H10612

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey ... Multibeam/Side Scan

Field No. ... C

Registry No. ... H-10612

LOCALITY

State ... New York

General Locality ... Western Long Island Sound

Sublocality ... Rocky Point tp Perfingo Neck

19 95

CHIEF OF PARTY
Walter Simmons (SAIC)

LIBRARY & ARCHIVES

DATE ... October 22, 1997

NOAA FORM 77-28 (11-72)

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

REGISTRY NO.
H-10612

HYDROGRAPHIC TITLE SHEET

FIELD NO.
C

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

State NEW YORK

General locality WESTERN LONG ISLAND SOUND

Locality ROCKY POINT TO PERFINGO NECK

Scale 1:10,000 Date of survey ~~May - July 1995;~~ ~~Nov 1995~~ 5/31/95-7/8/95 11/4/95-11/12/95

Instructions dated September 30, 1994 as amended Project No. OPR-B389-CN

Vessel M/V ATLANTIC SURVEYOR

Chief of party WALTER SIMMONS

Surveyed by J. Miller; S. Ferguson; A. Gagnon; D. Allen; J. Kiernan; P. Selvitelli; R. Watson; L. Gates; E. DeAngelo; J. Case; A. Maddock; S. Cook; R. Franchuck; T. Hamel; D. Reifsteck

Soundings taken by (echo sounder) hand lead, pole MULTIBEAM RESON SEABAT 9002

Graphic record scaled by Survey Personnel

Graphic record checked by Survey Personnel

~~Protracted~~ Evaluation by J.A. Ferguson Automated plot by ~~J. Kiernan; D. Allen~~ HP 650 C

Verification by D. Reifsteck

Soundings in fathoms (meters) feet at MLW (MLLW) and decimeters

REMARKS:* Contract # 50-DGNC-4-00035
Contractor Name: Science Applications International Corp.;
221 Third Street; Newport, R. I. 02840;
Subcontractor Name: Ocean Surveys Inc.;
91 Shefield Street; Old Saybrook; CT 06475

AWOIS/SURF ✓ 8/14/97 SJ ✓

Smooth Sheet Production Date/Time 05/17/96 15:10 Time Reference : UTC

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537.

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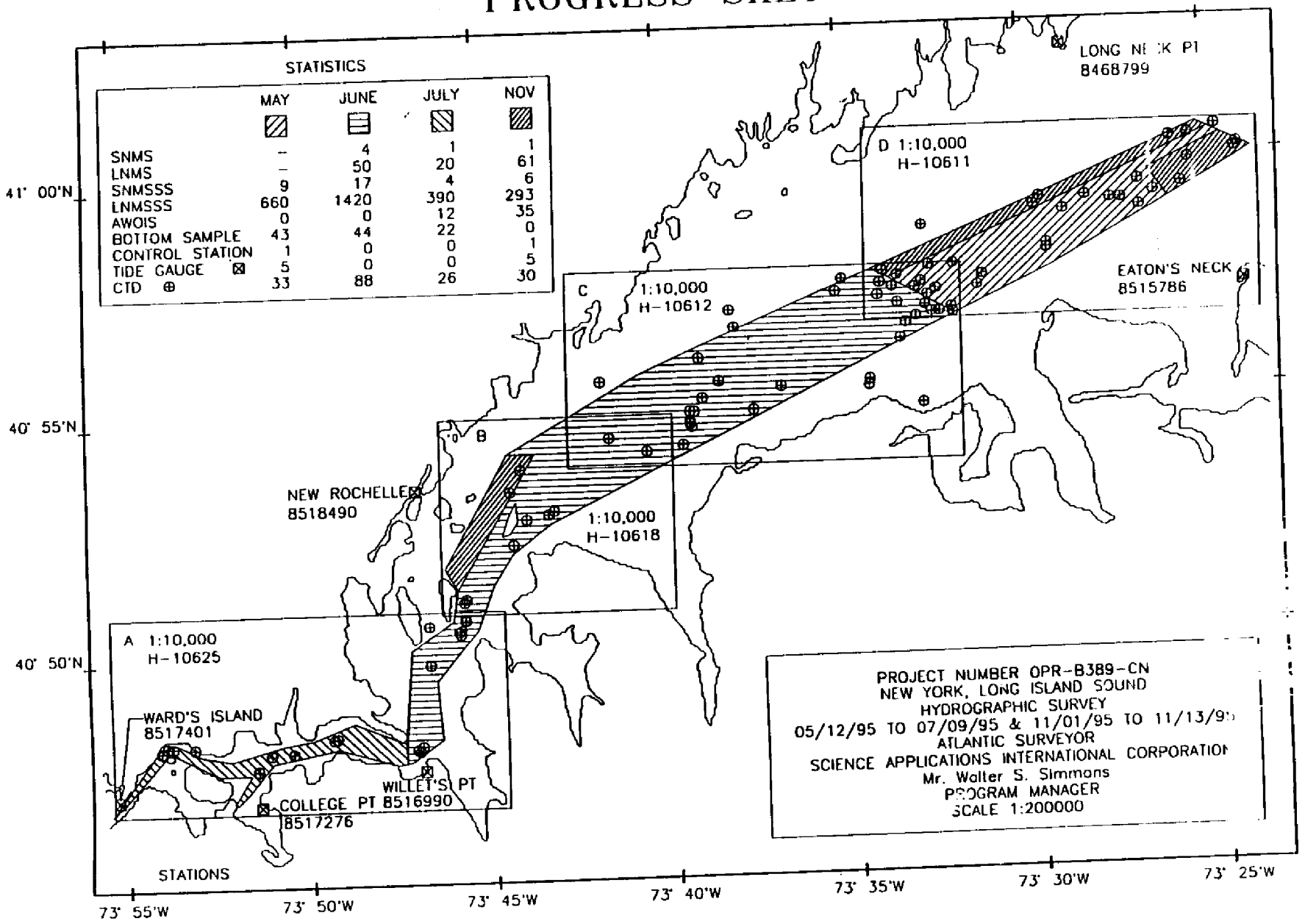
* Marginal notes and revisions to the Descriptive Report were generated at the Pacific Hydrographic Branch during review of the Survey work.

SUPPLEMENTAL REPORTS ARCHIVED WITH SURVEY DATA.

H-10612

PROGRESS SKETCH



Science Applications International Corporation (SAIC) warrants only that the survey data acquired by SAIC and delivered to NOAA under Contract 50-DGNC-4-00035 reflect the state of the sea floor in existence on the day and at the time the survey was conducted.

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Descriptive Report to Accompany
Hydrographic Survey H-10612

A. PROJECT ✓

Project number: OPR-B389-CN

Dates of instructions:	**30 September 1994**	**Original 50-DGNC-4-00035**
	21 March 1995	**Modification #1**
	03 April 1995	**Modification #2**
	06 June 1995	**Modification #3**
	23 June 1995	**Project limit definition, Execution Rocks**
	10 July 1995	**Modification #4**
	07 September 1995	**Modification #5**
	07 November 1995	**56-DGNC-6-13003**

Sheet letter: C
Registry number: H-10612
Purpose: Obtain 100% multibeam sonar coverage and 200% side scan sonar coverage within the survey area limits

B. AREA SURVEYED ✓

General locality: Western Long Island Sound, Rocky Point to Perfingo Neck. Main navigation channel, bounded approximately by the following positions:

Lat.	Long.
40° 57.7' N	073° 34.4' W
40° 56.6' N	073° 32.1' W
40° 53.8' N	073° 40.1' W
40° 54.9' N	073° 42.6' W
40° 55.6' N	073° 40.6' W

Dates of data acquisition: ✓

05/31/95 - 06/14/95	JD 151 - 165
06/24/95	JD 175
07/08/95	JD 189
11/04/95	JD 308
11/11/95 - 11/12/95	JD 315 - 316

C. SURVEY VESSELS ✓

M/V ATLANTIC SURVEYOR (ID# D582365) was the platform for all multibeam sonar, side scan sonar, sound velocity and bottom sampling operations. Data acquisition and post processing systems were mounted in CONEX containers which were welded in place on the aft deck. The gyro compass was mounted in the pilot house, and the TSS335B motion sensor was mounted on the aft end of the deck house just above the main deck.

Multibeam sounder transducers were mounted back to back on a plate at the bottom of a stainless steel pipe at the starboard waist. Bearing plates were welded to the main deck, and a stabilizing alignment bracket was welded to the side of the boat. The primary GPS navigation antenna was mounted directly above the transducer pole and the reference GPS antenna was mounted just inboard on the same mount.

The vessel layout is depicted in Figures C-1, C-2, C-3, and C-4, the coordinate systems in use are shown in Figure C-5, and the vessel offsets are shown in Table C-1 and C-2. The Reference Point for the entire system is located on the transducer pole at the water line. For surveys conducted from May through July 1995, the transducer depth was recorded as 2.20 meters, therefore the pole was marked with the Reference Point at 2.20 meters. Lead Line comparisons revealed an 0.11 meter error in the recorded transducer depth, and a corrector of +0.11m was applied to soundings in post processing.

During survey operations conducted from September through November, 1995, the transducer depth was recorded as 2.30 meters and the pole was marked accordingly. Lead Line comparisons confirmed the recorded transducer depth.

As discussed in the Phase IIA Summary Report, the IHSS, the RESON, and the TSS-335B all have different coordinate systems, and therefore care must be taken when inputting correctors to the system. The IHSS considers "z" to be positive down, while both the RESON and TSS consider "z" positive up. Both the IHSS and TSS consider "x" positive forward, the RESON considers "x" as positive athwartships to starboard. IHSS considers "y" positive athwartships to starboard, the TSS considers "y" positive athwartships to port and the RESON considers "y" as positive forward.

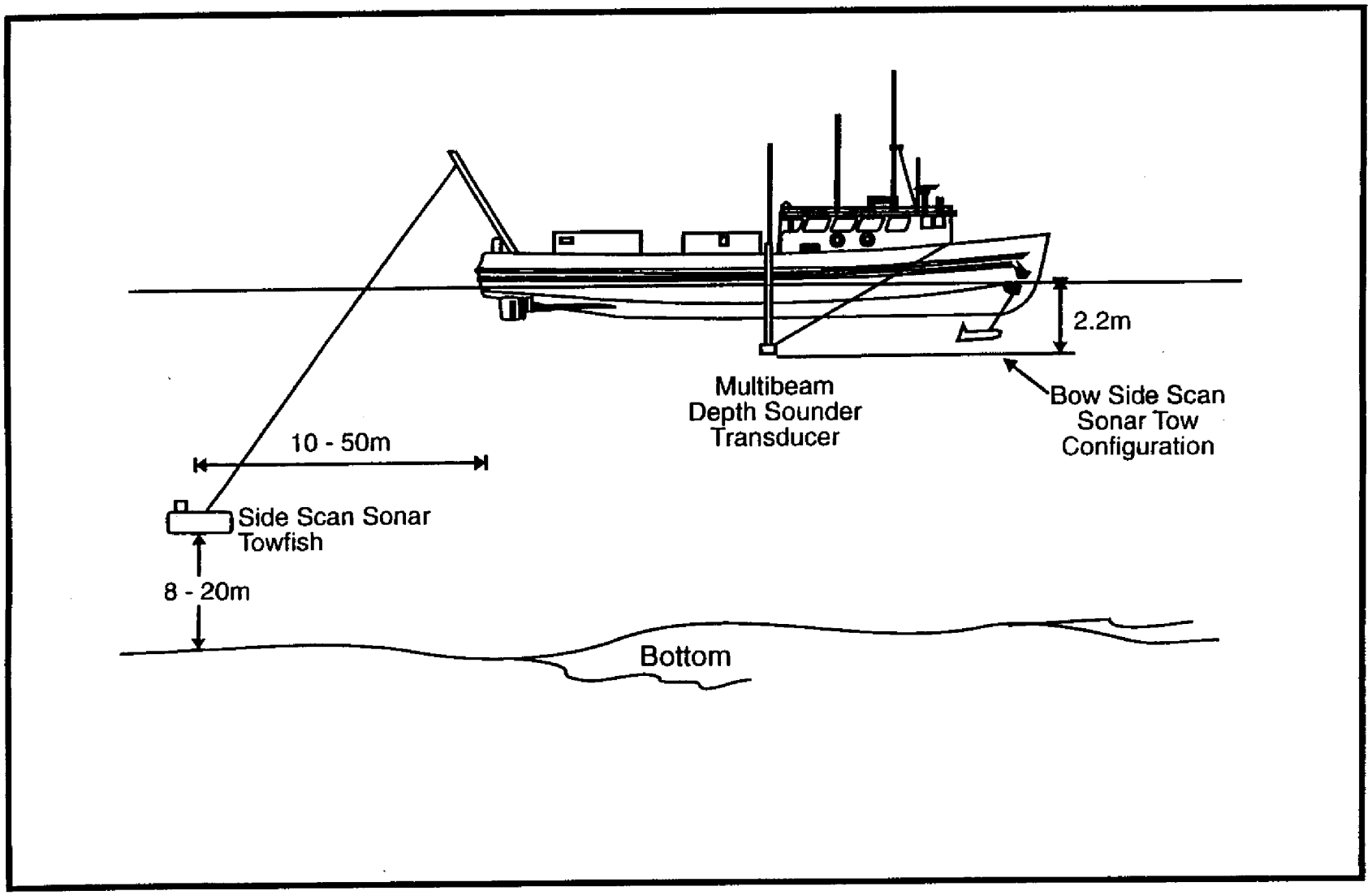


Figure C-1. Configuration of M/V Atlantic Surveyor During Survey Operations (May 14 - July 9, 1995)

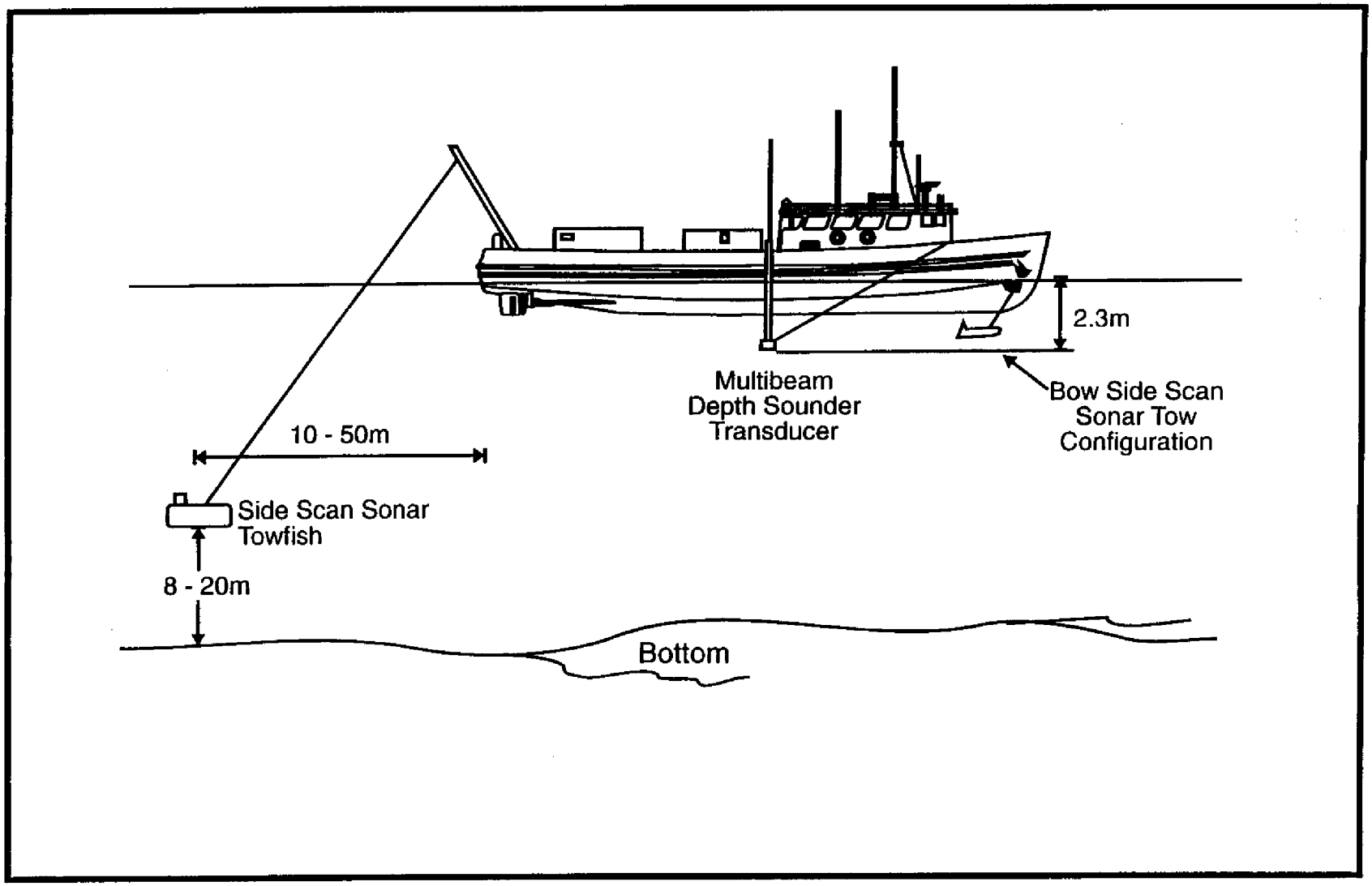


Figure C-2. Configuration of M/V Atlantic Surveyor During Survey Operations (Sept. 19 - Nov. 13, 1995)

