

U.S. DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: W00216

LOCALITY

State: U.S. Virgin Islands

General Locality: Caribbean Sea

Sub-locality: 5nm SE St. Johns Island

2011

CHIEF OF PARTY
Timothy Battista

LIBRARY & ARCHIVES

DATE:

W00216

HYDROGRAPHIC TITLE SHEET

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

State: **U.S. Virgin Islands**

General Locality: **Caribbean Sea**

Sub-Locality: **5nm SE St. Johns Island**

Scale: **1:40,000** Date of Survey: **March 30 to April 3, 2011**

Instructions Dated: **14 February 2011** Project Number: **M-I907-NF-11**

Vessel: **NOAA Ship *Nancy Foster***

Chief of Party: **Timothy Battista**

Surveyed by: **CCMA Biogeography Branch**

Soundings by: **Reson 7125 SV, Kongsberg EM1002**

Graphic record scaled by: **N/A**

Graphic record checked by: **N/A**

Protracted by: **N/A**

Automated Plot: **N/A**

Verification by: **Atlantic Hydrographic Branch**

Soundings in: **Meters at MLLW**

Remarks:

- 1) All Times are in UTC.*
- 2) This is a Coral Reef Mapping Project and Hydrographic Survey.*

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

TABLE OF CONTENTS

A. AREA SURVEYED	1
B. DATA ACQUISITION AND PROCESSING.....	2
B.1 EQUIPMENT & VESSEL.....	3
B.2. QUALITY CONTROL	3
B 2.a System Certification and Calibration.....	3
B2.b Sounding Coverage.....	3
B2.c Crosslines.....	3
B2.d Junctions and Prior Surveys.....	3
B2.e Systematic Errors.....	3
B3. CORRECTIONS TO ECHO SOUNDINGS	5
B4. DATA PROCESSING.....	6
B4.a Total Propagated Error.....	6
B4.b BASE Surfaces and Mosaics.....	6
B4.c Data Cleaning.....	7
C. HORIZONTAL AND VERTICAL CONTROL	7
C1.a Horizontal Control	7
C1.b Vertical Control.....	7
D. RESULTS AND RECOMMENDATIONS	7
D1. CHART COMPARISON	7
D1.a Prior and Junctions	7
D2. ADDITIONAL RESULTS.....	7
D2.a Automated Wreck and Obstruction Information Service (AWOIS) Items.....	7
D.2.b Shoreline.....	8
D2.c Charted Features.....	8
D2.d Charted Pipelines and Cables	8
D2.e Bridges, Ferry Routes, and Overhead Cables.....	8
D3. DANGERS TO NAVIGATION AND SHOALS	8
D3.a Dangers to Navigation.....	8

D3.b Shoals	8
D4. AIDS TO NAVIGATION	9
D5. COAST PIOT INFORMATION	9
D6. MISCELLANEOUS BOTTOM SAMPLES	9
D7. ENVIRONMENTAL CONDITIONS AND NOTES	9
D8. ADAQUACY OF SURVEY	9
E. APPROVAL SHEETS	10

LIST OF FIGURES

Figure 1. W00216 Survey Area	2
Figure 2. Reson 7125 outer beam error	5
Figure 3. Standard deviation example	8
Figure 4. Final tide zoning W00216.....	8
Figure 5. 10 fathom shoal charted and discredited.....	8

LIST OF TABLES

Table 1. Hydrographic Survey Statistics.....	1
Table 2. MB Acquisition Dates.....	2
Table 3. TPE Parameters.....	6
Table 4. Base Surfaces	6

APPENDICES

Appendix I DANGER TO NAVIGATION REPORTS.....	11
Appendix II SURVEY FEATURES REPORT.....	12
Appendix III FINAL PROGRESS SKETCH AND SURVEY OUTLINE	13
Appendix IV TIDES AND WATER LEVELS	14
Appendix V SUPPLEMENTAL SURVEY RECORDS & CORRESPONDENCE.....	24

Descriptive Report to Accompany Hydrographic Survey W00216
Project M-I907-NF-11
U.S. Virgin Islands
Caribbean Sea
Scale 1:40,000
March 30 – April 3, 2011
NOAA Ship *Nancy Foster*

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions M-I907-NF-11, dated February 14, 2011. Data acquisition was conducted from March 30-April 3, 2011.

