

H12437

NOAA Form 76-35A

U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Ocean Survey

**DESCRIPTIVE REPORT**

Type of Survey: Navigable Area

Registry Number: H12437

**LOCALITY**

State: New York

General Locality: Long Island Sound

Sub-locality: North Shore Beach to Herod Pt. Shoal, NY

**2012**

CHIEF OF PARTY  
CDR Lawrence T. Krepp

LIBRARY & ARCHIVES

Date:

**HYDROGRAPHIC TITLE SHEET****H12437**

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: **Long Island Sound**

Sub-Locality: **North Shore Beach to Herod Pt. Shoal, NY**

Scale: **40000**

Dates of Survey: **05/03/2012 to 05/23/2012**

Instructions Dated: **05/08/2012**

Project Number: **OPR-B340-TJ-12**

Field Unit: **NOAA Ship *Thomas Jefferson***

Chief of Party: **CDR Lawrence T. Krepp**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

Verification by: **Atlantic Hydrographic Branch**

Soundings Acquired in: **meters at Mean Lower Low Water**

H-Cell Compilation Units: ***meters at Mean Lower Low Water***

Remarks: ***The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via <http://www.ngdc.noaa.gov/>.***

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## Descriptive Report to Accompany Survey H12437

Project: OPR-B340-TJ-12

Locality: Long Island Sound

Sublocality: North Shore Beach to Herod Pt. Shoal, NY

Scale: 1:40000

May 2012 - May 2012

**NOAA Ship *Thomas Jefferson***

Chief of Party: CDR Lawrence T. Krepp

### A. Area Surveyed

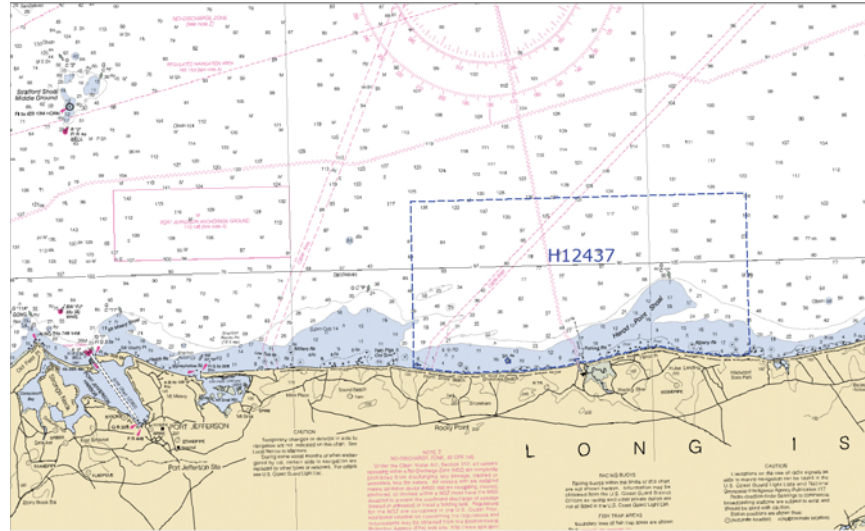
This hydrographic survey (registry number H12437) covers an area approximately 25 square nautical miles in Long Island Sound from North Shore Beach to Herod Point Shoal, NY. Coverage requirements as per Hydrographic Survey Letter Instructions OPR-B350-TJ-12 Long Island Sound Change 1, dated 8 May 2012, were met using object detection multibeam echosounder and backscatter data collected in accordance with the National Ocean Service Hydrographic Surveys Specifications and Deliverables Manual (HSSD), dated April 2012.

#### A.1 Survey Limits

Data was acquired within the following survey limits:

<b>Northeast Limit</b>	<b>Southwest Limit</b>
41.0241 N 72.7877 W	40.9655 N 72.9442 W

*Table 1: Survey Limits*



*Figure 1: H12437 Survey Limits*

Survey Limits were acquired in accordance with the requirements in the Project Instructions and the HSSD.

## **A.2 Survey Purpose**

This project is being conducted in support of NOAA's Office of Coast Survey to provide contemporary hydrographic data in order to update the nautical charting products and reduce the survey backlog within the area. In addition, data from this project will support the Long Island Sound Seafloor Mapping Initiative for the States of Connecticut and New York. This project also responds to the Coast Guard proposal to establish six anchorage grounds in Long Island Sound to increase safety for vessels through enhanced voyage planning and also by clearly indicating the location of anchorage grounds for ships proceeding to ports in New York. The USCG is requesting that NOAA confirm that their underwater surveys of Long Island Sound did not detect any wrecks at all in the locations being proposed for the anchorage areas. Data acquired for this project will be used by partners for species and habitat identification, infrastructure projects, ocean mapping, coastal hazards and geology. Partners include the US Environmental Protection Agency, Connecticut Department of Environmental Protection, the University of Connecticut Marine Science Department, New York Department of Environmental Quality, and other organizations. This project will cover approximately 206 SNM of which 165 SNM are critical survey areas as designated in the NOAA Hydrographic Survey Priorities, 2010 edition.

## **A.3 Survey Quality**

The entire survey is adequate to supersede previous data.

This hydrographic survey was completed as specified by 'Hydrographic Survey Letter Instructions OPR-B340-TJ-12 Long Island Sound, NY Change 1', dated 8 May 2012. No additional work is needed to complete this survey. It is recommended that this survey receive normal processing priority.

## A.4 Survey Coverage

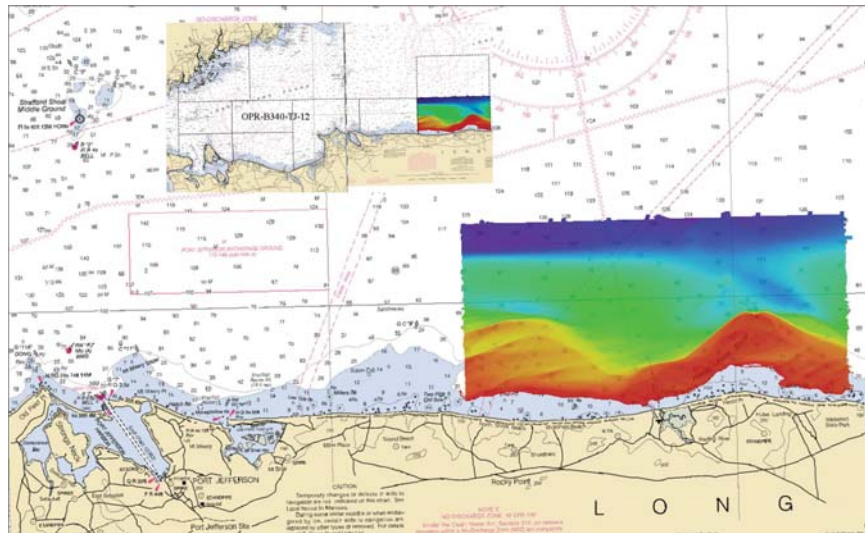


Figure 2: H12437 Survey Coverage

Survey coverage was generally in accordance with the requirements in the Project Instructions and the HSSD April 2012. There are, however, 8 holidays in the 50cm object detection CUBE BASE surface. The holidays are due to steering errors or formed after cleaning out schools of fish captured in the sonar data during post-processing. The surrounding bathymetry and backscatter at each holiday was examined by the hydrographer, and no evidence of significant features were found.