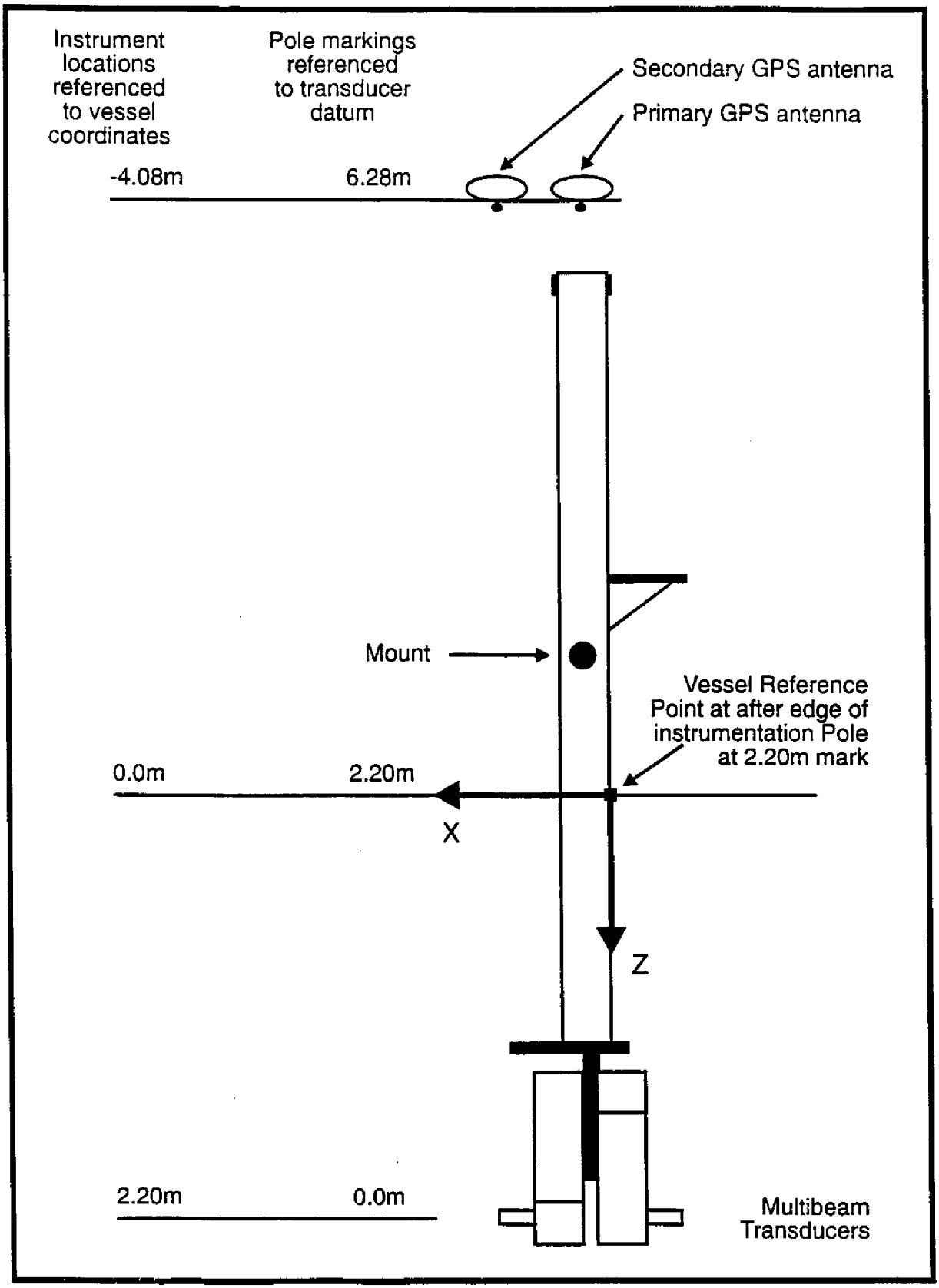


Figure C-3. Configuration of Multibeam Transducer Pole (May 14 - July 9, 1995)

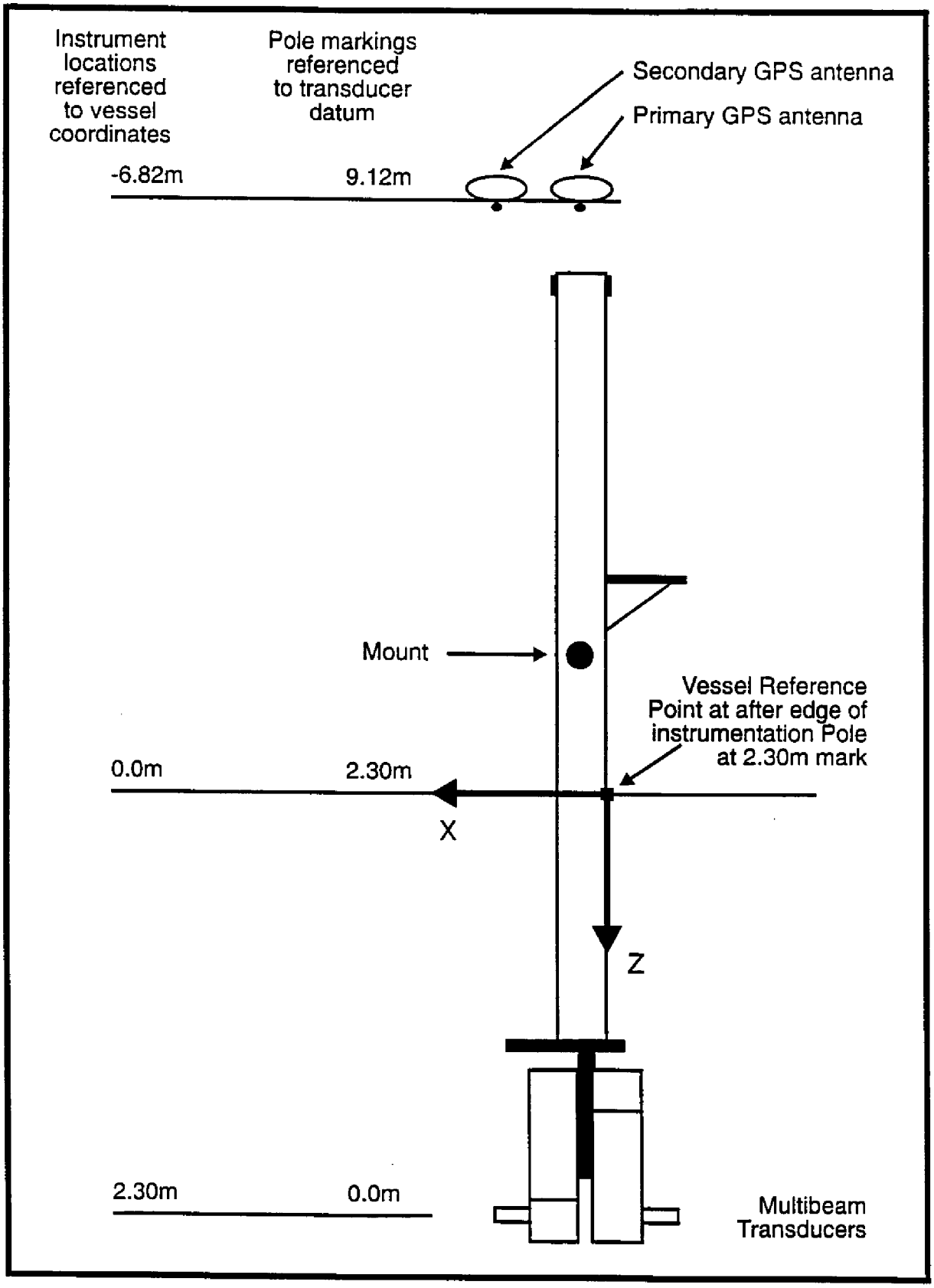


Figure C-4. Configuration of Multibeam Transducer Pole (Oct. 3 - Nov. 13, 1995)

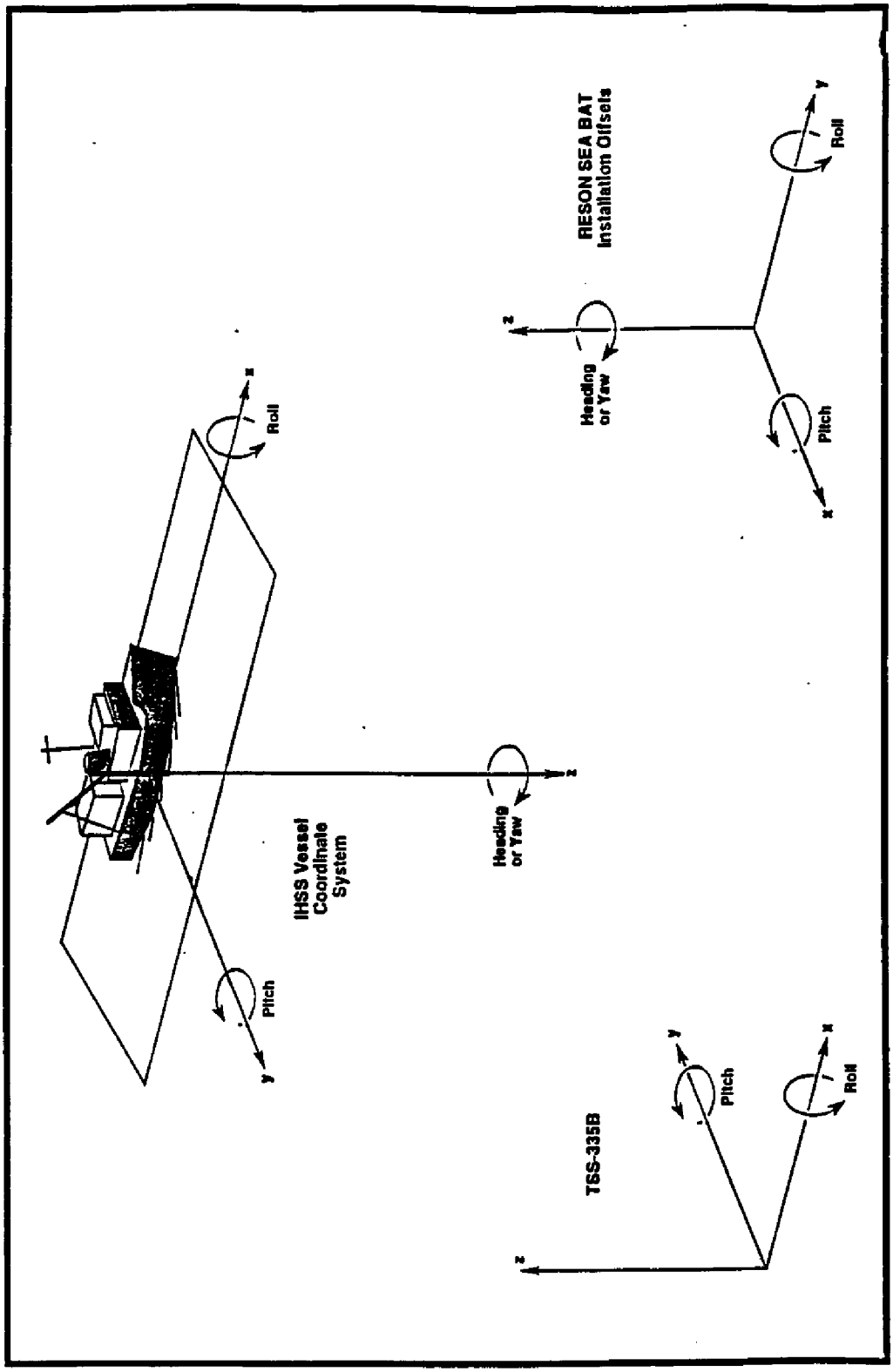


Figure C-5. Relevant IHSS Instrument Coordinate Systems

Table C-1. Antenna and Transducer Locations Relative to Vessel Reference Point (May 14 - July 9, 1995)

Sensor	Offset in IHSS	IHSS Coordinate Value, m	Offset in RESON 6042	RESON Coordinate Value, m
Multibeam	x	0	x(port)	-0.07
	y	0	y(port)	+0.11
	z	0	z(port)	-2.20
			x(stbd)	+0.07
			y(stbd)	-0.02
			z(stbd)	-2.20
Trimble 4000DS	x	0		
	y	0		
	z	-4.08		
TSS335B	x			-3.204
	y			+3.169
	z			+1.200
Sidescan Tow PT	x	-15.90		
"A" frame aft	y	-2.46		
	z	-5.18		

Table C-2. Antenna and Transducer Locations Relative to Vessel Reference Point (Oct. 3 - Nov. 13, 1995)

Sensor	Offset in IHSS	IHSS Coordinate Value, m	Offset in RESON 6042	Reson Coordinate Value, m
Multibeam	x	0	x(port)	-0.07
	y	0	y(port)	+0.11
	z	0	z(port)	-2.30
			x(stbd)	+0.07
			y(stbd)	-0.02
			z(stbd)	-2.30
Trimble 4000DS	x	0		
	y	0		
	z	-6.82		
TSS-335B	x			-3.020
	y			+3.320
	z			+1.300
Side scan Tow PT	x	-15.90		
"A" frame aft	y	-2.46		
	z	-5.18		

Note that offsets relative to depth measurement are input to the RESON, while those for navigation are input to the IHSS.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

The following SAIC IHSS software modules were used in the real time acquisition of MULTIBEAM data during the spring survey operation(May 14 - July 9, 1995):

Program	Modification Date
ap9	May 20, 1995
auto_archive	May 4, 1995
cbatdtc	May 11, 1995
	May 13, 1995
	May 15, 1995
cbatout	May 11, 1995
	May 13, 1995
	May 15, 1995
chutil	May 9, 1995
datamgr	May 4, 1995
dtc_data_display	May 4, 1995
eoscandtc	May 10, 1995
	May 18, 1995
	May 30, 1995
	Sept. 19, 1995
	Sept. 23, 1995
filemgr	May 4, 1995
irig-b pdd	May 8, 1995
kfstub	May 5, 1995
klein595	May 8, 1995
	May 23, 1995
mbmgr	May 4, 1995
	May 18, 1995
mergeserve	May 4, 1995
	May 27, 1995
messagemgr	May 4, 1995
mk32	Apr 26, 1995
navmgr	May 5, 1995
	May 17, 1995
	May 28, 1995
nms	May 9, 1995
ntimesrv	Apr 06, 1995
kflog	Apr 10, 1995
	May 18, 1995
	May 30, 1995
helm_display	May 05, 1995
	May 17, 1995
	May 28, 1995
rtkfst	Apr 29, 1995
setclock	Apr 22, 1995
sb_sssv	Apr 26, 1995
	May 22, 1995
spmgr	May 05, 1995
stateb	May 04, 1995
stateb	May 04, 1995
strip	May 09, 1995
svpmon	May 04, 1995
swathplot	May 04, 1995
sync_os2	Apr 23, 1995
sync_ux	May 04, 1995
syscon	May 04, 1995
teltx	May 04, 1995

Program	Modification Date
telrx	May 04, 1995
timechk telrx	May 04, 1995
tr4000	May 08, 1995
	May 16, 1995
tr4ref	May 08, 1995
	May 16, 1995
tss335b	May 08, 1995
utilitymgr	May 04, 1995

The following Polaris Imaging and SAIC IHSS software modules were used in real time acquisition of SIDE SCAN Data during the spring survey operation (May 14 - July 9, 1995):

Program	Modification Date
eoscan.exe	May 15, 1995
sonar.bin	May 15, 1995
eoscan.cfg	May 15, 1995
sonar.bin/eoscan.exe	May 16, 1995
sonar.bin/eoscan.exe	May 17, 1995
eoscan.cfg	May 18,1995
sonar.bin/eoscan.cfg	May 19, 1995
DSP Card (Hardware), eoscan.exe	May 21, 1995
eoscan.exe, eoscan.cfg	June 13 ,1995

The following SAIC IHSS software modules were used in the real-time acquisition of MULTIBEAM data during the fall survey operation (September 19 - November 13, 1995):

Program	Modification Date
ap9	May 20, 1995
auto_archive	May 4, 1995
cbatdtc	May 15, 1995
cbatout	May 15, 1995
chutil	May 9, 1995
datamgr	May 4, 1995
dtc_data_display	May 4, 1995
eoscandtc	Sept. 19, 1995
eoscandtc	Sept. 23, 1995
filemgr	May 4, 1995
irig-b pdd	May 8, 1995
kfstub	May 5, 1995
klein595	May 23, 1995
mbmgr	May 18, 1995
mergeserve	May 27, 1995
messagemgr	May 4, 1995
mk32	Apr 26, 1995
navmgr	May 28, 1995
nms	May 9, 1995
ntimesrv	Apr 06, 1995
kflog	May 30, 1995
helm_display	May 28, 1995
rtkfst	Apr 29, 1995
seabird seasoft (4.210)	Feb. 23, 1995
setclock	Apr 22, 1995
sb_sssv	May 22, 1995
spmgr	May 05, 1995
stateb	May 04, 1995
strip	May 09, 1995
svpmon	May 04, 1995
swathplot	May 04, 1995

Program	Modification Date
sync_os2	Apr 23, 1995
sync_ux	May 04, 1995
syscon	May 04, 1995
Teltx	May 04, 1995
telrx	May 04, 1995
timechk telrx	May 04, 1995
tr4000	May 16, 1995
tr4ref	May 16, 1995
tss335b	May 08, 1995
utilitymgr	May 04, 1995

The following Polaris Imaging and SAIC IHSS software modules were used in real-time acquisition of SIDE SCAN Data during the fall survey operation (September 19 - November 13, 1995):

Program	Modification Date
eoscan.exe	May 15, 1995
sonar.bin	May 15, 1995
eoscan.cfg	May 15, 1995
sonar.bin/eoscan.exe	May 17, 1995
eoscan.cfg	May 18,1995
sonar.bin/eoscan.cfg	May 19, 1995
DSP Card (Hardware), eoscan.exe	May 21, 1995
eoscan.exe, eoscan.cfg	June 13 ,1995

The following SAIC software modules were used in the processing of all data.

Program	Modification Date
appcors	May 17, 1995
applydft	July 26, 1995
applysqt	July 26, 1995
chutil	May 05, 1995
corrtarg	Sept. 18, 1995
corrtarg	Oct. 17, 1995
datamgr	May 4, 1995
datasumm	Aug. 15, 1995
examgyro	Jun 22, 1995
exammb	May 19, 1995
gsf2hdcs	May 22, 1995
gsfedit	Sept. 4, 1995
gsfupdat	June 30, 1995
MBHAT>check_cover	Sept. 19, 1995
MBHAT>check_z	Nov. 21, 1995
MBHAT> contact_dxf	Jan 5, 1996
MBHAT>cover_dxf	Nov. 16, 1995
MBHAT>feature_gsf	Nov. 16, 1995
MBHAT> get_contact	Nov. 8, 1995
MBHAT>init_sheet	July 19, 1995
MBHAT>junction	Oct. 23, 1995
MBHAT>main_x_diff	June 29, 1995
MBHAT>make_contours	Dec 22, 1995
MBHAT>make_final_contours	Nov. 3, 1995
MBHAT>makeacadpcx	July 20, 1995
MBHAT>new_select	Jan 5, 1996
MBHAT>new_ss_cover	Nov. 28, 1995
MBHAT>noaagsf	Nov. 8, 1995
MBHAT>set_eoflag	Oct. 2, 1995
MBHAT>target_dxf	Jan. 5, 1996
MBHAT>track_dxf	July 20, 1995
MBHAT>update_contact	Nov. 6, 1995
MBHAT>view3d	July 21, 1995

Program	Modification Date
MBHAT>ztogsf	Oct. 5, 1995
navup	Sept. 19, 1995
rangeflt	Sept. 4, 1995
rangeflt	Oct. 5, 1995
refdraft	Sept. 20, 1995
resetflg	Sept. 18, 1995
resonflt	May 05, 1995
setsound	July 25, 1995
swathmap	May 05, 1995
tid2hmps	May 17, 1995

Throughout this descriptive report wherever software is mentioned (in bold print) the most current version of the software available was used.

E. SONAR EQUIPMENT (Side scan sonar operations)

The following side scan sonar equipment was used for the entire Sheet C survey:

- Klein 595 Side Scan Sonar Recorder, Klein Associates, Serial Number 658.
- Klein 595 Dual Frequency Towfish, Klein Associates, Serial Number 700.
- Klein 595 Dual Frequency Towfish, Klein Associates, Serial Number 894.
- Eoscan Digital Side Scan Recording and Target Analysis, Polaris Imaging, Serial Number 10270A.

