H12607

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Project Number:	OPR-C301-KR-13
Registry Number:	H12607

LOCALITY

State(s):	New York
General Locality:	North Atlantic, East Rockaway Inlet, NY
Sub-locality:	East Rockaway Inlet to Zachs Bay

2014

CHIEF OF PARTY
George G. Reynolds

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Date:

NOAA FORM 77-28	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		**H12607**

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:	**North Atlantic, East Rockaway Inlet, NY**
Sub-Locality:	**East Rockaway Inlet to Zachs Bay**
Scale:	**1:10000**
Dates of Survey:	**Jan 17, 2014 to Feb 27, 2014**
Instructions Dated:	**Jun 19, 2013**
Project No.:	**OPR-C301-KR-13**
Field Unit:	**Ocean Surveys, Inc.**
Chief of Party:	**George G. Reynolds**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Side Scan Sonar and MBES Backscatter**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

All times are recorded in UTC. Data recorded and presented relative to UTM Zone 18 North. The information presented in this report and the accompanying surfaces and mosaics represent the results of a hydrographic survey performed by Ocean Surveys, Inc. during the period of 17 January 2014 to 27 February 2014 and can only be considered as indicating the conditions existing at that time. Reuse of this information by client or others beyond the specific scope of work for which it was acquired shall be at the sole risk of the user and without liability to OSI.

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 Centers for Environmental Information (NCEI) and can be retrieved via http://www.ncei.noaa.gov/.

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Descriptive Report to Accompany Survey H12607

Project: OPR-C301-KR-13

Locality: North Atlantic, East Rockaway Inlet, NY

Sublocality: East Rockaway Inlet to Zachs Bay

Scale: 1:10000

January 2014 - February 2014

Ocean Surveys, Inc.

Chief of Party: George G. Reynolds

A. Area Surveyed

This survey provides hydrographic data for portions of East Rockaway Inlet, Jones Inlet and certain navigable waters inshore of Long Beach Island and Jones Beach Island generally between East Rockaway Inlet and Zachs Bay, NY. The general locations of the survey limits are presented in Table 1.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
40° 37" 51' N 73° 47" 8' W	40° 34" 20' N 73° 28" 51' W

Table 1: Survey Limits

A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. This project is in response to different user group needs following Hurricane Sandy landfall. Specifically these data will adjoin updated shoreline, address the need for updated bathymetry for inundation modeling, and help identify marine debris for potential removal.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

Survey Coverage was in accordance with the requirements in the Hydrographic Survey Project Instructions (June 19, 2013), the Statement of Work, and the Hydrographic Specifications and Deliverables, April 2013 (HSSD). The Project Instructions (PI) stated: "The inshore limit of hydrography will be the farthest offshore of the following: (1) the 2-meter depth contour or (2) the line defined by the distance seaward from the MHW line which is equivalent to 0.8 millimeters at the scale of the largest scale nautical chart." The coverage criteria assigned in the PI varied with water depth; the coverage requirements were as follows:

- 2 meters to 4 meters water depth: 100% SSS with concurrent VBES or MBES (and backscatter), or Object Detection MBES (and backscatter).

- 4 meters to 20 meters water depth: 200% SSS with concurrent VBES or MBES (and backscatter), or Object Detection MBES (and backscatter).

- Greater than 20 meters water depth: Complete MBES with Backscatter.

All PI coverage requirements for Survey H12607 were satisfied. The entirety of the project was in waters less than 20 meters; therefore, the requirement for Complete Multibeam Coverage was not applicable for the survey area. Additional MBES coverage was obtained as necessary to provide a least depth for all significant SSS contacts and assigned AWOIS investigation items. The final survey area covers 4.43 square nautical miles (Figure 1).

SSS tracklines were separated by one-half the distance required for 100% coverage plus an allowance for overlap and trackline maintenance. During data acquisition the goal was to run odd numbered lines for the 100% SSS coverage and even numbered lines for the 200% SSS coverage; however, in many areas, the narrow channels and shoreline constructions complicated the line plans and to meet the double coverage requirements the odd and even numbering scheme did not always apply. During coverage mosaic generation, the majority of the lines acquired to satisfy the requirement of 100% SSS coverage in the 2 meter to 4 meter depth area were added to the 100% coverage mosaic (H12607_SSS_100_1m). The 200% coverage mosaic includes the remaining SSS lines within the 2 meter to 4 meter depth area.

A best attempt was made to create discrete 100% and 200% mosaics, but due to the complex survey line driving, several coverage gaps were unavoidable in the 100% and 200% mosaics in depth areas 4 meters or deeper. A gap in the mosaic did not preclude the fulfillment of coverage requirements if one or both of the following conditions were met: 1) 200% SSS coverage was met with any two SSS lines regardless of designation in a 100% or 200% mosaic (i.e. double coverage exists in one mosaic over a gap in the second mosaic), and 2) there was MBES coverage over the SSS mosaic gap, which can be considered as the second 100% coverage. The second condition was specified in Section 5.2.2 Coverage and Resolution in the HSSD which states the following: "Note that 200% side scan sonar coverage with set line spacing bathymetry is also a valid 100% bottom coverage technique." No SSS contacts or bathymetric features were positioned within the mosaic coverage gaps.

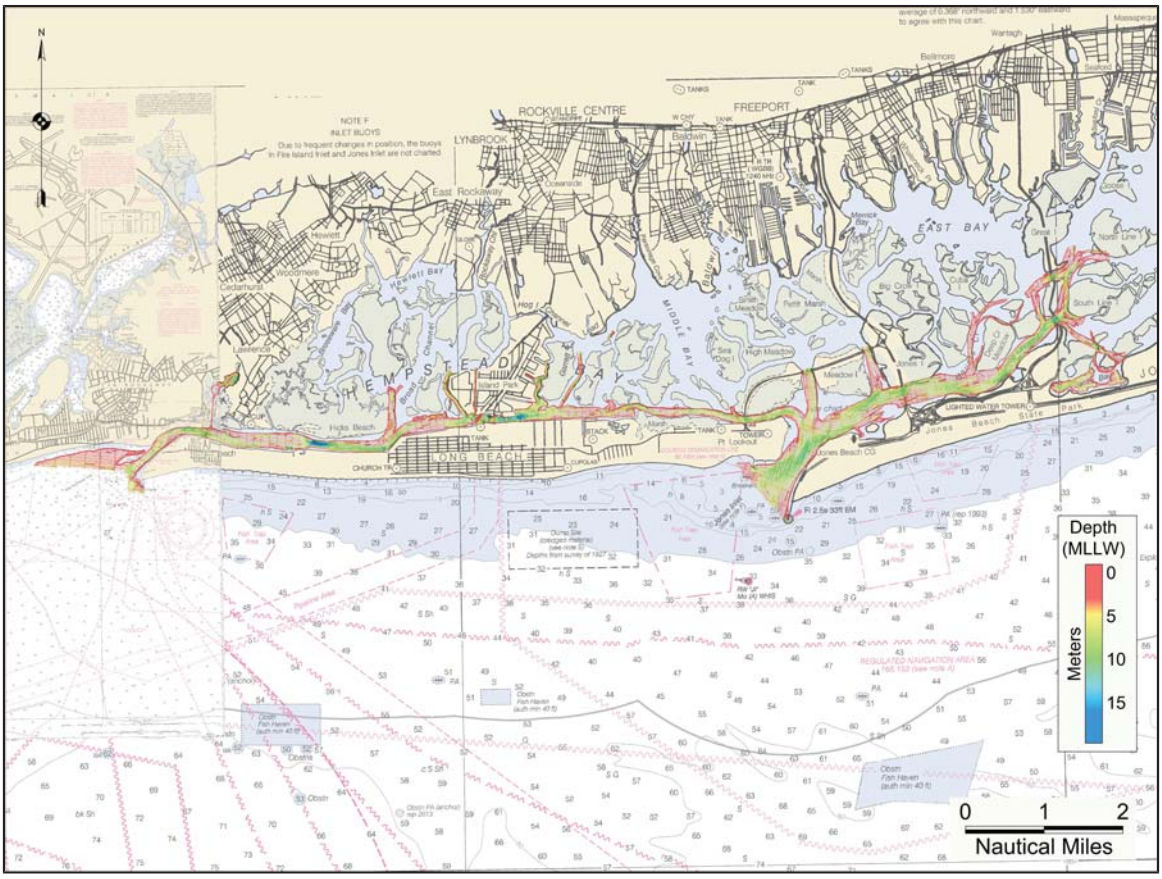

Figure 1: Survey H12607 MBES survey coverage colored by depth overlaid on RNCs 12326 and 12350.

A.5 Survey Statistics

The following tables list the survey statistics (Table 2) and the dates of hydrography (Table 3).

	Hull ID	*R/V ABLE II*	*Total*
LNM	**SBES Mainscheme**	0	0
	MBES Mainscheme	65.1	65.1
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/MBES Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	360.8	360.8
	SBES/MBES Crosslines	29.1	29.1
	Lidar Crosslines	0	0
Number of Bottom Samples			12
Number of AWOIS Items Investigated			10
Number of Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total Number of SNM			4.43

Table 2: Hydrographic Survey Statistics

Survey Dates	Day Number
01/18/2014	18
01/19/2014	19
01/20/2014	20
01/23/2014	23
01/24/2014	24
01/26/2014	26
01/27/2014	27
01/28/2014	28
01/30/2014	30
01/31/2014	31
02/01/2014	32
02/02/2014	33
02/03/2014	34
02/04/2014	35
02/05/2014	36
02/06/2014	37
02/07/2014	38
02/08/2014	39
02/09/2014	40
02/10/2014	41
02/11/2014	42
02/12/2014	43
02/15/2014	46
02/16/2014	47
02/17/2014	48
02/18/2014	49
02/19/2014	50
02/20/2014	51
02/21/2014	52
02/22/2014	53
02/23/2014	54
02/24/2014	55
02/25/2014	56

Survey Dates	Day Number
02/26/2014	57
02/27/2014	58

Table 3: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the OPR-C301-KR-13 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

All survey operations were conducted from the R/V Able II, Connecticut registration number CT 4788 BB, a 7.6-meter fiberglass vessel with a 2.9-meter beam and 0.8-meter draft. R/V Able II is powered by twin 150 HP outboard engines.

Hull ID	***Able II - CT 4788 BB***
LOA	7.6 meters
Draft	0.8 meters

Table 4: Vessel Used

B.1.2 Equipment

All equipment was installed and calibrated in accordance with the DAPR.

Manufacturer	Model	Type
Reson	8125	MBES
EdgeTech	4125	SSS
Applanix	POS MV 320 V4	Positioning and Attitude System
AML	Base X with SX-Xchange and P-Xchange sensors	Sound Speed System
SeaBird Electronics	MicroCAT SBE 37	Sound Speed System
Trimble	MS 750	Positioning System

Table 5: Primary Survey Equipment

B.2 Quality Control

B.2.1 Cross Lines

The planned cross line mileage was approximately 10% of the planned mainscheme mileage required in the HSSD for Set Line Spacing coverage. A hybrid mainscheme line plan featuring 40-meter and 60-meter lines was used in calculating total planned line mileage. There were myriad unanticipated shoals and features requiring substantial additional effort to achieve coverage results as specified in the HSSD. As a result the total percentage of MBES cross line mileage versus down-looking MBES mainscheme line coverage equals 8.1% while MBES cross line mileage versus all MBES line mileage, including mainscheme, investigation, shoal development, and side-looking shallow water coverage, equals 6.8%.

Cross lines were run nominally perpendicular to mainscheme lines (Figure 2). Soundings from mainscheme lines and cross lines were compared periodically throughout survey operations reviewing preliminary MBES surfaces and using CARIS HIPS Subset Editor. Cross line comparisons provided confirmation that the system offsets and biases were entered correctly and verified the accuracy of sounding correctors (i.e. tide, sound speed, TrueHeave).

Statistical quality control information was compiled from a difference surface, generated in CARIS HIPS, between the depth layer of a 2-meter CUBE surface composed only of cross line data and the depth layer of a 2-meter CUBE surface composed of all accepted mainscheme, development, and side looking data. The cross line analysis results demonstrate excellent agreement between cross line soundings and mainscheme soundings. In fact, 99.85% of cross line versus mainscheme depth differences were less than or equal to 0.50 meters. The maximum allowable TVU for the range of water depths within Survey H12607 is greater than 0.50 meters. Figure 3 is a histogram showing the distribution of depth differences for all comparison grid cells considered with extreme Min/Max values omitted to maintain a usable scale. The table shown in Figure 4 presents a

breakdown of cross line versus mainscheme depth differences with respect to depth difference range. The total number of 2-meter comparison cells equaled 174,632. The table is organized as shown in the following example: of 174,632 possible comparison cells, 169,195 or 96.89% of the cells have cross line/mainscheme soundings that match within +/- 20 centimeters.

The minimum/maximum depth difference range of all comparison cells is -1.21 meters to 2.04 meters with the overwhelming majority of comparison cells showing differences below 0.50 meters. Larger depth differences are distributed evenly throughout the survey area, i.e. no systematic, temporal, sound speed, or tide errors are evident. The largest differences of -1.21 and 2.04 as well as other differences approaching these values are the result of small positioning differences between cross line and mainscheme line data over features having steep walls or discrete features such as the bedform area at position 40-35-41 N, 73-35-21 W or the submerged hummocky portions of slumping marsh walls at position 40-37-11 N, 73-29-48 W.

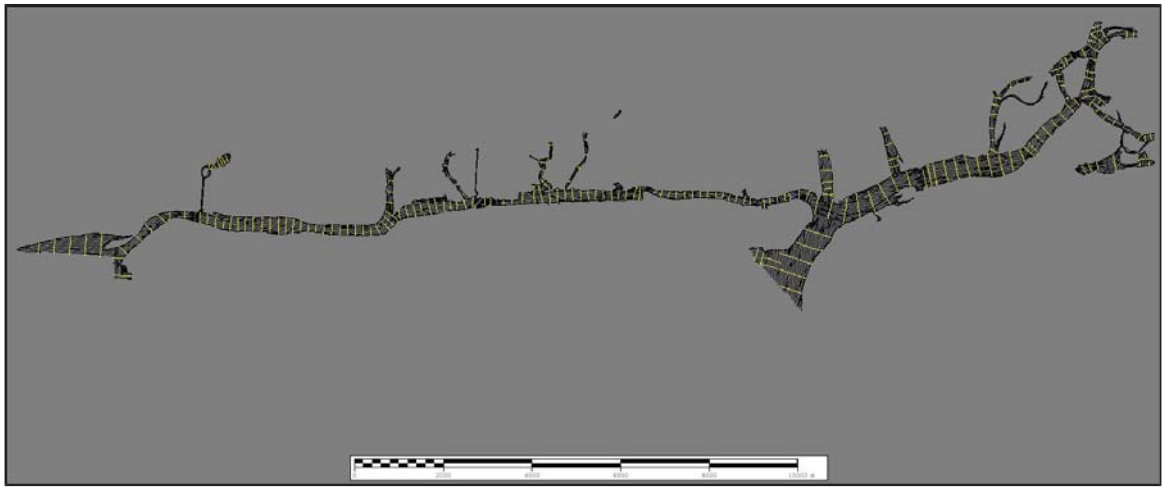

Figure 2: An overview of MBES survey lines shows the cross lines highlighted in yellow in reference to all other MBES lines displayed in black.

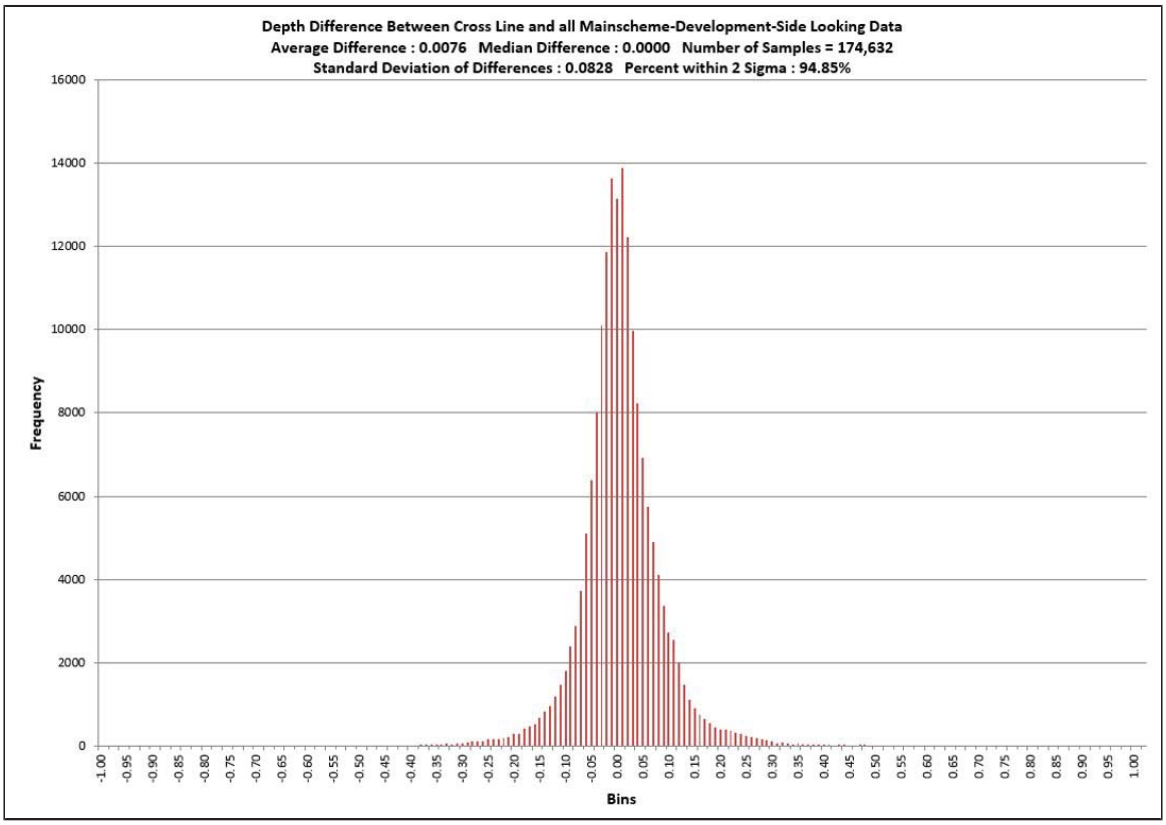

Figure 3: The graph shows a frequency distribution of the depth differences between the H12607 cross line data and all H12607 mainscheme, development, and side-looking data. Statistics from the depth difference sample set are displayed at the top of the graph.

Depth Difference in 2-Meter Comparison Cells Cross Line vs. Mainscheme (+/-) cm	Number of 2-Meter Cross Line Comparison Cells with Depth Range ≤ Depth Difference Column	Percentage of 2-Meter Cross Line Comparison Cells*
50	174,378	99.85%
25	171,741	98.34%
20	169,195	96.89%
15	164,345	94.11%
13	160,807	92.08%
10	151,126	86.54%
* Total of 2-Meter Cross Line Comparison Cells = 174,632		

Figure 4: A total number of 174,632 cells were compared in the generation of the H12607 Cross line versus Mainscheme difference surface. Column 3 of the table displays the percentages of the 2m x 2m cells that had depth differences less than or equal to the values displayed in column 1.

B.2.2 Uncertainty

The following two tables list the tide and sound speed uncertainty parameters that were used to compute Total Propagated Uncertainty (TPU) for this survey.

Measured	Zoning
0.01 meters	0.19 meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
Able II - CT 4788 BB	4 meters/second		2 kilometers/hour

Table 7: Survey Specific Sound Speed TPU Values

The methods used to minimize the uncertainty in the corrections to echo soundings are described in detail in Section B. Processing and Quality Control of the project DAPR. Survey H12607 did not deviate from the methods documented in the DAPR.

The Total Vertical Uncertainty Quality Check (TVU QC) "Ratio Method" was used to evaluate IHO uncertainty for all finalized surfaces. The TVU QC "Ratio Method" is described in the Chapter 4 Appendices of the NOAA OCS Field Procedures Manual (FPM) dated April 2013. Per the FPM TVU QC section, "The hydrographer

should use the finalized surface because this surface will identify areas where either the uncertainty or the standard deviation exceeded the maximum allowable error and the greater of these two values is used in addition to having the uncertainty scaled to a 95% CI, whereas unfinalized surface uncertainties are reported at the 68% CI." The FPM TVU QC section also states that, "[ratio] values which do not require further examination are from -1 to 0 and the values which do require further examination are from -100 to -1." Finalized surfaces were used in this analysis.

Two (2) finalized CUBE surfaces were delivered along with Survey H12607 including "H12607_MB_4m_MLLW_Final"and "H12607_MB_50cm_MLLW_Final". The 4-meter surface is intended to satisfy set line spacing coverage and sounding density requirements whereas the 0.5-meter surface is intended to satisfy the sounding density requirements for item investigations while offering a high resolution product for the survey acceptance review.

Results from the TVU QC indicate that 96.79% of the nodes from the finalized 4-meter set line spacing surface meet IHO Order 1 uncertainty specifications. The TVU QC also indicates that 99.86% of the nodes from the finalized 0.5-meter set line spacing surface meet IHO Order 1 uncertainty specifications. The maximum ratio range of all comparison cells from the 4-meter surface is -2.18 with the majority of comparison cells showing ratio differences below -1.0. As expected the ratio range is greater for the 0.5-meter cells; few outliers on the 0.5 meter comparison surface exceed a ratio of -7.0. For all surfaces the larger ratio differences are distributed evenly throughout the survey area, i.e. no systematic, temporal, sound speed, or tide errors are evident. The position of the comparison cells of the 0.5-meter surface exhibiting the largest ratio values generally coincide with the non-compliant comparison cells of the 4-meter surface, such that the largest uncertainties exist in the same general location for all surfaces. As expected, QC nodes not in compliance with IHO Order 1 Uncertainty Specifications are found in areas such as around bridge piers, in areas with steep slopes such as shoreline banks, and around discrete features such as obstructions and the submerged hummocky portions of slumping marsh walls.

B.2.3 Junctions

One survey junction was assigned for Survey H12607: Survey H12138, a survey completed in 2009 by the NOAA Ship THOMAS JEFFERSON. The junction overlap area is in East Rockaway Inlet (Figure 5). Survey H12138 was conducted using two of the Thomas Jefferson's launches (#3101 and #3102) employing both VBES and MBES systems. Except for item investigations the survey was conducted using only the nadir beam of the MBES systems aboard the launches as well as one VBES system. Item investigations for Survey H12138 were conducted using an MBES. The portion of Survey H12138 data that junctions with Survey H12607 is comprised mostly of VBES data with only a portion of data from one MBES item investigation. Since both surveys were accomplished with Set Line Spacing coverage, the number of coincident bathymetric grid cells was low considering the area of overlap between the survey outlines (Figure 6).

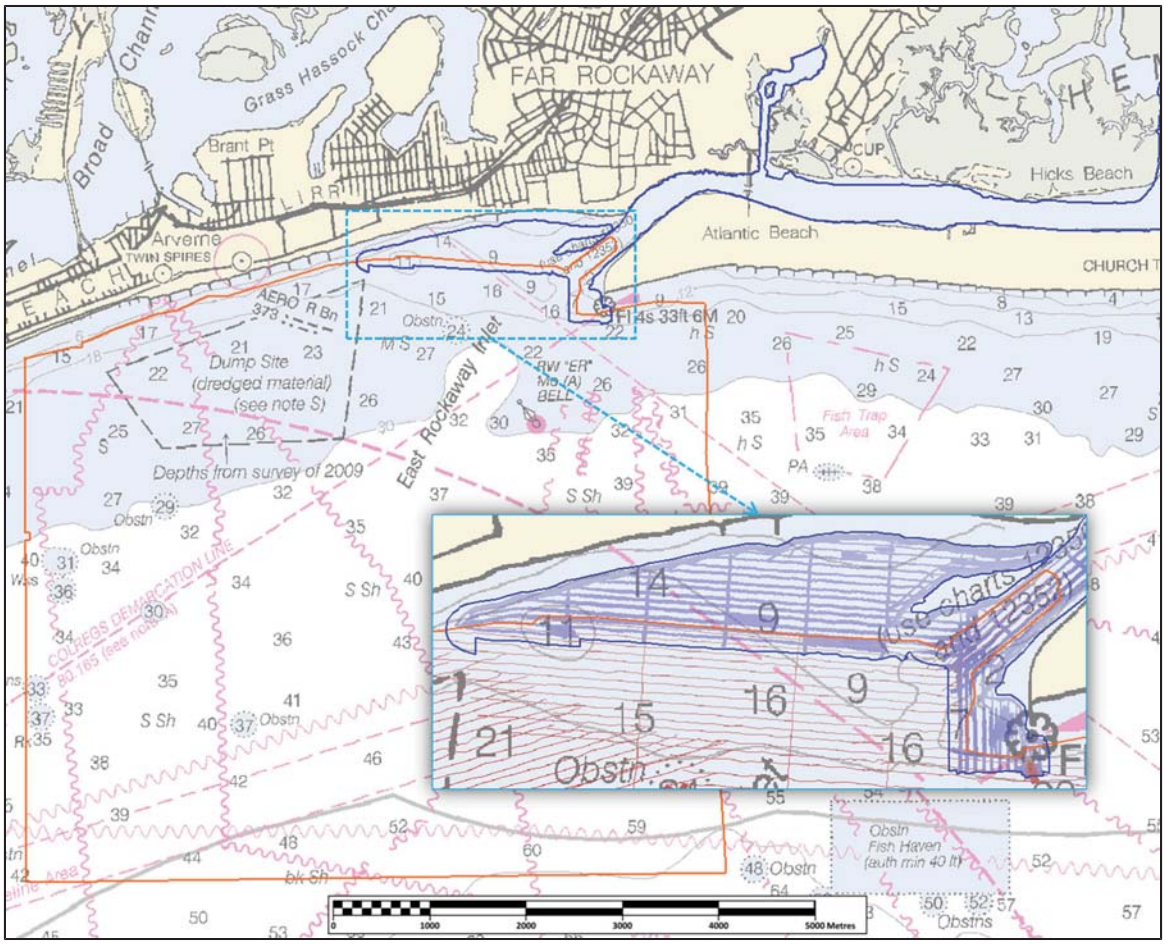

Figure 5: *The junction between the survey outlines for H12607 (in blue) and H12138 (in orange) is shown with RNC 12326 in the background. The inset includes the survey outlines and the overlapping MBES/VBES coverages for each survey.*

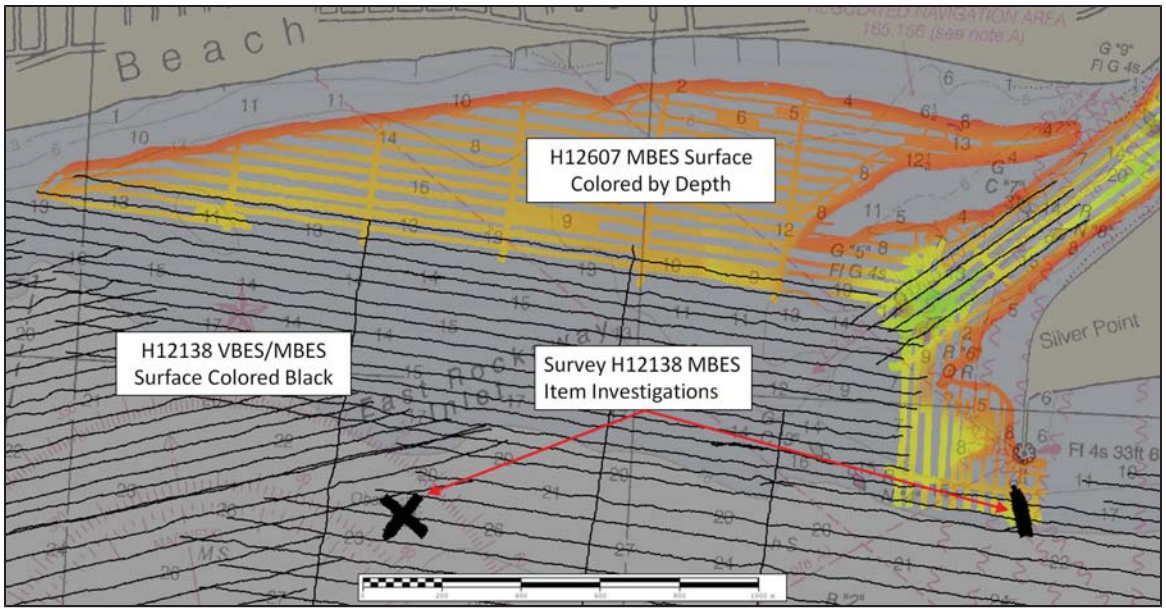

Figure 6: *Survey junction overview showing MBES coverage from contemporary Survey H12607 (2m CUBE surface colored by depth) and a 2m BAG of VBES/MBES coverage from NOAA's 2009 Survey H12138 (colored black for clarity). RNC 12352 is in the background.*

The following junction was made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12138	1:10000	2009	NOAA Ship THOMAS JEFFERSON	SW

Table 8: Junctioning Survey

H12138

Using the CARIS HIPS Difference Surface function, depths from a 2-meter resolution CUBE surface generated from the H12607 MBES data were compared to the depths from the "H12138_MBVB_2m_MLLW_Combined" (2-meter resolution) Bathymetric Attributed Grid (BAG) downloaded from the National Geophysical Data Center (NGDC) website. The difference surface coverage in Figure 7 has been exaggerated for clarity, such that the difference surface resulting from subtraction of the H12138 2-meter depth surface from the H12607 2-meter depth surface was output to a 20m x 20m grid for the purposes of this discussion. Depths from Survey H12607 show surprisingly good agreement with the depths from Survey H12138 considering that the junction area is within and nearby an ocean inlet and that approximately five years have elapsed between surveys. The larger depth discrepancies fall within an area that is suspected to have been recently dredged and along the steep channel wall of the inlet channel. According to LNM 33/13 (14 August 2013), "Until approximately 1 October 2013.... dredging is being done from East

Rockaway Inlet Buoy 3 (LLNR 31520) to East Rockaway Inlet Buoy 7 (LLNR 31540)." The LNM-defined area describes the area having seen the most change between Surveys H12607 and H12138. By contrast, the junction area west of the inlet, circled in the figure below, shows good positive and negative variability in depth differences between surveys suggestive of a moving bedform with an average depth difference of 0.36 meters. Figure 8 displays the full range of depth differences between H12138 and H12607 in histogram form.

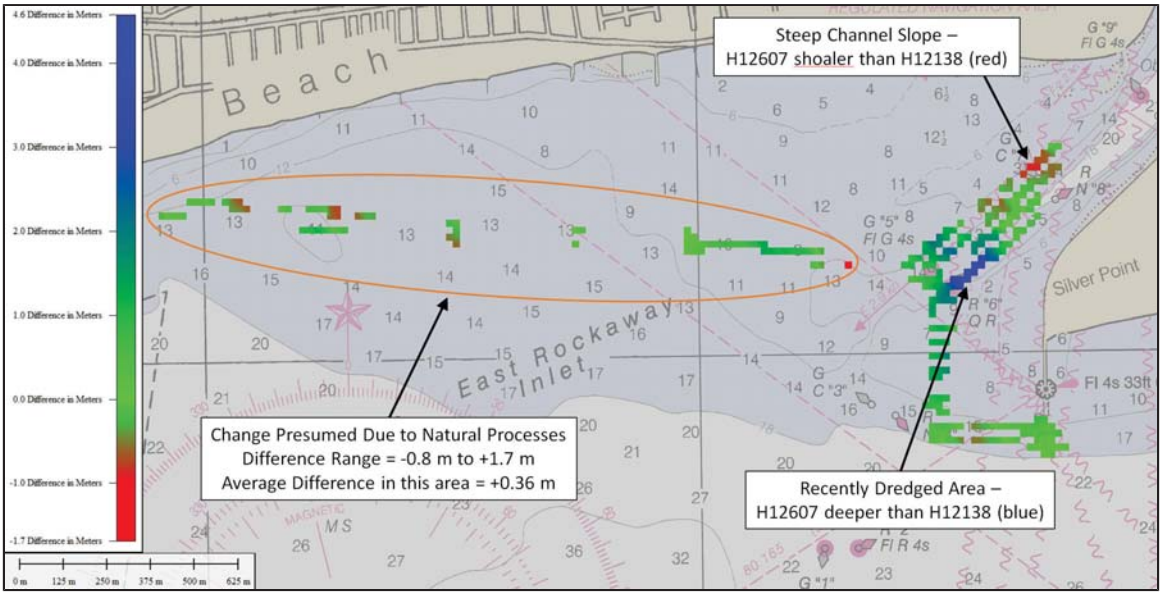

Figure 7: *Surface-to-surface difference plan comparing Survey H12607 to Survey H12138 with RNC 12352 in the background. Difference values derived from subtracting 2-meter surfaces (H12607 minus H12138) are plotted on a 20m x 20m grid for clarity.*

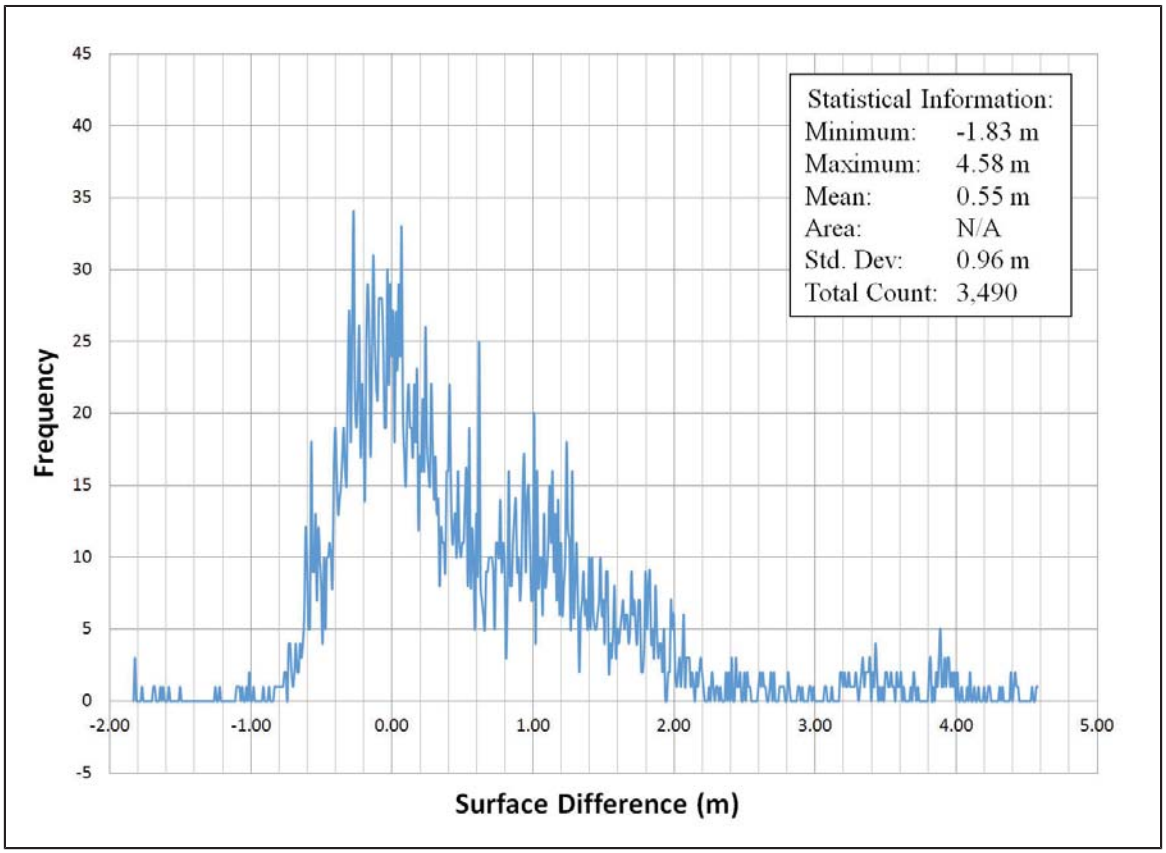

Figure 8: *The graph shows a frequency distribution of the resultant depth differences from the subtraction of an H12138 2-m depth surface from an H12607 2-m depth surface. Statistics from the depth difference sample set are displayed in the inset.*

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the Quality Control section of the DAPR. Results from the daily MBES bar checks are included in Appendix II of the DAPR.

B.2.5 Equipment Effectiveness

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

B.2.6 Factors Affecting Sonar Data

SSS Refraction

Dynamic water column sound speed changes affected the SSS imagery at times, causing refraction in the outer ranges of the SSS swath. When refraction affected the imagery the data were assessed in comparison to

overlapping SSS coverage, MBES coverage, and the hydrographic complexity of the area affected. If necessary, line spacing was reduced in refractive areas to ensure that the Hydrographic Survey Project Instructions-specified 200% SSS coverage requirement was achieved using only high quality imagery. As changes to the line plan or SSS range scale were made they were recorded in the acquisition and processing logs.

Despite the sometimes dynamic sound speed tendencies in the area, acquisition of frequent sound speed profile casts allowed for adequate correction of the MBES sounding swath.

Fish in SSS Imagery

In some areas an abundance of fish were seen in the SSS data, either as lone swimmers or in schools. Fish were noted in the acquisition log by the field team, and these areas were carefully reviewed during data processing. Shadows, usually detached from a dark return, were typically associated with fish either in the water column or at a position closer to nadir. In the cases where a visible shadow was recorded, the contact was designated as a fish for two reasons: 1) the possibility that the assumed fish was actually a feature and 2) to assist processors in rejecting fish-related noise from the MBES data. The fish designation was confirmed if no correlating item was found in the second SSS coverage. If visible in both SSS coverages with a significant height, the contact was investigated with object detection MBES coverage to verify or disprove the presence of a feature.

B.2.7 Sound Speed Methods

Sound speed profile data were acquired with an AML Base-X approximately every 2 hours or less during survey operations. Profiles were acquired more frequently if high variability was noted in the surface sound speed or the survey vessel moved between survey area locations. To a point, if the surface sound speed alarm in HYSWEEP SURVEY was triggered, due to a greater than 2 meters/second surface-to-cast difference, then additional casts would be taken. However, there were certain periods during the survey when the surface sound speed was highly irregular. It would have been impractical during these periods to collect an additional sound speed cast each time the surface sound speed changed by 2 m/s. As a result, the hydrographers used their judgment about when and where to collect sound speed profile casts. Up to 12 sound speed profiles were collected on days such as this.

Profiles were manually acquired by lowering the instrument(s) to the seafloor. Locations for the casts were selected to maximize depth and capture a profile representative of conditions observed within a daily operating area. At all times the instruments reached a depth of at least 95% of water depth. All casts were acquired in or within close proximity to the survey area.

With few exceptions the Nearest in Distance Within Time (3-hour) profile selection method was used to determine which cast was applied to the soundings. This method was selected to limit the effects of spatial and temporal variation in sound speed.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw Backscatter was logged in HYSWEEP SURVEY in 81X format. Per discussion with the AHB Hydrographic Team Lead during his OSI office visit on April 29, 2014 OSI did not process the 81X files. The backscatter files are included in the "Preprocess\Bathy\MBES" day folder with their corresponding .HSX file.

B.5 Data Processing

B.5.1 Software Updates

The following Feature Object Catalog was used: NOAA Extended Attribute File v. 5.3.2.

Software versions described in Section A of the DAPR were used throughout acquisition and processing of data for Project OPR-C301-KR-13.

B.5.2 Surfaces

The following surfaces were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12607_MB_4m_MLLW_Final	CUBE	4 meters	-1.62 meters - 19.70 meters	NOAA_4m	MBES Set Line Spacing
H12607_MB_50cm_MLLW_Final	CUBE	0.5 meters	0 meters - 19.73 meters	NOAA_0.5m	Object Detection

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12607_SSS_100_1m	SSS Mosaic	1 meters	0 meters - 19.7 meters	N/A	100% SSS
H12607_SSS_200_1m	SSS Mosaic	1 meters	0 meters - 19.7 meters	N/A	200% SSS

Table 9: Submitted MBES Coverage Surfaces and SSS Mosaics

Two (2) MBES CUBE surfaces and two (2) SSS mosaics comprise the total surfaces delivered with Survey H12607. To prove MBES coverage requirements were met for Set Line Spacing, a 4-meter CUBE surface was generated for the entire survey area. Due to the large number of item investigations, object detection coverage surfaces are not presented individually. Rather, a 0.5-meter CUBE surface serves to satisfy the density requirements for item investigations over significant features while offering a high-resolution product for general use by AHB.