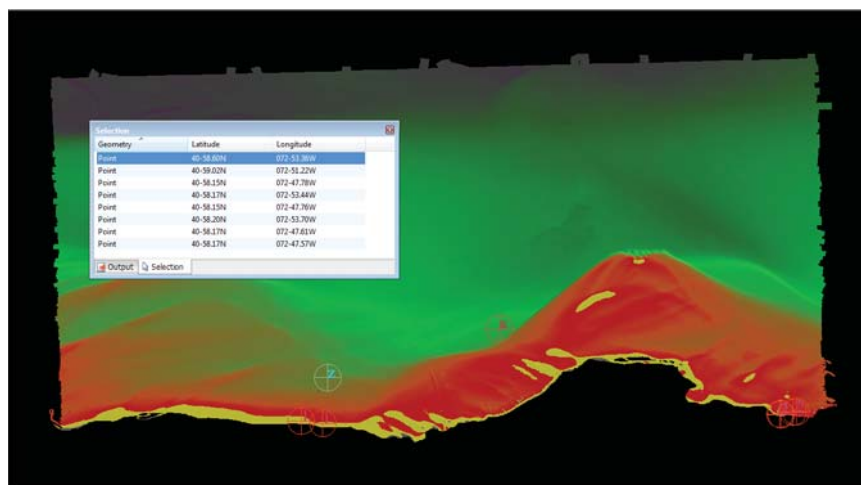


Figure 3: H12437 Holidays

## A.5 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	<b>HULL ID</b>	<b>S-222</b>	<b>3101</b>	<b>3102</b>	<b>Total</b>
<b>LNM</b>	<b>SBES Mainscheme</b>	0	0	0	0
	<b>MBES Mainscheme</b>	365.24	399.58	499.28	1264.10
	<b>Lidar Mainscheme</b>	0	0	0	0
	<b>SSS Mainscheme</b>	0	0	0	0
	<b>SBES/MBES Combo Mainscheme</b>	0	0	0	0
	<b>SBES/SSS Combo Mainscheme</b>	0	0	0	0
	<b>MBES/SSS Combo Mainscheme</b>	0	0	0	0
	<b>SBES/MBES Combo Crosslines</b>	19.94	0	44.86	64.80
	<b>Lidar Crosslines</b>	0	0	0	0
	<b>Number of Bottom Samples</b>				
<b>Number of DPs</b>					0
<b>Number of Items Items Investigated by Dive Ops</b>					0
<b>Total Number of SNM</b>					23.1

*Table 2: Hydrographic Survey Statistics*



The following table lists the specific dates of data acquisition for this survey:

<i>Survey Dates</i>
05/03/2012
05/04/2012
05/05/2012
05/06/2012
05/07/2012
05/08/2012
05/09/2012
05/10/2012
05/15/2012
05/16/2012
05/17/2012
05/18/2012
05/19/2012
05/20/2012
05/22/2012
05/23/2012

*Table 3: Dates of Hydrography*

## **A.6 Shoreline**

Of the 53 assigned features within the limits of H12437, 49 of them were in areas too shallow to be safely developed. These features were not addressed.

## **A.7 Bottom Samples**

All assigned bottom samples on H12437 were collected, except for one. Refer to the Final Feature File for more information.

## B. Data Acquisition and Processing

### B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

#### B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	<i>S-222</i>	<i>3101</i>	<i>3102</i>
LOA	208 feet	31 feet	31 feet
Draft	14 feet	5.2 feet	5.2 feet

*Table 4: Vessels Used*

Data were acquired by NOAA Ship Thomas Jefferson, S-222, and her two hydrographic survey launches, 3101 and 3102. All three platforms acquired Reson 7125 MBES soundings and sound speed profiles. Vessel configurations, equipment operation, and data acquisition and processing were consistent with specifications described in the DAPR.

#### B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
Applanix	POSMV	Positioning and Attitude System
Seabird	Seacat 19+	Sound Speed System
Brooke Ocean	MVP100	Sound Speed System
Reson	7125 ROV	MBES
Reson	7125 SV-1	MBES

*Table 5: Major Systems Used*

## B.2 Quality Control

### B.2.1 Crosslines

MBES cross-lines totaling 64.8 LNM, approximately 5.1% of total hydrography, were acquired during the course of the survey. As per email dated 10 Sept, 2009 from AHB located in the Descriptive Report, Appendix 5, quality control was performed using the standard deviation layer of the survey's CUBE surface. Areas of unusually high standard deviation were investigated and resolved in processing, except where caused by areas of high bathymetric relief or as described in Section B.5 Data Processing. The maximum standard deviation on cross-lines compared with mainscheme data is 0.21m (in position 41-01.31'N, 072-52.17'W). Throughout the entire data set, the mean standard deviation was 0.04m, whereas the maximum standard deviation was 0.91m. The regions of highest standard deviation are found at the reported features found throughout the survey area, and are described in detail in the Final Feature File.

### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

<b>Measured</b>	<b>Zoning</b>
0.102meters	0meters

*Table 6: Survey Specific Tide TPU Values*

<b>Hull ID</b>	<b>Measured - CTD</b>	<b>Measured - MVP</b>	<b>Surface</b>
S-222		1meters/second	0.2meters/second
3101	4meters/second		0.2meters/second
3102	4meters/second		0.2meters/second

*Table 7: Survey Specific Sound Speed TPU Values*

Values listed were values applied for all lines utilizing VDATUM as the tidal reducer. A number of lines did not have VDATUM applied due to positioning data not being recorded. For all TCARI lines, values for Tidal Uncertainty were left at 0. The following lines utilized TCARI: 3101, DN 137, all lines after and including 137\_1340. For a few of the lines, RMS data was not able to be applied to the lines. For these lines, uncertainty values for the vessel were utilized.

CO-OPS provided tide uncertainty values for the TCARI surface and the VDATUM solution as part of the Total Propagated Uncertainty (TPU) calculation performed within CARIS HIPS and SIPS. TPU is calculated and written to each line's HDCS file (CARIS processed data format). When surfaces are created, an uncertainty child layer is created. This child layer represents the amount of uncertainty for individual nodes in the surface based on a combination of a priori values from equipment vendors, values determined from environmental observation in the field, and from automated empirical analysis of data in real-time. Once all investigated features have been reviewed and least depths have been designated, surfaces are

finalized. In finalization, the standard deviation for each node in the surface is multiplied by 1.96 to provide the 95% (2-sigma) confidence value for the node. This 2-sigma standard deviation is compared to the computed Total Vertical Uncertainty (TVU) for each node. The larger of the two values is retained as the finalized Uncertainty for each node. Uncertainty is reported in meters. IHO has established allowable TVU values for each order of survey. This survey meets IHO Order I TVU requirements in 99.99% of nodes in the final surface.

### B.2.3 Junctions

H12437 was compared with H12438 and H12417 from the same project.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12438	1:40000	2012	NOAA Ship THOMAS JEFFERSON	N
H12417	1:5000	2012	NOAA Ship THOMAS JEFFERSON	W
H11360	1:10000	2004	NOAA Ship THOMAS JEFFERSON	E
H11255	1:10000	2004	NOAA Ship THOMAS JEFFERSON	NE

*Table 8: Junctioning Surveys*

#### H12438

The junction with H12438 was compared using a difference surface in CARIS Bathy DataBase using preliminary data. The surveys had a mean difference of 0.0485m and a standard deviation of 0.069m.

#### H12417

The junction with H12417 was compared using a difference surface in CARIS Bathy DataBase using preliminary data. The surveys had a mean difference of 0.092m and a standard deviation of 0.092m.

#### H11360

A difference surface was computed using the current 2m grid and the BAG for H11360. This difference surface has a mean difference of 43.7cm with a standard deviation of 12.8cm. The largest difference was 1.849m. The largest differences were in the northern section of the junction. In general, current surveyed depths are shoaler than H11360.

#### H11255

The BAG provided threw an error when attempting to open it within CARIS BathyDataBase. No comparison could be made.

## **B.2.4 Sonar QC Checks**

Not all data could be reduced to MLLW using VDATUM. All lines for 3101 DN137 after and including 137\_1340 were reduced using TCARI due to positioning data not being recorded.

## **B.2.5 Equipment Effectiveness**

### **B.2.5.1 None Exist**

There were no conditions or deficiencies that affected equipment operational effectiveness.