The vertical beam width of the Klein 595 side scan was 40° at 3dB. A depression angle of 20 degrees was used on the tow fish. The dual frequency fish had the 500 kHz frequency disabled, and the 100 kHz frequency was used at all times.

Side scan operations were conducted in water depths ranging from 8.5 meters to 19 meters. The point of deployment of the tow fish was the center A-frame at the stern of the vessel. The 75 meter range scale was used throughout the survey with the exception of the first day of survey operations which was conducted at a 100 m range setting. Since the range scale was chosen to be 75 m, the survey vessels speed was maintained at six knots or less. A line spacing of 50 m was standard throughout Sheet C.

The side scan altitude off the bottom was maintained between 6 and 15 m for the 75 m range scale setting and between 8 and 20 m for the 100 m range setting, except as noted in restricted time periods indicated in the Sheet C Processing and Multibeam Summary Report and the *cssl.p00* file. The amount of cable deployed was determined by using the 1 meter markings on the cable. As the cable length was adjusted to maintain the proper fish altitude, the operator would note the markings on the cable and enter the amount of cable deployed for layback calculations.

To verify that the side scan signal reached the full extent of the slant range setting, records were checked for location of known objects at the far edge of the slant range. Lobster pots were also useful as confidence checks because they were good sonar targets which extended across the area of coverage.

Side-Scan Target and Feature Processing ✓

For a full discussion of side scan processing, refer to the Phase IIA Summary Report, for complete Sheet C processing lists to the Sheet C Processing and Multibeam Summary Report.

Sheet C side scan targets were collected with the **Eoscan_DTC**, versions are as noted in Section D of this report. Layback is not independently recorded in the records collected during the spring deployment, while layback is included in the records from the November deployment. Target and fish positions prior to Sept. 23 are calculated with a different layback equation than those collected after this date, as described in the Phase IIA Summary Report.

For the targets collected during the spring deployment, all targets were read into an Excel spreadsheet, which calculated slant range and target height. Using the output listing from the spreadsheet, two side-scan processors reviewed each graphic record and the associated target file. Additions, corrections and deletions of target ranges, shadows, and times were agreed upon and entered into the spreadsheet.

All Sheet C targets collected during the November deployment were read into a revised Excel spreadsheet, which calculated only slant range. Using the output listing from the spreadsheet, two side-scan processors reviewed each graphic record and the associated target file. Additions, corrections and deletions of target ranges, shadows, and times were agreed upon and entered into the spreadsheet. The **corr_targ** program was then run to update target positions, ranges, and heights for these targets.

Targets were correlated with multibeam features using the **get_contact** program, which produces the *cfeature* file and modifies the *ctargets.ctv* file. Correlations were made in two phases. First, targets collected during the spring deployment were processed as described above and correlated with features during July and August 1995 in order to provide recommendations for item investigation. Because feature-to-target correlations were made and features selected at this time, targets collected during the spring were not reprocessed with a revised layback estimate nor using the **corr_targ** program. The second processing phase was during November when one additional target was identified; it was processed as described above and added to the *ctargets.ctv* file.

There were 55 features and 471 targets for Sheet C. Each feature was reevaluated with reference to its position and relation to soundings on the smooth sheet. *Cfeature* and *ctargets.ctv* files were combined into the *cupdate.out* file using **update_contact** to provide a correlated features-to-targets listing. The *cfeatgsf.out* file was created using the **feature_gsf** program, which traces a feature to a multibeam file, ping and beam number. 36 features were correlated directly to corresponding multibeam 1xIHO least depths using the **feature_gsf** program; 3 features were correlated with 1xIHO multibeam least depths using the **gsfedit** program; 13 features were correlated to 2xIHO least depths using the **feature_gsf** program; 3 features were correlated with 2xIHO least depths using **gsfedit**.

Watch standers identified 24 targets as wrecks. During post processing and evaluation, the hydrographer judged that 3 were not wrecks and were non-significant. Therefore, only 21 of the targets initially labeled as "wreck" were correlated into wreck features. Twenty five other targets were also correlated with the wreck targets. These 46 targets were correlated into 16 wreck features.

After completion of item investigations, the target/feature correlations were redone using all multibeam data with all correctors applied. As a result, some features were judged non-significant and removed from the features list. In some cases, non-significant features had been placed on the list and were therefore removed. In other cases item investigation resulted in 1xIHO depths which showed features to be non-significant. The following features were removed from the features list as non-significant after analysis of data with all correctors applied: Agree.

Features were analyzed during office processing.

Feature Number	Latitude	Longitude	Feature Depth	Feature Type	1 or 2 x IHO	Description
1	40 54.51852N	073 38.19110W	9.65	OBSTR	2	buoy_sinker
3	40 56.36187N	073 33.76851W	13.43	OBSTR	1	Feature in 13.6m
5	40 54.53428N	073 38.92094W	15.54	OBSTR	1	Feature in 15.6m
6	40 54.52844N	073 38.93242W	15.57	OBSTR	1	Feature in 15.6m
8	40 54.81775N	073 38.08296W	16.30	ROCK	2	Feature in 16.8m
10	40 54.72348N	073 38.65342W	14.78	ROCK	2	Feature in 15.3m
12	40 54.75188N	073 38.81748W	15.03	ROCK	2	Feature in 15.3m
13	40 54.73941N	073 38.77288W	14.54	ROCK	2	Feature in 15.0m
15	40 54.74344N	073 38.77833W	14.54	ROCK	2	Feature in 15.0m
16	40 54.88781N	073 38.37795W	15.44	ROCK	2	Feature in 16.0m
17	40 54.96428N	073 38.13345W	15.97	ROCK	2	Feature in 16.3m
18	40 56.64543N	073 33.47790W	14.49	OBSTR	1	Feature in 14.6m
19	40 54.92757N	073 38.36066W	15.89	ROCK	2	Feature in 16.3m
23	40 55.00373N	073 38.40050W	16.41	ROCK	2	Feature in 16.8m
26	40 55.01991N	073 38.35243W	16.30	ROCK	2	Feature in 16.8m
28	40 54.91636N	073 38.83620W	15.17	ROCK	2	Feature in 15.8m
31	40 56.11836N	073 35.44784W	14.14	ROCK	2	Feature in 14.5m
33	40 54.85690N	073 39.05823W	15.55	ROCK	2	Feature in 15.9m
34	40 54.98359N	073 38.90475W	15.25	ROCK	2	Feature in 15.9m
36	40 55.10701N	073 38.72752W	16.64	ROCK	2	Feature in 16.9m
38	40 54.95804N	073 39.02053W	15.56	ROCK	2	Feature in 16.1m
40	40 55.10972N	073 38.59437W	16.64	ROCK	2	Feature in 17.3m
41	40 54.91465N	073 39.05991W	15.77	ROCK	2	Feature in 16.3m
42	40 54.47454N	073 40.48452W	13.00	ROCK	2	Feature in 13.2m
43	40 54.49307N	073 40.49779W	12.79	ROCK	2	Feature in 13.3m
44	40 54.51395N	073 40.44025W	13.06	ROCK	2	Feature in 13.5m
48	40 55.52309N	073 37.71437W	15.46	OBSTR	1	Feature in 15.5m
50	40 56.58883N	073 35.24566W	15.19	ROCK	1	Feature in 15.4m
52	40 54.90498N	073 37.77494W	17.05	ROCK	2	Feature in 17.5m
53	40 55.29333N	073 37.21310W	14.42	ROCK	2	Feature in 14.8m
56	40 55.20018N	073 39.62057W	15.79	ROCK	1	Feature in 15.9m
58	40 55.20111N	073 40.68162W	15.15	ROCK	2	Feature in 15.5m
61	40 55.16572N	073 41.14644W	15.58	OBSTR	1	Depression in 15.0m
64	40 54.88348N	073 42.47419W	12.70	ROCK	1	Feature in 13.0m
65	40 54.89758N	073 42.43043W	12.32	ROCK	1	Feature in 12.7m
71	40 56.89314N	073 32.89709W	15.46	ROCK	1	Feature in 15.7m
75	40 54.62554N	073 37.82708W	13.43	ROCK	2	Feature in 13.8m
87	40 54.56859N	073 38.17155W	11.40	ROCK	2	Feature in 11.9m
89	40 54.35287N	073 38.66961W	14.65	OBSTR	1	Feature in 15.1m

95	40 54.67086N	073 37.87238W	13.66	ROCK	2	Feature in 14.0m
98	40 54.69361N	073 37.95746W	14.02	ROCK	1	Feature in 14.5m
99	40 54.70792N	073 37.93011W	14.22	ROCK	2	Feature in 14.5m
100	40 54.29836N	073 39.23065W	16.64	ROCK	1	Feature in 17.0m
102	40 54.48260N	073 38.94838W	15.02	OBSTR	1	Feature in 15.4m
103	40 54.77691N	073 39.06276W	15.90	ROCK	2	Feature in 16.3m

Side Scan Coverage Analysis ✓ Evaluator concurs that these items are non-significant.

The side scan lines in Sheet C were, in general, run with a line spacing of 50 m and a side scan range setting of 75 m, providing the required 200% side scan coverage with at least a 50% overlap of lines, as shown on the side scan coverage plot. Side scan coverage for Sheet C is 300% or more for at least 95% of the area. This coverage was calculated using the **new_ss_cover** program (see Phase IIA Summary Report for discussion of parameter settings) with settings of a=20, r=30, p=30, and b=10, with the *cssl.p00* and *ceos.lst* files as input.

F. SOUNDING EQUIPMENT ✓

The following components were used for acquisition of multibeam bathymetric data:

- RESON SeaBat 9002 multibeam system consisting of:
  - Three SeaBat Transducers, Serial Numbers (port) 332217, (starboard) 332202 and 214010.
  - Two SeaBat 9001 Processors, Serial Numbers 6597 and 5230
  - SeaBat 6042 Controller and Processing Unit, Serial Number 590 P0 794-387

On Julian Day 271 (Sept 28) the Starboard Transducer Head (332202) was replaced with a spare (214010). Alignment tests were run on this day and the new head was used for survey beginning on Julian Day 272 (Sept. 29). Consequently, this head was used for all fall survey operations in Sheet C.

A lead line made of Kevlar line with a 35-pound steel plate as a weight was used for checking the center beams of the multibeam echo sounder. The line was marked in feet and was calibrated against a steel tape.

G. CORRECTIONS TO SOUNDINGS ✓

Speed of sound

The following systems were used to determine sound velocity profiles for corrections to multibeam sonar soundings.

- Sea-Bird Electronics, Inc., Model 19 CTD, Serial Number 1801, Calibration Date 08 March 1995, (CTW in file names).

- Sea-Bird Electronics, Inc., Model 19 CTD, Serial Number 565, Calibration Date 11 April 1995, (CTG in file names).

Speed of sound profiles were computed from casts taken with the Sea-Bird Electronics, Inc. Model 19 CTD's. The primary unit was SBE19 #1801. Daily confidence checks were obtained from simultaneous casts with the primary CTD and with SBE19 #565. All profiles were computed using **SBE Term19** software. Computed profiles were copied to the **IHSS** for comparison on the screen. A selected profile was applied to the system, recorded, and sent to the RESON 6042 where a refraction lookup table was computed for application of depth, angle and range correctors to the multibeam sounding data. If sounding depths exceeded the cast depth, the 6042 used the bottom of the table to extend correctors below the table. Reference page 32, Sound Velocity Corrections, Table O-1.

Positions and dates of all casts are shown in Table G-1. Confidence check profiles from simultaneous casts were compared using the multibeam display program and were, in general, identical. If the comparison was not satisfactory, at least one more profile was done.

Table G-1. CTD Files and Locations

CTD File Name	Confidence Check	Apply to Reson	Log Sheet	Plot	Cast Depth (m)	Latitude	Longitude
CTW15103.CNV		X	X	X	18	40 56.99N	73 38.11W
CTW15104.CNV		X	X	X	17.5	40 56.00N	73 39.00W
CTW15201.CNV		X	X	X	19	40 56.62N	73 38.00W
CTW15401.CNV	X	X	X	X	14.5	40 56.24N	73 33.45W
CTG15401.CNV	X		X	X	14.5	40 56.24N	73 33.45W
CTW15402.CNV		X	X	X	14.5	40 56.74N	73 31.98W
CTW15403.CNV		X	X	X	17.5	40 56.86N	73 32.02W
CTW15404.CNV		X	X	X	18	40 54.23N	73 39.48W
CTW15405.CNV		X	X	X	17.5	40 54.73N	73 32.38W
CTW15501.CNV		X	X	X	17.5	40 56.78N	73 32.36W
CTW15502.CNV		X	X	X	17	40 56.78N	73 32.56W
CTW15601.CNV		X	X	X	16	40 55.42N	73 34.30W
CTW15602.CNV	X		X	X	16	40 56.70N	73 33.01W
CTG15602.CNV	X	X	X	X	16	40 56.70N	73 33.01W
CTW15603.CNV		X	X	X	15	40 55.35N	73 36.74W
CTW15604.CNV		X	X	X	14.5	40 56.57N	73 33.29W
CTW15605.CNV			X	X	19	40 54.60N	73 39.23W
CTW15606.CNV			X	X	19.5	40 54.65N	73 39.27W
CTW15607.CNV		X	X	X	19.8	40 54.70N	73 39.27W
CTW15701.CNV		X	X	X	10	40 55.30N	73 34.34W
CTW15702.CNV	X	X	X	X	16	40 57.16N	73 32.75W
CTG15702.CNV	X	X	X	X	16	40 57.16N	73 32.75W
CTW15703.CNV		X	X	X	17.5	40 57.15N	73 32.67W
CTW15704.CNV		X	X	X	17.5	40 54.92N	73 39.27W
CTW15705.CNV		X	X	X	17.2	40 54.91N	73 39.16W
CTW15801.CNV		X	X	X	16.5	40 55.51N	73 38.46W
CTW15802.CNV	X		X	X	21	40 57.35N	73 33.64W

CTD File Name	Confidence Check	Apply to Reson	Log Sheet	Plot	Cast Depth (m)	Latitude	Longitude
CTW15803.CNV	X	X	X	X	21	40 57.35N	73 33.64W
CTW15901.CNV		X	X	X	18.8	40 57.18N	73 34.04W
CTW15902.CNV		X	X	X	21	40 57.60N	73 33.50W
CTW15903.CNV			X	X	8.5	40 54.89N	73 32.87W
CTW15904.CNV			X	X	8.5	40 54.89N	73 32.87W
CTW15905.CNV	X	X	X	X	20	40 57.45N	73 33.97W
CTG15906.CNV	X		X	X	20	40 57.45N	73 33.97W
CTW16001.CNV		X	X	X	22	40 57.44N	73 32.84W
CTW16002.CNV		X	X	X	18.5	40 57.71N	73 33.90W
CTW16003.CNV		X	X	X	19.5	40 57.30N	73 35.20W
CTW16004.CNV	X	X	X	X	18	40 57.57N	73 35.01W
CTG16005.CNV	X		X	X	18	40 57.57N	73 35.01W
CTW16101.CNV		X	X	X	16.5	40 55.18N	73 38.92W
CTW16102.CNV	X		X	X	16	40 56.93N	73 32.74W
CTG16103.CNV	X	X	X	X	16	40 56.93N	73 32.74W
CTW16201.CNV		X	X	X	20	40 54.90N	73 37.52W
CTG16202.CNV	X	X	X	X	17	40 57.00N	73 33.50W
CTW16203.CNV	X		X	X	17	40 57.00N	73 33.50W
CTW16204.CNV		X	X	X	18.5	40 57.32N	73 33.02W
CTW16401.CNV		X	X	X	17	40 57.53N	73 33.78W
CTW17501.CNV	X	X	X	X	15	40 55.60N	73 41.72W
CTG17502.CNV	X		X	X	15	40 55.60N	73 41.72W
CTW30801.CNV		X	X	X	21	40 57.2	73 33.5
CTW31502.CNV		X	X	X	17	40 56.0	73 39.2
CTW31602.CNV		X	X	X	15	40 54.7	73 42.1

Corrections determined from vertical casts ✓

Leadline comparisons to multibeam center beam soundings were made weekly to verify the transducer draft and echo sounder instrument correctors. For each comparison, a CTD cast was taken and the sound velocity profile loaded into the **IHSS** and the RESON 6042. Ten leadline readings were recorded along with the UTC time of observation while the **IHSS** recorded the multibeam readings. **Exammb** was used to find the port and starboard center beam readings for the time of each leadline reading.

The results of these readings were entered into a spreadsheet along with the draft reading from the transducer pole and any squat corrector which may have been entered in the **IHSS**. The spreadsheet applied a calibration corrector to the leadline readings and converted the readings from feet to meters. It also applied correctors to the port and starboard multibeam readings for the difference between the observed draft and reference point (2.20 meter - spring, 2.30 meter - fall), and for any settlement and squat inadvertently left in the **IHSS**.

Each corrected cast depth was compared to the simultaneous multibeam readings and correctors were calculated by the spreadsheet. The ten comparisons were averaged for each transducer and the standard deviations were computed.

During the May - July, 1995, deployment, comparisons revealed a consistent system bias with the multibeam soundings being too shallow by 0.11 meters. Correctors of +0.11 meters were applied to all May - July, 1995, multibeam soundings in post processing. Records of the comparisons are included in the Phase IIA Summary Report.

During the autumn, 1995, deployment, the mean of the results for six sets of comparisons resulted in a corrector of 0.006 meters for each transducer. Therefore, no instrument or draft corrector was applied to soundings for this deployment. The leadline comparisons are included in the Phase IIA Summary Report.

Static draft ✓

At a minimum, the static draft was observed on a daily basis by reading the markings on the transducer pole while the vessel was stationary. If the static draft value changed from the previously noted value, the new value was entered into the RESON system. The static draft value was recorded at the beginning of a GSF file or whenever values in the header were changed. All results are reported in the Processing and Multibeam Data Summary.

Settlement and squat ✓

Measurements of settlement and squat were conducted at the breakwater north of Coddington Cove, Narragansett Bay, Rhode Island on May 5, 1995, in 14 meters of water. The results were compiled into a lookup table of the vessel's engine rpm vs settlement and squat. Rpm settings were entered into the Multibeam parameters by the real-time system operator, the computer applied settlement and squat correctors interpolated from the lookup table, and recorded it in the "Depth Corrector" field of the GSF data file for each ping. All results are reported in the Phase IIA and Phase IIA Summary Report-Settlement and Squat Test.

Roll, Pitch and Heading ✓

The following sensors were used for acquisition of Roll, Pitch and Heading data:

- TSS-335B Vertical Reference Units, Serial Numbers 001615 and 583
- Sperry MK32 Gyrocompass, Serial Number 208

The TSS-335B Vertical Reference Units and their corresponding junction boxes, were used for heave, roll, and pitch. The accuracy of the sensor is 5 percent of 1 m or 5 cm for heave; ± 0.10° dynamic accuracy for roll and pitch, and ± 0.05° static accuracy for roll and pitch. The Sperry MK32 was used for heading. The dynamic heading accuracy of the unit at 3 sigma was 0.6° times the secant of latitude.

Occasional power fluctuations affected the Sperry MK 32 gyrocompass for periods of approximately .01 seconds. These fluctuations were identified and corrected in processing using the program **examgyro**.