North Western Limit	South Western Limit	South Eastern Limit	North Eastern Limit
18°14'42.74" N 064°43'12.81" W	18°12'43.44" N 064°41'14.95" W	18°14'01.55" N 064°39'10.60" W	18°16'08.12" N 064°39'32.80" W

The purpose of this project is to map critical coral habitats and to update the nautical charts in the area. Most of the bathymetry is from surveys completed from 1970-1989 with partial bottom coverage. This project responds, in part, to the U.S. Coral Reef Task Force (USCRTF) that was established by Presidential Executive Order 13089. The USCRTF mission is to lead, coordinate, and strengthen U.S. government actions to better preserve and protect coral reef ecosystems. The National Oceanic and Atmospheric Administration's (NOAA) Center for Coastal Monitoring and Assessment (CCMA) Biogeography Team is supporting the USCRTF mandate. The Biogeography Team completed its eighth year of an ongoing scientific research mission on board the NOAA Ship *Nancy Foster*.

Table 1: Hydrographic Survey Statistics

	Linear Nautical Miles
LNM Single beam mainscheme only	N/A
Multibeam mainscheme only	115.95
LNM Lidar mainscheme only	N/A
Side Scan Sonar mainscheme only	N/A
Lineal nautical miles of any combination of the above techniques (specify methods)	115.95
LNM Crosslines singlebeam and multibeam combined	10.77
LNM Lidar Crosslines	N/A
Development lines non mainscheme	0
LNM shoreline/nearshore investigations	
Number of Bottom Samples	0
Number of items investigated that required additional time/effort in the field beyond the above survey operations	0
Total number of square nautical miles	8.81

Fig. 1. W00216 Survey Area.

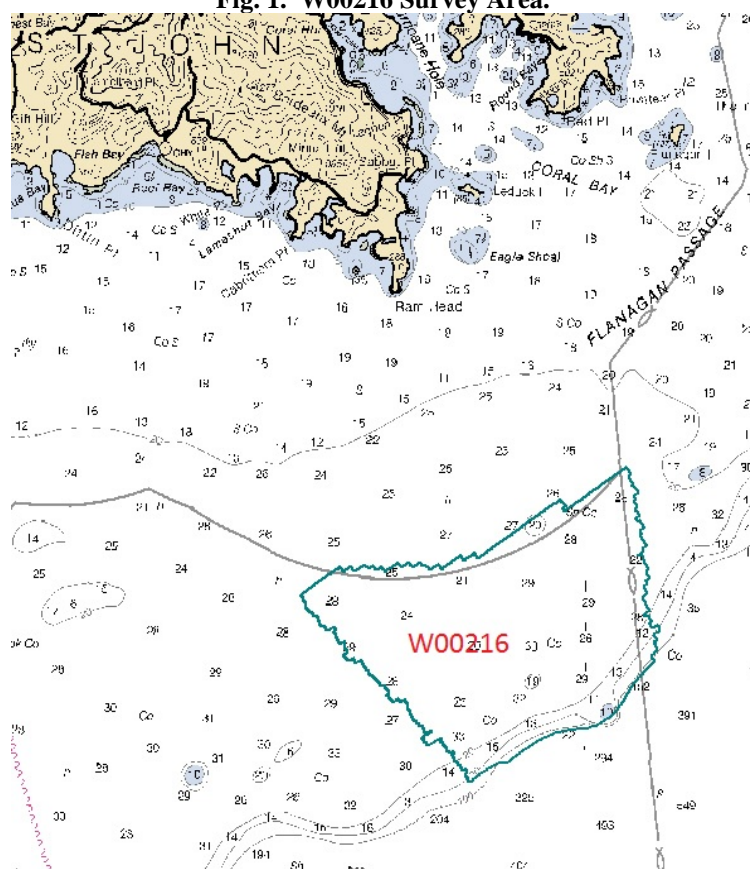


Table 2: MB Acquisition Dates

Calendar Date	Julian Day
30-March-2011	089
31-March-2011	090
1-April-2011	091
2-April-2011	092
3-April-2011	093

B. DATA ACQISTION AND PROCESSING

Refer to *M-I907-NF-11 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, as well as any deviations from the DAPR, are included in this descriptive report.

B1. EQUIPMENT AND VESSEL

The NOAA Ship *Nancy Foster* acquired Reson 7125 SV and EM1002 multibeam echosounder soundings and sound-velocity profiles with SBE equipment. Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR.