## **B.2.6 Factors Affecting Soundings**

### **B.2.6.1 None Exist**

There were no other factors that affected corrections to soundings.

## **B.2.7 Sound Speed Methods**

Sound Speed Cast Frequency: The ship used a Moving Vessel Profiler with casts occurring approximately every 30 minutes. 3101 and 3102 CTDs with casts approximately every 4 hours. Sound speed profiles were analyzed for data quality, concatenated and then applied to the bathymetry using the "nearest in time" mode in CARIS HIPS and SIPS.

No abnormal sound velocity issues were present in the data.

## **B.2.8 Coverage Equipment and Methods**

99.35% of all nodes 0-20m met the density requirements of at least 5 pings per node for Object Detection MBES at 50cm grid resolution. 99.99% of all nodes greater than 18m met density requirements of at least 5 pings per node at the 2m grid resolution.

## **B.3 Echo Sounding Corrections**

### **B.3.1 Corrections to Echo Soundings**

HDCS sounding data were reduced to mean lower low (MLLW) primarily with a VDATUM solution. Select lines were processed using TCARI when issues with ERS processing did not allow for an SBET solution. See the Vertical and Horizontal Control Section for more information.

### B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

### B.4 Backscatter

Backscatter was logged as a 7k file and submitted to the IOCM processing center and/or directly to NGDC, and is included with the data submitted to the Branch.

### B.5 Data Processing

#### B.5.1 Software Updates

There were no software configuration changes after the DAPR was submitted.

The following Feature Object Catalog was used: NOAAProfileField.xml v. 5.2

#### B.5.2 Surfaces

The following CARIS surfaces were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12437_50cm_MB_MLLW_Final	CUBE	0.5 meters	0.19 meters - 20 meters	NOAA_0.5m	Object Detection
H12437_2m_MB_MLLW_Final	CUBE	2 meters	18 meters - 43.01 meters	NOAA_2m	Complete MBES
2437_MB_MLLW_2m_Final_Combir	CUBE	2 meters	0.19 meters - 43.01 meters	NOAA_2m	Complete MBES

*Table 9: CARIS Surfaces*

## C. Vertical and Horizontal Control

No additional information is provided.

### C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

Standard Vertical Control Methods Used:

TCARI

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Kings Point, NY	8516945
Bridgeport, CT	8467150
New Haven, CT	8465705

*Table 10: NWLON Tide Stations*

File Name	Status
8516945.tid	Final Approved
8467150.tid	Final Approved
8465705.tid	Final Approved

*Table 11: Water Level Files (.tid)*

File Name	Status
B340TJ2012_Rev.tc	Final

*Table 12: Tide Correctors (.zdf or .tc)*

A request for final approved tides was sent to N/OPS1 on 06/03/2012. The final tide note was received on 06/25/2012.

Non-Standard Vertical Control Methods Used:

## VDatum

Ellipsoid to Chart Datum Separation File:

2012\_B340\_VDatum\_Ellip\_MLLW.txt

Crosslines with and without SBETs applied were compared using Pydro's Time Series Comparison tool. Statistics for S-222 crosslines were: N,mean,stdev = 267178,-0.002,0.034. Statistics for 3102 crosslines were: N,mean,stdev = 48207,-0.038,0.030. See Appendix V for the interim deliverable memo and resulting VDATUM approval memo. The majority of H12437 was processed to the ellipsoid and used the OPS provided VDATUM separation model to reduce data to MLLW. 201 line files from day number 137 from 3101 did not have GPS tides applied and instead were processed with TCARI tides.

**C.2 Horizontal Control**

The horizontal datum for this project is North American Datum of 1983 (NAD83).

The following PPK methods were used for horizontal control:

Smart Base

The following CORS Stations were used for horizontal control:

<b>HVCR Site ID</b>	<b>Base Station ID</b>
NYRH	NYRH
MOR6	MOR6
ZNY1	ZNY1
NYCI	NYCI
RVDI	RVDI
CTDA	CTDA
CTGU	CTGU
MOR5	MOR5
CTBR	CTBR
CTNE	CTNE

*Table 13: CORS Base Stations*



The following DGPS Stations were used for horizontal control:

DGPS Stations
Moriches, NY (293 kHz)

Table 14: USCG DGPS Stations

## D. Results and Recommendations

### D.1 Chart Comparison

#### D.1.1 Raster Charts

The following are the largest scale raster charts, which cover the survey area:

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
12354	1:80000	44	05/2012	12/11/2012	12/22/2012

Table 15: Largest Scale Raster Charts

#### 12354

Surveyed soundings generally agreed within three feet of charted soundings. In the SW region, there is a charted 30ft shoal that has shrunk by about 1000m (Figure 5). In the same region a 25 ft charted sounding was found in a region of 30 ft surveyed soundings (Figure 6).

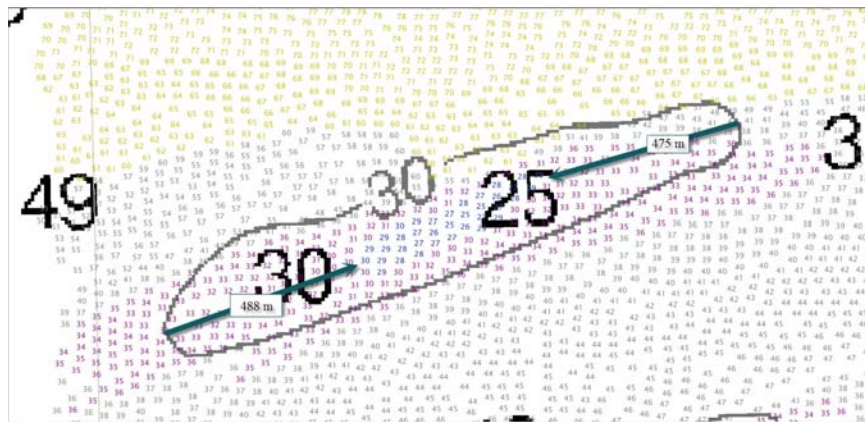


Figure 5: 30ft Shoal

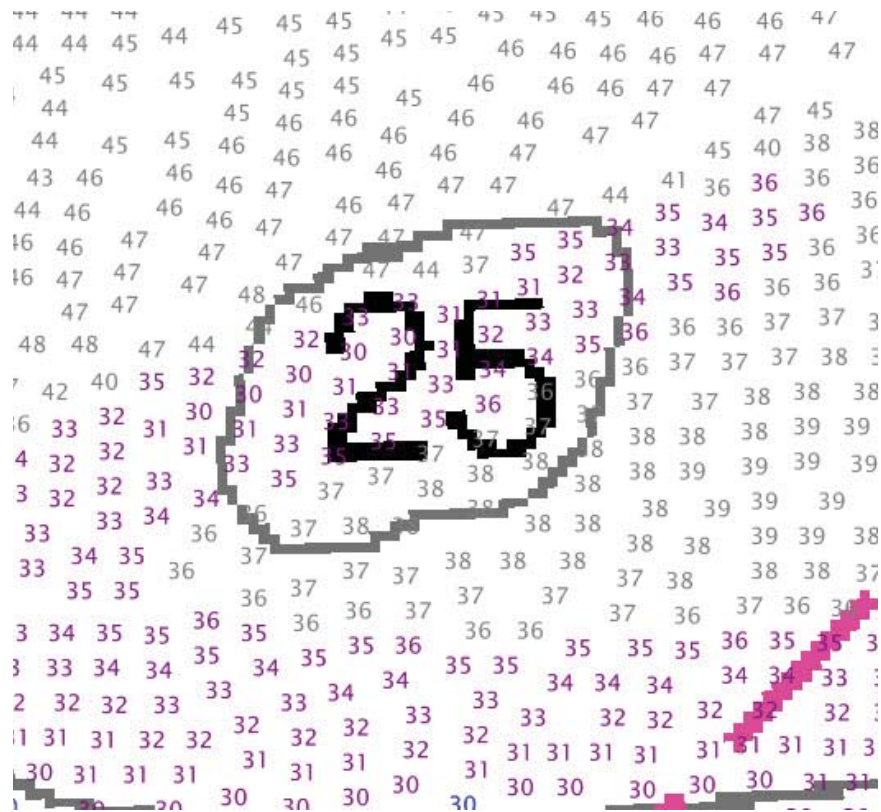


Figure 6: 25ft Shoal

### D.1.2 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US4NY1GM	1:80000	20	07/11/2011	07/11/2011	NO

Table 16: Largest Scale ENC's

#### US4NY1GM

The ENC and chart 12354 are identical datasets. See discussion on comparison of NOAA Raster Chart 12354.