Two 1-meter SSS mosaics were submitted as CARIS mosaics and as GeoTIFFs to satisfy the SSS coverage requirements of 100% coverage up to the 2-meter contour and 200% coverage up to the 4-meter contour. Between the two SSS mosaics, a minimum of 100% SSS coverage was obtained within the 2 to 4 meter depth range as safe navigation permitted. In addition, GeoTIFFS were submitted at a higher resolution of 25 centimeters for each 100% and 200% SSS coverage to assist with the survey review.

As noted in the DAPR Section B.3 Data Processing, the Examined sounding flag was used in CARIS HIPS to indicate high-water features in the MBES data, rather than rejecting the features from the dataset. Per page 33 of the OPR-C301-KR-13 DAPR: "A 1-meter CUBE surface built solely from Examined soundings was created to display all high-water features (floating piers, pilings, bridges, sheet pile, etc.) that remain dry at high tide." A Bathymetric Attributed Grid (BAG) file of the 1-meter Examined sounding surface (H12607_MB_1m_Examined-points.bag) is provided with the H12607 data submission.

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying HVCR.

C.1 Vertical Control

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

Standard Vertical Control Methods Used: Discrete Zoning

As documented in the tide zoning report entitled "OPR-C301-KR-2013 Zoning Report 20140605.pdf" and the project DAPR, preliminary zoning was superseded by a new zoning scheme created by JOA

Surveys after their analysis of subordinate gauge and other "zoning gauge" datasets. The final zoning file "C301KR2013CORP_20140509.zdf" as well as subordinate tide gauge data were accepted by CO-OPS in a letter dated July 16, 2014.

The tide zoning report was delivered to CO-OPS under separate cover and is included in the Project HVCR delivery directory.

Prior to generation of the final zoning scheme the preliminary zoning scheme that was included in the Tides SOW was tested during early stages of MBES data processing. It was evident at the outset of testing that the preliminary zoning scheme, using tide data from only the Sandy Hook gauge (853-1680) did not yield favorable overlap agreement between mainscheme and cross line MBES data. Analysis of cross line data using the final zoning scheme along with data from all tide stations tabulated above indicates that the final zoning scheme is well constructed as evidenced by overwhelmingly good agreement between mainscheme and cross line MBES datasets.

As a QA/QC measure POSPac MMS was used to create an IAPPK tide file. Soundings were corrected to MLLW using the IAPPK tides (corrected to MLLW using V-Datum). A qualitative review of depth agreement between cross lines vs. mainscheme lines as well as adjacent line overlaps was undertaken using both the final zoned tides and the IAPPK-corrected tides. In general, sounding agreement did not appear to be considerably better or worse using the IAPPK-corrected tides as opposed to using zoned tides. Therefore, zoned tides were ultimately used for sounding reduction.

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

Station Name	Station ID
Sandy Hook, NJ	853-1680

Table 10: NWLON Tide Station

The following subordinate water level stations were established for this survey:

Station Name	Station ID
Long Beach, NY	851-6663
Green Island, NY	851-6155

*Table 11: Subordinate Tide Station*s

The following water level files were used during tide correction of MBES data:

File Name	Status
8531680.tid	Final Approved
8516663.tid	Final Approved
8516155.tid	Final Approved

*Table 12: Water Level File*s

The following tide zoning file was used during tide correction of MBES data:

File Name	Status
C301KR2013CORP_20140509.zdf	Final

Table 13: Tide Corrector File

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83). The projection used for this project is UTM Zone 18 North.

All data products, except the S-57 Final Feature File (FFF) are referenced to Latitude/Longitude, UTM Zone 18 North. The S-57 Final Feature File, H12607.FFF.000, is referenced to the World Geodetic System Datum of 1984 (WGS 84) as specified in Section 8.2 S-57 Format Features Deliverables of the HSSD.

As noted in the DAPR, DGPS positioning was employed as the real-time positioning method during Survey H12607. However, IAPPK SBET horizontal position data were substituted in lieu of real-time DGPS position data during post processing in order to improve vessel positioning. This practice enhanced the data processing flow by reducing the number of redundant discrete features or "blurry" features erroneously created when using DGPS positioning. IAPPK SBET positioning was substituted for real-time DGPS positioning for all survey days.

The following PPK method was used for horizontal control: Smart Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
CORS	NYVH
CORS	NYBR
CORS	NJI2
CORS	SHK5
CORS	SHK6
CORS	NYQN
CORS	NYBP
CORS	LAMT
CORS	NJNT
CORS	NJOC
CORS	ZNY1
CORS	MOR5
CORS	MOR6
CORS	NYCI
CORS	CTDA
CORS	RVDI

Table 14: CORS Base Stations

RTK GPS positioning was used during calibration of the MBES and SSS systems aboard R/V Able II. In practice the position of the RTK GPS base station was established via one OPUS-RS observation. However, the GPS base station information is not documented as if it were serving as the project's horizontal or vertical reference. Rather, the exact position and elevation of the RTK GPS base station is treated as an arbitrarily derived value since during calibrations, X, Y, Z positioning precision, not accuracy is paramount. All pre-survey calibrations were conducted with the vessel's primary positioning system, the POS-MV, in RTK GPS mode where horizontal and vertical positioning precision was achieved with minimal regard for the absolute horizontal or vertical accuracy of the RTK GPS solution.

Prior to and during the course of the survey the accuracy of the primary positioning system was verified by means of a physical measurement to a project horizontal control point established at the vessel’s overnight berth. The project horizontal control point was established using the National Geodetic Survey’s Online Positioning Users Service (OPUS). Position confidence checks were accomplished daily. Refer to the DAPR and HVCR for additional details.

Real-time positioning correctors from the USCG Sandy Hook, NJ station were received and used by the primary positioning system without interruption throughout the duration of the survey. DGPS correctors from the USCG Moriches, NY station were received and used by the secondary positioning system as a quality control check for the primary positioning system.

The following DGPS stations were used for horizontal control:

DGPS Stations
Sandy Hook, NJ (primary positioning) 286 kHz
Moriches, NY (positioning integrity alarm) 293 kHz

Table 15: USCG DGPS Stations used for Horizontal Control

D. Results and Recommendations

D.1 Chart Comparison

Chart comparisons were performed in CARIS HIPS/SIPS and Notebook using finalized BASE surfaces and contours and soundings generated from a combined final BASE surface. The latest editions of the NOAA NOS Raster Nautical Charts (RNC) and Electronic Nautical Charts (ENC) were downloaded from the NOAA Office of Coast Survey website (http://www.nauticalcharts.noaa.gov/) weekly during survey operations, and after the survey was completed for final comparisons. The RNCs and ENCs used for final comparisons were downloaded on June 13, 2014 and are submitted with the survey deliverables.

LNM and NM spanning the period beginning at the date of issuance of the Hydrographic Project Instructions (June 19, 2013) and ending on June 18, 2014 were consulted in conjunction with the foregoing chart comparison. Pertinent notifications are included, as appropriate, in following report sections. All pertinent NM corrections are also noted in the LNM. The current USCG Light List, corrected up to the LNM/NM ending June 18, 2014, was consulted frequently during the chart comparison.

The following sections adhere to the Descriptive Report sounding rounding system as described in Section 5.1.2 of the HSSD. Specifically, features described below having “precision” depths are presented in the following manner: ff feet (mm.mm meters, ±t.tt TPU) where ff = depth expressed in feet (chart units) having been rounded based on the precise meters expression of the depth using the 0.75 round value rule.

mm.mm = depth expressed in meters
±t.tt = Total Propagated Uncertainty (TPU) expressed in meters

An example of this notation follows: 80 feet (24.58 meters, ±0.24 TPU).

During the chart comparison it was found that the least depth soundings for charted regions were on features such as wrecks or obstructions; however, the chart comparisons documented below will discuss general seafloor changes, shoaling and deepening trends, associated with natural or unnatural (dredging) sediment transport. All new or charted features identified, updated or disproved within Survey H12607 were addressed and attributed in the S-57 Final Feature File.

D.1.1 Raster Charts

The following table summarizes pertinent epoch details about the largest scale RNCs assigned for the survey area.

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
12352	1:20000	34	09/2012	10/28/2008	06/14/2014

Table 16: Largest Scale Raster Charts

12352

RNC 12352 is a multi-sheet chart comprising RNC 12352_1 through 12352_8. The three chart sections impacted by Survey H12607 include RNC 12352_4 (Kapp 697), RNC 12352_5 (Kapp 698), and RNC 12532_6 (Kapp 699). LNM and NM dates are not found on the aforementioned chart sections. The LNM and NM dates listed above are those listed on the "NOAA Chart Dates of Latest Editions" page of the NOAA OCS website at http://www.charts.noaa.gov/MCD/Dole.shtml on the day the charts were downloaded for comparison (June 13, 2013). Figure 9 below shows a screen grab from the "NOAA Chart Dates of Latest Editions" page on June 13, 2014. The chart scale is listed as 1:40,000 on the "Latest Editions" web page. However, the RNC charts discussed above show a scale of 1:20,000 which is believed to be the correct scale.

Survey H12607 data differed significantly from the charted coastline, soundings, and contours. In particular, the charted soundings and contours did not accurately represent the navigable water within the channels with the surveyed depths indicating relatively massive shifts in the centerlines of the channels. In many cases channels have widened such that navigable water was surveyed over charted land areas. The significant differences found during the chart comparison are documented below with the discussion subdivided by geographically defined sea areas.

East Rockaway Inlet:

Surveyed depths at the entrance to East Rockaway Inlet, west of Silver Point, were deeper than charted depths by up to 10 feet. As noted in the Junction Comparison Section, LNM 33/13 indicated dredging had occurred within East Rockaway Inlet up until October 2013, which explains the deeper surveyed depths. The western extents of a charted shoal defined by a dashed-line 6-foot contour were found to have moved over 150 meters west of the charted position. According to Section I of U.S. Chart No. 1, Depths, a dashed line is indicative of an area with inadequate depth information. Additional shoaling was noted south of Rockaway Beach, where

the surveyed 6-foot contour was positioned over 100 meters south of its charted position. Figure 10 highlights the areas of significant change at the entrance to East Rockaway Inlet.

On the east end of East Rockaway Inlet, a deepening trend was identified with the majority of charted depths 5 to 9 feet shallower than surveyed depths. A charted 18-foot shoal located in the center of the channel (40-35-37.73 N, 73-44-31.19 W) was disproved with 100% MBES coverage (Figure 11).

Bannister Creek:

Shoaling was observed at the entrance to and within Bannister Creek. Soundings selected to represent the shoaling trend were submitted to AHB with OSI H12607_DtoN_#3 and some changes have since been enacted on the chart (Figure 12); however, the 4-foot shoal surveyed at the entrance to the creek has yet to replace the charted 7-foot depth. Surveyed depths of 4 to 5 feet set new draft clearance limits for Bannister Creek. There was deepening identified over a charted 6-foot shoal at the entrance to Bannister Bay (40-36-12.77 N, 73-43-52.84 W), but a predominant shoaling trend was evident within the creek, with surveyed depths being 2 to 16 feet shallower than the charted depths (Figure 13).

Reynolds Channel:

Beginning at the western limit of Reynolds Channel, the fixed bridge spanning East Rockaway Inlet, up until Reynolds Channel Light 7, there were significant differences, shoaling and deepening, between the surveyed and charted contours and soundings within Reynolds Channel. In particular the charted 3-foot, 6-foot, and 12-foot contours showed the greatest amount of change along the northern channel boundary, with the channel widening and narrowing in different locations. The majority of the soundings charted in the northern half of the channel need to be updated, along with the positions of the charted contours (Figure 14). Shoaling was noted in the center of the channel within a deep hole centered on 40-35-26.73 N, 73-42-18.72 W.

For the portion of Reynolds Channel between South Black Banks Hassock and Long Beach, deepening was noted along the northern banks of the channel with the surveyed 6-foot and 12-foot contours positioned inshore of the charted 3-foot contour. Intermittent shoals with depths less than 6 feet were surveyed beyond the surveyed 12-foot depth curve in the vicinity of Reynolds Channel Light 9 (Figure 15). Charted soundings on the south side of the channel differed with surveyed depths by over 7 feet, with surveyed depths being shallower than the charted depths.

A deep section of Reynolds Channel south of California Canal and east of two bascule bridges, has been updated with soundings submitted by OSI with H12607_DtoN_#5. Prior to the submission of the shoal depths with DtoN #5, the deep section of the channel had been charted with depths over 50 feet; however, following the OSI DtoN submission the area is shoal biased (Figure 16). In this section of Reynolds Channel, the 12-foot contour on the south side of the channel has moved closer to shore by over 30 meters.

The selected sounding submission for H12607 DtoN #5 covered an extensive subset of Reynolds Channel over 3000 meters (1.6 nautical miles) from east to west. The charted depths for the area of Reynolds Channel located between the approximate coordinates of 40-35-43.36 N, 73-39-22.16 W and 40-35-48.14 N, 73-37-04.33 W were updated with the selected soundings from DtoN #5, which resulted in good agreement between surveyed depths and the current charted soundings on the RNC downloaded on June 13, 2014 (Figure 17). The charted

contours in this area still require updating with the aid of surveyed depths. In particular the extents surrounding a charted 2-foot shoal positioned at 40-35-46.69 N, 73-37-45.70 W have shifted to the west.

Charted shoals south of Ingraham Hassock have shrunk in size with depths surveyed between 9 and 23 feet over a charted 0- to 3-foot depth area (Figure 18). The aids to navigation marking the "best water" in Reynolds Channel, Buoys 15 and 16, were positioned over the disproved shoal, indicating that the US Coast Guard was aware that the channel depths have shifted; however, the charted soundings conflict with the channel markers with a 3-foot sounding positioned between the buoys.

Reynolds Channel has widened in the area between Reynolds Channel Daybeacon 19 and the fixed bridge that spans the channel from Alder Island to Point Lookout. The surveyed 6-foot and 12-foot contours have advanced inshore of the surveyed locations into the charted 0- to 3-foot depth area. In particular deepening was noted surrounding Reynolds Channel Buoy 21.

Between Alder Island and Point Lookout, surveyed soundings within Reynolds Channel were 5 to 19 feet deeper than charted depths and the 6- and 12-foot contours have advanced inshore of their charted positions (Figure 19).

Broad Channel:

At the confluence of Reynolds Channel and Broad Channel, surveyed depths were 5 to 8 feet deeper than charted depths in the center of the entrance to Broad Channel. The charted shoal on the southeast approach to Broad Channel has expanded southwest to include Broad Channel Junction Buoy B. Within Broad Channel, a deepening trend was noted near Broad Channel Buoys 8 and 10. Figure 20 highlights the areas of change in Broad Channel.

Hog Island Channel and Island Park Channel:

In general, charted depths within Hog Island Channel agree well with surveyed depths, with deepening noted in the vicinity of Hog Island Channel Buoy C5 (Figure 21). There was also good agreement between charted and surveyed depths within Island Park Channel with the exception of a new least depth of 3 feet (0.99 meters, ±0.40 TPU) being developed over a charted 6-foot sounding at 40-36-11.21 N, 73-39-42.46 W (Figure 22).

Shell Creek:

There was good agreement between surveyed and charted depths within Shell Creek with the majority of depths agreeing within 4 feet. Surveyed depths were over 6 feet shallower than charted depths in two instances: 1) Depths of 18 to 19 feet were developed over a charted 25-foot sounding centered at 40-36-22.9 N, 73-38-31.0 W, and 2) Depths of 16 to 24 feet were developed over a charted 34-foot sounding centered at 40-36-15.2 N, 73-38-34.5 W.

Garrett Lead:

Overall, surveyed depths within Garrett Lead were 5 to 15 feet deeper than charted depths.

Cinder Creek and North Channel:

The southern and northern entrances to Cinder Creek and the southern entrance to North Channel have shoaled considerably with depths between 0 to 2 feet limiting passage into the waterways (Figure 23). Hydrography was not attempted within Cinder Creek and North Channel due to the shallow water encountered at the entrances.

Jones Inlet:

Shoaling and deepening were noted along the charted 6-foot contour on the east side of Point Lookout. The 6-foot contour has migrated into the channel at the approximate location of 40-35-26.06 N, 73-34-21.90 W and has moved closer to shore at the approximate position of 40-35-12.41 N, 73-34-34.19 W with soundings of 9 to 13 feet surveyed over a 0 to 6-foot depth area.

A shoal delineated with a 0-foot contour line in the southwest portion of Jones Inlet was disproved. The shoal was positioned at 40-34-57.35 N, 73-35-02.70 W and surveyed depths over the shoal ranged between 10 and 20 feet (Figure 24).

At the confluence of Reynolds Channel and Jones Inlet, a shoal southeast of Alder Island has advanced into the channel in between Alder Island Buoy 2A and Jones Inlet Buoy 15. Surveyed depths of 2 and 3 feet were surveyed over charted depths of 7 and 10 feet (Figure 25). It is recommended that the charted 6-foot contour be updated with surveyed depths.

Sloop Channel:

At the western end of Sloop Channel, a deepening trend was observed on the north side of the channel in the vicinity of Sloop Channel Buoy 5 (40-35-42.38 N, 73-33-27.72 W), while on the southern side of the channel a large uncharted shoal was identified south of Sloop Channel Lighted Buoy 6 (40-35-51.77 N, 73-33-03.65 W). The shoal south of Buoy 6 intersects with the charted 6-foot and 12-foot contours in a complex chart area with charted depths ranging between 1 to 13 feet (Figure 26). It is recommended that the extents of the 6-foot contour be updated with surveyed depths to replace the disproved charted soundings and contours and that the soundings positioned inside the new 6-foot contour be deleted in favor of blue shading.

For the section of Sloop Channel east of the bascule bridge that spans from Jones Island to Jones Beach Island up until Deep Creek Meadow, surveyed depths along the southern half of the channel were 6 to 20 feet deeper than charted depths with bathymetry acquired over charted land coastline (Figure 27). Whereas surveyed depths south of Deep Creek Meadow were over 14 feet shallower than charted depths. Although the charted soundings do not reflect the change in navigable waters, the charted aids to navigation do.

Sloop Channel turns southeast after the Wantagh State Parkway Bridge connecting Green Island with Jones Beach Island, south of South Line Island. Within this section of Sloop Channel centered around the approximate position of 40-36-41.31 N, 73-29-42.52 W significant change was observed. New shoals were developed and bathymetry was acquired over charted marsh land and 0 to 3-foot depth areas (Figure 28). These changes were addressed by selected soundings submitted to AHB with OSI H12607_DtoN_#13.

There was shoaling observed west of Green Island between Sloop Channel Daybeacon 18 and Sloop Channel Light 20 where surveyed depths were 5 to 10 feet shallower than charted depths. The shoal was reported as

selected soundings in OSI H12607_DtoN_#11. Directly north of the shoal, surveyed depths were 7 to 8 feet deeper than charted over charted 2- and 3-foot depths located at 40-37-17.10 N, 73-30-19.83 W.

Haunts Creek:

Massive changes were identified within Haunts Creek and were addressed with selected soundings submitted with OSI H12607_DtoN_#10. The navigable areas within Haunts Creek now pass over multiple charted marsh land regions, Deep Creek Meadow to the east, Egg Island to the north, and East Crow Island to the west (Figure 29). It is recommended that the bathymetry acquired with Survey H12607 be utilized for a complete re-charting of the southern portion of Haunts Creek.

Goose Creek, Great Island Channel, and Stone Creek:

At the location where Goose Creek meets Great Island Channel the entrance to the channel has shifted to the west over a charted intertidal zone (Figure 30). Even though the coastline on the chart has not been updated, the channel buoys (Great Island Channel Buoys Z1 and Z2) properly mark the new entrance to the channel. A new shoal has advanced across the charted entrance to the channel between Great Island Channel Buoys Z2 and Z4.

Stone Creek has widened significantly beyond the charted channel limits, with navigable water expanding over the charted marsh lands of South Line Island to the east and Green Island to the west. A new shoal positioned at 40-37-02.99 N, 73-29-54.71 W was developed in the center of Stone Creek with selected soundings representing the shoal submitted to AHB as OSI H12607_DtoN_#12. The area of safe passage within Stone Creek has changed dramatically shifting east of the "deep water" channel currently charted (Figure 31).

Zachs Bay:

In general, surveyed soundings within Zachs Bay were shallower than the majority of charted depths and contours, most significantly within the narrow channels that provide entrance into the Bay off of Sloop Channel. The western entrance into Zachs Bay from Sloop Channel has migrated approximately 70 meters west of its charted position; however, the charted channel buoys once again correspond with the H12607 bathymetry and the charted coastline lags behind the USCG channel buoy positioning. Given the location of the Jones Beach Amphitheater in the southwest corner of Zachs Bay, it is assumed that recreational boating traffic would be high in this area. Selected soundings within Zachs Bay were submitted by OSI to AHB as H12607_DtoN_#14 to represent the new shoals. Despite the predominance of shoaling within the Bay, several locations exhibited deepening within the 0- to 3- foot depth areas and bathymetry was acquired over the marsh land near the Bay's entrance. The areas of shoaling and deepening within Zachs Bay are highlighted in Figure 32.

NUMBER	IMAGES	TITLE	SCALE	EDITION & DATE	
12352	View	Shinnecock Bay to East Rockaway Inlet	40,000	34	Sep /12 (NM:6/14/2014) (LNM:10/28/2008)

Figure 9: *June 13, 2014 screen grab from "NOAA Chart Dates of Latest Editions".*

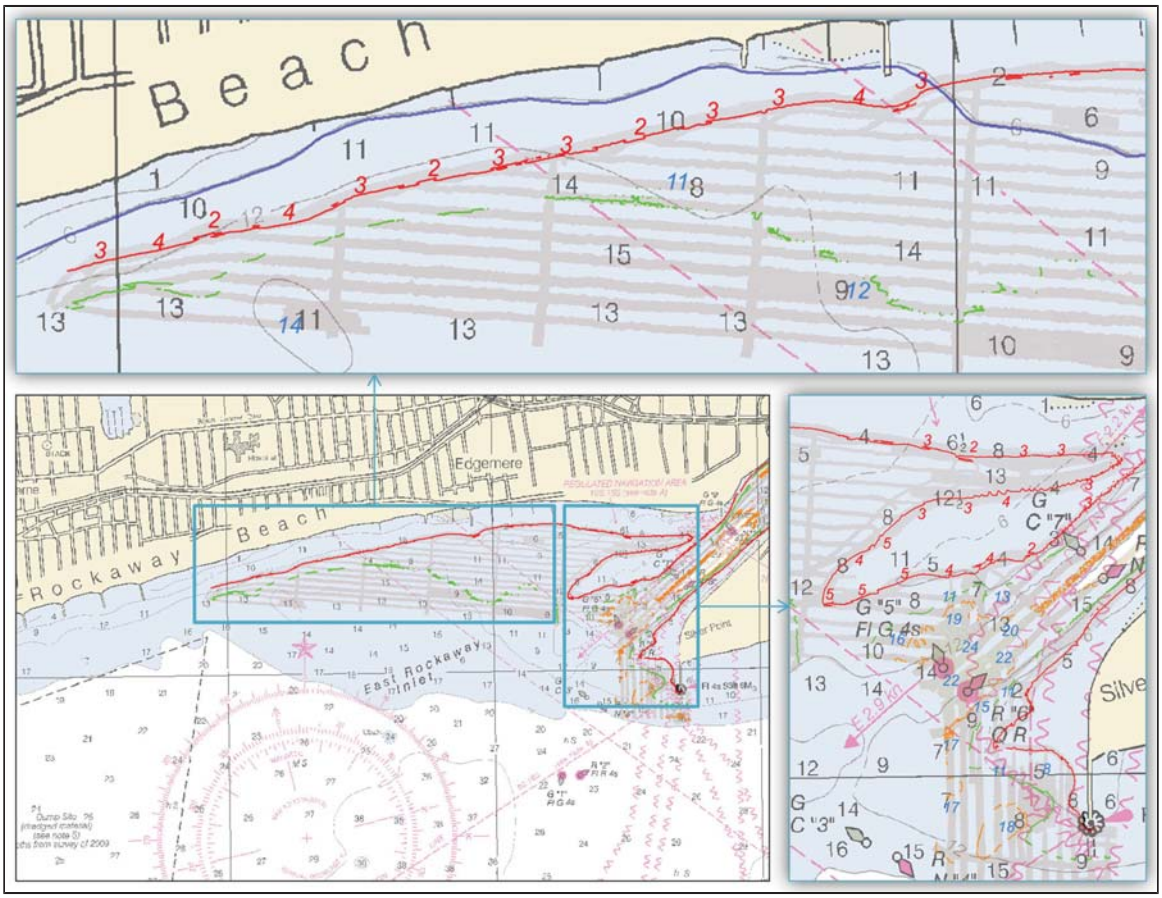

Figure 10: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to East Rockaway Inlet. Representative soundings of the shoaling and deepening trends are highlighted in red and blue with a CUBE surface overlaid on RNC 12352 in the background.*

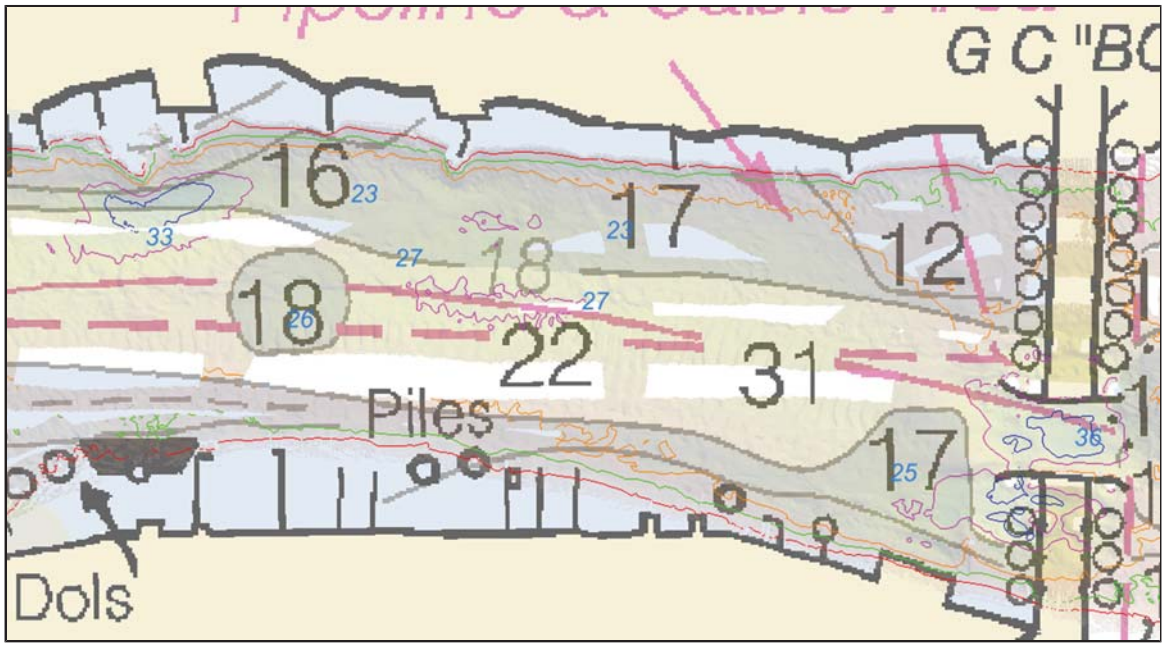

Figure 11: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to East Rockaway Inlet. Representative soundings of the deepening trend are highlighted in blue with a CUBE surface overlaid on RNC 12352 in the background.*

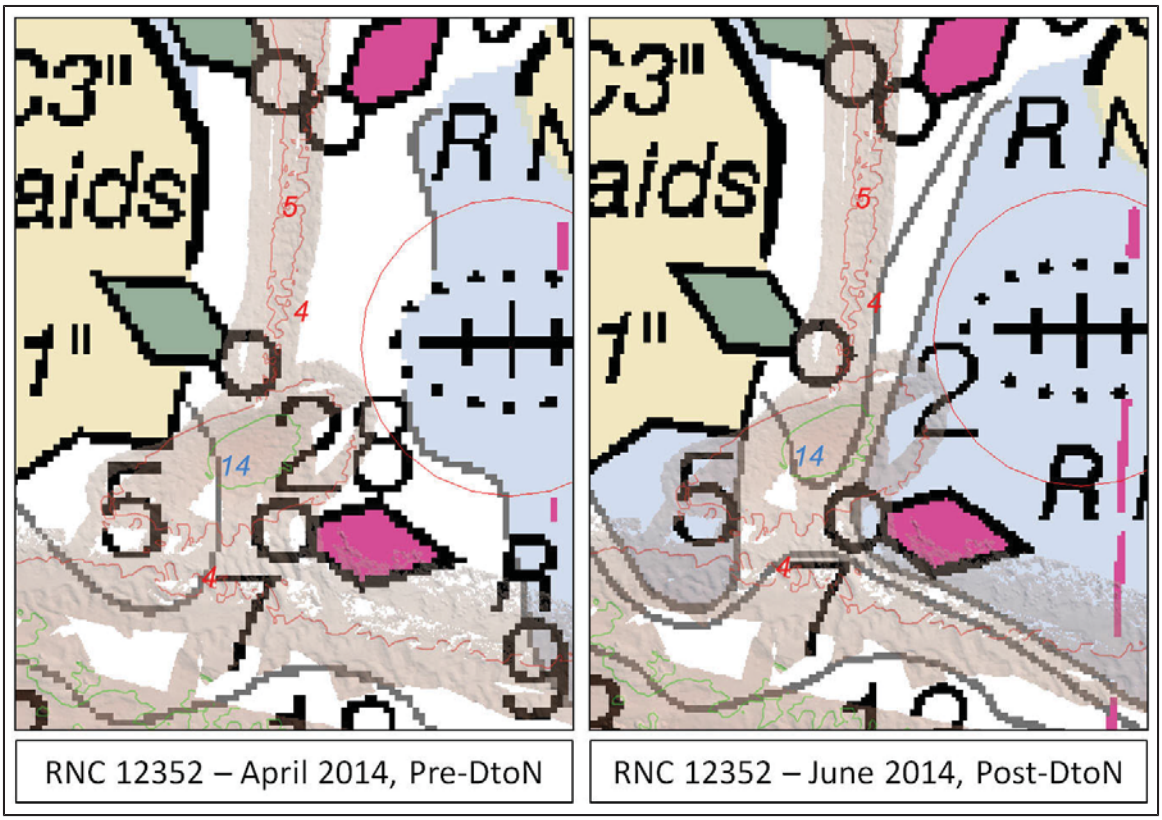

Figure 12: *The entrance to Bannister Creek is highlighted to show the changes to the RNC pre and post submission of OSI H12607 DtoN #3. The image on the left shows RNC 12352 as charted pre-DtoN with surveyed data overlaid on top. The image on the right shows RNC 12352 as charted post-DtoN with surveyed data overlaid on top. Contours generated from the H12607 MBES data (6' in red, 12' in green) along with selected soundings in blue and red indicate how the charted depths and contours differ in comparison to the chart.*

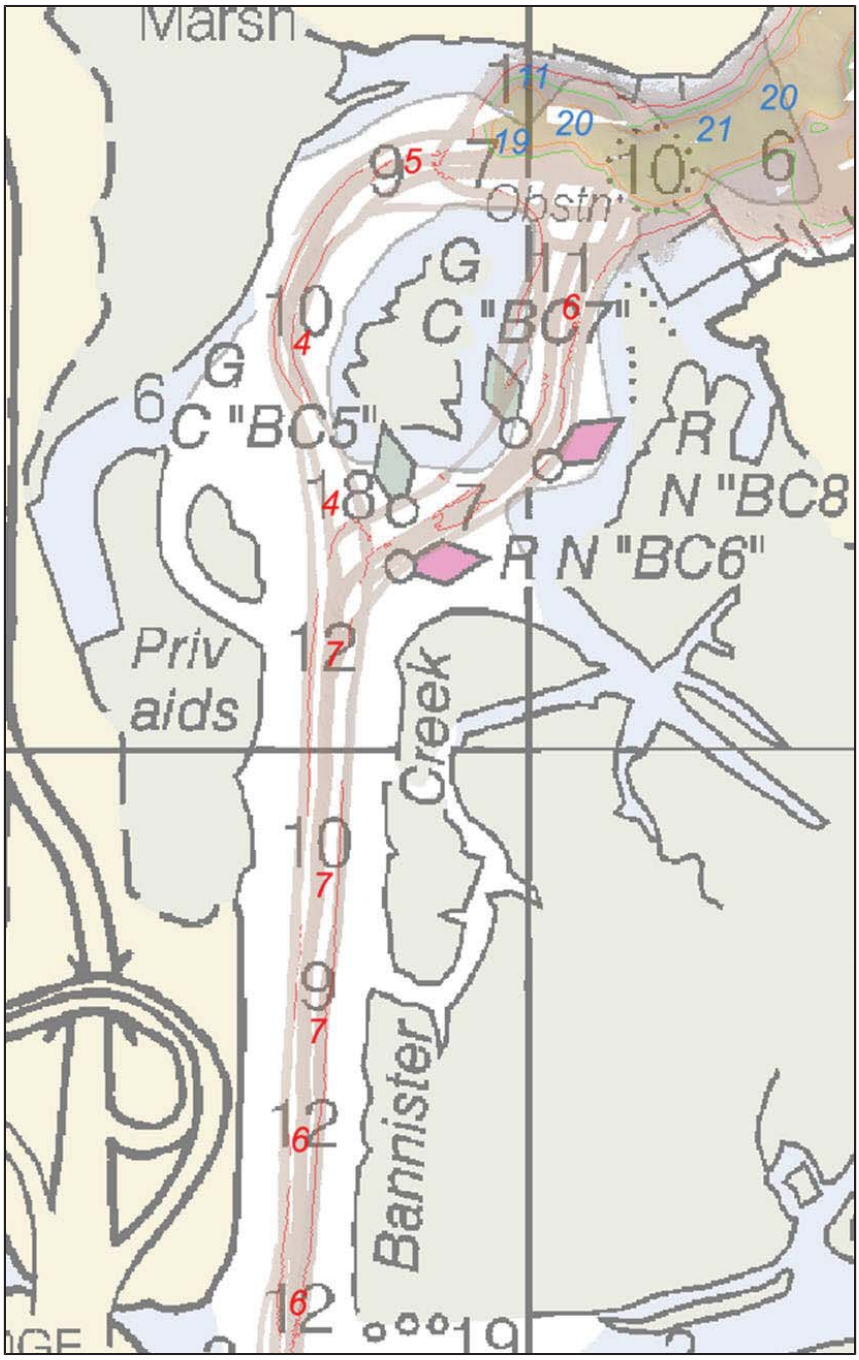

Figure 13: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Bannister Creek. Representative soundings of the shoaling and deepening trends are highlighted in red and blue with a CUBE surface overlaid on RNC 12352 in the background.*

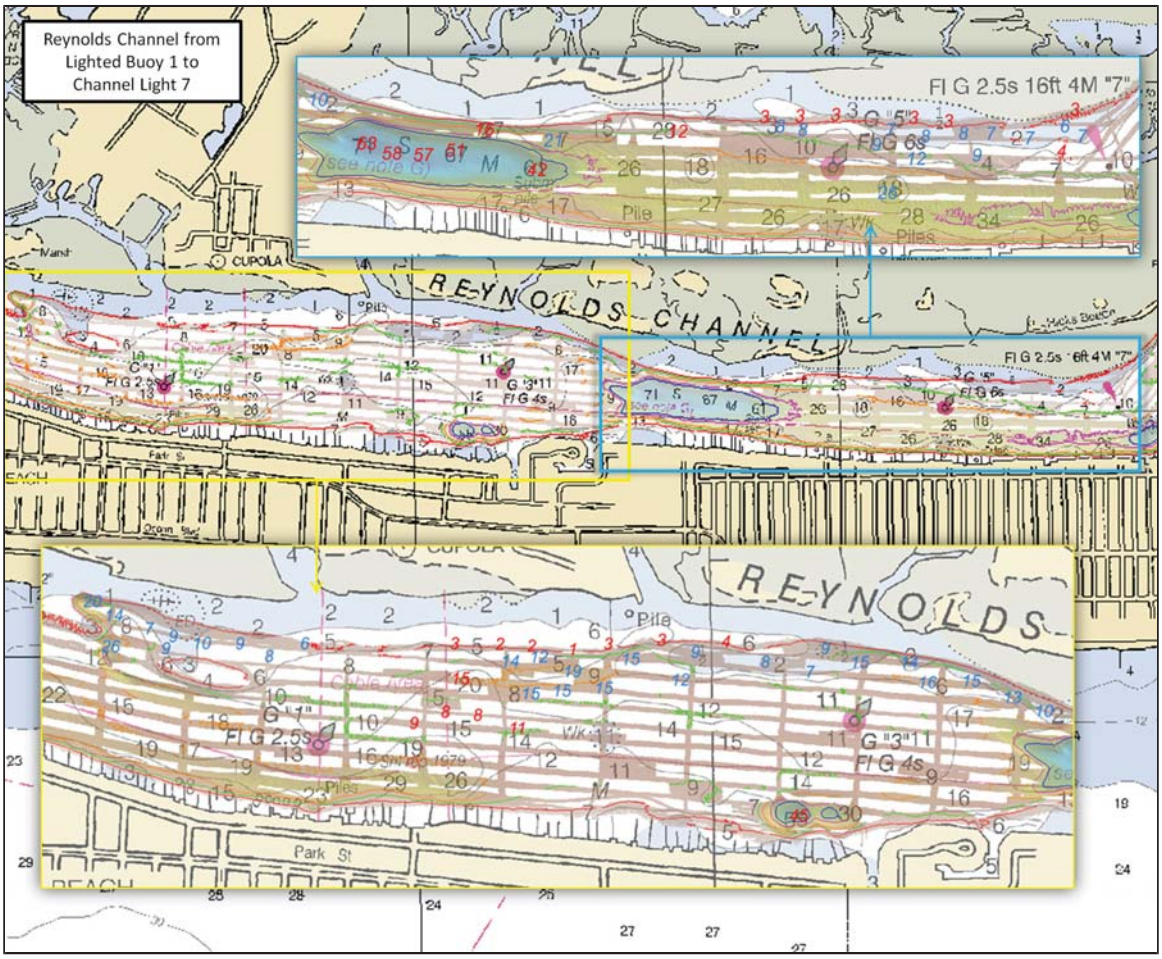

Figure 14: *Two insets highlight areas of significant change within the western end of Reynolds Channel. Contours generated from the H12607 MBES data (6' in red, 12' in green, 18' in orange, 30' in pink, and 36' in blue) are shown in reference to Reynolds Channel. Representative soundings of the deepening trend are highlighted in blue with a CUBE surface overlaid on RNC 12352 in the background.*

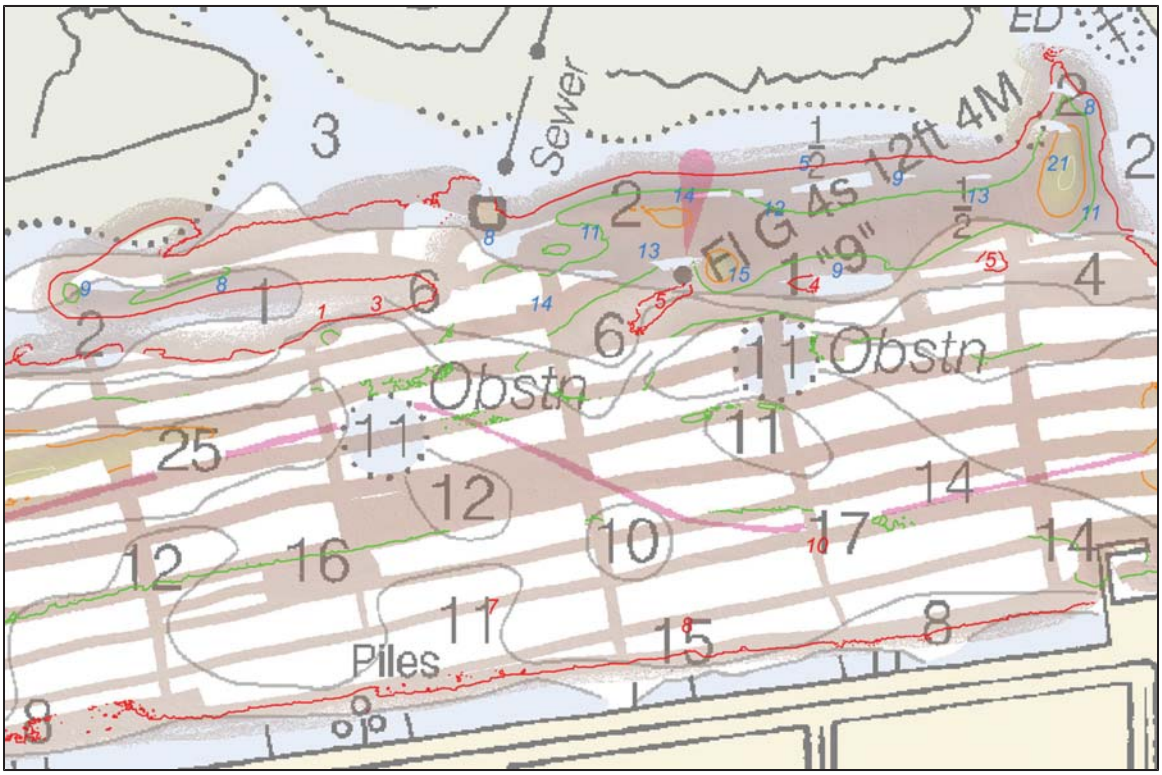

Figure 15: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Reynolds Channel. Representative soundings of the shoaling and deepening trends are highlighted in red and blue with a CUBE surface overlaid on RNC 12352 in the background.*