B2. QUALITY CONTROL

B2.a System Certification and Calibration

Refer to NOAA Ship *Nancy Foster*'s DAPR for a complete description of system integration and initial calibration results for equipment and sensors used for this survey.

B2.b Sounding Coverage

As per the Project Instructions, this survey was conducted using complete coverage multibeam specifications. Bathymetry coverage was monitored by creating BASE surfaces with 2-meter, 4-meter, 8-meter and 16-meter resolutions as per HSSD 5.2.2.2, "Complete Multibeam Coverage." Data densities in within the BASE surfaces generally meet the five soundings per node criteria, except in areas where multibeam data were shadowed by features of significant height from surrounding bathymetry.

B2.c Crosslines

Multibeam echosounder cross-lines totaling 10.7 nm were acquired during the course of the survey, comprising 9.28 % of multibeam mainscheme hydrography.

B2.d Junctions and Prior Surveys

No prior surveys or junction comparisons assigned in the project instructions.

B2.e Systematic Errors

No significant artifacts due to systematic errors were observed in the data. Occasional small artifacts of up to 0.3m affecting the outer beams of the 7125 were observed though. They appear to be caused by sound velocity. Due to the consistency of the sound velocity in the area and agreement between the SBE 19 and the SV-71 at the surface, this has been ruled out. During the dry dock installation it has been learned that the elements were painted with anti-fouling paint and this may be the cause of the problem. The 7125 will be pulled from the hull before the 2012 season to be tested at the Reson facility and re-certified. Areas of higher standard deviation can be found around significant reef structures. An area of overlapping mainscheme data shows the extent of standard deviations.

Fig. 2. Reson 7125 outer beam error

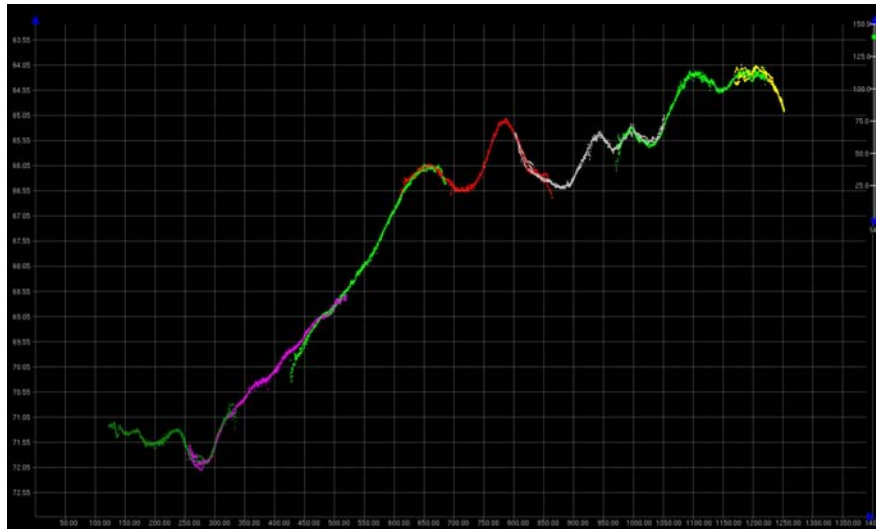
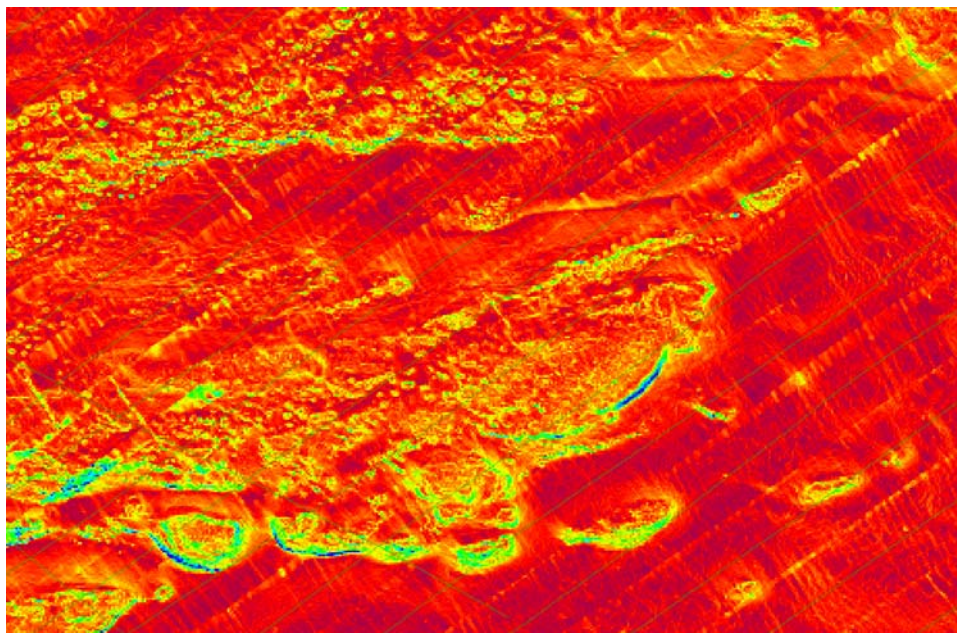


