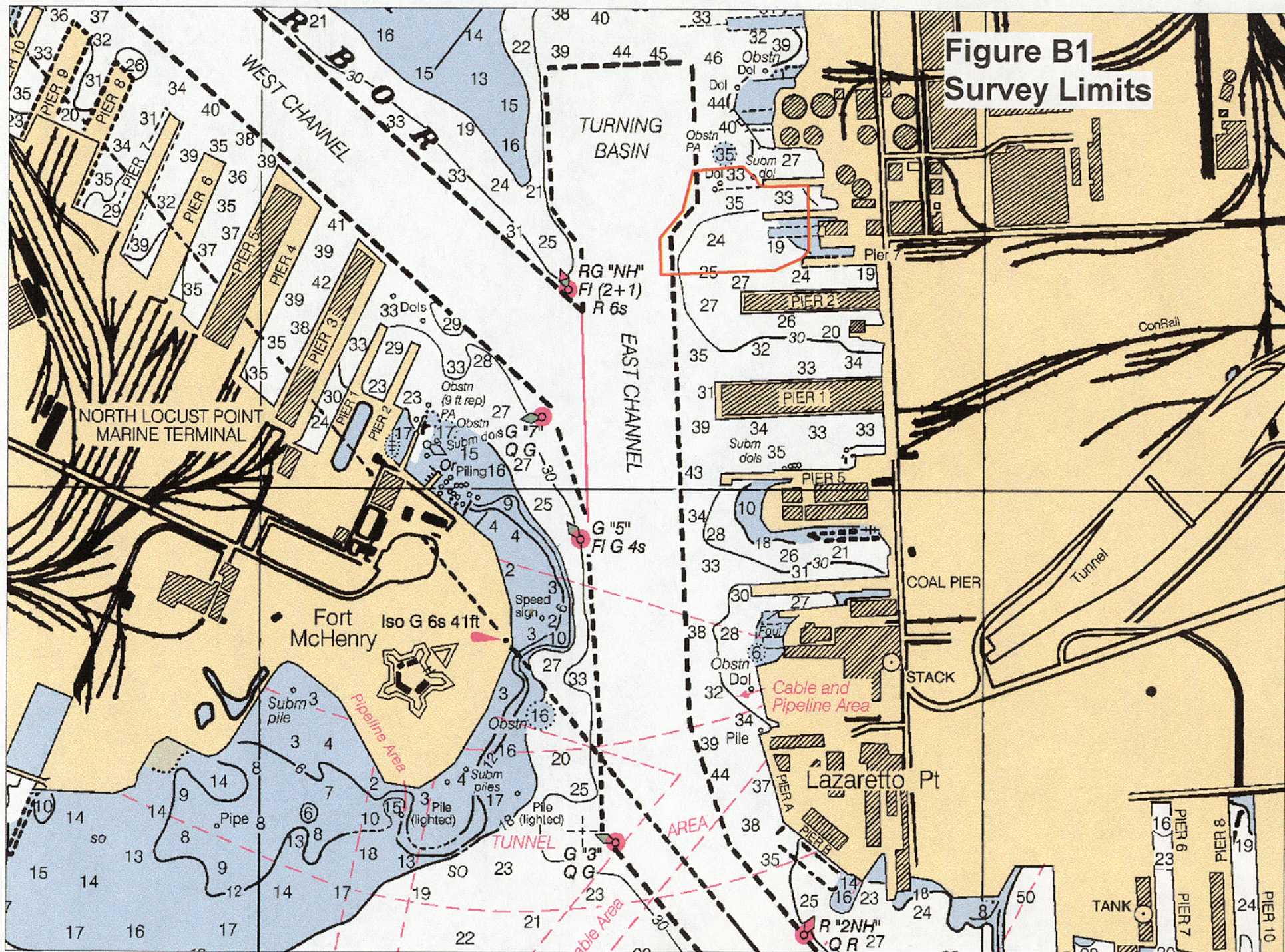
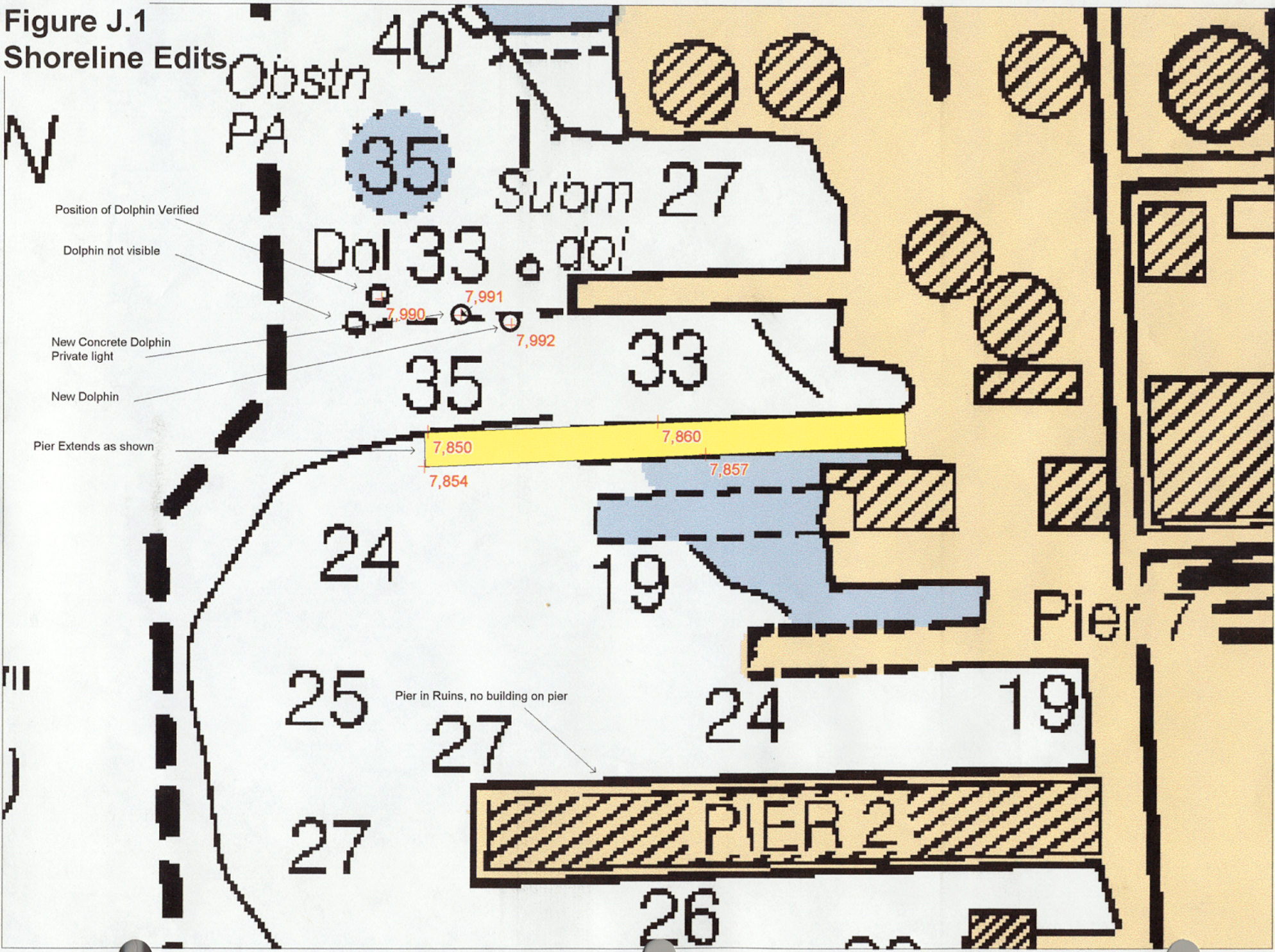


Figure J.1
Shoreline Edits

N



76° 34' 30"

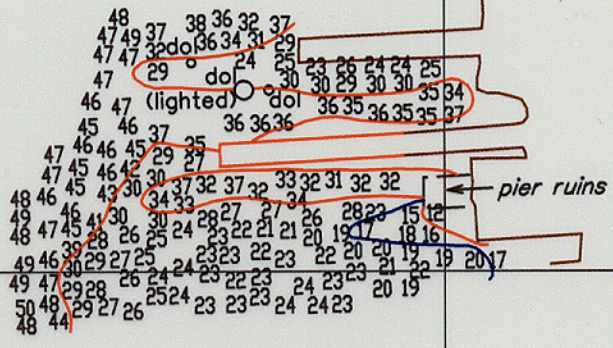
76° 34' 15"

76° 34' 30" W

NAD 27 39° 16' 30" N

39° 16' 30"

CHECKED BY: RWB
04/04/2000



39° 16' 15"

F00454
 MARYLAND
 BALTIMORE HARBOR
 NORTHWEST HARBOR
 SEPTEMBER 1999
 SCALE 1:5000
 SOUNDING IN FEET AT MLLW
 HORIZONTAL DATUM : NAD 1983
 SHEET 1 OF 1
 Brown shoreline originates with NOS chart 12281, 48th
 Edition, Apr. 17, 1999 and is for orientation purposes only.

39° 16' 00"

76° 34' 30"

76° 34' 15"