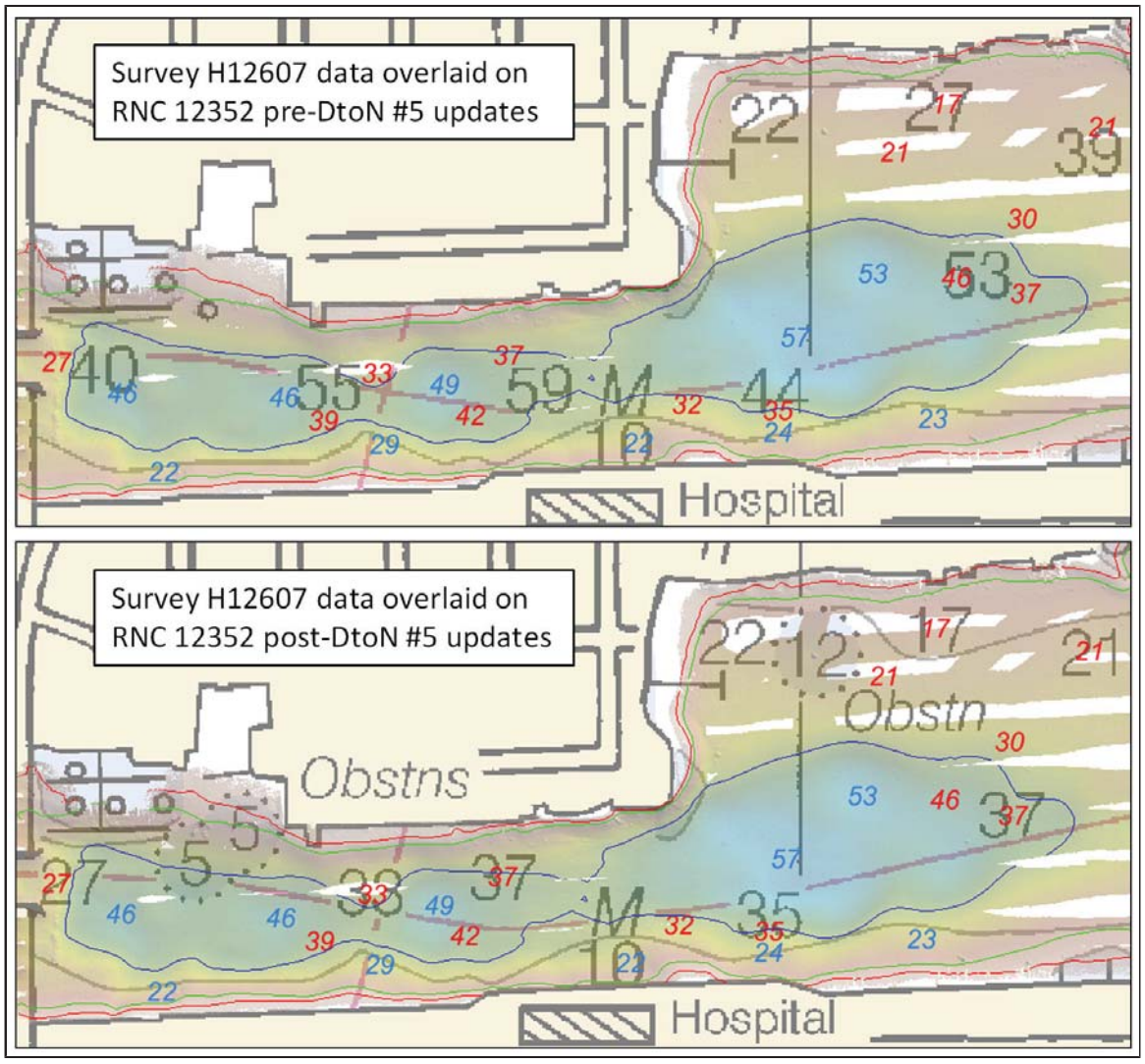

Figure 16: *A subset of Reynolds Channel is displayed on RNC 12352 pre- and post-sounding updates from OSI H12607_DtoN_#5. The charted depths prior to the DtoN submission are shown in the top image and the charted depths following the DtoN submission are shown in the bottom image. In both images, contours generated from the H12607 MBES data (6' in red, 12' in green, 18' in orange, 30' in pink, and 36' in blue) are shown in reference to Reynolds Channel. Representative soundings of the shoaling and deepening trends are highlighted in red and blue with a CUBE surface overlaid on RNC 12352 in the background.*

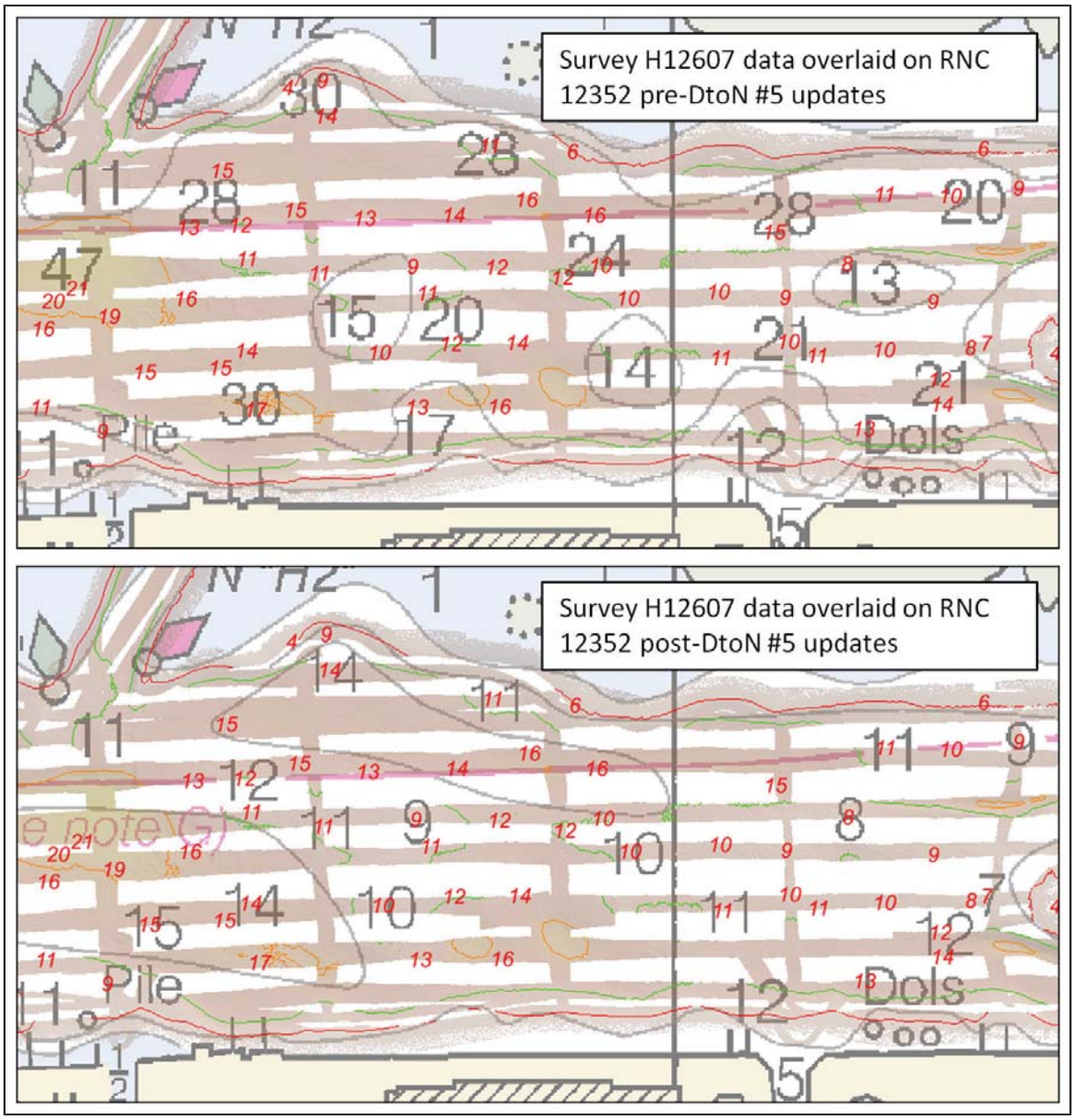

Figure 17: *A subset of Reynolds Channel is displayed on RNC 12352 pre- and post-sounding updates from OSI H12607_DtoN_#5. The charted depths prior to the DtoN submission are shown in the top image and the charted depths following the DtoN submission are shown in the bottom image. In both images, contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Reynolds Channel. Representative soundings from DtoN #5 are highlighted in red with a CUBE surface overlaid on RNC 12352 in the background.*

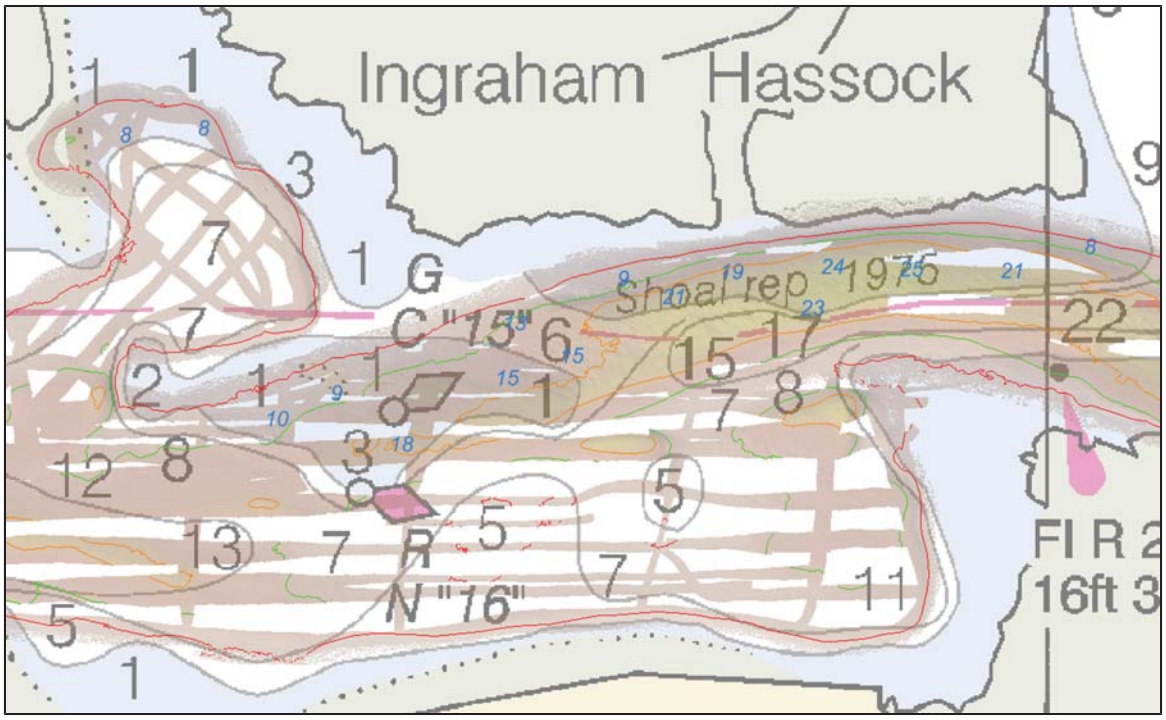

Figure 18: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Reynolds Channel south of Ingraham Hassock. Representative soundings of the deepening trend are highlighted in blue with a CUBE surface overlaid on RNC 12352 in the background.*

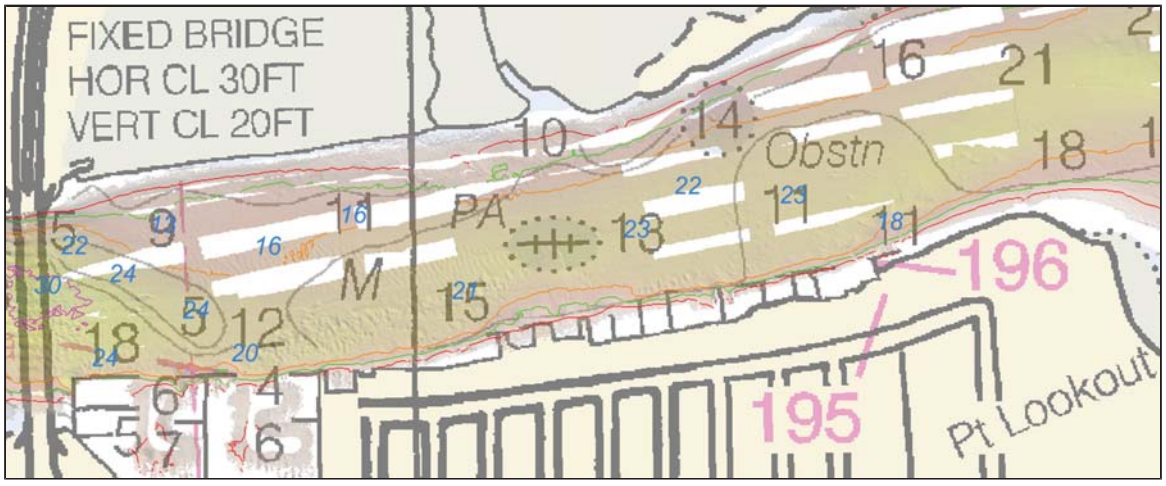

Figure 19: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Reynolds Channel south of Alder Island. Representative soundings of the deepening trend are highlighted in blue with a CUBE surface overlaid on RNC 12352 in the background.*

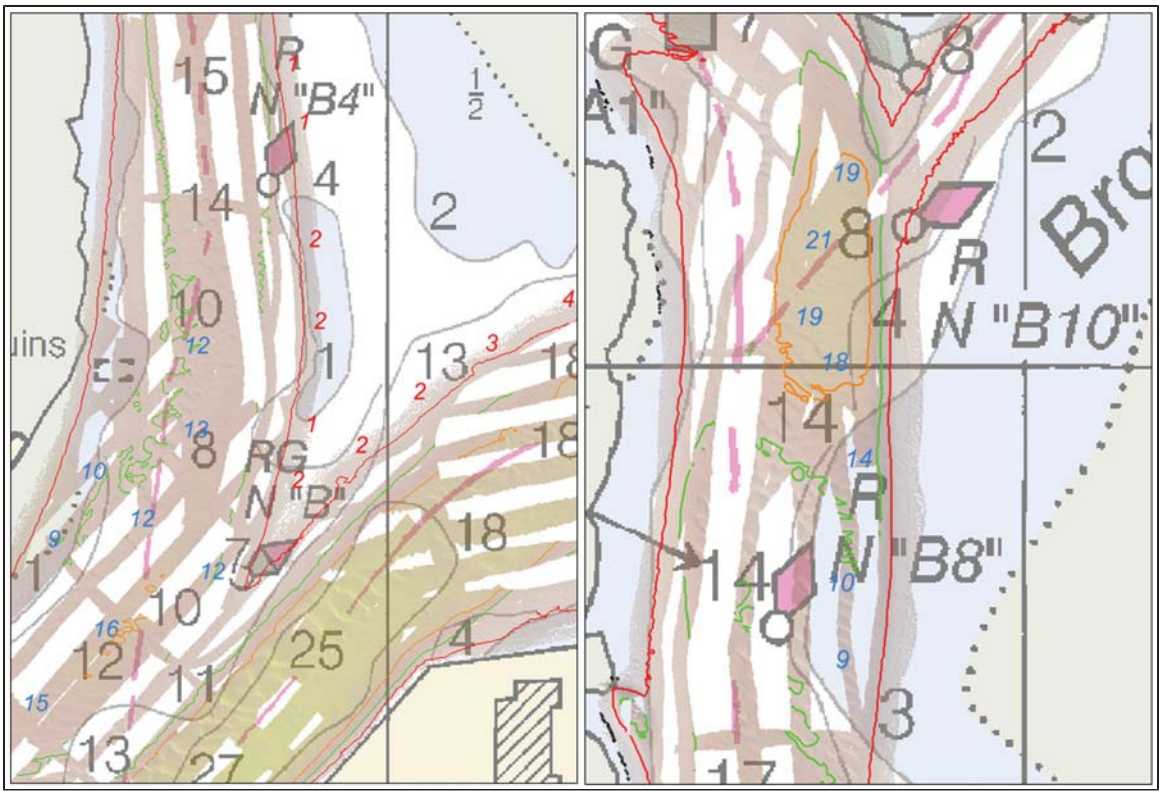

Figure 20: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Broad Channel. Representative soundings of the deepening and shoaling trends are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

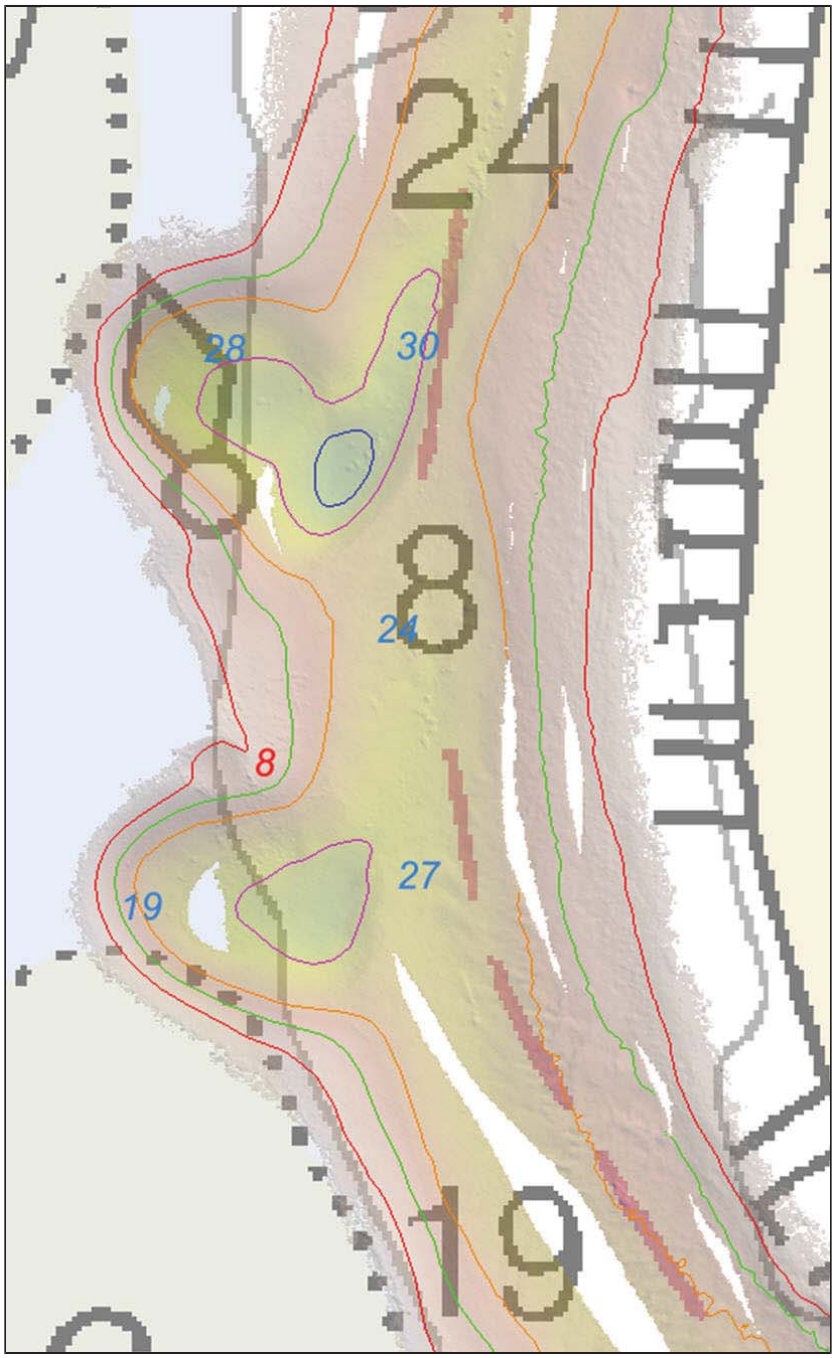

Figure 21: *Contours generated from the H12607 MBES data (6' in red, 12' in green, 18' in orange, 30' in pink, 36' in blue) are shown in reference to Hog Island Channel. Representative soundings of the deepening and shoaling trends are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

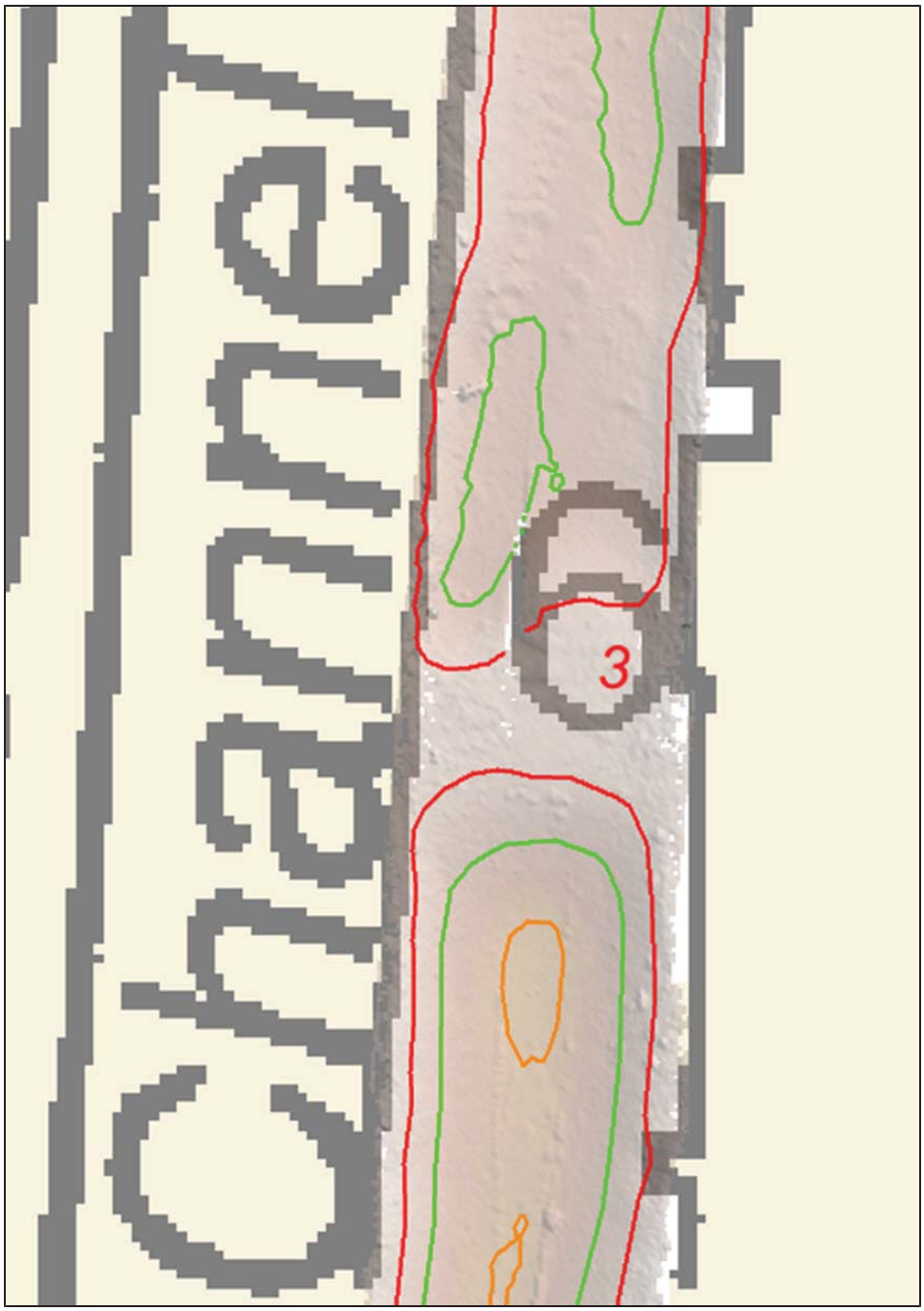

Figure 22: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to a shoal in Island Park Channel. A representative sounding of the shoal's least depth is shown in red with a CUBE surface overlaid on RNC 12352 in the background.*

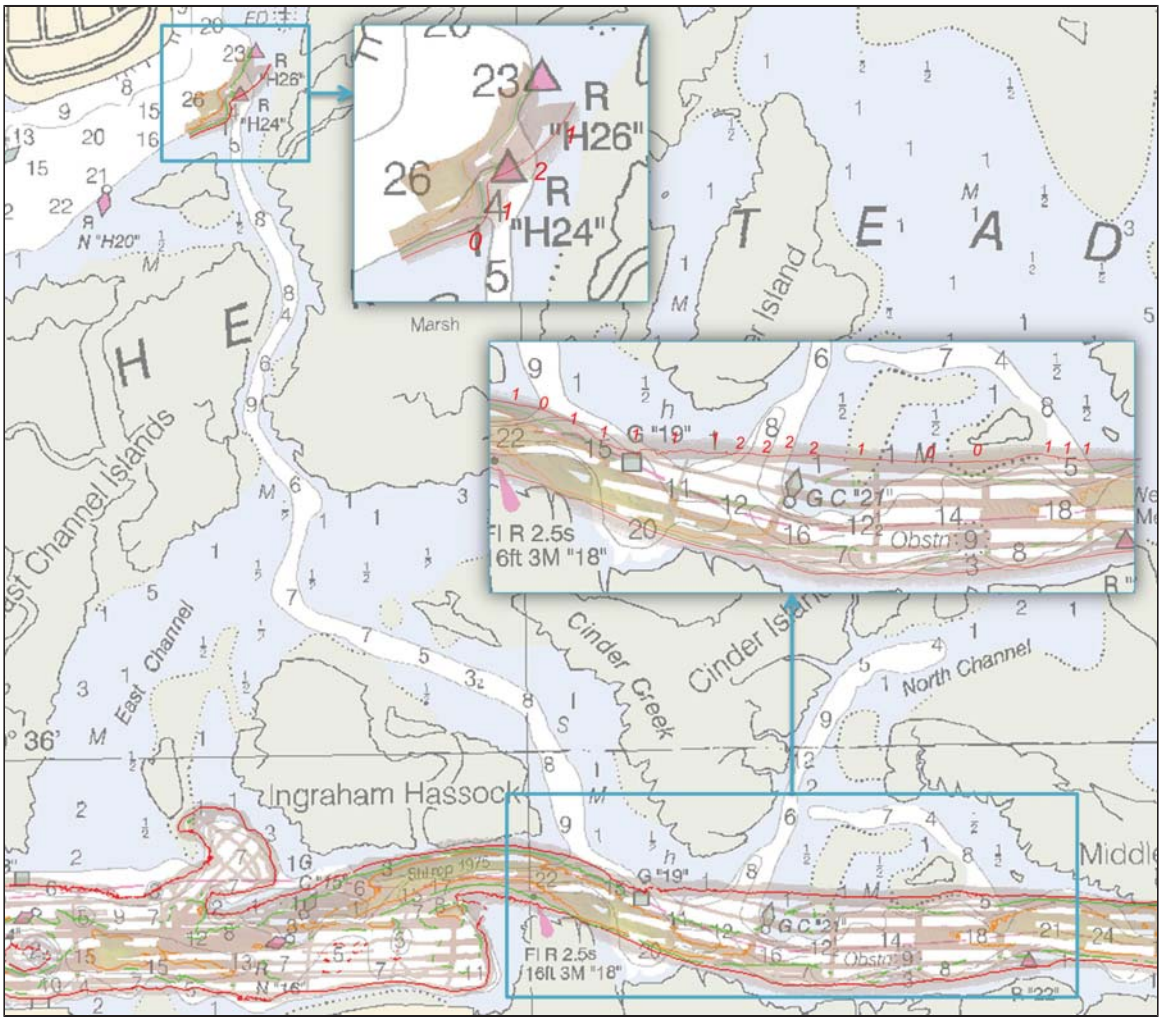

Figure 23: *Multiple insets highlight areas of significant shoaling at the entrances to Cinder Creek and North Channel. Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Hempstead Bay and Reynolds Channel. Representative soundings of the shoaling trend are highlighted in red with a CUBE surface overlaid on RNC 12352 in the background.*

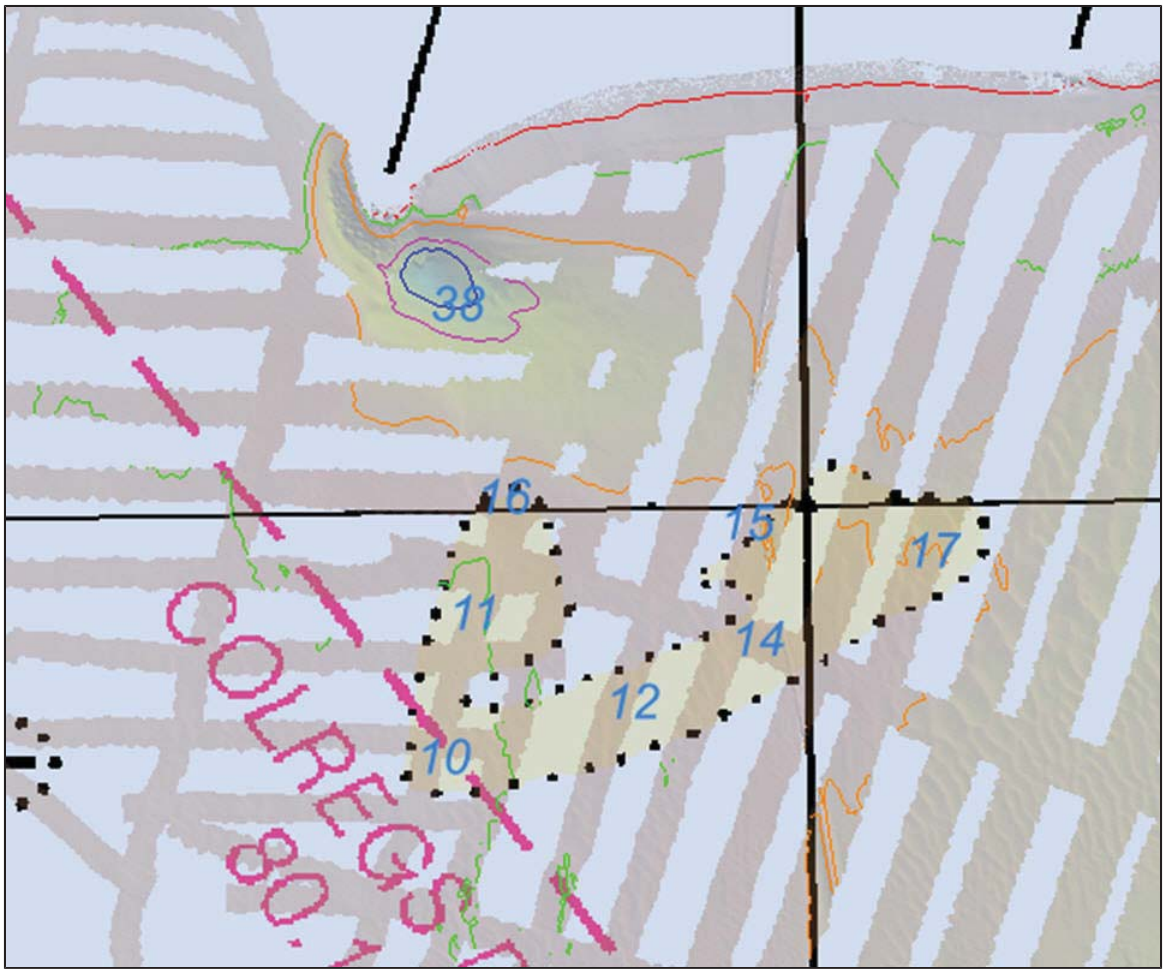

Figure 24: *Contours generated from the H12607 MBES data (6' in red, 12' in green, 18' in orange, 30' in pink, and 36' in blue) are shown in reference to Jones Inlet. Representative soundings of the deepening trend are highlighted in blue with a CUBE surface overlaid on RNC 12352 in the background.*

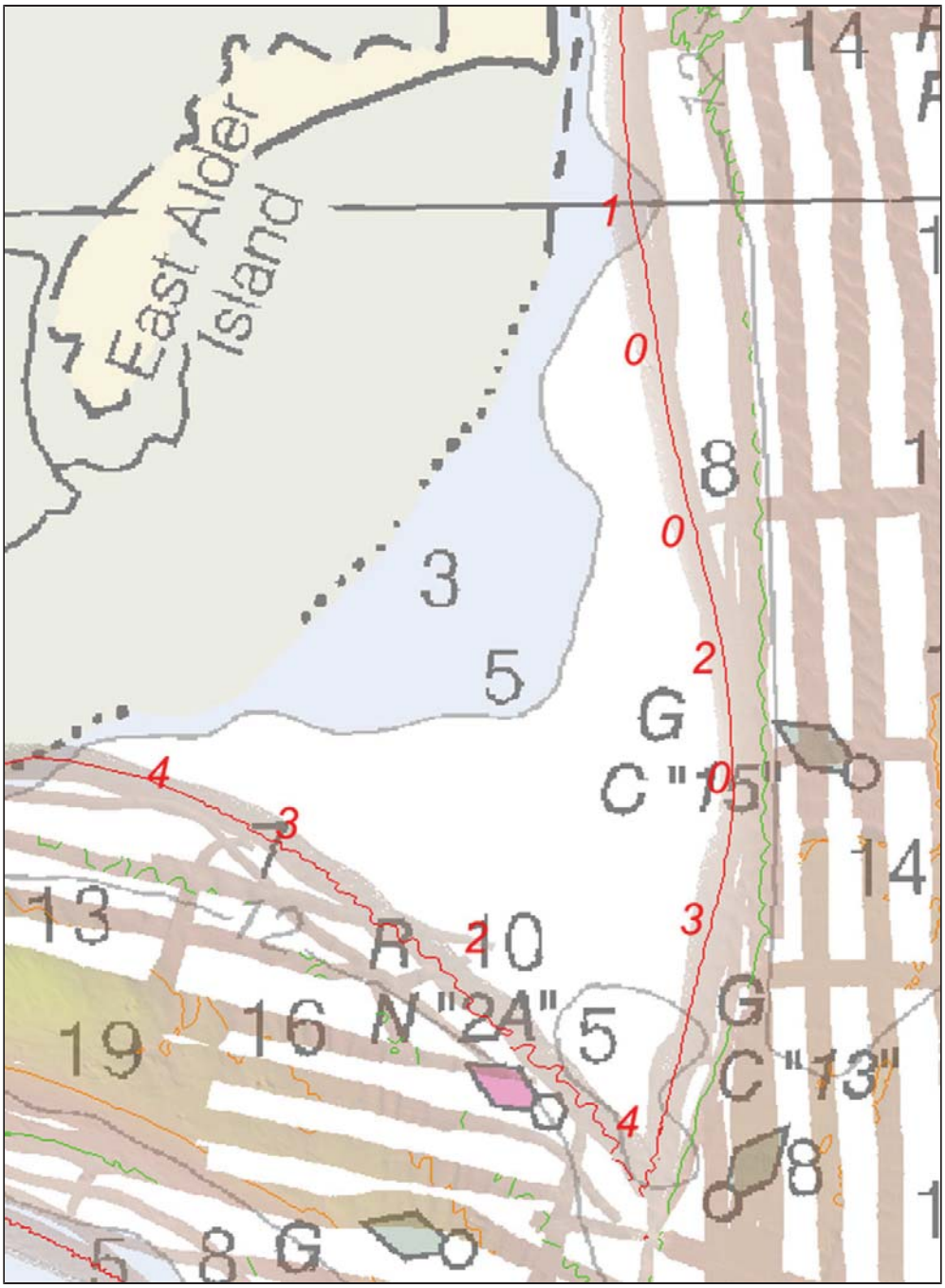

Figure 25: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Jones Inlet, southeast of Alder Island. Representative soundings of the shoaling trend are highlighted in red with a CUBE surface overlaid on RNC 12352 in the background.*

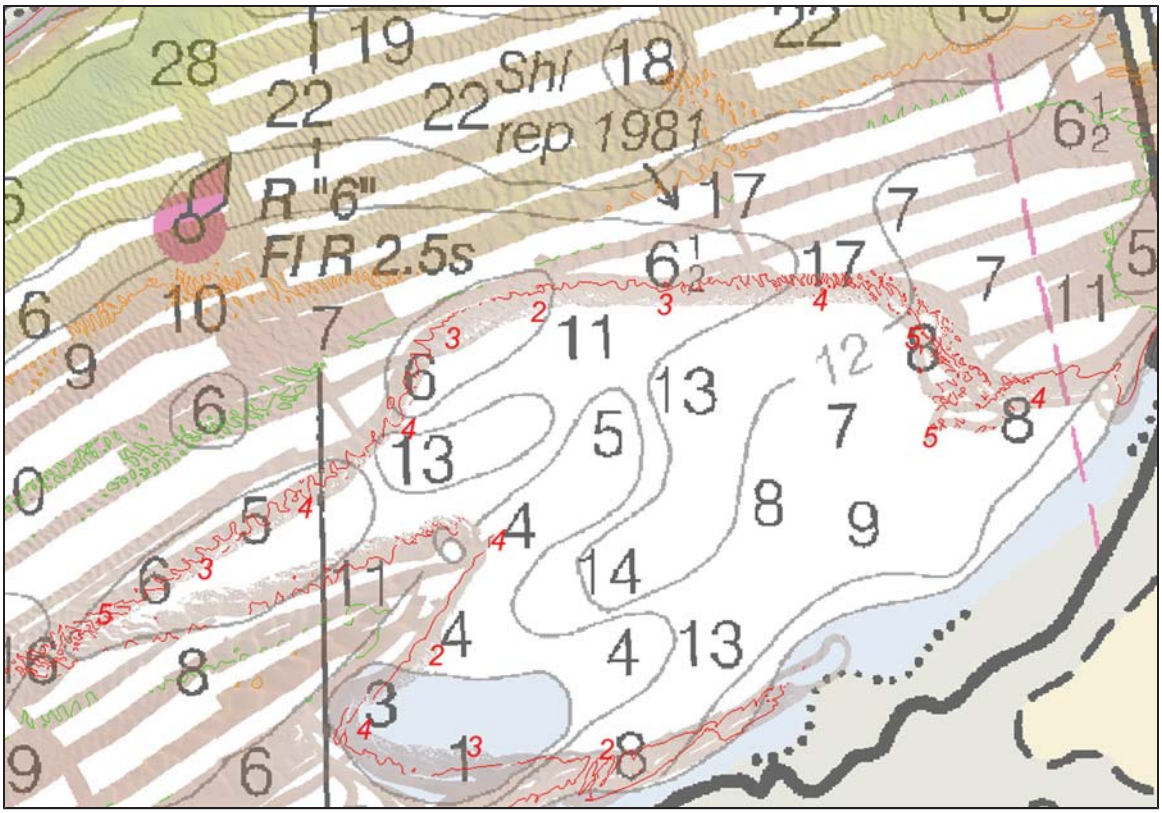

Figure 26: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Sloop Channel. Representative soundings of the shoaling trend are highlighted in red with a CUBE surface overlaid on RNC 12352 in the background.*