Fig. 3. Standard deviation example. Color map: dark red 0.01, blue 0.5 std deviation



B3. CORRECTIONS TO ECHO SOUNDINGS

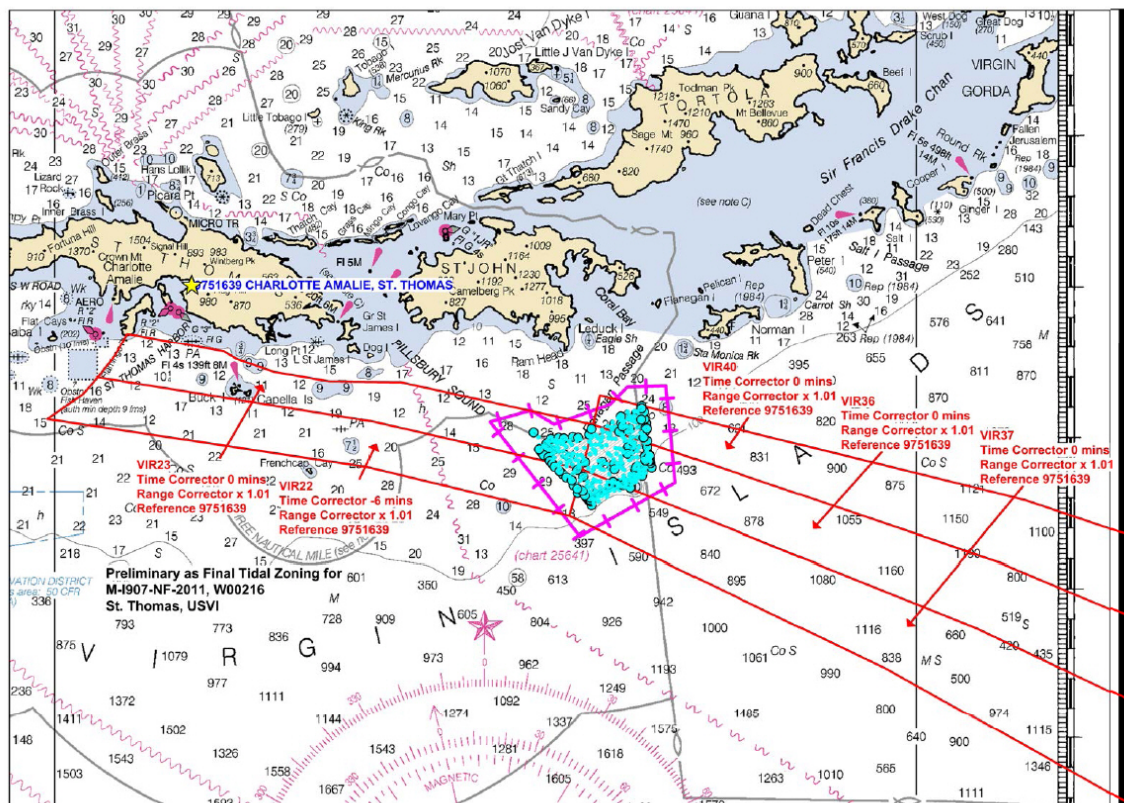
HDCS sounding data were reduced to mean lower-low water (MLLW 83-01 Tidal Epoch) using final tidal zoning supplied by CO-OPS and verified water levels from the tide gauge located at Charlotte Amalie, U.S.V.I. (975-1639).