Heading, roll, and pitch biases were determined in a series of tests performed in Long Island Sound for the spring survey, and in Narragansett Bay for the fall survey prior to the start of the

surveys. Appropriate biases were redetermined each time a transducer or Vertical Reference Unit was changed. Prior to conducting any of the tests, a CTD cast was taken to determine the sound velocity profile and entered into the RESON system. In the RESON 6042 the port and starboard roll biases were initially set to +30° and -30° respectively, heading biases were initially set to 0° and 180°, and pitch biases were set to 0. In the IHSS heading biases were set to 0. The roll bias test was run first in an area with relatively flat bottom. The range scale was set to 100 meters. Three lines were run spaced 40 meters apart and each line was run in both directions. The data from parallel lines in the same direction were used for roll bias calculations for each head separately; the ideal data set was positioned so that the depths from the center beams from a transducer were compared against the depths of the mid-swath beams. Tidal corrections were applied to all data before roll corrections were calculated using routines in the **MBHAT** software. Results are reported in the Phase IIA Accuracy and Alignment Report and in the Phase IIA Summary Report.

After the roll biases were calculated and entered into the RESON system, the pitch bias test was conducted. The pitch test was conducted on multiple reciprocal runs of a single line perpendicular to a slope of approximately five degrees. The range scale of the RESON was set to 50 meters and vessel's speed was maintained approximately constant. Pitch biases were computed by comparing runs in opposite directions. Tidal corrections were applied to all data before pitch corrections were calculated using routines in the **MBHAT** software. Results are reported in the Phase IIA Accuracy and Alignment Report and in the Phase IIA Summary Report.

After measurement, calculation, and entry of the pitch bias correctors, heading bias tests were conducted. For the heading bias test 5 parallel lines were run in opposing directions so that the inner beams from a transducer head overlay the intermediate or outer beams of the same head. The heading bias was then determined by measuring the distance between equal depths and calculating the angle subtended by that distance. Tidal corrections were applied to all data before heading corrections were calculated using routines in the **MBHAT** software. Results are reported in the Phase IIA Accuracy and Alignment Report and in the Phase IIA Summary Report.

Roll, pitch, and heading biases applied in H-10612 are shown in Table G-2.

Table G-2. Roll, Pitch, and Heading Bias

	Days 151-189		**Day 308**		**Days 315-316**	
	Port	Starboard	Port	Starboard	Port	Starboard
Roll	+29.98	-29.59	+30.095	-29.051	+29.985	-29.044
Pitch	-0.16	-0.13	-1.079	-0.511	-2.062	-1.847
Heading	-1.65	-1.65	+1.25	+1.25	+1.25	+1.25

Tide and water level correctors ✓

The reference stations for H-10612 were Willets Point, NY (851-6990) and Bridgeport, CT (846-7150).

Smooth sheet soundings were corrected for water level through application of observed data from the Long Neck Point, CT (846-8799) and New Rochelle, NY (851-8490) stations. A new staff datum for MLLW was computed for each station from simultaneous comparison with Willets Point, NY (851-6990) and with Bridgeport, CT (846-7150) using the NOAA Form 248 method prescribed by Marmer (Tidal Datum Planes, Spec. Pub. 135, U.S. Dept of Commerce). The simultaneous comparison computations are included in the Phase IIA Summary Report - Tides.

The boundaries of tide zones used are listed in the Phase IIA Summary Report - Tides. Gage readings were recorded in relation to staff zero; therefore, the MLLW datum height was subtracted from gage readings before applying the time and ratio correctors.

Full data for all project water level gages are in the Phase IIA Summary Report - Tides.

H. CONTROL STATIONS

See Eval Rpt, Section H

Horizontal datum is the North American Datum (NAD) 1983. Two existing first order horizontal control stations were used. A DGPS reference station was established at station MANRESA 1983 (LX7443) to provide primary navigation control for hydrographic positioning. Station ZIEGLER 1932 (LX3804) was used to check the DGPS performance. Horizontal control data are included in the Phase IIA Summary Reports.

I. HYDROGRAPHIC POSITION CONTROL

See Eval Rpt, Section I.

The following equipment was used for positioning:

- Trimble 4000 GPS Receiver, Serial Numbers 3504A09516, antenna 0080176651
- Magnavox MX50R Differential Beacon Receiver, Serial Number 154
- Trimble 4000 GPS Receiver, Serial Number 3430A07030
- DGPS shore station [OSI], Serial Number 3433A07356

The primary hydrographic positioning control equipment was a Trimble 4000 GPS using differential correctors from the contractor established station at MANRESA 1983 (LX7443). HDOP, number of satellites, elevation of satellites, and age of correctors were monitored so that the resulting hydrographic positioning control met the specifications.

Positioning confidence checks were established by recording a separate (reference) Trimble DGPS using correctors from the U.S. Coast Guard station at Montauk, NY. A real time monitor raised an alarm when the two DGPS positions differed by more than 10 meters horizontally. During all times when differential correctors were being received, positioning confidence checks were well within tolerance. In daily post processing, the reference DGPS positioning was substituted for the primary DGPS positioning during those times when the reference met the specifications but the primary did not.

J. SHORELINE - Not Applicable ✓

K. CROSSLINES ✓

Crosslines constituted approximately 5 percent of the main scheme length. Comparisons of all crossing data in the 1xIHO swaths, using **MBHAT** software, show that only 39 comparisons in more than 798,000 had differences exceeding 50cm, and none of the comparisons exceeded 80cm. Table K-1 shows the results of the main scheme crossline comparisons.

Table K-1. Junction Analysis Main Scheme - Crosslines

Category	Count	Percent	Total Percent
to 10 cm	520040	54.47	54.47
to 20 cm	214607	32.85	87.32
to 30 cm	55339	11.20	98.52
to 40 cm	7747	1.39	99.91
to 50 cm	620	0.08	99.99
to 60 cm	35	0.01	100.00
to 70 cm	2	0.00	100.00
to 80 cm	2	0.00	100.00
to 90 cm	0	0.00	100.00
to 100 cm	0	0.00	100.00
> 100 cm	0	0.00	100.00
Total Counts = 798392			

Evaluation of the soundings in the area near Matinecock Point revealed a difference between results on days 154 and 162 of 10 to 15cm, with day 162 being deeper. A thorough search of the records and of the processing did not reveal any cause for the offset. Junction analysis of days 154 and 162 shows that more than 98% of soundings agreed within 30cm while more than 99% of soundings agree within 50cm. In addition, the analysis shows a bias with day 162 soundings being deeper by between 10 and 20cm.

Comparison of days 154 and 162 to the day 151 crosslines shows a bias with the crosslines being the shallower. More than 99% of the soundings on days 151 and 154 were within 30cm, and 100% were within 50cm. A bias is shown with day 154 deeper in the range of 0 to 20cm.

The comparison of days 151 and 162 shows a bias of 20 to 30cm with day 162 being deeper. More than 90% of soundings were within 30cm, more than 99% were within 50cm, and 100% were within 60cm.

These three comparisons are consistent, and are within the allowable tolerance limits for comparison at crossings and for comparison of soundings from different days. Agree

L. JUNCTIONS See Evl Rpt., Section L.

Junction comparisons were made with the following surveys:

H-10347	1:10,000 scale	1990
H-10353	1:10,000 scale	1990
H-~~10612~~ 10611	1:10,000 scale	1995
H-10618	1:10,000 scale	1995

whose relative locations are shown in Figure L-1 and in the Progress Sketch.

Comparisons were accomplished using **MBHAT** software to compare each junction survey sounding to all H-10612 soundings occurring within a 5x5 meter cell encompassing the junction sounding.

The junctioning comparisons of H-10612 and H-10353 are shown in Table L-1. More than 90% of comparisons were within 30cm, and more than 99% of comparisons were within 50cm. These comparisons include all junction survey data, not just those over relatively flat bottom. Larger differences occur in comparison with junction survey soundings in rocky areas. One of these appears to be a carry through from H-5078WD (1930). Another appears to be an approximate sounding derived from side scan data in 1990. The area off Matinecock Point, south of 40° 55.0'N and between 073° 37.0'W and 073° 39.0'W, is an area of varying terrain, sand waves, and rocks. Even in this area, more than 97% of the junction comparisons are within 50cm.

Table L-1. Junction Analysis H-10612 &H-10353

Category	Count	Percent	Total Percent
to 10 cm	46531	40.55	40.55
to 20 cm	37028	32.27	72.81
to 30 cm	20337	17.72	90.53
to 40 cm	7395	6.44	96.98
to 50 cm	2351	2.05	99.03
to 60 cm	619	0.54	99.57
to 70 cm	221	0.19	99.76
to 80 cm	94	0.08	99.84
to 90 cm	25	0.02	99.86
to 100 cm	33	0.03	99.89
> 100 cm	126	0.11	100.00
Total Counts = 114760			

The junctioning comparisons of H-10612 and H-10347 are shown in Table L-2. More than 91% of comparisons were within 20cm, and more than 99.6% of comparisons were within 40cm. These comparisons include all junction survey data, not just those over relatively flat bottom. All 23 comparisons which exceed 60cm occur in comparison with one survey H-10347 sounding, and are shoaler than the H-10347 sounding. None of the comparisons exceed 80cm.

Table L-2. Junction Analysis H-10612 & H-10347

Category	Count	Percent	Total Percent
to 10 cm	4188	65.57	65.57
to 20 cm	1665	26.07	91.64
to 30 cm	407	6.37	98.01
to 40 cm	102	1.60	99.61
to 50 cm			
to 60 cm	2	0.03	99.64
to 70 cm	22	0.34	99.98
to 80 cm	1	0.02	100.00
to 90 cm			
to 100 cm			
> 100 cm			
Total Counts = 6387			

Junction comparison of H-10612 and H-10611 shows more than 94% of comparisons within 20cm, more than 99.5% within 30cm and more than 99.99% within 50cm. Table L-3 shows the results of comparisons of all soundings common to the two surveys.

Table L-3. Junction Analysis H-10612 & H-10611

Category	Count	Percent	Total Percent
to 10 cm	111808	64.77	64.77
to 20 cm	51674	29.93	94.70
to 30 cm	8346	4.89	99.59
to 40 cm	639	0.37	99.96
to 50 cm	62	0.04	100.00
to 60 cm	7	0.00	100.00
to 70 cm		0.00	100.00
to 80 cm		0.00	100.00
to 90 cm	1	0.00	100.00
to 100 cm		0.00	100.00
> 100 cm		0.00	100.00
Total Counts = 172627			

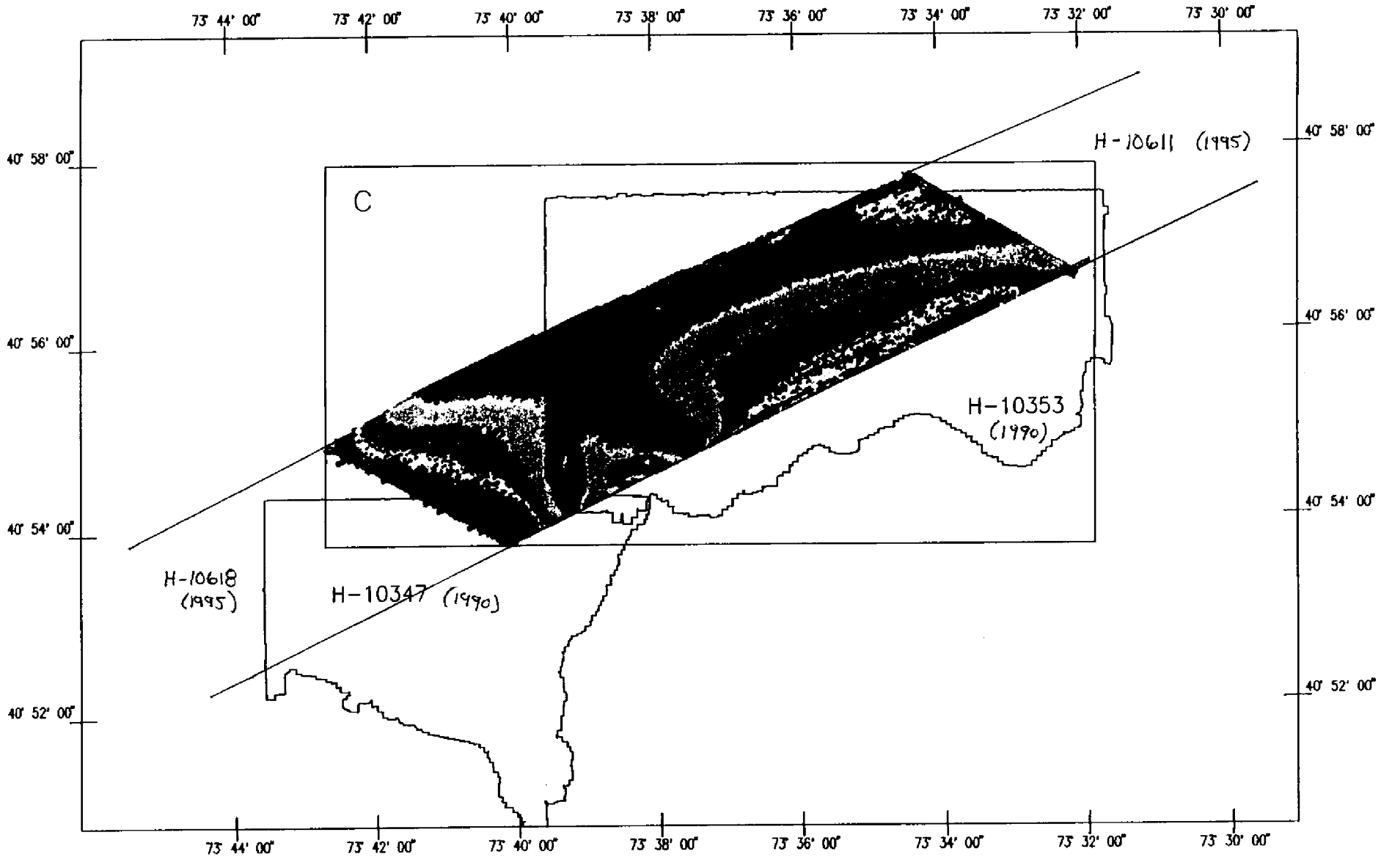
Junction comparison of H-10612 and H-10618 shows more than 94.4% of comparisons within 20cm, more than 99.3% within 30cm and more than 99.7% within 50cm. Table L-4 shows the results of comparisons of all soundings common to the two surveys.

Table L-4. Junction Analysis H-10612 & H-10618

Category	Count	Percent	Total Percent
to 10 cm	117913	64.32	64.32
to 20 cm	55189	30.10	94.42
to 30 cm	9022	4.92	99.34
to 40 cm	612	0.34	99.68
to 50 cm	189	0.10	99.78
to 60 cm	128	0.07	99.85
to 70 cm	83	0.05	99.90
to 80 cm	40	0.02	99.92
to 90 cm	33	0.02	99.94
to 100 cm	15	0.01	99.95
> 100 cm	107	0.05	100.00
Total Counts = 183331			

Figure L-1

JUNCTION SURVEYS



M. COMPARISON WITH PRIOR SURVEYS See eval. rpt., sect. M.

Comparison was made with survey H-1732a (1914), 1:20000 scale. The quality of agreement was reasonable with differences averaging about ± 0.3 to 0.5 meters in depth. There are no significant features in H-1732a that do not appear in the data for H-10612. Concur

Shoaling (1.0 to 2.0 meters) has occurred south east of Delancey Point and south of Milton Point in a triangular area defined by the bounds of 40° 54.9'N, 073 42.6'W; 40° 55.5'N, 073° 41.2'W; 40° 54.7'N, 073° 41.1'W. Concur

Shoaling (1.0 to 2.5 meters) has occurred in the area just north and west of Matinecock Point proceeding north and east to approximately due north of Fox Point. The area perimeter is described below. NOT AS EXTENSIVE, SEE EVAL. REPORT, SECTION M. Do not concur

40° 54.00'N, 073° 40.00'W	40° 55.00'N, 073° 40.00'W
40° 55.50'N, 073° 36.00'W	40° 55.25'N, 073° 36.00'W

Comparison with H-10353, (1990), 1:10,000 scale, revealed the carry forward of two rocks from H-5078WD (1930).A 10.7 m Rk sounding was carried forward in 40° 54.545'N, 073° 38.480'W. H-10612 shows 12.5 m in this area. However, soundings nearby include:
10.7 RK NOT CHARTED. However a 35 foot sdg does plot at this position.

11.4 m 2xIHO in 40° 54.53959'N, 073° 38.51053'W (44 m at 257° true)
11.4 m 2xIHO in 40° 54.57223'N, 073° 38.52838'W (85 m at 307° true)
11.4 m 1xIHO (about 50 m south-east)

A 10.4 m Rk sounding was carried forward in 40° 54.595'N, 073° 38.050'W. H-10612 does not reveal a rock in this position, but has a 10.0 m Rk sounding (feature #80) in 40° 54.60291'N, 073° 38.02045'W (44 m at 070° true). Chart 33 RK See AWOIS 8766, page 29.
10.4 RK NOT CHARTED.

Recommend H-10612 supersede H-5078WD in the common area. Agree

H-10353 also shows soundings with type Rk(A). The 9.8 m Rk(A) in 40° 54.620'N, 073° 38.082'W corresponds to feature #93, an 11.9 m rock in 40° 54.61455'N, 073° 38.08444'W (10 m at 198° true). Soundings of 13.2, 2xIHO exist in the H-10353 position.
Agree 9.8 RK(A) disproved.

The 8.8 m Rk(A) in 40° 54.548'N, 073° 38.112'W is in depths of 10-11.2 m, 2xIHO. The nearest feature is #86 in 40° 54.54859'N, 073° 38.07939'W (46 m at 089° true). ~~10' RK~~ 10.1m RK plots as item "BC. 8.8 m RK(A) disproved.

Recommend H-10612 supersede H-10353 in the common area. Agree

Presurvey review (AWOIS) items were investigated as a normal part of the 100% multibeam and 200% side scan sonar coverage of the basic survey. In some cases, additional multibeam coverage was run under the item investigation Task Order to obtain 1xIHO sounding coverage of the feature. Of the 13 presurvey review (AWOIS) items in the area of this survey, two were not detected in the records. Results of the AWOIS investigations are reported below.

AWOIS #1739 ✓ TYPE: Info RADIUS: 100m

Wreck with least depth 16.5 meters (54 feet) by multibeam echosounder (MB feature #60, 1xIHO), found at 40° 56.19691'N, 073° 37.66486'W. Position is 2 meters (6 feet) at 324 degrees from the reported AWOIS position.

Recommend removal of danger circle, blue tint and sounding 52 ft with type Wk charted in 40° 56.196'N, 073° 37.664'W, and charting a sounding 16.5 meters (54 feet) with type Wk in survey position. (54 Wk) Agree. Retain associated danger circle and blue tint.