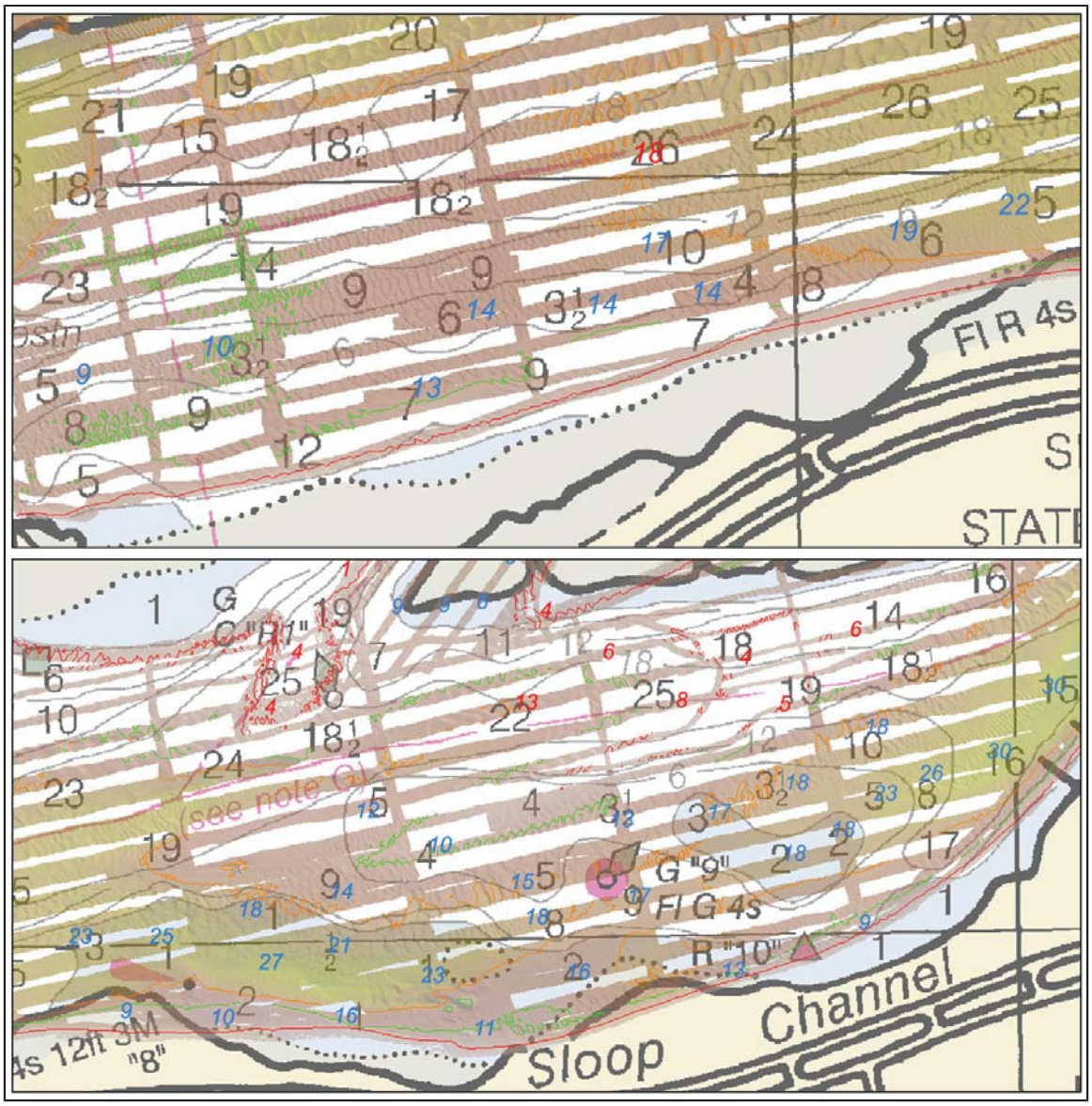

Figure 27: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Sloop Channel. In the top image, soundings south of Jones Island are displayed, and in the bottom image soundings south of Deep Creek Meadow are displayed. Representative soundings of the shoaling and deepening trends are highlighted in red and blue with a CUBE surface overlaid on RNC 12352 in the background.*

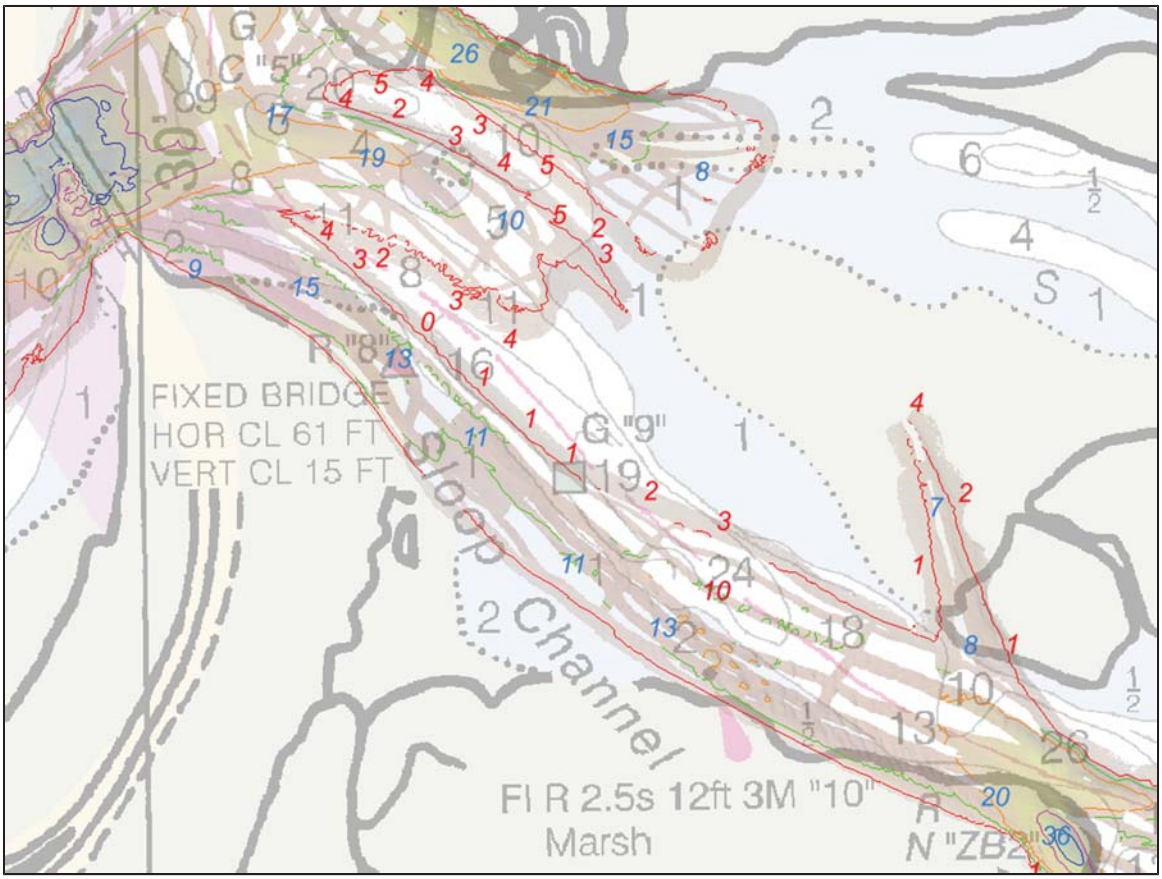

Figure 28: *Contours generated from the H12607 MBES data (6' in red, 12' in green, 18' in orange, 30' in pink, 36' in blue) are shown in reference to Sloop Channel. Representative soundings of the deepening and shoaling trends are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

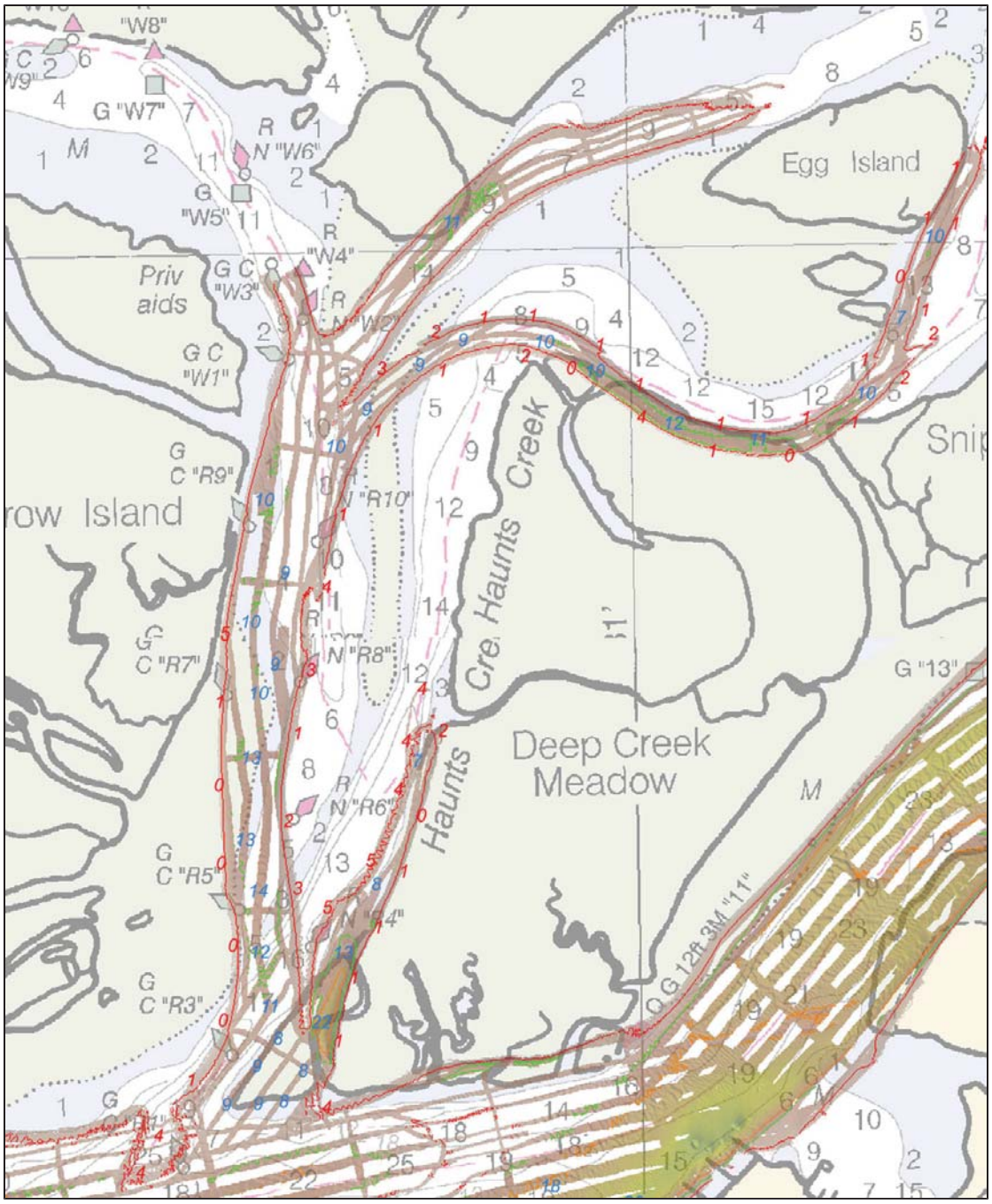

Figure 29: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Haunts Creek. Representative soundings of the deepening and shoaling trends are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

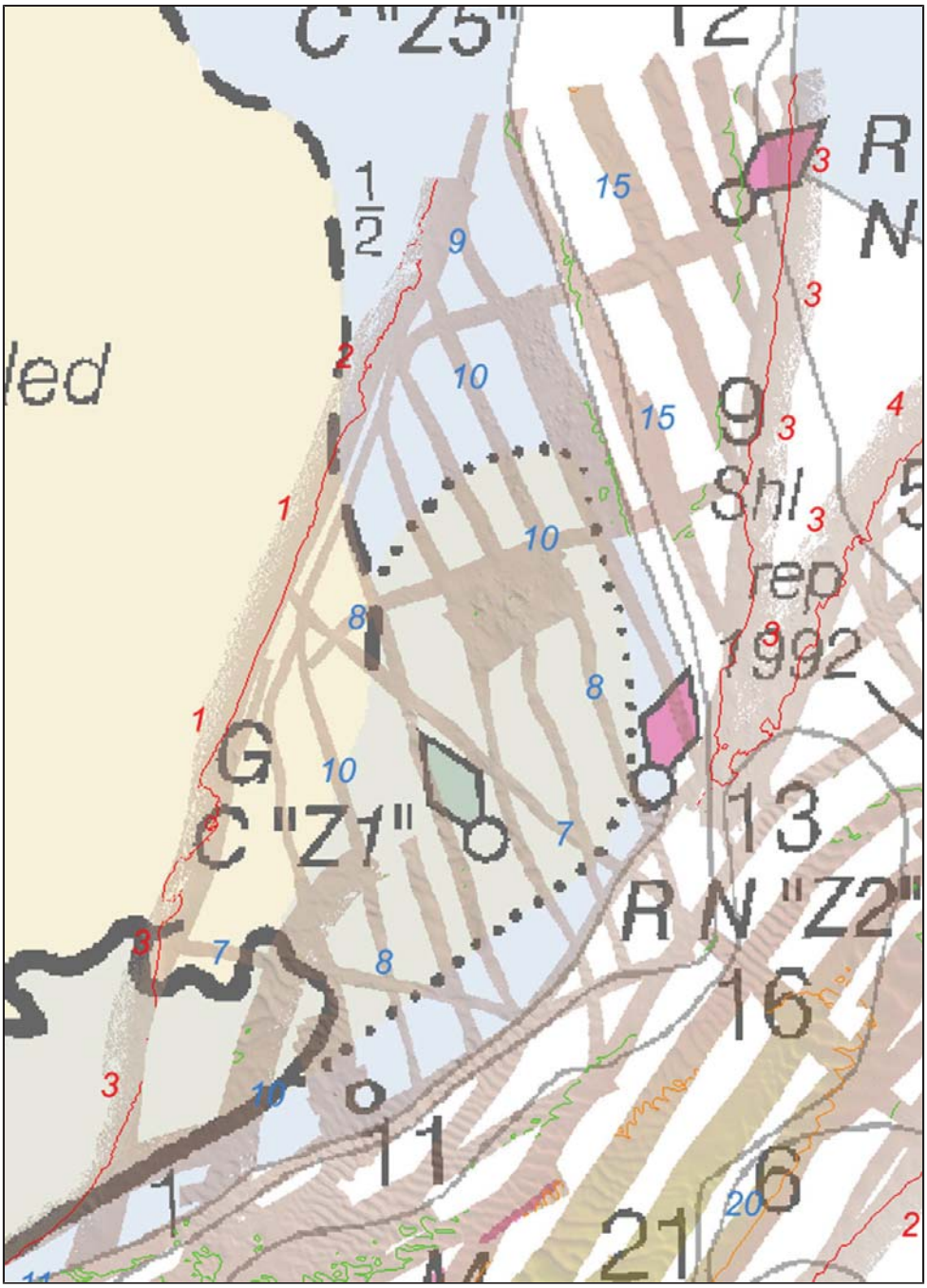

Figure 30: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to the Entrance to Great Island Channel. Representative soundings of the deepening and shoaling trends are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

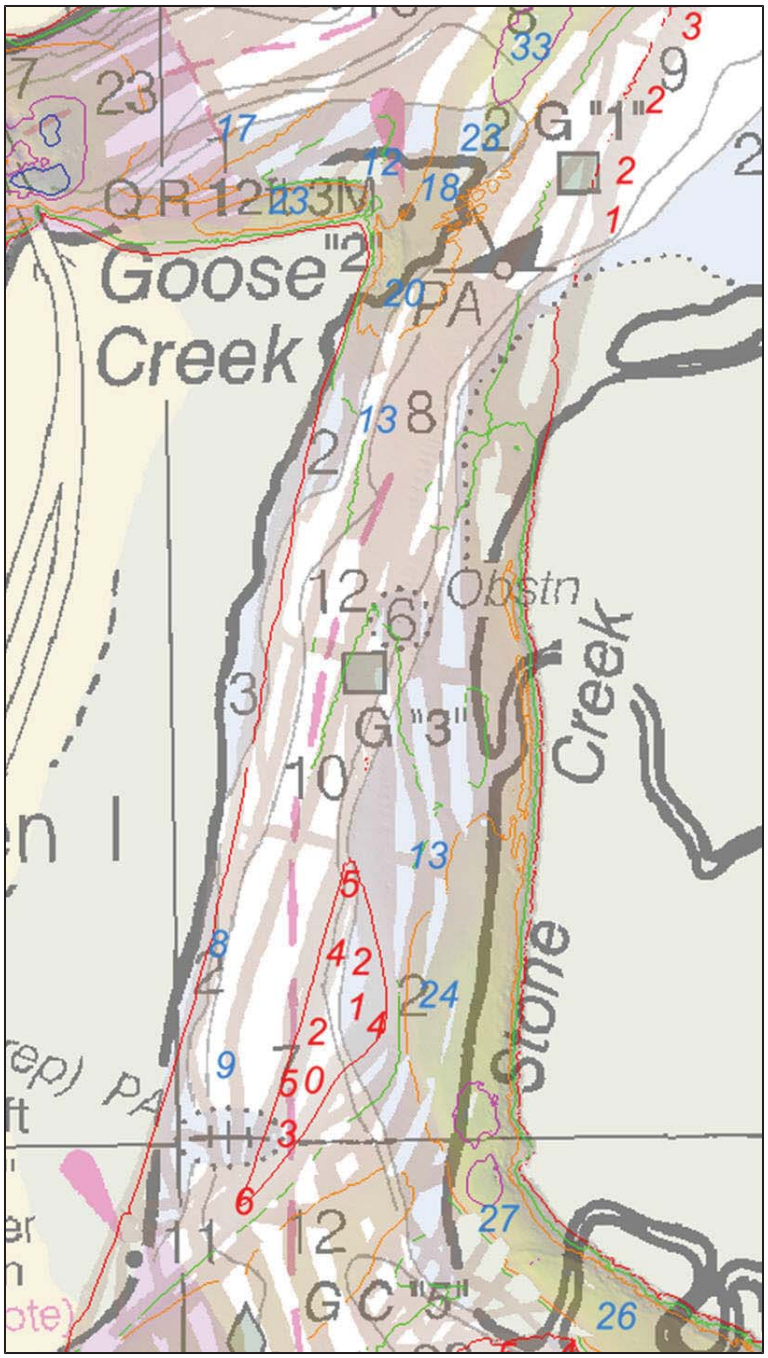

Figure 31: *Contours generated from the H12607 MBES data (6' in red, 12' in green, 18' in orange, 30' in pink, and 36' in blue) are shown in reference to Stone Creek and Goose Creek. Representative soundings of the deepening and shoaling trends are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

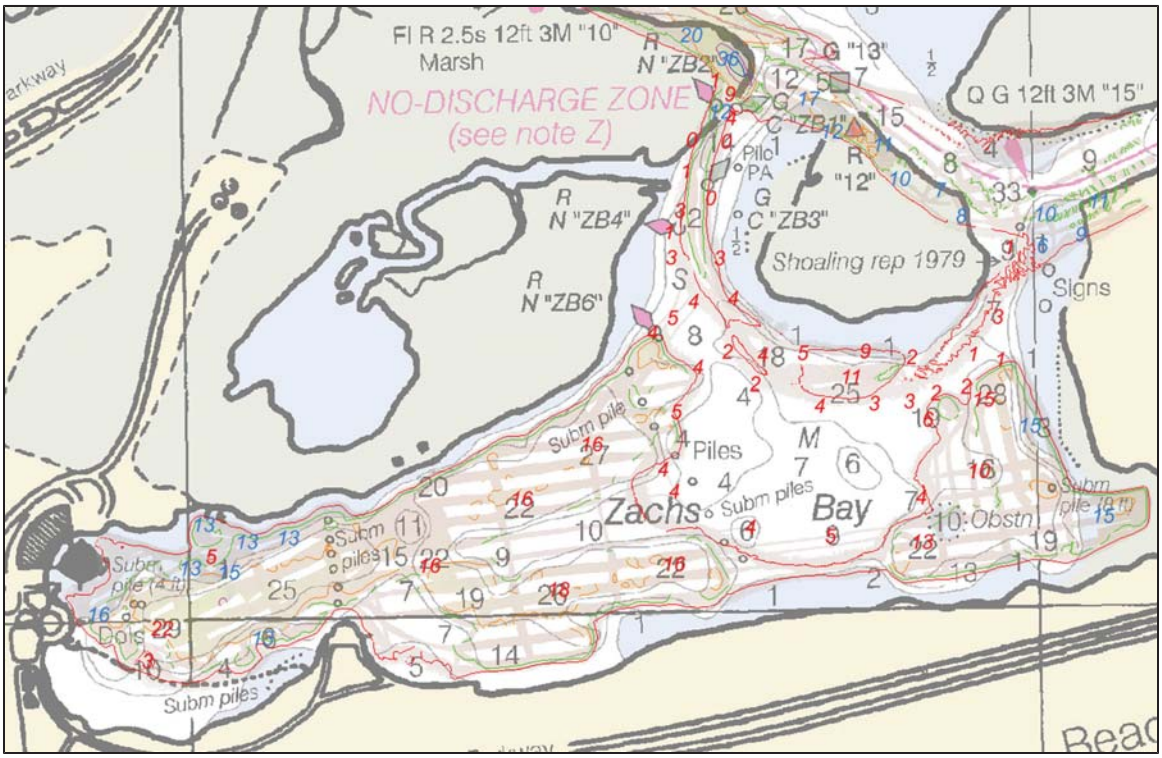

Figure 32: *Contours generated from the H12607 MBES data (6' in red, 12' in green, 18' in orange, 30' in pink, and 36' in blue) are shown in reference to Zachs Bay. Representative soundings of the deepening and shoaling trends are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

D.1.2 Electronic Navigational Charts

The following table summarizes pertinent epoch details about the ENCs assigned for the survey area.

ENC	Scale	Edition	Update Date	Issue Date	Preliminary?
US5NY50M	1:20000	11	05/19/2014	05/29/2014	NO
US5NY53M	1:20000	11	05/19/2014	05/29/2014	NO

Table 17: Largest Scale Electronic Charts

US5NY50M

The results from the chart comparison between Survey H12607 and ENC US5NY50M were nearly identical to the comparison with RNC 12352 as the majority of charted soundings, contours and features on the ENC

and RNC matched. Therefore, the chart comparison for RNC 12352 within East Rockaway Inlet is applicable to ENC US5NY50M as well.

During chart comparisons and the generation of the FFF, a horizontal shift in position was noted between charted coastline and shoreline features on the ENC and the positions on the RNC. This position disparity was first identified in the CSF which was generated from the ENC. For the entirety of the area where data from Survey H12607 intersects ENC US5NY50M, the coastline and shoreline features were shifted over 5 meters west from the RNC position (Figure 33). Survey data, both MBES and SSS, confirm the RNC's coastline and shoreline feature positioning.

There was also a discrepancy between the RNC and ENC near the Entrance to Bannister Creek where the charts were updated with selected soundings from OSI H12607_DtoN_#3. The charted 6-foot contour on RNC 12352 was extended to include Bannister Creek Entrance Buoy BC2, while the ENC 6-foot contour remained charted over 50 meters inshore of the updated RNC contour (Figure 34).

Lastly, in Reynolds Channel, where ENC US5NY50M meets ENC US5NY53M there is a mismatch between the depth areas and contours at the approximate location of 40-35-36.9 N, 73-43-57.8 W. The depth area on ENC US5NY50M is improperly classified as 12 feet to 18 feet when it should be classified as 3 feet to 6 feet. Also, a 6-foot contour and a 12-foot contour on ENC US5NY50M adjoined a 3-foot contour and a 6-foot contour on ENC US5NY53M. The contours and depth areas on ENC US5NY50M should be updated to match those on ENC US5NY53M. Figure 35 lays out the mismatch between the two ENCs. The contour and depth area on the RNC is charted correctly.

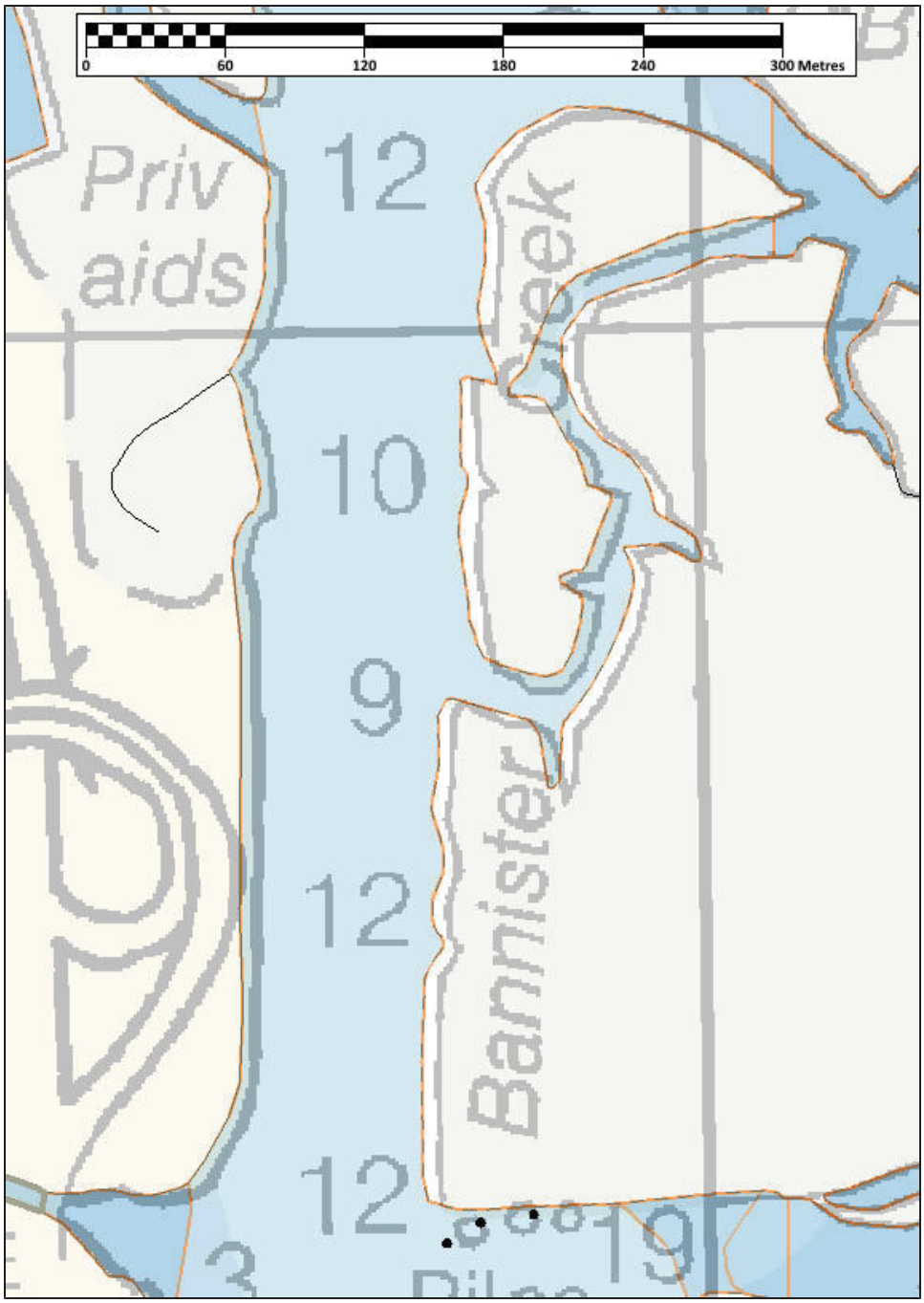

Figure 33: *An example of the horizontal shift between RNC 12352 coastline and the ENC US5NY50M coastline within Bannister Creek. A transparent RNC 12352 was overlaid on the depth areas (blue) and depth contours (brown) from ENC US5NY50M. The ENC was consistently shifted west of the RNC.*

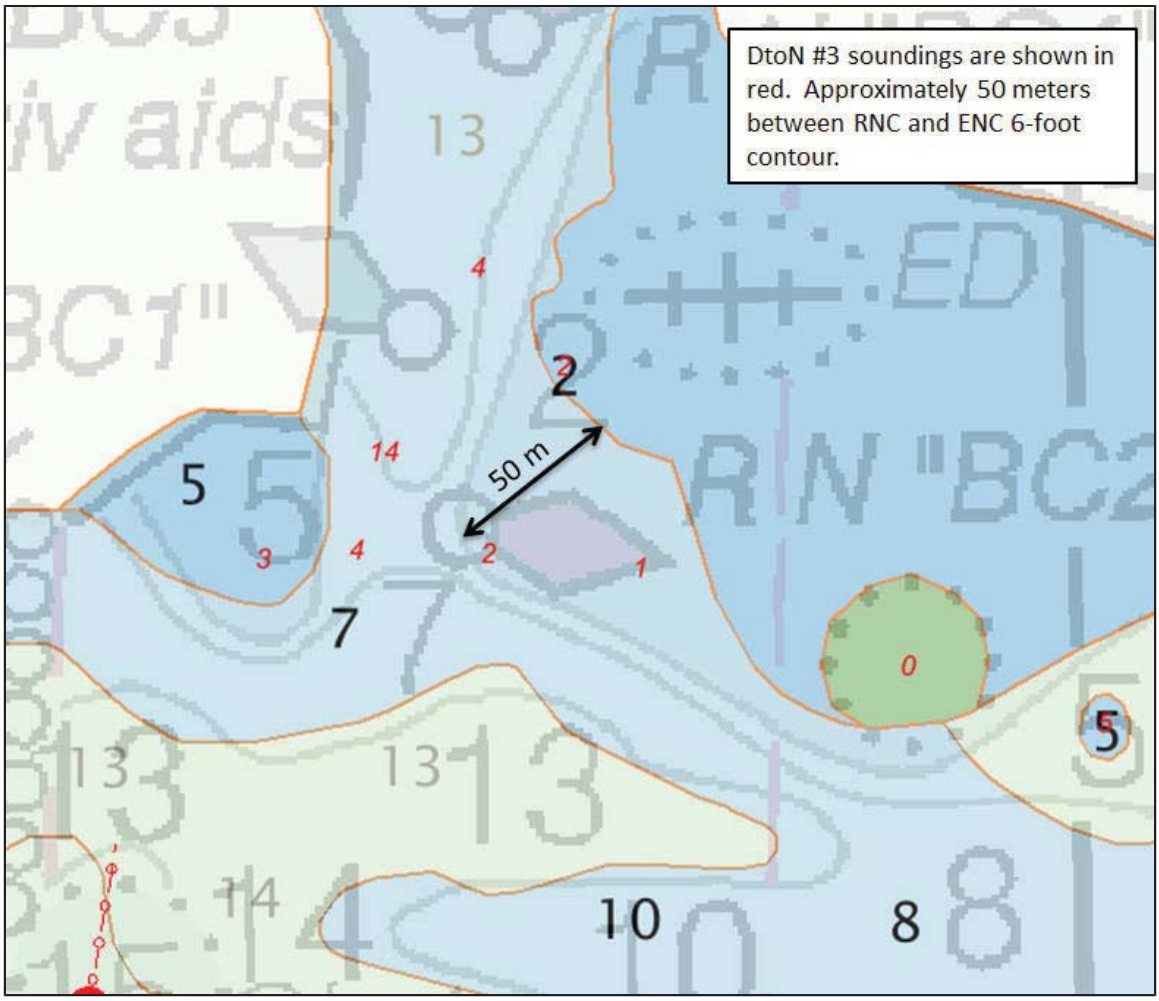

Figure 34: *A transparent RNC 12352 was overlaid on the depth areas (blue), depth contours (brown), and soundings from ENC US5NY50M. There was a discrepancy in the charting of the 6-foot contour between the RNC and ENC following submission of DtoN #3. The selected soundings from DtoN #3 are highlighted in red. All soundings are in feet.*

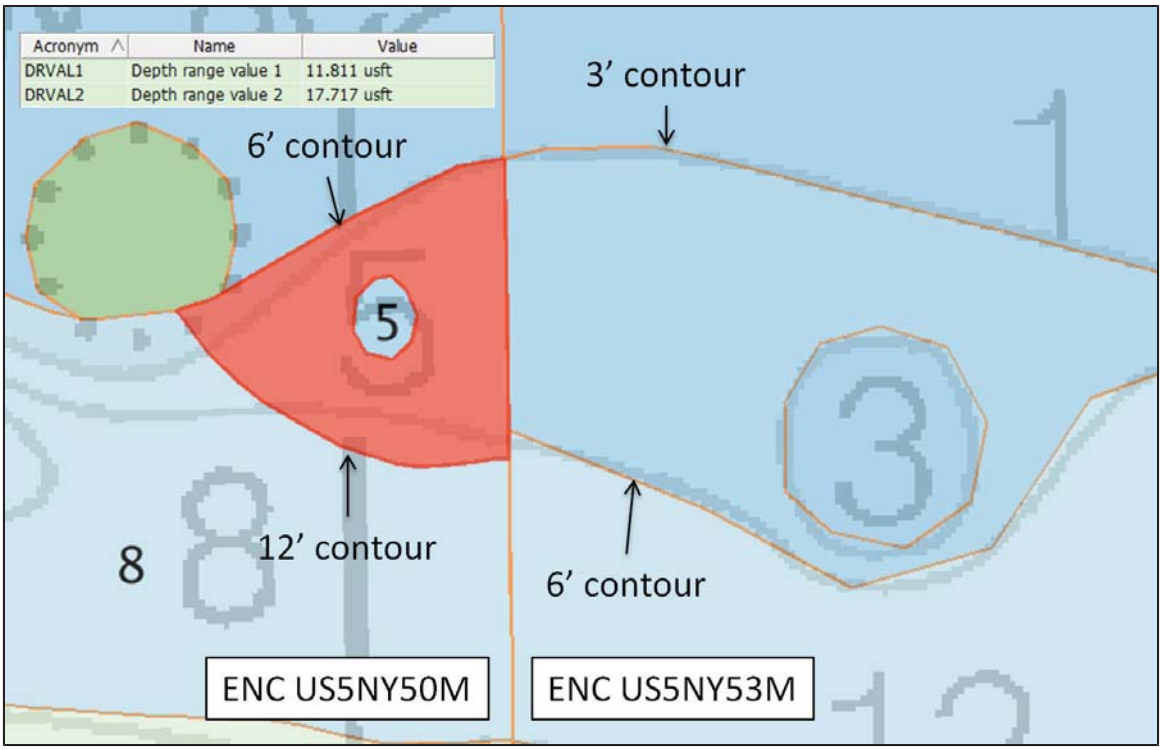

Figure 35: *A transparent RNC 12352 was overlaid on the depth areas (blue), depth contours (brown), and soundings from ENCs US5NY50M and US5NY53M. There was a mismatch within Reynolds Channel between the adjoining depth areas and contours charted on the ENCs.*

US5NY53M

The results from the chart comparison between Survey H12607 and ENC US5NY53M were identical to the comparison with RNC 12352 as the charted soundings, contours and features on the ENC and RNC matched. Therefore, see the chart comparison for RNC 12352 for information regarding discrepancies between charted and surveyed data.

D.1.3 AWOIS Items

There were 10 AWOIS item investigations assigned for Survey H12607. Wherever practical AWOIS item search areas were investigated employing 200% SSS coverage along with coincidental MBES coverage. This approach was discussed and approved in an e-mail from the COR on November 27, 2013. In some cases, AWOIS items existed in shallow water adjacent to the shoreline, such that a portion of the search area was on land. In these instances, SSS and/or MBES coverage was obtained as far inshore as possible given the water depth. At times the outer range of the SSS was utilized along with operation of the MBES system in the side-looking configuration to ensonify as much of the search area as possible. Individual AWOIS item investigation results are discussed in the FFF, with investigation techniques documented in the Remarks field and supporting images appended when applicable.

D.1.4 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.5 Charted Features

All charted features not specifically assigned as AWOIS items but assigned within the CSF were addressed in the S-57 Final Feature File.

D.1.6 Uncharted Features

No uncharted features from miscellaneous sources were provided for investigation for Survey H12607. However, a substantial number of new, uncharted wrecks and obstructions were identified and are included in the S-57 Final Feature File.

D.1.7 Dangers to Navigation

The following DTON reports were submitted to the processing branch:

DTON Report Name	Date Submitted
H12607_DTON_1.000	2014-03-12
H12607_DTON_02.000	2014-04-22
H12607_DTON_03.000	2014-04-22
H12607_DTON-04.000	2014-04-23
H12607_DTON-05.000	2014-04-23
H12607_DTON-06.000	2014-04-23
H12607_DTON-07.000	2014-04-23
H12607_DTON-08.000	2014-04-28
H12607_DTON-09.000	2014-05-01
H12607_DtoN_#10.000	2014-06-12
H12607_DtoN_#11.000	2014-06-12
H12607_DtoN_#12.000	2014-06-12
H12607_DtoN_#13.000	2014-06-12
H12607_DtoN_#14.000	2014-06-12

Table 18: DTON Reports

Danger to Navigation reports were delivered via e-mail to AHB from the home office as intensive processing of Survey H12607 progressed. OSI DtoNs were submitted based on guidance in Section 8.1.3 of the HSSD. Many of the OSI DtoN reports contain numerous features and/or soundings that were grouped into single DtoN deliveries, for example OSI DtoN #3 was comprised of 1 pipeline feature, 28 shoal soundings, and 10 individual obstructions and wrecks. The features OSI selected as DtoNs, as submitted to the COR and the AHB DtoN e-mail account, are included in the H12607 FFF; shoal soundings were not included.

AHB considered groups of OSI DtoN submittals and repackaged those that they considered worthy of forwarding to the Nautical Data Branch (NDB). For this reason DtoN number designations found in the FFF for this survey are not in sync with DtoN number designations submitted to NDB by AHB. The .PDF version of AHB DtoN recommendations submitted to NDB along with transmittal e-mails and NDB response are included in DR Appendix II. AHB does not appear to have submitted a DtoN recommendation having the number designation of #3 or #5, and it appears that AHB DtoN Recommendation #8 contains select shoal soundings and obstructions from OSI-submitted DtoNs #3, #4, #5, #6, and #7. In summary, DtoN recommendations by AHB to NDB include #1, #2, #4, #6, #7, #8, #9, and #10-#14.

D.1.8 Shoal and Hazardous Features

Multiple charted shoals were investigated within the extents of Survey H12607. On the RNCs, shoals were identified with annotations such as "Shoaling"or "Rep Shoal 1984" or as caution areas. For the ENCs, shoals were classified with the S-57 object class CTNARE (Caution Area) as point or area features with the INFORM (Information) field updated to identify the hazard. The results from the investigation of charted shoals and caution areas within Survey H12607 are as follows:

Caution areas were charted beneath the two Wantagh Parkway bridges spanning Sloop Channel and Goose Creek. The caution areas bound the north and south sides of Green Island and are represented on RNC 12352 and ENC US5NY53M. Notes on the RNC indicate the bridges are under construction and the CTNARE Inform field stated the following: "Fixed and floating obstructions, some submerged, may exist within this area. Mariners are advised to proceed with caution." The majority of the caution areas were developed with 200% SSS and concurrent MBES coverage. Survey data confirmed the caution area statement of the existence of submerged obstructions within the area. As discussed in the additional results section below, bridge construction has been completed on the Wantagh Parkway bridges; however, the debris and obstructions in the caution area appear to be remnants from the old bridge. All significant obstructions were developed with object detection MBES coverage and were included in the FFF. Several of the obstructions were submitted with OSI H12607_DtoN_#8.

A caution area was charted on ENC US5NY53M within Swift Creek with a note in the Inform field that states: "Swift Creek Buoys 1-6, 8 & 10 are not charted due to frequently changing local conditions." This note was also included on RNC 12352. At the time of survey, there was overall good agreement between surveyed and charted depths with the exception of a confirmed shoal in the southeast corner of Swift Creek. The note "Shl rep 1980" points to position 40-36-02.80 N, 73-32-52.46. Shoaling was confirmed by H12607 MBES data at this location that extended approximately 300 meters northwest of the reported shoal, along the eastern side of the creek. Shoal soundings of 2 to 4 feet charted at the southern entrance to the creek are no longer valid. According to H12607 MBES data the reported shoal has migrated out of the center of the creek entrance to the northeast, following along the eastern border of the creek (Figure 36). It is recommended that the H12607

survey depths be used to update the charted soundings and contours within Swift Creek and the "Shl rep 1980" caution area and annotation be removed from the ENC and RNC.

A caution area was charted on ENC US5NY53M within Jones Inlet with a note in the Inform field that states: "Jones Inlet - The buoys and soundings in this inlet are not charted because of continual change." This note was also included on RNC 12352. At the time of survey, depths within the Jones Inlet caution area ranged between 1 and 38 feet, with depths near the center of the inlet averaging 20 feet. It is recommended that this caution notation be retained.

A shoal within Reynolds Channel with the note "Shl Rep 1979" was positioned at 40-35-27.55 N, 73-43-26.50 W on ENC US5NY53M and on RNC 12352. Partial MBES coverage (set line spacing) was obtained over the shoal along with 200% SSS coverage. There was some shoaling in the vicinity of the reported shoal, such that surveyed depths of 11 to 17 feet were developed over a charted 19-foot depth. It is recommended that the charted 18-foot contour be updated using surveyed soundings to remedy the depth discrepancy and the shoal annotation be removed from the chart.

Within Broad Channel, three caution area point features were charted on ENC US5NY53M with a note in the Inform field that states: "No recent hydrography. Private aids mark best water." This note was also included on RNC 12352. Given that Survey H12607 now provides recent hydrography, it is recommended that the caution area points be removed from the ENC. A fourth caution area within Broad Channel was charted on the ENC at 40-35-55.88 N, 73-41-08.81 W and a shoal annotation was in the same position on RNC 12352 which stated: "Shl to 5 ft rep 1973." The area surrounding the reported shoal was developed with 200% SSS coverage and concurrent MBES coverage. No shoal was identified in the MBES or SSS data with surveyed depths of 7 to 15 feet developed in the vicinity of the reported 5-foot shoal. It is recommended that the caution area and shoal annotation be removed from the ENC and RNC.

A caution area point feature within Reynolds Channel with the note "Ruins" was charted on ENC US5NY53M and RNC 12352 at 40-35-45.31 N, 73-39-48.41 W. Partial MBES coverage (set line spacing) was obtained over the ruins annotation along with 200% SSS coverage. No ruins were observed in the vicinity of the caution area point; however, there was some shoaling noted south of the Hog Island Channel Lighted Buoy C2, with surveyed depths of 13 to 17 feet positioned offshore of a charted 18-foot contour. It is recommended that the Ruins/Caution Area be removed from the chart and the 18-foot contour updated with the surveyed depths.

A shoal within Reynolds Channel south of Ingraham Hassock with the note "Shl Rep 1975" was positioned at 40-35-51.89 N, 73-37-08.65 W on ENC US5NY53M and on RNC 12352. Partial MBES coverage (set line spacing) was obtained over the shoal along with 200% SSS coverage. The shoal was disproved as surveyed depths ranging between 8 to 23 feet were developed over the reported shoal which was charted in a 0- to 3-foot depth area. Figure 14 from the RNC 12352 chart comparison section addresses the deepening trend in this area. It is recommended that the charted contours south of Ingraham Hassock be updated using surveyed soundings and the shoal annotation be removed from the chart.

A shoal reported ("Shl Rep") charted on ENC US5NY53M and RNC 12352 at the entrance to Sea Dog Creek was verified. The charted caution area point was charted at 40-35-47.24 N, 73-35-28.13 W. Partial MBES coverage (set line spacing) was obtained over the shoal along with 200% SSS coverage. Surveyed depths of 4 to 6 feet were developed over a charted 11 foot depth and a new 2-foot shoal was identified north of the Sea Dog Creek Buoy SD5 (Figure 37). The "best water" for the channel has migrated east of its charted position,

and the channel buoys are properly positioned. It is recommended that the charted depths and contours be updated with the surveyed soundings and the shoal annotation and caution area be removed from the chart.

A charted shoal/caution area ("Shl Rep 1981") on ENC US5NY53M and RNC 12352 was positioned at 40-35-41.55 N, 73-33-50.70 W at the confluence of Jones Inlet, Reynolds Channel, and Sloop Channel. The shoal was disproved with partial MBES coverage (set line spacing) and 200% SSS coverage. Surveyed depths over the charted 1-foot shoal ranged between 9 to 17 feet, with a deepening trend extending to the northeast over the charted marsh land (Figure 38). It is recommended that the surveyed depths be used to update charted depths, contours, and coastline and the shoal annotation and caution area be removed from the chart.

Two charted shoals/caution areas in the vicinity of Short Beach Island reported in 2005 ("Shl to bare rep 2005") were verified visually and with MBES coverage. Short Beach Island is on the south side of Sloop Channel and the charted caution areas are located at 40-35-26.26 N, 73-33-10.64 W and 40-35-35.59 N, 73-32-58.36 W. In the National Geodetic Survey (NGS) post-Sandy imagery, the baring shoals are confirmed given that sand bars are visible in the photography extending to the east and south of the island. Also, the size and position of the charted coastline surrounding Short Beach Island is significantly different than the island extents visible in the aerial photography (Figure 39). The island size in the aerial photography is smaller than its charted size and located further to the east. It is recommended that the coastline delineating Short Beach Island be updated with aerial imagery and the verified shoals be charted as appropriate to identify the baring sand bars.

Within Sloop Channel, a shoal/caution area was charted on ENC US5NY53M and RNC 12352 at 40-35-51.95 N, 73-32-49.14 W with the note: "Shl rep 1981." While shoaling was not surveyed directly over the reported shoal's position, a massive shoal was identified to the south. This shoal was discussed in the RNC 12352 Chart Comparison section. It is recommended that the new shoal be represented on the chart by updating the charted 3-foot and 6-foot contours and depths with the surveyed soundings and that the shoal annotation be removed from the chart.

A charted shoal/caution area was located east of Snipe Island positioned on the ENC at 40-36-43.79 N, 73-30-14.93 W and labeled on the RNC with the note "Shl rep 1982." Partial MBES coverage (set line spacing) was obtained over the reported shoal along with 200% SSS coverage. No evidence of an uncharted shoal was found with surveyed depths of 20 to 30 feet being developed in the vicinity of the note. It is recommended that the caution area and shoal annotation be removed from the ENC and RNC respectively.

Three caution area point features within ENC US5NY53M report a shoal within Goose Creek south of North Line Island. The shoals are annotated on RNC 12352 as "Shl rep 1992," "Shl to 1 ft rep 2006," and "Shl rep 1979." The shoal was confirmed with H12607 MBES data. The 1-foot shoal reported in 2006 positioned at 40-37-41.25 N, 73-29-25.74 W best represents the surveyed location of the shoal (Figure 40). Surveyed depths of 1 to 8 feet were developed over charted 7 to 16 foot depths. It is recommended that the surveyed soundings are used to update charted contours and soundings in the area and the caution areas and reported shoal annotations be removed from the ENC and RNC respectively.

A charted shoal/caution area located at the southern entrance to Racehorse Channel at 40-37-18.42 N, 73-30-22.17 W was verified with partial MBES coverage (set line spacing). Surveyed depths of 3 to 4 feet were developed in the vicinity of the reported shoal. It is recommended that the charted depths and contours at the entrance to Racehorse Channel be updated with surveyed soundings and the caution area point feature and reported shoal annotation be removed from the ENC and RNC.

Within the eastern channel entering Zachs Bay, a caution area point feature with the note "Shoaling rep 1979" was positioned on ENC US5NY53M and RNC 12352 at 70-36-18.58 N, 73-29-02.44 W. The shoal was verified with partial MBES coverage (set line spacing). Surveyed depths of 1 to 3 feet were developed in the channel located east of the marsh land charted at the entrance to Zachs Bay. Selected soundings representative of this shoal were submitted by OSI to AHB with H12607_DtoN_#14. It is recommended that the charted contours and depths be updated with surveyed soundings and the caution area point feature and shoaling annotation be removed from the ENC and RNC.

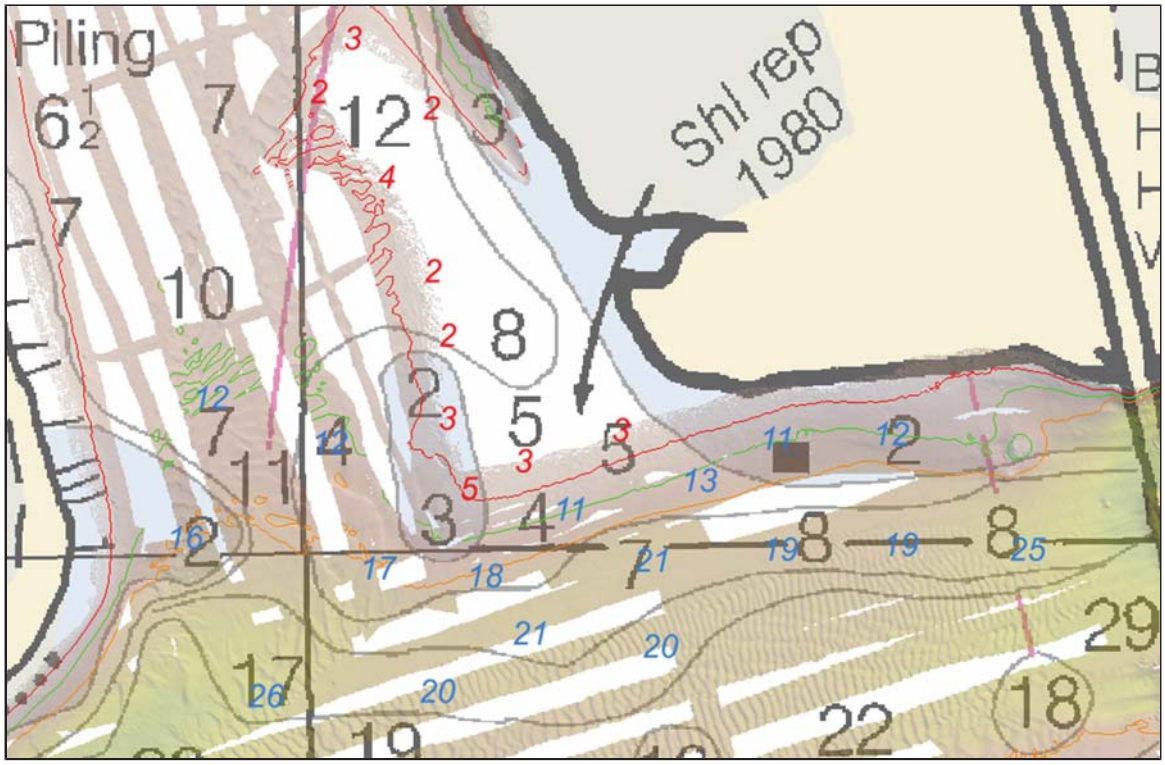

Figure 36: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to southern Swift Creek. Representative soundings of the deepening and shoaling trends surrounding the reported shoal are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

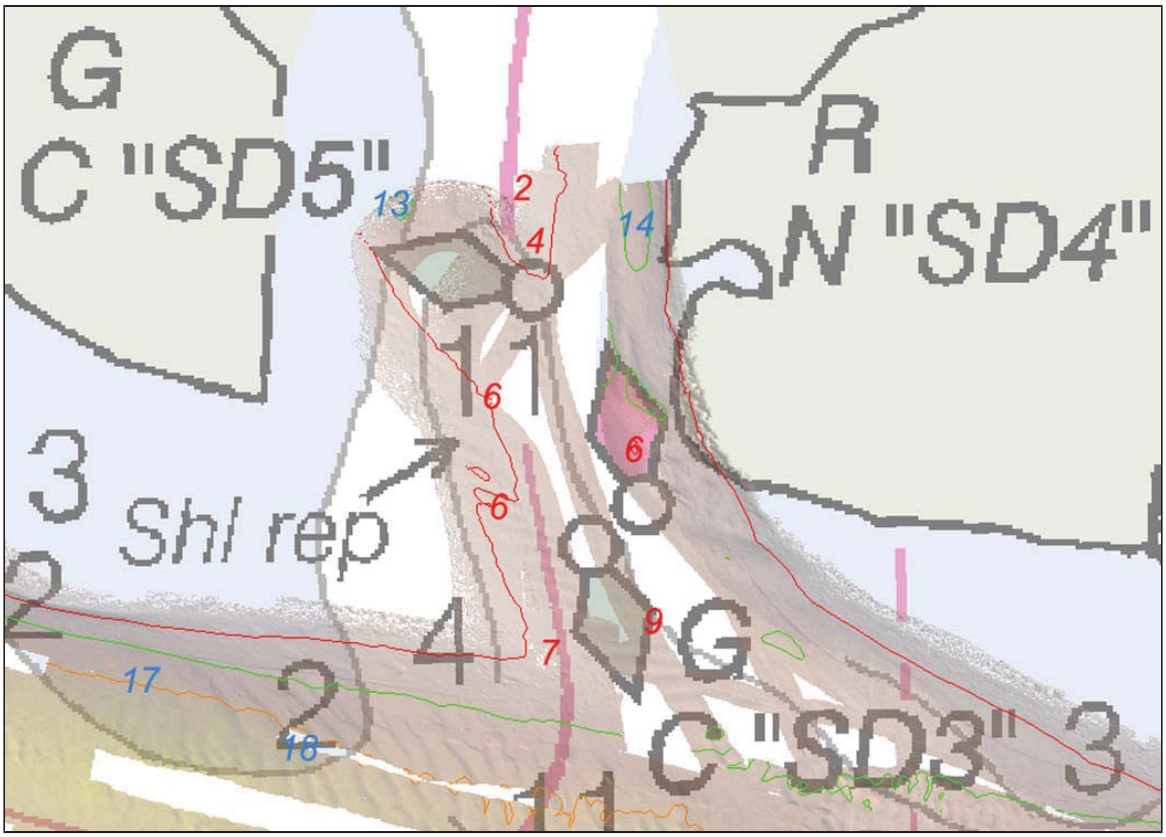

Figure 37: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to southern Sea Dog Creek. Representative soundings of the deepening and shoaling trends surrounding the reported shoal are highlighted in blue and red with a CUBE surface overlaid on RNC 12352 in the background.*

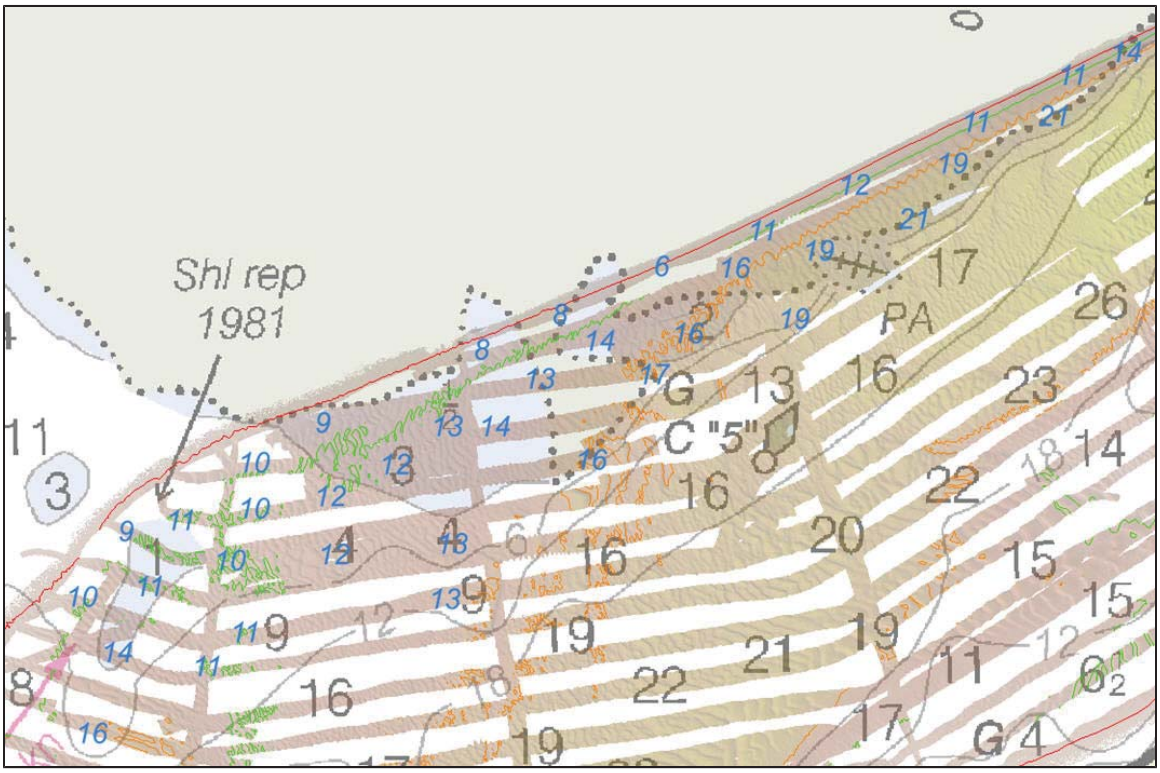

Figure 38: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to the shoal at the confluence of Jones Inlet and Sloop Channel. Representative soundings of the deepening trend surrounding the reported shoal are highlighted in blue with a CUBE surface overlaid on RNC 12352 in the background.*

Figure 39: *In the top image, contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to Short Beach Island. Representative soundings of the shoaling surrounding the island are highlighted in red with a CUBE surface overlaid on RNC 12352 in the background. In the image on the bottom, NGS post-Sandy imagery of Short Beach Island is shown with the H12607 survey outline highlighted in red.*

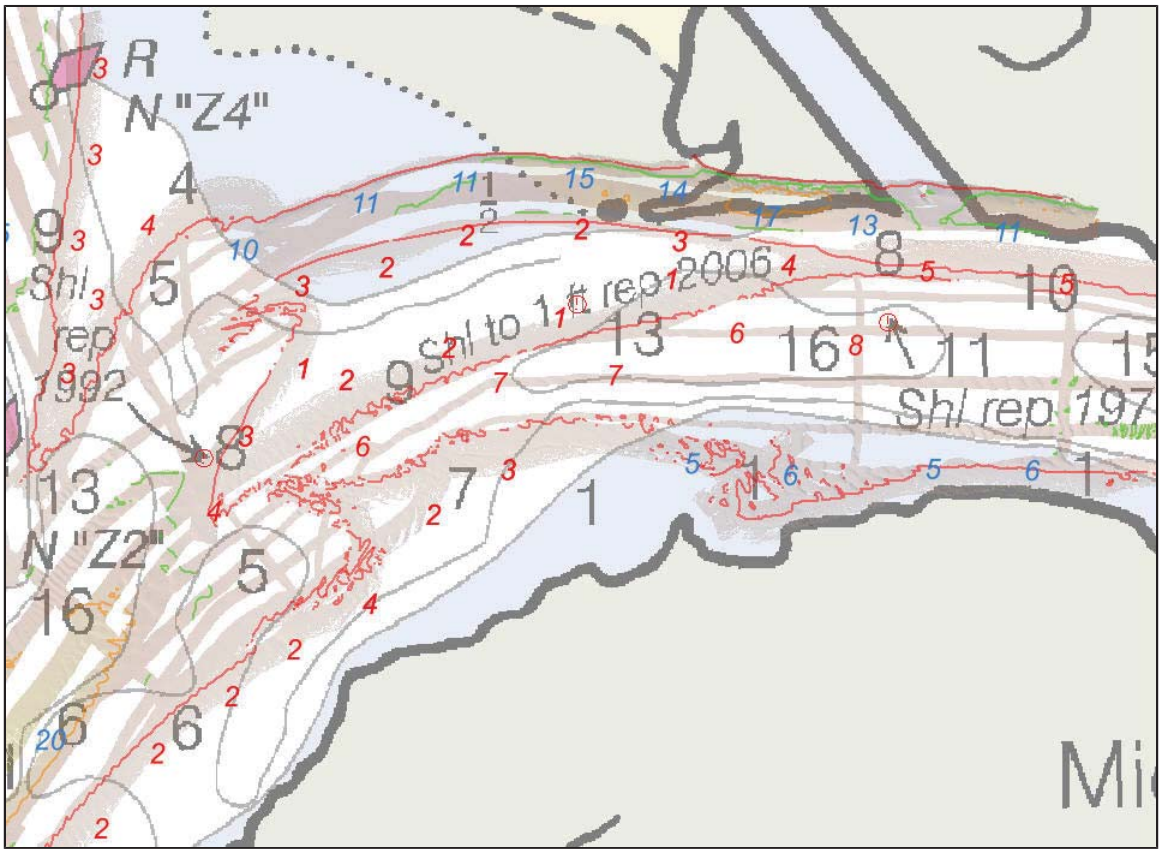

Figure 40: *Contours generated from the H12607 MBES data (6' in red, 12' in green, and 18' in orange) are shown in reference to the shoal at the confluence of Goose Creek and Great Island Channel. Representative soundings of the shoal are highlighted in red with a CUBE surface overlaid on RNC 12352 in the background.*

D.1.9 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.1.10 Bottom Samples

Bottom samples were not specifically assigned for Project OPR-C301-KR-13. As such, OSI acquired 12 bottom samples in areas deemed appropriate based on the following general criteria. Many of the sediment samples were acquired nearby existing charted bottom type symbols while a few samples were acquired at areas having seen substantial depth change when comparing charted versus as-surveyed depths. In practice a sediment sampler was manually deployed over the gunwale to acquire seafloor sediment samples. Bottom sample locations were logged in a target file in HYPACK SURVEY. Once the sample was on deck it was photographed and classified based on the criteria outlined in Appendix 10 Bottom Classification in the HSSD.

A position and description of each sample are provided as attributed SBDARE objects in the FFF. Digital images with identification reference numbers are submitted with the survey data and referenced in the NOAA extended attributes ‘images’ field.

D.2 Additional Results

D.2.1 Shoreline

Per the Project Instructions, a limited shoreline verification was accomplished by verifying, disproving, or updating all "Assigned" features from the CSF. Charted shoreline features that were not assigned but were within the survey area and were found to be disproved or significantly changed were also addressed (e.g. ruined piers, disproved pilings, charted pipelines). The assigned charted shoreline features and all new features found by Survey H12607 were included in the S-57 attributed Final Feature File: H12607.FFF.000. Feature attribution was completed per Section 8.2 S-57 Format Features Deliverables of the HSSD. Images accompanying the FFF were included within the Multimedia folder.

D.2.2 Prior Surveys

Prior survey data exists for this survey area. However, with the exception of the assigned junction survey, prior data were not investigated.

D.2.3 Aids to Navigation

Aids to Navigation (ATONs) listed in the Project CSF were investigated during Survey H12607. The Light List was used to confirm ATON light and sound characteristics depicted on the assigned RNC/ENC charts and listed in the Project CSF. Investigation techniques included:

- Visual Observation of ATON during daylight hours.
- Positioning of buoy clump weight if visible in MBES and/or SSS data.
- Review of current 2014 USCG Light List V1.
- Review of appropriate LNM and NM.

The majority of ATONs included in the Project CSF were found at their charted position and appear to serve their intended purpose. A few uncharted buoys were observed throughout the survey area. These same buoys were later noted as missing by the field team. The buoys appear to have been temporarily placed by the USCG or another entity and removed relatively soon after.

In other cases charted buoys were found off station, perhaps moved intentionally or by ice floes. Buoys in both categories described herein were tracked in the field and via review of pertinent LNMs and NMs during this chart comparison. It was found that some ATONs that were identified in the field or in the LNM/NM as "off station," "missing," or "removed due to ice" during data acquisition and data processing had those issues resolved in an LNM subsequent to the survey. The resolved ATONs are not discussed in the chart comparison; however, if an issue with a navigational aid (NavAid) persisted beyond the last LNMs/NMs reviewed for the

chart comparison, that ATON is included in this discussion. All discrepancies and observations regarding NavAids are discussed below.

Red Lighted Buoy #6 (LL#31535) in East Rockaway Inlet was found very close to the “relocate” position mentioned in LNM 5/14 (4 February 2014) at position 40-35-06.06 N, 73-45-29.40 W. The Light List states that this buoy is “replaced by nun when endangered by ice.” The buoy appears to be properly charted. It is recommended that this buoy's ENC US5NY50M INFORM field is updated with the buoy’s winter status description.

East Rockaway Inlet Breakwater Light (LL#31500) located at 40-34-56.60 N, 73-45-17.20 W is reported as “Discontinued for Dredging” in LNMs 24/13 (12 June 2013) through 24/14 (18 June 2014) which is the range of LNMs reviewed for this survey. During Survey H12607, the light was not seen and it is believed to be missing. However, the light remains charted on the RNC and ENC versions used during this chart comparison. As mentioned above the RNCs and ENCs used in this review were downloaded on June 13, 2014. It is recommended that the contemporary LNMs and NMs and/or the USCG Aids to Navigation Team (ANT) in Moriches, NY are consulted to determine the operational status of the light to determine if charting action is required.

An uncharted white buoy (no USCG Light List designation), believed to be a "TRUB" (temporarily replaced by unlighted buoy) for the East Rockaway Inlet Breakwater Light, was observed visually during Survey H12607 (Figure 41). The buoy clump weight was also imaged with 200% SSS at position 40-34-53.40 N, 73-45-16.86 W. As mentioned in the previous paragraph the East Rockaway Inlet Breakwater Light was reported as "Discontinued for Dredging" for all LNMs reviewed for this chart comparison. At no time was the Breakwater Light reported as "TRUB" in any of these LNMs. However, this buoy appears to be exactly that, a "TRUB" for the missing breakwater light. It is recommended that contemporary LNMs as well as other sources are consulted to determine the USCG's long term plan for the buoy. It is likely that the East Rockaway Inlet Breakwater Light has been reinstalled and that the temporary buoy is no longer required. However, if it is determined that the temporary buoy is intended to be deployed for a long period it is recommended that this buoy is charted.

Green Lighted Buoy #3 (LL#31575) positioned at 40-35-28.98 N, 73-42-47.34 W was identified as missing during data acquisition. Processing of SSS data revealed a feature suggestive of a NavAid buoy clump weight imaged at the buoy's charted location. Soon after the survey vessel was done working in the area of the buoy, LNM 5/14 (4 February 2014) states that the buoy is "Watching Properly." It is recommended that LNMs and NMs issued subsequent to LNM 24/14 (which is the last LNM reviewed for this chart comparison) are consulted to confirm the status of the buoy.

Broad Channel Red Nun #B12 (LL#31770) positioned at 40-36-07.50 N, 73-40-58.50 W was not observed during Survey H12607. This is no cause for concern since it is a seasonal buoy scheduled to be ex situ during the period of the survey. In reviewing the RNC and ENC expression of this buoy it is noted that the charted RNC position and designation match that listed in the USCG Light List. However, the buoy's ENC US5NY53M OBJNAM field lists the buoy as "Broad Channel Buoy B14." It is recommended that buoy name is corrected in the ENC.

An uncharted white buoy with orange diamond and the word "SHOAL" was observed (Figure 42) close to the southern end of Simmons Hassock in close proximity to Hog Island Channel buoy #C1 (LL#31975). The SHOAL buoy's clump weight was not clearly imaged with either the MBES or SSS systems in part due to its

location in water less than 2 meters. However, what is believed to be the buoy's anchor chain was ensonified with both MBES and SSS. The chain appears to leave the bottom at position 40-35-45.3 N, 73-39-55.8 W. This buoy is not found in either the USCG Light List or in the LNMs/NMs reviewed for this chart comparison. The hydrographer has no charting recommendation for this buoy due to the lack of information about its origin, owner, or longevity.

Garrett Lead Daybeacon "H24" (LL#32190) positioned at 40-36-46.44 N, 73-37-25.50 W was found to have a number of "18" not "24" on its triangular day shape. This is unusual as all of the other daybeacons within this channel are numbered in their proper sequence suggesting that the #18 daymark sign is improperly placed. Given that this is a "private aid" there is no recommended charting action unless the owner of the daybeacon could be located to confirm that the substitution of #18 in place of #24 was intentional and meant to remain into the future.

Within Reynolds Channel, in the overlap area between RNC 12352_5 and RNC 12352_6, red nun #14 (LL#32090) and red nun #16 (LL#32305) are charted in different locations on each chart segment (Figure 43). The position of the these buoys as charted on RNC 12352_5 closely matches the position of the buoys as shown on ENC US5NY53M and as defined in the USCG Light List (40-35-49.20 N, 73-37-45.43 W and 40-35-47.00 N, 73-37-22.31 W). It is recommended that the charted position of the buoys is updated on RNC 12352_6.

OSI DtoN # 6 included missing Reynolds Channel Daybeacon #19 (LL#32540) which is charted at 40-35-49.57 N, 73-36-48.75 W. This beacon is noted as "Watching Properly" in LNM 11/14 (19 March 2014). The meaning of the term "Watching Properly," as pertains to a fixed aid, was clarified during a phone conversation between OSI and the USCG Aids to Navigation Team (ANT) in Moriches, NY on 28 August 2014. OSI inquired about this Daybeacon (fixed aid) as well as a number of others within Survey H12607 that are described in the LNMs as "Watching Properly." To the lay reader the term "Watching Properly" implies that an ATON buoy is swinging within its expected watch circle. However, in the case of all fixed aids reviewed with the Moriches, NY ANT the term means that the fixed aid was reconstructed at its charted position.

Jones Inlet Breakwater Light (LL#30890) is reported as “Discontinued for Dredging” in LNMs 24/13 (12 June 2013) through 24/14 (18 June 2014) which is the range of LNMs reviewed for this survey. Starting in LNM 28/13 (10 July 2013) the light is listed as "TRUB" or Temporarily Replaced by Unlighted Buoy." During Survey H12607 the light was not seen, i.e. it was missing. However, the light remains charted at 40-34-23.57 N, 73-34-32.36 W on the RNC and ENC versions used during this chart comparison. As mentioned above the RNCs and ENCs used in this review were downloaded on June 13, 2014. Beginning with LNM 22/14 (4 June 2014) the USCG gives notification of the proposed change to the light technology used on the Jones Inlet Breakwater Light which would result in the reduction in light range from 6 down to 4 nautical miles. It is recommended that the contemporary LNMs and NMs and/or the USCG ANT in Moriches, NY are consulted to check if this change has been made and to change the charted light range notation if appropriate.

For the Jones Inlet Breakwater Light discussed above the "TRUB" notation refers to a temporary white buoy (no USCG Light List designation) that was observed visually during Survey H12607 (Figure 44). What is likely the buoy's clump weight was imaged with SSS at position 40-34-21.07 N, 73-34-32.76 W. LNM 22/14 (4 June 2014) through LNM 24/14 (18 June 2014) states that this buoy is "missing." LNM 24/14 was the last LNM considered during this chart comparison. It is recommended that contemporary LNMs as well as other sources are consulted to determine the USCG's long term plan for the buoy. It is likely that the Jones Inlet Breakwater

Light has been reinstalled and that the TRUB buoy is no longer required. However, if it is determined that the TRUB buoy is intended to be deployed for a long period it is recommended that this buoy is charted.

Private Light "A" in position 40-36-11.15 N, 73-34-06.13 W was included in OSI DtoN #7. This ATON is not included in the USCG Light List nor was the missing ATON included in the LNM/NM reviewed for this survey. It is recommended that the ATON "A" be removed from RNC 12352 and ENC US5NY53M unless information contained in LNMs/NMs issued subsequent to 24/14 (18 June 2014) or other sources contradict this recommendation.

Broad Creek Channel Green Can #W3 (LL#33323) located at 40-36-59.46 N, 73-31-26.10 W was not observed during Survey H12607. This is no cause for concern since it is a seasonal buoy scheduled to be ex situ during the period of the survey. The buoy's ENC US5NY53M PEREND and PERSTA attribute fields do not reflect its seasonal nature whereas these attribute fields are populated for the surrounding buoys in the area. According to the USCG Light List the buoy is maintained from May 1 to Nov. 1. It is recommended that the ENC attributes mentioned above are updated accordingly.

Sloop Channel Light #10 (LL#31150) was observed visually and imaged with both MBES and SSS. The surveyed position of the light closely matches the position shown on ENC UN5NY53M which is 40-36-35.15N, 73-29-35.92 W. However, RNC 12352 shows the light at the position listed in both the USCG Light List and in NGIA NM 8/14 (22 February 2014) which is 40-36-35.25 N, 73-29-35.96 W. The distance between these points is approximately four (4) meters. A feature, believed to be a submerged section of an older Light #10 piling, was imaged at the location shown on the RNC and in the 8/14 NM. Presumably the light piling was broken off below the water and a new piling installed at an offset location. As mentioned above, it appears that the ENC properly represents the position of the light as it was surveyed. It is recommended that the position of the light, as depicted on the RNC, is adjusted to match the ENC position.

Sloop Channel Daybeacon #16 (LL#31080) charted at 40-36-54.86 N, 73-30-16.22 W is listed as "STRUCT DEST" (structure destroyed) starting at LNM 10/14 (12 March 2014). LNM 13/14 states that the status of the daybeacon is "STRUCT DEST." No new information is published as of the last LNM/NM reviewed for this chart comparison. During Survey H12607 a red nun #16 was observed in place of the missing daybeacon. It is recommended that the LNMs and NMs issued subsequent to LNM 24/14 (which is the last LNM reviewed for this chart comparison) are consulted to confirm the status of Daybeacon 16.

Sloop Channel Light #20 (LL#31095) was observed visually and imaged with MBES and SSS at position 40-37-14.96 N, 73-30-23.00 W which is approximately 23 meters east of the RNC- and ENC-charted position. The FFF contains a "submerged piling" obstruction that is likely the remnants of a broken piling from an older Light #20. The current position charted on the RNC and ENC agrees with that listed in NGIA NM 8/14 (22 February 2014). However, based on data from Survey H12607 it is recommended that the charted position of Light #20 be updated to the surveyed position noted above.

Racehorse Channel Green Can #X1 (LL#33475) charted at 40-37-20.58 N, 73-30-26.64 W was not observed during Survey H12607. This is no cause for concern since it is a seasonal buoy scheduled to be ex situ during the period of the survey. The buoy's ENC US5NY53M PEREND and PERSTA attribute fields do not reflect its seasonal nature whereas these attribute fields are populated for the surrounding buoys in the area. According to the USCG Light List the buoy is maintained from May 1 to Nov. 1. It is recommended that the ENC attributes mentioned above are updated accordingly.

A total of five buoys within Zachs Bay were missing during Survey H12607. The USCG Light List states that the position of these buoys "ZB1," "ZB2," "ZB3," "ZB4," and "ZB6" are "frequently shifted with changing conditions." However, there is no mention in the Light List of seasonal deployment. As such these buoys were included in OSI DtoN #9. There is no mention of these buoys being redeployed in LNMs and NMs reviewed for this chart comparison. It is recommended that contemporary data sources such as the LNM are consulted to determine the local municipality or USCG's intent for the long and/or seasonal status of the buoys and to make charting adjustments as appropriate. The Zachs Bay buoys discussed above include Light List designations: 31151, 31151.1, 31151.2, 31151.3, and 31151.5.

OSI DtoN # 9 also included missing State Boat Channel Daybeacon #3 (LL#31120) which is located in Stone Creek at 40-37-11.52 N, 73-29-53.76 W. This beacon is noted as "Watching Properly" in LNM 11/14 (19 March 2014). It is recommended that this Daybeacon remains charted as shown on the RNC and ENC included in this chart comparison.

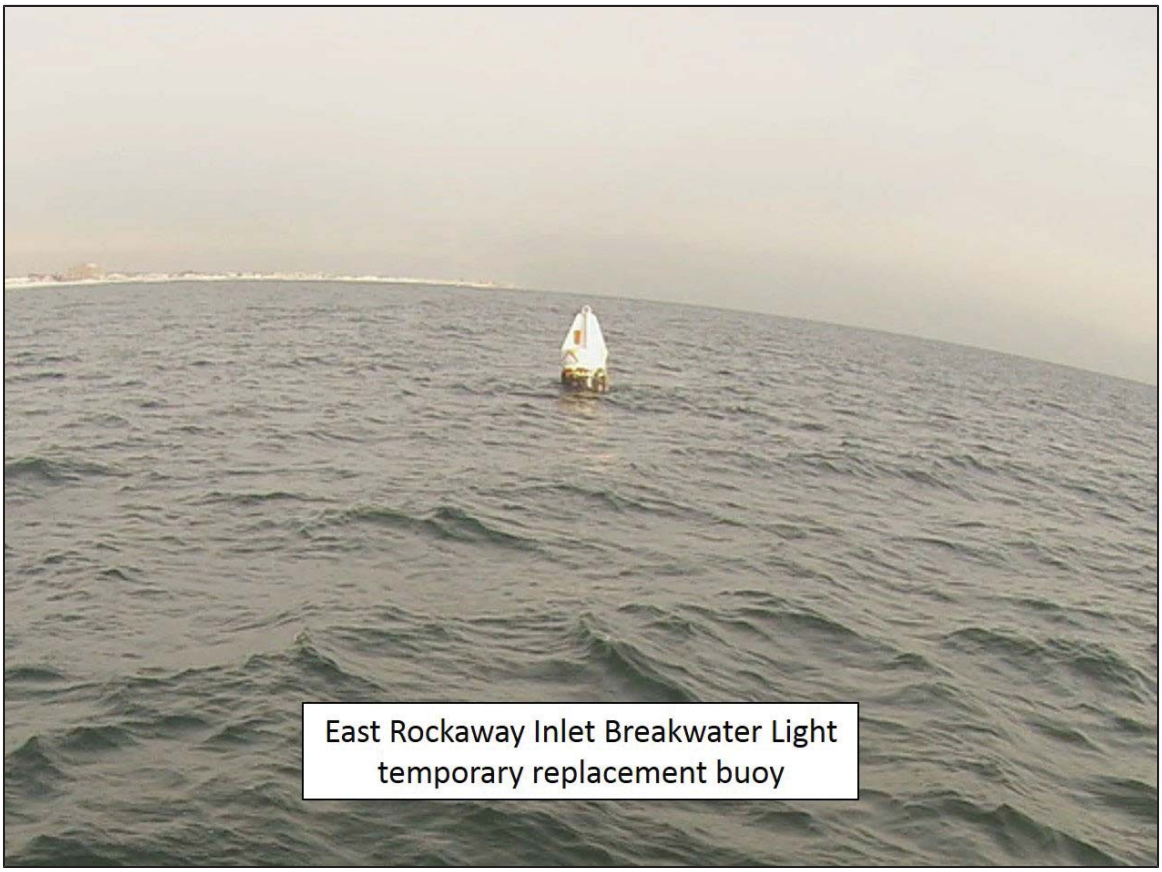

Figure 41: *A photo of the East Rockaway Inlet Breakwater Light TRUB, temporary replacement buoy.*

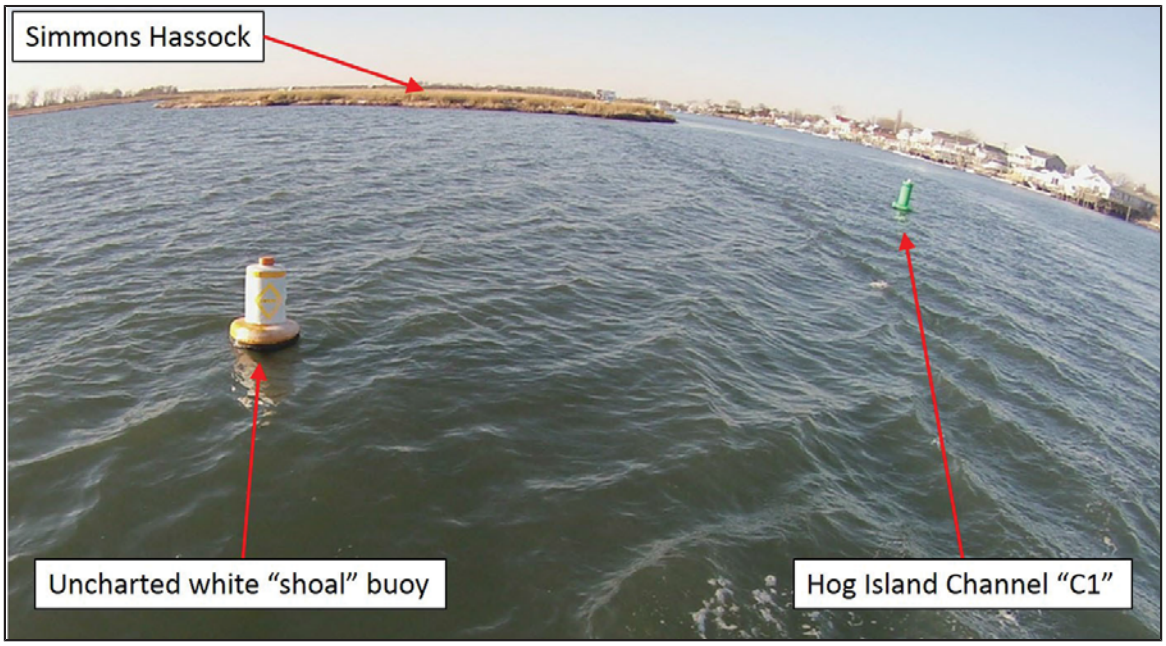

Figure 42: *A photo of the uncharted white buoy near the southern end of Simmons Hassock that is marking a shoal.*

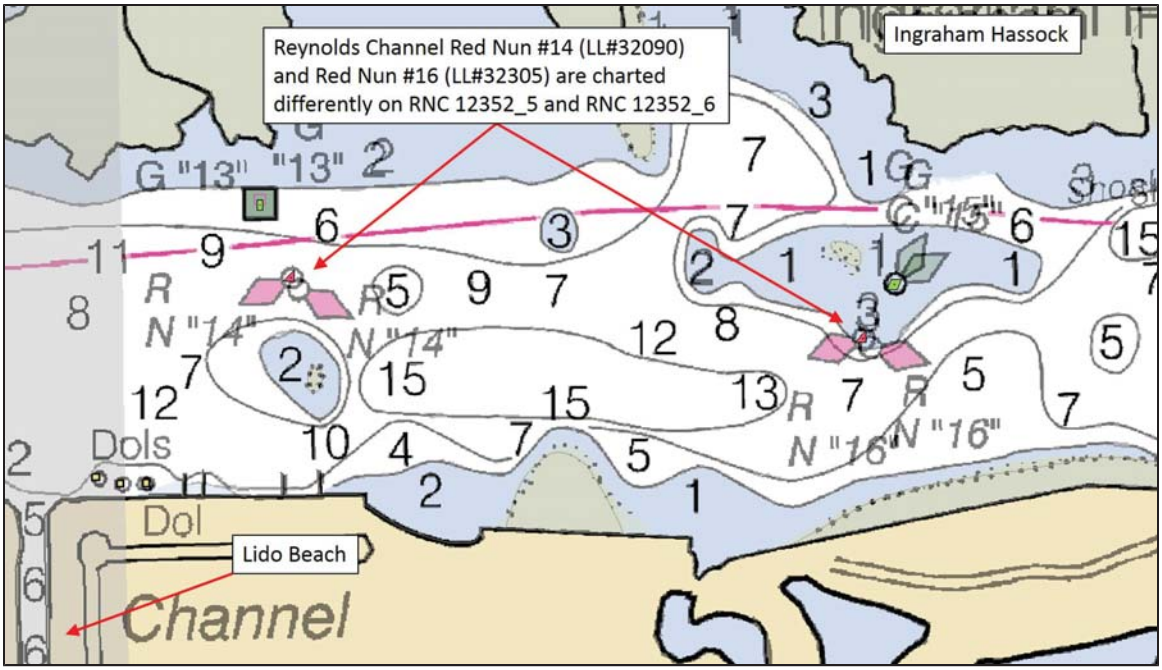

Figure 43: *A chart overview highlights Reynolds Channel Red Nuns #14 and #16, which were charted differently on RNC 12352_5 and RNC 12352_6. In the CARIS Notebook window shown in this figure, RNC 12352_6 is displayed with 50% transparency overlaid on RNC 12352_5. The ENC buoy symbols are overlaid on the RNC buoy positions.*

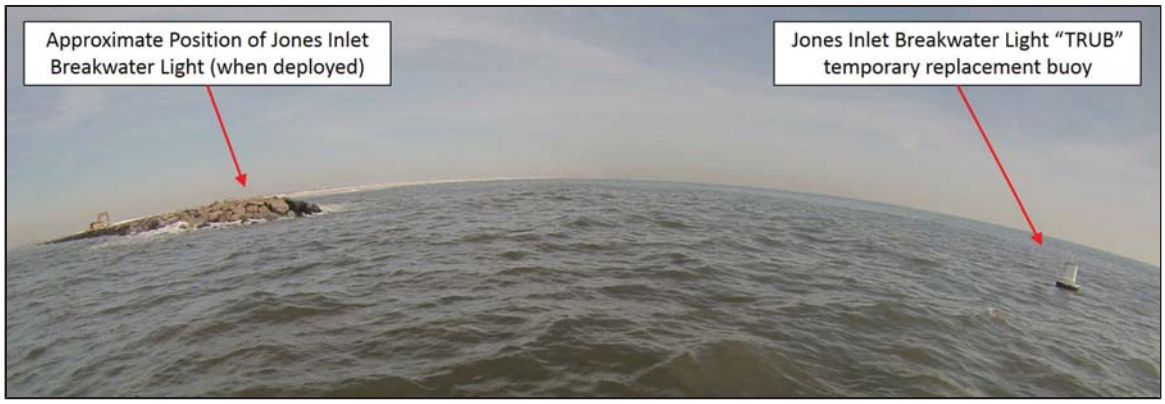

Figure 44: *A photo of the Jones Inlet Breakwater Light TRUB, temporary replacement buoy.*

D.2.4 Overhead Features

Overhead features exist for this survey, but were not investigated. Bridges, overhead cables, and overhead pipes were included in the project CSF but were not attributed "assigned." As such, they were not specifically investigated during the limited shoreline verification, and bridge horizontal and vertical clearances were not confirmed in the field. Although overhead cables and pipes were included in the CSF there were none that fell within the boundary of Survey H12607.

OSI completed a review of bridges during home office processing using still photos, shoreline video, contemporary aerial imagery, specifically NOAA's Post-Hurricane Sandy orthophoto dataset, as well as a review of pertinent LNMs. MBES and SSS data were consulted to confirm the charted position of bridges within the bounds of Survey H12607. All bridges, within the area surveyed, are visible in the field photos and/or video. The results of the OSI Overhead Features review are presented below.

The ENC expression of the Atlantic Beach bascule bridge that crosses inner East Rockaway Inlet at approximate position 40-35-35 N, 73-44-14 W appears to be shifted west relative to the RNC and the aerial imagery reviewed during the chart comparison. It is recommended that the position of this bridge be adjusted on ENC US5NY50M. This bridge is mentioned in LNMs 24/13 (12 June 2013) through 20/14 (21 May 2014) as "under construction." Earlier LNMs within the date range mentioned above state that, "Temporary work platforms will be installed under the flanking spans and will remain until completion of the project. A 40ft barge will be operating in the navigation channel and will remain in the channel after working hours." Later LNMs state that, "A 20ft by 40ft barge will be operating under the flanking span during the daylight hours. A 30ft by 45ft barge with a manlift will be operating in the navigation channel and will remain in the channel after working hours from April 21, 2014 through May 22, 2014." LNM 20/14 states that the project is to be completed by May 23, 2014. As seen in Figure 45 the construction equipment was present during Survey H12607. The present construction status of the bridge is not known. It is recommended that contemporary LNM's as well as other sources are consulted to determine if the bridge remains under construction and that the RNC and ENC charts are updated with a caution area if construction is ongoing.

Horizontal/vertical clearance information is not included on either the RNC or ENC for the Wantagh State Parkway span crossing Goose Creek at approximate position 40-37-24 N, 73-30-05 W. It is recommended that the RNC and ENC charts are updated to include this information. This bridge is charted as "under construction." However, no evidence of ongoing construction was observed during Survey H12607. None of the LNMs reviewed for this chart comparison made mention of this bridge. The present construction status of the bridge is not known. It is recommended that contemporary LNM's as well as other sources are consulted to determine if the bridge remains under construction and that the RNC and ENC charts are updated by removing the caution area shading and "under construction" notation if construction is completed. Based on review of contemporary aerial imagery as well as shoreline video recording during Survey H12607 it appears that this bridge has a fixed span, meaning it is not capable of opening, which is contrary to a description of the bridge uncovered during online research. The progression of bridge shape and function, i.e. the transition from "capable of opening" to "fixed span" is seen when using the "historical imagery" function in Google Earth. This information is shared such that there is no confusion about the bridge's operating capability. It appears that this bridge has transitioned from articulated to fixed.

The Wantagh State Parkway span crossing Sloop Channel at approximate position 40-36-52 N, 73-30-02 W was reported as under construction in most of the LNMs reviewed for this chart comparison. However, no construction activity was noted during Survey H12607. The last mention of bridge construction in the date range of LNMs reviewed was in LNM 13/14 (2 April 2014) which states, "[sic] Bridge replacement to the Wantagh State Parkway Bridge across Sloop Channel, mile 15.4, at Jones Beach, New York has been completed. There are few temporary mooring piles with white lights remain outside the main navigation channel to be removed by spring 2014." Four uncharted pilings, located on the east side of the bridge were imaged using MBES and SSS and observed visually during Survey H12607 (Figure 46). It is not known if these pilings were "removed by spring 2014" as stated in LNM 13/14. Therefore, it is recommended that contemporary LNMs as well as other sources are consulted to determine if the pilings have been removed and, if not, that the RNC and ENC charts are updated with piling symbols at locations shown in the FFF. If it is confirmed that construction is completed then it is recommended that the RNC and ENC charts are updated by removing the caution area shading and "under construction" notation. It is also noted that the ENC and RNC expression of this bridge shows two distinct spans running parallel to one another. Based on review of MBES and SSS data and review of contemporary aerial imagery it appears that the eastern span has been removed. Figure 47 depicts Google Earth imagery from 2000 (left panel) and 2013 (right panel) demonstrating the change. It is recommended that the charted position of this bridge, including the new main pier/fender structures, is updated. It appears that the new bridge has been transitioned from fixed to articulated. Based on shoreline video recorded during Survey H12607, it is inferred, based on lay knowledge of bridge design, that the new bridge is a double-leaf bascule bridge (Figure 48). It is recommended that the functional nature of the bridge is charted and that charted horizontal and vertical clearance values are updated if appropriate.

Figure 45: *A photo of construction equipment observed under the Atlantic Beach Bridge during Survey H12607.*

Figure 46: *Aerial imagery and photographs acquired during survey acquisition show the uncharted pilings associated with bridge construction of the Wantagh State Parkway span crossing Sloop Channel.*

Figure 47: *Google Earth imagery from 2000 (left panel) and 2013 (right panel) show the changes to the Wantagh State Parkway span crossing Sloop Channel.*

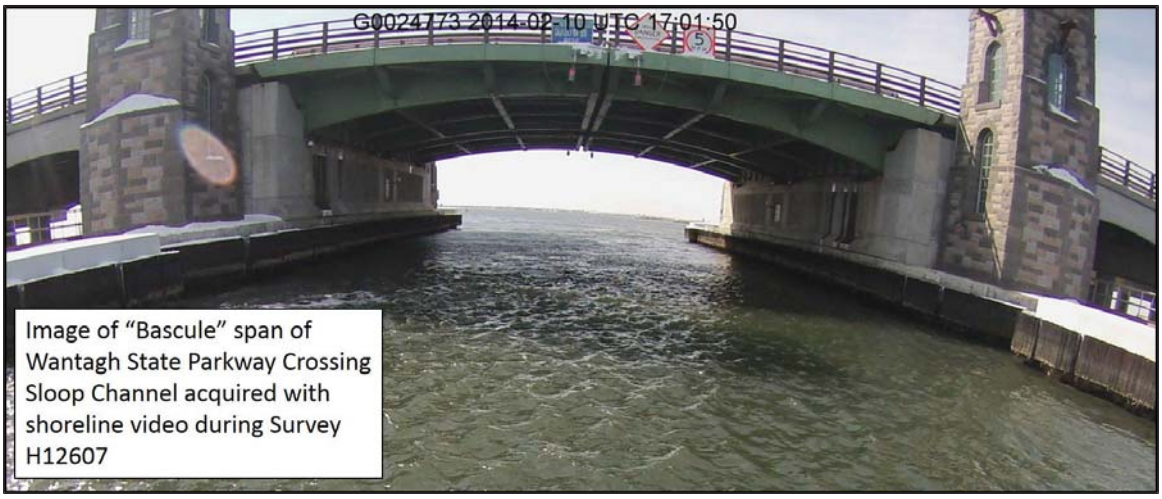

Figure 48: *A screen capture from the shoreline video shows the new Wantagh State Parkway Bridge "Bascul"e span crossing Sloop Channel.*

D.2.5 Submarine Features

Submarine features exist for this survey, but were not investigated. Pipeline Areas were included in the project CSF but were not attributed "assigned." As such, they were not specifically investigated during Survey H12607. No submarine cable areas were included in the CSF although both cable and pipeline areas are shown on the RNC and included in the ENC. OSI conducted a review of possible submarine features during home office processing using still photos and shoreline video acquired during the survey as well as contemporary aerial imagery and MBES/SSS data.

Occasional uncharted linear features that could be cable segments or pipeline segments or dredge pipe segments, or debris were observed in MBES and SSS data throughout the survey area. These features, if of significant height or character, are included in the FFF. OSI has no reason to believe that seemingly random linear features are associated with uncharted cable or pipeline installations.

There were also a number of linear features that fall within charted cable and pipeline corridors. In most cases these features are: 1) insignificant in relation to surrounding depths, 2) extremely short in relation to a given cable or pipeline corridor and 3) may or may not be actual cable or pipeline segments, i.e. their presence within the charted corridor may be merely coincidental. Some cable and/or pipeline area landfalls/crossings are without signage that would indicate a cable or pipeline landfall/crossing exists. Photos of all of the cable and pipeline signs that were encountered during Survey H12607 are included in this section. Noteworthy cable and/or pipeline features are discussed below.

Two cable- or pipe-like segments are seen in MBES and SSS data within the cable field in the vicinity of East Rockaway Inlet. The two cable- or pipe-like segments are centered at approximate position 40-34-59 N, 73-45-22 W.

OSI DtoN #3 describes, among other things, a pipe-like feature that is approximately 5 feet proud of the surrounding seafloor. The feature is adjacent to and east of the Atlantic Beach Bridge at approximate position 40-35-35.8 N, 73-44-11.8 W. This location falls within a charted cable and pipeline area.

A submerged feature suggestive of an outfall pipe was imaged with MBES and SSS at position 40-35-20 N, 73-41-29 W. There is no charted indication of a pipe on either the RNC or ENC. The shoal point on the pipe is included in the FFF as an obstruction. It is recommended that an obstruction symbol is added to the charts at this location given that the true identity of the presumed outfall pipe is not known. An RNC obstruction symbol at the chart scale of RNC 12352 has a diameter of approximately 60 meters which will easily cover the length of the presumed outfall pipe which has a relatively short length, approximately 15 meters.

A charted sewer outfall structure was observed visually and positioned with MBES and SSS at a position 40-35-46.64 N, 73-40-32.30 W which is approximately 12 meters northwest of the currently charted position. The charted sewer pipeline that presumably connects to this structure was not imaged with either MBES or SSS. It is not known if the pipeline is buried or if it was not imaged with MBES or SSS simply due to the shallow water in which the pipeline lays. The sewer outfall structure is shown in Figure 49.

OSI DtoN #4 describes, among other things, numerous exposed pipeline-like and cable-like features between a train bridge and a pair of road bridges crossing western Reynolds Channel and connecting Island Park, NY to Long Beach, NY. The approximate center of the area is 40-35-44 N, 73-39-33 W. The charted pipeline and cable area in which the features are found extends east and west of the bridges described above. However, MBES and SSS data show features only between the bridges. Pipeline crossing signs for this area are shown in Figure 50.

In the vicinity of Jones Inlet, what is believed to be dredge pipes in various states of "wet storage" were identified with MBES and SSS data. Pipes found on the western side of the inlet were completely submerged. Individual pipe segments located in the western end of Sloop Channel, along the southern perimeter of Meadow Island, were both floating and submerged: the "Meadow Island pipes." The Meadow Island pipe segments were in the midst of moored barges and dredge support equipment in an apparent dredging staging area. The long section of Meadow Island pipe was imaged with SSS while it floated at and near the water surface as it was supported by buoys and/or its natural buoyancy when purged of water. One Meadow Island pipe segment was completely submerged. All three dredge pipeline areas shown in Figure 51 were marked with surface buoys typical of a dredging operation. Although the hydrographer cannot be certain, it is assumed that the dredge pipes in all areas described herein were deployed on a temporary basis during dredging operations. However, since OSI has no evidence to the contrary, i.e. contemporary survey data, the submerged pipes are included in the final CUBE surface(s) and included in the FFF. Most of the submerged pipes are not recommended for charting. Only one of the Meadow Island pipe segments is recommend for charting located at 40-35-46.6 N, 73-33-30.6 W. This segment was neither marked by a surface buoy nor was it part of a long assemblage of pipes, implying it could have been a lost or discarded pipe segment.

A linear feature suggestive of a cable was imaged at approximate position 40-36-02.0 N, 73-32-34.3 W. This cable-like feature falls within the charted cable area which runs parallel to and east of the bridge between Jones Island and Jones Beach Island.

Multiple linear features suggestive of cables running parallel to one another were imaged west of the Wantagh State Parkway Bridge crossing Goose Creek. The cables fall within a charted cable area. The approximate

position of the cable field is 40-37-24 N, 73-30-08 W. This charted cable area is marked by three signs. Two of the signs, east of the bridge, state clearly that there is a cable crossing. A third sign, on the west side of the bridge is assumed to be a cable crossing sign based on its position and character. However, this sign is not legible. The Goose Creek cable crossing signs are seen in Figure 52.

Three cable crossing signs were observed in the vicinity of the Wantagh State Parkway span that crosses Sloop Channel (Figure 53) at approximate position 40-36-52 N, 73-30-02 W. However, neither the RNC nor ENC show any indication of the cable area. It is recommended that cable area symbolism and shading is added to both sides of this bridge on both RNC 12352 and ENC US5NY53M.

Given that submarine features were not specifically investigated, OSI is unable to state that "all submarine features exist as charted" as required in Section 8.1.4.D.2 of the HSSD.

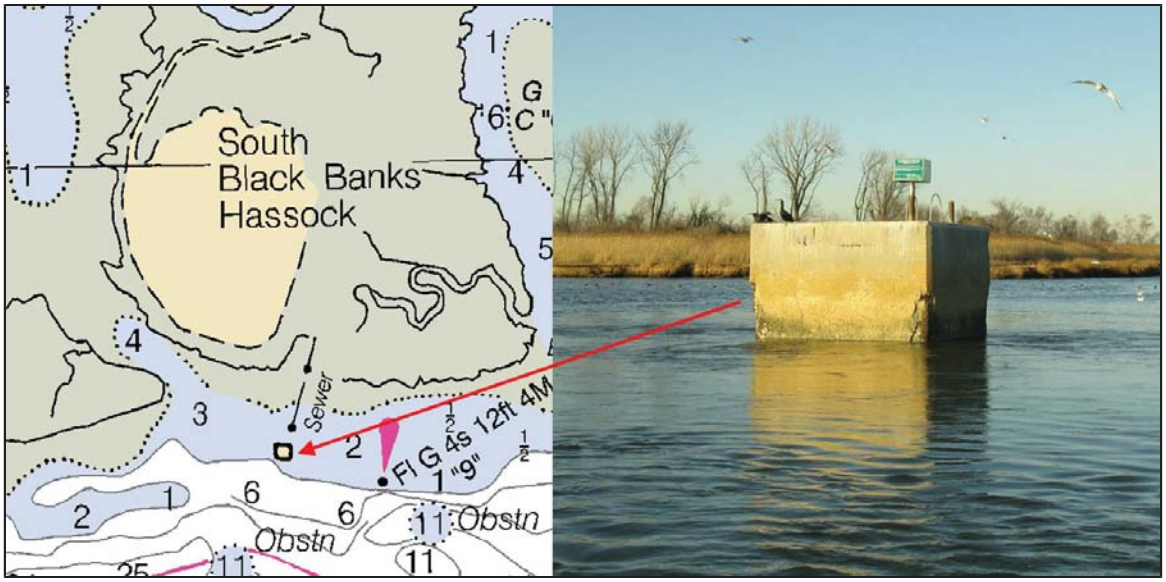

Figure 49: *A sewer outfall structure was incorrectly charted as a marsh land region on RNC 12352 (on the left). The right image is a photo of the concrete structure identified during survey operations.*

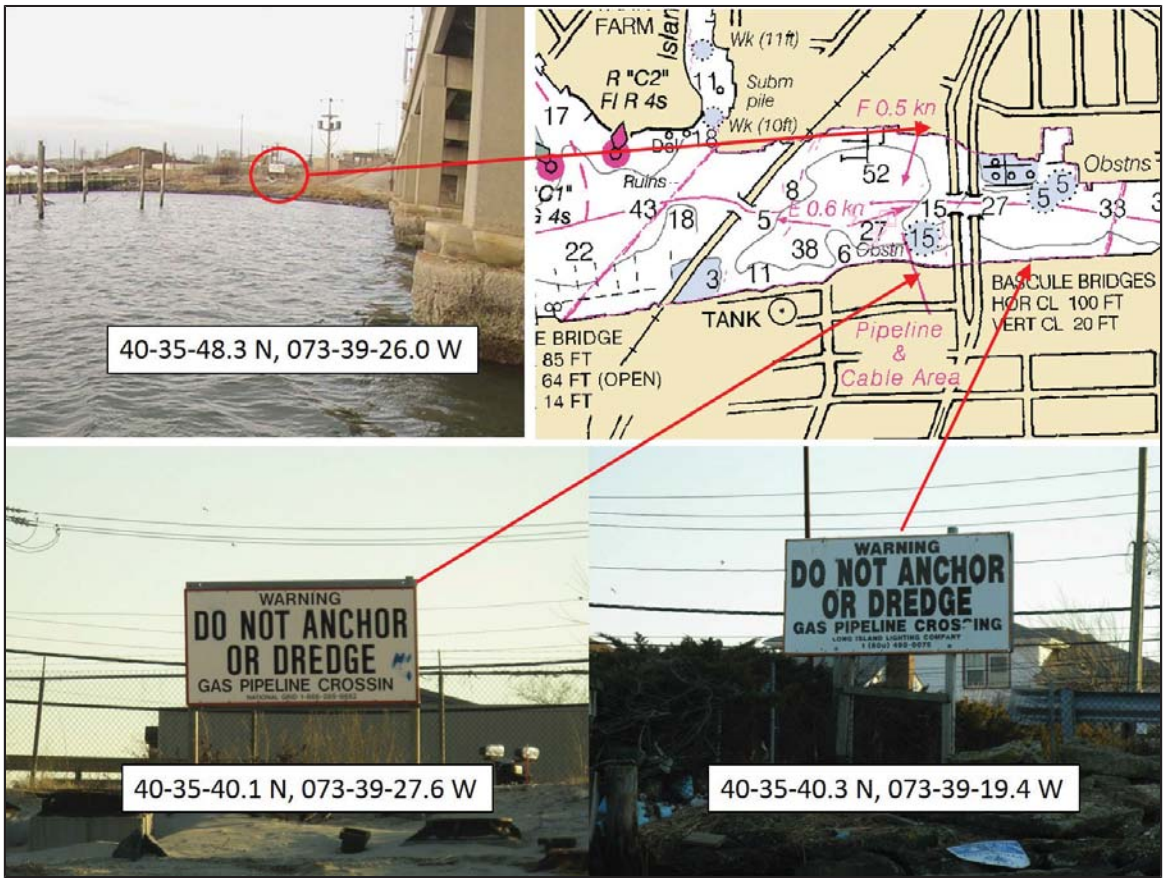

Figure 50: *Photos of pipeline crossing signs within Reynolds Channel are shown with their respective positions highlighted on RNC 12352.*

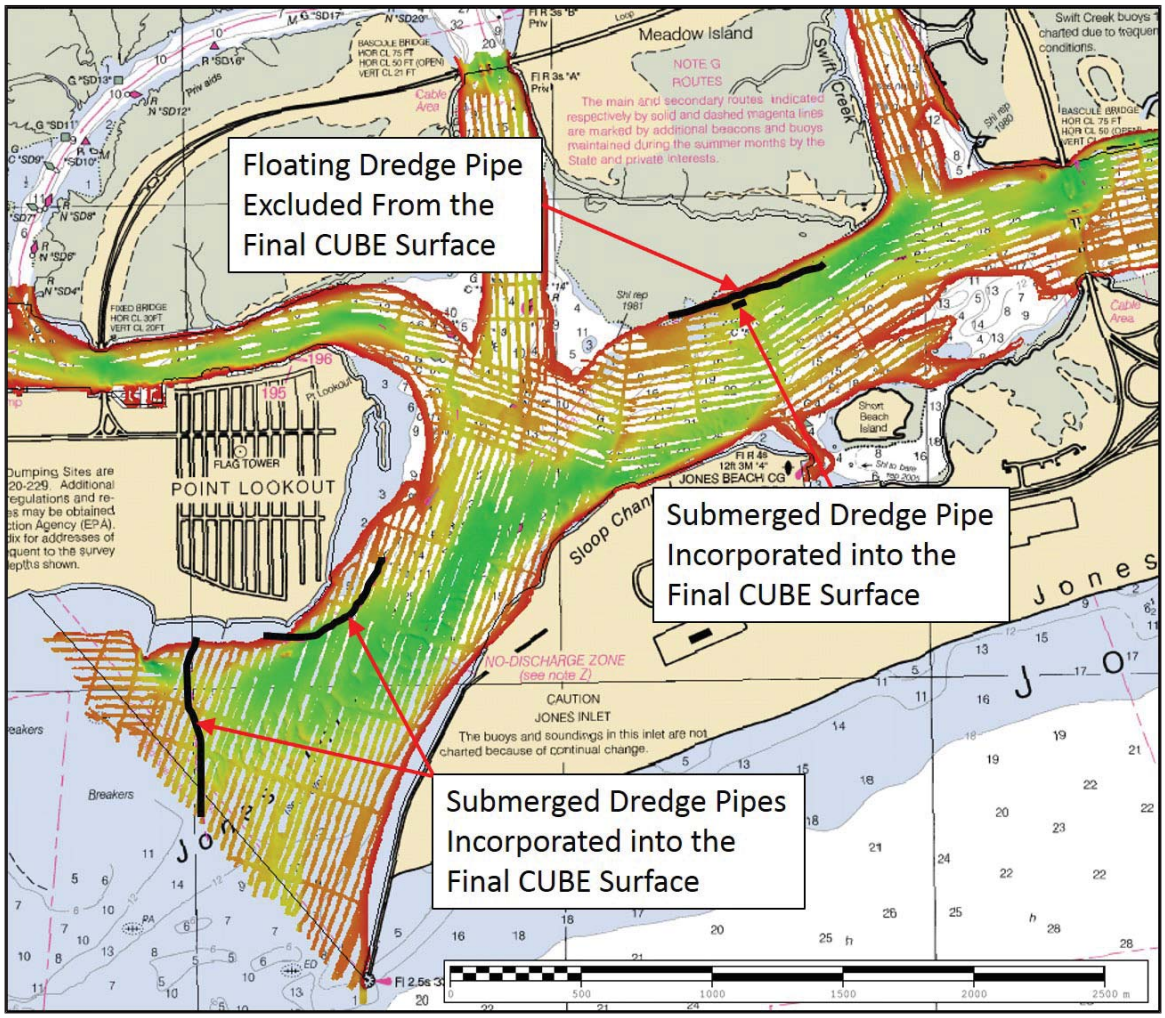

Figure 51: The general locations of pipes in wet storage are highlighted on RNC 12352 as imaged with MBES and SSS during Survey H12607.

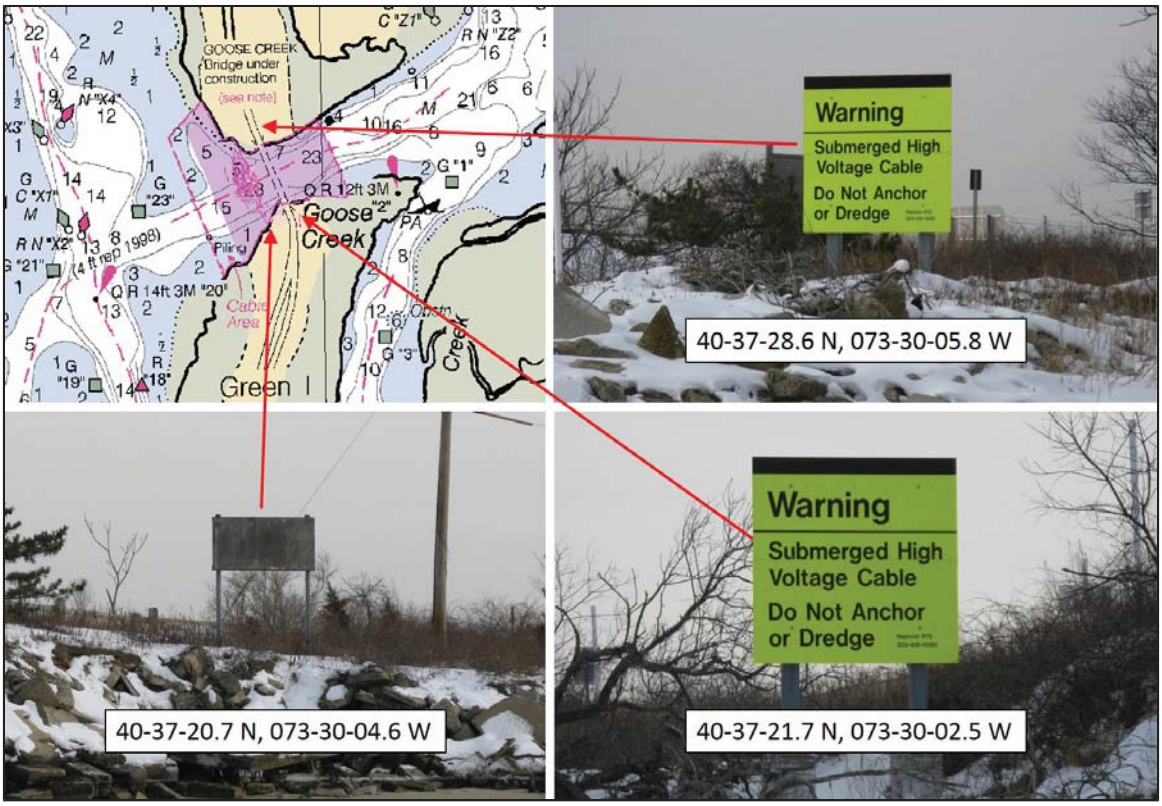

Figure 52: *Photos of cable crossing signs observed during Survey H12607 are shown with their respective positions highlighted on RNC 12352. The cables fall on either side of the Wantagh State Parkway Bridge span that crosses Goose Creek.*

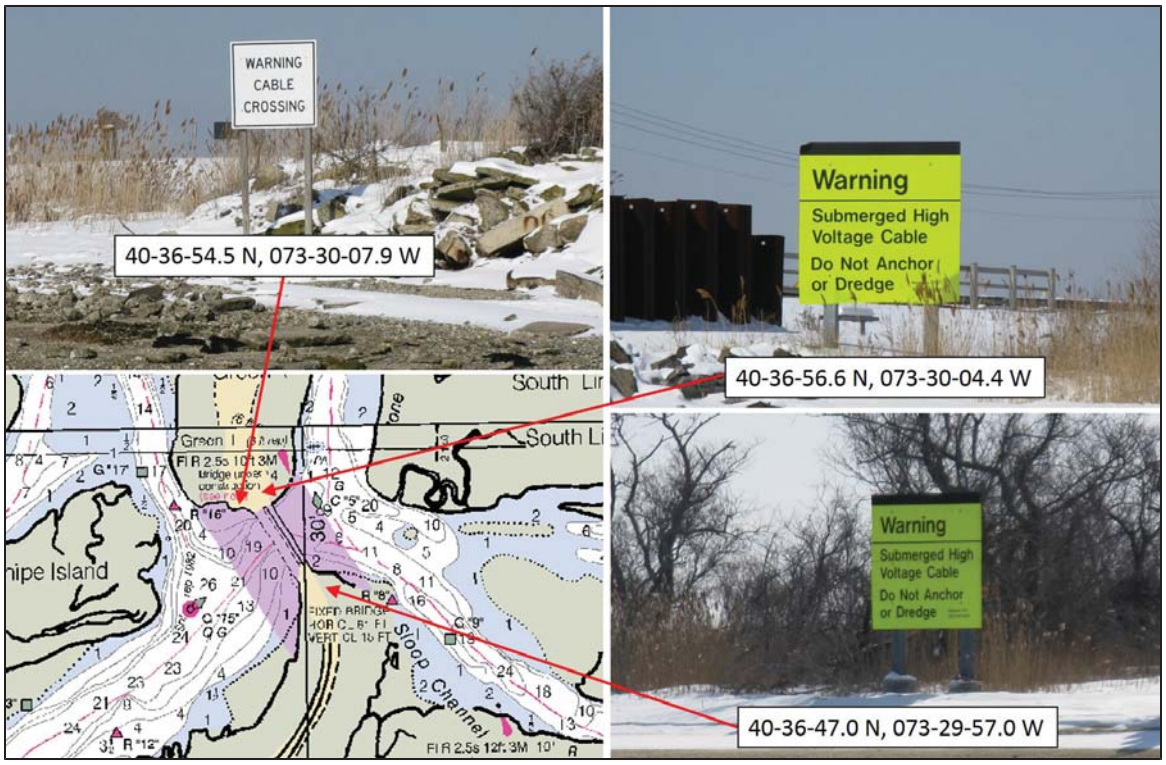

Figure 53: *Photos of cable crossing signs observed during Survey H12607 are shown with their respective positions highlighted on RNC 12352. The cables fall on either side of the Wantagh State Parkway Bridge span that crosses Sloop Channel. No charted indication of a cable crossing is shown on either the RNC or ENC used during this chart comparison.*

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist within Survey H12607.

D.2.7 Platforms

Two "platforms" are currently charted within Survey H12607.

The platform charted at position 40-36-01.80 N, 73-32-46.72 W was not observed visually during the survey. Furthermore, there is no record of the platform in project shoreline video acquired with the GoPro camera. However, two significant submerged obstructions were surveyed approximately 17 meters northeast of the charted platform. Review of Google Earth historical imagery suggests that a structure did exist in year 2000. However, the structure is not visible in subsequent aerial image layers (on Google Earth). The year 2000 image shows the structure in the same general location as the obstructions mentioned above. This correlation suggests that the old platform was charted in the wrong position (by approximately 17 meters). In consideration of the foregoing discussion it is recommended that this platform symbol be removed from RNC 12352 and ENC

US5NY53M and that an obstruction symbol, with shoal depth, be added in the position of the obstructions surveyed in the vicinity of the charted platform.

The platform charted at position 40-37-28.86 N, 73-29-59.20 W was not observed visually during the survey. The platform or submerged remnants of the platform were disproved with 200% SSS. It is recommended that this platform symbol be removed from RNC 12352 and ENC US5NY53M.

No uncharted platforms were observed during Survey H12607.

D.2.8 Significant Features

No significant features exist for this survey.

D.2.9 Construction and Dredging

Dredging was observed in the vicinity of the confluence of Jones Inlet, Sloop Channel, and Reynolds Channel at approximate position 40-35-47 N, 73-34-06 W. This area was first surveyed on February 3, 2014 (DN 034). Later, the field team noted dredging in this area as operations progressed elsewhere during Survey H12607. The area was resurveyed on February 24, 2014 (DN 055) since the field team was still on site when the dredging operation was observed to be completed and removed from the area. In the areas of overlapping data from the two survey dates mentioned above the DN 034 data were rejected in favor of the DN 055 data. As a result, the post-dredge condition is represented in the final CUBE surfaces delivered for Survey H12607.

Construction was observed along the shoreline on the north side of Point Lookout at approximate position 40-35-38.9 N, 73-34-55.3 W. The large dock structure charted at this general location appears to have been removed (Figure 54). It is recommended that the charted shoreline is adjusted accordingly using tools such as the SSS mosaic provided with this survey or contemporary aerial imagery. That said, based on land use in the surrounding area it is reasonable to assume that new shoreline construction may be planned for this area. Therefore, it is suggested that this area is revisited for possible re-charting as newer aerial imagery becomes available.

Observed and LNM-reported construction on the Atlantic Beach bascule bridge was noted in the Overhead Features section of this report.

Throughout the survey area other minor construction activities were observed. In general these activities appeared to be associated with reconstruction of existing structures, i.e. dock repairs. Individual instances of dock repair are not documented in this report.

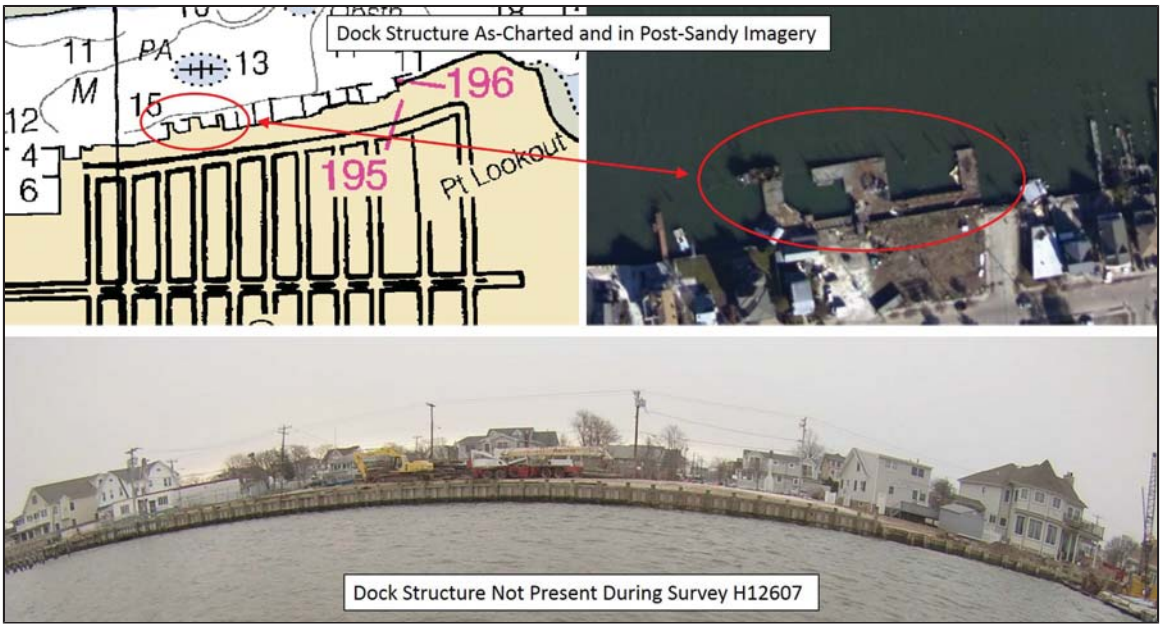

Figure 54: *A large dock structure that is recommended for removal from RNC 12352 and ENC US5NY53M. Is shown as charted on RNC 12352 and in Post-Sandy aerial imagery in the upper two images. The bottom photo was taken during data collection for Survey H12607 and the dock is no longer present.*

D.2.10 Routes and Recommended Tracks

RNC and ENC charts covering Survey H12607 show "routes" (RNC) or "recommended tracks" (ENC) which, according to Note G on RNC 12352, "are marked by additional beacons and buoys maintained during the summer months by the State and private interests." In the opinion of the hydrographers conducting this chart comparison, routes/recommended tracks are not necessary for the charts within Survey H12607 and, as currently charted, are sometimes confusing or misleading. In some cases, the routes/recommended tracks would lead the unwary navigator across dangerous shoals. To the recreational boater the presence of routes/recommended tracks on a chart may be viewed as a de facto endorsement by NOS/NOAA implying that the path of the route is safe to navigate. Charted routes/recommended tracks may be appropriate in a traffic separation scheme or other fairway used by professional mariners but may fall under the heading of "too much information" when not properly utilized by a recreational boater. The overwhelming majority of chart users in waters covered by Survey H12607 are likely to be recreational boaters.

It is noted that a number of the charted buoys follow the surveyed "best water" channel even though the same buoys are currently charted outside of the routes/recommended tracks because charted depth updates are behind ATON movements and subsequent NavAid position updates. An example of this can be seen at approximate position 40-36-36 N, 73-31-27 W where the buoy configuration leads the navigator to think they are transiting over an area exposed at low tide. It is recognized that the USCG and local interests are frequent users of the local waterways and therefore place buoys appropriately to mark best water. This information is transmitted to NOAA via LNMs and Light List corrections and therefore the buoy information is properly charted. The

frequency of hydrographic surveys cannot possibly maintain pace with natural channel meandering, natural or storm-induced shoaling, etc. It then follows that the accuracy of the routes/recommended tracks cannot keep pace either. The practice of "recommending" a route does not seem prudent in this setting; therefore, it is recommended that the routes/recommended tracks are removed from RNC and ENC products within and adjacent to Survey H12607.

If this recommended course of action is not taken then the routes/recommended tracks should be updated to reflect surveyed depths and best water channels. It is also recommended that NOAA consult frequently with the USCG and "State and private interests" who deploy seasonal ATONs such that the ATONs are properly charted (when appropriate) and that routes/recommended tracks lead the navigator to the correct side of charted buoys and through "safe water." As currently charted the routes/recommended tracks within Survey H12607 are sometimes plotted through or on the wrong side of charted ATONs and across shoals. Also, a few of the route lines, as charted on the RNC, are not continuous lines. The following Figures 55 through 64 offer suggested changes to some of the routes/recommended tracks that conflict with surveyed depths or charted ATONs within Survey H12607. It is recommended that AHB consider the path of ALL routes/recommended tracks within and outside the bounds of Survey H12607 and improve upon the charted routes/recommended tracks if, in fact, the practice of charting routes/recommended tracks continues in this area.

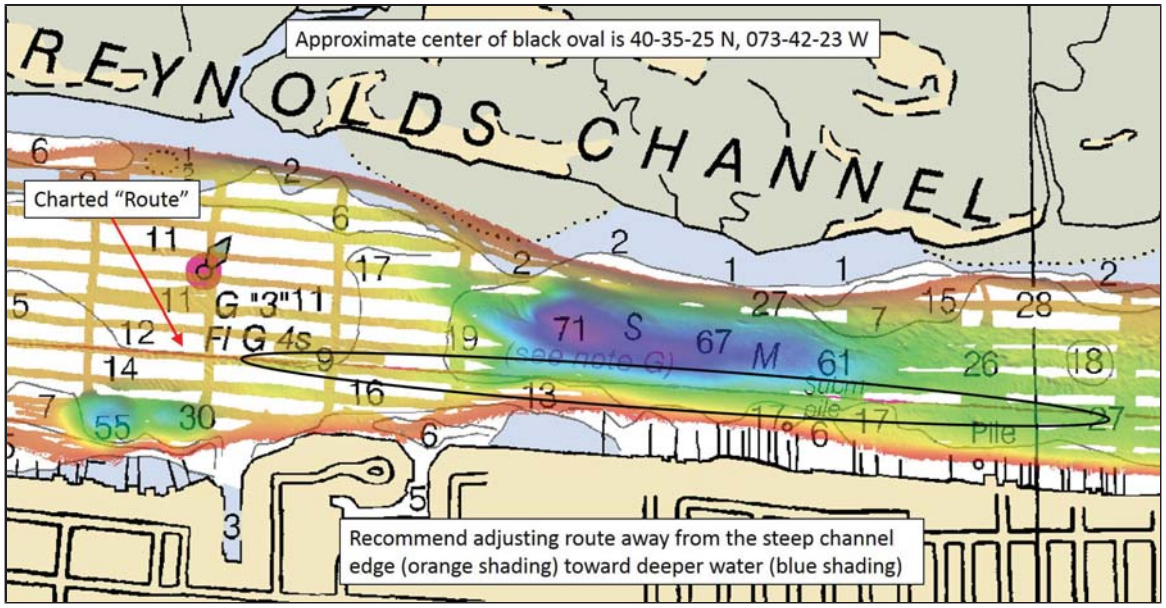

Figure 55: *The image highlights the charted route (magenta line) in Reynolds Channel north of Atlantic Beach that is recommended for adjustment. In the background, a CUBE surface is overlaid on RNC 12352.*

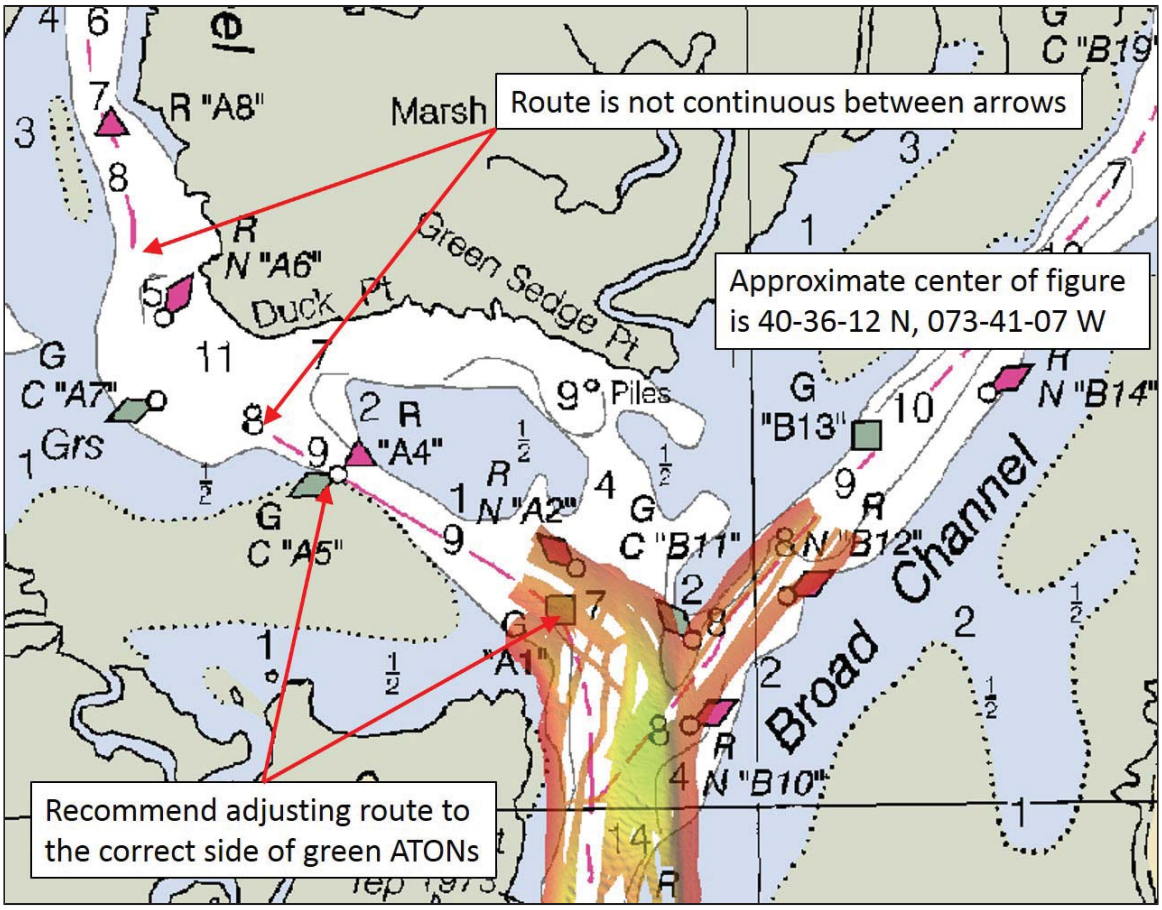

Figure 56: The image highlights the sections of the charted route (magenta line) within Broad Channel that are recommended for adjustment. In the background, a CUBE surface is overlaid on RNC 12352.

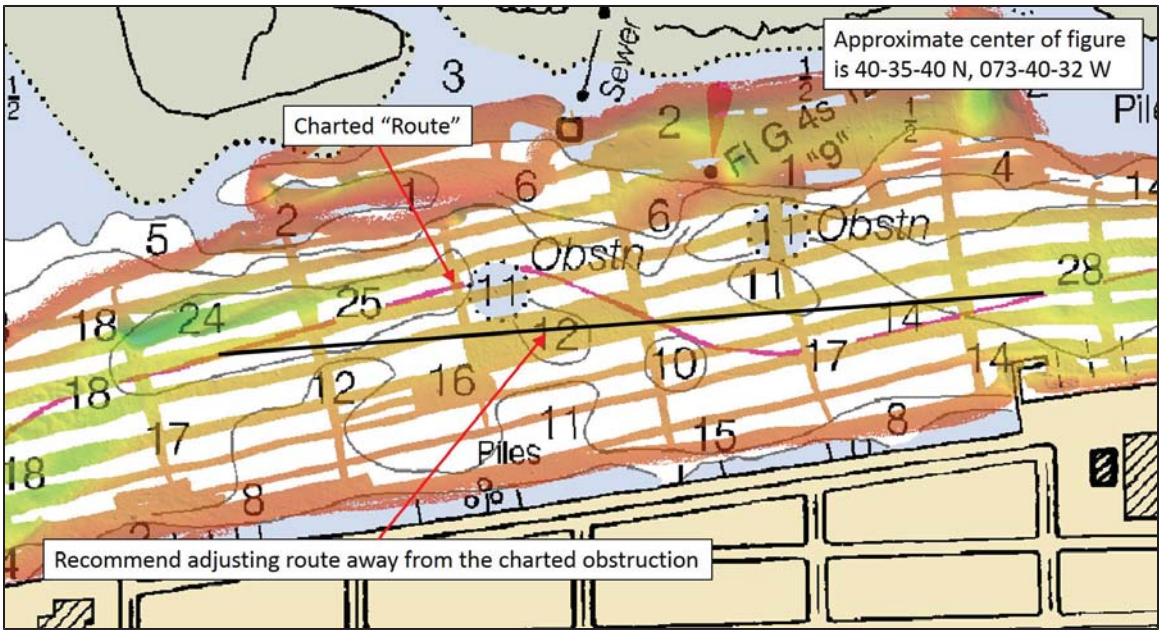

Figure 57: *A suggested route adjustment for Reynolds Channel north of Long Beach is highlighted in black in respect to the charted route in magenta. In the background, a CUBE surface is overlaid on RNC 12352.*

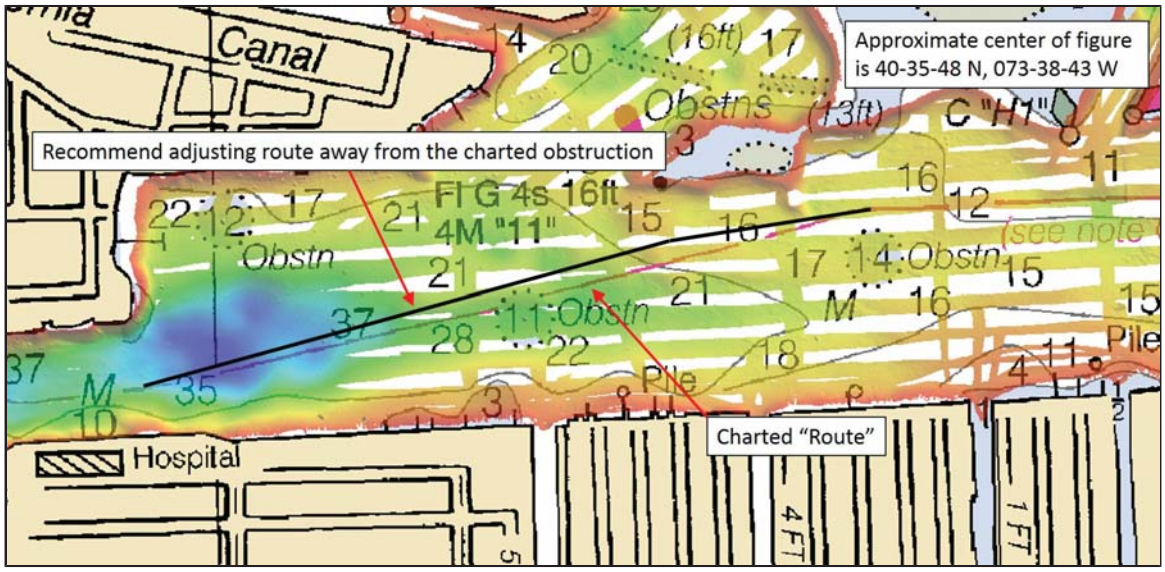

Figure 58: *A suggested route adjustment for Reynolds Channel north of Lido Beach is highlighted in black in respect to the charted route in magenta. In the background, a CUBE surface is overlaid on RNC 12352.*

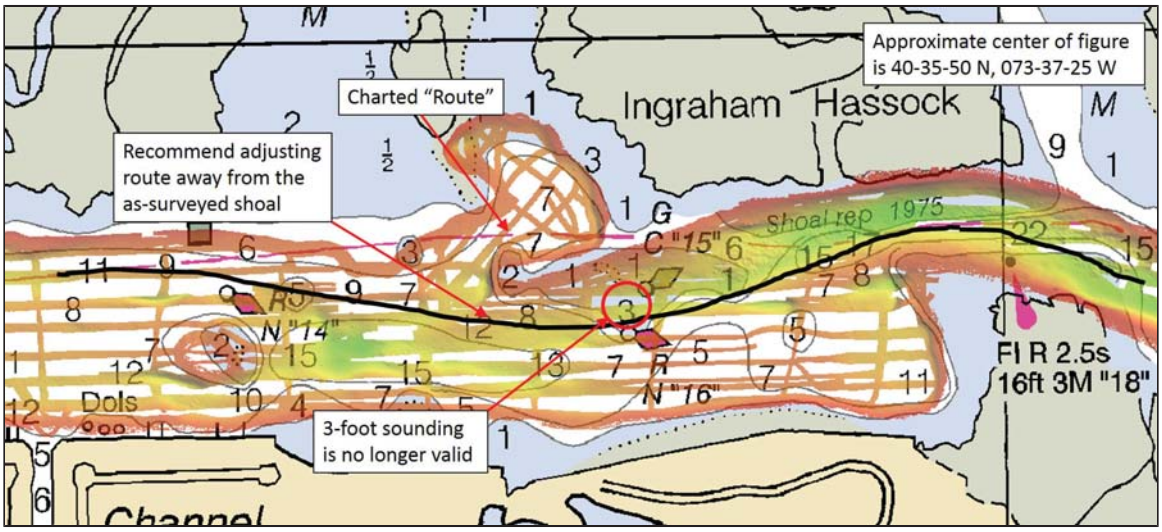

Figure 59: *A suggested route adjustment for Reynolds Channel south of Ingraham Hassock is highlighted in black in respect to the charted route in magenta. In the background, a CUBE surface is overlaid on RNC 12352.*

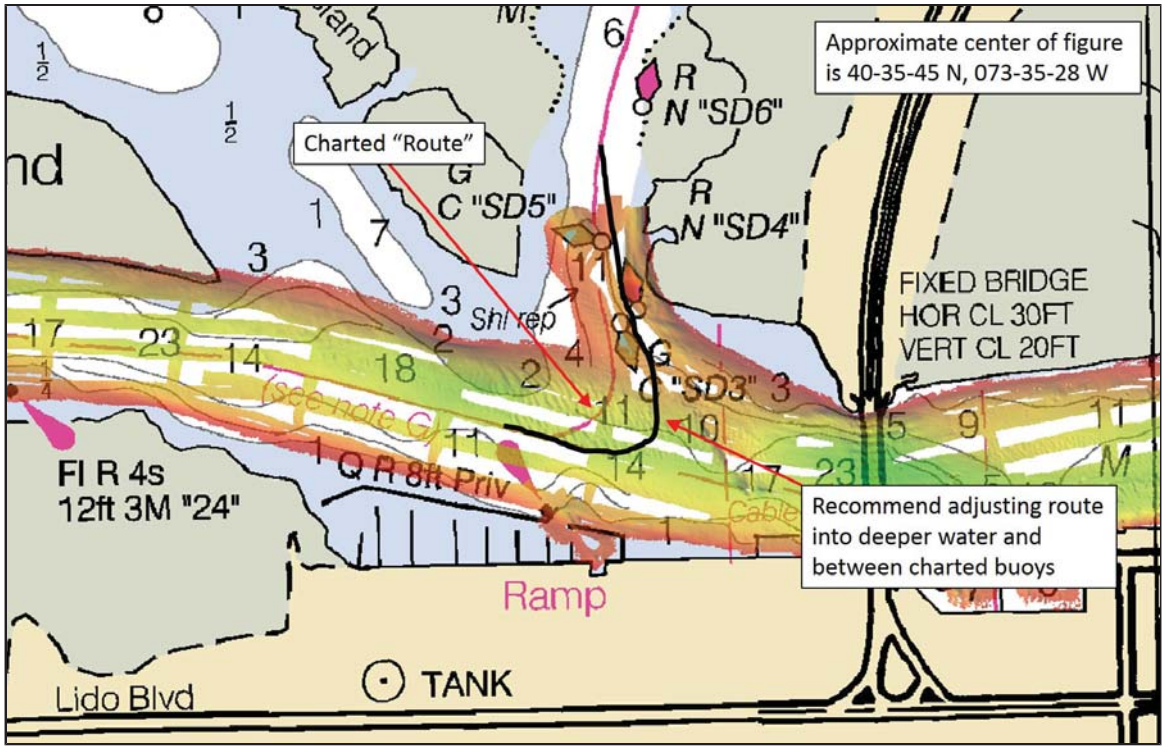

Figure 60: *A suggested route adjustment for southern Sea Dog Creek is highlighted in black in respect to the charted route in magenta. In the background, a CUBE surface is overlaid on RNC 12352.*

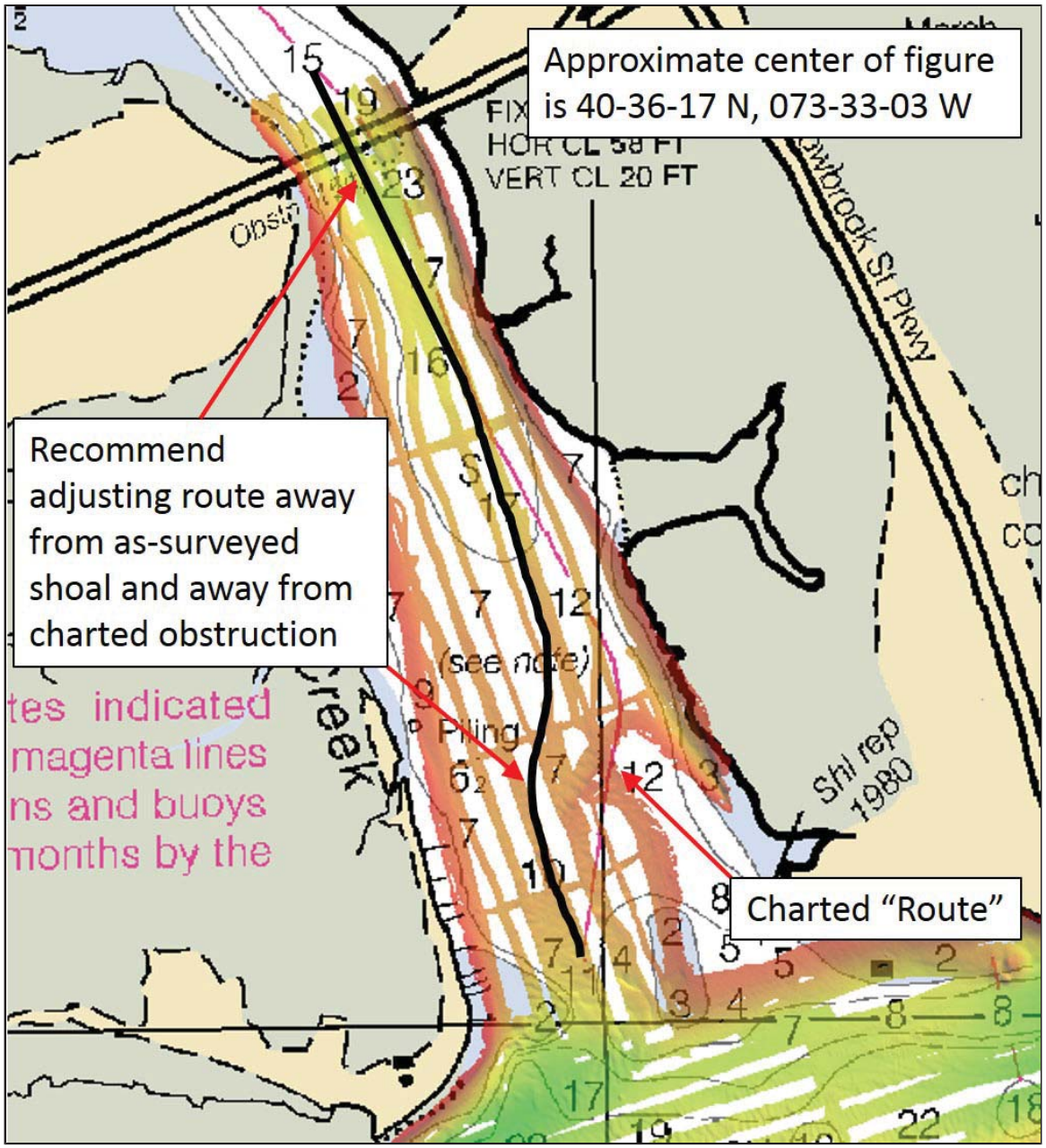

Figure 61: *A suggested route adjustment for Swift Creek is highlighted in black in respect to the charted route in magenta. In the background, a CUBE surface is overlaid on RNC 12352.*

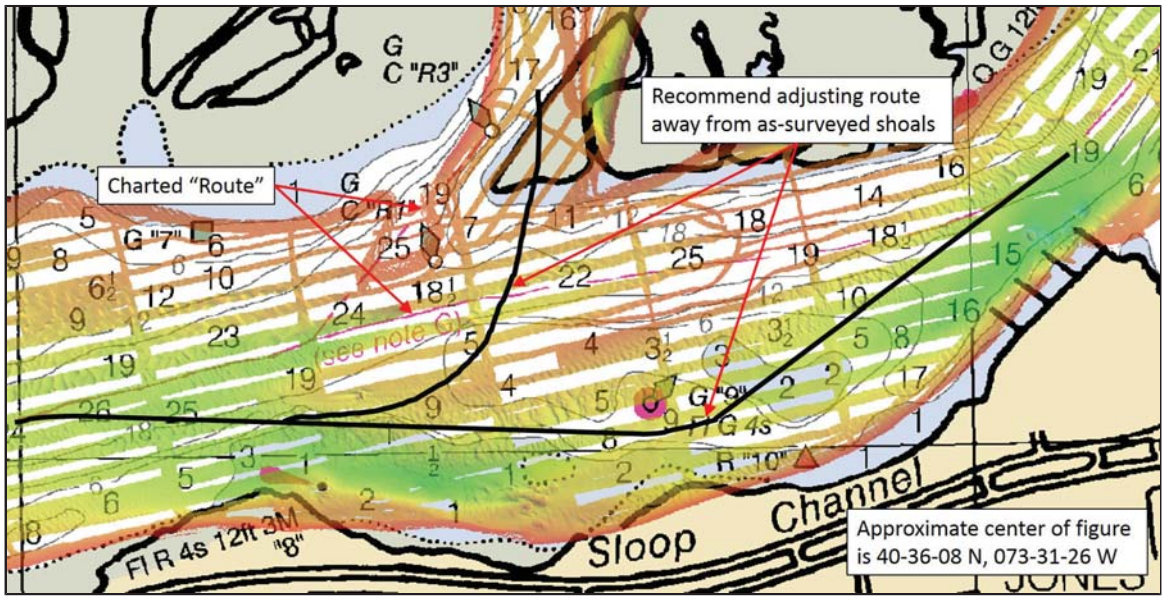

Figure 62: *Suggested route adjustments for Sloop Channel and the southern entrance to Hunts Creek are highlighted in black in respect to the charted routes in magenta. In the background, a CUBE surface is overlaid on RNC 12352.Recommended Route Adjustment - Sloop Channel at Haunts Creek.*

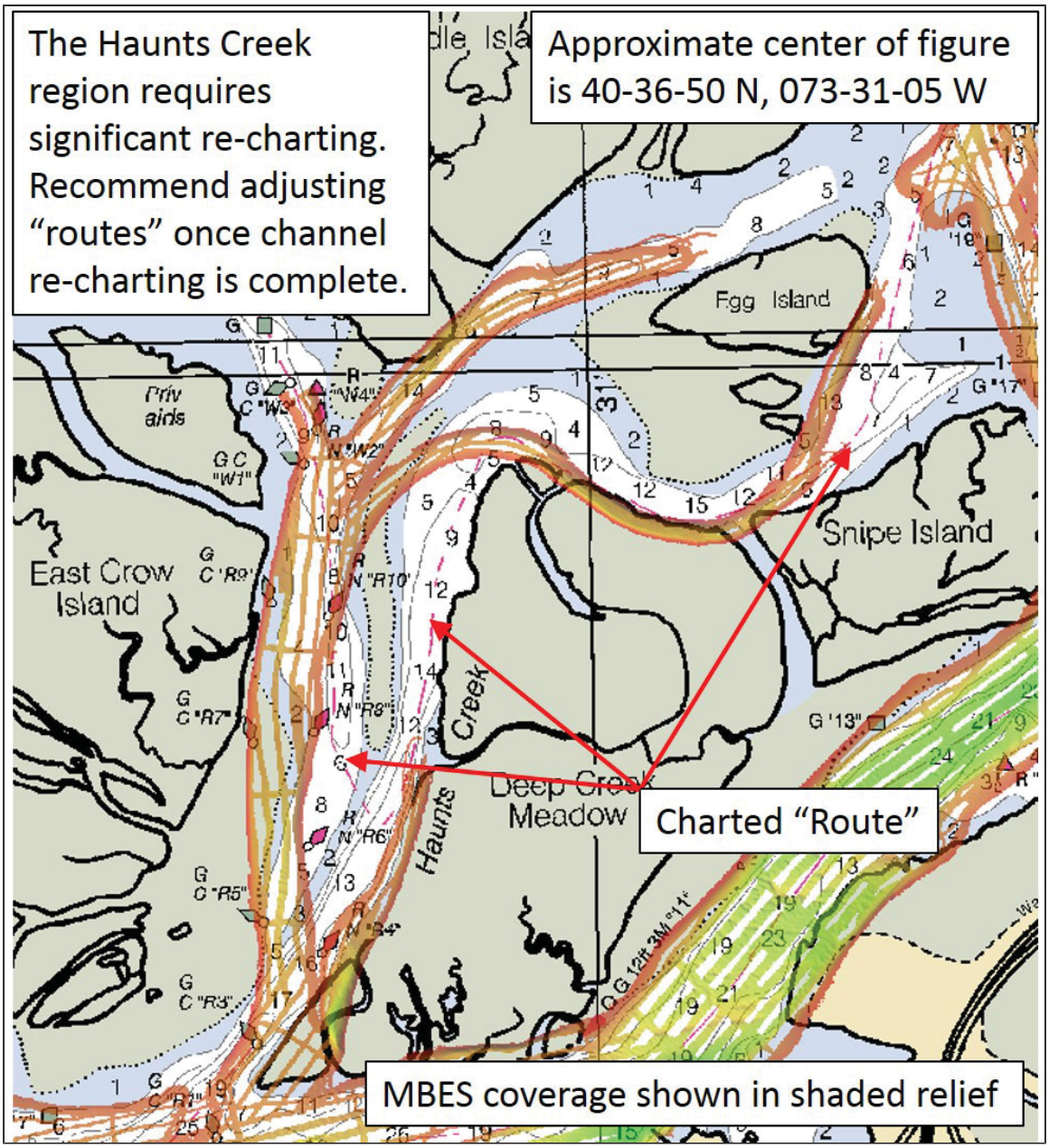

Figure 63: *The image highlights the charted routes (magenta line) in Haunts Creek that require adjustment. In the background, a CUBE surface is overlaid on RNC 12352.*

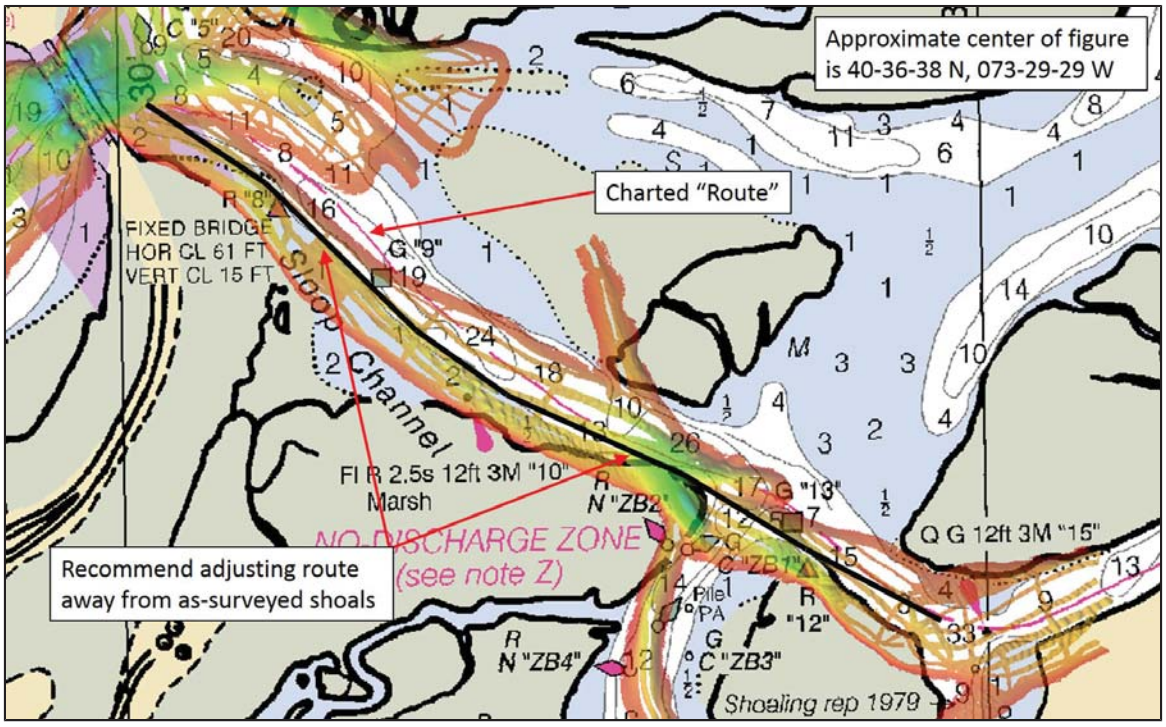

Figure 64: *A suggested route adjustment for Sloop Channel south of South Line Island is highlighted in black in respect to the charted route in magenta. In the background, a CUBE surface is overlaid on RNC 12352.*

D.2.11 RNC 12352 - Note D

The text for Note D on RNC 12352 is positioned over a marsh area north of Reynolds Channel at approximate position 40-35-44 N, 73-41-36. All RNC areas referencing Note D are, geographically, relatively far away to the north and east of the note.

There are numerous instances of ENC "Caution Areas" that have the same description as RNC Note D, "No recent hydrography. Private aids mark best water." Three of the ENC "Caution Areas" having this notation are located within or close to the limits of Survey H12607. Due to their geographic proximity to the RNC Note D text it is assumed that the RNC Note D text was intentionally placed to maintain this geographic proximity. However, the three ENC Caution Areas described herein do not have an RNC counterpart. Therefore, the RNC Note D text appears to be positioned in an unusual location as it is not located near any of the RNC areas described by Note D. Although there may not be a negative consequence, the RNC chart user may mistakenly infer, from the Note's proximity to Reynolds Channel, that this is the channel that has "no recent hydrography."

It is recommended that the RNC 12352 Note D text is moved from the position listed above to a location closer to the areas described by this note. It may be appropriate to trade note positions with the RNC 12352 Rip Rap Caution note located at approximate position 40-37-05 N, 73-38-01 W. It is also recommended that the three ENC Caution Areas discussed in the prior paragraph be removed from ENC US5NY53M since the content of the caution note is no longer valid. The three ENC caution symbols are located at the following positions:

1) 40-35-39.53 N, 73-41-06.05 W, 2) 40-36-07.54 N, 73-40-59.60 W, and 3) 40-36-08.71 N, 73-41-11.77 W. Figure 65 provides an overview of the area discussed above.

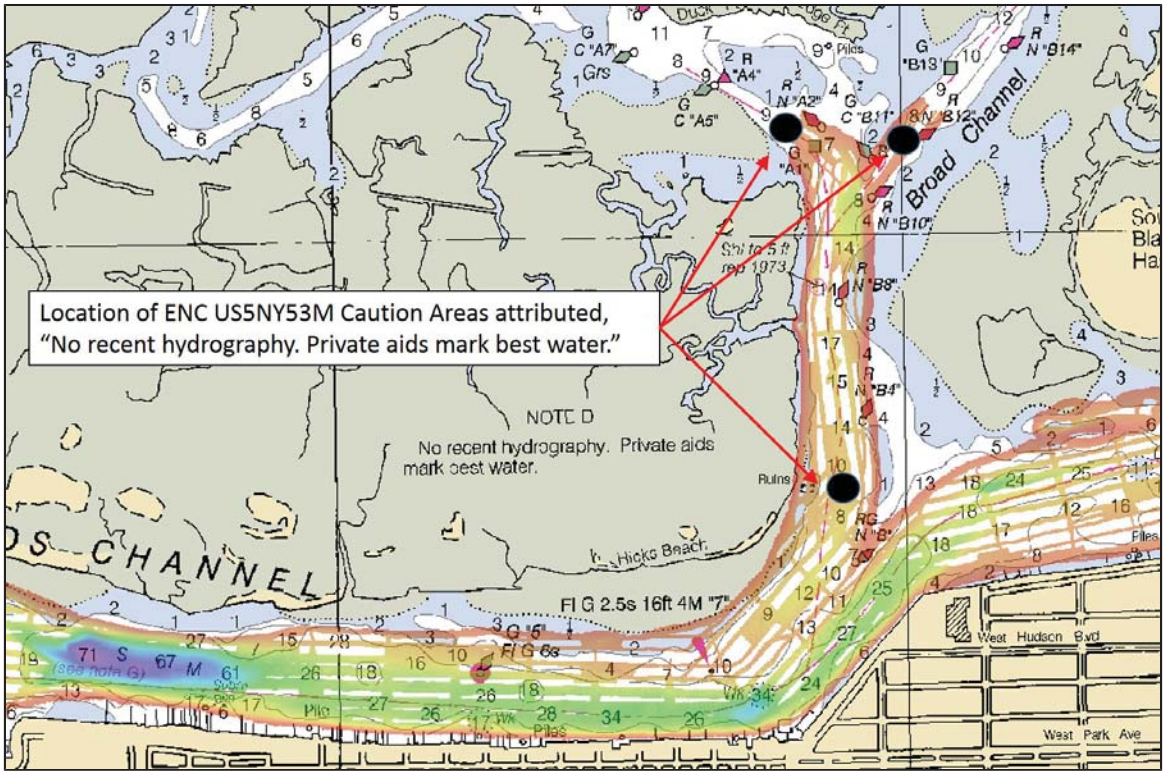

Figure 65: *The locations within Broad Channel of the Caution Areas from ENC US5NY53M are highlighted as black circles. The caution area point features contain the same information stated in Note D on RNC 12352.*

D.2.12 New Survey Recommendation

Refer to recommendations offered in the preceding paragraphs.

D.2.13 New Inset Recommendation

No new insets are recommended for this area.

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, 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
George G. Reynolds	Chief of Party	09/29/2014	

APPENDIX I

TIDES AND WATER LEVELS

Abstract of Times of Hydrography

The table below, "Abstract of Times of Hydrography," summarizes the days in which data were collected that contribute to the final accepted data set.

Date	Day Number	Min. Time UTC	Max. Time UTC
Jan 18, 2014	018	16:24:14	21:14:26
Jan 19, 2014	019	13:03:00	21:05:50
Jan 20, 2014	020	12:57:34	21:28:40
Jan 21, 2014	021	13:12:43	17:48:50
Jan 23, 2014	023	14:11:10	20:40:55
Jan 24, 2014	024	17:43:42	21:25:34
Jan 26, 2014	026	16:54:18	21:09:20
Jan 27, 2014	027	13:05:00	19:37:13
Jan 28, 2014	028	13:14:33	21:18:03
Jan 30, 2014	030	15:17:46	21:09:47
Jan 31, 2014	031	12:51:57	19:36:13
Feb 1, 2014	032	12:51:34	21:28:08
Feb 2, 2014	033	12:39:34	21:22:06
Feb 3, 2014	034	13:59:21	21:50:18
Feb 4, 2014	035	13:07:51	21:14:55
Feb 5, 2014	036	13:42:16	21:40:23
Feb 6, 2014	037	13:00:51	21:49:30
Feb 7, 2014	038	12:29:10	20:37:11
Feb 8, 2014	039	13:00:01	21:14:09
Feb 9, 2014	040	12:48:55	21:41:09
Feb 10, 2014	041	14:09:38	21:43:26
Feb 11, 2014	042	13:25:40	20:52:58
Feb 12, 2014	043	12:43:07	21:41:33
Feb 15, 2014	046	12:55:15	19:17:47
Feb 16, 2014	047	13:13:06	19:40:25
Feb 17, 2014	048	13:15:50	21:16:37
Feb 18, 2014	049	13:03:43	20:56:46
Feb 19, 2014	050	13:51:03	21:22:25
Feb 20, 2014	051	12:49:06	20:59:29
Feb 21, 2014	052	12:37:34	20:20:26
Feb 22, 2014	053	12:51:35	21:18:18
Feb 23, 2014	054	13:10:26	20:26:18
Feb 24, 2014	055	13:04:10	20:24:32
Feb 25, 2014	056	13:08:07	21:50:48
Feb 26, 2014	057	12:57:28	21:47:13
Feb 27, 2014	058	14:35:23	19:29:12

Tide and Zoning Discussion

Per the Project Instructions, the survey is controlled by three tide stations:

1) NOS-NOAA Sandy Hook, NJ (853-1680)
2) Short term, subordinate station Long Beach, NY (851-6663)
3) Short term, subordinate station Green Island, NY (851-6155)

The short term, subordinate stations were installed and operated by OSI and OSI's tides subcontractor JOA Surveys of Anchorage, AK. Preliminary tidal zoning provided by NOAA CO-OPS in the Tides SOW was superseded by final zoning produced by JOA Surveys. The final zoning scheme, "C301KR2013CORP_20140509.zdf" as well as subordinate tide station water levels were accepted by CO-OPS in a letter dated July 16, 2014. Final project data are delivered with verified tides applied using the zoning file discussed above. These support data are included with the deliverables for this survey.

Based on the results of cross line analysis, it appears that the time and range factors as provided in the final zoning scheme are adequate.

Coordinated Universal Time (UTC) was used to annotate the tide records and all other data obtained in this project.

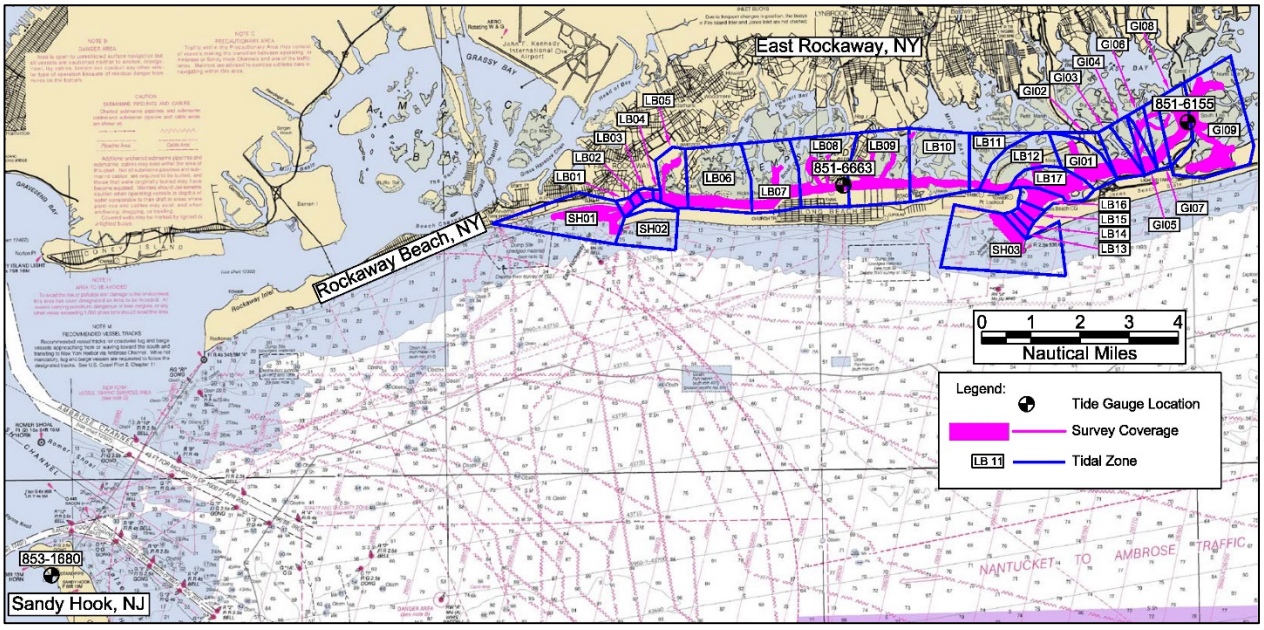

Figure 1. Project survey area overview, tidal zone boundaries (blue lines), and the project tide station locations.