All datum reduction procedures conform to those outlined in the DAPR.

All methods and instruments used for sound velocity correction were as described in the DAPR.

Sound velocity corrections for this survey were applied using only data from the ship's SBE 19 *Plus*. Application in CARIS HIPS was nearest in distance within time (six hours) for all data.

Fig 4. Final Tide Zoning W00216



B4. DATA PROCESSING

B4.a Total Propagated Error

The Total Propagated Error (TPE) values used in Caris for this survey were derived using the HTD 2007-10 as a guide. Tidal error values entered into Caris are assumed to be 1 sigma, therefore the value supplied by CO-OPS was divided by 2 to approximate the required 1 sigma error level. These values were calculated for all MBES data immediately following CARIS Merge. The project-specific parameters for TPE calculation for W00216 are as follows:

Table 3: TPE Parameters

Project	Vessel	Tide Values		Sound Speed Values	
		Measured	Zoning	Measured	Surface
W00216	NF	0.0	0.61	4.0	1.0

B4.b BASE Surfaces and Mosaics

Survey W00216 BASE surfaces were created using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. The parameters contained in the NOAA xml file provided with HTD 2009-2 were used to modify the values required for CUBE processing. Finalized BASE surface used final uncertainty from the “Greater of the two” option and resolution dependent depth thresholds were applied as necessary. Refer to the 2009 DAPR, 2009 *Field Procedures Manual*, and Caris HIPS and SIPS *User Guide* for further discussion. Table 4 describes all BASE Surfaces submitted as part of Survey W00216:

Table 4: BASE Surfaces

<i>Field Sheet W00216</i>	<i>Resolution</i>	<i>Type</i>	<i>Description</i>	<i>Depth Threshold</i>
NOAA_2m_CUBE	2m	CUBE	Bathy/Coverage	No
NOAA_4m_CUBE	4m	CUBE	Bathy/Coverage	No
NOAA_8m_CUBE	8m	CUBE	Bathy/Coverage	No
NOAA_16m_CUBE	16m	CUBE	Bathy/Coverage	No
NOAA_2m_CUBE_Final	2m	CUBE	Bathy/Coverage	18m-40m
NOAA_4m_CUBE_Final	4m	CUBE	Bathy/Coverage	36m-80m
NOAA_8m_CUBE_Final	8m	CUBE	Bathy/Coverage	72m-160m
NOAA_16m_CUBE_Final	16m	CUBE	Bathy/Coverage	144m-1000m
NOAA_1m_CUBE	1m	CUBE	Bathy/Coverage	No
NOAA_1m_Final_No_Threshold	1m	CUBE	Habitat mapping	No
NOAA_2m_Final_No_Threshold	2m	CUBE	Habitat mapping	No

B4.c Data Cleaning

The survey data was cleaned using the swath and subset editor tools in Caris. Areas of the BASE surfaces that indicated a high standard deviation, hypothesis count or uncertainty were examined and cleaned as required such that no residual outliers existed within the surfaces.

C. VERTICAL AND HORIZONTAL CONTROL

As per *FPM* Section 5.2.3.2.3, an HVCR report was not filed, as no horizontal and vertical control stations were established by the field party for this survey. A summary of horizontal and vertical control for this survey follows.

C1.a Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83), Zone 20 North. Differential GPS (DGPS) was the sole method of positioning. Differential corrections from a U.S. Coast Guard beacon located at Isabel, Puerto Rico were used during this survey.

C1.b Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) station at Charlotte Amalie (975-1639) served as datum control for W00216. A request for delivery of final approved tides for this survey was forwarded to N/OPS1 in accordance with the *FPM* and project letter instructions. Verified tides have been applied to all sounding data.

D. RESULTS AND RECOMMENDATIONS

D1. CHART COMPARISON

No chart comparisons were assigned in the project instructions.

D1.a Prior and Junctions

No prior surveys or junction comparisons were assigned in the project instructions.

D2. ADDITIONAL RESULTS

D2.a Automated Wreck and Obstruction Information Service (AWOIS) Items

No AWOIS Items were assigned in the project instructions.

D2.b Shoreline

There is no shoreline within the sheet limits of survey W00216.

D2.c Charted Features

There are no charted features within the sheet limits of survey W00216.