AWOIS #1741 ✓ TYPE: Info RADIUS: 100m

Wreck with least depth 13.8 meters (45 feet) by multibeam echosounder (MB feature #29, 1xIHO), found at 40° 55.87371'N, 073° 36.22476'W. Position is 31 meters (102 feet) at 164 degrees from the reported AWOIS position.

Recommend removal of danger circle, blue tint and sounding 46 ft with type Wk charted in 40° 55.890'N, 073° 36.231'W, and charting a sounding 13.8 meters (45 feet) with type Wk in survey position. Agree. 45 Wk Retain associated danger circle and blue tint.

~~AWOIS description listed under paragraph 210 of~~ AWOIS description is not this wreck. Wreck does not appear broken in two pieces. No dive. Based on MB 1555 data.

AWOIS #1743 ✓ TYPE: Info RADIUS: 100m

Wreck with least depth 14.8 meters (48 feet) by multibeam echosounder (MB feature #32, 1xIHO), found at 40° 56.35791'N, 073° 34.88749'W. Position is 10 meters (32 feet) at 319 degrees from the reported AWOIS position.

Recommend removal of danger circle, blue tint and sounding 47 ft with type Wk charted in 40° 56.354'N, 073° 34.883'W, and charting a sounding 14.8 meters (48 feet) with type Wk in survey position. Wreck is now in a depression and is lower than the surrounding bottom. This wreck is in depths of 14.2 - 14.5 meters. ~~48~~ Wk Agree. Retain associated danger circle and blue tint.

AWOIS #7516 ✓ TYPE: Info RADIUS: 100m

Wreck with least depth 15.1 meters (49 feet) by multibeam echosounder (MB feature #11, 1xIHO), found at 40° 54.74411'N, 073° 38.66684'W. Position is 9 meters (29 feet) at 249 degrees from the reported AWOIS position.

Recommend removal of danger circle, blue tint and sounding 46 ft with type Wk charted in 40° 54.746'N, 073° 38.661'W, and charting a sounding 15.1 meters (~~50~~ 49 feet) with type Wk in survey position. (49 Wk) Agree. (w/ depth fix) Retain associated dangercircle and blue tint.

AWOIS #7531 ✓ TYPE: Info RADIUS: 100m

Small wreck with least depth 18.0 meters (59 feet) by multibeam echosounder (MB feature #69, 1xIHO), found at 40° 56.35638'N, 073° 38.53097'W. Position is 4 meters (13 feet) at 280 degrees from the reported AWOIS position.

Recommend removal of danger circle, blue tint and sounding sounding 56 ft with type Wk charted in 40° 56.356'N, 073° 38.528'W, and charting a sounding 18.0 meters (59 feet) with type Wk in survey position. Wreck is now in a depression. Previous diver least depth was 56 feet. This wreck is in depths of 17.7 - 17.8 meters. 59 wk Agree. Retain associated dangercircle/blue tint

AWOIS #7532 ✓ TYPE: Info RADIUS: 100m

Wreck with least depth 13.1 meters (43 feet) by multibeam echosounder (MB feature #30, 1xIHO), found at 40° 55.93681'N, 073° 36.97461'W. Position is 31 meters (102 feet) at 212 degrees from the reported AWOIS position.

Recommend removal of danger circle, blue tint and sounding 41 ft with type Wk charted in 40° 55.951'N, 073° 36.963'W, and charting a sounding 13.1 meters (43 feet) with type Wk in survey position. 43 wk Agree. Retain associated dangercircle and blue tint.

AWOIS #7533 ✓ TYPE: Info RADIUS: 100m

Obstruction
~~Wreck~~ with least depth 15.7 meters (51 feet) by multibeam echosounder (MB feature #54, 1xIHO), found at 40° 56.12007'N, 073° 36.83971'W. Position is 18 meters (59 feet) at 282 degrees from the reported AWOIS position. AWOIS describes wreckage and recommends charting a non_dangerous obstruction (wreckage) based on diver investigation. Side scan record of 1995/158/13:12:18 confirms diver evaluation as wreckage.

Recommend removal of danger circle, blue tint and sounding 48 ft with type ~~Wk~~ Obstn charted in 40° 56.118'N, 073° 36.827'W, and charting a sounding 15.7 meters (51 feet) with type ~~Wk~~ Obstn in survey position. This wreck is in depths of 15.3 - 15.6 meters. 51 wk obstn Agree. Retain associated danger circle and blue tint.

AWOIS #7535 ✓ TYPE: RADIUS: 100m

Mound with least depth 15.0 meters (49 feet) by multibeam echosounder (MB feature #57, 1xIHO), found at 40° 56.83589'N, 073° 36.18319'W. Position is 8 meters (26 feet) at 296 degrees from the reported AWOIS position of a wooden wreck covered by a mound of gravel.

Recommend removal of danger circle, blue tint and sounding 49 ft with type Wk charted in 40° 56.834'N, 073° 36.178'W, and charting a sounding 15.0 meters (49 feet) with type Wk in survey position. Wreck is not visible on the sidescan record under the mound. 49 wk Concur, Retain associated danger circle and blue tint. No real change. Pos. diff. within error budget.

AWOIS #8080 ✓ TYPE: Full RADIUS: 700m

Wreck with least depth 13.4 meters (44 feet) by multibeam echosounder (MB feature #35, 1xIHO), found at 40° 55.05938'N, 073° 38.62888'W. Position is 329 meters (1080 feet) at 220 degrees from the reported AWOIS position.

Recommend charting a sounding 13.4 meters (44 feet) with type Wk in survey position. This barge is the only man-made feature found within the 700 meter search radius. Agree. 44Wk with ~~feet~~ associated danger circle and blue tint

AWOIS #8699 TYPE: Full RADIUS: 500m

Full 500 meter radius searched with 100 percent multibeam coverage and 200 percent sidescan coverage. No objects fitting the description were found. Depths of 16.8-17.4 meters (55-57 ft) were found. small insignif. shiver missed at south edge. Consider completly resolved.

Recommend removal of danger circle, blue tint and label "Obstn PA ~~subm structures~~ (49 ft rep 1988) (Auth min 49 ft)" charted in 40° 55.~~50~~.00'N, 073° ~~36.83~~ 31.50'W. Agree. Chart this area based on the present survey information.

AWOIS #8700 TYPE: Full RADIUS: 500m

Full 500 meter radius searched with 100 percent multibeam coverage and 200 percent sidescan coverage. No objects fitting the description were found. Depths of 14.3-14.5 meters (47 ft) were found on the present survey

Recommend removal of danger circle, blue tint and label "Obstn ~~PA (49 ft rep 1988)~~ Subm structures (4 auth min 49 ft)" charted in 40° 55.~~00~~.52'N, 073° ~~37~~.36'W. Agree. Chart this area based on the present survey information.

AWOIS #8788 TYPE: Full RADIUS: 100m DEPTH: 9.7 m (32 ft)(side scan)

Rock with least depth 10.0 meters (33 feet) by multibeam echosounder (MB feature #80, 1xIHO), found at 40° 54.60291'N, 073° 38.02045'W. Position is 126 meters (413 feet) at 98 degrees from the reported AWOIS position. Chart 33Rk

Rock with least depth 11.3 meters (37 feet) by multibeam echosounder (MB feature #85, 1xIHO), found at 40° 54.59442'N, 073° 38.11621'W. Position is 34 meters (112 feet) at 195 degrees from the reported AWOIS position. Chart 37 Rk

Rock with least depth 11.9 meters (39 feet) by multibeam echosounder (MB feature #93, 1xIHO), found at 40° 54.61455'N, 073° 38.08444'W. Position is 36 meters (118 feet) at 83 degrees from the reported AWOIS position. 39 Rk cannot be shown at survey scale. See 37 Rk (11.3 meters) discussed above.
Numerous other rocks in area.

Recommend removal of danger circle, blue tint and sounding 32 ft with type Rk rep charted in 40° 54.613'N, 073° 38.110'W, and charting of soundings with type Rk in survey positions. Agree. See charting recommendations above.

32 ft Rk disproved.

AWOIS #8789 TYPE: Full RADIUS: 100m DEPTH: 8.8 m
(29 ft, side scan)

Rock with least depth 9.9 meters (32 feet) by multibeam echosounder (MB feature #82, 1xIHO), found at 40° 54.56027'N, 073° 38.02281'W. Position is 165 meters (541 feet) at 78 degrees from the reported AWOIS position. Chart 32 Rk

Rock with least depth 10.8 meters (35 feet) by multibeam echosounder (MB feature #84, 1xIHO), found at 40° 54.57521'N, 073° 38.09235'W. Position is 89 meters (292 feet) at 45 degrees from the reported AWOIS position. Do not chart. Feature falls between 32 Rk and 37 Rk.

Rock with least depth 10.1 meters (33 feet) by multibeam echosounder (MB feature #86, 1xIHO), found at 40° 54.54859'N, 073° 38.07939'W. Position is 83 meters (272 feet) at 81 degrees from the reported AWOIS position. 33 Rk cannot be shown at survey scale. See 32 Rk (9.9 meters) discussed above.

Rock with least depth 10.3 meters (33 feet) by multibeam echosounder (MB feature #88, 2xIHO), found at 40° 54.53974'N, 073° 38.20147'W. Position is 89 meters (292 feet) at 267 degrees from the reported AWOIS position. Insig. next to 10.4 (1x1HO) depth

Recommend removal of danger circle, blue tint and sounding 29 ft with type Rk rep charted in 40° 52.542'N, 073° 38.138'W, and charting of soundings with type Rk in survey positions. Did not survey entire radius. Southern quarter fell outside contract defined survey area.

N. COMPARISON WITH THE CHART Concur with charting recommendation. However, item unresolved.

Comparison was made with Chart 12367, 1:20,000 scale, 20th Edition, February 19, 1995, the most current version of the chart, rather than the 19th Edition, August 17, 1991, as specified in project instructions.

There are two charted features that do not correspond to AWOIS items.

A 10.6m (35ft) obstruction charted in 40° 54.32'N, 73° 38.92'W corresponds to feature #90 (1xIHO) in 40° 54.31257'N, 73° 38.92194'W with a depth of 11.1m (36ft), identified as a wreck from side scan records. This feature lies 14m (46ft) at 191° true from the charted obstruction.

Recommend removal of danger circle, blue tint, and sounding 35 feet with type Obstn charted in 40° 54.32'N, 73° 38.92'W, and charting of danger circle, blue tint, and sounding 11.1 m (36 ft) with type Wk in survey position. Agree. 36 wk

A 9.7m (32ft) rock charted in 40° 54.58'N, 73° 38.04'W corresponds to feature #81 (1xIHO) in 40° 54.55904'N, 73° 38.05203'W with a depth of 10.4m (34ft) identified as a rock, which lies 42m (138ft) at 203° true from the charted rock, and to feature #82 (1xIHO) in 40° 54.56027'N, 73° 38.02281'W with a depth of 9.9m (32ft), which lies 44m (149ft) at 147° true from the charted rock.

Recommend removal of danger circle, blue tint, and sounding 32 feet with type Rk charted in 40° 54.58'N, 73° 38.04'W, and charting of danger circle, blue tint, and soundings with type Rk in survey positions. Agree, but only 32 ft Rk will be charted at scale.
32 Rk @ 40°54.56027'N 073°~~38.02281'W~~ 38.02281 W

The most significant difference between the two data was the movement of the 60-foot contour which had shifted in position approximately 400 - 500 meters to the west-south-west. The approximate bounds of the area of movement was:

Do not concur. The 60 foot contour has actually moved several hundred meters northeast. The likely differences between the shifts are due to the break points used for the 60 ft contour line.

40° 57.50'N, 73° 35.00'W	40° 57.50'N, 73° 34.00'W
40° 57.00'N, 73° 35.00'W	40° 57.00'N, 73° 34.00'W

In the area of 40° 54.97'N, 73° 42.53'W, a large rock outcropping was mapped. The least depth on the rock was feature #104 at 8.0 meters (2xIHO) with nearest 1xIHO sounding of 8.7 meters. The surrounding depths were 11 - 13 meters. Extreme edge of survey area.
Charted 26 ft sounding (8.0 m) @ 40/54.95 N 073/42.56 W.
Retain Charted 26 ft SDG.

Shoaling and sounding differences are as discussed in Section M, Comparison with Prior Surveys.

O. ADEQUACY OF SURVEY ✓

This survey is complete and adequate to supersede prior surveys. Agree.

Data for all tracks shown on the track plot are included in the accepted survey data. The decision was made to retain these data to provide more 1xIHO coverage. In many cases, the extra lines were run to fill in side scan gaps and the multibeam data were recorded simultaneously.

Soundings corresponding to wrecks, rocks, and obstructions were shown in bold print so that they may be easily related to the corresponding text label. The density of soundings on this survey, while necessary to fairly depict the bottom, made it difficult to place text within the sheet. For that reason, text for features (wrecks, rocks, and obstructions), for floating aids to navigation, and for bottom characteristics were shown in reduced height bold characters. This made them stand out from the soundings and eased their placement. Even so, it was often necessary to deviate from the traditionally preferred placement of text.

No plot on mylar or paper can fully represent the tremendous amount of data which are available in this survey. Manipulation of and viewing of the data with a computer is much more satisfactory for many applications. For example, the ***mbmz*** layer viewed with the **MBHAT** software gives an excellent picture of the shape and character of the bottom.

The designation of wreck, rock, or obstruction was assigned to features from examination of the side scan images and the multibeam data. If a feature could not be clearly judged a wreck or a rock it was designated an obstruction. Two or more side scan processors agreed upon the designation. The hydrographer and the Government Contracting Officer's Technical Representative reviewed and approved the designations.

The following discussion provides guidance for evaluation of this survey against the specifications.

Multibeam ✓

Multibeam coverage was 100%.

During survey operations on Julian Day 158 a temporary change in the multibeam power setting at approximately 17:38:52 produced a small amount of erroneous data in file mba95158.d05. The corrupted data included 22 pings and lasted a time span of approximately 5 seconds. The error was noted at the time and documented in the real time log. The line was aborted and re-run to fill in the gap created. These erroneous data were not flagged as invalid during the post processing of the data, and therefore remain in the data set.

The erroneous data were examined and found to be of a depth greater than the actual least depth. These data were not carried forward to any of the contract data products, and do not affect the validity of the survey. Concur

Sound Velocity Corrections ✓

In some cases the sound velocity profile applied did not extend to 95% of the maximum depth observed in the data set. In those cases the RESON SeaBat used the bottom of the sound velocity table to extend corrections to the observed depths greater than the cast depth. To check the validity of this vertical extrapolation, the hydrographer made extrapolations to the bottom using the trend of the bottom of the sound velocity profile, and determined the potential errors caused by using the SeaBat extrapolation method. The x, y, z coordinates of maximum soundings in the file were computed at nadir and at 45° off nadir. The following list shows the errors resulting from using the RESON extrapolation method compared to the trend extrapolation.

Table O-1. Depth and Position Errors Due to Sounding Exceeding Sound Velocity Profile Depth

Dataset	Cast #	Cast Max. Z	Data Max. Z	Delta Z	Beam Angle	Error in Meters		
						X	Y	Z
mba95154.d01	ctw15401.cnv	14.70	17.20	2.50	0	0.000	0.000	0.000
					45	0.000	0.000	0.000
mba95154.d02	ctw15401.cnv	14.70	17.37	2.67	0	0.000	0.000	0.000
					45	0.000	0.000	0.000
	ctw15402.cnv	14.62	17.37	2.75	0	0.000	0.000	-0.001
					45	0.000	-0.001	0.000
mba95154.d03	ctw15402.cnv	14.62	18.35	3.73	0	0.000	0.000	-0.001
					45	0.000	-0.002	0.000
mba95156.d05	ctw15604.cnv	14.05	18.84	4.79	0	0.000	0.000	0.000
					45	0.000	0.000	0.000
mba95161.d05	ctw16101.cnv	16.29	19.95	3.66	0	0.000	0.000	-0.001
					45	0.000	-0.002	0.000
mba95161.d06	ctw16103.cnv	15.48	19.14	3.66	0	0.000	0.000	-0.002
					45	0.000	-0.003	0.000
mba95316.d01	ctw31602.cnv	13.99	19.48	5.49	0	0.000	0.000	0.000
					45	0.000	0.001	0.000

The results of these comparisons show the depth and position errors from extending the bottom of the sound velocity table are less than 2 cm and are within the budget for meeting 1xIHO standards. Concur Data was analyzed during office processing and found to be consistant with surrounding depth information.

Side Scan ✓

Side scan coverage was at least 200% in all areas, with at least a 50% overlap of lines, as shown on the side scan coverage plot. Side scan coverage for Sheet C is 300% or more for at least 95% of the area. Concur

Contours

One meter contours were generated from 1 x IHO data gridded to select the shoalest sounding in a 15 meter true cell size. This method has the potential for a small horizontal offset of contours if the shoal sounding occurs in the corner of the cell. However, it does generate contours corresponding to the least depths for the survey. Smooth sheet contours were compared to the selected soundings plotted on the smooth sheet, and were modified as necessary for a clear and safe hydrographic presentation. Shoal curves were enlarged when necessary to make them visible around the shoal sounding. Curves were also modified toward deeper water to ensure inclusion of soundings equal to the curve depth. Small deep curves were removed for clarity, but deep curves were sometimes retained on the smooth sheet even though the density of soundings precluded placing a deep sounding within them. The hydrographer felt that the shape of the bottom was more adequately defined by making use of these contours derived from the data too dense for depiction on the smooth sheet in numeric form. On small steep features the one meter contours are too closely spaced for adequate depiction of the bottom while using contour labels. In those cases the shoalest contour label was offset with a leader pointing to the feature. Contour lines were revised on an overlay by the Pacific Hydrographic Branch to conform with the soundings shown on the smooth sheet.

2xIHO Features

Sixteen features detected in the 2xIHO portion of the multibeam swath were not covered by 1xIHO soundings. These features and nearby 1xIHO soundings are listed below.

Feature #	Latitude	Longitude	2xIHO Depth	Category	1xIHO Depths Closest	Nearby
2	40° 54.65678'N	073° 37.92243'W	11.8	ROCK	12.1	
7	40° 54.68987'N	073° 38.19257'W	12.3	ROCK	12.8	
14	40° 54.74171'N	073° 38.78281'W	14.4	ROCK	15.1	
25	40° 55.84253'N	073° 36.06026'W	13.2	ROCK	13.9	
27	40° 54.23744'N	073° 40.50075'W	11.8	OBSTR	12.4	12.3
37	40° 55.11121'N	073° 38.81041'W	16.1	ROCK	16.9	16.8
45	40° 55.08119'N	073° 38.88849'W	15.8	ROCK	16.9	
46	40° 55.08894'N	073° 38.98801'W	16.0	ROCK	16.7	
47	40° 55.09786'N	073° 38.94875'W	16.1	ROCK	16.8	
49	40° 55.11617'N	073° 38.91057'W	16.0	ROCK	16.5	
67	40° 54.85292'N	073° 42.60292'W	8.0	ROCK	7.2	on H-10618
76	40° 54.63089'N	073° 37.81404'W	13.2	ROCK	13.8	
78	40° 54.58155'N	073° 37.94483'W	10.3	ROCK	10.5	
88	40° 54.53974'N	073° 38.20147'W	10.3	ROCK	11.2	

97	40° 54.69324'N	073° 37.98091'W	13.3	ROCK	13.9	
104	40° 54.95295'N	073° 42.55612'W	8.0	ROCK	8.7	

P. AIDS TO NAVIGATION

Items navigationally insignif. or due to shoal bias in extreme outer beams. Not on smooth sheet.