Table 2
Final Accepted Tide Zones for Project OPR-C301-KR-13

Zone	Time Correction (minutes)	Range Correction
SH01	-18	1.000
SH02	-24	0.900
SH03	-30	0.800
LB01	-29	1.003
LB02	-26	1.003
LB03	-23	1.002
LB04	-19	1.001
LB05	-15	1.000
LB06	-10	1.000
LB07	-5	1.000
LB08	0	1.000
LB09	-4	0.983
LB10	-9	0.966
LB11	-14	0.949
LB12	-19	0.930
LB13	-41	0.845
LB14	-39	0.862
LB15	-34	0.879
LB16	-29	0.896
LB17	-24	0.913
GI01	-35	1.207
GI02	-30	1.177
GI03	-25	1.148
GI04	-20	1.118
GI05	-15	1.090
GI06	-10	1.059
GI07	-5	1.029
GI08	0	1.000
GI09	5	0.970

Letters Transmitting Tide Data to CO-OPS

MARINE AND FRESHWATER
SURVEY SERVICES

OCEAN SURVEYS, INC.
129 MILL ROCK ROAD EAST
OLD SAYBROOK, CT 06475
TEL. (860) 388-4631 FAX (860) 388-5879
www.oceansurveys.com

January 29, 2014

CO-OPS Ocean Engineering Team (OET).
1305 East-West Highway
Silver Spring, MD 20910

SUBJECT: TRANSMITTAL OF TIDE STATION INSTALLATION REPORT for 8516663 LONG BEACH, NEW YORK

The installation report for tide station 8516663 Long Beach, NY has been posted to our ftp site for retrieval. Station 8516663 was installed as a subordinate tide station in support of hydrographic survey project OPR-C301-KR-13. The information you will need to retrieve the report is listed below:

Host: ftp-oceansurveys.egnyte.com
Username: osi-noaa$oceansurveys
Password: NewYorkSurveys
File name: /Shared/Project-Folders/NOAA/8516155 Long Beach Install Report 20140116.rar

Sincerely,

John R. Bean Jr.
Hydrographer

JRB/lf
Enclosures

• OLD SAYBROOK, CT • METAIRIE, LA • NORTHBROOK, IL •

MARINE AND FRESHWATER
SURVEY SERVICES

OCEAN SURVEYS, INC.
129 MILL ROCK ROAD EAST
OLD SAYBROOK, CT 06475
TEL. (860) 388-4631 FAX (860) 388-5879
www.oceansurveys.com

March 28, 2014

CO-OPS Ocean Engineering Team (OET).
1305 East-West Highway
Silver Spring, MD 20910

SUBJECT: TRANSMITTAL OF TIDE STATION REMOVAL REPORT for 8516663 LONG BEACH, ISLAND PARK, NEW YORK

The removal report for tide station 8516663 Green Island, Island Park, NY has been posted to our ftp site for retrieval. Station 8516663 was installed as a subordinate tide station in support of hydrographic survey project OPR-C301-KR-13. The information you will need to retrieve the report is listed below:

Host: ftp-oceansurveys.egnyte.com
Username: osi-noaa$oceansurveys
Password: NewYorkSurveys
File name: /Shared/Project-Folders/NOAA/8516663 Long Beach Removal Report 20140327.zip

Sincerely,

John R. Bean Jr.
Hydrographer

JRB/lf
Enclosures

• OLD SAYBROOK, CT • METAIRIE, LA • NORTHBROOK, IL •

MARINE AND FRESHWATER
SURVEY SERVICES

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OLD SAYBROOK, CT 06475
TEL. (860) 388-4631 FAX (860) 388-5879
www.oceansurveys.com

January 29, 2014

CO-OPS Ocean Engineering Team (OET).
1305 East-West Highway
Silver Spring, MD 20910

SUBJECT: TRANSMITTAL OF TIDE STATION INSTALLATION REPORT for 8516155 GREEN ISLAND, NEW YORK

The installation report for tide station 8516155 Green Island, NY has been posted to our ftp site for retrieval. Station 8516155 was installed as a subordinate tide station in support of hydrographic survey project OPR-C301-KR-13. The information you will need to retrieve the report is listed below:

Host: ftp-oceansurveys.egnyte.com
Username: osi-noaa$oceansurveys
Password: NewYorkSurveys
File name: /Shared/Project-Folders/NOAA/8516155 Green Island Install Report 20140116.rar

Sincerely,

John R. Bean Jr.
Hydrographer

JRB/lf
Enclosures

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TEL. (860) 388-4631 FAX (860) 388-5879
www.oceansurveys.com

March 28, 2014

CO-OPS Ocean Engineering Team (OET).
1305 East-West Highway
Silver Spring, MD 20910

SUBJECT: TRANSMITTAL OF TIDE STATION REMOVAL REPORT for 8516155 GREEN ISLAND, WANTAGH, NEW YORK

The removal report for tide station 8516155 Green Island, Wantagh, NY has been posted to our ftp site for retrieval. Station 8516155 was installed as a subordinate tide station in support of hydrographic survey project OPR-C301-KR-13. The information you will need to retrieve the report is listed below:

Host: ftp-oceansurveys.egnyte.com
Username: osi-noaa$oceansurveys
Password: NewYorkSurveys
File name: /Shared/Project-Folders/NOAA/8516155 Green Island Removal Report 20140328.zip

Sincerely,

John R. Bean Jr.
Hydrographer

JRB/lf
Enclosures

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129 MILL ROCK ROAD EAST
OLD SAYBROOK, CT 06475
TEL. (860) 388-4631 FAX (860) 388-5879
www.oceansurveys.com

June 5, 2014

NOAA/National Ocean Service/CO-OPS
Chief, Engineering Division
N/OPS1 - SSMC4, Station 6531
1305 East-West Highway
Silver Spring, MD 20910

SUBJECT: TRANSMITTAL OF TIDE ZONING REPORT, PROJECT OPR-C301-KR-13,
EAST ROCKAWAY INLET, NY

Dear Chief,

The tide zoning report and supporting files for Project OPR-C301-KR-13 are forwarded via e-mail. The attached compressed file, "OPR-C301-KR-13_Tide_Zoning_Report.ZIP", contains the following:

- This transmittal letter;
- Tide zoning report in .PDF format;
- CARIS compatible .ZDF file;
- Various required GIS files;
- Tabulation of water level data and datum computation summaries referenced in the report and used in creating the updated zoning scheme.

Please don't hesitate to contact me if you have any questions.

Regards,

Robert M. Wallace Jr.

Robert M. Wallace Jr.
Hydrographer

RMW/ms
Enclosures

• OLD SAYBROOK, CT • METAIRIE, LA • NORTHBROOK, IL •

OCS Contractor Validation Memo

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Center for Operational Oceanographic Products and Services
Silver Spring, MD 20910

Date: July 16, 2014

TO: LCDR Michael Gonsalves
Chief, Operations Branch
Hydrographic Services Division
Office of Coast Survey

FROM: Gerald Hovis
Chief, Products and Services Branch
Oceanographic Division
CO-OPS

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: 2014.07.17 10:04:20 -04'00'

RE: Validation of Zoning supplied in support of OPR-C301-KR-2013, East Rockaway, Jones, Shark & Manasquan Inlets, NY & NJ

John Oswald & Associates (JOA) submitted discrete tidal zoning for validation by CO-OPS based on subordinate water level data collected at Long Beach (851-6663) and Green Island Drawbridge (851-6155). CO-OPS finds the water level data as well as discrete zoning submitted in support of OPR-C301-KR-2013 to be valid and meet the requirements under NOS Specifications and Deliverables.

CO-OPS bases its validation of the contractor supplied zoning on the following reasons:

1. JOA's method to develop final zoning geometry and tide correctors is reasonable
2. The estimate of total propagated error within the survey area using JOA's final tidal zoning and provided zoning station water level data (USGS water level gauge) is within 0.18 meters.

CO-OPS offers the following recommendation:

- Although it is not required to generate new tidal zone geometry when HWI, LWI, and MN contours are created, it is recommended to do so. Designing tidal zoning to roughly mirror the co-phase and co-range contours of a given area will allow for better precision when determining the HWI, LWI, and MN values for each particular zone. This will, in turn, allow for more precision in determining the time and range corrector values for each particular zone. JOA is encouraged to develop new zoning geometry when new data is collected.

CC:
Jeff Ferguson
Patrick Burke
Michael Brown
Matthew Jaskoski
Castle "Gene" Parker
LCDR Ben Evans
Laura Rear McLaughlin
Corey Allen
Cristina Urizar
Grant Froelich
Colleen Fanelli

Tides Statement of Work

Content within the Tides Statement of Work was superseded by the final Hydrographic Survey Project Instructions which stated that it was only necessary to install two subordinate tide stations, Green Island, NY (851-6155) and "Central South Oyster Bay (851-AAAA)" which, it was eventually decided would become Long Beach (851-6663).

STATEMENT OF WORK
OPR-C301-KR-2013 East Rockaway, Jones, Shark & Manasquan Inlets, NY&NJ
(05/06/2013 LH)

1.0. TIDES AND WATER LEVELS

1.1. Specifications

Tidal data acquisition, data processing, tidal datum computation and final tidal zoning shall be performed utilizing sound engineering and oceanographic practices as specified in National Ocean Service (NOS) Hydrographic Surveys Specifications and Deliverables (HSSD), dated April 2013.

1.2. Vertical Datums

The tidal datums for this project are Chart Datum, Mean Lower Low Water (MLLW) and Mean High Water (MHW). Soundings are referenced to MLLW and heights of overhead obstructions (bridges and cables) are referenced to MHW.

1.2.1. The **Hydro Hot List (HHL)**

Please contact CO-OPS' Hydrographic Planning Team (HPT) at nos.coops.hpt@noaa.gov and CO-OPS' Operational Engineering Team (OET) at nos.coops.oetteam@noaa.gov at least three business days before survey operations begin, and within 1 business day after survey operations are completed so that the appropriate CO-OPS National Water Level Observation Network (NWLON) control water level station(s) is/are added to or removed from the CO-OPS Hydro Hotlist (HHL) (http://tidesandcurrents.noaa.gov/hydro). Include start and end survey dates, full project number (e.g. OPR-H355-TJ-10), and control and subordinate station numbers. The notification must be sent to both teams.

Station	Station ID	Control or Subordinate	Type (e.g. NWLON, PORTS©, etc)	Comment
Sandy Hook	8531680	Control	NWLON	

Table 1: All stations that need to be added to the HHL in support of C301-KR-2013

This project requires a subordinate installation. Therefore, please contact OET and HPT via e-mail at least three business days before the subordinate stations are installed and send the site report listing the DCP and sensor serial numbers so that stations can be configured in the database. For station removal, inform OET and HPT 3 business days prior to the actual removal of a station and confirm with OET upon final station removal.

It is important to know that the addition of a water level station to the HHL ensures the station is monitored by CORMS and any problems are reported daily. However, platforms should view the

HHL each morning of active survey operations and click on the eyeball icon to double check that there are not problems with the required stations on that day. If a platform notices problems with data on their survey day of operation, please contact HPT at nos.coops.hpt@noaa.gov, CORMS at CORMS@noaa.gov, and their respective headquarters point of contact at HSD or NSD. Stations on the HHL are given priority for maintenance should a station cease normal operation during scheduled times of hydrography. CO-OPS will notify a field unit within 1 business day if a HHL water level station ceases operation during scheduled times of hydrography. This is in addition to the daily CORMS report that CORMS sends to NOAA field units, if the field unit's e-mail address is added to the CORM's daily e-mail list. To be added to the CORMS daily HHL report, the platform should contact CO-OPS' Data Monitoring and Analysis Team (DMAT) at nos.co-ops.dmat@noaa.gov and request to be added.

If the stations are listed on HHL, then weekly priority processing will occur and, for those water level stations, verified 6-minute water level data will be made available every week on Monday or Tuesday. If Monday happens to be a federal holiday, then the 6-minute verified water level data will be made available on the following Tuesday or Wednesday.

1.3. Tide Reducer Stations

The operating water level station at Sandy Hook, NJ (8531680) will also provide water level reducers for this project. Therefore it is critical that it remains in operation during the survey.

1.3.1. CO-OPS Long Term Water Level Station Operation Maintenance

The operating National Water Level Observation Network (NWLON) station at Sandy Hook, NJ (8531680) serves as datum control for the short-term stations Green Island Drawbridge, NY (8516155), Point Lookout, NY (8516385), Far Rockaway, NY (8516881) and 851AAAA for the survey area. Therefore, it is critical that this station remain in operation during all periods of hydrography.

During periods of hydrography, CO-OPS is only responsible for the operation and maintenance of NWLON control stations and the contractor is responsible for the maintenance and operations of all contractor installed (tertiary) stations. The contractor is required to monitor the NWLON control water level data via the CO-OPS Web site at http://tidesandcurrents.noaa.gov/hydro.shtml or through regular communications with the OCS COTR or the OCS COTR's CO-OPS authorized point of contact (Colleen Roche at 301-713-2897 x137 or via e-mail: nos.coops.oetteam@noaa.gov) before and during operations. The OCS COTR or the COTR's CO-OPS authorized point of contact (Colleen Roche) will serve as liaison between the contractor and NOS/CO-OPS to confirm operation of this station and to ensure the acquisition of NWLON control water level data during periods of hydrography. Problems or concerns regarding the acquisition of valid water level data identified by the contractor shall be communicated with the OCS COTR or the COTR's CO-OPS authorized point of contact (Colleen Roche) to coordinate the appropriate course of action to be taken such as gauge repair and/or developing contingency plans for hydrographic survey operations.

1.3.2. Subordinate Station Requirements

For this project, it will be necessary to install and continuously operate a water level measurement system (tide gauge) at a subordinate station location. This station will provide information on tidal datums, water level reducers, refinement of final zoning and harmonic constituents for predictions. The station listed in Section 1.2.1. will provide control for datum computation at the subordinate station by using the NOS method of comparison of simultaneous observations.

CO-OPS has also identified additional sites for other programs such as the NOS VDatum program which develops VDatum models that will support future surveys. Subordinate stations Green Island Drawbridge, NY (8516155), Point Lookout, NY (8516385), Far Rockaway, NY (8516881) and 851AAAA should be installed in support of the VDatum program in the area of East Rockaway, Jones, Shark & Manasquan Inlets, NY&NJ.

A 30-day minimum of continuous data acquisition is required. For the subordinate station, data must be collected throughout the entire survey period in specified areas for which it is applicable, from 4 hours before to 4 hours after the period of hydrography and not less than 30 continuous days. This is necessary to facilitate the computation of an accurate datum reference as per NOS standards.

Additionally, supplemental and/or back-up stations may also be necessary based upon the complexity of the hydrodynamics and/or the severity of environmental conditions of the project area. The installation of additional stations is left to the discretion of the contractor, subject to the approval of the COTR.

The following subordinate stations are to be installed:

Station Number	Station Name	Latitude(N)	Longitude(W)
8516155*	Green Island	40° 37.4’	73° 30.1’
8516385*	Point Lookout	40° 35.2’	73° 34.7’
8516881*	Far Rockaway	40° 35.7’	73° 44.6’
851AAAA**	Long Beach	40° 35.8’	73° 39.2’

* Historical water level station information has been provided for these stations.

** Conduct reconnaissance of the area to establish a suitable location for the placement of the water level gauge and provide the CO-OPS personnel listed in Section 1.2.1 with the proposed name and location. CO-OPS/ED will confirm this and then assign a station number. **Do not install these subordinate gauges prior to receiving assigned station numbers. If it is necessary to change the location of a gauge by more than ¼ mile from its assigned location and a station number has already been assigned, then contact CO-OPS/Engineering Division personnel prior to the installation of the gauge.**

1.3.3. Tide Component Error Estimation

The estimated tidal error contributions to the total survey error budget in the vicinity of Shark River Inlet, Manasquan Inlet and southern Long Island areas are 0.19, 0.14 m and 0.48 m, respectively, at the 95% confidence level, and include the estimated gauge measurement error, tidal datum computation error, and tidal zoning error. Based on this analysis, subordinate stations are required at Green Island Drawbridge, NY (8516155) and 851AAAA for the survey area in Rockaway and Jones Inlet, NY. It should be noted that the tidal error component can be significantly greater than stated if a substantial meteorological event or condition should occur during time of hydrography.

1.3.4. Water Level Records: Submit water level data, such as leveling records, field reports, and any other relevant data/reports, including the data downloaded onto diskette/CD within 1 week after

the end of each month or the end of hydrography to CO-OPS/Engineering Division (ED). Refer to Section 1.1.

1.3.4.1. Water level records should be forwarded to the following address:

NOAA/National Ocean Service/CO-OPS
Chief, Engineering Division
N/OPS1 - SSMC4, Station 6531
1305 East-West Highway
Silver Spring, MD 20910

1.3.5. Recover all historical bench marks at each required subordinate water level station. If any bench marks are destroyed or not found, install new bench marks to replace them. In the event of a new station with no historical marks, installation of a minimum of five bench marks will be required. Third-order levels from the tide staff or sensor to a minimum of five bench marks (including the primary bench mark) are required at the beginning and end of the survey period. See Section 1.1. for clarification of requirements.

1.3.5.1. Hand held GPS latitude and longitude positions on all historical subordinate water level station bench marks are required. In addition, one of the subordinate water level station bench marks shall be selected for high accuracy static differential GPS observations to obtain ties between the tidal datums and GPS derived datums. Refer to Section 1.1 for further details on the GPS positioning requirements.

1.3.6. Operate the water level stations listed in Section 1.3.1. of this Statement of Work for the following hydrographic area(s) or zone(s):

Station Number	Hydrographic Area(s) or Zone(s)
8516881	SA1, FIR1, FIR2, FIR3, FIR4, FIR5 & FIR17
851AAAA	FIR18, FIR19, FIR20 & FIR21
8516385	SA4, FIR10, FIR11, FIR12, FIR13, FIR14, FIR15 & FIR24
8516155	FIR27, FIR28, FIR30, FIR31, FIR32, FIR33 & FIR34

1.4. Zoning

1.4.1. The water level station at Sandy Hook, NJ (8531680) is the reference station for predicted tides for hydrography in the area of East Rockaway, Jones, Shark & Manasquan Inlets, NY&NJ. The time and height correctors listed below for applicable zones should be applied to the preliminary tides at the station indicated during the acquisition and preliminary processing phases of this project. Preliminary data may be retrieved in one month increments over the Internet from the CO-OPS website at **http://opendap.co-ops.nos.noaa.gov/axis/text.html.** The contractor must notify the COTR or the COTR's authorized representative immediately of any problems concerning the predicted tides. Predictions are six-minute time series data relative to MLLW in metric units on Greenwich Mean Time. For the time corrections, a negative (-) time correction indicates that the time of tide in that zone is earlier than (before) the predicted tides at the reference station. A positive (+) time correction indicates that the time of tide in that zone is later than (after) the predicted tides at the reference station. For height corrections, the water level heights **relative to MLLW** at the reference

station are multiplied by the range ratio to estimate the water level heights relative to MLLW in the applicable zone.

Zone	Time Corrector(mins)	Range Ratio	Predicted Reference Station
SA1	-18	x1.00	8531680
SA2	-24	x0.96	8531680
SA4	-30	x0.87	8531680
SA14	-36	x0.91	8531680
FIR1	-12	x0.96	8531680
FIR2	-12	x0.91	8531680
FIR3	-12	x0.87	8531680
FIR4	-6	x0.84	8531680
FIR5	-6	x0.82	8531680
FIR10	-24	x0.83	8531680
FIR11	-18	x0.79	8531680
FIR12	-12	x0.76	8531680
FIR13	-6	x0.72	8531680
FIR14	+12	x0.69	8531680
FIR15	+24	x0.70	8531680
FIR17	+6	x0.80	8531680
FIR18	+42	x0.73	8531680
FIR19	+12	x0.79	8531680
FIR20	+24	x0.77	8531680
FIR21	+36	x0.74	8531680
FIR23	+42	x0.70	8531680
FIR24	+24	x0.66	8531680
FIR25	+42	x0.66	8531680
FIR27	+42	x0.62	8531680
FIR28	+54	x0.62	8531680
FIR30	+78	x0.53	8531680
FIR31	+96	x0.49	8531680
FIR32	+66	x0.59	8531680
FIR33	+72	x0.56	8531680
FIR34	+54	x0.59	8531680
MANR1	-24	x0.87	8531680
MANR2	-18	x0.84	8531680
ASR1	-24	x0.91	8531680
ASR2	-18	x0.91	8531680

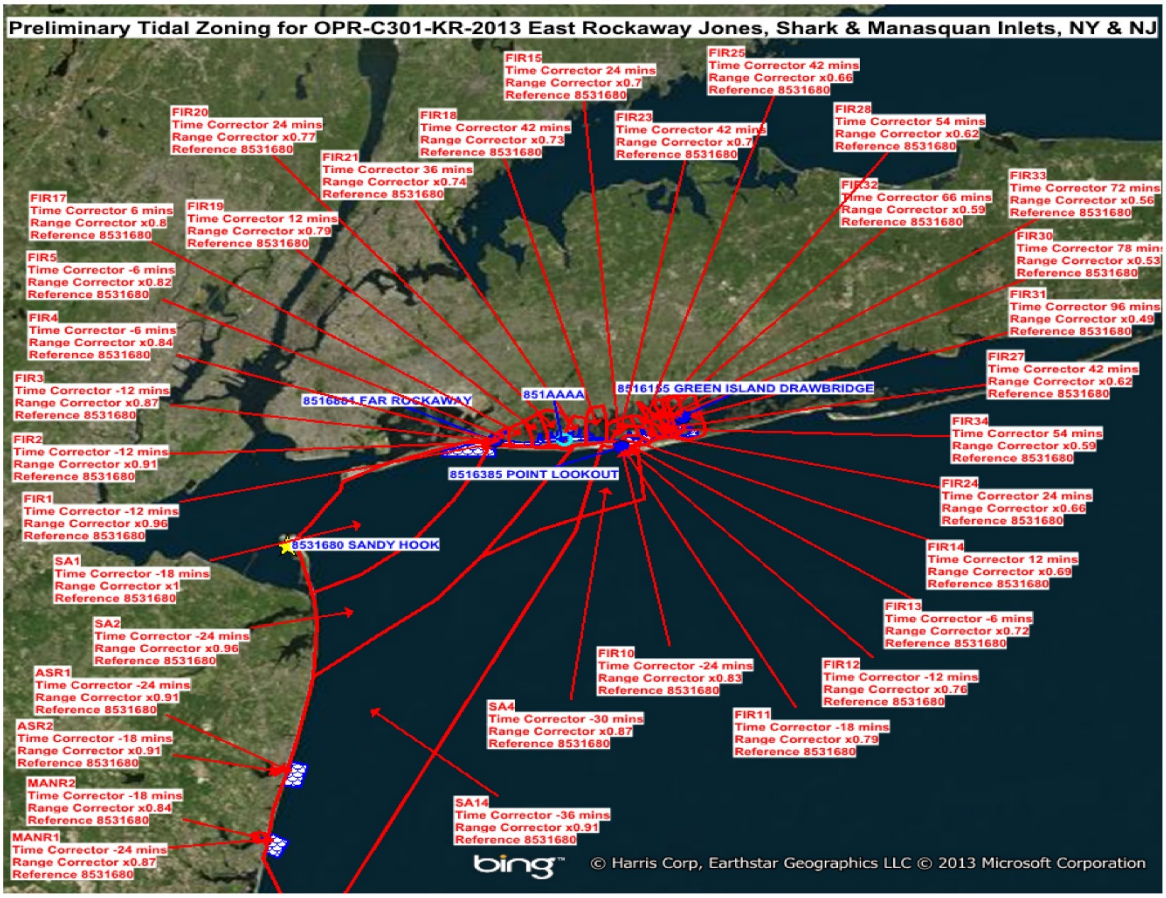
1.4.2. Polygon nodes and water level corrections referencing Sandy Hook, NJ (8531680) are provided. Zoning diagrams, created in MapInfo®, are provided digitally to assist with the zoning. Longitude and latitude coordinates are in decimal degrees. Negative (-) longitude is a MapInfo® representation of West longitude.

"Preliminary" data for the control water level station, Sandy Hook, NJ (8531680), are available in near real-time and verified data will be available on a weekly basis for the previous week. These

water level data may be obtained from CO-OPS SOAP web services at http://opendap.co-ops.nos.noaa.gov/axis/text.html.

1.4.3 Zoning Diagram(s)

Zoning diagrams, created in MapInfo® and Adobe PDF, are provided in digital format to assist with the zoning in section 1.4.1.



APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

From: David Scharff - NOAA Federal <david.scharff@noaa.gov>
Sent: Thursday, March 28, 2013 3:57 PM
To: George Reynolds
Subject: Re: Jamaica Bay Discussion Topics

Hi George,

We discussed your project this morning, here is what I have so far regarding your questions:

1) Any temporary features (e.g. temporary mornings) do not need to be addressed. If you cannot access an area because of obstructions such as mooring fields it would be acceptable to make a statement in the DR discussing the reason for the data gap.

2) You will not need to identify docks, we will acquire these features using airborne data.

3) Same as #2

4) We are looking into this. I will get back to you with more guidance.

5) That would be acceptable. FYI - the inshore requirements for this project have changed, it is now 100% SSS from 2-4 meters with concurrent MB, and 200% SSS for 4+ meters with concurrent MB. Sorry I just found this out today.

6) Refer to new requirements (#5).

7) This approach would be acceptable.

Dave

On Wed, Mar 27, 2013 at 12:34 PM, George Reynolds <ggr@oceansurveys.com> wrote:

> Hi Lori, David
>
> We have a few questions regarding the level of mapping effort NOAA will require in specific sections of the study area. The images below are provided to aid our discussion.
>
> Moorings and Docks


12/30/2004


11/5/2012
Shellbank Basin
293 ft

1) There are numerous moorings deployed in reaches of the study area. What will the SOW require to capture chart information in these areas?

A few possible approaches may include:

- treat as a development area and include any significant anchor weights in the final surface
- locate each mooring
- make a general statement in the DR discussing the presence of a mooring field
- provide an approximate mooring field perimeter polyline

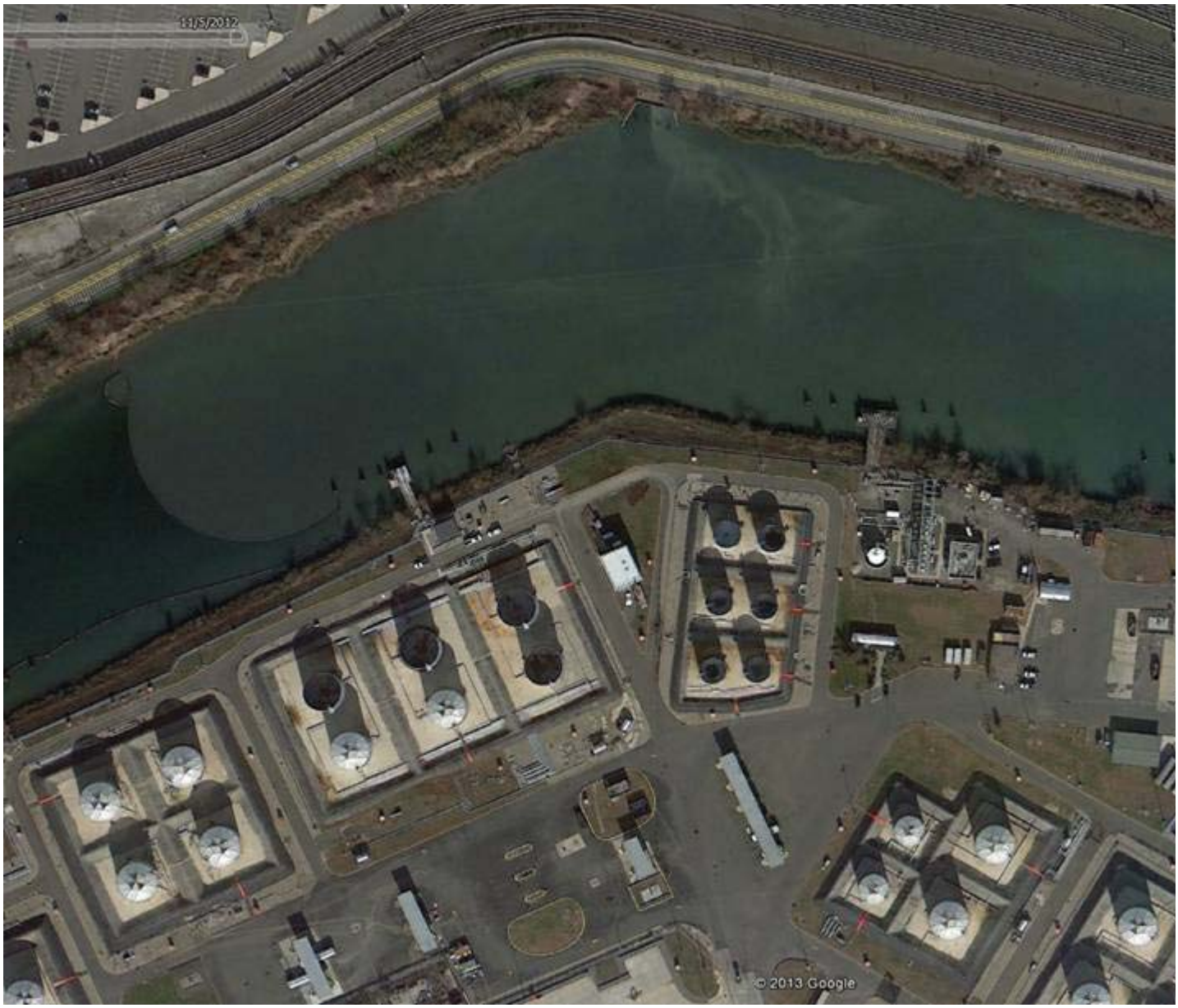
2) There are numerous docks that appear to extend out into depths greater that 2 meters. What level of mapping will be required to locate these features.

A few possible approaches may include:

- Locate every piling using GPS receivers
- Locate the structures with SSS
- Locate structures with MB
- Locate structures with a laser scan system

3) There are also docks that appear to be located in less than 2 meters of water. Is there a requirement to locate these structures?

<u>Booms and Containment Areas</u>



4) There are cases where containment booms cross the waterway. We assume that the survey will extend into these blocked areas. If so, will NOAA be able to provide a letter of introduction that we can transmit to State and City Departments along with interested private property owners as needed in attempt to gain access to these restricted reaches?

Other Items

5) We would propose to meet the 200% side scan coverage in 4 meters of water by running the shore most or shoalest line twice (once as a 100% line and again as a 200% line). Would this be acceptable?

6) There may be cases where it may be more efficient to run “single beam” lines using the MB system. In these cases, we would process and present only the MB Nadir data. Would this be an acceptable approach?

7) There may also be operational efficiency realized by acquiring side looking multibeam data along channel banks. Specifically, banks with relatively short shallow water expanses of less than 4 meters. Would side looking multibeam data be acceptable in these areas?

Thanks

George

George Reynolds

Ocean Surveys, Inc.

129 Mill Rock Road East

Old Saybrook, CT 06475

860 388 4631 Ext 112

www.oceansurveys.com

From: Paul Turner - NOAA Federal <paul.turner@noaa.gov>
Sent: Wednesday, November 27, 2013 2:25 PM
To: David Somers
Cc: George Reynolds
Subject: Re: H12604 Questions

Good morning Dave-

With regard to questions 1, I can get you an example of a contact point deliverable next Monday when I'm back in the office.

200% SSS is sufficient to disprove so long as is no detectable 'contact' within the imagery within the search radius. So if you covered with 200% sss and you do not see anything, this item will be considered disproved. I assume you ran concurrent MB during SSS operations?

And regarding AWOIS 15127, if you surveyed what you can safely access around the item then that should be sufficient. No need to risk the safety of the crew or survey vessel and you can just document that you were unable to completely cover the search radius due to shallow, unsafe conditions and remain debris. So no further investigations are required.

I am out of the office today but can be reached on my cell phone if you would like to discuss any of the items in more detail. 301-802-1631.

Happy Thanksgiving!

Paul

On Wed, Nov 27, 2013 at 9:11 AM, David Somers <dts@oceansurveys.com> wrote:

> Paul,
>
> We have a few questions:
>
> 1. For 2013, side scan sonar contact point deliverable has changed to an S-57 file. For our clarification, the correlation information goes in the remrks field? Could you provide us with an example?
>
> 2. Just confirming that 200% side scan sufficient to disprove an "full investigation" AWOIS item?
>
> 3. For AWOIS 15127, the center and a large portion of search radius lies within a piling field from a former marina that existed in 1990s and appears to be shoaler than 2 meters. This area is also covered by an assigned "foul area". We believe that we have surveyed to the extent of safe navigation and have acquired side scan that covers the perimeter of the relic marina. We also have several low tide photos. Please see attached jpg, the red swath coverage is shoaler than 2m. We would recommend marking this whole area "ruins", is any further investigation required?

Thanks,
Dave

--
Paul Turner
Physical Scientist
NOAA - Office of Coast Survey

301-713-2700 *106
Paul.Turner@noaa.gov

APPENDIX III

SURVEY FEATURES REPORT

AWOIS:	4
Maritime Boundaries:	0

Note: DTONs and Wrecks are too numerous to include in this report. DTONs and Wrecks reports are recorded at the Atlantic Hydrographic Branch.

1 - AWOIS Features

1.1) Charted Wreck

Charting Action is Not Addressed

Feature for AWOIS Item #15136

Search Position:	40° 35' 42.5" N, 073° 44' 04.7" W
Historical Depth:	[None]
Search Radius:	50
Search Technique:	Type: WRECK, Itemstatus: ASSIGNED, Searchtype: FULL, Technique: S2 ES MBES
Technique Notes:	

History Notes:

History

L-1356(77)--Wreck PA currently charted as an ED in approx position LAT 40-35-42N / 073-44-4.02. (ENT 6/4/2013 PTT).

Survey Summary

Survey Position:	40° 35' 42.5" N, 073° 44' 04.7" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2006-060.00:00:00.000 (03/01/2006)
Dataset:	H12607_awois.000
FOID:	0_ 0004394602 00001(FFFE00430E6A0001)
Charts Affected:	12350_1, 12352_6, 12326_1, 12300_1, 13006_1, 5161_1, 13003_1

Remarks:

WRECKS/remrks: The wreck was not addressed. The feature was located beyond the safe limits of hydrography to address with sonar. No visual evidence of a wreck was seen with shoreline photography. The AWOIS History is as follows: L-1356(77)--Wreck PA, currently charted as an ED in approx position LAT 40-35-42N / 073-44-4.02. (ENT, 6/4/2013 PTT).

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12607_awois.000	0_ 0004394602 00001	0.00	000.0	Primary

Hydrographer Recommendations

It is recommended that the wreck be retained as charted.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 2:depth unknown
	SORDAT - 20060300
	SORIND - US,US,graph,Chart 12352
	STATUS - 18:existence doubtful
	WATLEV - 3:always under water/submerged

Office Notes

AWOIS Item #15136 feature was not addressed. Retain as charted.

1.2) Charted Visible Wreck

Feature for AWOIS Item #15137

Search Position:	40° 35' 38.6" N, 073° 43' 47.6" W
Historical Depth:	[None]
Search Radius:	50
Search Technique:	Type: WRECK, Itemstatus: ASSIGNED, Searchtype: FULL, Technique: S2 ES MBES
Technique Notes:	

History Notes:

History

L-1356(77)--Wreck PA currently charted as an ED in approx position LAT 40-35-38.67N / 073-43-48.79. (ENT 6/11/2013 PTT).

Survey Summary

Survey Position:	40° 35' 38.6" N, 073° 43' 47.6" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2014-058.00:00:00.000 (02/27/2014)
Dataset:	H12607_awois.000
FOID:	0_ 0004394601 00001(FFFE00430E690001)
Charts Affected:	12352_6, 12326_1, 12300_1, 13006_1, 5161_1, 13003_1

Remarks:

WRECKS/remrks: The search radius of the charted wreck ED was partially developed with MBES coverage and SSS coverage. Most of the 50 meter search radius is located inshore of the 2 meter contour. The remnants of a large wreck were observed visually and positioned with partial 100% SSS coverage. The AWOIS History is as follows: L-1356(77)--Wreck PA, currently charted as an ED in approx position LAT 40-35-38.67N / 073-43-48.79. (ENT, 6/11/2013 PTT).

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12607_awois.000	0_ 0004394601 00001	0.00	000.0	Primary

Hydrographer Recommendations

It is recommended that the wreck's position be updated and the ED annotation removed.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	CONVIS - 1:visual conspicuous
	QUASOU - 2:depth unknown
	SORDAT - 20140227
	SORIND - US,US,graph,H12607
	TECSOU - 2:found by side scan sonar
	WATLEV - 5:awash

Office Notes

Concur with clarification with field recommendation. AWOIS Item #15137 detected visually by the field unit. The search radius was only partially ensonified with the requsite 100% SSS coverage. The side scan imagery includes an object with wreck like appearance that correlates to the photograph. Update the position of the charted wreck, and the associated "ED" annotation is considered disproved and recommended for deletion.

Feature Images

Figure 1.2.1

1.3) Charted Wreck

Charting Action is Not Addressed

Feature for AWOIS Item #15135

Search Position: 40° 35' 50.9" N, 073° 40' 12.4" W

Historical Depth: [None]

Search Radius: 50

Search Technique: Type: WRECK, Itemstatus: ASSIGNED, Searchtype: FULL, Technique: S2 ES MBES

Technique Notes:

History Notes:

History

Source Unknown--Wreck ED approx position LAT 40-35-50.85N / LONG 073-40-12.26W. (ENT PTT 6/4/13).

Survey Summary

Survey Position: 40° 35' 50.9" N, 073° 40' 12.4" W

Least Depth: [None]

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2006-060.00:00:00.000 (03/01/2006)

Dataset: H12607_awois.000

FOID: 0_ 0004394599 00001(FFFE00430E670001)

Charts Affected: 12352_6, 12326_1, 12300_1, 13006_1, 5161_1, 13003_1

Remarks:

WRECKS/remrks: Only a small portion of the search area defined by a 50 meter radius surrounding the charted wreck ED was investigated due to the majority of the search area being inshore of the 2 meter contour. It was not possible to obtain SSS or MBES coverage over the charted wreck ED symbol. The wreck was not observed during a visual inspection of the shoreline. AWOIS History is as follows: Source Unknown--Wreck ED, approx position LAT 40-35-50.85N / LONG 073-40-12.26W. (ENT PTT 6/4/13).

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12607_awois.000	0_ 0004394599 00001	0.00	000.0	Primary

Hydrographer Recommendations

It is recommended that the wreck be retained as charted.

S-57 Data

Geo object 1:	Wreck (WRECKS)
Attributes:	CATWRK - 2:dangerous wreck
	QUASOU - 2:depth unknown
	SORDAT - 20060300
	SORIND - US,US,graph,Chart 12352
	STATUS - 18:existence doubtful
	WATLEV - 3:always under water/submerged

Office Notes

AWOIS Item #15135 feature not addressed due to shallow conditions. Retain as charted.

1.4) Charted Obstruction

Feature for AWOIS Item #15133

Search Position:	40° 36' 28.8" N, 073° 38' 01.0" W
Historical Depth:	[None]
Search Radius:	50
Search Technique:	Type: OBSTRUCTION, Itemstatus: ASSIGNED, Searchtype: FULL, Technique: S2 ES MBES
Technique Notes:	

History Notes:

History

L-118(75)-- Reported Obstruction in approx position LAT 40-35-28.74N / LONG 073-38-0.93W. (ENT PTT 6/4/13)

Survey Summary

Survey Position:	40° 36' 28.8" N, 073° 38' 01.0" W
Least Depth:	[None]
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2006-060.00:00:00.000 (03/01/2006)
Dataset:	H12607_awois.000
FOID:	0_ 0004394598 00001(FFFE00430E660001)
Charts Affected:	12352_6, 12326_1, 12300_1, 13006_1, 5161_1, 13003_1

Remarks:

OBSTRN/remrks: AWOIS Item #15133 search radius not fully covered due to shallow conditions. Of the area covered with 200% object detection SSS, no evidence of an obstruction exists.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12607_awois.000	0_ 0004394598 00001	0.00	000.0	Primary

Hydrographer Recommendations

Retain AWOIS Item#15133 as charted.

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	QUASOU - 2:depth unknown
	SORDAT - 20060300
	SORIND - US,US,graph,Chart 12352
	TECSOU - 2:found by side scan sonar
	WATLEV - 3:always under water/submerged

Office Notes

AWOIS Item #15133 search radius not fully covered due to shallow conditions. Recommend to retain obstruction as charted.

APPROVAL PAGE

H12607

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 NCEI for archive

- H12607_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12607_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.

Digitally signed by Jasmine Cousins
DN: cn=Jasmine Cousins, o=NOAA, ou=Atlantic Hydrographic Branch, email=jasmine.cousins@noaa.gov, c=US
Date: 2016.07.29 12:38:58 -04'00'

Approved:_____

Lieutenant Commander Matthew Jaskoski, NOAA
Chief, Atlantic Hydrographic Branch