D2.d Charted Pipelines and Cables

There are no charted pipelines or cables within the sheet limits of survey W00216.

D2.e Bridges, Ferry Routes, and Overhead Cables

There are no ferry routes, bridges, or overhead cable crossings within the limits of survey W00216.

D3. DANGERS TO NAVIGATION AND SHOALS

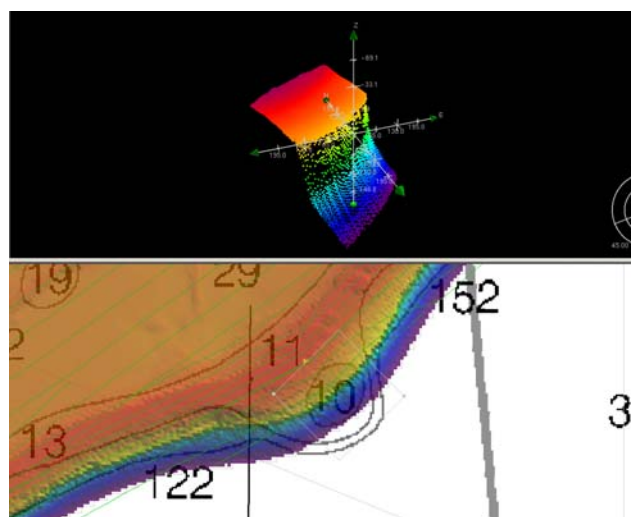
D3.a Dangers to Navigation

No dangers to navigation were found or reported to the NOAA's Office of Coast Survey.

D3.b Shoals

A 10 fathom shoal located at $18^{\circ} 13' 28.91''\text{N}$ $064^{\circ} 39' 44.91''\text{W}$ was discredited. True depth is approximately 200 meters. Recommend to update the depths based on the results of this survey and to remove the 10 fathom shoal. Otherwise shoals are adequately depicted as currently charted.

Fig. 5. 10 fathom shoal discredited



D4. AIDS TO NAVIGATION

There are no charted Aids to Navigation (ATON) within the limits of W00216.

D5. COAST PILOT INFORMATION

The Hydrographer has no recommendations for changes or addenda to the Coast Pilot.

D6. MISCELLANEOUS BOTTOM SAMPLES

No bottom samples were collected for W00216.

D7. ENVIRONMENTAL CONDITIONS AND NOTES

No environmental conditions or notes are required for W00216.

D8. ADEQUACY OF SURVEY

This survey is considered complete and adequate to supersede charted depths within the common area as per requirements specified in the Project Letter Instructions.

Summary and Recommendations for Additional Work

No additional work is needed to complete this survey. No changes significant to navigation have been noted and it is recommended that this survey receive normal processing priority.

E. APPROVAL

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Office of Coast Survey Hydrographic Surveys Division's *Field Procedures Manual*, and NOS *Hydrographic Surveys Specifications and Deliverables*. Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to N/CS33, Atlantic Hydrographic Branch.

The Data Acquisition and Processing Report for M-I907-NF-11 is submitted separately and contains additional information relevant to this survey.

Michael Stecher

NOAA Contractor

Lead Hydrographer

CCMA Biogeography Branch

APPENDIX I

TIDES AND WATERLEVELS



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : September 12, 2011

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: M-I907-NF-2011
HYDROGRAPHIC SHEET: W00216

LOCALITY: 5m SE of St. John Island, St. John, VI
TIME PERIOD: March 30 - April 3, 2011

TIDE STATION USED: 975-1639 Charlotte Amalie, VI
Lat.18° 20.15'N Long. 64° 55.2' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.227 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project M-I907-NF-2011, W00216, during the time period between March 30 to April 3, 2011.

Please use the zoning file "I907NF2011CORP" submitted with the project instructions for St. Thomas, USVI. Zones VIR22, VIR23, VIR36, VIR37 and VIR40 are the applicable zones for W00216.

Refer to attachments for zoning information.

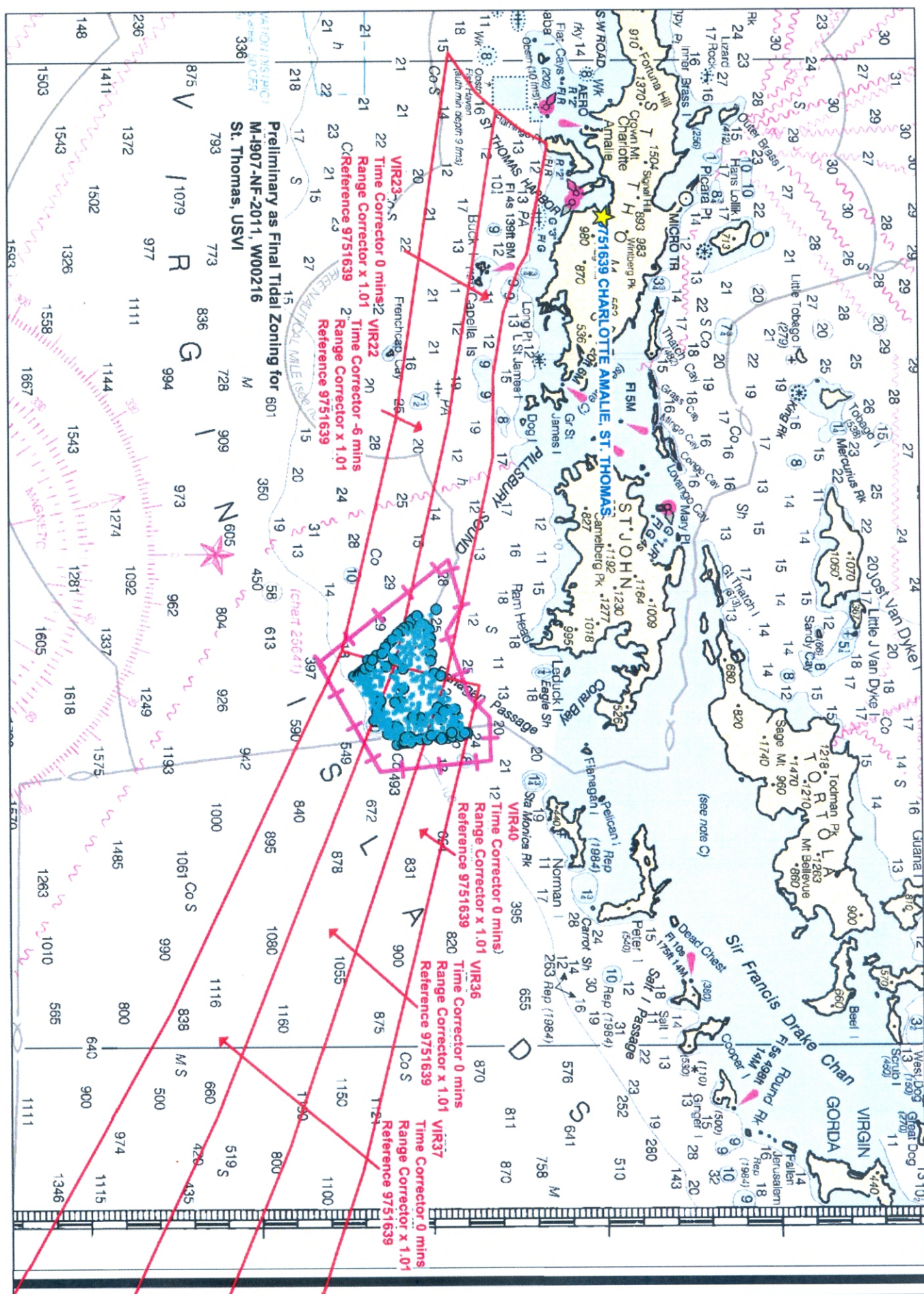
Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Gerald
Hovis

Digitally signed by Gerald Hovis
DN: cn=Gerald Hovis, o=Center for
Operational Oceanographic Products
and Services, ou=NOAA/NOS/CO-OPS/
OD/PSB, email=gerald.hovis@noaa.gov,
c=US
Date: 2011.09.09 15:56:09 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH





APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND COORESPONDENCE

(No correspondence attached)

APPENDIX III

FEATURES REPORT

DTONS - 0

AWOIS - 0

WRECK - 0

MARITIME BOUNDARIES - 0

APPROVAL PAGE

W00216

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

The following products will be sent to NGDC for archive

- W00216_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- W00216_GeoImage.pdf

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

Approved: _____ for:
LCDR Abigail Higgins
Chief, Atlantic Hydrographic Branch