The only aid to navigation within the area of this survey is Matinecock Point Shoal buoy, G "21" Fl G 4s GONG with green structure, which was on station at 40° 54.518'N, 073° 38.191'W. This is in agreement with chart 12367 and with the Light List, Volume 1, Atlantic Coast, #21420. Buoy "21" adequately serves its apparent purpose. Agree.

Q. STATISTICS ✓

Survey statistics are as follows:

1085	Lineal kilometers of sounding lines
46	Square kilometers of hydrography
14	Days of production
0	Days of weather downtime
2	Days of mechanical, electronic or operational downtime
3	Number of tide stations
52	Number of velocity casts
0	Number of XBT drops

R. MISCELLANEOUS ✓

Comparison with prior surveys reveals apparent littoral drift to the north-east along the southern side of the survey. This is evidenced by shoaling of 1.0 to 2.5 meters between H-1732a (1914) and H-10612 (1995) in the area north and west of Matinecock Point eastward to north of Oak Neck Point. Several wrecks appear to be sinking into scour holes caused by their own presence.

S. RECOMMENDATIONS ✓

Based on comparisons with previous surveys and existing charts, it is recommended that the entire common area of charts 12366 and 12367 be reconstructed with data from this survey. Agree.

T. REFERRAL TO REPORTS ✓

- Phase I - NOAA Acquisition of Sounding Data in Western Long Island Sound, Phase I Test Results, December 3, 1994. Submitted to NOAA COTR aboard M/V Beavertail.

- Phase IIA - Phase IIA Accuracy and Alignment Tests - submitted to NOAA COTR aboard M/V Atlantic Surveyor.

- Phase IIA - Survey Report - Calibration, Horizontal Control, Real-Time and Processing Procedures

- Sheet C Real Time Log Notebook
- Sheet C Sound Velocity Notebook
- Sheet C Processing Notebook
- Sheet C Digital Data Listing Notebook
- Sheet C Digital Data
- Sheet C Side Scan Sonar Analog Records
- Sheet C Plots

PROJECT SPECIFIC REPORTS ARCHIVED WITH SURVEY DATA FOR SURVEY H-10611.

SURVEY SPECIFIC REPORTS ARCHIVED WITH SURVEY DATA FOR SURVEY H-10612.

APPENDIX A:

DANGER TO NAVIGATION REPORTS

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

April 21, 1997

Commander (OAN)
First Coast Guard District
408 Atlantic Avenue
Boston, Massachusetts 02110-3350

Dear Sir:

During office review of hydrographic survey H-10612, New York, Western Long Island Sound, Rocky Point to Perfingo Neck, three wrecks and three obstructions were found and are considered potential dangers to navigation affecting the following charts.

Chart	Edition/date	Datum
12363	36, July 16, 1994	NAD 83
12364	29, July 23, 1994	NAD 83
12367	21, October 19, 1996	NAD 83

It is recommended that the enclosed Report of Dangers to Navigation be included in the Local Notice to Mariners.

Questions concerning this report should be directed to the Pacific Hydrographic Branch at (206) 526-6853.

Sincerely,

Kathy A. Timmons

Kathy A. Timmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

Enclosures

cc: DMA/HTC
NCS/261

REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: H-10612

Survey Title: State: New York
Locality: Western Long Island Sound
Sublocality: Rocky Point to Perfingo Neck

Project Number: OPR-B389-CN

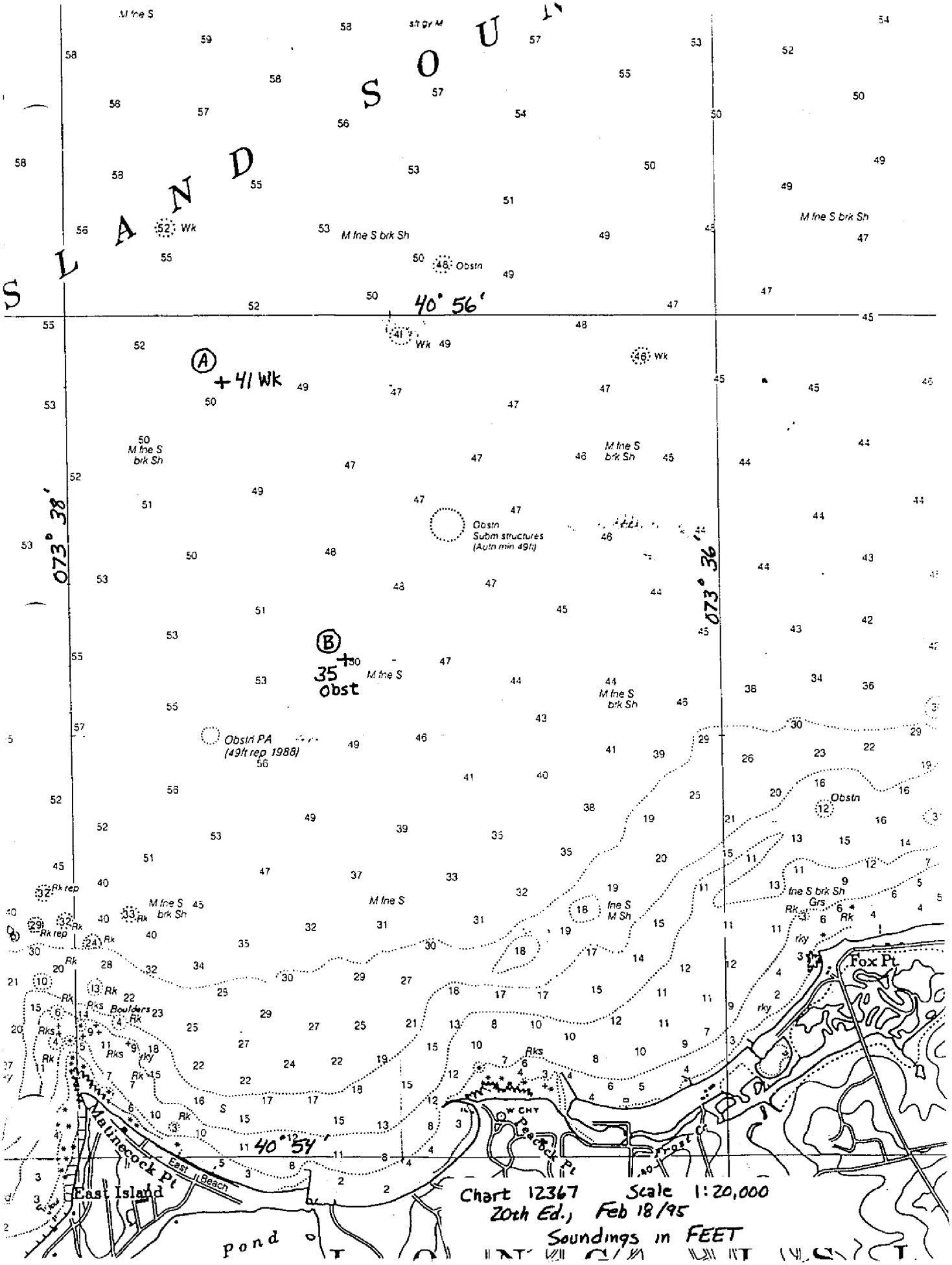
Survey Date: May - November, 1995

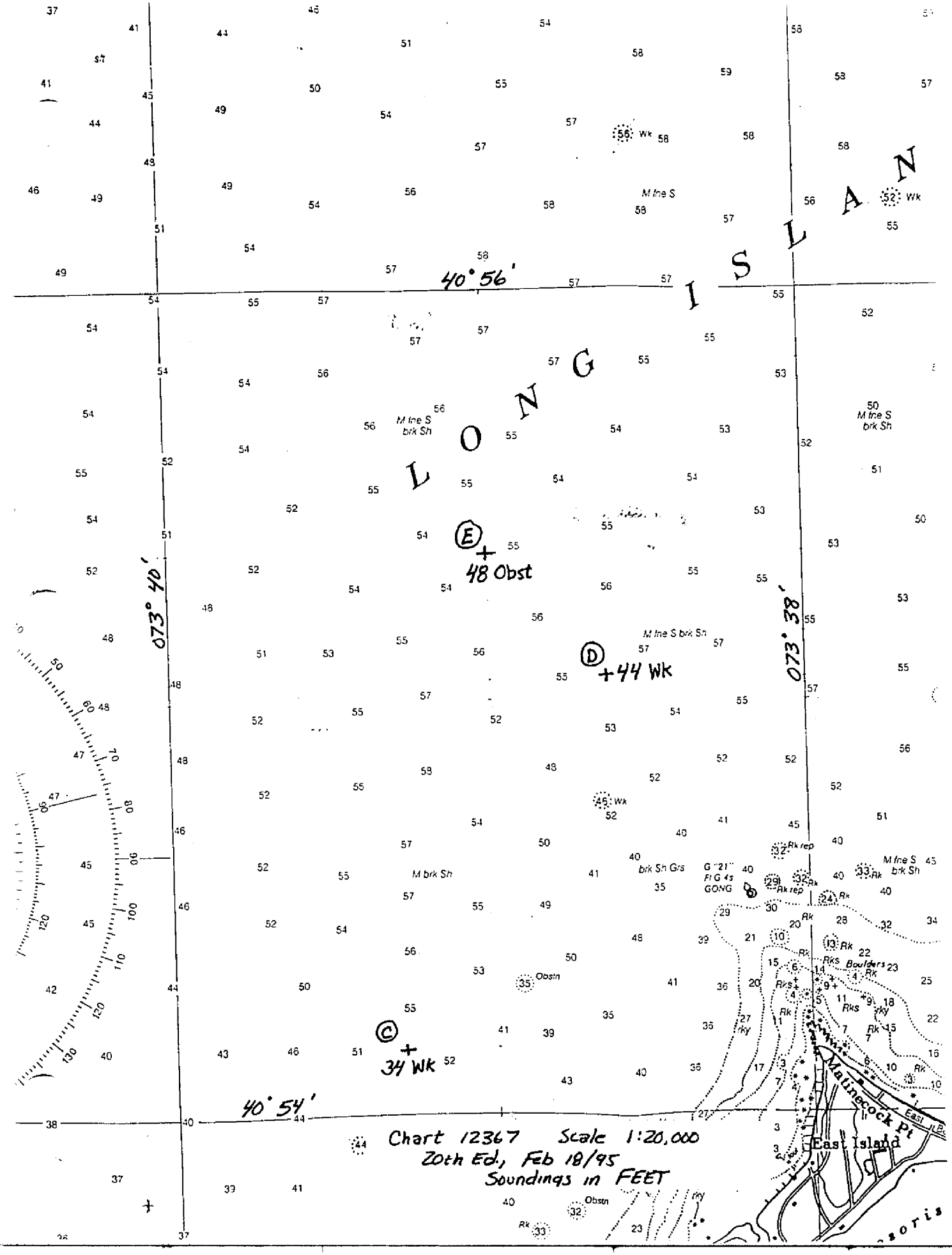
Features are reduced to Mean Lower Low Water using approved tides and are positioned on NAD 83.

Charts affected: 12363 36th edition/July 16, 1994, scale 1:80,000, NAD 83
12364 29th edition/July 23, 1994, scale 1:40,000, NAD 83
12367 21st edition/October 19, 1996, scale 1:20,000, NAD 83

DANGER TO NAVIGATION	LATITUDE(N)	LONGITUDE(W)
A: Wreck, subm 41 feet	40/55/49.7	073/37/31.4
B: Obstruction, subm 35 feet	40/55/11.4	073/37/09.1
C: Wreck, subm 34 feet	40/54/10.3	073/39/17.7
D: Wreck, subm 44 feet	40/55/03.6	073/38/37.7
E: Obstruction, subm 48 feet	40/55/22.4	073/39/00.4
F: Obstruction, subm 40 feet	40/54/46.3	073/41/57.0

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at (206) 526-6853.


SOUTH ISLAND
40° 56'
073° 38'
073° 36'
40° 54'
A
+41 Wk
B
35
Obst
Obstn
Subm structures
(Autn min 49ft)
Obstn PA
(49ft rep 1988)
M fne S
M fne S brk Sh
fne S brk Sh
Wk
Rk
Rk rep
Rks
Boulders
Grs
rky
Obstn
Fox Pt
Mainecock Pt
East Island
East Beach
Beach Pt
Frost Cr
W CHY
pond
Chart 12367 Scale 1:20,000
20th Ed., Feb 18/95
Soundings in FEET


LONG ISLAN
40° 56'
40° 54'
073° 40'
073° 38'
E
48 Obst
D
44 Wk
C
34 Wk
Chart 12367 Scale 1:20,000
20th Ed., Feb 18/95
Soundings in FEET
Matinecock Pt
East Island

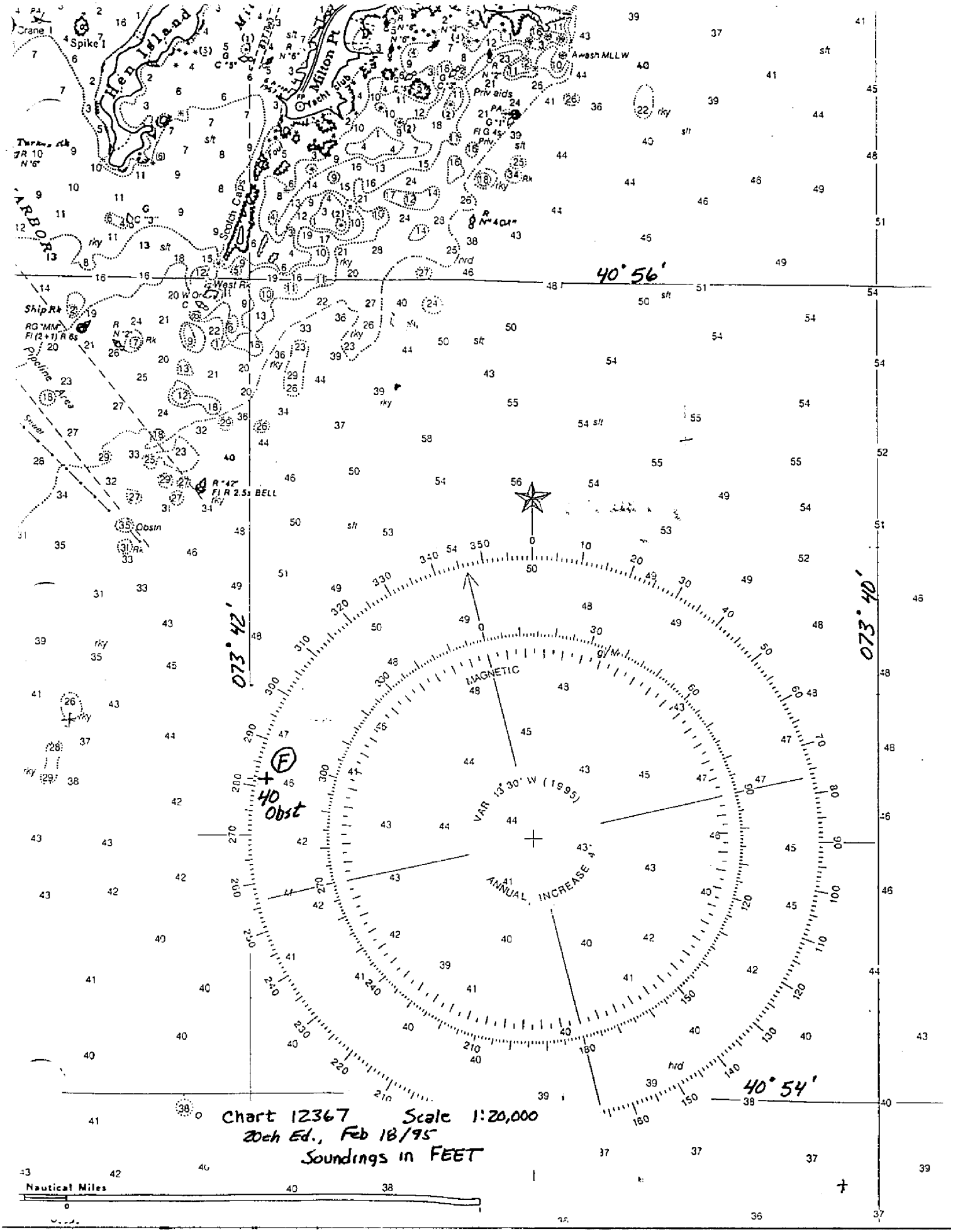


Chart 12367 Scale 1:20,000
20th Ed., Feb 18/95
Soundings in FEET

APPENDIX B:

LANDMARKS AND NON-FLOATING AIDS TO NAVIGATION LISTS

NOT APPLICABLE

APPENDIX C:

LIST OF HORIZONTAL CONTROL STATIONS

NAME	LATITUDE	LONGITUDE	ANTENNA ELEVATION	SOURCE	DATES & TIMES (UTC) OCCUPIED
MANRESA 1983 (LX7443)	41 04 22.81236N	073 24 38.93245W	52.56m	Published	28 March 1995 - 10 July 1995
ZIEGLER 1932 (LX3804)	41 02 38.71029N	073 28 40.45528W	16.46m	Published	28 March 1995, 1941 - 29 March 1995, 1623 29 March 1995, 2004 - 31 March 1995, 1312

APPENDIX D:

LIST OF GEOGRAPHIC NAMES

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-10612

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO.	B ON PREVIOUS SURVEY NO.	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	
Long Island Sound	12367									1
										2
										3
										4
										5
										6
										7
										8
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										22
										23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

H-10612 Geographic name not approved by Chief Geographer.

APPENDIX E:

TIDE NOTES

ADDED TO DR BY EVALUATER.

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

September 17,1996

MEMORANDUM FOR: LTCDR David A. Cole
Hydrographic Surveys Division

FROM: Stephen K. Gill
Chief, Tidal Analysis Branch

Michael C. O'Hargan
Chief, Sea and Estuarine Section

SUBJECT: Final Evaluation of Contract Deliverables, Project OPR-B389-

The Ocean and Lake Levels Division (OLLD), as requested, has reviewed information received from; the contractor in teleconference between the contractor, yourself, and Michael O'Hargan and Stephen Gill on July 24, 1996; and, the subsequent written submission from the contractor regarding project-wide compliance issues to you dated August 16, 1996.

The additional information received during the teleconference and the written submission completes the requests for detailed information from OLLD. Major errors noted have been corrected, and missing information has been provided. OLLD now has an acceptable understanding of the contractor's procedures related to the water level field collection, data reduction, data processing, and tidal datum determination.

Based on the review of the recent information in the context of the previous evaluation of the contractor's work on tides, OLLD has estimated a worst-case uncertainty in the tide-reducers applied to the soundings for the contract of 1.0 ft. This estimate includes datum recovery of MLLW datum on the bench marks (a bias error), and uncertainties in the raw tide gauge measurements, the staff-to-gauge settings applied to the data, and the tidal zoning correctors. It is our understanding that this maximum estimated error is within the 1.6 foot (0.50 meter) specified in the contract.