### D.1.3 AWOIS Items

Number of AWOIS Items Addressed: 0

Number of AWOIS Items Not Addressed: 1

AWOIS items exist for this survey, but were not addressed because the assigned search radius fell within the 12 foot curve within depths deemed unsafe to survey.

#### **D.1.4 Charted Features**

A charted feature that contains the label "PD" exists for this survey, but was not investigated because the feature fell within the 12 foot curve within depths deemed unsafe to survey.

#### **D.1.5 Uncharted Features**

A total of 50 uncharted significant features were found in survey H12437. For a full discussion, see the Final Feature File.

#### **D.1.6 Dangers to Navigation**

One DTON was submitted to the Marine Charting Branch for Survey H12437. For a complete report, refer to Appendix I of this report.

#### **D.1.7 Shoal and Hazardous Features**

Surveyed soundings no shoaler than 11 feet were found in the area around the 7 foot charted sounding of Herod Point Shoal.

#### **D.1.8 Channels**

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

### **D.2 Additional Results**

#### **D.2.1 Shoreline**

Of the 53 assigned features within the limits of H12437, 49 of them were in areas too shallow to be safely developed. These features were not addressed.

#### **D.2.2 Prior Surveys**

Prior survey comparisons exist for this survey, but were not investigated.

**D.2.3 Aids to Navigation**

All ATONs were found to be on station and serving their intended purpose.

**D.2.4 Overhead Features**

Overhead features do not exist for this survey.

**D.2.5 Submarine Features**

There is a charted pipeline, a charted submarine cable, and a cable area within the H12437 survey area. The sewer pipeline was observed to be approximately 30m to the west of the charted position. Refer to the Final Feature File for more information.

**D.2.6 Ferry Routes and Terminals**

No ferry routes or terminals exist for this survey.

**D.2.7 Platforms**

No platforms exist for this survey.

**D.2.8 Significant Features**

No significant features exist for this survey.

**D.2 Construction and Dredging**



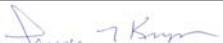
There is no present or planned construction or dredging within the survey limits.

## E. Approval Sheet

As Chief of Party, Field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Field Procedures Manual, Standing and Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
ENS Anthony Klemm	Sheet Manager	02/22/2013	
LT William Winner	Field Operations Officer	02/22/2013	
CDR Lawrence Krepp	Commanding Officer	02/22/2013	

## F. Table of Acronyms

<b>Acronym</b>	<b>Definition</b>
<b>AFF</b>	Assigned Features File
<b>AHB</b>	Atlantic Hydrographic Branch
<b>AST</b>	Assistant Survey Technician
<b>ATON</b>	Aid to Navigation
<b>AWOIS</b>	Automated Wreck and Obstruction Information System
<b>BAG</b>	Bathymetric Attributed Grid
<b>BASE</b>	Bathymetry Associated with Statistical Error
<b>CO</b>	Commanding Officer
<b>CO-OPS</b>	Center for Operational Products and Services
<b>CORS</b>	Continually Operating Reference Station
<b>CTD</b>	Conductivity Temperature Depth
<b>CEF</b>	Chart Evaluation File
<b>CSF</b>	Composite Source File
<b>CST</b>	Chief Survey Technician
<b>CUBE</b>	Combined Uncertainty and Bathymetry Estimator
<b>DAPR</b>	Data Acquisition and Processing Report
<b>DGPS</b>	Differential Global Positioning System
<b>DP</b>	Detached Position
<b>DR</b>	Descriptive Report
<b>DTON</b>	Danger to Navigation
<b>ENC</b>	Electronic Navigational Chart
<b>ERS</b>	Ellipsoidal Referenced Survey
<b>ERZT</b>	Ellipsoidally Referenced Zoned Tides
<b>FOO</b>	Field Operations Officer
<b>FPM</b>	Field Procedures Manual
<b>GAMS</b>	GPS Azimuth Measurement Subsystem
<b>GC</b>	Geographic Cell
<b>GPS</b>	Global Positioning System
<b>HIPS</b>	Hydrographic Information Processing System
<b>HSD</b>	Hydrographic Surveys Division
<b>HSSDM</b>	Hydrographic Survey Specifications and Deliverables Manual

<b>Acronym</b>	<b>Definition</b>
<b>HSTP</b>	Hydrographic Systems Technology Programs
<b>HSX</b>	Hypack Hysweep File Format
<b>HTD</b>	Hydrographic Surveys Technical Directive
<b>HVCR</b>	Horizontal and Vertical Control Report
<b>HVF</b>	HIPS Vessel File
<b>IHO</b>	International Hydrographic Organization
<b>IMU</b>	Inertial Motion Unit
<b>ITRF</b>	International Terrestrial Reference Frame
<b>LNM</b>	Local Notice to Mariners
<b>LNM</b>	Linear Nautical Miles
<b>MCD</b>	Marine Chart Division
<b>MHW</b>	Mean High Water
<b>MLLW</b>	Mean Lower Low Water
<b>NAD 83</b>	North American Datum of 1983
<b>NAIP</b>	National Agriculture and Imagery Program
<b>NALL</b>	Navigable Area Limit Line
<b>NM</b>	Notice to Mariners
<b>NMEA</b>	National Marine Electronics Association
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NOS</b>	National Ocean Service
<b>NRT</b>	Navigation Response Team
<b>NSD</b>	Navigation Services Division
<b>OCS</b>	Office of Coast Survey
<b>OMAO</b>	Office of Marine and Aviation Operations (NOAA)
<b>OPS</b>	Operations Branch
<b>MBES</b>	Multibeam Echosounder
<b>NWLON</b>	National Water Level Observation Network
<b>PDBS</b>	Phase Differencing Bathymetric Sonar
<b>PHB</b>	Pacific Hydrographic Branch
<b>POS/MV</b>	Position and Orientation System for Marine Vessels
<b>PPK</b>	Post Processed Kinematic
<b>PPP</b>	Precise Point Positioning
<b>PPS</b>	Pulse per second

<b>Acronym</b>	<b>Definition</b>
<b>PRF</b>	Project Reference File
<b>PS</b>	Physical Scientist
<b>PST</b>	Physical Science Technician
<b>RNC</b>	Raster Navigational Chart
<b>RTK</b>	Real Time Kinematic
<b>SBES</b>	Singlebeam Echosounder
<b>SBET</b>	Smooth Best Estimate and Trajectory
<b>SNM</b>	Square Nautical Miles
<b>SSS</b>	Side Scan Sonar
<b>ST</b>	Survey Technician
<b>SVP</b>	Sound Velocity Profiler
<b>TCARI</b>	Tidal Constituent And Residual Interpolation
<b>TPU</b>	Total Propagated Error
<b>TPU</b>	Topside Processing Unit
<b>USACE</b>	United States Army Corps of Engineers
<b>USCG</b>	United States Coast Guard
<b>UTM</b>	Universal Transverse Mercator
<b>XO</b>	Executive Officer
<b>ZDA</b>	Global Positioning System timing message
<b>ZDF</b>	Zone Definition File



APPENDIX I  
TIDES AND WATER LEVELS



29 July 2012

MEMORANDUM TO: Jeffrey Ferguson  
Chief, Hydrographic Surveys Division

FROM: Lawrence T. Krepp, CDR/NOAA  
Commanding Officer

SUBJECT: H12437 Interim Deliverables

As per the project instructions for OPR-B340-TJ-12, NOAA Ship *Thomas Jefferson* was tasked with providing a recommendation on the vertical transformation technique to be used for each sheet. This recommendation is based upon an analysis of crossline data processed with TCARI tidal zoning and VDatum ERS. This analysis was performed using Pydro's Post Acquisition Tools.

### **Crossline Analysis**

Crosslines from H12437 were parallel processed with one set of depths reduced to MLLW via TCARI tidal zoning and the other set reduced via VDatum ERS. Pydro's Post Acquisition Tool "Compare Time Series Data" yielded the following results:

#### File-wise Statistics

-----  
H12437\_ERS\_TJ\_3102\_Reson7125\_400KHZ\_MiddlePD.txt | H:\Surveys\H12437\ERS  
Projects\Crossline\_timeseries  
- (minus)

H12437\_TCARI\_TJ\_3102\_Reson7125\_400KHZ\_MiddlePD.txt | H:\Surveys\H12437\ERS  
Projects\Crossline\_timeseries

=====  
N,mean,stdev = 267178,-0.002,0.034

H12437\_ERS\_TJ\_S222\_RESON7125\_STBD\_MiddlePD.txt | H:\Surveys\H12437\ERS  
Projects\Crossline\_timeseries  
- (minus)

H12437\_TCARI\_TJ\_S222\_RESON7125\_STBD\_MiddlePD.txt | H:\Surveys\H12437\ERS  
Projects\Crossline\_timeseries

=====  
N,mean,stdev = 48207,-0.038,0.030

#### Sensor-wise Statistics

-----  
MiddlePD: N,mean,stdev = 315385,-0.008,0.036



**Discussion**

Results of the analysis showed that the mean difference between ERS and TCARI tidal corrections was 0.8cm with a standard deviation of 3.6cm.

**Recommendation**

Our recommendation is to utilize ERS VDatum for tidal corrections for this survey. The results of the analysis show that there are only minor differences between sounding data reduced to MLLW using TCARI and ERS VDatum. This difference is less than the uncertainty of the VDatum model (10.2cm).



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Coast Survey  
Silver Spring, Maryland 20910-3282

August 2, 2012

MEMORANDUM FOR: CDR Larry Krepp, NOAA  
Commanding Officer, NOAA Ship *Thomas Jefferson*

FROM: Jeffrey Ferguson  
Chief, Hydrographic Surveys Division

SUBJECT: Vertical Datum Transformation Technique,  
OPR-B340-TJ-12, Long Island Sound, NY

Hydrographic survey H12437 is approved for vertical reduction to chart datum, Mean Lower Low Water (MLLW), using the NOAA Vertical Datum Transformation (VDatum) (<http://vdatum.noaa.gov>) derived separation (SEP) model provided on the project CD/DVD.

Approval of VDatum, in lieu of the NOAA Center for Operational Oceanographic Products and Services (CO-OPS) TCARI package as per the Project Instructions, is based on your recommendation and the review of comparison results you included in your memo from July 29, 2012, Subject "H12437 Interim Deliverables".

The results of the data analysis show that ellipsoidally referenced survey (ERS) techniques with VDatum used as the vertical datum reducer to MLLW in this area indicate a better internal consistency of the survey data and produces final sounding values that meet or exceed horizontal and vertical specifications for hydrographic surveys.

The comparison techniques are in line with the procedures that were developed and approved as part of the CSDL Ellipsoidally Referenced Survey (ERS) project. These procedures and deliverables were added to the April 2012 edition of the NOS Hydrographic Surveys Specifications and Deliverables Manual and Field Procedures Manual documents.

You shall include a description of your ERS processing procedures and the comparisons you conducted between ERS and traditional tides in the appropriate Descriptive Report (DR), Horizontal and Vertical Control Report and/or Data Acquisition and Processing Report.

This memo and your memo, shall be included in the supplemental correspondence Appendix of the DR.





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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** June 19, 2012

**HYDROGRAPHIC BRANCH:** Atlantic  
**HYDROGRAPHIC PROJECT:** OPR-B340-TJ-2012  
**HYDROGRAPHIC SHEET:** H12437

**LOCALITY:** North Shore Beach to Herod Pt. Shoal, NY  
**TIME PERIOD:** May 03 - May 23, 2012

**TIDE STATION USED:** New Haven, CT 846-5705  
Lat. 41° 17.0' N Long. 72° 54.5' W  
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 1.946 meters

**TIDE STATION USED:** Bridgeport, CT 846-7150  
Lat. 41° 10.4' N Long. 73° 10.9' W  
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.129 meters

**Tide STATION USED:** Kings Point, NY 851-6945  
Lat. 40° 48.6' Long. 73° 45.9' W  
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.268 meters

**REMARKS: RECOMMENDED GRID**

Please use the TCARI grid "B340TJ2012.tc" as the final grid for project OPR-B340-TJ-2012, Registry No. H12437, during the time period between May 03 and May 23, 2012.

**Refer to attachments for grid information.**

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

**HOVIS.GERALD.THOMAS.1365860250**  
Digitally signed by  
HOVIS.GERALD.THOMAS.1365860250  
DN: c=US, o=U.S. Government, ou=DoD,  
ou=PKI, ou=OTHER,  
cn=HOVIS.GERALD.THOMAS.1365860250  
Date: 2012.06.22 15:49:13 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH





OAST  
NEW YORK  
FATHOM BANK

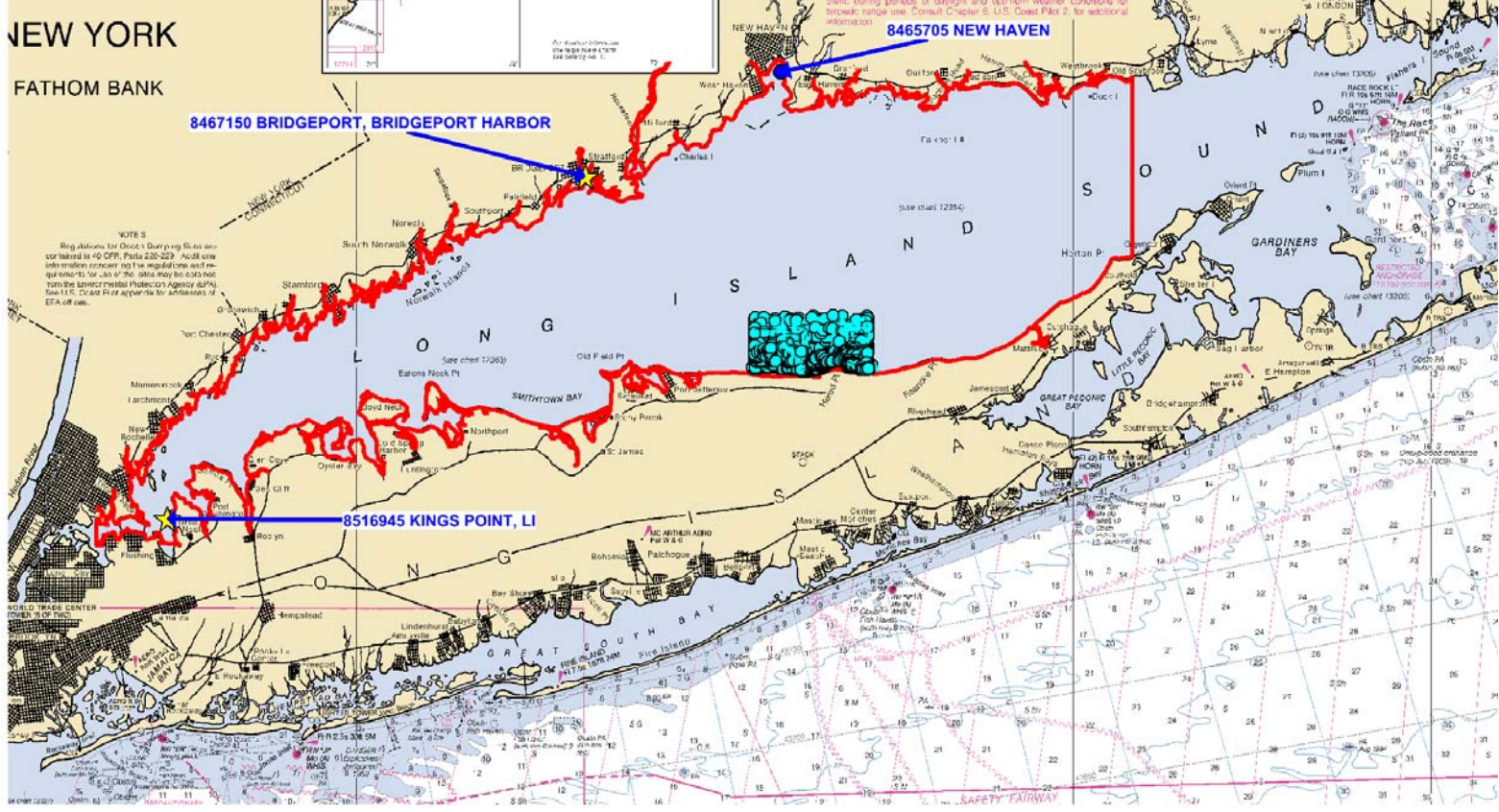


**NOTE E**  
**TRAFFIC SEPARATION SCHEME**  
One-way traffic lanes overlaid on the chart are RECOMMENDED for use by all vessels transiting between the points involved. They have been designed to aid in the prevention of collisions at the approaches to New York Harbor, Narragansett Bay and Buzzards Bay, but are not intended in any way to supersede or alter the applicable Rules of the Road. Secondary zones are intended to separate inbound and outbound traffic and to be free of ship traffic. Separation zones should not be used except for crossing purposes. When crossing traffic lanes are separation zones use extreme caution.

**PRECAUTIONARY AREAS**  
Traffic within the Precautionary Areas may consist of vessels making port or starboard between the points involved, or vessels transiting between the points involved, or vessels transiting between the points involved, or vessels transiting between the points involved. The normal Pilot Operating Area is outlined by a larger project's line.

**PORTION REPORTS**  
Report a light's or off and hazardous sun-lights to the National Hydrographic Office via 1-800-424-9822 (all times) or to the nearest U.S. Coast Guard Sector if it reports your number on

**Preliminary as Final TCARI grid for  
OPR-B340-TJ-2012, Registry No. H12437  
North Shore Beach to Herod Point Shoal, Long Island Sound, NY**



## APPENDIX II

# SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

**Subject:** Re: Bottom Sample submission

**From:** Gene Parker <Castle.E.Parker@noaa.gov>

**Date:** Mon, 31 Jan 2011 11:47:48 -0500

**To:** "ops.thomas.jefferson" <OPS.Thomas.Jefferson@noaa.gov>

Good day Mark,

Submit both. HSSD specifies both in two areas of the document. First one needs to comply with HSSD; if the TJ wants to make the Hob file, then they have gone beyond the minimum requirements. If the TJ doesn't do it, then AHB would have to as long as the BS is within the Pydro PSS. Reference HSSD Section 8.2 S57 Feature File, paragraph 6:

The S-57 feature file contains all the attributed information on specific objects that cannot be portrayed in a simple depth grid. Features to include in the S-57 feature file include; wrecks, obstructions, shoreline, rocks, islets, oil platforms, nature of seabed (bottom samples) and all other objects that may need to be compiled to a navigational product and require additional information that cannot be included in the BAG.

The Pydro PSS is in lieu of the S57 format file.

We could make the hob from the table, but since the TJ has done this, submit both the Hob file and the table contained in DR Appendix 5. Place the Hob file in the PSS directory which has contained all features in NOAA PSS format as in the past. If the TJ is going to submit the hob file, the source would be the table, so HSSD specifies delivery of both. If the TJ only submitted the table, AHB would have to generate the feature objects. If the TJ creates the hob file, then submit it.

gene

ops.thomas.jefferson wrote:

Gene,

We will be submitting .HOB files for the bottom samples in addition to the summary table found in the supplemental survey records and correspondence section of the DR. It is my understanding that the table is only used to create the .HOB anyways. A recommendation will need to be made that either the table either be omitted or be used in place of the .hob file. Only the summary table is mention in the HSSD april 2010 version. If there are any other issues with this idea please let us know.

Mark

Castle Eugene Parker <[castle.e.parker@noaa.gov](mailto:castle.e.parker@noaa.gov)>

Physical Scientist - Hydrographic Team Lead

Atlantic Hydrographic Branch

NOAA Office of Coast Survey



**Subject:** Re: Crossline comparison

**From:** Chris van Westendorp <Christiaan.VanWestendorp@noaa.gov>

**Date:** Thu, 10 Sep 2009 13:00:35 -0400

**To:** "mark.blankenship" <Mark.Blankenship@noaa.gov>

**CC:** LCDR Rick Brennan <Richard.T.Brennan@noaa.gov>, Castle Parker <Castle.E.Parker@noaa.gov>, Edward Owens <Edward.Owens@noaa.gov>, LT Jasper Schaer <jasper.schaer@noaa.gov>, CDR Shep Smith <Shep.Smith@noaa.gov>, Daniel Wright <Daniel.Wright@noaa.gov>

Mark,

Per 5.1.4.3 of the HSSD, AHB authorizes TJ to use the Standard Deviation layer to conduct surface difference comparison and analysis on future survey submissions of multibeam data. This meets the crossline comparison requirement laid out in HSSD.

Please let me know if you have any questions or need for further clarification.

R/

LCDR Chris van Westendorp, NOAA

mark.blankenship wrote:

Chris,

You mentioned in the meeting today that AHB was not going to require the multiple CUBE surface comparison, instead allowing us to use a single surface standard deviation layer to do our checks with. Is there any memo coming out for that?

Mark

LCDR Chris van Westendorp <[christiaan.vanwestendorp@noaa.gov](mailto:christiaan.vanwestendorp@noaa.gov)>

Atlantic Hydrographic Branch

NOAA OCS



Marilyn Schluter - NOAA Federal <marilyn.l.schluter@noaa.gov>

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## NOAA Hydrographic Surveys H12415, H12430, H12437, H12438

4 messages

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Marilyn Schluter - NOAA Federal <marilyn.l.schluter@noaa.gov>

Thu, Mar 21, 2013 at 3:57 PM

To: ruth.pierpont@oprhp.state.ny.us, Christina Rieth <crieth@mail.nysed.gov>

Cc: bruce.terrell@noaa.gov, Marc.S.Moser@noaa.gov, Todd.A.Haupt@noaa.gov, frank.cantelas@noaa.gov,

Abigail.Higgins@noaa.gov, Castle.E.Parker@noaa.gov, marilyn.l.schluter@noaa.gov, Brian.Jordan@boemre.gov, Lawrence Krepp - NOAA Federal <Lawrence.T.Krepp@noaa.gov>

Dear Sir/Madam,

The National Oceanic and Atmospheric Administration's Office of Coast Survey (OCS) may have previously contacted you regarding hydrographic surveys in **Block Island Sound** and **Long Island Sound, NY**. These surveys have been completed. The complete Descriptive Reports for these surveys are available for your review on NOAA's public ftp web site. Please provide any comments regarding these surveys (please reference the survey numbers **H12415, H12430, H12437, H12438**) within 30 days to:

LT Abigail Higgins

Chief, Atlantic Hydrographic Branch

Work: [757-441-6746](tel:757-441-6746) Ext.200

Fax: [757-441-6601](tel:757-441-6601)

E-Mail: [Abigail.Higgins@noaa.gov](mailto:Abigail.Higgins@noaa.gov)

439 W. York St.

Norfolk, VA 23510

If we have not received a response in 30 days, we will assume that these surveys do not include any data of sufficient historical significance (for instance, an historic shipwreck whose location should not be made public knowledge) to warrant special data handling, and will forward this data for our standard nautical charting process.

You will need to have Winzip compression utility installed on your computer to access these files. The following link

<http://www.winzip.com/downwz.htm> will take you to the Winzip free evaluation site where you can register for Winzip and access the files.

To access this information follow this link <ftp://205.156.4.84/4SHPO> to NOAA's public ftp web site and select the aforementioned surveys (**H12415, H12430, H12437, H12438**).

The "Key" for these surveys (i.e. to remove the encryption from the .zip files) is:  
**B340\_NY\_4617**

Regards,

Marilyn Schlüter, Data Manager  
NOAA/Atlantic Hydrographic Branch  
[757-441-6746](tel:757-441-6746) Ext.113  
439 W. York St.  
Norfolk, VA 23510

---

**Abigail Higgins - NOAA Federal** <abigail.higgins@noaa.gov>  
To: Marilyn Schluter - NOAA Federal <marilyn.l.schluter@noaa.gov>

Thu, Mar 21, 2013 at 3:58 PM

Thank you! : )  
[Quoted text hidden]  
--

LT Abigail Higgins, NOAA  
Chief, Atlantic Hydrographic Branch  
439 W York Street  
Norfolk, VA 23510  
[757-441-6746](tel:757-441-6746) x200

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**Christina Rieth** <CRIETH@mail.nysed.gov>  
To: Marilyn Schluter - NOAA Federal <marilyn.l.schluter@noaa.gov>

Mon, Mar 25, 2013 at 7:57 AM

Dear Ms. Schluter,

Thank you for the opportunity to review these reports. At this time, the New York State Museum has reviewed the reports under Section 233 of NYS Education Law and has no concerns. Thank you again for allowing us the opportunity to comment.

Sincerely,

Christina Rieth  
New York State Museum

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Christina B. Rieth, Ph.D.  
State Archaeologist and Director,  
Cultural Resource Survey Program  
New York State Museum  
Cultural Education Center 3122  
Albany, New York 12230  
Phone: [\(518\)402-5975](tel:5184025975), Fax: [\(518\)486-2149](tel:5184862149)  
Email: [crieth@mail.nysed.gov](mailto:crieth@mail.nysed.gov)  
[http://www.nysm.nysed.gov/research\\_collections/](http://www.nysm.nysed.gov/research_collections/)

>>> Marilyn Schluter - NOAA Federal <[marilyn.l.schluter@noaa.gov](mailto:marilyn.l.schluter@noaa.gov)> 3/21/2013 3:57 PM >>>  
[Quoted text hidden]

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**Marilyn Schluter - NOAA Federal** <marilyn.l.schluter@noaa.gov>  
To: Christina Rieth <CRIETH@mail.nysed.gov>

Mon, Mar 25, 2013 at 8:59 AM

Thank you, Ms. Rieth, for responding to these requests so quickly. I wish I could send them all at once, but I generally have to send them as they come in, so there will probably be more. Thanks again for your help and patience.

Marilyn  
[Quoted text hidden]

APPENDIX III

SURVEY FEATURES REPORT

AWOIS - none  
Dangers to Navigation - one  
Maritime Boundary - none  
Wrecks - none

# H12437 DR DTON Report 1

**Registry Number:** H12437  
**State:** New York  
**Locality:** Long Island Sound  
**Sub-locality:** North Shore Beach to Herod Pt. Shoal, NY  
**Project Number:** ORP-B340-TJ-12  
**Survey Date:** 05/16/2012

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12354	43rd	09/01/2010	1:80,000 (12354_1)	USCG LNM: 2/21/2012 (2/21/2012) CHS NTM: None (2/24/2012) NGA NTM: 12/4/1999 (3/3/2012)
12300	47th	05/01/2008	1:400,000 (12300_1)	[L]NTM: ?
13006	34th	05/01/2007	1:675,000 (13006_1)	[L]NTM: ?
5161	13th	10/01/2003	1:1,058,400 (5161_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_1)	[L]NTM: ?

\* Correction(s) - source: last correction applied (last correction reviewed--"cleared date")

## Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	DTON 1- Dangerous Rock 5455/508	Rock	4.54 m	40° 58' 28.8" N	072° 53' 28.3" W	---

## 1.1) DTON 1- Dangerous Rock 5455/508

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 40° 58' 28.8" N, 072° 53' 28.3" W  
**Least Depth:** 4.54 m (= 14.90 ft = 2.483 fm = 2 fm 2.90 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.583$  m ; TVU (TPEv)  $\pm 0.135$  m  
**Timestamp:** 2012-137.20:35:28.223 (05/16/2012)  
**Survey Line:** h12437 / tj\_3102\_reson7125\_400khz / 2012-137 / 137\_2030  
**Profile/Beam:** 5455/508  
**Charts Affected:** 12354\_1, 12300\_1, 13006\_1, 5161\_1, 13003\_1

#### Remarks:

Dangerous Rock found with Object Detection Reson 7125 multibeam. Soundings are corrected to MLLW using Observed tides and Preliminary zoning.

#### Feature Correlation

Source	Feature	Range	Azimuth	Status
137_2030	5455/508	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart a dangerous underwater rock using symbol K.14.2 from Chart No. 1.

#### Cartographically-Rounded Depth (Affected Charts):

15ft (12354\_1)

2 ½fm (12300\_1, 13006\_1, 13003\_1)

4.5m (5161\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** INFORM - Rock  
 NATSUR - 9:rock  
 NINFOM - Rock

QUASOU - 1:depth known

SORDAT - 20120516

SORIND - US,US,graph,H12437

TECSOU - 3:found by multi-beam

VALSOU - 4.541 m

WATLEV - 3:always under water/submerged

### Feature Images

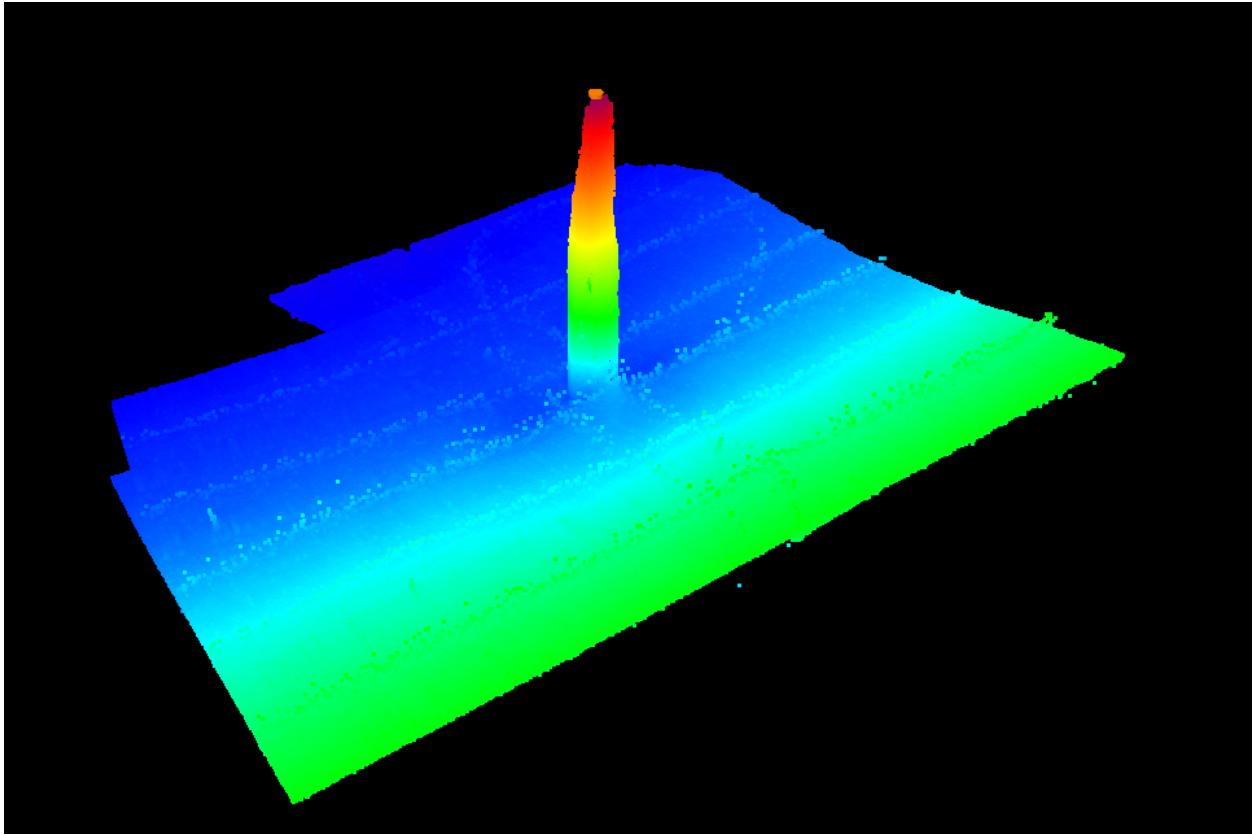


Figure 1.1.1

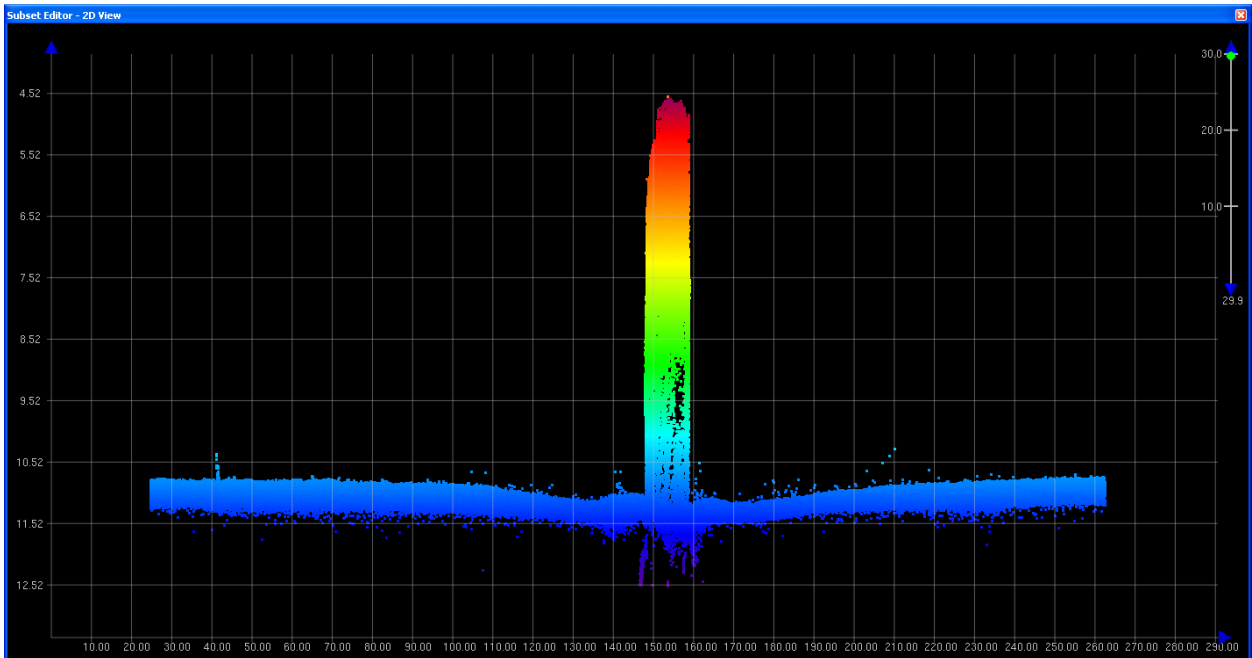


Figure 1.1.2



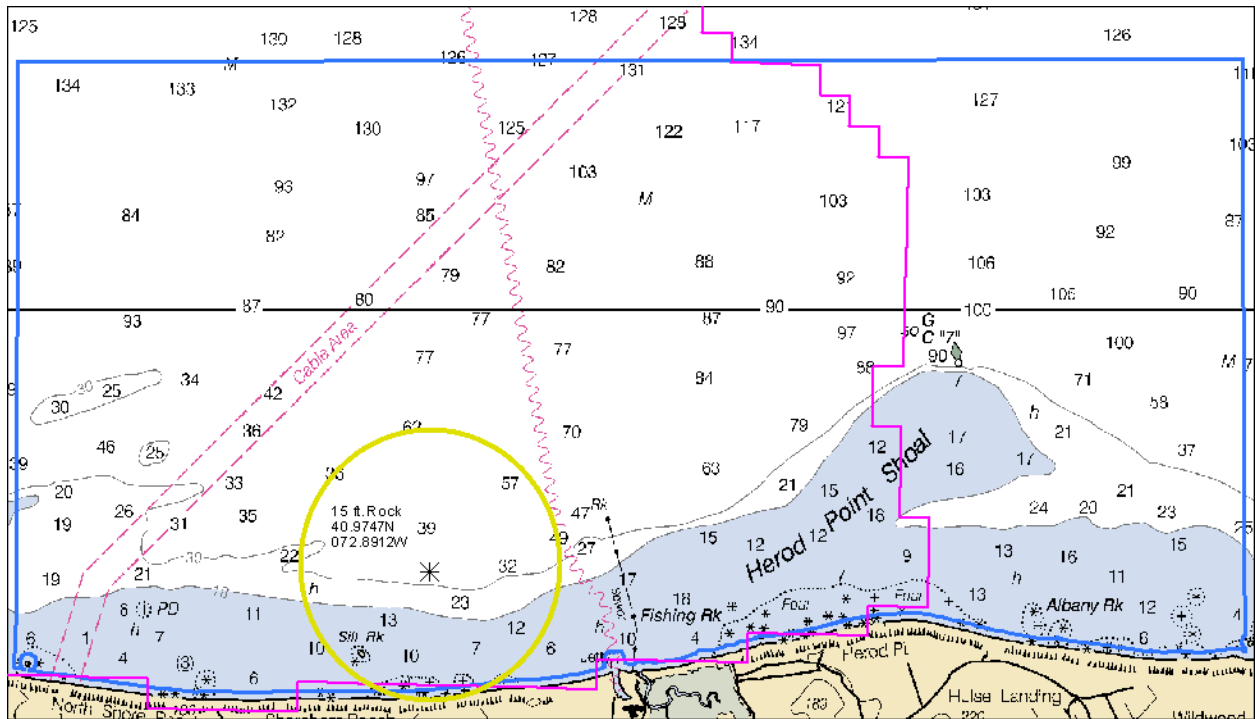


Figure 1.1.3

APPROVAL PAGE

H12437

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NGDC for archive

- H12437\_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12437\_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: \_\_\_\_\_

**Lieutenant Matthew Jaskoski, NOAA**  
Chief, Atlantic Hydrographic Branch