OLLD will provide details of the evaluation in a subsequent in-house program evaluation document. OLLD has determined, based on the evaluation, that the tide data collected for this survey are "single purpose data" for use as tide reducer only. Accepted tidal datums, bench mark elevations, and published bench mark sheets will not be updated or produced as result of the contractor data. This limitation does not affect acceptance of the contract deliverables.

cc:

Richard Barazotto
Philip Morris
Jim Hubbard
Mike Gibson

TIDE NOTES

SITE	LOCATION	PERIOD	PERIOD
Long Neck Point, CT	41° 02.3N	19 April 1995	23 Oct 1995
8468788	73° 28.8W	13 July 1995	17 Nov 1995
New Rochelle, NY	40° 53.5N	20 April 1995	03 Nov 1995
8518490	73° 46.9W	13 July 1995	15 Nov 1995

Long Neck Point, CT

Sea Data Model TDR-3A (S/N 018) and Coastal Leasing Microtide (S/N 10302) gages were installed on 19 April 1995. The staff was installed and leveled on 24 April. The Long Neck primary gage, TDR #018, malfunctioned on 31 May and Coastal #10302 became the primary gage. A new backup gage, Coastal #10320, was installed. Both gages were removed 13 July 1995. Coastal Microtide (S/N 10357 and 10353) gages were installed on 23 October 1995. The staff was leveled on 23 October. Both gages were removed on 17 November 1995.

New Rochelle, NY

Sea Data Model TDR-3A (S/N 224) and Coastal Leasing Microtide (S/N 10321) gages were installed on 20 April 1995. The staff was installed on 20 April and leveled on 25 April. The primary gage, TDR #224, failed on 01 May. The backup gage, COASTAL #10321, was connected to the telemetry system as the new primary gage. The backup gage has a complete record of the deployment and no data were lost. TDR #510 was installed as the new secondary gage on 03 May. Both gages were removed 13 July 1995. Coastal Microtide (S/N 10307 and 10320) gages were installed on 3 November 1995 and the staff was leveled. Both gages and staff were removed 17 November 1995.

Tide and Water Level Correction

The reference stations for H-10612 were Willets Point, NY (851-6990) and Bridgeport, CT (846-7150).

Soundings for field sheets were corrected using observed water level data from NOAA Station Willets Point, NY (851-6990). Data were acquired by cellular phone modem using the NOAA REALDATA software.

Smooth sheet soundings were corrected for water level through application of observed data from the Long Neck Point, CT (846-8799) and the New Rochelle, NY (851-8490) stations. A staff MLLW datum was computed at each station by simultaneous comparison with Willets Point, NY (851-6990) and with Bridgeport, CT (846-7150) using the NOAA Form 248 method prescribed by Marmer (Tidal Datum Planes, Spec. Pub. 135, U.S. Dept. of Commerce). The simultaneous comparison computations are included in the Phase IIA Summary Report - Tides.

The boundaries of tide zones used are listed in the Phase IIA Summary Report - Tides. Gage readings were recorded in relation to staff zero; therefore, the MLLW datum height was subtracted from gage readings before applying the time and ratio correctors.

Zoning correctors applied to the observed gage values were:

Station	Zone	Correctors			Staff MLLW Datum
		Time (h min)	Ratio	Height	
Long Neck Point	A10	+00 06	*1.00	0.496	0.496
Long Neck Point	A2	+00 09	*1.01	0.496	0.496
New Rochelle	A3	-00 03	*0.99	0.983	0.983

All data for project water level gages are reported in the Phase IIA Summary Report - Tides.

Table E-1. Abstract of Times of Hydrography

1995/151 21:52:26.66 to 1995/151 22:14:32.01
1995/151 22:16:06.81 to 1995/151 22:39:10.97
1995/151 22:52:26.92 to 1995/151 23:14:03.01
1995/151 23:17:26.54 to 1995/151 23:39:46.85
1995/151 23:42:03.05 to 1995/151 23:59:56.06
1995/151 23:59:56.14 to 1995/152 00:03:40.10
1995/152 00:06:35.71 to 1995/152 00:09:29.09
1995/152 00:15:35.47 to 1995/152 00:35:40.99
1995/152 00:41:01.16 to 1995/152 00:54:11.93
1995/152 01:47:28.39 to 1995/152 02:10:17.96
1995/152 02:16:12.57 to 1995/152 02:41:49.00
1995/152 02:48:10.79 to 1995/152 03:12:05.90
1995/152 03:15:15.42 to 1995/152 03:36:04.79
1995/152 03:41:27.03 to 1995/152 04:05:05.85
1995/152 04:07:46.34 to 1995/152 04:28:32.96
1995/152 04:34:53.64 to 1995/152 04:59:51.85
1995/154 09:40:07.80 to 1995/154 10:16:57.02
1995/154 10:25:46.93 to 1995/154 11:23:15.95
1995/154 11:38:58.54 to 1995/154 11:45:01.45
1995/154 11:51:16.80 to 1995/154 12:47:20.79
1995/154 12:52:51.11 to 1995/154 13:22:53.79
1995/154 13:50:16.43 to 1995/154 14:27:22.23
1995/154 14:33:57.35 to 1995/154 15:09:06.43
1995/154 15:16:52.95 to 1995/154 15:40:05.99
1995/154 15:55:26.07 to 1995/154 16:04:49.32
1995/154 16:23:04.48 to 1995/154 17:26:40.55
1995/154 17:38:53.77 to 1995/154 17:43:10.92
1995/154 18:15:35.43 to 1995/154 19:28:20.97
1995/154 20:06:17.95 to 1995/154 20:44:59.96
1995/154 21:45:13.62 to 1995/154 22:29:44.98
1995/154 22:32:45.10 to 1995/154 23:10:08.90
1995/154 23:26:55.48 to 1995/154 23:47:16.70
1995/155 21:26:59.96 to 1995/155 22:18:00.00
1995/155 22:23:06.84 to 1995/155 23:30:15.92
1995/155 23:37:28.37 to 1995/155 23:59:56.38
1995/155 23:59:56.61 to 1995/156 00:47:32.83
1995/156 00:52:20.12 to 1995/156 01:22:47.09
1995/156 10:36:42.50 to 1995/156 11:13:29.94
1995/156 11:49:17.38 to 1995/156 12:24:38.01
1995/156 12:28:44.42 to 1995/156 13:32:59.89
1995/156 13:43:24.31 to 1995/156 13:49:47.07
1995/156 14:13:10.11 to 1995/156 14:21:37.66
1995/156 14:30:11.58 to 1995/156 14:59:43.53
1995/156 15:07:15.16 to 1995/156 15:49:03.88
1995/156 15:55:10.27 to 1995/156 16:21:52.46
1995/156 16:28:28.47 to 1995/156 17:12:51.99
1995/156 17:17:31.94 to 1995/156 18:26:46.85

Table E-1. Abstract of Times of Hydrography (Cont'd)

1995/156 18:33:02.12 to 1995/156 18:44:18.54
1995/156 19:23:07.58 to 1995/156 20:06:58.51
1995/156 20:10:25.14 to 1995/156 20:21:13.93
1995/156 20:31:55.09 to 1995/156 20:35:50.83
1995/156 20:35:54.31 to 1995/156 20:45:06.07
1995/156 20:53:13.41 to 1995/156 21:46:51.65
1995/156 21:58:17.98 to 1995/156 22:58:08.76
1995/156 23:15:09.86 to 1995/156 23:59:50.92
1995/156 23:59:51.14 to 1995/157 00:26:11.64
1995/157 00:41:36.46 to 1995/157 01:48:32.87
1995/157 09:59:26.95 to 1995/157 11:13:39.23
1995/157 11:28:58.56 to 1995/157 12:38:08.66
1995/157 12:44:18.30 to 1995/157 13:53:36.40
1995/157 14:11:51.26 to 1995/157 15:19:52.48
1995/157 15:44:11.29 to 1995/157 16:52:37.83
1995/157 16:57:56.82 to 1995/157 17:13:19.42
1995/157 17:31:41.84 to 1995/157 17:42:44.92
1995/157 17:47:26.13 to 1995/157 18:10:17.92
1995/157 18:18:40.07 to 1995/157 18:35:47.09
1995/157 19:20:31.49 to 1995/157 19:43:45.12
1995/157 19:49:28.11 to 1995/157 20:04:16.41
1995/157 20:04:16.49 to 1995/157 20:29:22.03
1995/157 20:34:01.47 to 1995/157 21:42:48.90
1995/157 22:02:05.53 to 1995/157 22:49:13.17
1995/157 22:52:02.84 to 1995/157 23:37:00.72
1995/157 23:50:52.51 to 1995/157 23:59:53.84
1995/157 23:59:54.21 to 1995/158 01:09:29.11
1995/158 01:52:28.19 to 1995/158 01:56:27.78
1995/158 03:26:55.75 to 1995/158 04:42:20.90
1995/158 04:49:22.10 to 1995/158 05:04:53.14
1995/158 05:04:54.47 to 1995/158 05:31:32.00
1995/158 06:08:00.03 to 1995/158 06:38:35.81
1995/158 08:04:56.71 to 1995/158 09:18:06.32
1995/158 09:24:48.85 to 1995/158 10:39:17.12
1995/158 11:11:26.15 to 1995/158 12:14:51.34
1995/158 12:23:37.40 to 1995/158 12:34:24.93
1995/158 12:40:26.14 to 1995/158 13:55:34.39
1995/158 14:01:28.49 to 1995/158 15:13:59.44
1995/158 15:24:42.45 to 1995/158 16:28:59.63
1995/158 16:40:09.23 to 1995/158 16:50:44.31
1995/158 16:57:07.29 to 1995/158 17:39:44.30
1995/158 17:48:22.37 to 1995/158 18:25:57.64
1995/158 23:38:40.87 to 1995/158 23:59:54.00
1995/158 23:59:54.22 to 1995/159 00:53:31.28
1995/159 01:00:02.99 to 1995/159 02:12:21.87
1995/159 02:24:08.65 to 1995/159 02:34:24.11
1995/159 03:05:34.04 to 1995/159 04:20:53.19

Table E-1. Abstract of Times of Hydrography (Cont'd)

1995/159 04:43:34.98 to 1995/159 05:58:34.50
1995/159 06:05:06.73 to 1995/159 06:12:30.52
1995/159 06:12:30.74 to 1995/159 07:17:48.72
1995/159 07:29:37.28 to 1995/159 07:40:39.99
1995/159 07:40:40.06 to 1995/159 08:44:20.80
1995/159 08:50:10.08 to 1995/159 10:00:55.05
1995/159 10:14:42.70 to 1995/159 11:25:07.30
1995/159 12:03:44.19 to 1995/159 12:13:49.51
1995/159 12:26:27.61 to 1995/159 13:30:42.42
1995/159 21:39:43.92 to 1995/159 22:11:31.18
1995/159 22:19:27.18 to 1995/159 22:54:07.23
1995/160 00:18:57.03 to 1995/160 01:06:10.44
1995/160 01:16:41.67 to 1995/160 01:41:06.11
1995/160 01:53:29.92 to 1995/160 02:34:40.13
1995/160 02:36:49.81 to 1995/160 03:15:34.86
1995/160 03:22:03.76 to 1995/160 04:31:32.00
1995/160 04:52:57.13 to 1995/160 06:05:34.97
1995/160 06:11:58.02 to 1995/160 06:16:49.31
1995/160 06:31:13.69 to 1995/160 07:35:39.83
1995/160 07:43:31.69 to 1995/160 07:53:58.92
1995/160 08:05:14.30 to 1995/160 08:36:08.01
1995/160 08:45:58.36 to 1995/160 09:24:00.15
1995/160 09:30:37.35 to 1995/160 10:42:33.20
1995/160 11:17:30.87 to 1995/160 11:23:32.67
1995/160 11:30:06.90 to 1995/160 12:37:35.83
1995/160 12:44:33.46 to 1995/160 13:55:05.77
1995/160 20:54:19.03 to 1995/160 22:04:16.08
1995/160 22:25:45.95 to 1995/160 23:24:56.81
1995/160 23:25:12.14 to 1995/160 23:32:16.44
1995/160 23:40:49.55 to 1995/160 23:59:56.63
1995/160 23:59:56.85 to 1995/161 00:48:58.69
1995/161 00:56:08.77 to 1995/161 01:55:30.66
1995/161 02:06:05.45 to 1995/161 03:03:45.43
1995/161 03:08:49.90 to 1995/161 03:12:03.72
1995/161 03:14:10.45 to 1995/161 03:17:46.41
1995/161 03:22:42.96 to 1995/161 04:13:19.30
1995/161 04:22:33.21 to 1995/161 05:09:23.52
1995/161 05:15:18.42 to 1995/161 05:16:36.63
1995/161 05:18:46.98 to 1995/161 05:26:33.80
1995/161 05:26:33.87 to 1995/161 05:50:27.43
1995/161 06:01:52.28 to 1995/161 06:06:50.09
1995/161 06:13:10.40 to 1995/161 06:23:24.31
1995/161 06:30:03.28 to 1995/161 06:48:47.92
1995/161 06:55:08.90 to 1995/161 07:10:36.75
1995/161 07:20:43.70 to 1995/161 07:45:56.72
1995/161 08:36:53.65 to 1995/161 09:19:20.29
1995/161 09:27:24.29 to 1995/161 10:05:17.71

Table E-1. Abstract of Times of Hydrography (Cont'd)

1995/161 11:05:18.93 to 1995/161 11:51:29.83
1995/161 11:59:32.42 to 1995/161 12:25:28.92
1995/161 12:32:30.49 to 1995/161 13:44:12.93
1995/161 13:50:28.50 to 1995/161 15:00:49.84
1995/161 21:21:13.17 to 1995/161 22:32:50.94
1995/161 22:38:19.71 to 1995/161 23:13:50.93
1995/161 23:13:57.15 to 1995/161 23:21:02.94
1995/161 23:21:09.16 to 1995/161 23:56:11.65
1995/162 00:00:14.80 to 1995/162 01:14:36.40
1995/162 01:24:16.08 to 1995/162 02:33:57.73
1995/162 02:45:01.25 to 1995/162 03:24:24.81
1995/162 04:00:30.92 to 1995/162 04:37:31.98
1995/162 04:44:15.10 to 1995/162 04:48:14.25
1995/162 04:48:14.47 to 1995/162 05:13:05.57
1995/162 05:25:55.75 to 1995/162 05:43:53.88
1995/162 05:52:15.36 to 1995/162 06:05:14.27
1995/162 06:13:31.31 to 1995/162 06:13:32.86
1995/162 07:03:37.65 to 1995/162 07:17:24.86
1995/162 07:25:44.26 to 1995/162 07:38:39.62
1995/162 07:43:55.94 to 1995/162 07:57:53.81
1995/162 08:08:48.75 to 1995/162 08:24:58.74
1995/162 08:34:17.10 to 1995/162 08:44:39.59
1995/162 08:57:22.66 to 1995/162 09:04:05.64
1995/162 09:21:53.84 to 1995/162 10:08:27.85
1995/162 11:04:33.18 to 1995/162 11:21:04.80
1995/162 11:33:00.17 to 1995/162 11:42:42.08
1995/162 12:00:04.51 to 1995/162 12:09:15.90
1995/162 12:14:04.97 to 1995/162 12:54:31.26
1995/162 13:09:33.93 to 1995/162 13:39:10.91
1995/162 13:43:43.10 to 1995/162 13:56:14.16
1995/162 14:17:49.00 to 1995/162 14:35:38.83
1995/162 21:33:58.07 to 1995/162 21:40:56.45
1995/162 21:47:36.61 to 1995/162 22:19:19.21
1995/162 22:22:46.21 to 1995/162 22:52:51.93
1995/162 23:16:02.16 to 1995/162 23:25:51.18
1995/162 23:39:29.05 to 1995/162 23:51:04.12
1995/163 00:01:11.07 to 1995/163 00:11:18.45
1995/163 00:15:12.42 to 1995/163 00:25:04.10
1995/163 01:26:02.42 to 1995/163 01:57:05.02
1995/163 02:11:30.89 to 1995/163 02:21:07.76
1995/163 02:29:04.06 to 1995/163 02:38:29.08
1995/163 02:46:06.71 to 1995/163 02:53:49.45
1995/163 02:59:03.48 to 1995/163 03:26:23.89
1995/163 03:40:02.35 to 1995/163 03:49:15.23
1995/163 04:00:52.23 to 1995/163 04:42:42.66
1995/163 04:42:42.73 to 1995/163 05:01:01.82
1995/163 05:17:13.15 to 1995/163 05:51:25.05

Table E-1. Abstract of Times of Hydrography (Cont'd)

1995/163 06:18:52.43 to 1995/163 06:40:06.97
1995/164 23:20:51.71 to 1995/164 23:44:13.05
1995/164 23:52:24.75 to 1995/164 23:59:55.94
1995/164 23:59:56.02 to 1995/165 00:15:21.50
1995/165 00:22:05.81 to 1995/165 00:41:06.15
1995/165 00:51:17.24 to 1995/165 00:58:21.84
1995/165 01:40:50.40 to 1995/165 01:56:42.92
1995/165 01:56:53.59 to 1995/165 02:09:03.84
1995/165 02:26:51.46 to 1995/165 02:35:30.26
1995/308 04:01:17.91 to 1995/308 04:31:49.68
1995/308 04:39:52.49 to 1995/308 04:42:37.87
1995/308 04:54:18.42 to 1995/308 04:55:44.40
1995/308 05:01:00.13 to 1995/308 05:02:48.93
1995/308 05:16:10.79 to 1995/308 05:34:25.50
1995/308 05:51:24.82 to 1995/308 06:03:03.07
1995/308 06:11:31.13 to 1995/308 06:22:54.65
1995/308 07:17:08.26 to 1995/308 07:36:34.58
1995/315 05:57:17.41 to 1995/315 05:59:34.05
1995/315 06:07:16.43 to 1995/315 06:09:34.56
1995/315 06:14:33.11 to 1995/315 06:18:22.48
1995/315 06:23:18.36 to 1995/315 06:25:44.78
1995/315 06:45:32.69 to 1995/315 06:46:58.38
1995/315 06:55:15.71 to 1995/315 06:56:00.52
1995/315 07:05:10.59 to 1995/315 07:06:03.39
1995/315 07:11:11.72 to 1995/315 07:12:41.26
1995/315 07:18:45.28 to 1995/315 07:19:47.86
1995/315 07:29:06.53 to 1995/315 07:30:06.44
1995/315 07:43:58.24 to 1995/315 07:45:04.38
1995/315 08:06:25.31 to 1995/315 08:07:09.82
1995/315 08:44:09.86 to 1995/315 08:44:53.49
1995/315 08:51:19.43 to 1995/315 08:52:11.35
1995/315 09:06:16.26 to 1995/315 09:07:04.85
1995/315 09:12:58.79 to 1995/315 09:13:37.38
1995/315 09:23:59.44 to 1995/315 09:25:20.32
1995/315 09:31:57.29 to 1995/315 09:33:14.10
1995/315 09:42:28.61 to 1995/315 09:44:12.37
1995/315 10:02:11.84 to 1995/315 10:03:32.79
1995/315 10:11:34.72 to 1995/315 10:12:47.31
1995/315 10:22:29.74 to 1995/315 10:23:56.61
1995/315 10:31:00.18 to 1995/315 10:32:38.02
1995/315 16:21:49.41 to 1995/315 16:22:47.25
1995/315 16:26:54.25 to 1995/315 16:27:58.02
1995/315 16:33:36.56 to 1995/315 16:34:36.78
1995/315 16:49:11.24 to 1995/315 16:50:19.45
1995/315 17:09:41.10 to 1995/315 17:10:50.13
1995/315 17:15:15.47 to 1995/315 17:16:15.88

Table E-1. Abstract of Times of Hydrography (Cont'd)

1995/315 17:29:55.51 to 1995/315 17:30:52.88
1995/315 17:35:34.56 to 1995/315 17:36:50.10
1995/315 17:42:52.05 to 1995/315 17:43:47.82
1995/315 17:51:43.82 to 1995/315 17:52:50.26
1995/315 17:59:42.57 to 1995/315 18:01:05.29
1995/315 18:23:10.36 to 1995/315 18:25:49.82
1995/316 19:35:37.50 to 1995/316 19:36:30.30
1995/316 19:39:10.28 to 1995/316 19:39:56.42
1995/316 19:49:44.48 to 1995/316 19:50:45.59
1995/316 20:08:24.62 to 1995/316 20:09:17.72
1995/316 20:21:52.20 to 1995/316 20:26:09.94
1995/316 20:32:03.67 to 1995/316 20:32:50.85
1995/316 20:36:46.59 to 1995/316 20:37:53.62
1995/316 20:44:29.93 to 1995/316 20:46:02.95
1995/316 20:51:16.68 to 1995/316 20:52:09.49
1995/316 20:58:26.55 to 1995/316 20:59:06.02
1995/316 21:06:54.92 to 1995/316 21:08:08.16
1995/316 21:16:15.72 to 1995/316 21:17:04.09
1995/316 21:25:12.59 to 1995/316 21:26:07.83
1995/316 21:32:20.36 to 1995/316 21:33:07.08
1995/316 21:42:39.77 to 1995/316 21:43:41.17
1995/316 21:49:39.56 to 1995/316 21:50:52.51
1995/316 21:56:10.91 to 1995/316 21:57:22.97
1995/316 22:06:02.82 to 1995/316 22:07:11.33
1995/316 22:14:59.93 to 1995/316 22:16:09.62
1995/316 22:25:43.98 to 1995/316 22:26:28.79
1995/316 22:36:44.03 to 1995/316 22:37:17.58
1995/316 22:45:12.11 to 1995/316 22:46:04.91
1995/316 23:10:46.99 to 1995/316 23:11:44.54

NOAA FORM 77-27(H)
(9-83)

U.S. DEPARTMENT OF COMMERCE

REGISTRY NUMBER
H-10612

HYDROGRAPHIC SURVEY STATISTICS

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	1	SMOOTH OVERLAYS: POS., ~~ARC EXCESS~~ XXX XXXXX, CORR.	1
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	NA

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES						
ENVELOPES						
VOLUMES						
CAHIERS						
BOXES	1		2			

SHORELINE DATA

SHORELINE MAPS (List): NA

PHOTOBATHYMETRIC MAPS (List): NA

NOTES TO THE HYDROGRAPHER (List): NA

SPECIAL REPORTS (List): NA

NAUTICAL CHARTS (List): Chart 12367 20th Ed. February 19, 1995, Chart 12365 24th Ed.

OFFICE PROCESSING ACTIVITIES

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

PROCESSING ACTIVITY	AMOUNTS VERIFICATION	AMOUNTS EVALUATION	AMOUNTS TOTALS
POSITIONS ON SHEET			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS VERIFICATION	TIME-HOURS EVALUATION	TIME-HOURS 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			
COMPARISON WITH PRIOR SURVEYS AND CHARTS		40	40
EVALUATION OF SIDE SCAN SONAR RECORDS		80	80
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		24	24
GEOGRAPHIC NAMES			
OTHER*			
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS		144	144

Pre-processing Examination by J. Ferguson	*Beginning Date* 5/28/96	*Ending Date* 5/31/96
Verification of Field Data by J. Ferguson	*Time (Hours)* 120	*Ending Date* 9/6/96
Verification Check by B. Olmstead	*Time (Hours)* 8	*Ending Date* 1/17/97
Evaluation and Analysis by J. Ferguson	*Time (Hours)* 24	*Ending Date* 6/27/97
Inspection by B. Olmstead	*Time (Hours)* 18	*Ending Date* 6/27/97

EVALUATION REPORT
H-10612
Sheet C

A. PROJECT

The hydrographer's report contains a complete discussion of the project information.

B. AREA SURVEYED

The hydrographer's report lists the geographic coordinates outlining the survey area and lists the dates of data acquisition. The survey area is in western Long Island Sound, New York. Depths range from 28 feet (8.5 meters) to 64 feet (19.5 meters). Bottom characteristics are grey mud with small rocky outcrops.

C. SURVEY VESSELS

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Due to contractor proprietary data formats, final data processing and verification was accomplished using contractor supplied software and a contractor supplied HP workstation. The software, used for processing is discussed in the hydrographer's report. The final smooth sheet is an AutoCAD (version 12) drawing file submitted by the contractor. Data is plotted using a UTM projection and are depicted on a single sheet. A revision overlay was created at PHB during office processing. The overlay includes the removal of depth curves from around wreck and obstructions, addition of depth curves to reflect plotted data and junctional notes.

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 SAIC's Generic Sensor Format (GSF) for multibeam survey data. In addition, the sounding plot is filed both in the AutoCAD drawing format, i.e., .dwg (extension); and in the more universally recognized graphics transfer format, i.e., .dxf (extension). Copies of these files will be retained at PHB until data transfer protocols are developed and approved.

E. SONAR EQUIPMENT

Side scan sonar was used on survey H-10612. The side scan sonar equipment, the method of operation, and disposition of significant sonar contacts are adequately discussed in the hydrographer's report.

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. Soundings were corrected for heave, roll, pitch, and heading during data acquisition. Actual tide reduction is derived from Long Neck Point, CT (846-8788) and New Rochelle, NY (851-8490). Refer to Appendix E., Tide Notes, for specific tidal information.

Several velocity casts did not meet the depth requirement. When sounding depths exceeded the cast depth, the RESON used the bottom of the table to extend correctors below the table. The hydrographer's report describes (Pg 32) how an error analysis was conducted comparing the vertical extrapolation to an extrapolation using the trend of the bottom of the velocity profile. The error analysis determined that errors are minimal.

H. CONTROL STATIONS

Sections H and I of the hydrographer's report contain adequate discussions of horizontal control and hydrographic positioning. The positions of horizontal control stations used during hydrographic operations are published and field values based on NAD83. The geographic positions of all survey data are based on NAD83.

A DGPS reference station was established at first order station MANRESA 1983 (LX7443). The station was properly recovered and the DGPS reference station was properly verified. Results are included in the Phase II-A summary report.

Data based on NAD27 may be referenced to this survey by applying the following corrections:

Latitude:	0.359 seconds	(11.07 meters)
Longitude:	-1.530 seconds	(-35.82 meters)

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A maximum allowable horizontal dilution of precision (HDOP) limit of 2.5 was used for this survey. The hydrographer's report adequately describes the methods used to insure all positions were within specifications.

J. SHORELINE

Shoreline verification was not required.

K. CROSSLINES

Crosslines are adequately discussed in the hydrographer's report.

L. JUNCTIONS

Survey H-10612 junctions with the following surveys.

Survey	Year	Scale	Area
H-10347	1990	1:10,000	SW corner
H-10353	1990	1:10,000	Eastern half
H-10611	1995	1:10,000	Eastern edge
H-10618	1995	1:10,000	Western edge

The junctions with H-10611 and H-10618 are complete. Soundings are in good agreement within the common area. The junctions with H-10347 and H-10353 were not formally completed since these surveys were previously processed and forwarded for charting. Depths on the present survey are consistently 0.3 meters (one foot) shoaler than the survey data collected in 1990. An "Adjoins" note has been added to the smooth sheet overlay. Dashed lines have been placed on surveys H-10347 and H-10353 to indicate the areas which have been superseded.

The hydrographer's report adequately discussed the junctions. There are large common areas in the junctions between H-10347, H-10353 and the present survey. The common areas are listed below:

H-10347	Latitude (N)	Longitude (W)
	40/54/20	073/41/20
	40/54/20	073/38/40
	40/53/50	073/40/10

H-10353	Latitude (N)	Longitude (W)
	40/54/10	073/39/00
	40/54/10	073/39/30
	40/56/05	073/39/30
	40/57/30	073/35/00
	40/57/30	073/33/50
	40/56/40	073/32/05

The sounding data from H-10612 should supersede the junction surveys within the common area.

M. COMPARISON WITH PRIOR SURVEYS

Survey H-10612 was compared to the following prior survey.

Survey	Year	Scale
H-1732a	1914	1:20,000

Sounding data from H-1732a has largely been superseded by survey work conducted in 1990 and few depths remain charted within the common area of the present survey. A comparison with the present survey reflects differences of zero to 0.6 meters, with the 1995 survey work generally shoaler. Additional discussion with the prior survey can be found in the hydrographer's report, section M.

The shoaling around Matinecock Point listed in the hydrographer's report is not as extensive as described. The one to two meter shoaling extends from Lat. 40/55.25 N, Long. 073/37.75 W, eastward to Lat. 40/55.25 N, Long. 073/36.00 W.

Survey H-10612 is adequate to supersede the prior survey within the common area.

N. ITEM INVESTIGATIONS

Thirteen AWOIS items were investigated within the survey area. Discussions and disposition of the items have been adequately addressed in the hydrographer's report.

O. COMPARISON WITH THE CHART

Survey H-10612 was compared with the following chart:

Chart	Edition	Date	Scale	Datum
12367	20th	February 18, 1995	1:20,000	NAD83

a. Hydrography

Junction surveys H-10347 and H-10353 conducted in 1990 are the sources for most of the currently charted data. The remaining charted data originates from prior survey H-1732a and miscellaneous sources. The prior survey has been adequately discussed in section M of the hydrographer's report and supplemented by additional comments in the evaluation report. General differences of zero to one foot are noted between the charted depths and the present survey. A few instances are noted where differences range from two to five feet. The present survey generally reflects shoaler depth information. Charted miscellaneous source data have been adequately discussed in the hydrographer's report.

Survey H-10612 is adequate to supersede charted hydrography in the common area.

b. Dangers to Navigation

There were no dangers to navigation reported by the hydrographer. Six dangers to navigation were identified by the Multibeam Processing Group during subsequent review of the contractor's survey data. These dangers have been reported to the USCG, NIMA, and N/CS261. A copy of the report is attached.

P. ADEQUACY OF SURVEY

Hydrography on survey H-10612 is adequate to:

a. delineate the bottom configuration, determine least depths, and draw the standard depth curves.

b. Reveal there are no significant discrepancies or anomalies requiring further investigation.

c. Show the survey was properly controlled and soundings are correctly plotted.

The hydrographic records and reports received for processing are adequate and conform to the contract specifications.

Survey H-10612 adequately complies with the project instructions.

Q. AIDS TO NAVIGATION

There is one floating aid within the survey limits. It is properly positioned and plotted and serves the intended purpose.

R. STATISTICS

Statistics are itemized in the hydrographer's report.

S. MISCELLANEOUS

Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is a good hydrographic survey, no additional work is required.

U. REFERRAL TO REPORTS

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

Lieutenant Commander Jeffrey A. Ferguson, NOAA
Multibeam Processing Officer

C Features Correlated with Multibeam Source Data

DEPTHS ARE IN METERS

Feat. #	Latitude	Longitude	Feature Least Depth	Feature Type	1 or 2 x IHO	Multibeam File Name	Ping Number	Beam Number	MB Depth
2	40 54.65678N	073 37.92243W	11.81	ROCK	2	mba95154.d03	31236	10	11.81
4	40 55.18978N	073 37.15115W	10.92	OBSTR	1	mba95315.d06	8102	28	10.92
7	40 54.68987N	073 38.19257W	12.36	ROCK	2	mba95154.d05	12266	4	12.36
9	40 54.78598N	073 38.31745W	15.22	ROCK	1	mba95156.d02	51596	40	15.22
11	40 54.74411N	073 38.66684W	15.12	WRECK	1	mba95316.d01	25283	41	15.12
14	40 54.74171N	073 38.78281W	14.44	ROCK	2	mba95156.d04	30820	3	14.44
20	40 54.86825N	073 38.82383W	15.63	ROCK	1	mba95157.d01	1436	35	15.63
21	40 54.84051N	073 38.81722W	14.79	OBSTR	1	mba95156.d07	19247	18	14.79
24	40 54.97582N	073 38.42398W	15.68	ROCK	1	mba95161.d06	43184	32	15.68
25	40 55.84253N	073 36.06026W	13.26	ROCK	2	mba95161.d06	52137	3	13.26
27	40 54.23744N	073 40.50075W	11.85	OBSTR	2	mba95161.d06	34140	44	11.85
29	40 55.87371N	073 36.22476W	13.85	WRECK	1	mba95315.d06	1619	9	13.85
30	40 55.93681N	073 36.97461W	13.09	WRECK	1	mba95316.d01	52934	2	13.09
32	40 56.35791N	073 34.88749W	14.78	WRECK	1	mba95157.d04	15624	59*	14.8*
35	40 55.05938N	073 38.62888W	13.39	WRECK	1	mba95316.d01	27868	4	13.39
37	40 55.11121N	073 38.81041W	16.12	ROCK	2	mba95157.d05	11553	16*	16.1*
39	40 54.90477N	073 39.27531W	17.39	WRECK	1	mba95315.d03	17804	2	17.39
45	40 55.08119N	073 38.88849W	15.78	ROCK	2	mba95157.d05	11368	4	15.78
46	40 55.08894N	073 38.98801W	15.99	ROCK	2	mba95157.d05	15046	16*	16.0*
47	40 55.09786N	073 38.94875W	16.12	ROCK	2	mba95151.d02	49174	5	16.12
49	40 55.11617N	073 38.91057W	16.05	ROCK	2	mba95157.d05	14898	16*	16.0*
51	40 55.82838N	073 37.52280W	12.7	WRECK	1	mba95316.d01	35879	25	12.7
54	40 56.12007N	073 36.83971W	15.77	WRECK	1	mba95316.d01	58414	55*	15.8*
55	40 55.37337N	073 39.00654W	14.83	OBSTR	1	mba95315.d03	21258	9	14.83
57	40 56.83589N	073 36.18319W	14.99	WRECK	1	mba95315.d03	31943	1	14.99
59	40 54.77210N	073 41.95043W	12.44	OBSTR	1	mba95159.d05	35150	14	12.44
60	40 56.19691N	073 37.66486W	16.54	WRECK	1	mba95316.d01	66083	60	16.54
62	40 55.62945N	073 40.20485W	14.7	WRECK	1	mba95315.d03	13464	9	14.7
63	40 54.91270N	073 42.47133W	11.26	ROCK	1	mba95315.d03	5791	22	11.26
66	40 54.91758N	073 42.52690W	10.51	ROCK	1	mba95163.d02	1329	38	10.51
67	40 54.85292N	073 42.60292W	8.06	ROCK	2	mba95161.d02	32930	2	8.06
68	40 54.96495N	073 42.45901W	11.43	ROCK	1	mba95315.d06	33296	40	11.43
69	40 56.35638N	073 38.53097W	17.98	WRECK	1	mba95316.d01	78228	53*	18.0*
70	40 55.27025N	073 41.68709W	15.24	WRECK	1	mba95315.d02	686	1	15.34
73	40 54.63666N	073 37.85381W	12.29	ROCK	1	mba95162.d03	6913	28	12.29
74	40 54.61741N	073 37.87420W	11.94	ROCK	1	mba95154.d01	40686	28	11.94
76	40 54.63089N	073 37.81404W	13.26	ROCK	2	mba95154.d01	40422	10	13.26
77	40 54.62954N	073 37.93870W	12.25	ROCK	1	mba95154.d02	18935	42	12.25
78	40 54.58155N	073 37.94483W	10.36	ROCK	2	mba95154.d01	41055	6	10.36
79	40 54.60033N	073 37.98279W	10.23	ROCK	1	mba95162.d03	6438	36	10.23
80	40 54.60291N	073 38.02045W	10.07	ROCK	1	mba95154.d02	18562	25	10.07
81	40 54.55904N	073 38.05203W	10.38	ROCK	1	mba95154.d01	41517	37	10.38
82	40 54.56027N	073 38.02281W	9.93	ROCK	1	mba95154.d01	41407	23	9.93
84	40 54.57521N	073 38.09235W	10.82	ROCK	1	mba95154.d02	18226	6	10.82
85	40 54.59442N	073 38.11621W	11.33	ROCK	1	mba95154.d03	32111	25	11.33
86	40 54.54859N	073 38.07939W	10.18	ROCK	1	mba95154.d01	41647	33	10.18
88	40 54.53974N	073 38.20147W	10.34	ROCK	2	mba95162.d03	5671	2	10.34
90	40 54.31257N	073 38.92194W	11.13	WRECK	1	mba95154.d03	39623	15	11.13
91	40 54.17210N	073 39.29518W	10.67	WRECK	1	mba95315.d06	25394	59	10.67
93	40 54.61455N	073 38.08444W	11.94	ROCK	1	mba95154.d03	31943	36	11.94
94	40 54.06759N	073 39.97544W	11.9	ROCK	1	mba95156.d01	22598	40	11.9
96	40 54.66984N	073 37.91571W	12.56	ROCK	1	mba95154.d03	31183	12	12.56
97	40 54.69324N	073 37.98091W	13.37	ROCK	2	mba95154.d04	32260	4	13.37
101	40 56.76056N	073 32.38046W	15.08	WRECK	1	mba95315.d03	49793	2	15.08
104	40 54.95295N	073 42.55612W	8.02	ROCK	2	mba95161.d02	80855	2	8.02

* after beam number and mb depth indicates that values were determined using gsfedit

APPROVAL SHEET
H-10612

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: 6/27/97
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 A. Timmons Date: 6/28/97
Kathy A. Timmons
Commander, NOAA
Chief, Pacific Hydrographic Branch

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Final Approval:

Approved:

Andrew A. Armstrong III Date: Oct 21, 1997
Andrew A. Armstrong III
Captain, NOAA
Chief, Hydrographic Surveys Division

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10612

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
12365	4/30/97	[signature]	Full ~~Part~~ ~~Before~~ After Marine Center Approval Signed Via
			Drawing No. Full application of soundings from smooth sheet.
12367	5/10/97	[signature]	Full ~~Part~~ ~~Before~~ After Marine Center Approval Signed Via
			Drawing No. Full application of soundings from smooth sheet.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED