NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey *Sidescan Sonar, Single Beam Sonar and Interferometric Sonar*

Field No. *C*

Registry No. *H11614*

LOCALITY

State *Louisiana*

General Locality *Lake Borgne*

Sublocality *South*

2007

CHIEF OF PARTY

Paul L. Donaldson

Science Applications International Corporation

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DATE

NOAA FORM 77-28 (11-72) U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTRY NO. **H11614**

HYDROGRAPHIC TITLE SHEET

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

FIELD NO. **C**

State Louisiana

General Locality Lake Borgne

Sublocality South

Scale 1:20,000 Date of survey 09 January 2007 – 01 June 2007

Instructions Dated October 18, 2006 Project No. S-J977-KR-SAIC

Vessel *M/V Thomas R. Dowell* AL1534AH and *F/V Lacey Marie* LA6708FC

Chief of Party *Paul L. Donaldson*

Surveyed by: *Brian Biggert, Louie Cust, Gary Davis, Kevin Davis, Rick Davis, Travis Daniel, Paul Donaldson, Sean Halpin, Karen Hart, Chuck Holloway, Jason Infantino, Fred Jordon, John Kiernan, Meme Lobecker, Rick Nadeau, Chris Pinero, Gary Parker, Evan Robertson, Jeremy Shambaugh, Deb Smith, Mike Tappia, Justin West*

Soundings taken by **echo sounder**, hand lead, pole Odom Echotrac CV, GeoAcoustics GeoSwath Plus

Graphic record scaled by

Graphic record checked by

Protracted by Automated plot by

Verification by ***AHB (comments in bold, red, italic font)***

Soundings in fathoms, feet, ~~**meters**~~ at MLW, **MLLW**

REMARKS: **Contract**: DG-133C-05-CQ-1088
Contractor: Science Applications International Corp., 221 Third Street, Newport, RI 02840 USA
Subcontractors: Williamson & Associates, 1124 NW 53rd Street, Seattle WA 98107; Rotator Staffing Services, PO Box 366, 557 Cranbury Rd., E. Brunswick, NJ 08116; Lowe Engineers 2000 RiverEdge Parkway, Suite 400, Atlanta, GA 30328; John Oswald & Associates, LLC. 2000 E. Dowling Rd, Suite 10, Anchorage, AK 99507
Times: All times are recorded in UTC
UTM Zone: Zone 16
Purpose: To provide NOAA with accurate hydrographic survey data suitable for item detection and debris mapping in the assigned area: Sheet C (H11614) in Lake Borgne, Louisiana.

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537. ☆ U.S. GOVERNMENT PRINTING OFFICE: 1976—665-661/1222 REGION NO. 6

Science Applications International Corporation (SAIC) warrants only that the survey data acquired by SAIC and delivered to NOAA under Contract DG133C-05-CQ-1088 reflects the state of the sea floor in existence on the day and at the time the survey was conducted.

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Descriptive Report to Accompany
Hydrographic Survey H11614
Scale 1:20,000, Surveyed 2007
M/V Thomas R. Dowell* and *F/V Lacey Marie
Science Applications International Corporation (SAIC)
Paul L. Donaldson, Lead Hydrographer

PROJECT
Project Number: S-J977-KR-SAIC
Dates of Instructions: October 18, 2006 **Task Order#:** T0002
Dates of Supplemental Instructions: 25 October 2006, 16 November 2006, 09 January 2007, 30 May 2007, and 03 October 2007
Sheet Letter: C
Registry Number: H11614
Purpose: To provide NOAA with accurate hydrographic survey data suitable for item detection and debris mapping in the assigned area: Sheet C (H11614) in Lake Borgne, Louisiana.

A. AREA SURVEYED

The area surveyed was the southern section of Lake Borgne, Louisiana, which covered 29.55 square nautical miles (Figure A-1). The line nautical miles, bottom samples, and other survey parameters are located in Table A-1. The area was surveyed at 40m line spacing with interferometric, singlebeam and sidescan sonar from 09 January 2007 – 01 June 2007 (Table A-2). The overall range of depths encountered in H11614 was from 0.82 to 3.90 meters (2 to 13 feet). The depth range for singlebeam sonar data was 0.82 to 3.30 meters (2 to 11 feet) based on a minimum grid. The depth range for interferometric sonar data was 1.12 to 3.90 meters (3 to 13 feet) based on the CUBE depth. ***Concur.***

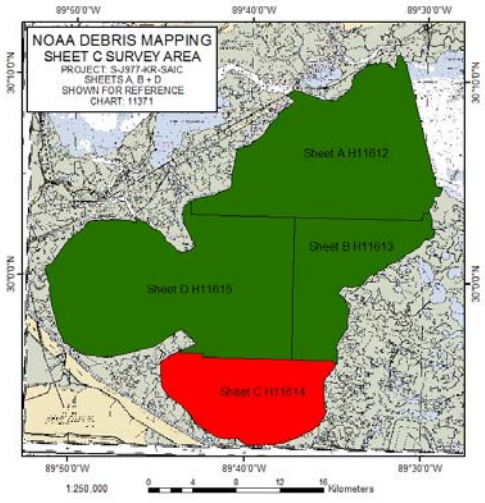

Figure A-1. NOAA Debris Mapping Survey Bounds

Table A-1. Hydrographic Survey Statistics

***M/V Thomas R. Dowell* and *F/V Lacey Marie,* Sheet C H11614**	
LNM Sidescan only	1679
LNM Interferometric, Bathymetry	1290
LNM Singlebeam Bathymetry	389
LNM of Interferometric and Singlebeam Bathymetry	1679
LNM Shoreline / Nearshore Investigations	N/A
Number of Bottom Samples	30
Number of items investigated that required additional time/effort in the field beyond the above survey operations	0
Total number of square nautical miles	29.55

Table A-2. Dates of Data Acquisition in Calendar and Julian Days

Calendar Date	Julian Day
09-January-2007	009
11-January-2007	011
12-January-2007	012
13-January-2007	013
14-January-2007	014
15-January-2007	015
18-January-2007	018
19-January-2007	019
21-January-2007	021
22-January-2007	022
23-January-2007	023
24-January-2007	024
25-January-2007	025
26-January-2007	026
27-January-2007	027
29-January-2007	029
30-January-2007	030
31-January-2007	031
01-February-2007	032
02-February-2007	033
03-February-2007	034
04-February-2007	035
06-February-2007	037
07-February-2007	038

Calendar Date	Julian Day
08-February-2007	039
09-February-2007	040
11-February-2007	042
12-February-2007	043
13-February-2007	044
17-February-2007	048
07-March-2007	066
08-March-2007	067
12-March-2007	071
09-April-2007	099
10-April-2007	100
16-April-2007	106
18-April-2007	108
20-April-2007	110
21-April-2007	111
27-April-2007	117
28-April-2007	118
11-May-2007	131
16-May-2007	136
19-May-2007	139
28-May-2007	148
31-May-2007	151
01-June-2007	152

B. DATA ACQUISITION AND PROCESSING

B.1 Equipment

A detailed description of the systems used to acquire and process these data has been included in the separate Data Acquisition and Processing Report (DAPR)* for S-J977-KR-SAIC delivered on 18 January 2008 (SAIC document number 07-TR-005). There were no variations from the equipment configuration described in the 18 January 2008 DAPR. Table B-1 and Table B-2 provide a summary of the major systems used. ***DAPR filed with original field reports, and also submitted to Hydrographic Survey Division (HSD) with survey deliverables.***

Table B-1. Major Systems (*M/V Thomas R. Dowell*)

	Manufacturer / Model Number
Singlebeam Sonar	Odom CV
Sidescan Sonar	Klein 3000 Towfish
Vessel Attitude System	Applanix POS/MV 320 Inertial Navigation System
Positioning Systems	POS/MV 320 version 4
Sound Speed Systems	Sea-Bird Electronics, Inc. SBE 19-01 CTD Profiler

Table B-2. Major Systems (*F/V Lacey Marie*)

	Manufacturer / Model Number
Interferometric Sonar	GeoAcoustics GeoSwath Plus 250 kHz
Vessel Attitude System	Applanix POS/MV 320 Inertial Navigation System
Positioning Systems	POS/MV 320 version 4
Sound Speed Systems	Sea-Bird Electronics, Inc. SBE 19-01 CTD Profiler

B.1.1 Survey Vessels

The *M/V Thomas R. Dowell* and *F/V Lacey Marie* were the vessels used for all survey operations during the Lake Borgne survey project. Table B-3 lists vessel characteristics for the *M/V Thomas R. Dowell* and *F/V Lacey Marie*. Preliminary data processing took place on site at Shell Beach, LA and then data products were shipped to the Data Processing Center in the SAIC Newport, RI office for final processing.

Table B-3. Survey Vessel Characteristics

Vessel Name	**LOA**	**Beam**	**Draft**	**Max Transit Speed**	**Max Survey Speed**
M/V Thomas R. Dowell	32’	7’	2.5’	30 kts	8 kts
F/V Lacey Marie	41’	12’	2.5’	14 kts	7 kts

The *M/V Thomas R. Dowell* was the platform for the Odom CV singlebeam sonar, Klein 3000 sidescan sonar, and SBE 19-01 CTD data collection. The sensor configuration and offsets used for the survey are tabulated and depicted in the Data Acquisition and Processing Report (SAIC Doc 07-TR-005 dated 18 January 2008)*. The reference point for the entire system is located at the top centerline of the POS/MV IMU. The Odom transducer was hull-mounted and the Klein 3000 Towfish was bow-mounted. The POS/MV IMU was mounted 0.905 meters above, 2.080 meters forward, and 0.290 meters starboard of the transducer.

The *F/V Lacey Marie* was the platform for the GeoAcoustics GeoSwath Plus 250 kHz interferometric sonar and SBE 19-01 CTD data collection. The sensor configuration and offsets used for the survey are tabulated and depicted in the Data Acquisition and Processing Report*. The reference point for the entire system is located at the top centerline of the POS/MV IMU. The GeoSwath transducer was pole-mounted off the bow on the vessel centerline and 3.31 meters below the mounting plate. The POS/MV IMU was mounted 0.330 meters directly above the transducer. ***DAPR filed with original field reports, and also submitted to Hydrographic Survey Division (HSD) with survey deliverables.***

B.1.2 Major Systems

SAIC used their Integrated Survey System (**ISS-2000**) software on a Windows XP platform to acquire navigation and ancillary survey data on both vessels. Survey planning and data analysis were conducted using SAIC's **SABER** software on Red Hat Enterprise 4 Linux platforms.

On the *M/V Thomas R. Dowell*, Klein 3000 sidescan data were collected on a Windows XP platform using Klein's **SonarPro version 9.6** software. The Klein 3000 sidescan sonar data were collected in eXtended Triton Format (XTF) maintaining full resolution, with no conversion or down sampling techniques applied. All sidescan data were reviewed using Triton **Isis** software, while coverage mosaics were produced using **SABER**. Odom singlebeam sonar data were collected in Generic Sensor Format (GSF) using SAIC's **ISS-2000** software. The data were processed using SAIC's **SABER** software (edited and correctors applied).

On the *F/V Lacey Marie*, interferometric data were collected on a Windows XP platform using GeoAcoustics **GeoSwath Plus (GS+)** software. The GeoSwath system collected data in a proprietary Raw Data File (RDF) format, which stores all needed information for processing in one given file. The bathymetry data were then extracted from the RDF files within the **GS+** software into another proprietary intermediate file format CUBE File (CBF). The CBF files were then converted to Generic Sensor Format (GSF) using SAIC's **SABER** software. The data were then processed using SAIC's **SABER** software (edited and correctors applied). The sidescan imagery data were extracted from the RDF file into an intermediate **GS+** proprietary file as Swath Amplitude Files; pronounced swamp (SWP). The SWP files were then exported into an eXtended Triton Format

(XTF) using the GeoAcoustics **GS+** software where it was down sampled to 1,024 samples per channel. Once the GeoSwath imagery data were in XTF format, those data and the Klein 3000 data were treated the same for further data processing. All sidescan data were reviewed using Triton **Isis** software, while coverage mosaics were produced using **SABER**.

B.2 Quality Control

There were approximately 108 linear nautical miles of crosslines surveyed and approximately 1571 linear nautical miles of main scheme lines surveyed. This resulted in approximately 7 percent of linear nautical miles of crosslines compared to main scheme survey lines. The crosslines were generally oriented at 1.6°/181.6° and were spaced approximately 500 meters apart, while the main scheme lines were generally oriented at 91.6°/271.6° (near shore survey line orientation varied) and were spaced 40 meters apart. The range scale was set to 25 meters for the sidescan acquisition yielding a 50 meter swath. ***Concur.***

A Seabird Electronics SBE-19 CTD was used on both the *F/V Lacey* Marie and on the *M/V Thomas R. Dowell* to collect sound speed profile (SSP) data. SSP data were obtained at intervals frequent enough to reduce sound speed errors. The frequency of casts was based on observed sound speed changes from previously collected profiles and time elapsed since the last cast. Multiple casts were taken along a survey line to identify the rate and location of sound speed changes. Subsequent casts were made based on the observed trend of sound speed changes. As the sound speed profiles changed, cast frequency and location were modified accordingly. A surface sound velocimeter was used in conjunction with the sound speed profiles for collection of interferometric data. A Velport surface sound velocimeter was co-located with the transducers. Surface sound speed data were recorded and applied in real time by the GeoSwath **GS+** software to be used in computing the return angle of the pulse. On Julian Day 124 (04 May 2007) at 15:25:05 the 25 mm stand off Velport SSV sensor was damaged and was replaced with a 50 mm Velport sensor on the evening of JD 132 (12 May 2007). There were no GeoSwath data collected on sheet H11614 during the period JD124 to JD 132. ***Concur.***

Static draft measurements for the *F/V Lacey Marie* were taken from the bow, where the transducers were mounted, both before departure and after arrival at the dock. Dynamic draft was determined from a look up table using shaft RPM counters for the input. The dynamic draft table was constructed from measurements taken during the pre-survey Sea Acceptance Trials (SAT).

Static draft measurements for the *M/V Thomas R. Dowell* were taken from amid ship, where the transducer was mounted, both before departure and after arrival at the dock each day. Dynamic draft was determined from a look up table using manual entry of the RPM as read from the RPM gauge. The RPM value was updated with any change in RPM. The dynamic draft table was constructed from measurements taken during the pre-survey Sea Acceptance Trials. Dynamic draft corrections were performed in post-processing using SABER.

Horizontal positioning of the bathymetry transducers by the POS/MV was verified by daily confidence checks against an independent Trimble DGPS system. In addition, this comparison was running full time with an alarm to alert the survey watch stander should the position differences exceed the maximum allowable distance.

Confidence checks of the interferometric depths were made using a bar that was lowered to a known depth directly below the transducer. A sound speed profile was taken and the tide corrector was set to zero. The bar was lowered below the transducers to a depth of 2 meters. Data were recorded to a discrete raw data file. Depths displayed by the GeoSwath interferometric sonar were read and entered into a bar check log. Bar checks were taken approximately once per week during the survey. ***Concur.***

Confidence checks of the singlebeam depths were made using a bar that was lowered to a known depth directly below the transducer. A sound speed profile was taken; RPM value and the tide corrector were set to zero. The bar was lowered below the transducer to various depths in 1 meter increments. The GSF file for the Odom echo sounder, the Odom DTC, Odom video 32-display and Odom controller were examined for the reported values once the bar was in place. The depth for each source was recorded within the *M/V Thomas R. Dowell* bar check log. ***Concur.***

All individual soundings that were applied to the Bathymetric Attributed Grid (BAG) meet the Horizontal Position Accuracy and Vertical Accuracy specified in the NOS Specifications and Deliverables. There are, however, areas where the BAG node uncertainty exceeds the IHO Order 1 allowable value specified in the NOS Specifications and Deliverables. The largest number of nodes which exceed the maximum allowable uncertainty occur along the edges of a swath where there is no additional overlapping coverage from adjoining lines or where there is a variation in adjoining swaths due to sound speed differences or in a few cases tidal differences. In few cases elsewhere within the grid, uncertainty is exceeded where the node has a low number of soundings contributing to a node depth or areas around features where the standard deviation was high. Various tests were conducted to determine if there was an optimal swath cutoff angle to significantly reduce or eliminate nodes which exceed the specified uncertainty values. These tests showed that reducing the swath angle did reduce the number of high uncertainty nodes; however, it also resulted in flagging an excessive amount of low uncertainty data as invalid in the process. Therefore, it was decided to retain the full swath data for production of the Bathymetric Attributed Grids. A SABER process called "Check PFM Uncertainty" flags nodes which exceed specified uncertainty limits. A text file which lists node position, depth and uncertainty value for nodes which failed the specified uncertainty limit is included in Appendix V, Supplemental Survey Records and Correspondence. ***Concur.***

Comparisons of interferometric and singlebeam main scheme data to crossline data were done daily in the field to ensure there were no systematic errors introduced and to identify potential problems with the acquisition system configurations. Comparisons of final crossing data in H11614 were conducted in several different iterations on averaged

5m gridded data. Singlebeam main scheme data were compared to singlebeam crossline data, which showed that 97.58% of comparisons are within 10 centimeters and 100% of comparisons are within 25 centimeters (Table B-4). The singlebeam main scheme data were then compared to the interferometric crossline data, which showed that 93.22% of comparisons are within 50 centimeters and 99.44% of comparisons are within 70 centimeters (Table B-5). The main scheme interferometric data were compared to the interferometric crossline data, which showed that 96.88% of comparisons are within 30 centimeters and 99.42% of comparisons are within 45 centimeters (Table B-6). The interferometric main scheme data were compared to the singlebeam crossline data, which showed that 94.33% of comparisons are within 50 centimeters and 99.05% of comparisons are within 60 centimeters (Table B-7). A final H11614 comparison was made with all main scheme data compared to all crossline data, which showed that 96.70% of comparisons are within 30 centimeters and 99.39% of comparisons are within 45 centimeters (Table B-8). Table B-9 presents the results of the comparison between all data on H11614 compared to all data on H11613 and shows that 96.68% of comparisons are within 35 centimeters and 99.23% of comparisons are within 45 centimeters. Comparisons between the interferometric data and the singlebeam data shows that there was a slight difference between the soundings obtained with the singlebeam data versus the interferometric data. The depths reported by the singlebeam system were generally deeper then the depths reported by the interferometric system. ***Concur. See ER for charting ramifications regarding discrepancy between single beam and GeoSwath soundings.***

Table B-4. Junction Analysis Singlebeam Main Scheme vs. Singlebeam Crosslines, H11614

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0-5	546	82.6	228	74.27	234	86.67	84	100
5-10	99	97.58	63	94.79	36	100		
10-15	15	99.85	15	99.67	0	100		
15-20	0	99.85	0	99.67	0	100		
20-25	1	100	1	100	0	100		
Total	661	100	307	46.44	270	40.85	84	12.71

Table B-5. Junction Analysis Singlebeam Main Scheme vs. Interferometric Crosslines, H11614

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0-5	7	0.25	1	0.04	3	50	3	100
5-10	18	0.88	16	0.6	2	83.33		
10-15	62	3.06	61	2.75	1	100		
15-20	73	5.62	73	5.32	0	100		

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
20-25	196	12.51	196	12.24	0	100		
25-30	520	30.79	520	30.57	0	100		
30-35	595	51.7	595	51.55	0	100		
35-40	520	69.98	520	69.89	0	100		
40-45	427	84.99	427	84.94	0	100		
45-50	234	93.22	234	93.19	0	100		
50-60	152	98.56	152	98.55	0	100		
60-70	25	99.44	25	99.44	0	100		
70-80	10	99.79	10	99.79	0	100		
80-90	4	99.93	4	99.93	0	100		
90-100	2	100	2	100	0	100		
Total	2845	100.00	2836	99.68	6	0.21	3	0.11

Table B-6. Junction Analysis Interferometric Main Scheme vs. Interferometric Crosslines, H11614

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0-5	96822	31.18	41795	29.67	43745	27.62	11282	100
5-10	86368	58.99	41311	58.99	45057	56.07		
10-15	64582	79.79	30018	80.3	34564	77.89		
15-20	24652	87.72	11171	88.23	13481	86.4		
20-25	17789	93.45	7926	93.85	9863	92.63		
25-30	10649	96.88	4653	97.16	5996	96.41		
30-35	4430	98.31	1842	98.46	2588	98.05		
35-40	2033	98.96	840	99.06	1193	98.8		
40-45	1425	99.42	591	99.48	834	99.33		
45-50	792	99.68	336	99.72	456	99.62		
50-60	713	99.91	291	99.92	422	99.88		
60-70	187	99.97	68	99.97	119	99.96		
70-80	59	99.98	21	99.99	38	99.98		
80-90	33	100	16	100	17	99.99		
90-100	10	100	1	100	9	100		
100-110	3	100	0	100	3	100		
120-160	1	100	1	100	0	100		
Total	310548	100	140881	45.37	158385	51.00	11282	3.63

Table B-7. Junction Analysis Interferometric Main Scheme vs. Singlebeam Crosslines, H11614

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0-5	3	0.1	1	100	2	0.07	0	100
5-10	3	0.2	0	100	3	0.17		
10-15	20	0.88	0	100	20	0.85		
15-20	44	2.38	0	100	44	2.34		
20-25	190	8.83	0	100	190	8.79		
25-30	616	29.74	0	100	616	29.71		
30-35	699	53.46	0	100	699	53.45		
35-40	534	71.59	0	100	534	71.58		
40-45	447	86.76	0	100	447	86.76		
45-50	223	94.33	0	100	223	94.33		
50-60	139	99.05	0	100	139	99.05		
60-70	20	99.73	0	100	20	99.73		
70-80	6	99.93	0	100	6	99.93		
80-100	2	100	0	100	2	100		
Total	2946	100.00	1	0.03	2945	99.97	0	0.00

Table B-8. Junction Analysis All Main Scheme vs. All Crosslines, H11614

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0-5	97348	31.18	42007	29.61	43976	27.66	11365	100
5-10	86453	58.86	41365	58.76	45088	56.01		
10-15	64606	79.55	30039	79.93	34567	77.75		
15-20	24683	87.46	11200	87.82	13483	86.23		
20-25	17910	93.19	8013	93.47	9897	92.45		
25-30	10956	96.7	4837	96.88	6119	96.30		
30-35	4675	98.2	1985	98.28	2690	97.99		
35-40	2200	98.9	952	98.95	1248	98.78		
40-45	1535	99.39	668	99.42	867	99.32		
45-50	839	99.66	374	99.69	465	99.62		
50-60	746	99.90	322	99.91	424	99.88		
60-70	197	99.96	78	99.97	119	99.96		
70-80	63	99.98	25	99.99	38	99.98		
80-90	35	100	18	100	17	99.99		
90-160	15	100	3	100	12	100		
Total	312261	100.00	141886	45.44	159010	50.92	11365	3.64

Table B-9. Junction Analysis H11614 vs. H11613 (All Comparisons)

Depth Difference Range (cm)	All		Positive		Negative		Zero	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
0-5	909	26.93	366	30.02	446	21.66	97	100
5-10	866	52.59	339	57.83	527	47.26		
10-15	671	72.47	234	77.03	437	68.48		
15-20	329	82.22	127	87.45	202	78.29		
20-25	223	88.83	77	93.77	146	85.38		
25-30	172	93.93	51	97.95	121	91.26		
30-35	93	96.68	14	99.1	79	95.09		
35-40	50	98.16	6	99.59	44	97.23		
40-45	36	99.23	3	99.84	33	98.83		
45-50	17	99.73	2	100	15	99.56		
50-60	9	100	0	100	9	100		
Total	3375	100	1219	36.12	2059	61.01	97	2.87

Details of beam-by-beam comparison of 25 selected crossings for the interferometric data are presented in the Separates to this report. The crossings for detailed comparison were randomly selected for spatial and temporal distribution over the entire survey area. ***Concur.***

The junction with H11615 will be discussed within that survey.

On days when the vessel was heading into steep seas, residual heave and pitch artifacts are seen in the CUBE Depth surface. These artifacts appear as a cross track ripple with a magnitude of approximately 10 cm. Analysis of crossings in these areas, as well as the final depth uncertainties, verify that the data meet the specified accuracies. ***Concur.***

The GeoSwath Plus interferometric system provided bathymetry as well as sidescan imagery data. The system was operated at a 25-meter range scale for 100% sidescan bottom coverage. Vessel speed was controlled so that there were more than three pings per meter along track for object detection. While the full swath data provided full bottom coverage there were areas where the full swath was not used in the final BAG grids. Filters in the GS+ software were adjusted to reduce the swath when sound speed profile issues caused smiles or frowns that could not be corrected as well as some very shallow areas where full swath data was not attainable. The swath was cut down to minimize these impacts on the final depths in the BAGs.

The Klein 3000 sidescan sonar was operated using a 25-meter range scale to achieve 100% bottom coverage. Vessel speed was controlled so that there were more than three pings per meter along track for object detection. The Odom singlebeam was used for bathymetry in a fixed line spacing mode.

B.2.1 Multibeam Coverage Analysis

The line spacing used for the Lake Borgne debris mapping survey operations was set to achieve 100% sidescan sonar coverage. The resulting bathymetry coverage was comprised from the combination of the soundings from the singlebeam and interferometric sonars. The two 1-meter node BAGs H11614_1_of_2.bag (north) and H11614_2_of_2.bag (south) made from the separate 1-meter node **PFM CUBED Surfaces** were used for the demonstration of coverage. The **SABER Gapchecker** routine flagged nodes exceeding the allowable gap limit. In addition the entire surface was visually scanned for holidays. Additional survey lines were run to fill any detected holidays. The SABER Gapchecker routine was run on the final PFM Cubed Surfaces resulting in the coverage statistics shown in Table B-10. ***Concur.***

Table B-10. Coverage Statistics

Grid	Number of Nodes	Nodes with Valid Depth	> 3 Adjacent Empty Nodes	% Coverage
H11614_1_of_2.bag	38,227,435	38,225,829	426	100.00%
H11614_2_of_2.bag	42,907,345	42,905,085	179	99.99%

B.2.2 Survey Systems Error Model

The Total Propagated Error (TPE) model that SAIC has adopted had its genesis at the Naval Oceanographic Office (NAVOCEANO), and is based on years of work by Rob Hare and others. The fidelity of any error model is coupled to the applicability of the equations that are used to estimate each of the components that contribute to the overall error that is inherent in each sounding. SAIC's approach to quantifying the TPE is to decompose the cumulative errors into individual components and then further decompose those into a horizontal and vertical component. The model then combines the horizontal and vertical error components to yield an estimate of the system error as a whole. This cumulative system error is the TPE. By using this approach, SAIC can more easily incorporate future error information provided by sensor manufacturers into the model. This also allows SAIC to continuously improve the fidelity of the model as our understanding of the sensors increases or as more sophisticated sensors are added to a system.

The data needed to drive the error model are captured as parameters taken from an Error Parameters File (EPF), which is an ASCII text file typically created during survey system installation and integration. The parameters are also obtained from values recorded in the GSF file(s) during data collection and processing. While the input units vary, all error values that contribute to the cumulative TPE estimate are converted to meters by **SABER's errors** program or have units of meters from the beginning. The cumulative TPE estimates are separated into a horizontal and vertical component, and are recorded as the Horizontal Error and Vertical Error records for each beam in the GSF file. These

error values are at the two sigma or 95% confidence level. The intent is to use these error estimates to gauge the accuracy of each sounding's coordinates and depth.

As part of the Lake Borgne surveys, SAIC developed an error model for the GeoAcoustics GeoSwath 250kHz interferometric sonar with guidance coming from the sonar manufacturer. This error model included an angle uncertainty of 0.02 degrees and a range uncertainty of 0.04 meters for each sounding. This model also included a footprint correction to the sonar related components that contribute to the Total Propagated Error. The resulting error values produced from this model, match both the magnitude and the shape of the error curve over the entire swath that was apparent in the real survey data as determined by SAIC's Accutest procedures. For more information, see the Data Acquisition and Processing Report (SAIC Doc 07-TR-005 dated 18 January 2008)*.

H11614 used a newer version of the SABER Errors program than was discussed in the Data Acquisition and Processing Report*. The newer version included improvements in how the footprint perturbation of the error model was implemented by correcting for sign inconsistencies. The newer version also included a correction for the GS+ system to not include the affects of acoustic beam steering that the GS+ sonar system does not support. A more robust method for handling non-monotonically increasing depth/sound speed pairs was implemented as well in the newer version of the SABER Errors program.. Table B-11 and Table B-12 show the values in the EPF used for the **GS+** data. The only value that varied was the Surface Sound Speed Error (SSSV_measurement_error). When the 25-mm Velport SSV sensor was in use, an SSSV_measurement_error of 0.20 meters was used for the TPE calculation. When the 50-mm Velport SSV sensor was in use, an SSSV_measurement_error of 0.12 meters was used for the TPE calculation. All parameter uncertainties in this file are entered at the one sigma level of confidence, but the outputs from **SABER's errors** program are at the two sigma or 95% confidence level. Sign conventions are: X = positive forward, Y = positive starboard, Z = positive down. ***DAPR filed with original field reports, and also submitted to Hydrographic Survey Division (HSD) with survey deliverables.***

Table B-11. 2007 *F/V Lacey Marie* Error Parameters

Parameter	Value	Units
static_draft	1.20	Meters
draft_error (uncertainty)	0.02	Meters
squat_error (uncertainty)	0.02	Meters
fixed_heave_error_component (uncertainty)	0.05	Meters
perc_swellheave_err_component (uncertainty)	5.00	Percent
roll_measurement_error (uncertainty)	0.02	Degrees
pitch_measurement_error (uncertainty)	0.02	Degrees
heading_measurement_error (uncertainty)	0.02	Degrees
speed_measurement_error (uncertainty)	0.057	meters/second (m/s)
SSSV_measurement_error (uncertainty)	0.20 or 0.12*	meters/second (m/s)
predicted_tide_measurement_error (uncertainty)	0.18	Meters
observed_tide_measurement_error (uncertainty)	0.12	Meters
tide_zone_error (uncertainty)	0.10	Meters

Parameter	Value	Units
positioning_device_x_offset	-9.914	Meters
positioning_device_xoffset_err (uncertainty)	0.02	Meters
positioning_device_y_offset	-1.00	Meters
positioning_device_yoffset_err (uncertainty)	0.02	Meters
positioning_device_z_offset	-4.842	Meters
positioning_device_zoffset_err (uncertainty)	0.02	Meters
VRU_device_x_offset	-0.17	Meters
VRU_device_x_offset_error (uncertainty)	0.005	Meters
VRU_device_y_offset	0.09	Meters
VRU_device_y_offset_error (uncertainty)	0.005	Meters
VRU_device_z_offset	0.33	Meters
VRU_device_z_offset_error (uncertainty)	0.005	Meters
gps_latency	0.00	milliseconds (msec)
vru_latency	0.00	milliseconds (msec)
gps_latency_error (uncertainty)	1.00	milliseconds (msec)
vru_latency_error (uncertainty)	1.00	milliseconds (msec)
horizontal_navigation_error (uncertainty)	0.75	Meters
svp_measurement_error (uncertainty)	0.75	meters/second (m/s)
*See explanation regarding SSSV_measurement_error in previous paragraph.		

Table B-12. SONAR Parameters GeoSwath Plus

Parameter	Value	Units
transducer_device_x_offset	0.00	Meters
transducer_device_xoffset_error (uncertainty)	0.02	Meters
transducer_device_y_offset	0.00	Meters
transducer_device_yoffset_error (uncertainty)	0.02	Meters
transducer_device_z_offset	0.00	Meters
transducer_device_zoffset_error (uncertainty)	0.02	Meters
roll_offset_error (uncertainty)	0.05	Degrees
pitch_offset_error (uncertainty)	0.05	Degrees
heading_offset_error (uncertainty)	0.05	Degrees
sounder_latency	0.00	milliseconds (msec)
sounder_latency_error (uncertainty)	1.00	milliseconds (msec)
model_tuning Factor	-10	Unitless
amplitude_phase_transition	1	Unitless
sounder_installation_angle	60	Degrees
sounder_fore_aft_beamwidth	0.50	Degrees
sounder_athwartship_beamwidth	0.02	Degrees
range_sampling_res	0.017	Meters
pulse_length	0.064	Meters

B.3 Corrections to Echo Soundings

Please refer to the Data Acquisition and Processing Report, SAIC Doc 07-TR-005* delivered on 18 January 2008 for a description of all corrections applied to echo soundings. The only deviations from the corrections described therein, was the updated Total Propagated Errors program as discussed in Section B.2.2. GeoSwath

interferometric GSF format data is fully compatible with Caris 6.1 with hot fix 6. ***Concur.***

****DAPR filed with original field reports, and also submitted to Hydrographic Survey Division (HSD) with survey deliverables.***

B.4 Data Processing

The survey area of H11614 was broken into two separate BAGs because of the large volume of interferometric data. The areas were a northern (H11614_1_of_2.bag), and a southern (H11614_2_of_2.bag). Both BAGs were made with a 1-meter node resolution. While the depths in the areas surveyed with the GeoAcoustics GeoSwath 250kHz interferometric sonar were less than 15 meters, which would indicate the need for 0.5-meter node resolution, the consistently flat bottom merits larger node spacing. SAIC discussed this approach with the Atlantic Hydrographic Branch. The 1-meter BAGs serve for both the delivered bathymetric model and the demonstration of coverage for this survey. ***Concur.***

Throughout the survey effort, sidescan data were reviewed and preliminary contacts identified. On a weekly basis newly identified preliminary sidescan contacts were uploaded to a NOAA SharePoint web site. The upload of preliminary contacts allowed NOAA to assess progress and review contact densities and size to prioritize debris removal efforts. After final analysis of all available data, a final set of contacts was established for delivery. The list of preliminary contacts delivered via the share point web site was compared to the finalized sidescan contact list. Of the 37 preliminary sidescan contacts uploaded to the NOAA SharePoint web site, 11 contacts were disproved after further data was collected during item investigations. There were 21 contacts remade that refined the length, width and height calculations. Thirty-five additional contacts were added during the final data review that was not part of the preliminary weekly deliveries. Item investigations were carried out on 14 items deemed as significant. As stated above, 11 of the 14 items were disproved as a result of the additional data collected during item investigations.

C. HORIZONTAL AND VERTICAL CONTROL

A subordinate tide station (8761529 Martello Castle, LA) was installed by John Oswald and Associates and Lowe Engineers, under sub-contract to SAIC. Analysis of water levels obtained from tide station 8761529 and NOAA tide station 8747437 Bay Waveland Yacht Club, MS were performed to determine final water level zoning parameters. Zone boundaries were provided by NOAA. Tide station 8761529 was the source of verified water level heights for corrections to soundings. ***Concur.***

The primary means for analyzing the adequacy of zoning was to conduct a zone to zone analysis. In addition, adequacy of zoning was verified by observing zone boundary

crossings in the navigated swath editor, SAIC's **MultiView Editor (MVE)**, and examination of the sun illuminated coverage plots at zone boundaries. Crossline comparisons were used to analyze zoning for the influence of wind and weather. Table C-1 presents the water level zoning parameters for H11614 that were developed based on comparisons to NOAA tide station 8747437 and a zone to zone analysis.

Table C-1. Water Level Zoning Parameters Applied on Sheet H11614

Zone	Time Corrector (hours:minutes)	Range Ratio	Reference Station
CGM86	-1:18	1.065	8761529
CGM87	-1:06	1.052	8761529
CGM88	-0:48	1.039	8761529
CGM89	-0:30	1.026	8761529
CGM90	-0:12	1.013	8761529

The survey data for sheet H11614 were collected in horizontal datum NAD-83, using geodetic coordinates, while data display and products used the UTM Zone 16 projection. The equipment used for positioning on the *F/V Lacey Marie* and the *M/V Thomas R. Dowell* are listed in Table C-2.

Table C-2. Positioning Equipment Used for Sheet H11614

	POS/MV Serial No.	Hardware Firmware	Software Firmware	GPS Receivers
F/V Lacey Marie	2575	2.9-7	03.26	Trimble BD950
M/V Thomas R. Dowell	2579	2.9-7	03.26	Trimble BD950

Differential correctors used for H11614 online data were from the U.S. Coast Guard Stations at English Turn, LA and Mobile Point, AL. The differential receiver was set to only receive data from these two corrector stations. There were two occasions where differential correctors were lost for 12-15 seconds while on line, however in general any loss observed in differential correctors was less than 1 second in duration. There were no positional issues noted for times where the differential correctors were lost. This is consistent with what is expected from a POS/MV inertial system, which has the ability to maintain accurate positions for several minutes after loss of differential correctors.

Please refer to the Horizontal and Vertical Control Report SAIC Doc 07-TR-006* for detailed descriptions of the procedures and systems used to attain hydrographic positioning. ***Concur. *HVCR filed with original field reports, and also submitted to Hydrographic Survey Division (HSD) with survey deliverables.***

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

H11614 was compared to the largest scale Raster Chart (11371, 1/80,000 scale) and to the Electronic Navigational Chart (ENC) that covered the statement of work area (US4LA35M). All positions are presented in horizontal datum NAD-83. ***Concur.***

Chart 11371, 1/80,000 scale, 38th Edition 04/01/2007 corrected by NTM through 01/26/2008

ENC US4LA35M, 1/80,000, 14th Edition, Issued 05/25/2007 Update 01/16/2008, area common to chart 11364

The chart comparisons were conducted by using SAIC's **SABER** software to view the largest scale BSB Raster chart with overlain layers of H11614 data such as the CUBE gridded surface, selected soundings, and features. For comparisons of the ENC to the results of this survey, HydroService's **dKart Inspector** was used in conjunction with **SABER**. Results from the comparisons are described below. Recommend reconstruction of the common areas of all charts using data from this survey.

Chart 11371, 1/80,000 scale

There were four charted objects that were identified for 200% sidescan coverage on chart 11371. Each of the four charted objects was submerged piles. ***Concur.***

Of the three charted submerged piles extending from 29° 56' 07.55"N 089° 44' 35.17"W to 29° 55' 57.87"N 089° 44' 29.91"W, two were found to be exposed (features 15 and 16). Feature 15 consists of a single exposed pile rising 6-8 feet above the waters surface. Feature 16 consists of 2 piles side by side which rise 6-8 feet above the waters surface. There were no piles found that were submerged within the area surveyed in this location. Recommend removing the pile symbols in 29° 56' 02.61"N 089° 44' 32.67"W and 29° 55' 57.87"N 089° 44' 29.91"W and label Subm piling and chart a pile symbol in 29° 56' 01.45"N 089° 44' 33.22"W (feature 16) and 29° 55' 52.42"N 089° 44' 26.71"W (feature 15) and label Piles. ***Do not concur. Submerged piles in 29° 56' 02.61"N 089° 44' 32.67"W and 29° 56' 02.40"N 089° 44' 32.42"W lie outside of coverage extents, therefore cannot be disproved. Recommend to remain as charted. Also recommend to chart pile symbols in 29°56' 01.45"N 089° 44' 33.22"W and 29°55' 52.42"N 089° 44' 26.71"W and label Piles.***

The charted submerged piles extending from 29° 52' 22.70"N 089° 40' 31.47"W to 29° 52' 10.52"N 089° 40' 32.95"W were not found as charted. Submerged piles were found extending from 29° 52' 07.18"N 089° 40' 30.78"W (contact 071164300, no feature made) to 29° 52' 12.10"N 089° 40' 29.11"W (feature 25). While two contacts were made to identify the bounds of piles (contacts 071164300 and 071155035) most of the

piles within this area had no significant height (20cm to 30cm). There were also several piles laying flat on the bottom (contact 071155044) in 29° 52’ 12.38”N 089° 40’ 30.39”W. Additional debris was found approximately 50 meters to the southeast of the charted pile in 29° 52’ 17.43”N 089° 40’ 32.40”W, however the debris had no significant height. Debris was also found in the area just offshore of Fort Beauregard in 29° 52’ 04.69”N 089° 40’ 39.51”W (feature 13). Recommend removing the 6 charted pile symbols in 29° 52’ 22.70”N 089° 40’ 31.47”W to 29° 52’ 10.52”N 089° 40’ 32.95”W and charting pile symbols in 29° 52’ 07.18”N 089° 40’ 30.78”W (contact 071164300) and 29° 52’ 12.10”N 089° 40’ 29.11”W (feature 25) and changing the label Subm piling to Subm Piles. Recommend extending the currently charted Foul area northward to 29° 52’ 17.49”N 089° 40’ 30.13”W to encompass the debris with no significant height near the charted pile in 29° 52’ 17.43”N 089° 40’ 32.40”W, the submerged piles in 29° 52’ 12.10”N 089° 40’ 29.11”W (feature 25) and 29° 52’ 07.18”N 089° 40’ 30.78”W (contact 071164300) (Figure D-1). Retain the label Foul and arrow as currently charted. ***Do not concur. Recommend to chart submerged pile in 29° 52’ 07.18”N 089° 40’ 30.78”W. Submerged pile in 29° 52’ 12.10”N 089° 40’ 29.11”W lies within the Foul area, hence do not recommend to chart.***

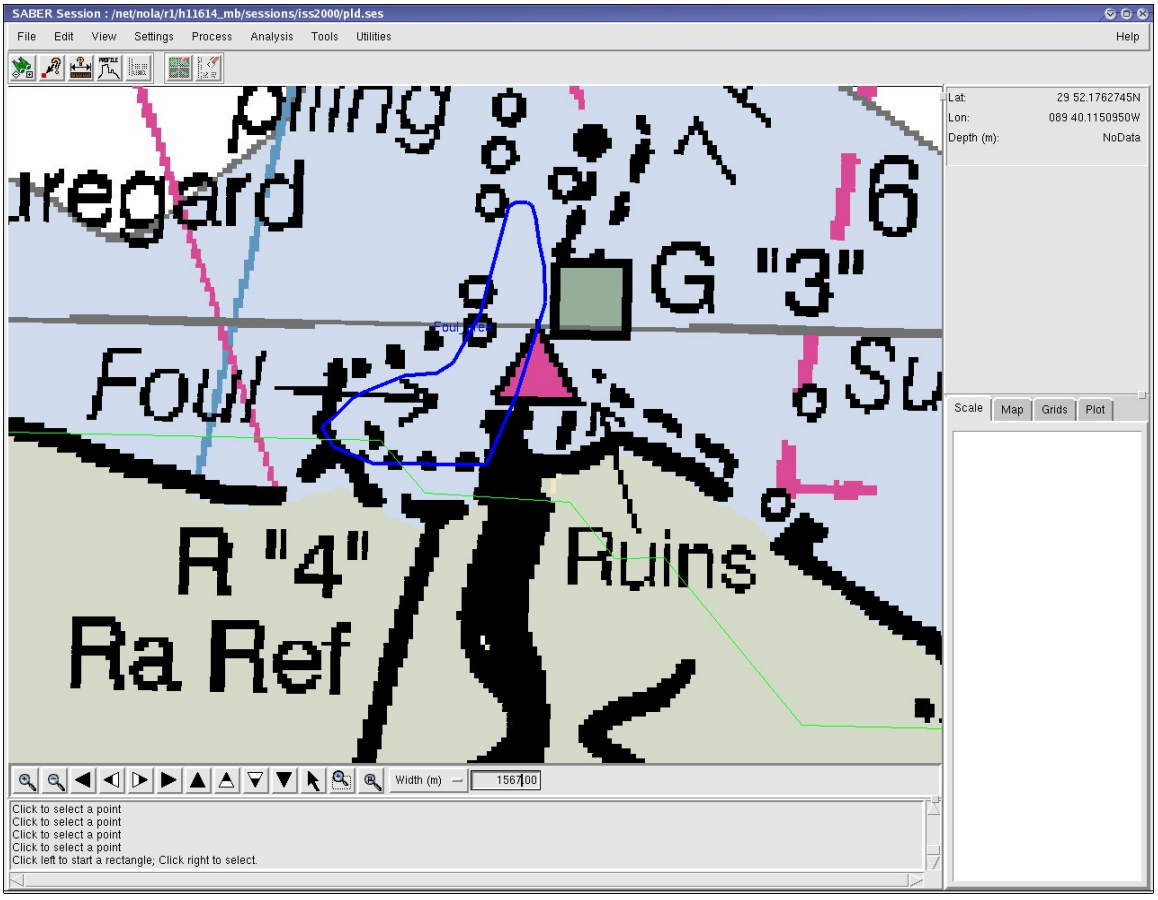

Figure D-1. Proposed Foul Area Bounds by Fort Beauregard (Blue Polygon)

The charted submerged pile in 29° 52’ 02.00”N 089° 39’ 00.10”W was not found in its charted position. There were a line of exposed piles in 29° 51’ 53.69”N 089° 38’ 43.39”W (feature 14) extending to shore. Recommend removing the pile symbol charted in 29° 52’ 02.00”N 089° 39’ 00.10”W and label Subm pile and charting a pile symbol in 29° 51’ 53.69”N 089° 38’ 43.39”W (feature 14) and label Piles. ***Concur.***

The charted submerged piles extending from 29° 52’ 01.40”N 089° 40’ 14.20”W to 29° 52’ 06.94”N 089° 40’ 12.24”W were not found as charted. Submerged piles were found to extend from 29° 52’ 02.21”N 089° 40’ 18.00”W (feature 23) to approximately 29° 52’ 05.50”N 089° 40’ 14.88”W (contact 067215701) and then turning southeast and extending to 29° 52’ 04.77”N 089° 40’ 12.71”W (feature 10). Recommend removing the two charted pile symbols in 29° 52’ 01.40”N 089° 40’ 14.20”W to 29° 52’ 06.94”N 089° 40’ 12.24”W and charting pile symbols in 29° 52’ 02.21”N 089° 40’ 18.10”W (feature 23), 29° 52’ 05.50”N 089° 40’ 14.88”W (contact 067215701) and 29° 52’ 05.25”N 089° 40’ 13.90”W (feature 11). Change the charted label Subm piling to Subm piles. ***Concur.***

The charted Ruins area defined by a dashed line in 29° 52’ 01.59”N 089° 40’ 18.23”W, 29° 52’ 03.81”N 089° 40’ 16.63”W, 29° 52’ 08.55”N 089° 40’ 25.89”W and 29° 52’ 03.85”N 089° 40’ 28.25”W consisted of exposed piles and the remains of a naval installation. The charted area does not fully cover the extents of the ruins as determined by this survey. Recommend removing the currently charted ruins area defined by a dashed line in 29° 52’ 01.59”N 089° 40’ 18.23”W, 29° 52’ 03.81”N 089° 40’ 16.63”W, 29° 52’ 08.55”N 089° 40’ 25.89”W and 29° 52’ 03.85”N 089° 40’ 28.25”W and charting an area consisting of a dashed line in 29° 52’ 01.21”N 089° 40’ 17.11”W (feature 22), 29° 52’ 03.23”N 089° 40’ 15.54”W, 29° 52’ 07.81”N 089° 40’ 24.48”W (feature 08), 29° 52’ 07.36”N 089° 40’ 27.95”W (feature 09) and 29° 52’ 03.89”N 089° 40’ 29.06”W. Retain the label Ruins and arrow as charted (Figure D-2). ***Concur.***

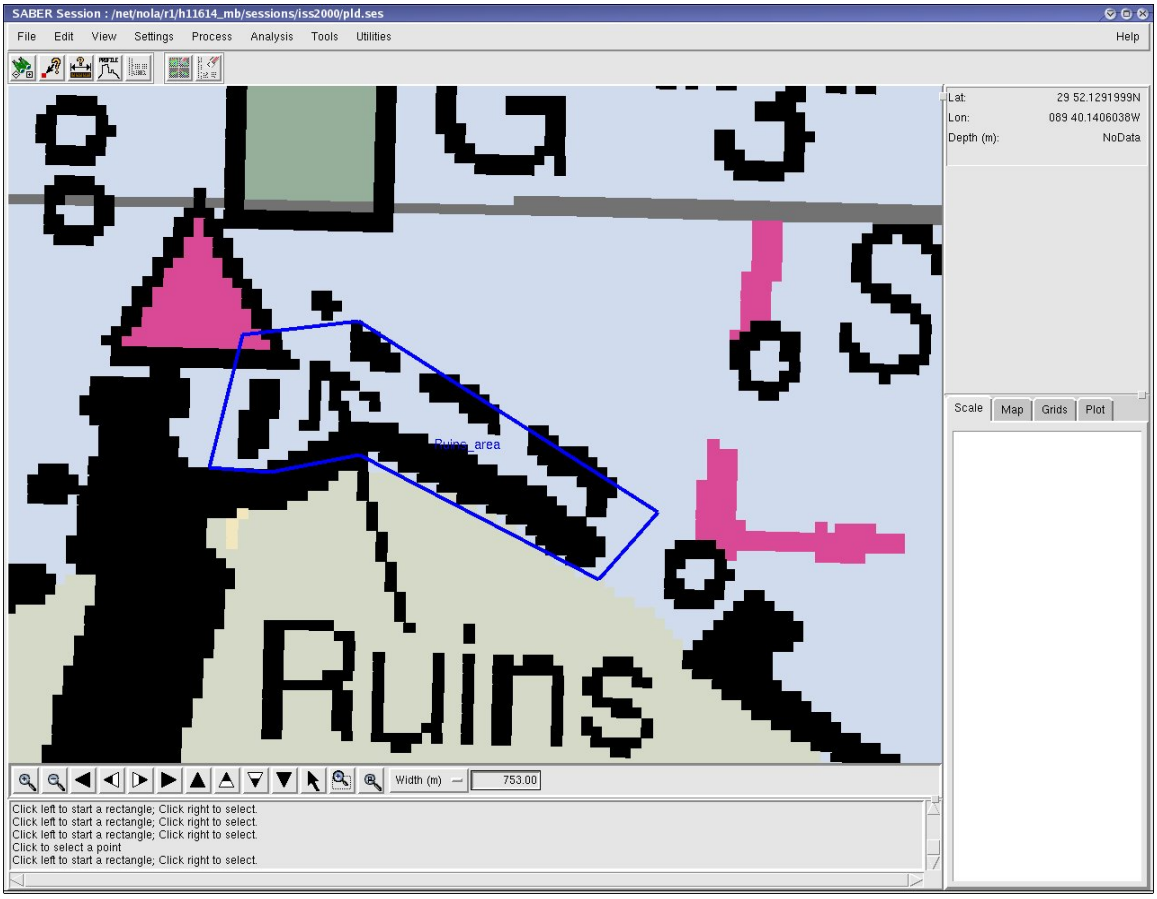

Figure D-2. Proposed Ruins Area East of Bayou Yscloskey (Blue Polygon)

The charted foul area designated by a dotted line between 29° 51’ 46.60”N 089° 39’ 22.38”W and 29° 51’ 49.90”N 089° 38’ 36.47”W was found to be clear over the area surveyed. There were exposed piles included within the foul area bounds which were discussed previously (feature 14 in 29° 51’ 53.69”N 089° 38’ 43.39”W). There was barge and crane activity within the foul area bounds in 29° 51’ 48.54”N 089° 38’ 48.67”W during the survey. Recommend removing the dotted line delineating the foul area and label Foul. ***Concur.***

Two yellow special purpose buoys were located in 29° 55’ 53.46”N 089° 39’ 05.96”W (feature 19) and 29° 56’ 05.27”N 089° 39’ 04.31”W (feature 21). The buoys were located along the charted exposed pipe in 29° 52’ 08.02”N 089° 41’ 17.86”W and 29° 56’ 05.42”N 089° 38’ 57.11”W within H11614. Sidescan data showed what appears to be a pipeline running between the two buoys however there was no indication that the pipeline was exposed anywhere within H11614 survey area. Based on the sidescan data, the pipeline exists from 29° 52’ 06.38”N 089° 41’ 21.50”W and 29° 56’ 05.42”N 089° 39’ 01.85”W, approximately 60 to 100 meters west of the charted pipe. This is consistent with data collected for H11613 and H11612 which were submitted to NOAA on 09 November 2007 and 18 January 2008. Recommend updating the charted position based

on the results of these surveys. ***Concur with clarification. Recommend updating the charted position of the pipeline based on this survey, and recommend charting the yellow special purpose buoys.***

A second set of yellow special purpose buoys were located in 29° 55' 50.83"N 089° 38' 26.64"W (feature 18) and 29° 55' 55.44"N 089° 38' 09.60"W (feature 20). Sidescan data showed what appears to be a pipeline or cable running between the two buoys on a 34/214 degree azimuth between 29° 56' 05.18"N 089° 38' 08.26"W and 29° 54' 14.46"N ~~***089° 38' 28.23"W***~~ ***089° 39' 28.23"W***. There is nothing charted in the area associated with the yellow buoys. Following the trajectory into H11613 the feature appears it would terminate at 29° 58' 05.70"N 089° 36' 57.40"W (Heater Platform) or 29° 58' 05.80"N 089° 36' 58.80"W (Well Head) identified during the H11613 survey which was submitted to NOAA on 09 November 2007. Recommend investigating with the owners of the platform to identify the feature and its as installed position. This information should be compared with the sidescan data and charted accordingly. ***Concur with clarification. However, the position of the linear feature is 29° 56' 05.18"N 089° 38' 08.26"W and 29° 54' 14.46"N 089° 39' 28.23"W (the longitude on one end of the feature reported by the Field Unit appears to be incorrect). Chart cable or pipeline based on the results of pending information request to regional navigation manager. The Navigation Manager in this region was contacted with this question and a response was never received. A copy of this email can be found in the DR appendices, saved as a text file named "email_to_Nav_Manager.txt".***

The pipeline charted in 29° 53' 38.84"N 089° 43' 34.06"W and 29° 56' 06.16"N 089° 41' 44.89"W within H11614 was found to be near its charted position. Sidescan data suggest that the pipe exists from 29° 56' 06.03"N 089° 41' 46.53"W and 29° 53' 40.39"N 089° 43' 34.03"W, 30 meters west of the charted position. Recommend leaving the pipe as charted as it adequately depicts the pipe's position. ***Do not concur, update position of charted pipeline.***

An uncharted platform was present in 29° 55' 34.61"N 089° 35' 55.45"W (feature 12). Recommend charting a platform symbol in 29° 55' 34.61"N 089° 35' 55.45"W and label Platform. ***Concur.***

Charted soundings deeper than the 6 foot depth curve are consistent with the surveyed depths collected during this survey. Depths shoaler than the 6 feet depth curve collected during this survey are generally 2 to 3 feet deeper than the charted depths. The 6 foot depth curve charted from Proctor Point southward to Flat Bayou has migrated westward approximately 900 to 1000 meters. The charted shoreline in this area has also migrated westward and no longer represents the current shoreline. The 6 foot depth curve from Flat Bayou eastward to the east side of Bayou Yscloskey as migrated shoreward to the charted shoreline. The charted 6 foot depth curve on the eastern side of H11614 has migrated shoreward less than on the western side of the sheet. The charted shoreline should be modified to be outside the sounding area of this survey. ***Concur. Bayou Yscloskey is not labeled on chart 11371. It is the name of the bayou in close proximity to Old Fort Beauregard.***

The pier (jetty) in ruins charted in 29º 52' 48.5"N 089º 35' 50.9"W was not present in this survey. Recommend removal of the pier (jetty) in ruins. ***Concur.***

The charted channel entrance to Bayou St Malo centered around 29° 53' 17.32"N 089° 36' 05.26"W and labeled as "2 FT OCT 1994" was found to have depths of 4 to 8 feet. The surveyed depths are consistent with the surrounding charted depths. Recommend updating the channel depths based on the results of this survey, and removing the label "2 FT OCT 1994". ***Concur with clarification. In addition, recommend to add the label "4 FT JUN 2007".***

The charted channel entrance to Bayou Yscloskey centered around 29° 52' 13.15"N 089° 40' 25.37"W and labeled "7 FT APR 1997" was found to have depths of 5 to 9 feet. Recommend updating the channel depths based on the results of this survey, and removing the label "7 FT APR 1997". ***Concur with clarification. In addition, recommend to add the label "5 FT JUN 2007".***

Three navigational aids charted within H11614 survey bounds were found to be in their charted position. See section D.1.2 for additional information. ***Concur.***

Recommend that the chart be updated with the results of this survey.

Uncharted Wrecks and Obstructions

No uncharted wrecks were found in H11614. Table D-1 lists other uncharted obstructions found in H11614 that are recommended for charting in raster chart 11371, 1/80,000 scale.

Table D-1. Uncharted Obstructions in Raster Chart 11371, 1/80,000 Scale

Feature Number	Feature Position (NAD83)		Least Depth (Meters)	Uncertainty (Meters)	Charting Recommendations
	Latitude (N)	Longitude (W)			
1	29° 52' 23.90"	089° 38' 33.40"	1.12	0.345	OBSTR Chart sounding and label Obstn ***Concur, chart 3ft obstruction..***
2	29° 52' 22.84"	089° 39' 08.67"	1.25	0.329	OBSTR Chart sounding and label Obstn ***Concur, chart 4ft obstruction.***
3	29° 54' 27.01"	089° 42' 11.58"	1.28	0.331	OBSTR Chart sounding and label Obstn ***Concur, chart 4ft obstruction..***
4	29° 53' 52.65"	089° 43' 19.78"	1.32	0.331	OBSTR Chart sounding and label Obstn ***Concur, chart 4ft obstruction.***
17*	29° 55' 25.95"	089° 43' 41.69"	1.28	N/A	OBSTR Chart sounding and label Subm Snag ***Concur, chart 4ft obstruction..***
* Found by sidescan sonar only, least depth estimated from sidescan data.					

ENC US4LA35M, 1/80,000 scale

There were 4 charted objects that were identified from 200% sidescan coverage on chart ENC US4LA35M. All 4 charted objects were submerged piles.

Of the three charted obstructions (piling) extending from 29° 56' 04.26"N 089° 44' 35.77"W to 29° 55' 54.75"N 089° 44' 30.87"W, two were found to be exposed (features 15 and 16). Feature 15 consists of a single exposed pile rising 6-8 feet above the waters surface. Feature 16 consists of 2 piles side by side which rise 6-8 feet above the waters surface. There were no piles found that were submerged within the area surveyed in this location. Recommend removing the charted obstruction symbols in 29° 55' 59.34"N 089° 44' 33.51"W and 29° 55' 54.75"N 089° 44' 30.87"W and chart an exposed pile symbol in 29° 56' 01.45"N 089° 44' 33.22"W (feature 16) and 29° 55' 52.42"N 089° 44' 26.71"W (feature 15). ***Do not concur. Submerged piles in 29° 55' 59.34"N 089° 44' 33.51"W and 29° 55' 54.75"N 089° 44' 30.87"W lie outside of coverage extents, therefore cannot be disproved. Recommend to remain as charted. Also recommend to chart pile symbols in 29° 56' 01.45"N 089° 44' 33.22"W and 29° 55' 52.42"N 089° 44' 26.71"W and label Piles.***

The charted obstructions (snag/stump) extending from 29° 52' 20.34"N 089° 40' 30.76"W to 29° 52' 06.44"N 089° 40' 33.01"W were not found as charted. Submerged piles were found extending from 29° 52' 07.18"N 089° 40' 30.78"W (contact 071164300) to 29° 52' 12.10"N 089° 40' 29.11"W (contact 017155044). While two contacts were made to identify the bounds of piles (contacts 071164300 and 071155035 (feature 25)) most of the piles within this area had no significant height (20cm to 30cm). There were also several piles laying flat on the bottom (contact 071155044) in 29° 52' 12.38"N 089° 40' 30.39"W. Additional debris was found near charted obstruction (snag/stump) in 29° 52' 16.89"N 089° 40' 31.08"W just north of the submerged piles in 29° 52' 12.10"N 089° 40' 29.11"W (feature 25) however the debris had no significant height. In addition, debris was found in the area just offshore of Fort Beauregard in 29° 52' 04.69"N 089° 40' 39.51"W (feature 13). Recommend removing the 6 charted obstruction (snag/stump) symbols in:
29° 52' 20.34"N 089° 40' 30.76"W ***Concur.***
29° 52' 16.89"N 089° 40' 31.08"W ***Concur.***
29° 52' 15.68"N 089° 40' 26.80"W ***Concur.***
29° 52' 14.18"N 089° 40' 32.26"W ***Concur.***
29° 52' 09.70"N 089° 40' 32.68"W ***Concur.***
29° 52' 06.44"N 089° 40' 33.01"W ***Concur.***

and charting submerged pile symbols in:
29° 52' 07.18"N 089° 40' 30.78"W (contact 071164300) ***Concur.***
29° 52' 12.10"N 089° 40' 29.11"W (feature 25) ***Concur.***
29° 52' 12.38"N 089° 40' 30.39"W (contact 071155044) ***Concur.***

and an obstruction symbol in:
29° 52' 04.69"N 089° 40' 39.51"W (feature 13). ***Concur.***

Recommend replacing the currently charted Foul area centered in 29° 52’ 05.32”N 089° 40’ 36.50”W with the updated foul area included within the feature file and labeled as “Foul Area 1”, centered in 29° 52’ 08.81”N 089° 40’ 32.13”W to encompass the debris with no significant height near charted obstruction (snag/stump) in 29° 52’ 16.89”N 089° 40’ 31.08”W, the submerged piles in 29° 52’ 12.10”N 089° 40’ 29.11”W (feature 25), and 29° 52’ 07.18”N 089° 40’ 30.78”W (contact 071164300). ***Concur.***

The charted obstruction (snag/stump) in 29° 52’ 06.72”N 089° 40’ 12.88”W and 29° 52’ 01.21”N 089° 40’ 14.38”W were not found as charted. Submerged piles were found to extend from 29° 52’ 02.21”N 089° 40’ 18.00”W (feature 23), to 29° 52’ 04.50”N 089° 40’ 16.37”W (feature 24), to approximately 29° 52’ 05.50”N 089° 40’ 14.88”W (contact 067215701) and then turning southeast and extending to 29° 52’ 04.77”N 089° 40’ 12.71”W (feature 10). Recommend removing the two obstruction symbols in 29° 52’ 06.72”N 089° 40’ 12.88”W and 29° 52’ 01.21”N 089° 40’ 14.38”W and charting submerged pile symbols in:
29° 52’ 02.21”N 089° 40’ 18.00”W (feature 23) ***Do not concur. Obstruction lies within recommended Foul area.***
29° 52’ 04.50”N 089° 40’ 16.37”W (feature 24) ***Do not concur, height insignificant..***
29° 52’ 05.50”N 089° 40’ 14.88”W (contact 067215701) ***Concur.***
29° 52’ 05.25”N 089° 40’ 13.90”W (feature 11) ***Concur.***
29° 52’ 04.77”N 089° 40’ 12.71”W (feature 10) ***Concur.***

The charted Ruins area centered on 29° 52’ 04.23”N 089° 40’ 23.32”W consisted of exposed piles and the remains of a naval installation. The charted area does not adequately cover the extents of the ruins as determined by this survey. Recommend replacing the currently charted ruins area centered around 29° 52’ 04.23”N 089° 40’ 23.32”W with the updated ruined area included within the feature file and labeled as “Ruined Area 1”, centered in 29° 52’ 04.80”N 089° 40’ 23.13”W to encompass feature 22 in, 29° 52’ 01.21”N 089° 40’ 17.11”W, feature 8 in 29° 52’ 07.81”N 089° 40’ 24.48”W, and feature 9 in 29° 52’ 07.36”N 089° 40’ 27.95”W and 29° 52’ 02.17”N 089° 40’ 29.27”W. ***Concur.***

The charted obstruction (snag/stump) in 29° 52’ 01.49”N 089° 38’ 59.44”W were not found in its charted position. There was a line of exposed piles in 29° 51’ 53.69”N 089° 38’ 43.39”W (feature 14) extending to shore. Recommend removing the obstruction symbol charted in 29° 52’ 01.49”N 089° 38’ 59.44”W and charting a pile symbol in 29° 51’ 53.69”N 089° 38’ 43.39”W (feature 14). ***Concur.***

The charted foul area around 29° 51’ 44.44”N 089° 39’ 24.00”W, 29° 51’ 45.76”N 089° 38’ 36.85”W, 29° 51’ 52.44”N 089° 38’ 40.71”W, 29° 51’ 48.43”N 089° 39’ 18.82”W was found to be clear over the area surveyed. There were exposed piles included within the foul area bounds which were discussed previously (feature 14 in 29° 51’ 53.69”N 089° 38’ 43.39”W). There was barge and crane activity within the foul area bounds in 29° 51’ 48.54”N 089° 38’ 48.67”W during the survey. Recommend removing the

charted foul area around 29° 51’ 44.44”N 089° 39’ 24.00”W, 29° 51’ 45.76”N 089° 38’ 36.85”W, 29° 51’ 52.44”N 089° 38’ 40.71”W, 29° 51’ 48.43”N 089° 39’ 18.82”W. ***Concur.***

Two yellow special purpose buoys were located in 29° 55’ 53.46”N 089° 39’ 05.96”W (feature 19) and 29° 56’ 05.27”N 089° 39’ 04.31”W (feature 21). The buoys were located along the charted pipe; which extends through H11614 from the south around 29° 52’ 06.51”N 089° 41’ 21.39”W to the northeast around 29° 56’ 05.61”N 089° 38’ 57.97”W. Sidescan data collected from this survey showed what appears to be a pipeline running between the two buoys however there was no indication that the pipeline was exposed anywhere within H11614’s survey area. The pipeline included in this survey’s feature file (29° 52’ 06.34”N 089° 41’ 21.50”W to 29° 56’ 05.61”N 089° 38’ 57.97”W) is located slightly to the west of the charted pipeline. Recommend updating the charted pipeline with the pipeline object from this survey. ***Concur.***

A second set of yellow special purpose buoys were located in 29° 55’ 50.83”N 089° 38’ 26.64”W (feature 18) and 29° 55’ 55.44”N 089° 38’ 09.60”W (feature 20). Sidescan data showed what appears to be a pipeline or cable running between the two buoys on a 34/214 degree azimuth. There is nothing charted in the area associated with the yellow buoys. Following the trajectory into H11613 the feature appears it would terminate at the charted 29° 58’ 05.70”N 089° 36’ 57.40”W (EB 12-17081-1 Heater Platform) or 29° 58’ 05.80”N 089° 36’ 58.80”W (EB 12-17081-1). Based on the H11614 survey, a pipeline object was created which extends from 29° 54’ 14.46”N 089° 39’ 28.23”W to 29° 56’ 05.18”N 089° 38’ 08.26”W. Recommend investigating with the owners of the platform to identify the feature and its as installed position. This information should be compared with the data from this survey and from the previously submitted H11613 data and charted accordingly. ***Concur. The Navigation Manager in this region was contacted regarding this issue and a response was never received. A copy of this email can be found in the DR appendices, saved as a text file named “email_to_Nav_Manager.txt”.***

The pipeline charted in 29° 53’ 40.18”N 089° 43’ 34.06”W and 29° 56’ 06.35”N 089° 41’ 46.40”W within H11614 was found and a pipeline object was created extending from 29° 53’ 40.39”N 089° 43’ 34.03”W to 29° 56’ 06.03”N 089° 41’ 46.53”W. This pipeline object agrees within 30 meters of the currently charted position. ***Concur.***

An uncharted platform was present in 29° 55’ 34.61”N 089° 35’ 55.45”W (feature 12). Recommend charting a platform symbol in 29° 55’ 34.61”N 089° 35’ 55.45”W and label Platform. ***Concur.***

The Fairway/Dredge area charted around 29° 53’ 17.32”N 089° 36’ 05.26”W has a maintained depth value of 0.6 meters. Results from this survey indicate that the depths around this area range between 1.4 to 2.6 meters. ***Concur with clarification. Revise chart notation to 4 ft June 2007.***

The charted Caution area at 29° 53’ 09.94”N 089° 35’ 36.85”W, just to the east and adjacent to the charted Fairway/Dredge area (29° 53’ 10.63”N 089° 35’ 39.06”W) has a reported depth of 0.6 meters. Results from this survey overlap with a small portion of this area near 29° 53’ 09.94”N 089° 35’ 36.85”W and indicate depths around this area range between 1.5 and 1.7 meters. ***The entire area of the caution area was not surveyed. No charting action recommended..***

The Fairway/Dredge area charted around 29° 52’ 13.15”N 089° 40’ 25.37”W has a maintained depth value of 2.1 meters. Results from this survey indicate that the depths around this area range between 1.7 to 2.8 meters. The fairway area bounds generally fall outside of the channel identified by the three charted day beacons charted as Fl R 6s 17ft 4M “2” Ra Ref (feature 5), R “4” Ra Ref (feature 7) and G “3” (feature 6). Recommend updating the fairway area bounds based on the current data and charted day beacons. ***Do not concur. Shoalest depth in the Fairway/Dredge area found to be 1.8 meters, not 1.7 meters. Recommend updating fairway bounds based on shoalest depth of 1.8 meters.***

The pier (jetty) in ruins charted in 29º 52’ 47.44”N 089º 35’ 54.34”W was not present in this survey. Recommend removal of the pier (jetty) in ruins. ***Concur.***

The three charted navigational aids at Bayou Yscloskey were found to be in their charted position. See section D.1.2 for additional information. **Concur.**

Generally the depths from this survey are deeper than the charted depths throughout H11614. The charted shoreline throughout the H11614 area has also migrated shoreward and no longer represents the current shoreline. In the eastern portion of H11614, the charted 1.8 meter depth curve has migrated approximately 200 to 300 meters east and shoreward. In the southern portion of H11614, the charted 1.8 meter depth curve has migrated south and shoreward approximately 200 to 300 meters. In the western portion of H11614, the charted 1.8 meter depth curve has migrated approximately 200 to 300 meters west, except in the northwest, where the 1.8 meter depth curve has migrated approximately 900 to 1500 meters northwest and shoreward. Generally, the survey depths that are deeper than the charted 1.8 meter depth curve are around 0.5 to 0.7 meters deeper than the currently charted depths. The charted shoreline should be modified to be outside the sounding area of this survey. ***Concur. Recommend MCD reference updated RSD aerial imagery for shoreline update.***

Uncharted Wrecks and Obstructions

No uncharted wrecks were found in H11614. Table D-2 lists uncharted obstructions found in H11614 that are recommended for charting in ENC US4MS10M not previously discussed.

Table D-2. Uncharted Obstructions in ENC US4LA35M, 1/80,000 scale

Feature Number	Feature Position (NAD83)	Least Depth (Meters)	Uncertainty (Meters)	Charting Recommendations

	Latitude (N)	Longitude (W)			
1	29° 52’ 23.90”	089° 38’ 33.40”	1.12	0.345	OBSTR Chart sounding and label Obstn ***Concur, chart 3 ft obstruction.***
2	29° 52’ 22.84”	089° 39’ 08.67”	1.25	0.329	OBSTR Chart sounding and label Obstn ***Concur, chart 4 ft obstruction.***
3	29° 54’ 27.01”	089° 42’ 11.58”	1.28	0.331	OBSTR Chart sounding and label Obstn ***Concur, chart 4 ft obstruction.***
4	29° 53’ 52.65”	089° 43’ 19.78”	1.32	0.331	OBSTR Chart sounding and label Obstn ***Concur, chart 4 ft obstruction.***
17*	29° 55’ 25.95”	089° 43’ 41.69”	1.28	N/A	OBSTR Chart sounding and label Subm Snag ***Concur, chart 4 ft obstruction.***
* Found by sidescan sonar only, least depth estimated from sidescan data.					

D.1.1 AWOIS Item Investigations

There were no AWOIS investigations assigned for H11614. However all charted wrecks, rocks and obstructions were to be verified during main-scheme survey operations and a 2nd 100% coverage for a radius of 100 meters around the charted position. The Statement of Work states that the 50 most significant items for the survey be investigated (SAIC assumed 50 per sheet). The fewer than expected significant items identified during survey operations led to somewhat less than 50 items per sheet. Therefore on H11614, only 14 items were deemed significant and investigated. This methodology was discussed with the COTR prior to item investigations being performed. See Appendix V Supplemental Survey Records and Correspondence for more information. ***Concur.***

D.1.2 Navigational Aids

There are three navigational aids charted within H11614 survey bounds. The three navigational aids charted as Fl R 6s 17ft 4M “2” Ra Ref (feature 5), R “4” Ra Ref (feature 7) and G “3” (feature 6) located at the entrance of Bayou Yscloskey, in approximately 29° 52’ 11.78”N 089° 40’ 26.12”W, were found to be in their charted position during this survey. The day marker charted as Fl R 6s 17ft 4M “2” Ra Ref in 29° 52’ 20.75”N 089° 40’ 26.20”W was verified as having a light present however it was not operational at the time of survey (feature 5). Recent reports from local fishermen are that it has since been repaired and is currently operational. ***Concur.***

Figure D-3. Day Beacons at the Entrance to Yscloskey Bayou

All of the above listed navigational aids within the H11614 survey bounds are listed on the USCG Light List, Volume 4, Gulfport Ship Channel, MS to Lakes Pontchartrain and Maurepas, LA. ***Concur.***

D.1.3 Danger to Navigation Reports

There were no Dangers to Navigation Reports submitted for this sheet.

D.2 Additional Results

Comparison with prior surveys was not required under this task order. See Section D.1 for comparison to the nautical charts.

E. APPROVAL SHEET

15 February 2008

LETTER OF APPROVAL

REGISTRY NUMBER: H11614

This report and the accompanying digital data for project S-J977-KR-SAIC, Lake Borgne, Louisiana are respectfully submitted.

Field operations and data processing contributing to the accomplishment of this survey, H11614, were conducted under supervision of myself and lead hydrographer Gary R. Davis with frequent personal checks of progress and adequacy. This Descriptive Report, digital data, and all accompanying records are approved, and are submitted as complete and adequate in compliance with the Statement of Work.

Reports previously submitted to NOAA for this project include:

Report	Submission Date
Descriptive Report H11613, SAIC Doc 07-TR-002	09 November 2007
Data Acquisition and Processing Report, SAIC Doc 07-TR-005	09 November 2007
Data Acquisition and Processing Report, SAIC Doc 07-TR-005 *This report replaces the Data Acquisition and Processing Report submitted on 09 November 2007*	18 January 2008
Descriptive Report H11612, SAIC Doc 07-TR-001	18 January 2008

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Paul L. Donaldson
Lead Hydrographer
Science Applications International Corporation
Friday, 15 February 2008

E. APPROVAL SHEET

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LETTER OF APPROVAL

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Report	Submission Date
Descriptive Report H11613, SAIC Doc 07-TR-002	09 November 2007
Data Acquisition and Processing Report, SAIC Doc 07-TR-005	09 November 2007
Data Acquisition and Processing Report, SAIC Doc 07-TR-005 *This report replaces the Data Acquisition and Processing Report submitted on 09 November 2007*	18 January 2008
Descriptive Report H11612, SAIC Doc 07-TR-001	18 January 2008

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Paul L. Donaldson

Digitally signed by Paul L. Donaldson
DN: cn=Paul L. Donaldson, o=MSTD, ou=SAIC, email=paul.l.donaldson@saic.com, c=US
Date: 2008.02.15 14:11:06 -05'00'

Paul L. Donaldson
Lead Hydrographer
Science Applications International Corporation
Friday, 15 February 2008

APPENDIX I. DANGER TO NAVIGATION REPORTS (AHB SUBMISSION TO MCD)

There were no Danger to Navigation Reports submitted for H11614.

APPENDIX II. SURVEY FEATURE REPORT

This survey feature report consists of 27 files, including:

- One excel spreadsheet and one corresponding PDF file, titled *H11614_Bathymetry_Feature_List.xls*, describing all bathymetry features that can be observed in the S-57 feature file,
- One excel spreadsheet and one corresponding PDF file, titled *H11614_Side_Scan_Contact_List.xls*, describing all side scan contacts identified on H11614.
- Twenty-five PDF files containing feature correlator sheets, listed below:
    - H11614_F01.pdf
    - H11614_F02.pdf
    - H11614_F03.pdf
    - H11614_F04.pdf
    - H11614_F05.pdf
    - H11614_F06.pdf
    - H11614_F07.pdf
    - H11614_F08.pdf
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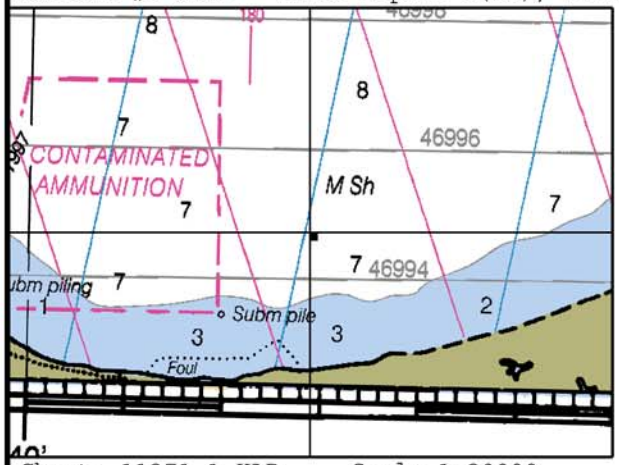
    - H11614_F18.pdf
    - H11614_F19.pdf
    - H11614_F20.pdf
    - H11614_F21.pdf
    - H11614_F22.pdf
    - H11614_F23.pdf
    - H11614_F24.pdf
    - H11614_F25.pdf

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0001 Least Depth: 3(ft), 1.12(m) Lat: 29 52 23.90N Lon: 089 38 33.40W Ping: 9431 Beam: 510



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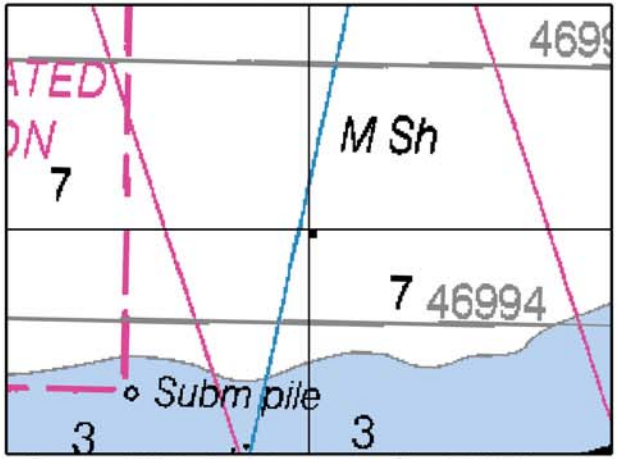

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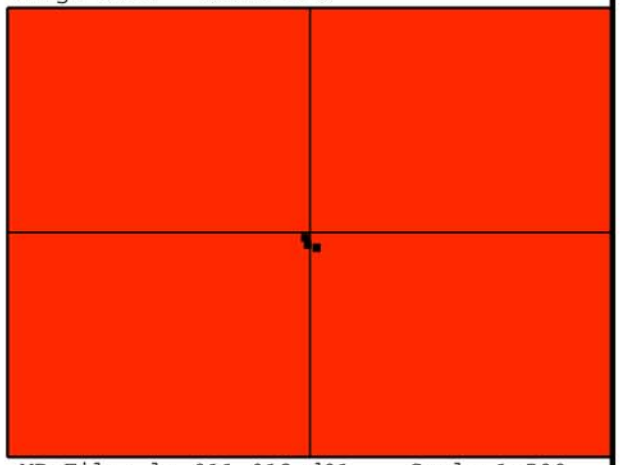
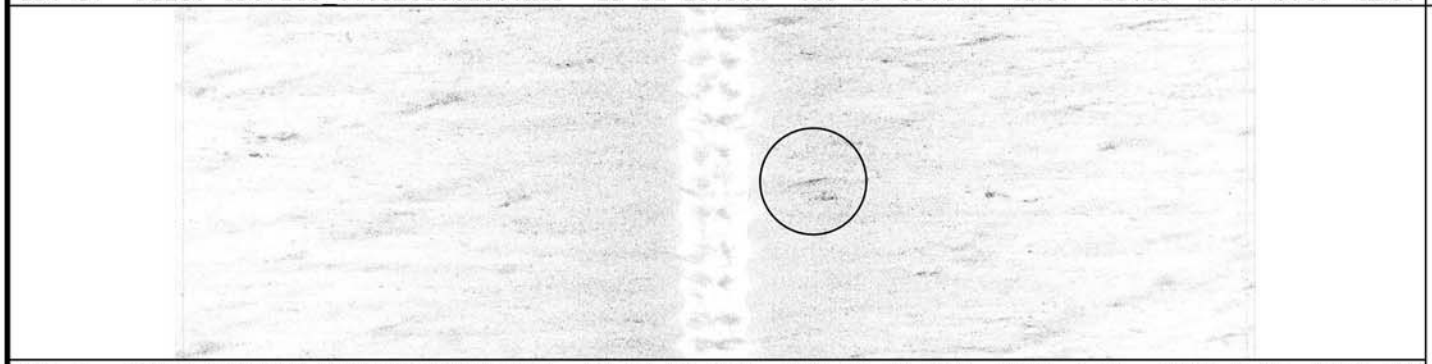


MB File: lm_011_012.d01 Scale 1:500

ID: 57 File: TD07148_070528200100.XTF 29 52 23.90N 089 38 33.47W RNG: -13.53 HGT: 0.46 HDG: 000

COMMENT:
OBSTR Plot sounding and label Obstr.



ID: 1 File: TD07009_070109224200.XTF 29 52 23.85N 089 38 33.45W RNG: 4.38 HGT: 0.95 HDG: 276

CORRELATED SS CONTACTS:

Contact	Range/Height
148200453	-13.53/0.46
009225426	4.38/0.95
011182031	-2.59/0.78
148201043	3.75/1.77

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0002 Least Depth: 4(ft), 1.25(m) Lat: 29 52 22.84N Lon: 089 39 08.67W Ping: 8865 Beam: 1221

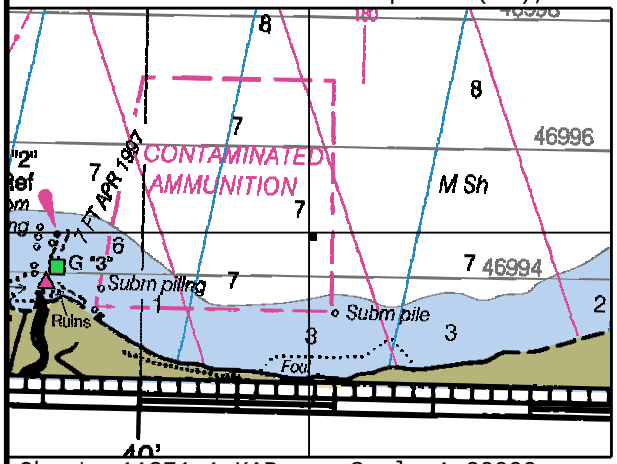
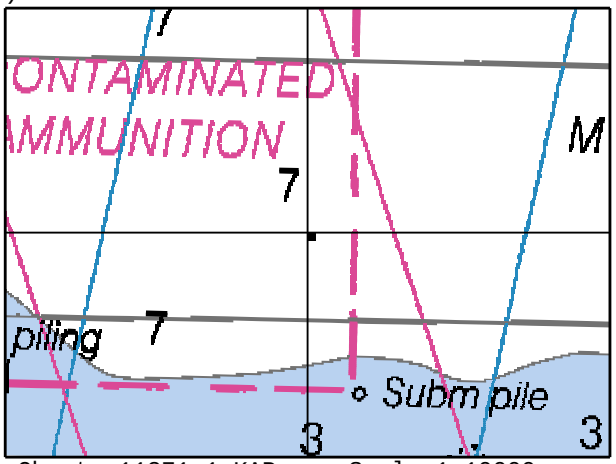


Chart: 11371_1.KAP Scale 1:20000



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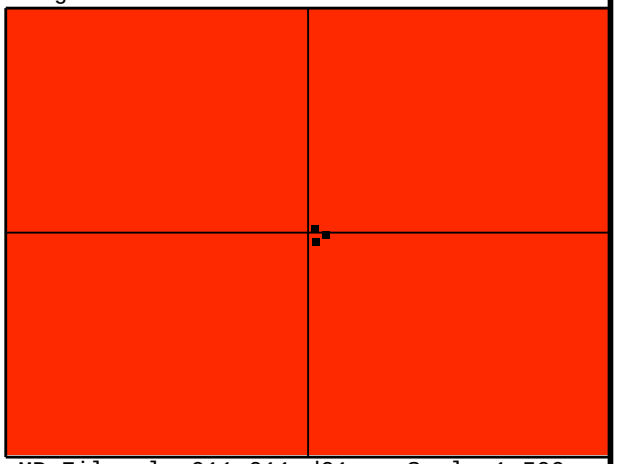

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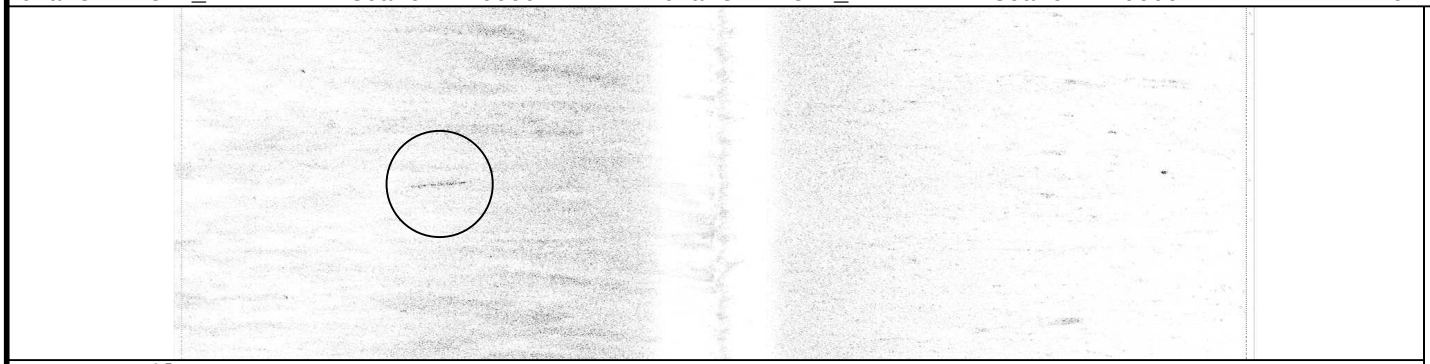

ID: 56 File: TD07148_070528193400.XTF 29 52 22.81N 089 39 08.64W RNG: -12.47 HGT: 0.82 HDG: 177

COMMENT:
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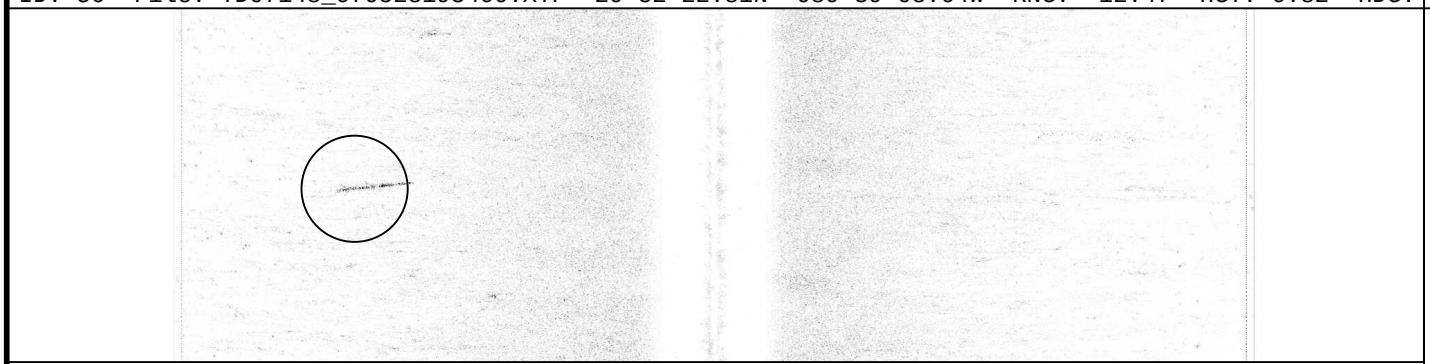


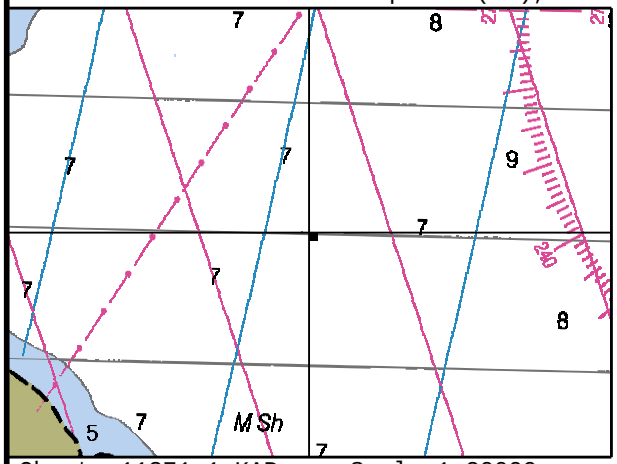
ID: 55 File: TD07148_070528192900.XTF 29 52 22.89N 089 39 08.65W RNG: -16.31 HGT: 0.70 HDG: 356

CORRELATED SS CONTACTS:

Contact	Range/Height
148193543	-12.47/0.82
148193305	-16.31/0.70
012144051	-9.00/0.96

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0003 Least Depth: 4(ft), 1.28(m) Lat: 29 54 27.01N Lon: 089 42 11.58W Ping: 12967 Beam: 658



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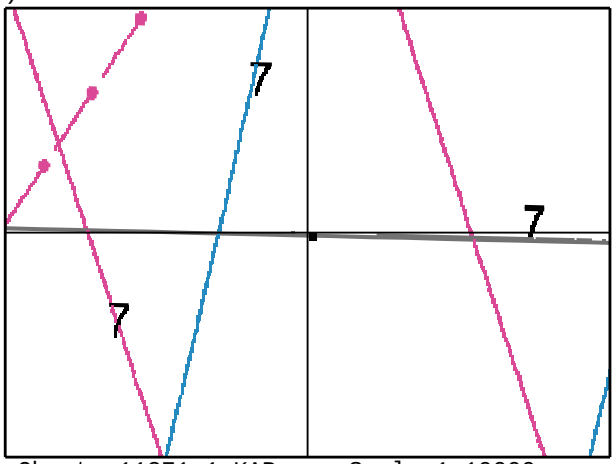
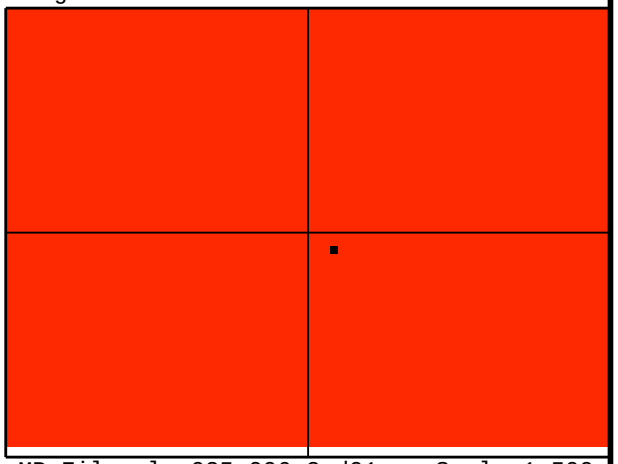
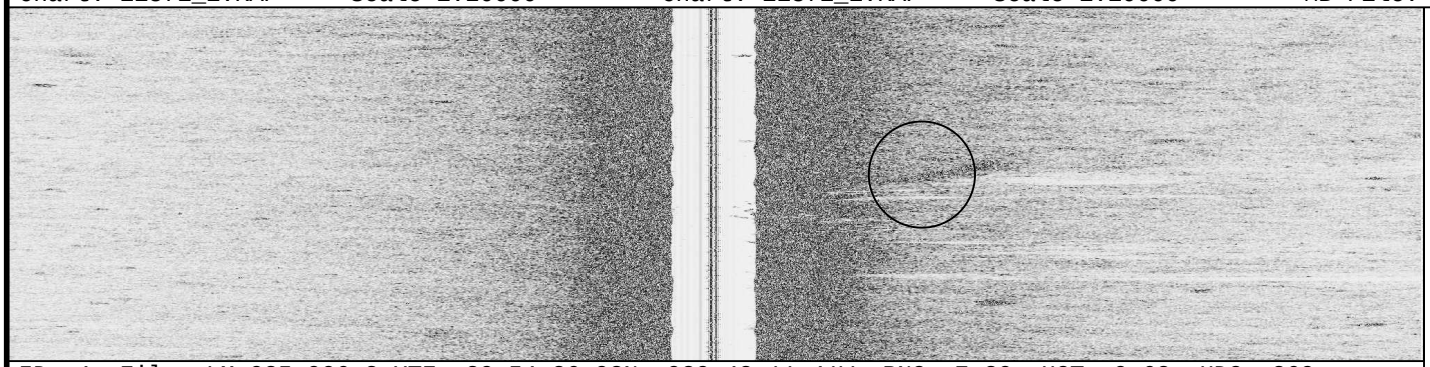


Chart: 11371_1.KAP Scale 1:10000



MB File: lm_025_006_2.d01 Scale 1:500



ID: 4 File: LM_025_006_2.XTF 29 54 26.93N 089 42 11.41W RNG: 7.30 HGT: 0.62 HDG: 269

COMMENT:
OBSTR Plot sounding and label Obstr.

CORRELATED SS CONTACTS:

Contact	Range/Height
025182534	7.30/0.62

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0004 Least Depth: 4(ft), 1.32(m) Lat: 29 53 52.65N Lon: 089 43 19.78W Ping: 15508 Beam: 1456

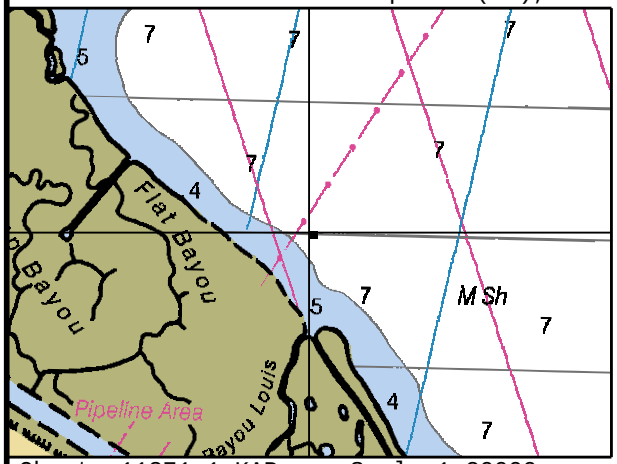


Chart: 11371_1.KAP Scale 1:20000

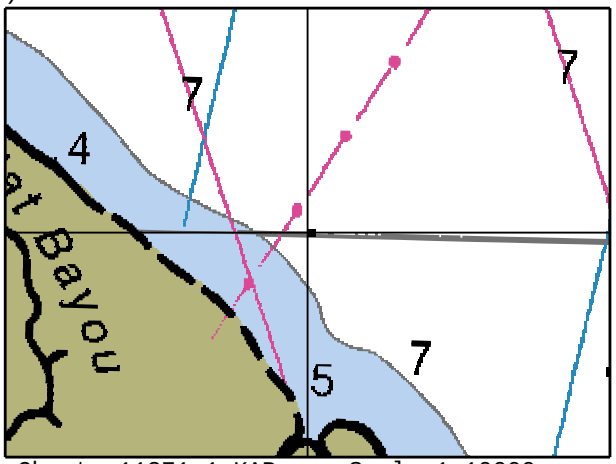
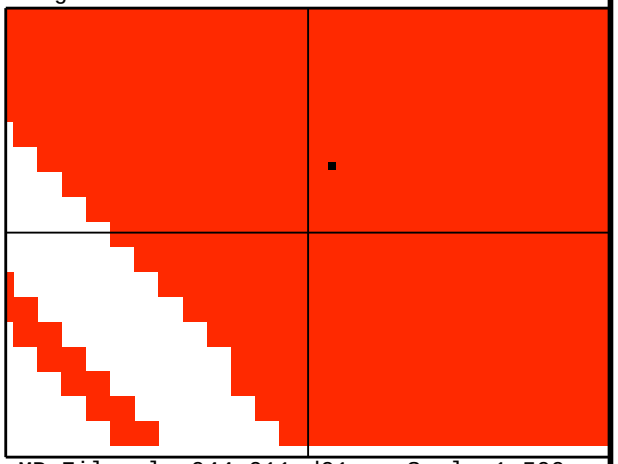
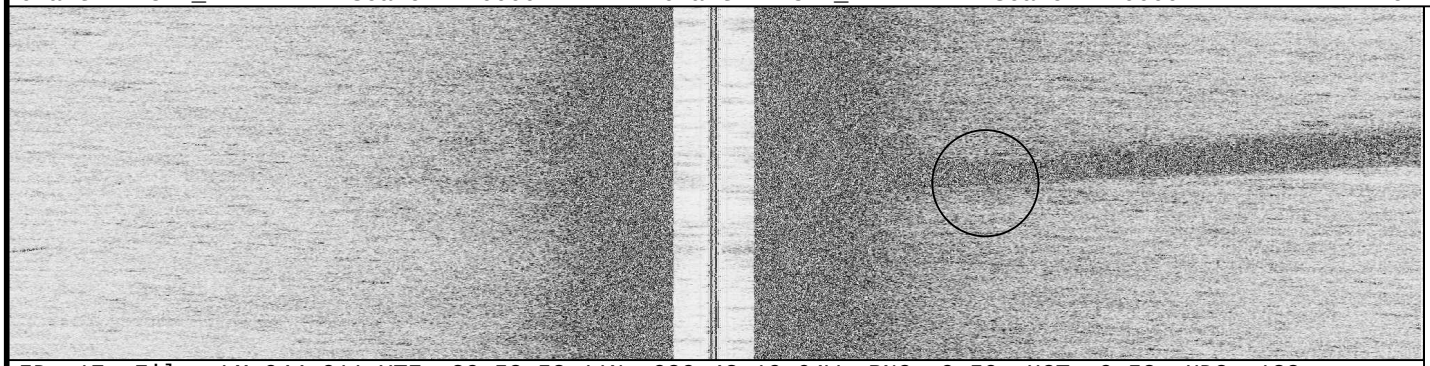


Chart: 11371_1.KAP Scale 1:10000



MB File: lm_044_011.d01 Scale 1:500



ID: 17 File: LM_044_011.XTF 29 53 53.11N 089 43 19.64W RNG: 9.50 HGT: 0.52 HDG: 138

COMMENT:
OBSTR Plot sounding and label Obstr.

CORRELATED SS CONTACTS:

Contact	Range/Height
044214010	9.50/0.52

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0005 Least Depth: Lat: 29 52 20.41N Lon: 089 40 26.39W Ping: Beam:

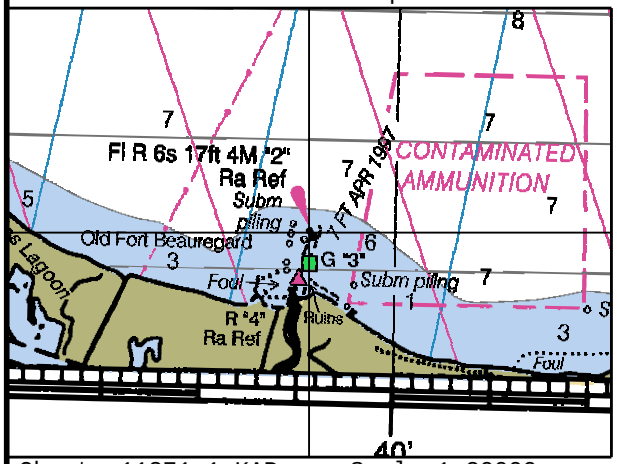


Chart: 11371_1.KAP Scale 1:20000

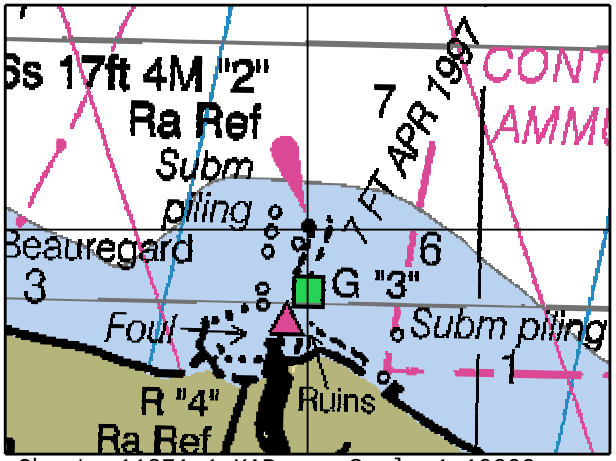
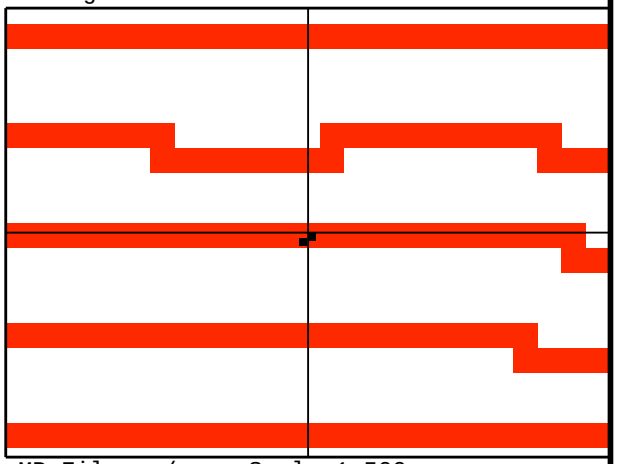
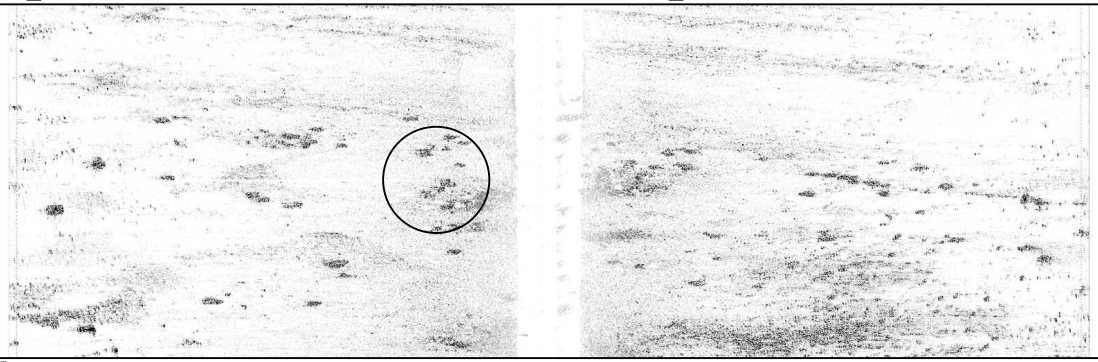


Chart: 11371_1.KAP Scale 1:10000

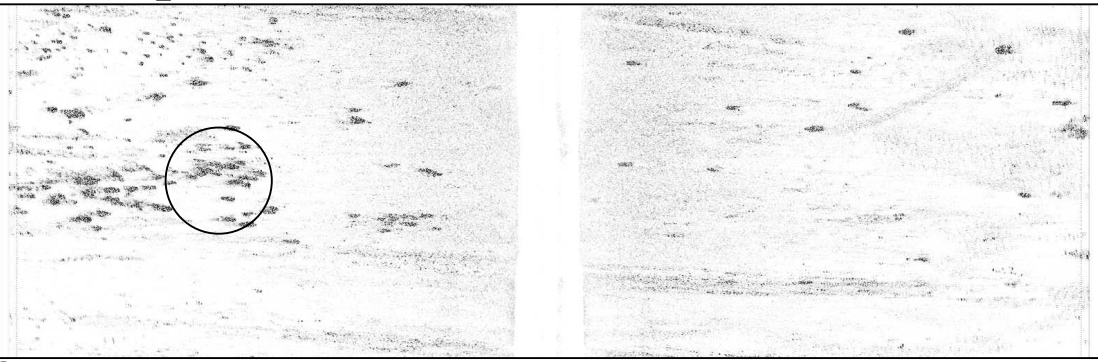


MB File: n/a Scale 1:500



ID: 22 File: TD07071_070312141700.XTF 29 52 20.41N 089 40 26.39W RNG: -5.16 HGT: 1.17 HDG: 085

COMMENT:
DAYBEACON Plot Daybeacon symbol and label Fl R 6s 17ft 4M '2' Ra Ref.



ID: 23 File: TD07071_070312150100.XTF 29 52 20.37N 089 40 26.46W RNG: -15.00 HGT: 0.54 HDG: 268

CORRELATED SS CONTACTS:

Contact	Range/Height
071142617	-5.16/1.17
071150211	-15.00/0.54

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0006 Least Depth: Lat: 29 52 09.52N Lon: 089 40 27.27W Ping: Beam:

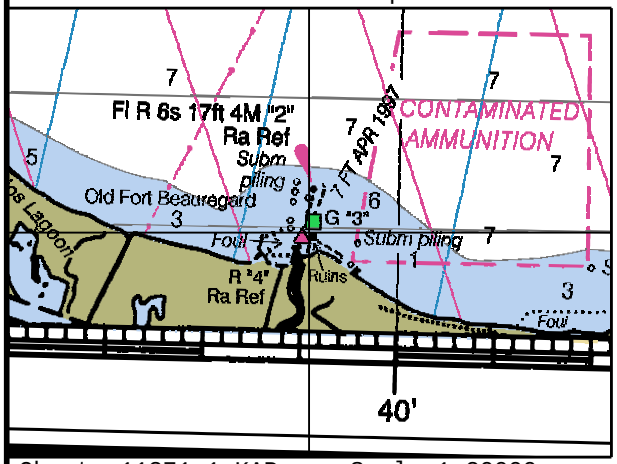


Chart: 11371_1.KAP Scale 1:20000

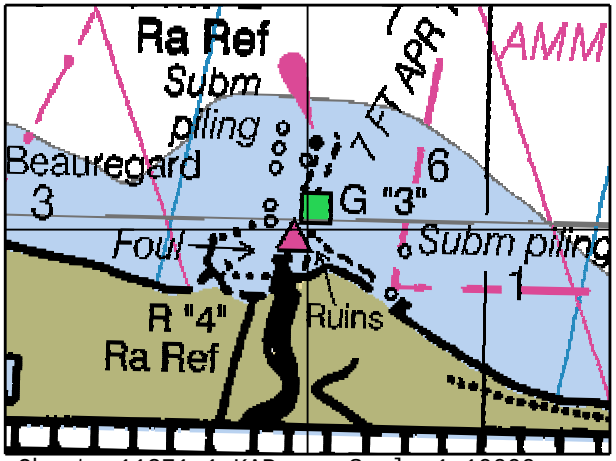
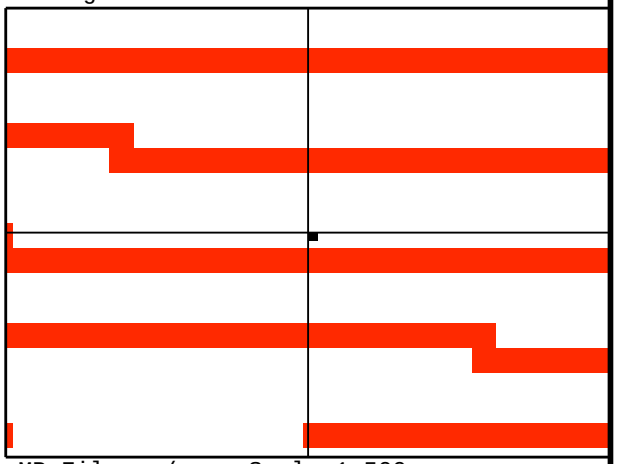
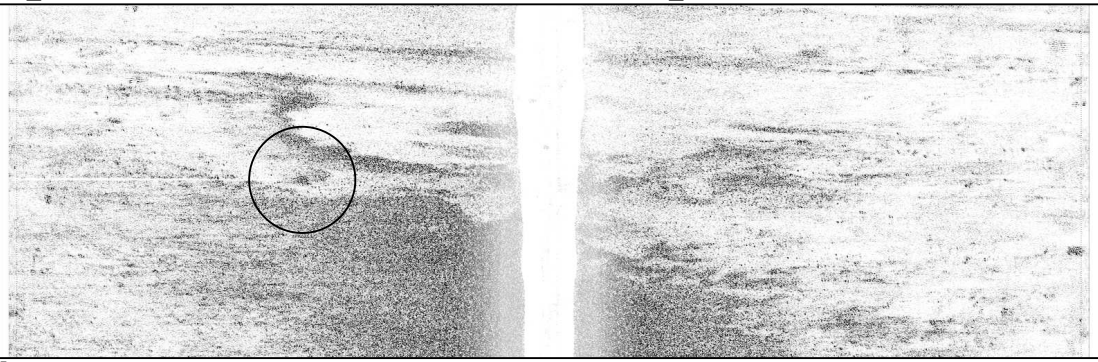


Chart: 11371_1.KAP Scale 1:10000

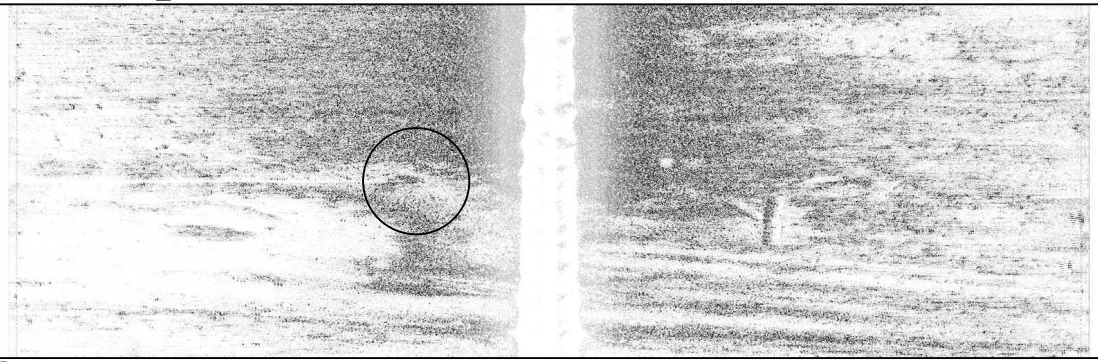


MB File: n/a Scale 1:500



ID: 30 File: TD07071_070312161100.XTF 29 52 09.52N 089 40 27.27W RNG: -11.22 HGT: 0.69 HDG: 270

COMMENT:
DAYBEACON Plot Daybeacon symbol and label G '3'.



ID: 27 File: TD07071_070312152200.XTF 29 52 09.51N 089 40 27.25W RNG: -6.06 HGT: 0.91 HDG: 087

CORRELATED SS CONTACTS:

Contact	Range/Height
071161841	-11.22/0.69
071152857	-6.06/0.91

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0007 Least Depth: Lat: 29 52 07.86N Lon: 089 40 29.51W Ping: Beam:

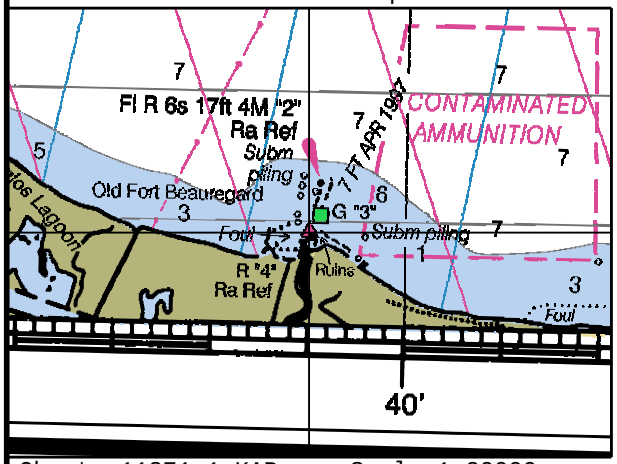


Chart: 11371_1.KAP Scale 1:20000

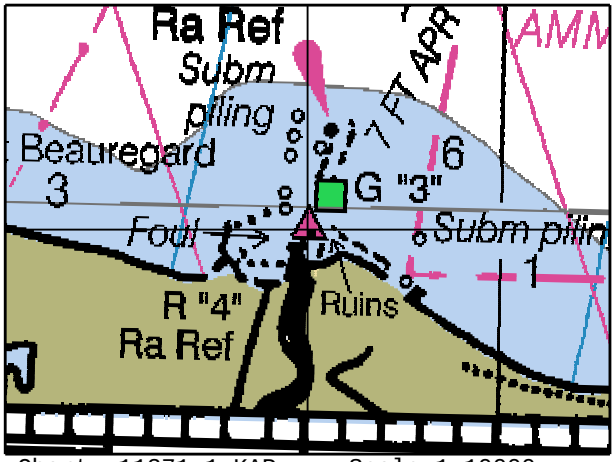
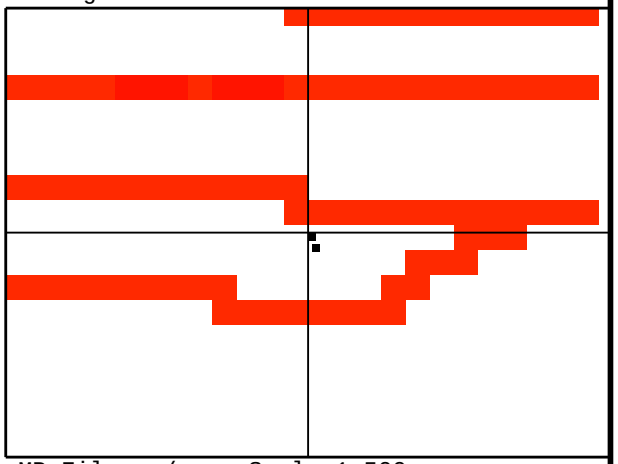


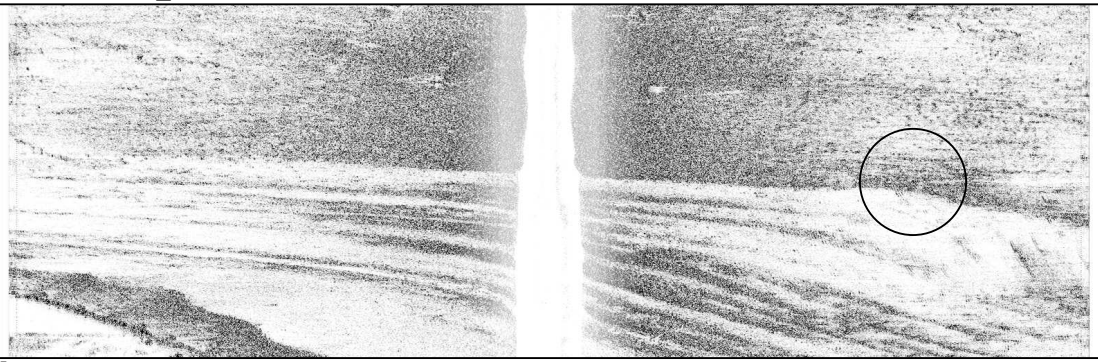
Chart: 11371_1.KAP Scale 1:10000



MB File: n/a Scale 1:500

ID: 24 File: TD07071_070312151400.XTF 29 52 07.86N 089 40 29.51W RNG: 4.47 HGT: 0.80 HDG: 091

COMMENT:
DAYBEACON Plot Daybeacon symbol and label R '4' Ra Ref.



ID: 33 File: TD07071_070312163900.XTF 29 52 07.79N 089 40 29.48W RNG: 16.41 HGT: 0.43 HDG: 272

CORRELATED SS CONTACTS:

Contact	Range/Height
071151623	4.47/0.80
071164251	16.41/0.43

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0008 Least Depth: Lat: 29 52 07.81N Lon: 089 40 24.48W Ping: Beam:

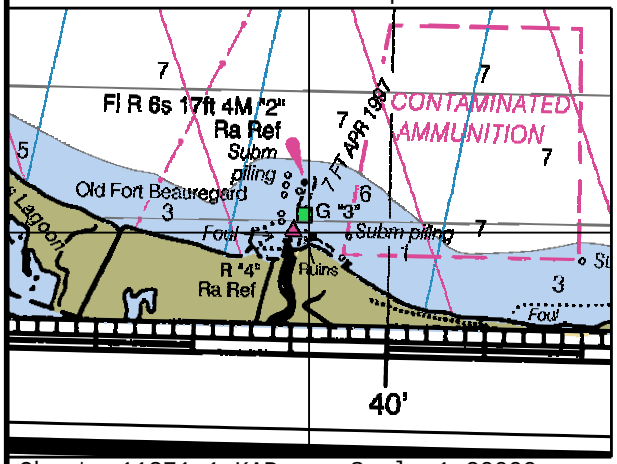


Chart: 11371_1.KAP Scale 1:20000

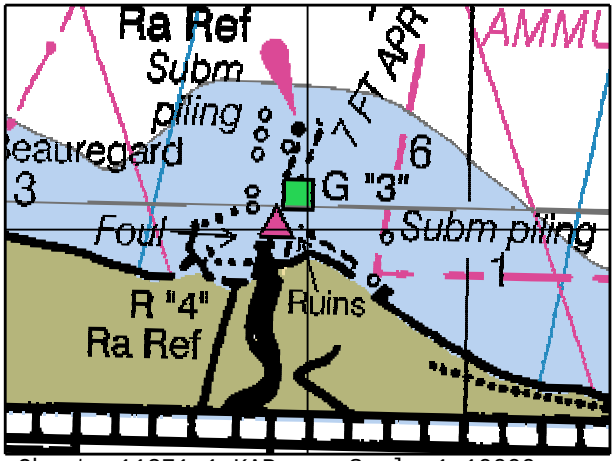
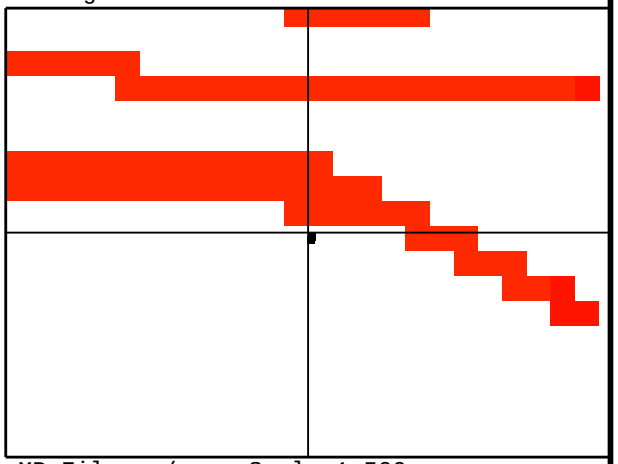
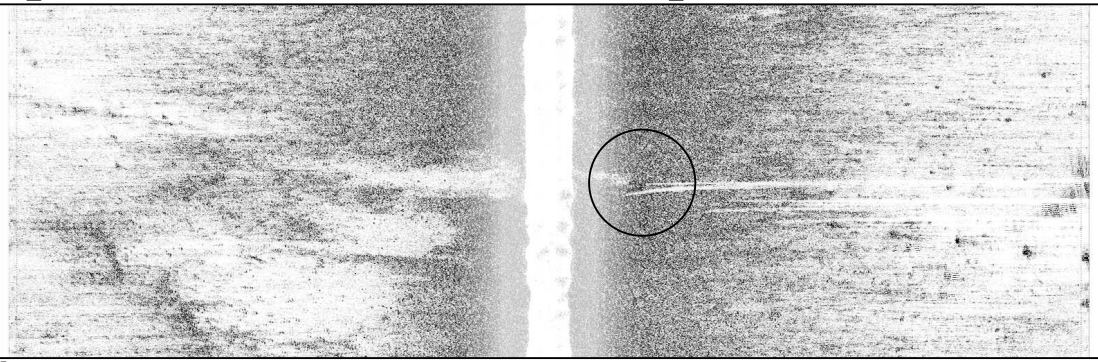


Chart: 11371_1.KAP Scale 1:10000

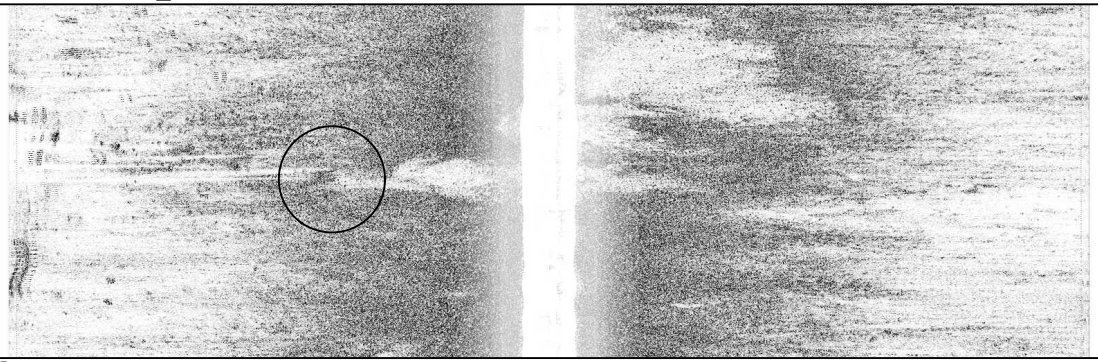


MB File: n/a Scale 1:500



ID: 26 File: TD07071_070312151400.XTF 29 52 07.81N 089 40 24.48W RNG: 4.16 HGT: 0.87 HDG: 096

COMMENT:
PILES EXPOSED Plot Pile symbol label Piles.



ID: 31 File: TD07071_070312163900.XTF 29 52 07.79N 089 40 24.49W RNG: -9.88 HGT: 0.69 HDG: 284

CORRELATED SS CONTACTS:

Contact	Range/Height
071151700	4.16/0.87
071164215	-9.88/0.69

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0009 Least Depth: Lat: 29 52 07.36N Lon: 089 40 27.95W Ping: Beam:

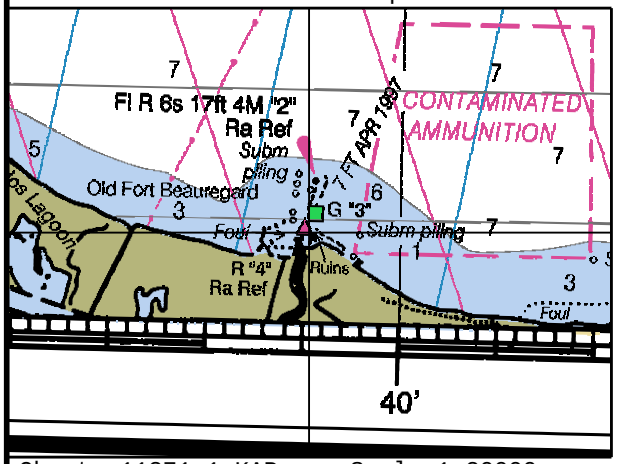


Chart: 11371_1.KAP Scale 1:20000

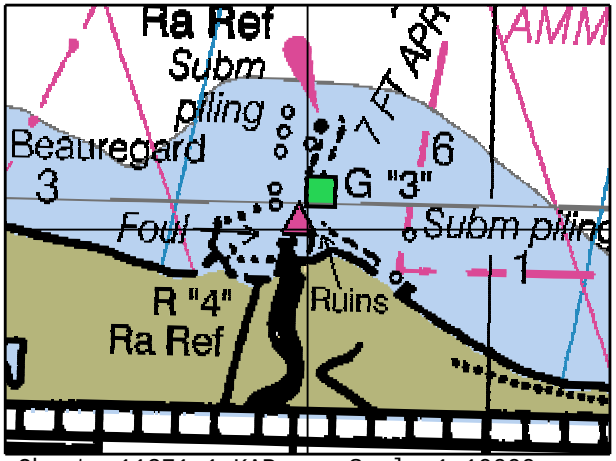
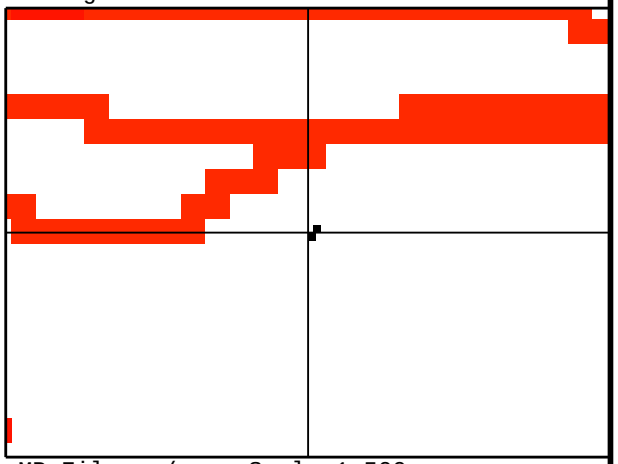
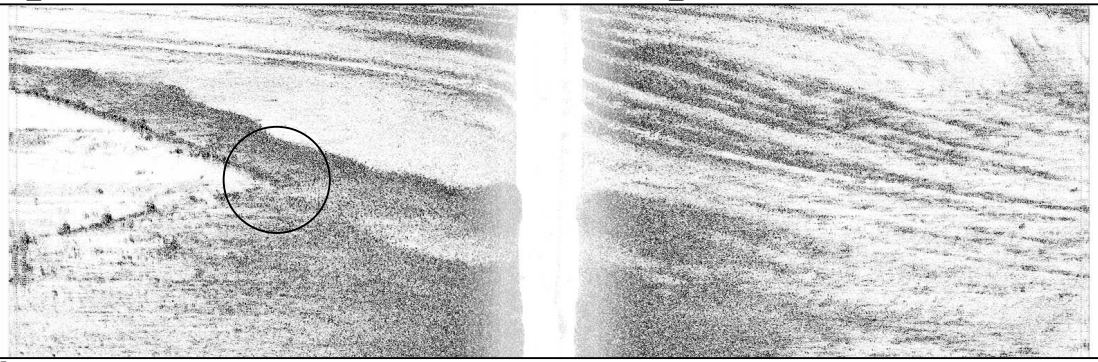


Chart: 11371_1.KAP Scale 1:10000

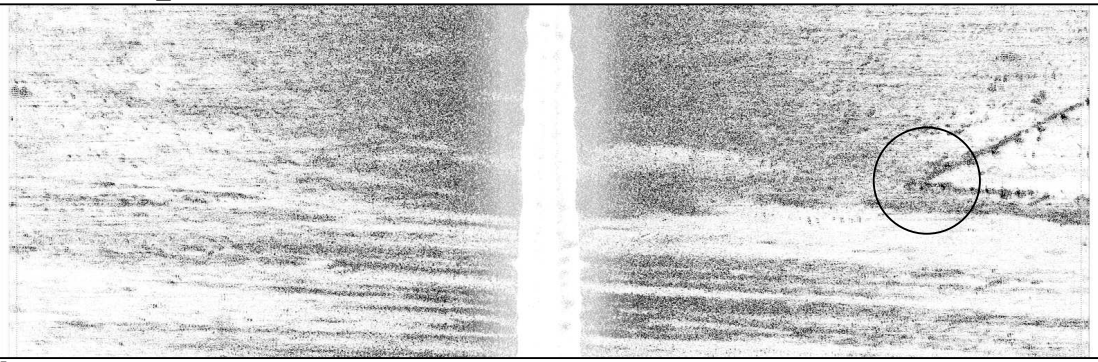


MB File: n/a Scale 1:500



ID: 32 File: TD07071_070312163900.XTF 29 52 07.36N 089 40 27.95W RNG: -12.38 HGT: 0.71 HDG: 240

COMMENT:
PILES EXPOSED Plot Pile symbol label Piles.



ID: 25 File: TD07071_070312151400.XTF 29 52 07.42N 089 40 27.92W RNG: 17.03 HGT: 0.37 HDG: 091

CORRELATED SS CONTACTS:

Contact	Range/Height
071164241	-12.38/0.71
071151634	17.03/0.37

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0010 Least Depth: 4(ft), 1.35(m) Lat: 29 52 04.77N Lon: 089 40 12.71W Ping: Beam:

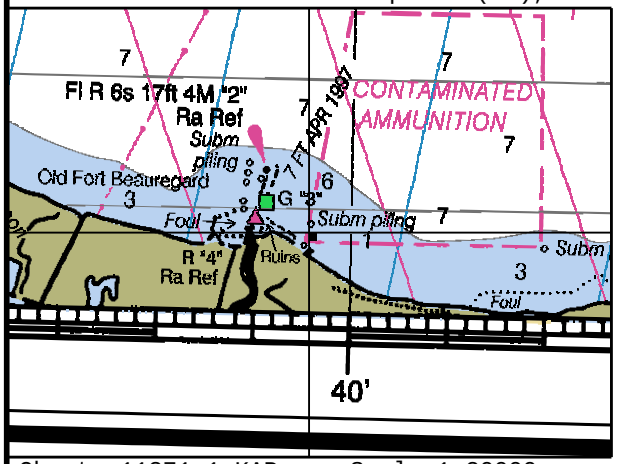


Chart: 11371_1.KAP Scale 1:20000

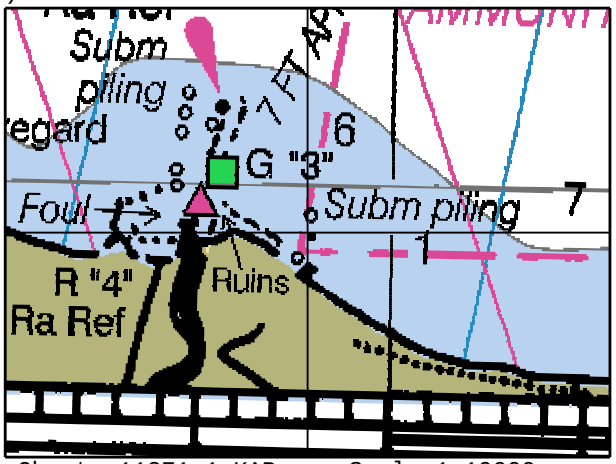
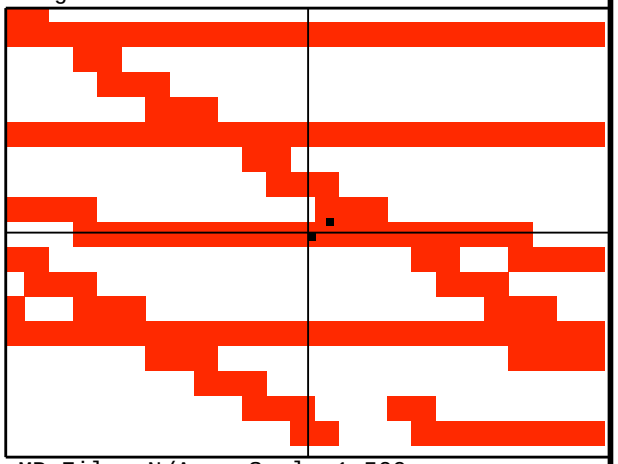
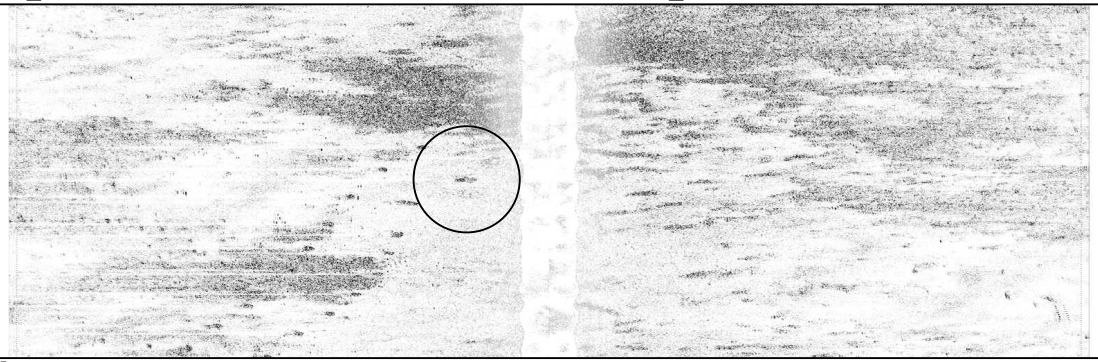


Chart: 11371_1.KAP Scale 1:10000

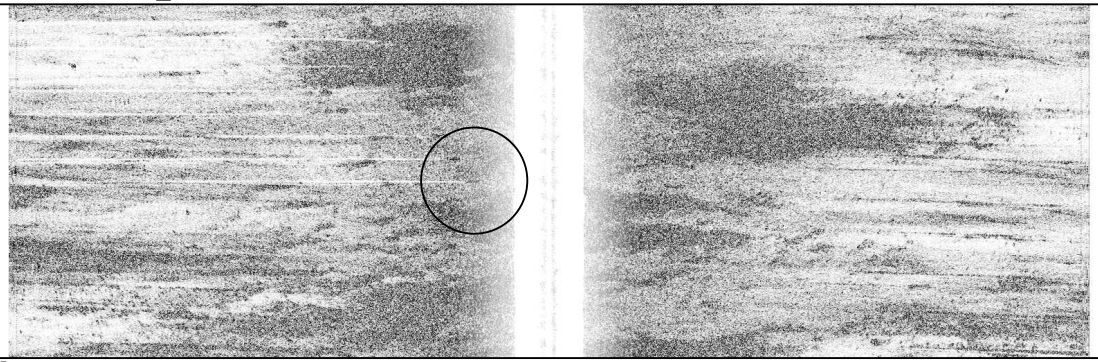


MB File: N/A Scale 1:500



ID: 37 File: TD07071_070312181600.XTF 29 52 04.77N 089 40 12.71W RNG: -3.78 HGT: 0.89 HDG: 087

COMMENT:
SUBM PILE No Plot. See Features 11, 23 and 24 (least depth estimated from side scan).



ID: 18 File: TD07067_070308213800.XTF 29 52 04.86N 089 40 12.57W RNG: -3.44 HGT: 1.12 HDG: 299

CORRELATED SS CONTACTS:

Contact	Range/Height
071181714	-3.78/0.89
067214611	-3.44/1.12

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0011 Least Depth: 4(ft), 1.18(m) Lat: 29 52 05.25N Lon: 089 40 13.90W Ping: Beam:

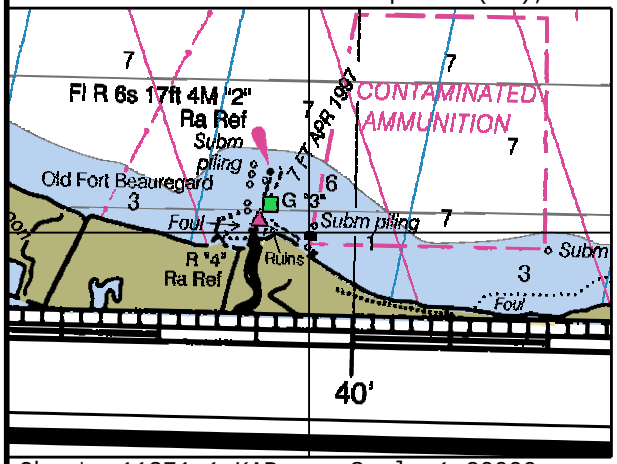


Chart: 11371_1.KAP Scale 1:20000

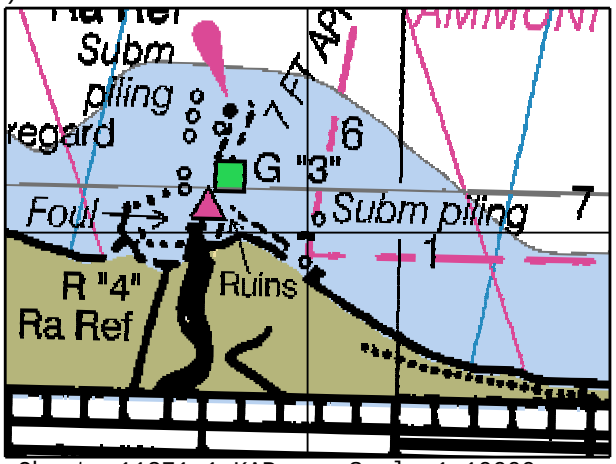
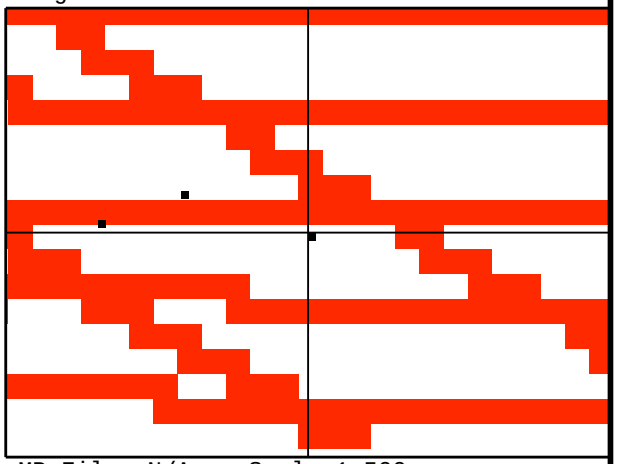
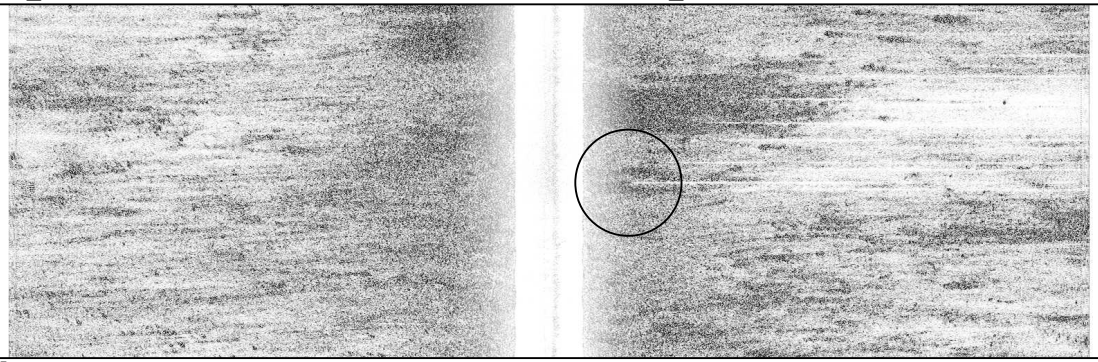


Chart: 11371_1.KAP Scale 1:10000

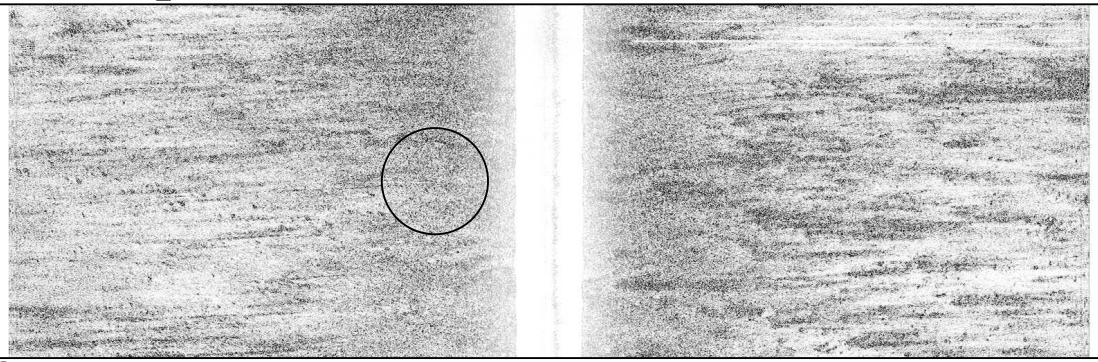


MB File: N/A Scale 1:500



ID: 20 File: TD07067_070308215500.XTF 29 52 05.25N 089 40 13.90W RNG: 3.53 HGT: 1.12 HDG: 088

COMMENT:
SUBM PILE Plot sounding, pile symbol and label Subm piles. See Features 10, 23 and 24 (least depth estimated from side scan).



ID: 19 File: TD07067_070308215500.XTF 29 52 05.50N 089 40 14.88W RNG: -5.22 HGT: 0.65 HDG: 089

CORRELATED SS CONTACTS:

Contact	Range/Height
067215707	3.53/1.12
067215701	-5.22/0.65
100175005	14.53/0.00

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0012 Least Depth: Lat: 29 55 34.61N Lon: 089 35 55.45W Ping: Beam:

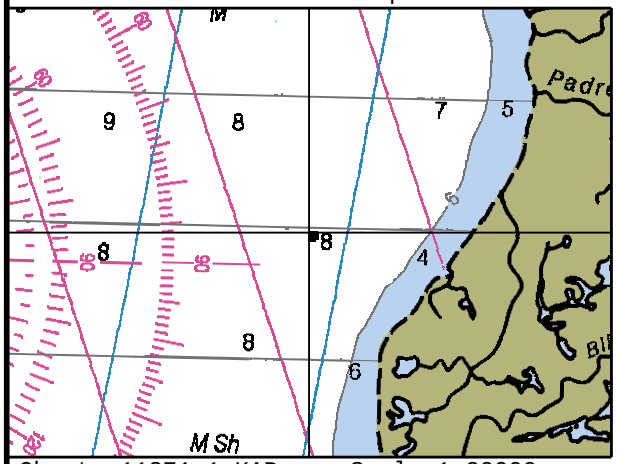


Chart: 11371_1.KAP Scale 1:20000

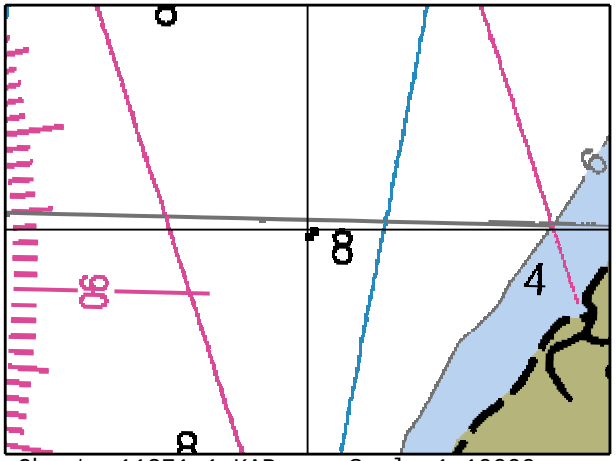
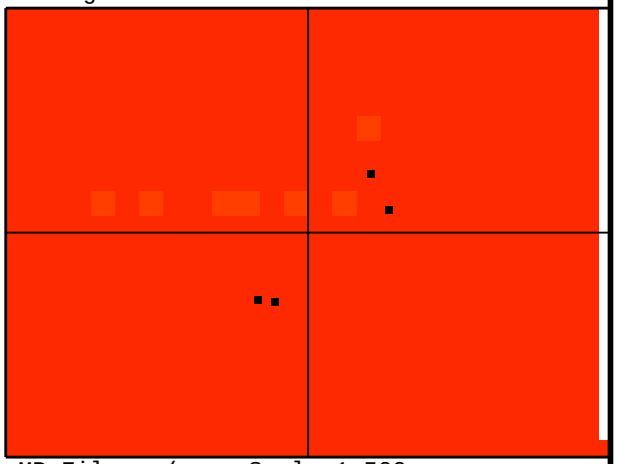
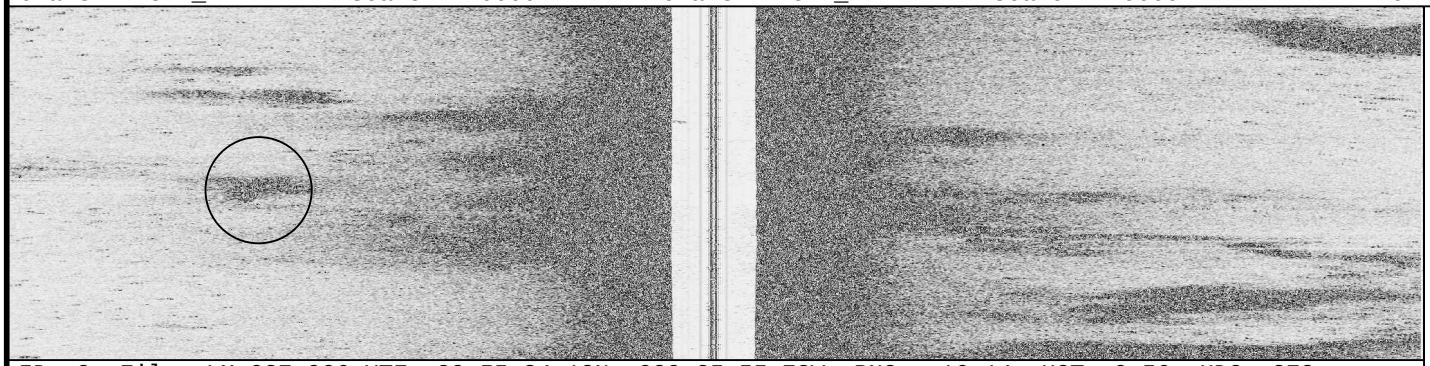


Chart: 11371_1.KAP Scale 1:10000

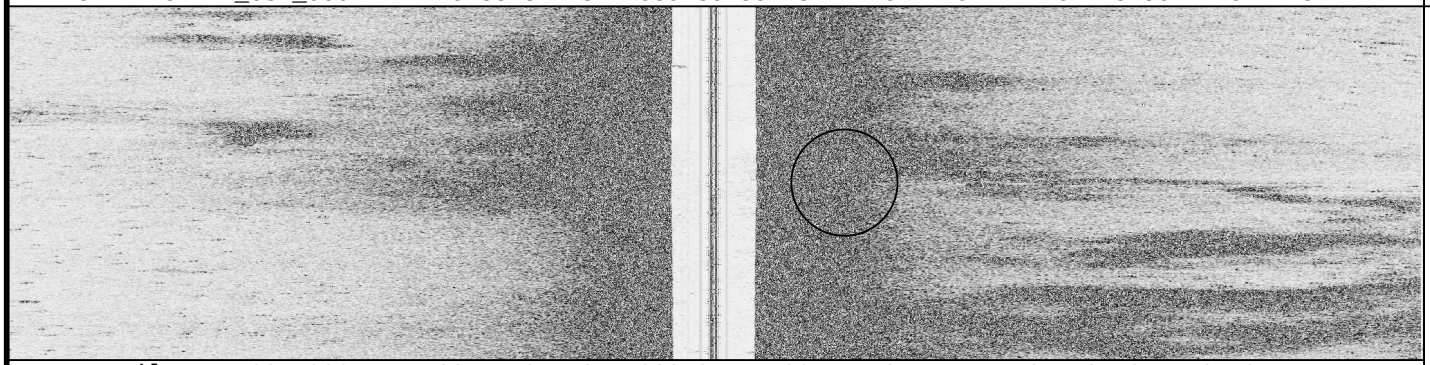


MB File: n/a Scale 1:500



ID: 8 File: LM_037_006.XTF 29 55 34.18N 089 35 55.73W RNG: -16.14 HGT: 0.56 HDG: 278

COMMENT:
PLATFORM Plot platform symbol.



ID: 7 File: LM_037_006.XTF 29 55 34.79N 089 35 54.86W RNG: 4.57 HGT: 0.70 HDG: 271

CORRELATED SS CONTACTS:

Contact	Range/Height
037163110	-16.14/0.56
037163104	4.57/0.70
037162128	-9.64/0.77
040224441	-13.67/0.79

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0013 Least Depth: 5(ft), 1.57(m) Lat: 29 52 04.69N Lon: 089 40 39.51W Ping: Beam:

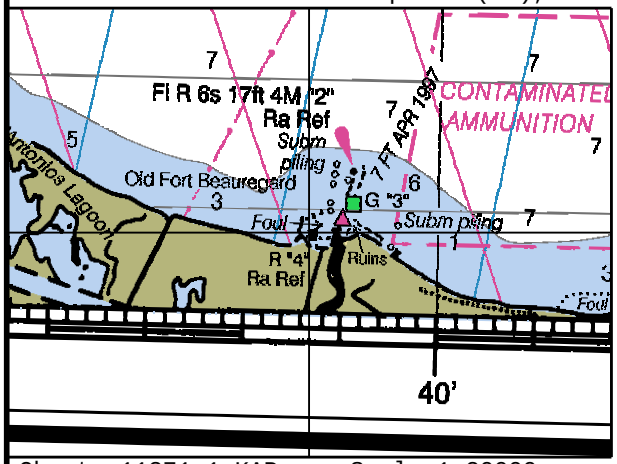


Chart: 11371_1.KAP Scale 1:20000

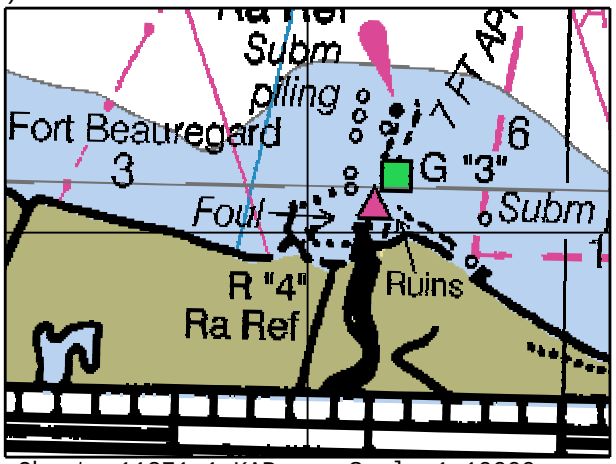
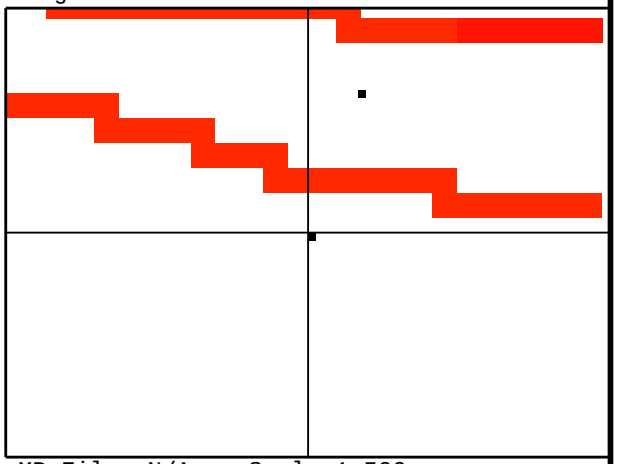


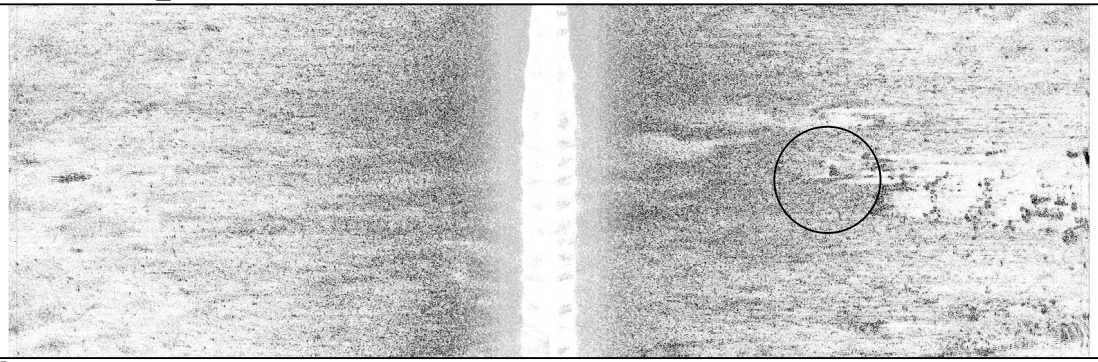
Chart: 11371_1.KAP Scale 1:10000



MB File: N/A Scale 1:500

ID: 36 File: TD07071_070312173000.XTF 29 52 04.69N 089 40 39.51W RNG: -9.41 HGT: 0.54 HDG: 281

COMMENT:
OBSTRS Plot sounding and symbol Obstrs (least depth estimated from side scan).



ID: 35 File: TD07071_070312172200.XTF 29 52 05.62N 089 40 39.15W RNG: 12.53 HGT: 0.58 HDG: 091

CORRELATED SS CONTACTS:

Contact	Range/Height
071173117	-9.41/0.54
071172854	12.53/0.58

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0014 Least Depth: Lat: 29 51 53.69N Lon: 089 38 43.39W Ping: Beam:

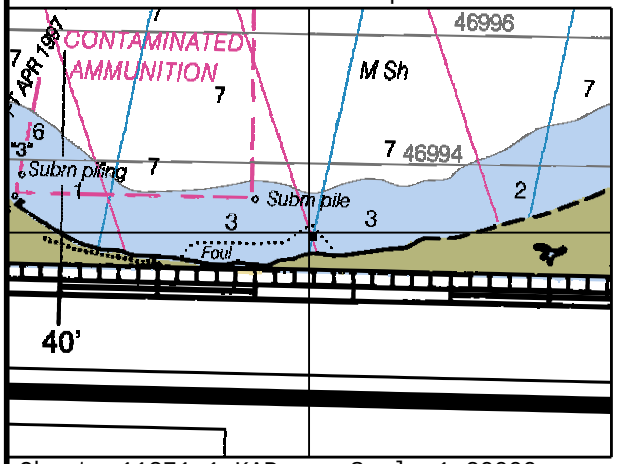


Chart: 11371_1.KAP Scale 1:20000

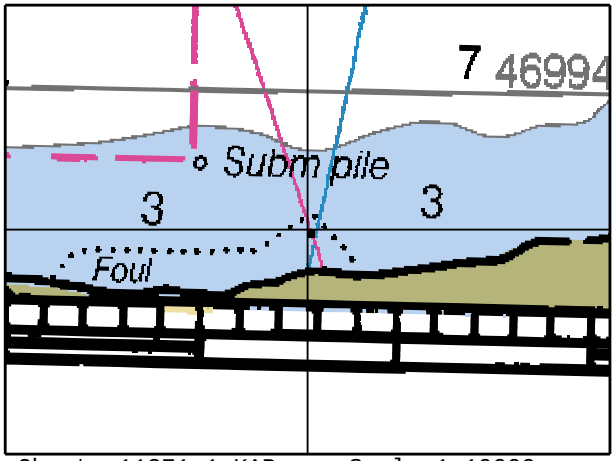
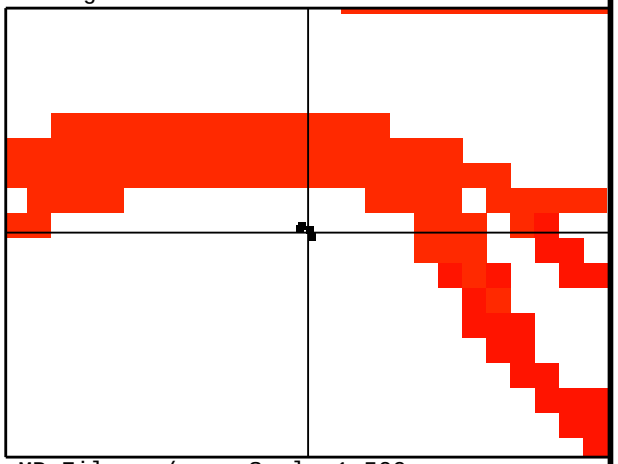
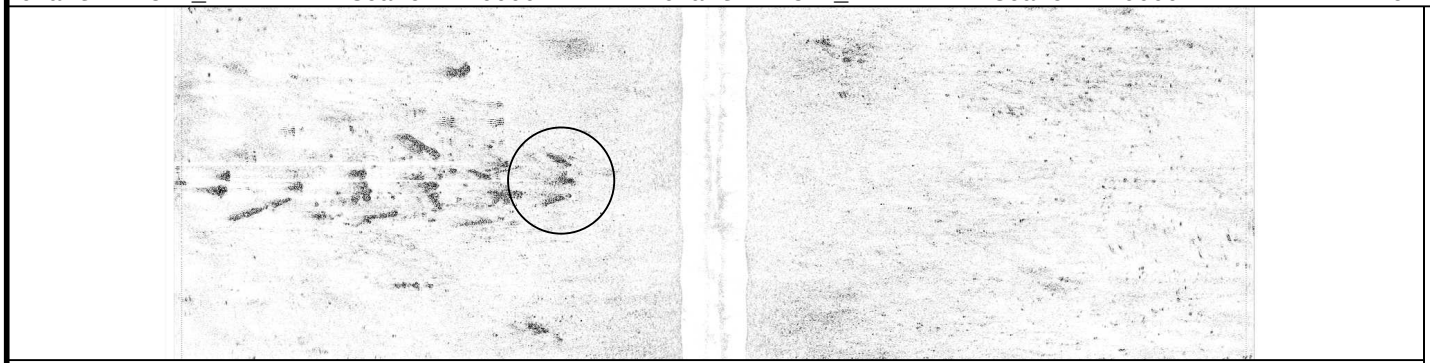


Chart: 11371_1.KAP Scale 1:10000

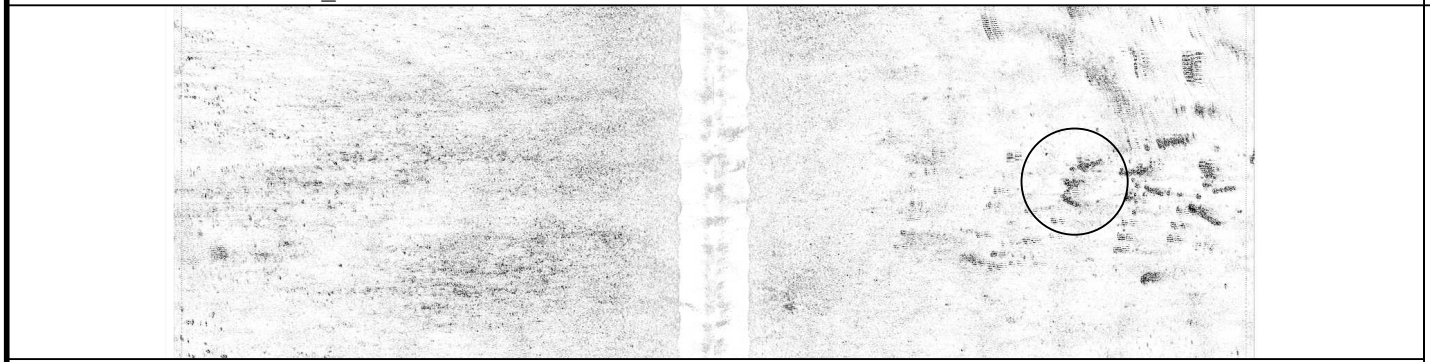


MB File: n/a Scale 1:500



ID: 38 File: TD07100_070410172200.XTF 29 51 53.69N 089 38 43.39W RNG: -6.97 HGT: 0.97 HDG: 268

COMMENT:
PILES EXPOSED Plot Pile symbol label Piles.



ID: 43 File: TD07100_070410175700.XTF 29 51 53.73N 089 38 43.41W RNG: 16.25 HGT: 0.52 HDG: 082

CORRELATED SS CONTACTS:

Contact	Range/Height
100173024	-6.97/0.97
100181110	16.25/0.52
100182222	-12.00/0.69
100184305	12.59/0.68

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0015 Least Depth: Lat: 29 55 52.42N Lon: 089 44 26.71W Ping: Beam:

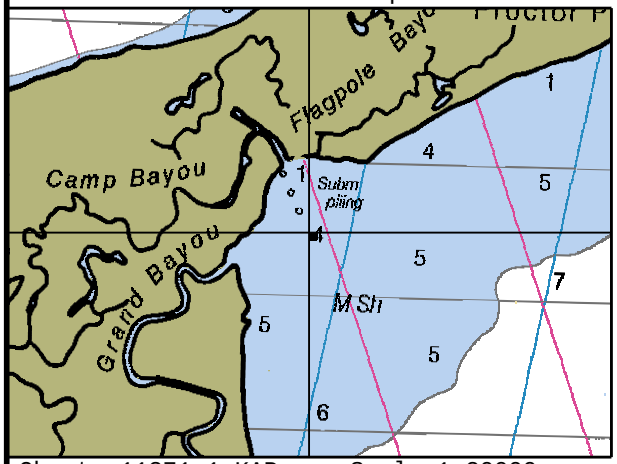


Chart: 11371_1.KAP Scale 1:20000

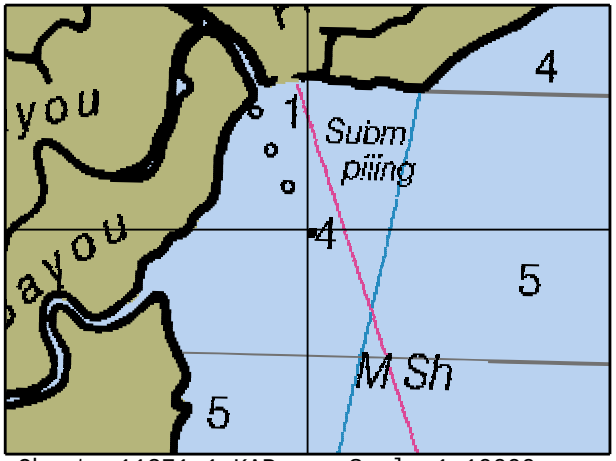
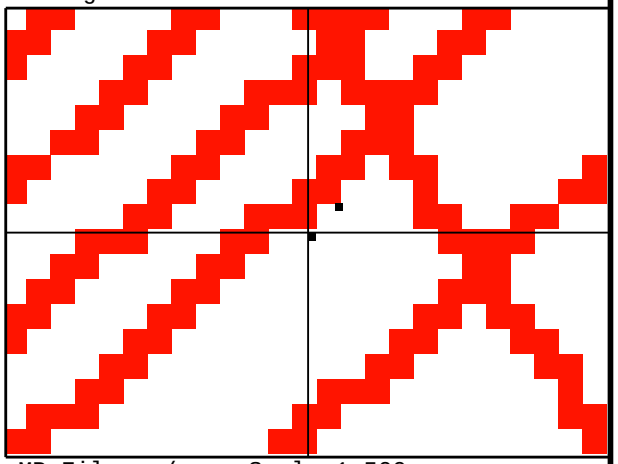
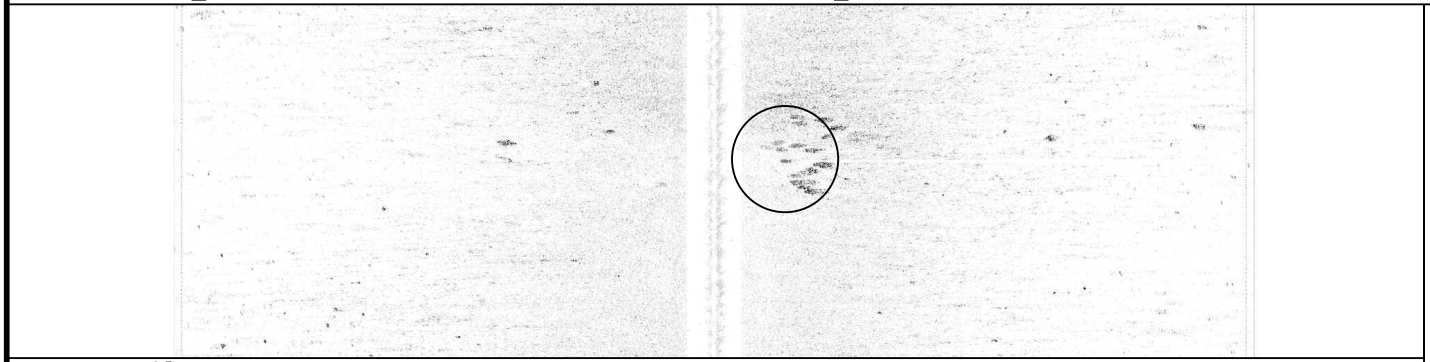


Chart: 11371_1.KAP Scale 1:10000

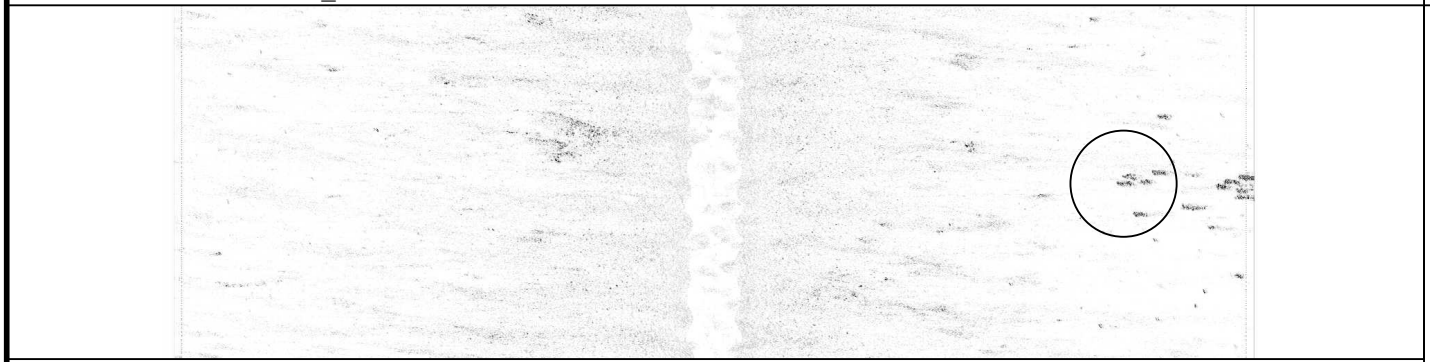


MB File: n/a Scale 1:500



ID: 48 File: TD07108_070418155900.XTF 29 55 52.42N 089 44 26.71W RNG: 3.16 HGT: 1.09 HDG: 047

COMMENT:
PILE EXPOSED Plot Pile symbol label Pile.



ID: 52 File: TD07111_070421190400.XTF 29 55 52.62N 089 44 26.50W RNG: 18.47 HGT: 0.23 HDG: 145

CORRELATED SS CONTACTS:

Contact	Range/Height
108160341	3.16/1.09
111190802	18.47/0.23

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0016 Least Depth: Lat: 29 56 01.45N Lon: 089 44 33.22W Ping: Beam:

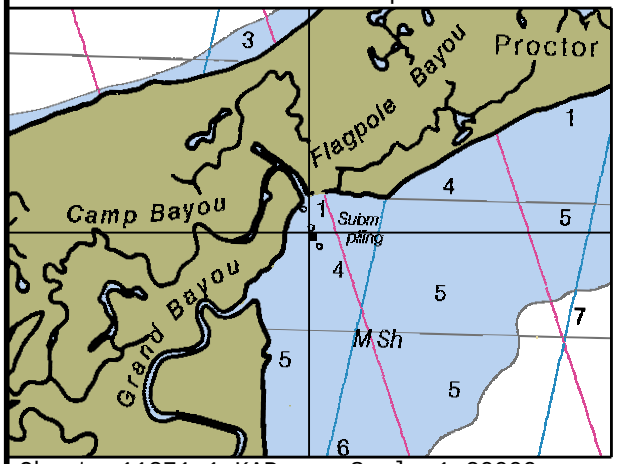


Chart: 11371_1.KAP Scale 1:20000

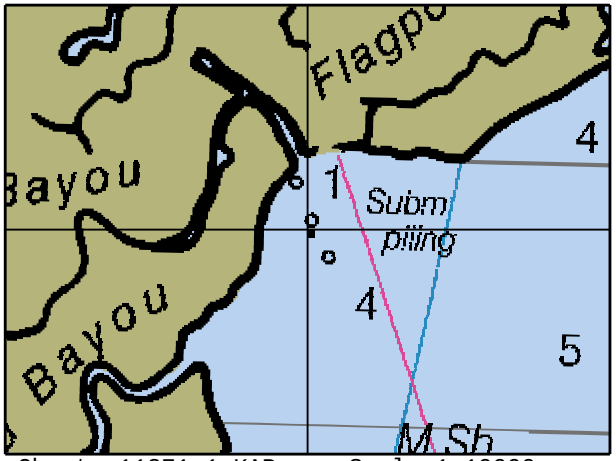
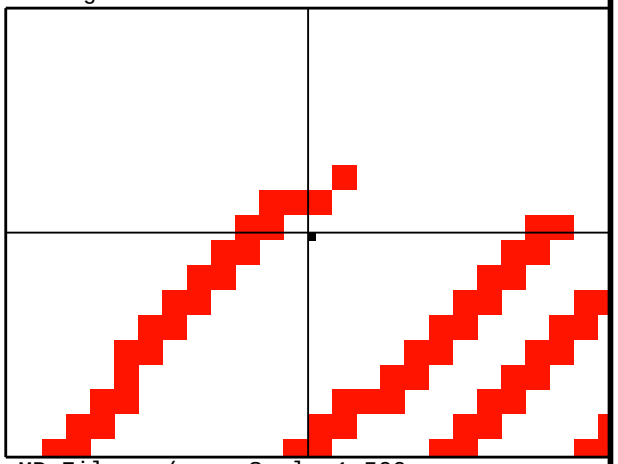
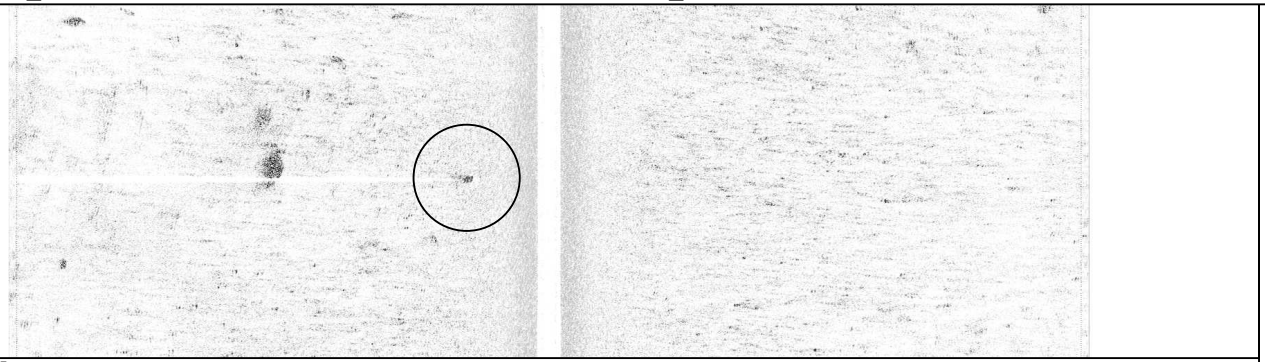


Chart: 11371_1.KAP Scale 1:10000



MB File: n/a Scale 1:500



ID: 49 File: TD07108_070418172200.XTF 29 56 01.45N 089 44 33.22W RNG: -3.78 HGT: 0.42 HDG: 244

COMMENT:
PILES EXPOSED Plot Pile symbol label Piles.

CORRELATED SS CONTACTS:

Contact	Range/Height
108172440	-3.78/0.42

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0017 Least Depth: 4(ft), 1.28(m) Lat: 29 55 25.95N Lon: 089 43 41.69W Ping: Beam:

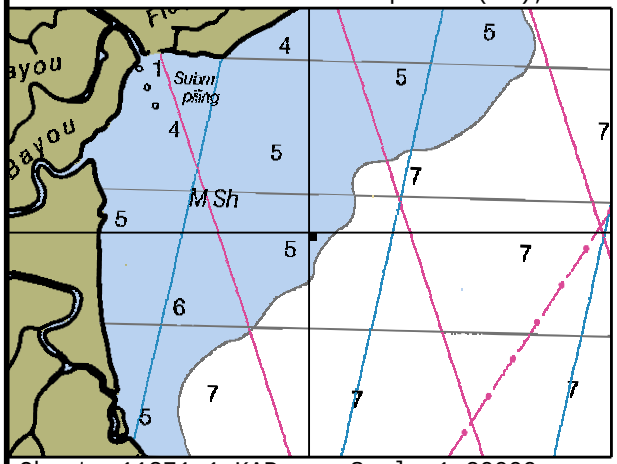


Chart: 11371_1.KAP Scale 1:20000

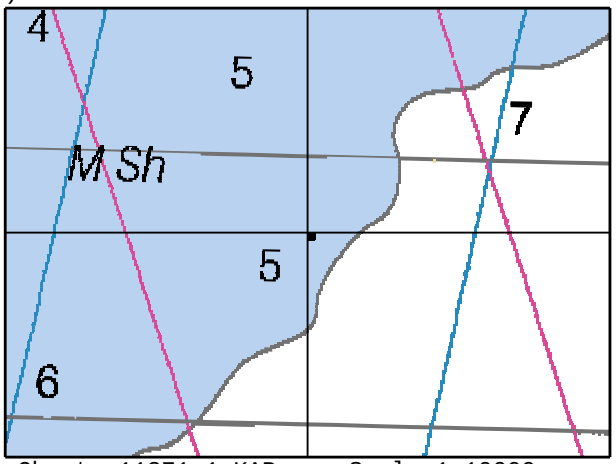
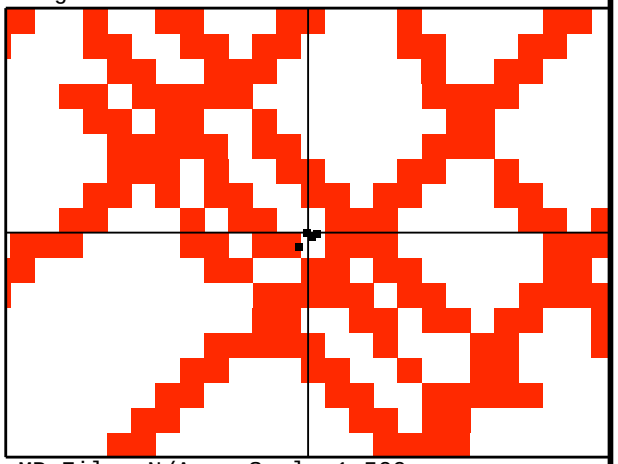
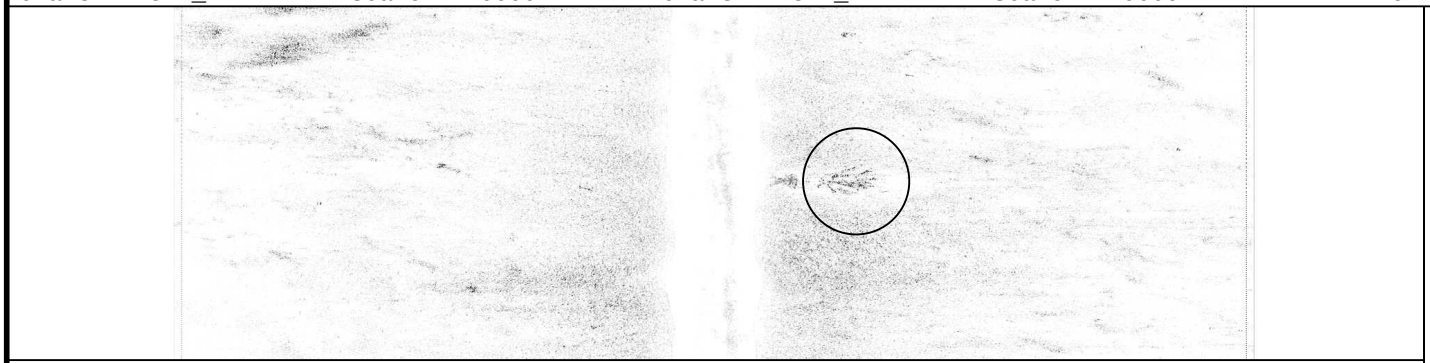


Chart: 11371_1.KAP Scale 1:10000

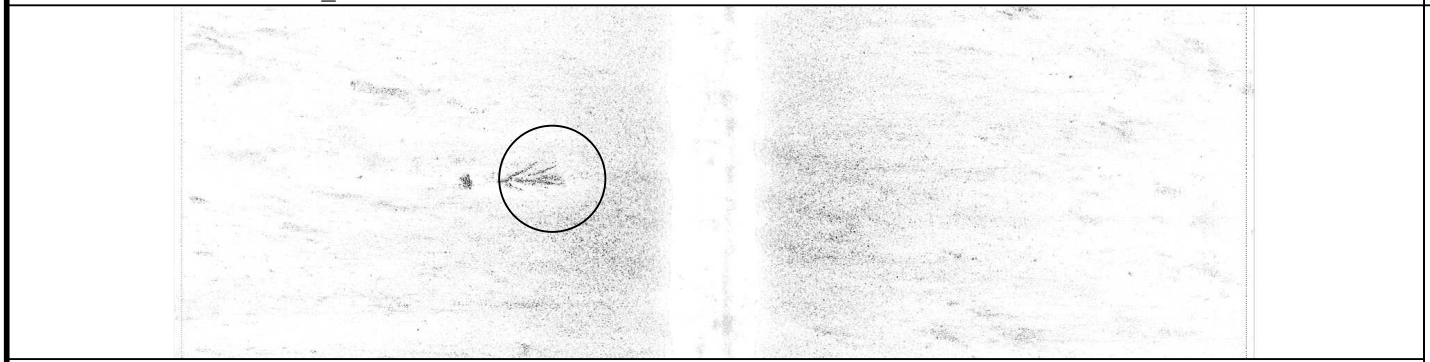


MB File: N/A Scale 1:500



ID: 61 File: TD07151_070531155800.XTF 29 55 25.95N 089 43 41.69W RNG: 6.38 HGT: 0.79 HDG: 312

COMMENT:
SNAG SUBMERGED Plot sounding and label Subm Snag (least depth estimated from side scan).



ID: 59 File: TD07151_070531154900.XTF 29 55 25.96N 089 43 41.65W RNG: -7.38 HGT: 1.23 HDG: 319

CORRELATED SS CONTACTS:

Contact	Range/Height
151155900	6.38/0.79
151155042	-7.38/1.23
151155446	16.53/0.50
110150644	-10.56/0.84

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0018 Least Depth: Lat: 29 55 50.83N Lon: 089 38 26.64W Ping: Beam:

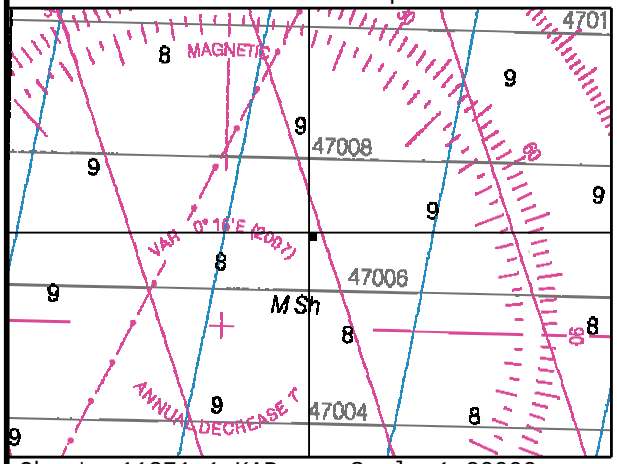


Chart: 11371_1.KAP Scale 1:20000

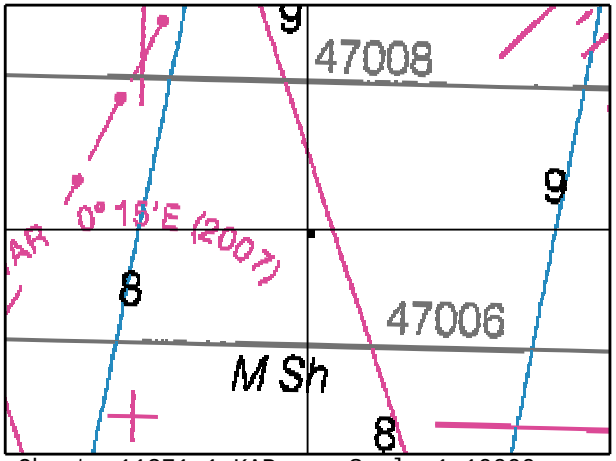
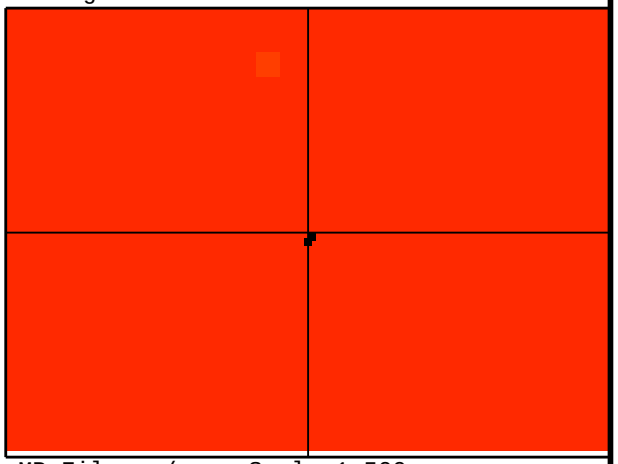


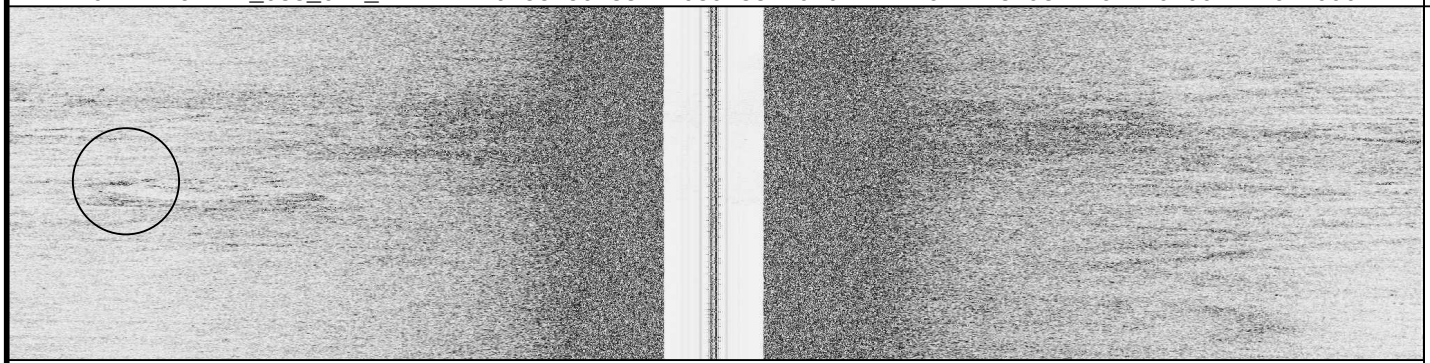
Chart: 11371_1.KAP Scale 1:10000



MB File: n/a Scale 1:500

ID: 10 File: LM_038_011_2.XTF 29 55 50.83N 089 38 26.64W RNG: -18.98 HGT: 0.00 HDG: 090

COMMENT:
BUOY Private Marker Plot Buoy symbol and Label Priv Y.



ID: 11 File: LM_038_013.XTF 29 55 50.80N 089 38 26.66W RNG: -20.81 HGT: 0.01 HDG: 270

CORRELATED SS CONTACTS:

Contact	Range/Height
038212802	-18.98/0.00
038222621	-20.81/0.01

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0019 Least Depth: Lat: 29 55 53.46N Lon: 089 39 05.96W Ping: Beam:

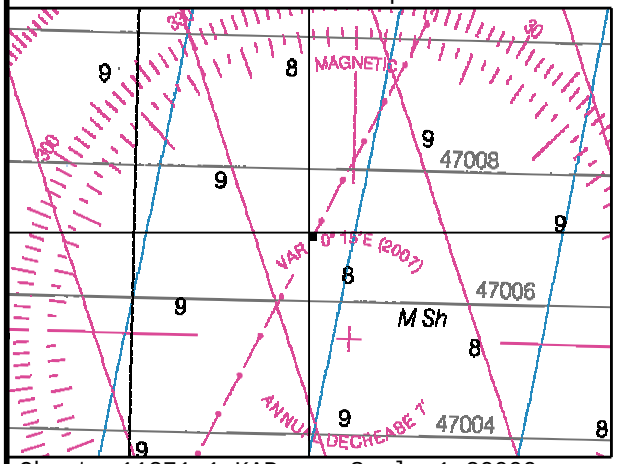


Chart: 11371_1.KAP Scale 1:20000

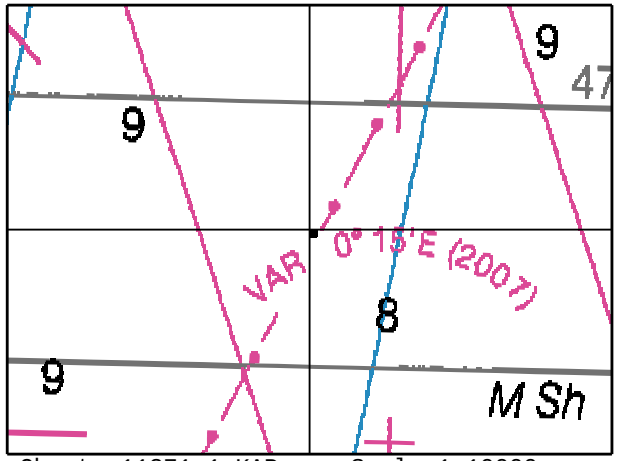
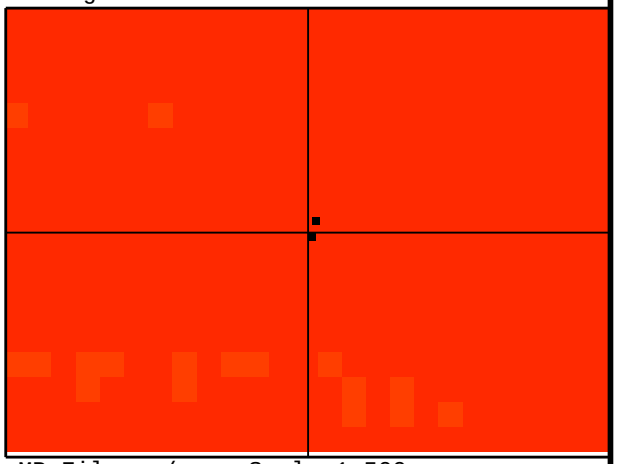
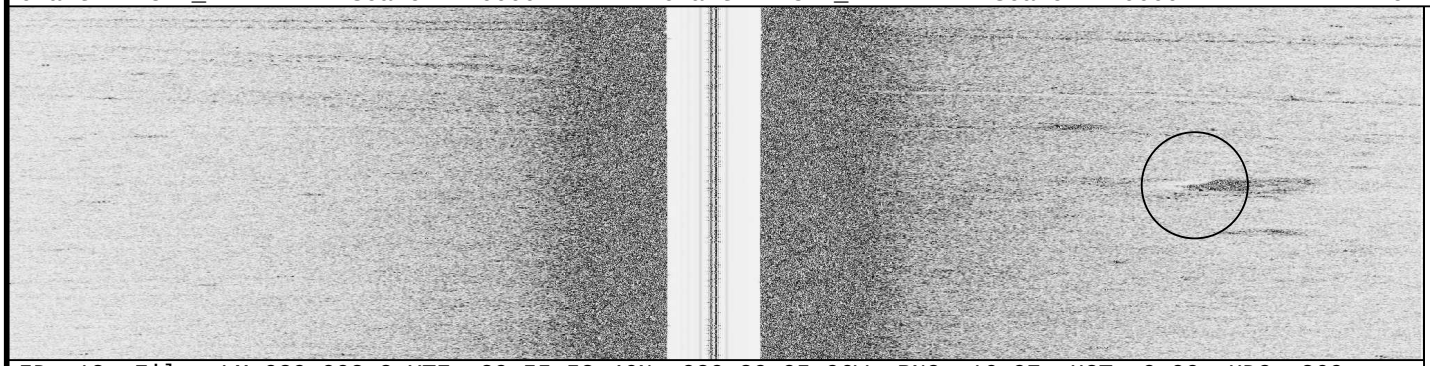


Chart: 11371_1.KAP Scale 1:10000

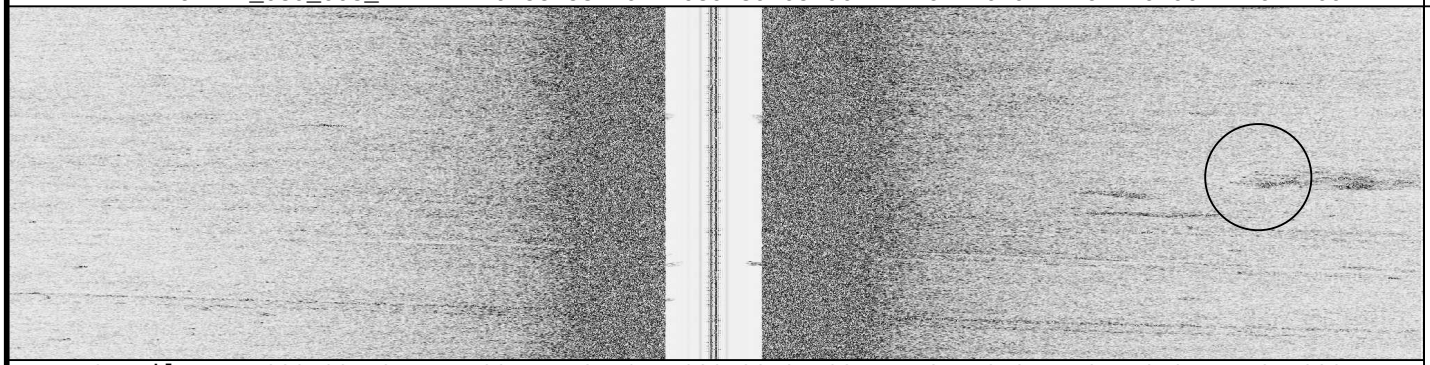


MB File: n/a Scale 1:500



ID: 12 File: LM_039_003_2.XTF 29 55 53.46N 089 39 05.96W RNG: 16.97 HGT: 0.00 HDG: 269

COMMENT:
BUOY Private Marker Plot Buoy symbol and Label Priv Y.



ID: 13 File: LM_039_004_2.XTF 29 55 53.56N 089 39 05.93W RNG: 19.21 HGT: 0.01 HDG: 089

CORRELATED SS CONTACTS:

Contact	Range/Height
039142127	16.97/0.00
039151844	19.21/0.01

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0020 Least Depth: Lat: 29 55 55.44N Lon: 089 38 09.60W Ping: Beam:

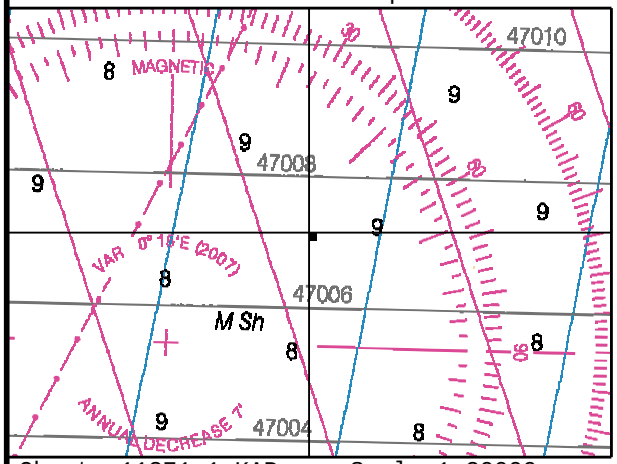


Chart: 11371_1.KAP Scale 1:20000

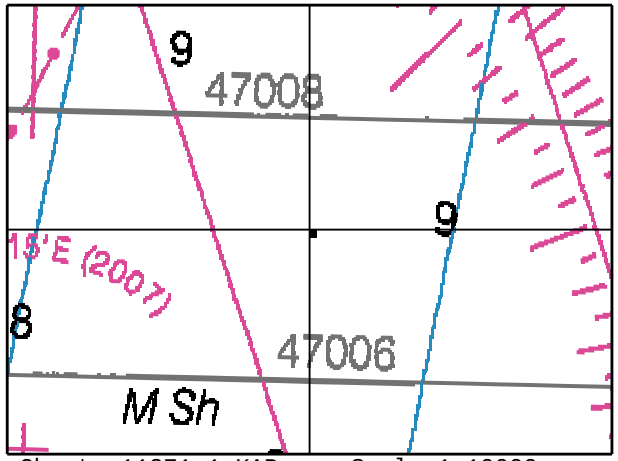
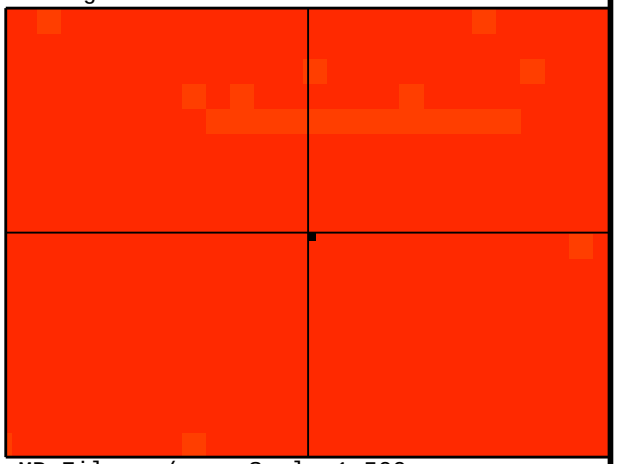
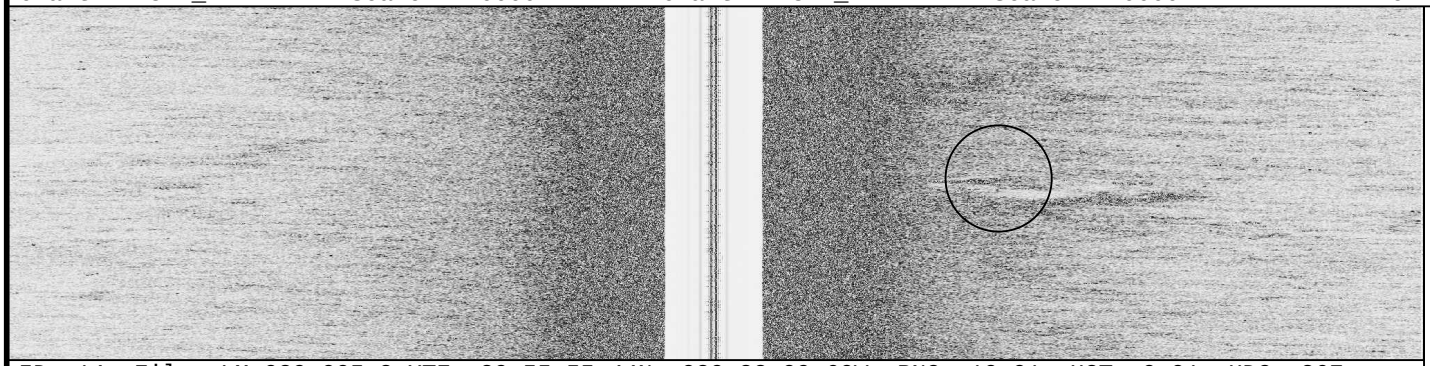


Chart: 11371_1.KAP Scale 1:10000



MB File: n/a Scale 1:500



ID: 14 File: LM_039_005_2.XTF 29 55 55.44N 089 38 09.60W RNG: 10.01 HGT: 0.01 HDG: 267

COMMENT:
BUOY Private Marker Plot Buoy symbol and Label Priv Y.

CORRELATED SS CONTACTS:

Contact	Range/Height
039161227	10.01/0.01

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0021 Least Depth: Lat: 29 56 05.27N Lon: 089 39 04.31W Ping: Beam:

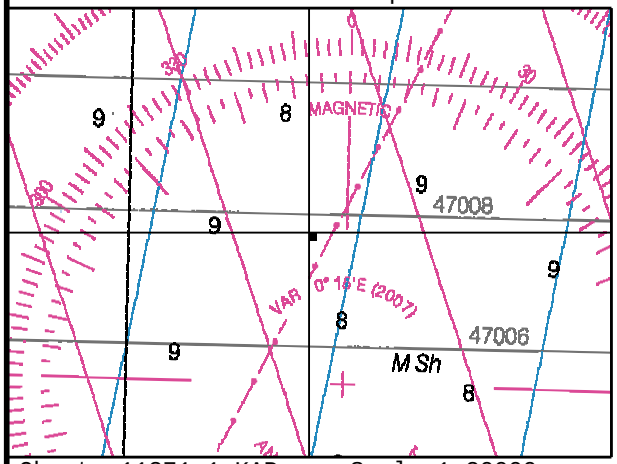


Chart: 11371_1.KAP Scale 1:20000

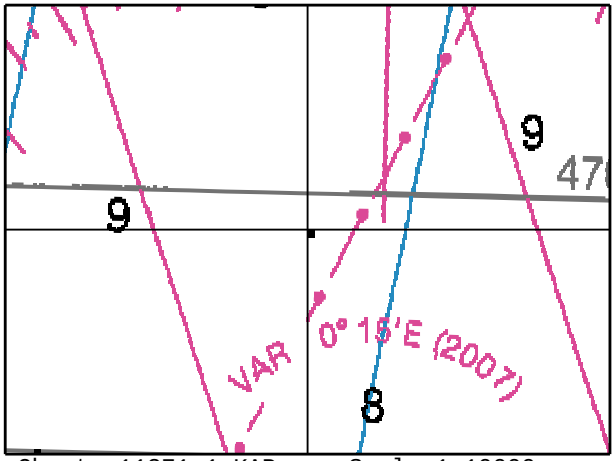
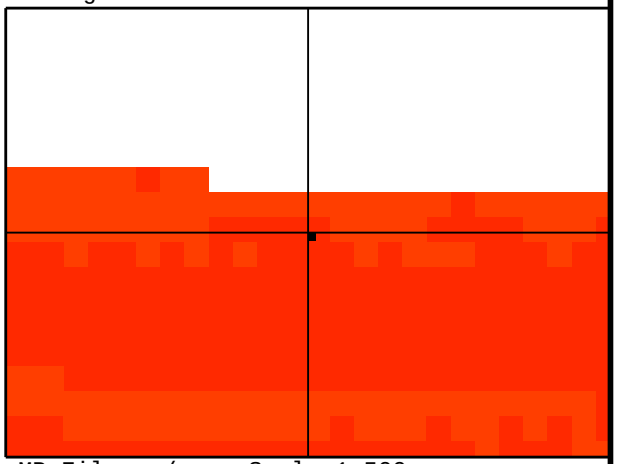
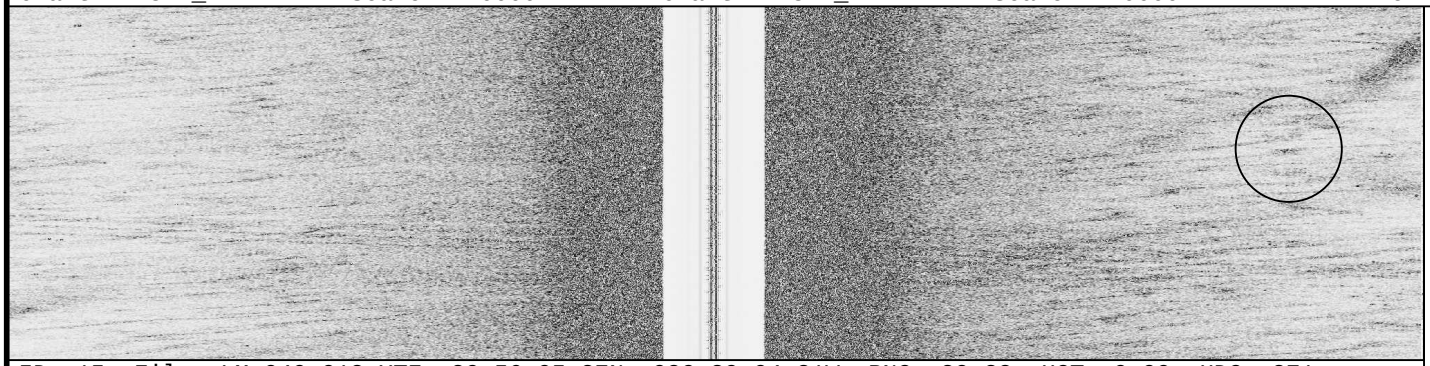


Chart: 11371_1.KAP Scale 1:10000



MB File: n/a Scale 1:500



ID: 15 File: LM_040_018.XTF 29 56 05.27N 089 39 04.31W RNG: 20.28 HGT: 0.00 HDG: 271

COMMENT:
BUOY Private Marker Plot Buoy symbol and Label Priv Y.

CORRELATED SS CONTACTS:

Contact	Range/Height
040173110	20.28/0.00

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0022 Least Depth: Lat: 29 52 01.21N Lon: 089 40 17.11W Ping: Beam:

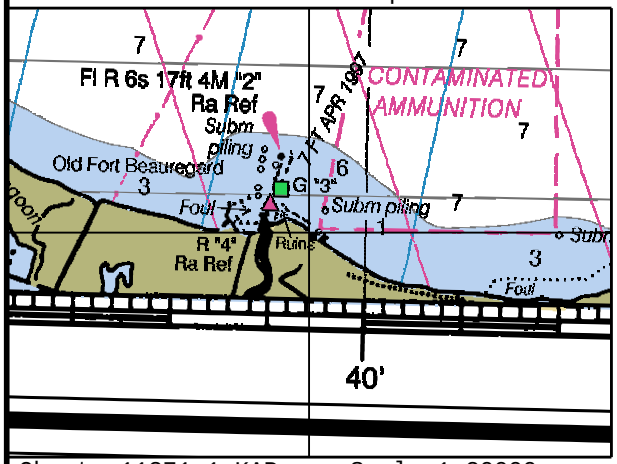


Chart: 11371_1.KAP Scale 1:20000

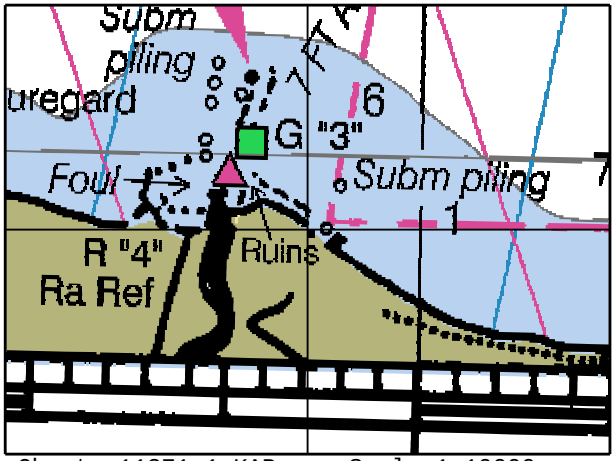
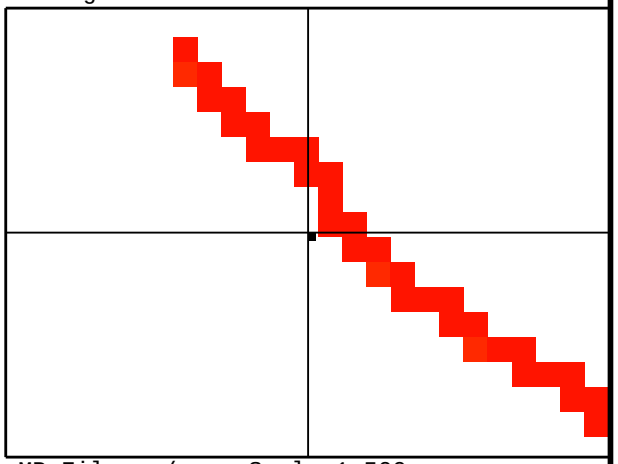
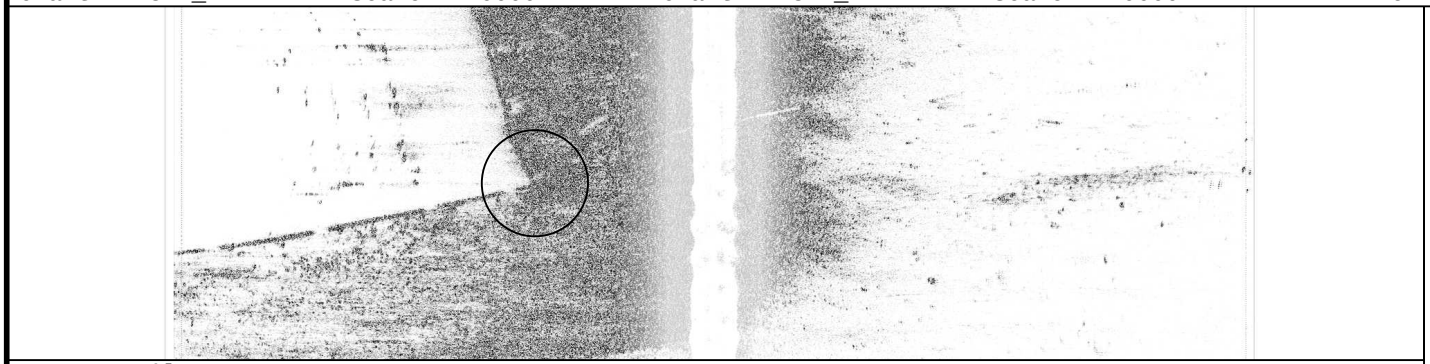


Chart: 11371_1.KAP Scale 1:10000



MB File: n/a Scale 1:500



ID: 53 File: TD07118_070428142000.XTF 29 52 01.21N 089 40 17.11W RNG: -8.16 HGT: 0.00 HDG: 322

COMMENT:
OBSTR Plot dashed line from shore encompassing Features 8, 9 and 23 and label Ruins.

CORRELATED SS CONTACTS:

Contact	Range/Height
118142854	-8.16/0.00

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0023 Least Depth: 1(ft), 0.29(m) Lat: 29 52 02.21N Lon: 089 40 18.00W Ping: Beam:

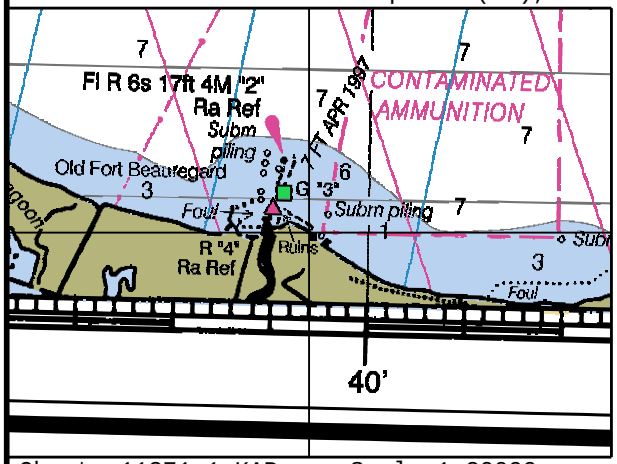


Chart: 11371_1.KAP Scale 1:20000

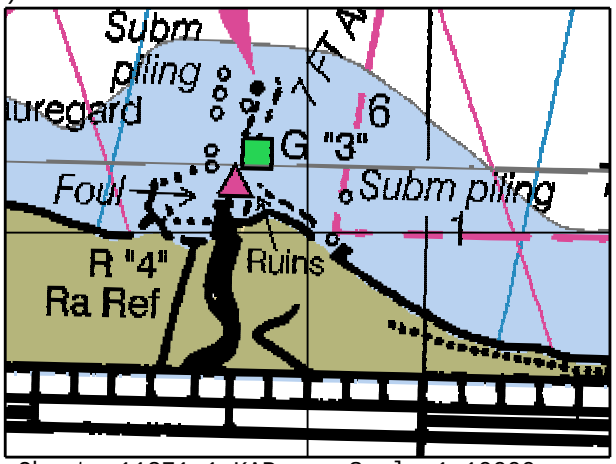
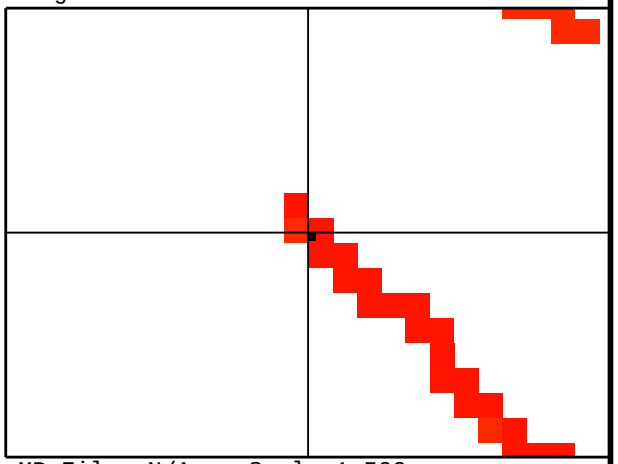
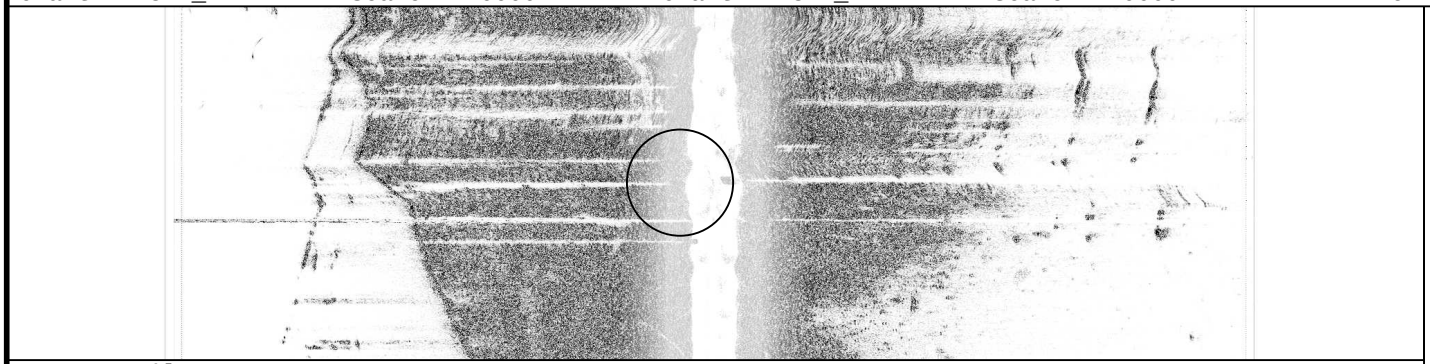


Chart: 11371_1.KAP Scale 1:10000



MB File: N/A Scale 1:500



ID: 54 File: TD07118_070428142000.XTF 29 52 02.21N 089 40 18.00W RNG: -1.59 HGT: 1.69 HDG: 329

COMMENT:
SUBM PILE Plot sounding and pile symbol. See Features 10, 11 and 24 (least depth estimated from side scan).

CORRELATED SS CONTACTS:

Contact	Range/Height
118142911	-1.59/1.69

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0024 Least Depth: 7(ft), 2.16(m) Lat: 29 52 04.50N Lon: 089 40 16.37W Ping: Beam:

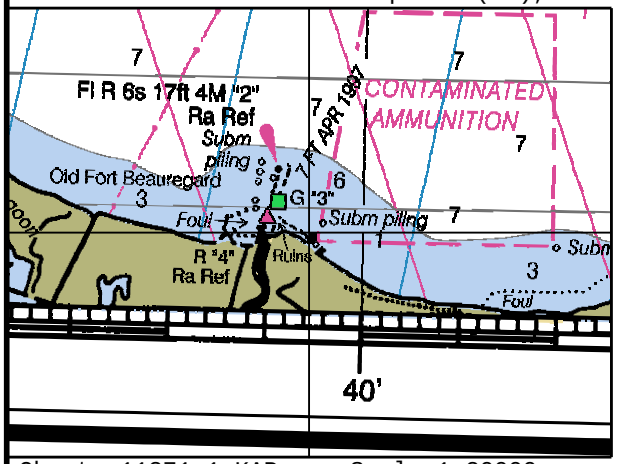


Chart: 11371_1.KAP Scale 1:20000

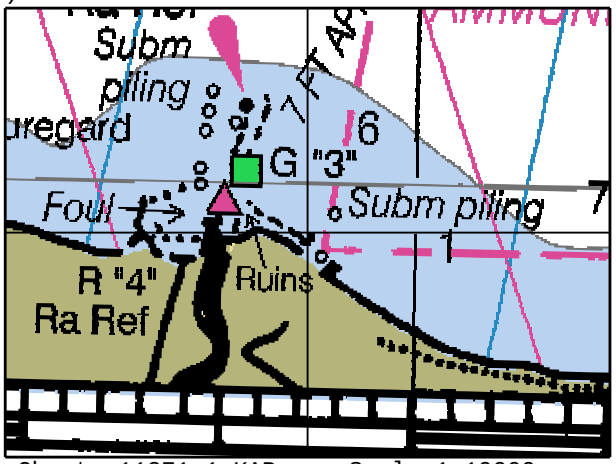
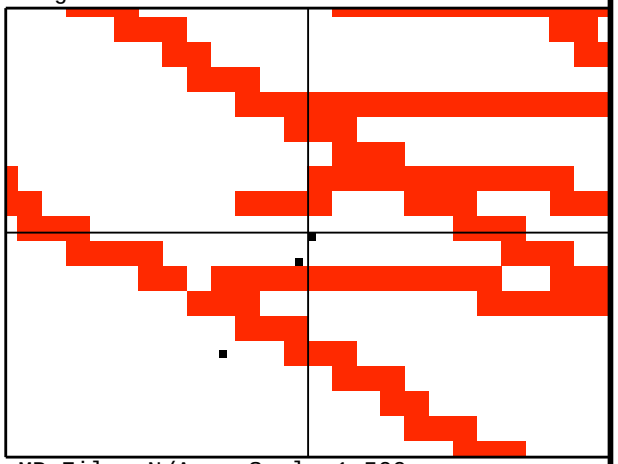
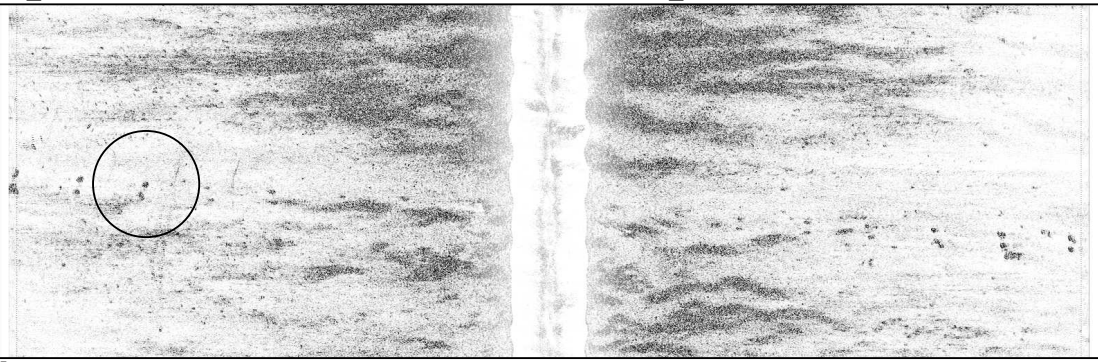


Chart: 11371_1.KAP Scale 1:10000

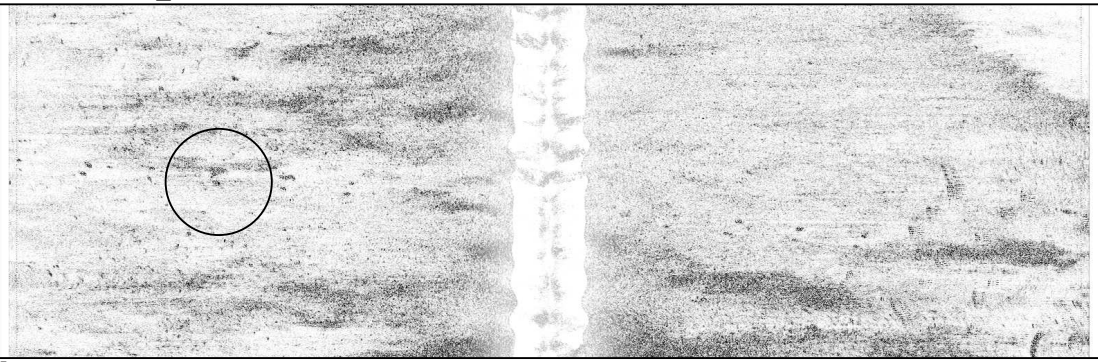


MB File: N/A Scale 1:500



ID: 40 File: TD07100_070410174000.XTF 29 52 04.50N 089 40 16.37W RNG: -18.28 HGT: 0.00 HDG: 296

COMMENT:
SUBM PILE No Plot. See Features 10, 11 and 23 (least depth estimated from side scan).



ID: 42 File: TD07100_070410175000.XTF 29 52 04.33N 089 40 16.47W RNG: -15.00 HGT: 0.04 HDG: 117

CORRELATED SS CONTACTS:

Contact	Range/Height
100175008	-18.28/0.00
100175153	-15.00/0.04
100175151	8.56/0.72

FEATURE CORRELATOR SHEET Job: H11614

Feature #: 0025 Least Depth: 4(ft), 1.15(m) Lat: 29 52 12.10N Lon: 089 40 29.11W Ping: Beam:

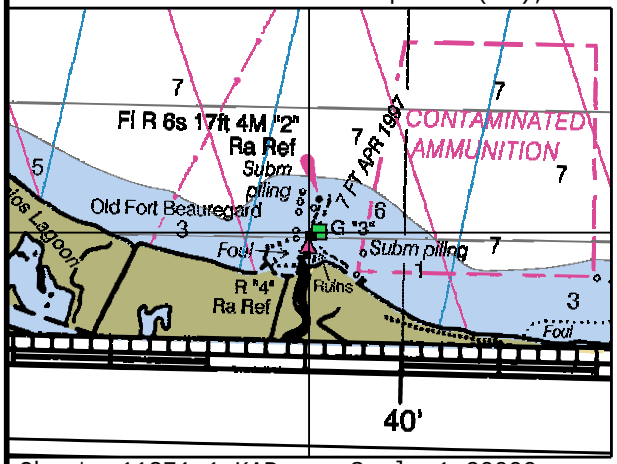


Chart: 11371_1.KAP Scale 1:20000

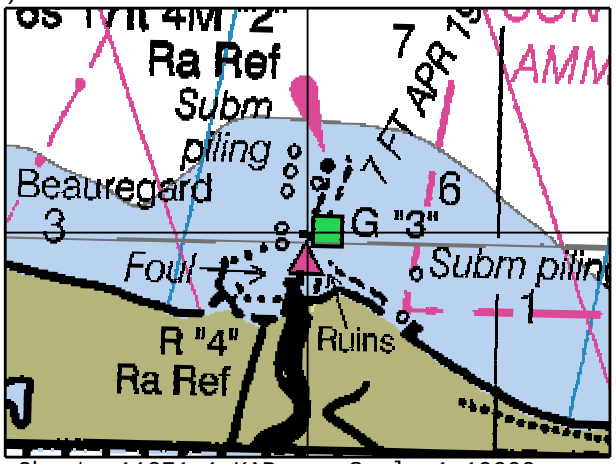
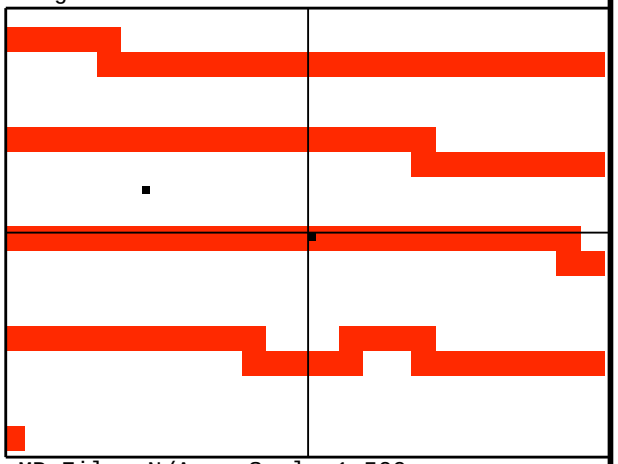
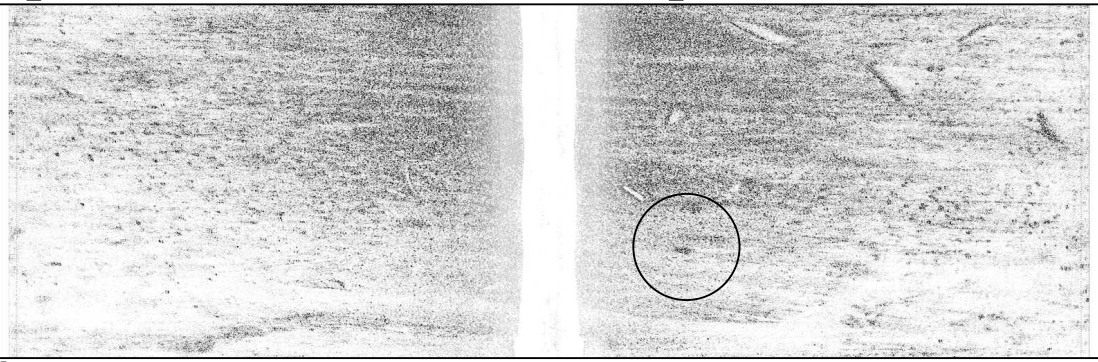


Chart: 11371_1.KAP Scale 1:10000

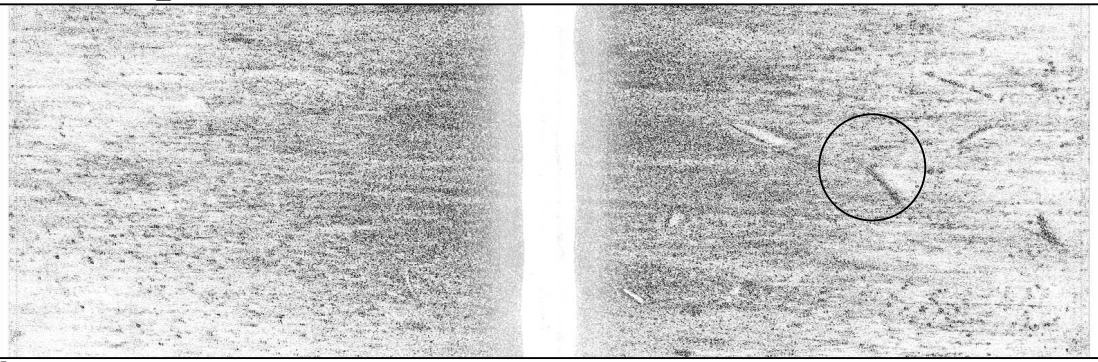


MB File: N/A Scale 1:500



ID: 28 File: TD07071_070312154800.XTF 29 52 12.10N 089 40 29.11W RNG: 6.16 HGT: 0.54 HDG: 271

COMMENT:
SUBM PILE Plot sounding, pile symbol and label Subm piles (least depth estimated from side scan).

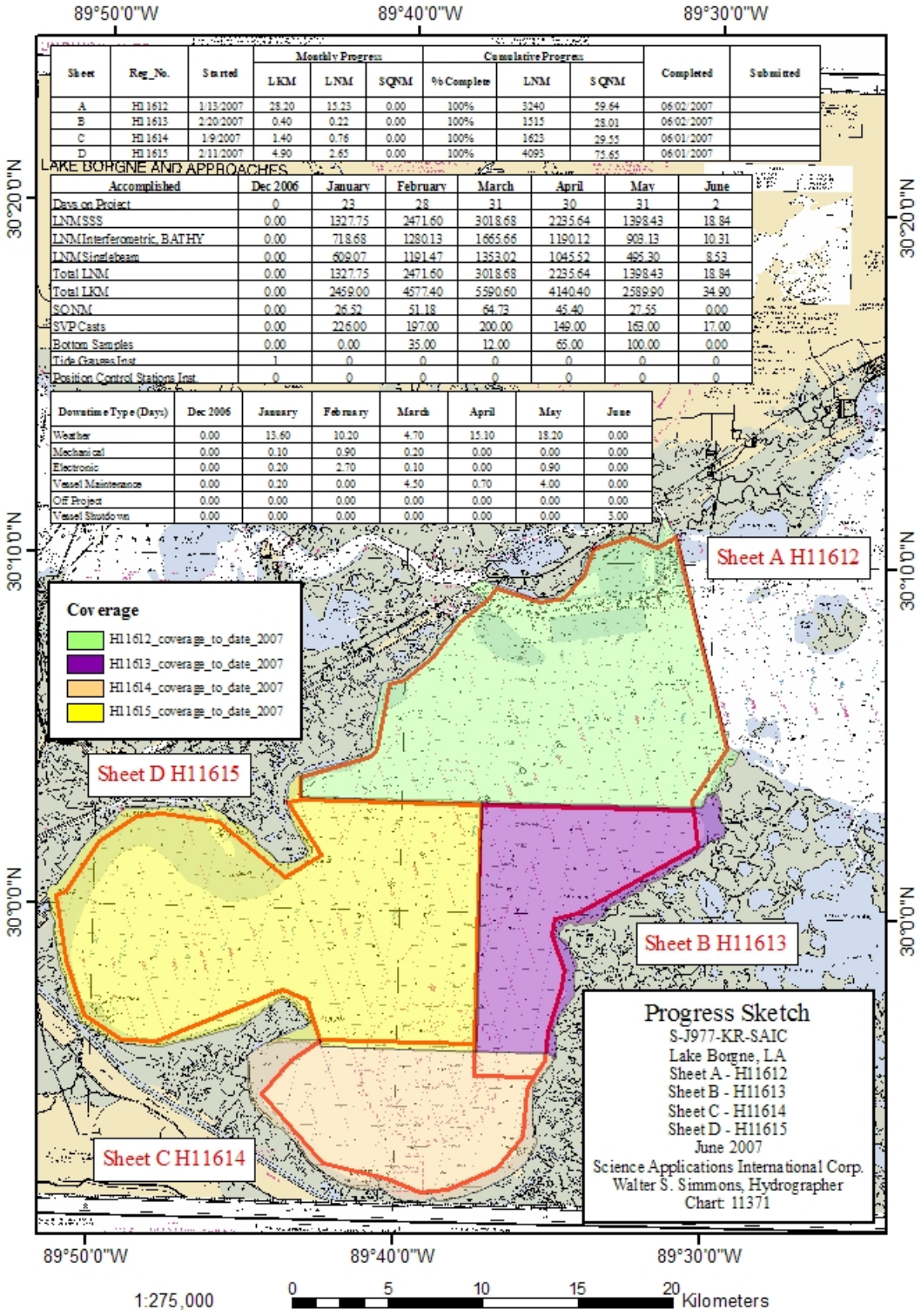


ID: 29 File: TD07071_070312154800.XTF 29 52 12.38N 089 40 30.39W RNG: 14.56 HGT: 0.16 HDG: 271

CORRELATED SS CONTACTS:

Contact	Range/Height
071155035	6.16/0.54
071155044	14.56/0.16
071164300	-6.78/0.44

APPENDIX III. FINAL PROGRESS SKETCH AND SURVEY OUTLINE



Sheet	Reg_No.	Started	Monthly Progress LKM	LNM	SQNM	Cumulative Progress % Complete	LNM	SQNM	Completed	Submitted
A	H11612	1/13/2007	28.20	15.23	0.00	100%	3240	59.64	06/02/2007	
B	H11613	2/20/2007	0.40	0.22	0.00	100%	1515	28.01	06/02/2007	
C	H11614	1/9/2007	1.40	0.76	0.00	100%	1623	29.55	06/01/2007	
D	H11615	2/11/2007	4.90	2.65	0.00	100%	4093	75.65	06/01/2007	

LAKE BORGNE AND APPROACHES

Accomplished	Dec 2006	January	February	March	April	May	June
Days on Project	0	23	28	31	30	31	2
LNM SSS	0.00	1327.75	2471.60	3018.68	2235.64	1398.43	18.84
LNM Interferometric, BATHY	0.00	718.68	1280.13	1665.66	1190.12	908.13	10.31
LNM Singlebeam	0.00	608.07	1191.47	1353.02	1045.52	496.30	8.53
Total LNM	0.00	1327.75	2471.60	3018.68	2235.64	1398.43	18.84
Total LKM	0.00	2459.00	4577.40	5590.60	4140.40	2589.90	34.90
SQNM	0.00	26.52	51.18	64.73	45.40	27.55	0.00
SVP Casts	0.00	226.00	197.00	200.00	149.00	163.00	17.00
Bottom Samples	0.00	0.00	35.00	12.00	65.00	100.00	0.00
Tide Gauges Inst	1	0	0	0	0	0	0
Position Control Stations Inst	0	0	0	0	0	0	0

Downtime Type (Days)	Dec 2006	January	February	March	April	May	June
Weather	0.00	13.60	10.20	4.70	15.10	18.20	0.00
Mechanical	0.00	0.10	0.90	0.20	0.00	0.00	0.00
Electronic	0.00	0.20	2.70	0.10	0.00	0.90	0.00
Vessel Maintenance	0.00	0.20	0.00	4.50	0.70	4.00	0.00
Off Project	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vessel Shutdown	0.00	0.00	0.00	0.00	0.00	0.00	3.00

Figure App. III-1. Final Progress Sketch for H11614

The Survey Outline for H11614 was delivered to the COTR, on 13 June 2007 in file H11612_H11613_H11614_H11615_Survey_outline.zip. The WinZip file contained a DXF format survey outline in lat/lon format for import into MapInfo for each sheet surveyed. The survey outline file for Sheet C (H11614_Survey_Outline_lat_long.dxf) is also part of this delivery. Figure App. III-2 demonstrates the graphical depiction of the DXF.

Figure App. III-2. Survey Outline for H11614

APPENDIX IV. TIDES AND WATER LEVELS

The on-line times for acquisition of valid hydrographic data for this sheet are presented in Table App. IV-1, H11614 Abstract of Times of Hydrography.

Project: S-J977-KR-SAIC
Registry No.: H11614
Contractor Name: Science Applications International Corporation
Date: 01 June 2007
Sheet Letter: C
Inclusive Dates: 9 January 2007 – 01 June 2007

Field work is complete.

Table App. IV-1. H11614 Abstract Times of Hydrography

Julian Day	Calendar Date	Begin Time	End Time
009	09-January-2007	20:02:48	23:05:30
011	11-January-2007	17:53:16	23:30:46
012	12-January-2007	14:34:53	23:17:51
013	13-January-2007	20:00:30	23:24:16
014	14-January-2007	14:01:09	23:37:45
015	15-January-2007	15:31:58	23:32:02
018	18-January-2007	14:13:52	23:23:00
019	19-January-2007	14:04:30	23:09:59
021	21-January-2007	14:24:02	23:33:06
022	22- January-2007	13:55:34	23:30:09
023	23-January-2007	13:37:02	23:19:50
024	24-January-2007	13:39:00	23:09:54
025	25-January-2007	14:24:38	23:33:15
026	26-January-2007	13:20:52	22:00:22
027	27-January-2007	13:49:39	21:55:13
029	29-January-2007	14:40:11	23:31:49
030	30-January-2007	13:42:04	22:48:36
031	31-January-2007	13:45:43	13:57:54
032	01-February-2007	13:27:07	22:55:54
033	02-February-2007	12:55:22	18:43:31
034	03-February-2007	13:12:41	23:42:19
035	04-February-2007	12:44:10	23:48:27
037	06-February-2007	12:34:41	23:30:39
038	07-February-2007	12:45:10	23:28:09
039	08-February-2007	12:59:05	23:14:45
040	09-February-2007	13:40:35	23:42:43
042	11-February-2007	13:19:38	14:05:57
043	12-February-2007	12:54:16	23:29:02
044	13- February-2007	12:35:26	23:00:59
048	17- February-2007	19:51:26	22:10:21
066	07-March-2007	20:51:54	22:49:20
067	08- March-2007	12:46:51	23:14:21

Julian Day	Calendar Date	Begin Time	End Time
071	12-March-2007	14:06:21	21:48:30
099	09-April-2007	18:32:12	21:58:56
100	10-April-2007	12:44:01	21:31:04
106	16-April-2007	19:52:46	21:49:35
108	18-April-2007	13:04:39	21:56:27
110	20- April-2007	14:28:41	16:10:13
111	21- April-2007	13:22:46	21:43:40
117	27-April-2007	21:32:05	21:48:51
118	28-April-2007	12:39:36	17:38:58
131	11-May-2007	15:25:45	16:54:52
136	16-May-2007	11:32:39	21:49:14
139	19-May-2007	15:49:31	16:04:52
148	28-May-2007	19:21:08	21:44:08
151	31-May-2007	15:24:02	15:59:18
152	01-June-2007	11:27:52	13:38:14

Final Tide Note

Subordinate tide station 8761529 (Martello Castle, LA) was the source of verified water level heights for corrections to soundings. Water Level correctors were prepared for each zone using the **SABER/Tools/Create Water Level Files** software. **SABER/Apply Correctors/Tides** software applied these files to the multibeam data according to the zone containing the nadir beam of each ping.

APPENDIX V. SUPPLEMENTAL SURVEY RECORDS & CORRESPONDENCE

This appendix contains three sections. The first section contains five email correspondences, the second section contains the bottom composition results, and the third section contains the text files, which list the nodes from the two Bathymetric Attributed Grid files that exceed uncertainties for IHO Order 1 uncertainty.

Correspondence

The email correspondence presented below are: 1) 03 October 2007 Rebecca Quintal to Crescent Moegling and Mark Lathrop regarding SAICs September 2007 visit to AHB and the proposed Lake Borgne deliverables; 2) 30 May 2007 Crescent Moegling to Rod Evans regarding item investigations; 3) 09 January 2007 Crescent Moegling to Rod Evans regarding the format of images in the SOW; 4) 16 November 2006 Crescent Moegling to Rod Evans discussing the SOW and bottom samples; and 5) 25 October 2006 Crescent Moegling to Rebecca Quintal on changes to the SOW.

From: Quintal, Rebecca T.
Sent: Wednesday, October 03, 2007 1:38 PM
To: 'Crescent.Moegling@noaa.gov'; Mark.T.Lathrop@noaa.gov
Cc: 'Evans, Rhodri E.'; PAUL.L.DONALDSON@saic.com; 'gene_parker'; 'Shep.Smith@noaa.gov'
Subject: 25 September 2007 Meeting - AHB and SAIC

Mark and Crescent,

On Tuesday, 25 September 2007, SAIC and AHB had a very productive meeting regarding general data processing flow and specific questions about the Lake Borgne Debris Mapping deliveries and the DELMARVA deliveries. Below is a synopsis of our specific questions / discussions. Please advise if you concur with the conclusions which we collectively came to (AHB and SAIC personnel). If you have any questions or need more information we would be happy to set up a telecom to discuss.

Thank you,
-Rebecca

Lake Borgne Questions/Answers:

1. For contacts with no least depth (i.e. we don't have bathy but are estimating the depth from side scan instead) should use a QUASOU of 9 (Value reported, not confirmed).

2. MCOVR and MQUAL will be made from the outer perimeter of the bathy (GS+ and SB).

3. A single MQUAL will be made for an entire sheet. MQUAL will have a CATZOC of 2 (ZOC A2 - Full seafloor ensonification or sweep. All significant seafloor features detected and depths measured.) We decided on this because we do have full ensonification via the side scan and all features do have depths measured except where noted (see QUASOU of 9 above). Note that the S&D states that we should use a CATZOC of 6 (not assessed), but AHB have started accessing and would like us to as well.

4. The single MQUAL for an entire sheet will also have a TECSOU of 1, 2 and 3 (found by echo sounder, found by side scan and found by multi-beam, respectively).

5. Regarding Section 6.2 of the SOW below:

If an interferometric side scan is used, final depth data from the side scan shall be submitted as a Bathymetric Attributed Grid (BAG). The DR shall discuss the uncertainty and total propagated error (TPE) of the data and describe what portions of the swath (if any) meet IHO Order 1 specifications. The single beam soundings shall be submitted separately as part of the S-57 feature file.

We asked if they really wanted every valid sounding of every singlebeam file to be populated in the S-57 feature file. Shep ended up calling Gerd Glang and Jeff Ferguson about this issue to see what their true intentions were for the data as stated in the SOW. They stated that their intention was to have selected soundings of the SB data at survey scale be in the S-57 feature file. So we came to a conclusion that we would build 5-meter binned minimum grids of the SB data, build selected soundings at survey scale (same as we did for smooth sheets), then deliver the XYZ file from the minimum grid and the selected soundings in the S-57 file. This approach precludes delivering every valid sounding of all SB files to be in the S-57 file.

We discussed Section 5.2.3 (Gridded Data Specifications) in the June 2006 S&D which states:

An example distribution of grid resolution;
- 0 to 15 meter depths; 0.5 meter grid resolution,
- 14 to 30 meter depths; 1.0 meter grid resolution,
- 29 to 60 meter depths; 2.0 meter grid resolution,
- 59 to 150 meter depths; 5.0 meter grid resolution,
- deeper than 149 meter depths; 10.0 meter grid resolution.

The hydrographer may adjust these values based on the bathymetry of the survey area, the type of multibeam sonar used and other factors.

All four Lake Borgne sheets fall in the water depths where the example node spacing is 0.5 meters. This will create very large grids representing a relatively flat seafloor. We discussed possibly delivering the Lake Borgne sheets at 1 meter node spacing due to the “bathymetry of the survey area”.

DELMARVA Questions/Answers:

1. We discussed that depth contours and depth areas had been added into the S-57 feature file in the April 2007 S&D. We asked about contour interval and were given guidelines to make the contours and depth areas based on the depth intervals used in H-Cells (0, 3, 6, 12, 18 feet etc., only the metric equivalent (using the 0.75 rounding rule).

2. We should include the swim buoys encountered in DELMARVA in the S-57 feature file as BOYSPP (Buoy special purpose) and attribute them with CATSPM = 13 (private mark).

3. For the swim buoys we should try to get some images even if they are from Google Earth or something similar. We should also add as much information to the inform field about when they are out (ex: Memorial Day through Labor Day) etc.

General things we should/can change for all submissions:

1. We can just include the AWOIS descriptions in the AWOIS database in Appendix 2 of the DR. In Section D of the DR we will just say “see AWOIS database in Appendix 2”. That way the information is only presented once. We do not need to include the Uncertainty value for the sounding in the AWOIS data base if it is presented elsewhere (in the Excel list of features for example).

2. We should put the DTN reports that AHB submit to MCD in Appendix 1 (Danger to Navigation Reports). We may (should) include our original DTN reports in Appendix 5 (Supplemental survey Records and Correspondence). AHB would like us to do this since they have to add in their submissions if we don’t.

3. We discussed that all four Lake Borgne sheets fall in the water depths where the recommended node spacing is 0.5 meters. This will create very large grids. AHB are OK with us having to break up sheets due to grid file sizes. They stated that we should break our survey areas down to what ever size works for us, and if AHB have to they can break them down even further.

Rebecca Quintal
Data Processing Manager
Science Applications International Corporation
221 Third Street
Newport, RI 02840 USA
401.847.4210
401.849.1585 (fax)

From: Crescent Moegling [Crescent.Moegling@noaa.gov]
Sent: Wednesday, May 30, 2007 5:02 PM
To: Evans, Rhodri E.
Cc: Mark.T.Lathrop@noaa.gov; Davis, Gary R.; Donaldson, Paul L.;
Quintal, Rebecca T.; Jeffrey Ferguson
Subject: Re: Item investigations: Lake Borgne Debris Survey

Hi Rod,

This approach is acceptable. Be sure to address in the Descriptive Report.

Crescent

Evans, Rhodri E. wrote:
Crescent,

On the Lake Borgne debris mapping survey we have the item surveys complied and we have put together a summary of the contacts versus additional item investigations (see attached file please).

In general we have not seen as much debris as we expected that is significant under the definition within the SOW, or what we would consider significant.

The SOW states that the 50 most significant items for the survey be investigated (we assume per sheet). The fewer than expected significant items identified leads to somewhat less than 50 items per sheet in general.

In general we have 58 items (76 contacts) for sheet A, 30 items (30 contacts) for sheet B, 14 items (14 contacts) on sheet C, and 45 items (54 contacts) for sheet D. This is an average of 36.75 items per sheet.

As we are now in the closing few days of survey, please confirm that this methodology is acceptable to you at your earliest convenience.

Regards, RE.

From: Crescent Moegling [Crescent.Moegling@noaa.gov]
Sent: Tuesday, January 09, 2007 9:55 AM

To: Evans, Rhodri E.
Cc: Quintal, Rebecca T.; PARKER, GARY C.
Subject: Re: Request for Proposal

Rod,

Either image format is acceptable. I apologize for the confusion.

Regards,

Crescent Moegling
NOAA Hydrographic Surveys Division
Physical Scientist
301.713.2698 x114

Evans, Rhodri E. wrote:
Crescent,

Please see the attached two files in Word format.

1.. The logistics and contact details for the SAIC operation in Slidell and Shell Beach, LA to aid you in your field visit;
2.. SoW comparison: prior to receipt of yesterday's SoW dated October 18th 2006, the only modified draft SoW SAIC had received was transmitted by you and dated September 25th 2006. Attached is a comparison of the differences between the two SoW's. The latest Oct 18th SOW includes the additional mosaic or survey boundary weekly submission. Also, the image format has changed to state jpeg now when we had discussed tiff images previously in place of geotiff. We can either put in a task to convert each image to jpg or ask you to confirm that tiff images are acceptable. Please advise us ASAP so that we can finalize the proposed costs.

I will try to call you shortly.

Regards, RE

Rod Evans Ph.D.,
Assistant Vice President,
Marine Survey Manager,
SAIC Marine Science and Technology Division,
221 Third Street,
Newport RI 02840
USA.
Tel (401) 848.4783.
Mobile (401) 439.1037.
Email: evansrh@saic.com
http://www.saic.com

From: Crescent Moegling [mailto:Crescent.Moegling@noaa.gov]
Sent: Monday, January 08, 2007 4:40 PM
To: Evans, Rhodri E.
Cc: Quintal, Rebecca T.; Linda D Brainard
Subject: Request for Proposal

Rod,

Please find attached the modified Statement of Work for S-J977-KR-SAIC. The only changes are to section 6.3. Please review and provide a cost estimate for the additional reporting requirements at your

earliest convenience. For your information I have also attached the format sample for the weekly submission requirement.

Regards,
Crescent Moegling
NOAA Hydrographic Surveys Division
Physical Scientist
301.713.2698 x114

From: Crescent.Moegling@noaa.gov on behalf of Crescent Moegling [Crescent.Moegling@noaa.gov]
Sent: Thursday, November 16, 2006 5:55 PM
To: Evans, Rhodri E.
Cc: Mark.T.Lathrop@noaa.gov; PARKER, GARY C.; Donaldson, Paul L.; Quintal, Rebecca T.
Subject: Re: Lake Borgne SoW
Rod,

1. We will not require the collection of single-beam during interferometric acquisition.
2. We ask that you keep the bottom samples as other offices within NOAA have requested them for habitat mapping purposes. We are asking they be either refrigerated or frozen prior to shipping. A shipment address will be provided once survey operations begin.

Regards,

Crescent

PS: I trust the request for tide supplies has been addressed by Larry Neeson?

Evans, Rhodri E. wrote:
Crescent,

We have a couple of technical SoW questions in relation to the Lake Borgne survey:

1.. We will mobilize two vessels: One is equipped with a Klein side scan sonar and Odom single-beam echo sounder. The second vessel will deploy the GeoAcoustics interferometer (note that this system is equipped with a single beam transducer. However, we do not intend to log this separately due to the non-disciplined time tagging of the data) The second vessel will have a Klein side scan and Odom single beam available in case the GeoAcoustics system performance is not satisfactory (as described in our Work Plan that accompanied our proposal).

Our question: do we need to acquire time tagged single beam echo sounder data when we are acquiring the copious GeoAcoustics interferometer bathy data (which covers nadir as well)?;

2.. On past Task Orders, we have usually been given relief on storage of the bottom samples, and permitted to dispose of the samples immediately after recovering and describing the samples.

Our question: May we dispose of the bottom samples during the Lake Borgne survey, or should we be making arrangements to store these sample for future inspection by the COTR?

Many thanks, RE,

Regards, RE.
Rod Evans Ph.D.,

Assistant Vice President,
Marine Survey Manager,

SAIC Marine Science and Technology Division,
221 Third Street,
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http://www.saic.com

From: Crescent.Moegling@noaa.gov on behalf of Crescent Moegling [Crescent.Moegling@noaa.gov]
Sent: Wednesday, October 25, 2006 11:05 AM
To: Quintal, Rebecca T.
Cc: Evans, Rhodri E.; Mark Lathrop
Subject: Re: FW: Updated SOW
Rebecca,

Thank you for your patience in responding on the changes to the SOW for S-J977. I have reviewed your minutes and find them acceptable. Please find my comments and clarifications below:

1. While I have agreed that the Line Name is not required for the weekly feature submission, please include the field in your submission as the formatting of the spreadsheet is set up for a database which will require the column. You can use the entry NA for the column. I concur that the Search Track Number will not be required for the final deliverable.

2. I concur Towfish Layback field will not be required in the final deliverable.

3. I concur Contact Range field will not be required in the final deliverable.

4. I concur that the length and width for SAIC's images will not be the longest and shortest edge but rather the along and across track values.

5. An indication of scale will not be required for each contact image. This is addressed in the SOW. The requirement states that you can either indicate scale or include the center and outer edge of the waterfall so as to give the reviewer some indication of scale.

I would like to reiterate that these changes only apply to this project. Any data submissions outside of project S-J977 will require the submission as outlined in the SOW.

Regards,

Crescent Moegling
NOAA Hydrographic Surveys Division
Physical Scientist
301.713.2698 x114

Quintal, Rebecca T. wrote:
Crescent,

Hello. I am just checking in with you regarding the teleconference we had last week and the email of the minutes reproduced below. Please let me know if you have any questions or comments regarding this meeting summary.

Thanks,
-Rebecca

From: Quintal, Rebecca T.
Sent: Thursday, October 05, 2006 5:12 PM
To: 'Crescent.Moegling@noaa.gov'; 'Mark.T.Lathrop@noaa.gov'
Cc: 'RHODRI.E.EVANS@saic.com'; 'WALTER.S.SIMMONS@saic.com'
Subject: FW: Updated SOW

Crescent,

Thank you for discussing the new SOW and Specifications for the Debris Mapping work with us yesterday. Please find below minutes to the teleconference. Please make changes and/or additions if you feel I have missed something or stated it incorrectly.

A teleconference was held between NOAA and SAIC on Wednesday, 4 October 2006 at 5:00 PM Eastern time. In attendance were:

Crescent Moegling (NOAA)
Rod Evans (SAIC)
Walter Simmons (SAIC)
Rebecca Quintal (SAIC)

The topic of discussion was the string of emails reproduced below regarding the updated SOW for S-J977 Lake Borgne and, in addition, the Side Scan Sonar Contact file required for final delivery in the June 2006 Specifications and Deliverables.

Regarding Item #1 in the below email from Rebecca Quintal to Crescent Moegling (Monday, October 02, 2006 10:56 AM)

1. In both the FeatureFileFormat weekly submission and the Side Scan Sonar Contact List final deliverable, SAIC request that the Line Name (FeatureFileFormat) and the Search Track Number (Side Scan Sonar Contact List) column not be required. The contact number is annotated by Julian Day and time so a reviewer can always correlate a contact to a certain survey line, corresponding bathymetry file, etc.

It was discussed that SAIC do not name their data files after the search track number (line name). SAIC discussed that since all data files and contact files are named after Julian Day and time and the line names are not, that this column does not seem necessary. Crescent discussed that the assumption was that the search track (survey line name) and the data file names are the same. Crescent took the action item to decide whether this field in both the FeatureFileFormat weekly submission and the Side Scan Sonar Contact List final deliverable is indeed required for SAIC's deliverables.

To provide more clarification than was possible over the telephone, we have provided more information regarding our logs below.

SAIC name their bathymetry files with a 2 digit vessel ID, 3 digit sensor ID, 2 digit year and 3 digit Julian Day. For example in the example Navigation Log below the vessel was the: Atlantic Surveyor (AS), the sensor was: multibeam a (for single beam files this would be sba, etc.), the year was 2006 and the Julian Day was 105. SAIC typically name the side scan files (exact naming convention depends upon the acquisition system) with vessel ID, year, JD and 6 digit time or as in the case below vessel ID, year, JD, year, date and 6 digit time.

UTC TIME
LB/LE
SURVEY LINE
MB FILE
RPM
SS FILE

SURVEY LINE AZ.
NOTES

23:19:16
LB
K-205
ASMBA06105.D12
319.2
AS06105_060415231700
186.7
MAIN: FORCE ACQUIRED: PICKING UP PARTIAL LINE GOING SOUTH.

23:50:29
LE
K-205

23:54:55
LB
K_ITEM_06-26
ASMBA06105.D14
319.2
AS06105_060415235400
0.6
ITEM

23:55:20
LE
K_ITEM_06-26

Regarding Item #2 in the below email from Rebecca Quintal to Crescent Moegling (Monday, October 02, 2006 10:56 AM)

2. In the Side Scan Sonar Contact List, SAIC request that Towfish Layback column not be required. This seems to be a left over from when the contact positions were calculated by hand. For example, shadow length used to be required as well.

SAIC explained that the ping positions within the side scan files, and therefore the contact positions, are already corrected for layback by the acquisition system and therefore the layback information does not provide useful information. Crescent stated that layback was not required in the Side Scan Sonar Contact List as long as the method of towfish positioning was fully explained the DAPR.

Regarding Item #3 in the below email from Rebecca Quintal to Crescent Moegling (Monday, October 02, 2006 10:56 AM)

3. In the Side Scan Sonar Contact List, SAIC request that Contact Range column not be required. Since this information is not required in the FeatureFileFormat, SAIC would like to not include it for final submission as part of the Side Scan Contact List for simplicity.

Crescent stated that range was still required in the Side Scan Sonar Contact List.

Regarding Item #4 in the below email from Rebecca Quintal to Crescent Moegling (Monday, October 02, 2006 10:56 AM)

4. In the FeatureFileFormat weekly submission, SAIC request that the Target Length not be required to be the longest side and likewise that the Target Width not be required to be the shortest side. SAIC uses Isis to review side scan data. In Isis the length is always the along track dimension and the width is always

the across track dimension. Therefore you can have a width measurement that is longer than the length measurement.

Crescent stated that Target Length will not be required to be the longest side, and likewise that the Target Width will not be required to be the shortest side, in the FeatureFileFormat.xls file due to limitations of the Isis sonar processing software as long as this methodology was fully explained in the DAPR. She also stated that the column headers will remain as indicated in the sample FeatureFileFormat.xls she provided on Monday, September 25, 2006.

Regarding the topic of whether the contact images to be delivered as part of the weekly delivery were required to have any geographic information associated with them (i.e. a geotiff or a tiff with a world file), Crescent stated that simple tiff images (containing no geographic information) would be acceptable as long as the image name was exactly the same as the contact name in the FeatureFileFormat.xls file.

Regarding the question of what was really being asked for in the Estimated Clearance columns in the FeatureFileFormat.xls file, Crescent explained that this column is really asking for the same information that is being requested in the Estimated Depth columns. Therefore the Estimated Least Depth and Estimated Clearance should always contain the same information. Crescent also stated that if an echosounder depth was not available "N/A" should be put in the Echosounder Depth columns and both of the Estimated Least Depth and Estimated Clearance columns should then be filled out. If an echosounder depth is available, then all three of the Echosounder Depth, Estimated Least Depth and Estimated Clearance columns should contain the same information.

Crescent also stated that the Associated Image Name column of the FeatureFileFormat.xls file does not have to contain a hotlink to the image as long as the image name is the same as the contact name in the Contact Name column.

One topic that was brought up in the email from Rebecca Quintal to Crescent Moegling (Wednesday, October 04, 2006 12:30 PM) that was not discussed in the teleconference yesterday was the requirement the tiff image have an indication of scale. This was called out in the email from Crescent Moegling (Friday, September 15, 2006 5:45 PM) but was not called out in the email from Crescent Moegling (Monday, September 25, 2006 2:09 PM). Crescent, can you please confirm that the indication of scale on the contact image is indeed not required?

We have attached a new FeatureFileFormat_Contact_List_Comment.xls document which outlines the changes discussed above. Note that the resolutions discussed above are in RED text.

Please let us know if you agree with these minutes or have any changes or additions to make.

Thank you,
-Rebecca

From: Quintal, Rebecca T.
Sent: Wednesday, October 04, 2006 1:32 PM
To: Crescent.Moegling@noaa.gov
Cc: Evans, Rhodri E.
Subject: RE: Updated SOW

Crescent,

We can make that time but may only be able to meet for 30-45 minutes. Hopefully that is plenty of time. We will have Walter Simmons calling in remotely so I will set up a telecon line for us all to call into. I'll email you with that info once it is set up.

Thanks,
-Rebecca

From: Crescent.Moegling@noaa.gov [mailto:Crescent.Moegling@noaa.gov]
Sent: Wednesday, October 04, 2006 12:30 PM
To: Quintal, Rebecca T.
Cc: Evans, Rhodri E.
Subject: Re: Updated SOW

Rebecca,

I know this is short notice but are you available for a telecon this afternoon at 5pm? I agree it would be easier to discuss these matters as you suggested.

Regards,

Crescent Moegling
NOAA Hydrographic Surveys Division
Physical Scientist
301.713.2698 x114

Quintal, Rebecca T. wrote:
Crescent,

Hello. SAIC has reviewed the updated SOW and the new FeatureFileFormat.xls spreadsheet that you sent out on Monday, 25 September. We have several questions. First we note that the FeatureFileFormat.xls spreadsheet differs from the Side Scan Sonar Contact List in section 8.4.2 in the Specifications and Deliverables. We also note that section 8.4.2 in the Specifications and Deliverables states: Suggested column entries are described below, along with a brief discussion of how each is to be derived. Specific entries may vary by hydrographer. The format should be reviewed by the COTR and/or Processing Branch before data collection is conducted. Likewise we note that your email of 25 September states: The Contractor is encouraged to present alternate means of quality assurance and quality control products in lieu of what is presented here. With the new SOW, this seems like a good time to discuss both deliverables. In the attached Excel file and outlined below we have suggestions for what SAIC would like to exclude from submission, or change, in both the weekly FeatureFileFormat and final deliverable Side Scan Sonar Contact List for simplicity. There is also one request for clarification in the FeatureFileFormat.xls file. We are still not exactly sure what is being requested in the Estimated Clearance columns. Is this really the drying height?

a.. In both the FeatureFileFormat weekly submission and the Side Scan Sonar Contact List final deliverable, SAIC request that the Line Name (FeatureFileFormat) and the Search Track Number (Side Scan Sonar Contact List) column not be required. The contact number is annotated by Julian Day and time so a reviewer can always correlate a contact to a certain survey line, corresponding bathymetry file, etc.

b.. In the Side Scan Sonar Contact List, SAIC request that Towfish Layback column not be required. This seems to be a left over from when the contact positions were calculated by hand. For example, shadow length used to be required as well.

c.. In the Side Scan Sonar Contact List, SAIC request that Contact Range column not be required. Since this information is not required in the FeatureFileFormat, SAIC would like to not include it for final submission as part of the Side Scan Contact List for simplicity.

d.. In the FeatureFileFormat weekly submission, SAIC request that the Target Length not be required to be the longest side and likewise that the Target Width not be required to be the shortest side. SAIC uses Isis to review side scan data. In Isis the length is always the along track dimension and the width is always the across track dimension. Therefore you can have a width measurement that is longer than the length measurement.

It is our hope that we can come to an agreeable format for both the weekly FeatureFileFormat submissions and final deliverable Side Scan Sonar Contact List that requires little reworking to go from one to the other. We are suggesting that the final deliverable Side Scan Sonar Contact List look very much like

the weekly submissions only with the final bathymetry information and a statement about if the contact is included in the S-57 Feature File.

In addition to questions regarding the deliverable spreadsheets, we have a question regarding the tiff images of the contacts. SAIC does not currently produce geotiff images of the contacts, but rather simple tiff images (with no geographic information). Providing the geographic information would require a software modification. Would it be acceptable to deliver simple tiff images like the one I have attached (note the image is named 3 digit JD and 6 digit time)? Note that this type of tiff image was the agreed upon deliverable on past NOAA contracts such as TimeCharter. If geographic information is required, would a tiff image and associated world file be acceptable? Or is a Geotiff the only acceptable format? Also we note that your email of 25 September did not require the tiff image have an indication of scale. Is this correct?

Please let us know if you would like to discuss any of these topics via a telecom as it might be easier than discussing via email. Thank you for considering these suggested changes to the deliverables. We look forward to working with you on this. Once we have agreed upon deliverables, SAIC can determine if the added scope of the weekly FeatureFileFormat.xls submissions can be achieved under current funding or if additional funding will be necessary.

-Rebecca

From: Crescent.Moegling@noaa.gov [mailto:Crescent.Moegling@noaa.gov]
Sent: Monday, September 25, 2006 2:09 PM
To: Evans, Rhodri E.; Quintal, Rebecca T.; Lepore, Christine A.
Subject: Updated SOW

Hello,

Please find attached an updated SOW for S-J977 Lake Borgne. Note changes to sections 6.3 with an added attachment #14 indicating the required Excel spreadsheet format which I've attached separately to this email. The sharepoint is being set up this week and I will be passing along information as soon as it comes available. In the meantime send all updates to me via email. The person I have listed to be given a login for you is Rod Evans and NOAA will require he perform an online security training prior to being given access to the Sharepoint.

6.3 Interim Deliverables

Interim deliverables are data analysis tools utilized by the COTR to evaluate and monitor the Contractor's field work and processing. These tools may include image files or graphics showing preliminary soundings, swath contours, multibeam and side scan coverage, and/or preliminary contacts. The Contractor shall make these products available to the COTR on a weekly basis. The weekly update shall include an Excel spreadsheet of all features noted the week prior. A sample of this format can be found in Appendix 14 with a key for each required field. In addition, Geotifs (or photos if the feature is above the water line) of these features shall be submitted and each Geotif hotlinked back to the Excel spreadsheet entry. The Geotifs or images shall be the same unique name as the feature in the Excel spreadsheet. The weekly update shall be made each Monday and placed on a web-based NOAA Share Point. The Contractor is encouraged to present alternate means of quality assurance and quality control products in lieu of what is presented here.

A few brief reminders this field season:

<!--[if !supportLists]-->- <!--[endif]-->All DTONs are to be sent to Atlantic Hydrographic Branch as stated in SOW Section 2.4.6.2. The email address is Castle.E.Parker@noaa.gov. Use the guidelines in the Specifications and Deliverables when determining a DTON and submit as soon as possible.
<!--[if !supportLists]-->- <!--[endif]-->Please send all completed survey outlines as stated in SOW Section 6.5. This should be done for all surveys completed under your contract with NOAA.

If you have any questions don't hesitate to contact me. I am out of the office Tuesday and Thursday until December so Monday, Wednesday or Friday is the best day to get in touch.

Regards,

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Crescent Moegling
NOAA Hydrographic Surveys Division
Physical Scientist
301.713.2698 x114

Bottom Composition

There were 30 bottom samples taken to verify the bottom types charted for H11614 (Table App. V-1). It is recommended that the bottom type charted be updated where necessary based on the information collected during the latest survey. ***Yellow highlighted bottom samples were used for seabed areas in the H-Cell.***

Table App. V-1. H11614 Bottom Sample Characteristics

H11614 Bottom Sample Position (NAD83)							
JD	**Sample Number**	**Latitude (N)**	**Longitude (W)**	**Observed Bottom Type**	**Depth of Bottom Sample (m)**	**Chart # 11371**	**Chart # 11364**
049	lm_049_bs_1	29° 52' 29.2"	089° 41' 23.5"	gy M Sh	2.44	x	x
049	lm_049_bs_2	29° 52' 32.6"	089° 40' 07.4"	gy M	2.50	x	x
049	lm_049_bs_10	29° 53' 30.0"	089° 40' 48.5"	gy M	2.81	x	x
049	lm_049_bs_11	29° 53' 28.9"	089° 42' 02.7"	gy M	2.72	x	x
049	lm_049_bs_12	29° 53' 24.1"	089° 42' 52.6"	gy M	2.83	x	x
049	lm_049_bs_13	29° 54' 19.6"	089° 43' 50.4"	gy M	2.35	x	x
049	lm_049_bs_14	29° 54' 23.7"	089° 42' 39.8"	gy M	2.65	x	x
049	lm_049_bs_25	29° 55' 20.7"	089° 42' 02.5"	gy M	2.59	x	x
049	lm_049_bs_26	29° 55' 18.3"	089° 43' 18.6"	gy M	2.29	x	x
049	lm_049_bs_29	29° 56' 09.7"	089° 42' 31.6"	gy M	2.38	x	x
049	lm_049_bs_24	29° 55' 22.3"	089° 40' 51.9"	gy M Sh	2.94	x	x
049	lm_049_bs_23	29° 55' 23.8"	089° 39' 37.9"	gy M	2.90	x	x
049	lm_049_bs_22	29° 55' 24.6"	089° 38' 21.7"	gy M	2.87	x	x
049	lm_049_bs_21	29° 55' 26.7"	089° 37' 09.6"	gy M Sh	2.89	x	x
055	lm_055_bs_3	29° 52' 38.4"	089° 38' 49.5"	M	2.50	x	x
055	lm_055_BS_4	29° 52' 37.7"	089° 37' 37.7"	M Sh	2.45	x	x
055	lm_055_BS_7	29° 53' 34.3"	089° 37' 04.6"	M Sh	2.59	x	x
055	lm_055_BS_8	29° 53' 33.2"	089° 38' 19.4"	M Sh	2.57	x	x
055	lm_055_BS_9	29° 53' 34.1"	089° 39' 34.5"	M Sh	2.85	x	x
055	lm_055_BS_15	29° 54' 25.5"	089° 41' 27.5"	M Sh	2.67	x	x
055	lm_055_BS_16	29° 54' 26.6"	089° 40' 11.2"	M	2.90	x	x
055	lm_055_BS_17	29° 54' 27.5"	089° 38' 56.8"	M	2.77	x	x
055	lm_055_BS_18	29° 54' 27.5"	089° 37' 39.9"	M	2.83	x	x
055	lm_055_BS_19	29° 54' 31.3"	089° 36' 24.4"	M Sh	2.63	x	x
055	lm_055_BS_20	29° 55' 28.9"	089° 35' 50.8"	Sh M	2.68	x	x
055	lm_055_BS_21*	29° 55' 25.4"	089° 37' 08.3"	M Sh	2.95	x	x
100	td_100_bs_5	29° 52' 38.1"	089° 36' 27.0"	br M Sh	1.98	x	x
100	td_100_bs_6	29° 53' 36.1"	089° 35' 50.4"	br M	2.14	x	x
111	td_111_bs_27	29° 55' 17.6"	089° 44' 39.8"	M	2.13	x	x
111	td_111_bs_28	29° 56' 13.1"	089° 43' 57.5"	M	1.82	x	x

* This is a duplicate sample. The original sample, lm_049_bs_21, was taken on JD 049 on the *F/V Lacey Marie.*

Bathymetric Attributed Grid Nodes that Fail IHO Order 1

There were two 1-meter BAG files created for Sheet H11614. Some nodes in these BAG files have uncertainties that exceed IHO Order 1 uncertainty. Information for each of these nodes is presented in two text files (one for each BAG). These text files are:

- H11614_1_of_2_uncertainty_exceeds.txt
- H11614_2_of_2_uncertainty_exceeds.txt

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT to ACCOMPANY
SURVEY H11614 (2007)

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

A. AREA SURVEYED

The area surveyed has not changed yet the area selected for chart compilation is a subset of the area surveyed. See below section B.2.1 for a full summary.

B. DATA ACQUISITION AND PROCESSING

B.1 DATA PROCESSING

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

CARIS HIPS/SIPS version 6.1 SP2 HF 1
CARIS Bathy Manager version 2.1 SP1
DKART INSPECTOR, version 5.0 Build 707
CARIS HOM version 3.3 SP3
CARIS S57 Composer version 2.0
FLEDERMAUS version 6.7 Build 285

Much of the processing of the survey data was accomplished by the contractor, SAIC, prior to submission to AHB, with the use of GeoAcoustics GeoSwath Plus and SAIC's SABER.

B.2. QUALITY CONTROL

B.2.1. H-Cell

It was noted several times in the review and in previously compiled SAIC Lake Borgne surveys that a significant discrepancy existed between the soundings of the GeoSwath interferometric sonar and the single beam sonar and that this discrepancy must be considered for charting purposes. The interferometric sonar was systematically shoaler than the single beam sonar in these surveys, generally by 2-3 feet, but in some portions of the common areas the magnitude of this difference is greater (3-4 feet). During the pre-compilation phases of this survey, it quickly became clear that the interferometric sonar could not go to chart, as was decided in H11612. The GeoSwath soundings differed too much from the single beam sonar, in such a significant way that

the contours produced from this union would be artificial and unnatural, reflecting the survey line plan of the vessel that was equipped with the interferometric sonar.

The systematic difference between the sonar systems is attributed to the nature of the high energy output of the interferometric sonar and the soft bottom in Lake Borgne. The usage of the interferometric sonar was somewhat experimental. The statement of work specified that "interferometric sonar and other emerging technologies" are highly encouraged for this project, however such usage could not be in lieu of the single beam coverage. There are portions in all of the Lake Borgne surveys where the interferometric data was used in lieu of the single beam data, particularly in H11614 and H11615 (more than 50% of the survey area). This is a deviation from the statement of work, but was deemed acceptable by AHB (see DR supplemental material and correspondence for more information). AHB could not justify sending such significantly different sounding sets to chart. The single beam data was the primary deliverable in the statement of work, hence it is the single beam data which will be retained for chart compilation. In the area of interferometric sonar coverage, the previous chart soundings will be retained. However, features located with the aid of the interferometric sonar and side scan sonar will be included in chart compilation. Feature detection was the primary purpose of the surveys, in accordance with the debris mapping efforts, and all the features located in this area, whether found by single beam, interferometric, or side scan, will be included for chart compilation. This is the reason why certain features lie outside of the H-Cell limits.

A 1m resolution surface of the single beam data was a final product from the review of this survey, and from this a product surface was generated with a 10m resolution. The sounding selection was generated from this product surface with a 200m shoal-biased radius. To aid in the chart sounding selection, first a TIN was made from the sounding selection. Next, a surface was interpolated from this TIN at a 100m resolution. This surface was then shifted by a factor of -0.229, to account for NOAA's rounding practices when creating contours. Finally, the contours were generated from this shifted, interpolated TIN surface. The chart soundings were then selected from the sounding selection using AHB best practices and with the aid of the contours.

The pre-compilation components include sounding selection and chart sounding selection (SOUNDG), features (BOYSPP, DEPARE, SBDARE, DEPCNT, OBSTRN, PILPNT), cartographic Blue Notes ($CSYMB), and Meta Objects (M_COVR, M_QUAL). Meta objects were submitted by the field unit, and they were altered accordingly to exclude the coverage area of the interferometric sonar. All of the components with the exception of the sounding selection were inserted into one feature layer, and this layer was exported into S-57 format in order to create the H-Cell deliverable. Similarly, the sounding selection was exported into S-57 format separately, and then both S-57 files were processed in CARIS HOM to convert the metric units to feet. The final products are two S-57 files, one that contains the chart soundings, all the features, Meta objects, and Blue Notes (H11614_CS.000), and one that contains the sounding selection (H11614_SS.000). Finally, quality assurance checks were made utilizing both DKART Inspector version 5.0 and CARIS S-57 Composer version 2.0 validation checks.

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

The H11614 CARIS H-Cell final deliverables include the following products:

H11614_CS.000	**1:80,000 Scale**	**H11614 H-Cell with Chart Scale Selected Soundings and Blue Notes**
H11614_SS.000	**1:20,000 Scale**	**H11614 Selected Soundings (Survey Scale)**

B.22. Junctions

Junctions include SAIC Lake Borgne surveys H11613 and H11615, also conducted in 2007. At least 95% of the data from H11614 falls within 30-35cm of H11613 (East Lake Borgne) and within 30-35cm of H11615 (West Lake Borgne).

C. VERTICAL AND HORIZONTAL CONTROL

Final corrections were applied by field unit and no other tidal correction was required.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON — **11371 (38th Edition, 04/01/2007)**
Corrected through NM 10/04/2008
Corrected through LNM 09/30/2008
Scale 1:80,000

ENC Comparison — **US4LA35M**
Edition 14
Issue Date 2007-05-25
Application Date 2008-09-23
Chart 11364

D.1.1 Hydrography

It was noted in the DR and again during the review that the charted shoreline from Proctor Point to Flat Bayou has migrated westward and no longer represents the current shoreline. The charted shoreline on the eastern side of H11614 has receded and requires updating.

The majority of the single beam soundings are within the 6 foot contour, and these soundings are generally 2 to 4 feet deeper than the charted depths. The 6 foot contour charted from Proctor Point southward to Flat Bayou has migrated westward approximately 900 to 1000 meters, and from Flat Bayou eastward to the east side of the bayou near Old Fort Beauregard (notated by SAIC as Bayou Yscloskey) has migrated shoreward to the charted shoreline.

See the following table for a listing of each Blue Note.

Feature ID	Acronym	Latitude	Longitude	INFORM
US 0000572465 00001	$CSYMB	29-54-28.81N	089-35-54.67W	INFORM=Delete charted sounding at survey boundary. Chart survey soundings in common area.
US 0000572466 00001	$CSYMB	29-56-19.72N	089-42-47.54W	INFORM=Delete charted sounding at survey boundary. Chart survey soundings in common area.
US 0000572467 00001	$CSYMB	29-54-11.07N	089-43-38.21W	INFORM=Delete charted sounding at survey boundary. Chart survey soundings in common area.
US 0000572468 00001	$CSYMB	29-53-37.98N	089-43-01.92W	INFORM=Delete charted sounding at survey boundary. Chart survey soundings in common area.
US 0000572469 00001	$CSYMB	29-53-03.02N	089-42-23.95W	INFORM=Delete charted sounding at survey boundary. Chart survey soundings in common area.
US 0000572470 00001	$CSYMB	29-52-07.90N	089-39-56.54W	INFORM=Recommend to change the labe Subm piling to "Subm piles."
US 0000572471 00001	$CSYMB	29-55-34.61N	089-35-55.45W	INFORM=An uncharted platform was observed here. Recommend charting a platform symbol and label Platform.
US 0000572472 00001	$LINES			INFORM=The charted exposed pipe was found, however there is no indication in the SSS that the pipeline was exposed anywhere within the H11614 survey area. Based on the SSS, the pipeline exists approximately 60-100 meters west of the charted pipe. This is consistent with data collected for junction surveys H11613 and H11612. Recommend to update the charted position of the pipeline based on the results of this survey.
US 0000572473 00001	$LINES			INFORM=SSS shows a pipeline, however nothing is on the chart. Nav Manager in this region contacted regarding this feature but a response was never received. Recommend charting a pipeline in the position indicated.
US 0000572474 00001	$CSYMB	29-52-25.59N	089-40-41.13W	INFORM=Recommend to change label Subm piling to "Subm piles".
US 0000572475 00001	$CSYMB	29-53-07.06N	089-36-55.00W	INFORM=Delete charted sounding.
US 0000572476 00001	$LINES			INFORM=The charted pipeline was found approximately 30 meters west of the charted position. Recommend charting the pipeline in the updated position.

US 0000572525 00001	$CSYMB	29-52-06.74N	089-40-12.05W	INFORM=The charted submerged pile was disproved with 200% SSS. Recommend to remove the submerged pile symbol.
US 0000572526 00001	$CSYMB	29-52-01.25N	089-40-14.04W	INFORM=The charted submerged pile was disproved with 200% SSS. Recommend to remove the submerged pile symbol.
US 0000572527 00001	$CSYMB	29-52-01.89N	089-38-59.86W	INFORM=The charted submerged pile was not found in its charted position. There were a line of exposed piles denoted nearby in the H11614 H-Cell and extending to shore. Recommend to remove the pile symbol and to remove the label Subm pile and to chart a pile symbol in the updated position and label Piles.
US 0000572528 00001	$CSYMB	29-52-10.38N	089-40-32.77W	INFORM=The charted submerged pile disproved with 200% SSS. Recommend to remove the submerged pile symbol.
US 0000572529 00001	$CSYMB	29-52-19.79N	089-40-31.73W	INFORM=The charted submerged pile was disproved with 200% SSS. Recommend to remove the submerged pile symbol.
US 0000572530 00001	$CSYMB	29-52-01.61N	089-40-30.57W	INFORM=This is Bayou Yscloskey (mentioned numerous times in the DR). This Bayou is labeled on Chart 11364. Recommend to add the label Bayou Yscloskey to Chart 11371.
US 0000572531 00001	$CSYMB	29-51-47.41N	089-39-11.77W	INFORM=The charted foul area was found to be clear over the area surveyed (with the exception of the exposed piles denoted in the H11614 H-Cell). Recommend removing the dotted line delineating the foul area and removing the label Foul.
US 0000572532 00001	$CSYMB	29-53-14.87N	089-36-12.13W	INFORM=The charted channel entrance to Bayou St Malo was found to have depths of 4 to 8 feet. Recommend revising the label "2 FT OCT 1994" to "4 FT JUN 2007".
US 0000572569 00001	$CSYMB	29-52-01.21N	089-40-17.11W	INFORM=The exposed remains of a Naval Station structure.
US 0000572578 00001	$CSYMB	29-52-05.74N	089-40-22.74W	INFORM=The charted platform was not addressed during this survey. The platform is not seen in 200% SSS. Recommend to remove the platform symbol from chart.
US 0000572580 00001	$CSYMB	29-52-17.26N	089-40-32.27W	INFORM=The submerged pile was disproved with 200% SSS. Recommend to remove the submerged pile symbol from the chart.

US 0000572581 00001	$CSYMB	29-52-22.52N	089-40-31.31W	INFORM=The charted submerged piles was disproved with 200% SSS. Recommend to remove the submerged pile symbol.
US 0000572582 00001	$CSYMB	29-55-57.62N	089-44-29.74W	INFORM=The charted submerged pile was disproved with 200% SSS. Recommend to remove the charted submerged pile symbol.
US 0000572587 00001	$CSYMB	29-52-18.38N	089-40-27.69W	INFORM=The charted submerged pile symbol was disproved with 200% SSS. Recommend to remove the submerged pile symbol.
US 0000572589 00001	$CSYMB	29-56-02.40N	089-44-32.42W	INFORM=Charted submerged pile lies outside of the SSS coverage extents. Recommend to retain as charted.
US 0000572594 00001	$CSYMB	29-52-12.48N	089-40-32.95W	INFORM=The charted submerged pile was disproved with 200% SSS. Recommend to remove the submerged pile symbol.
US 0000572595 00001	$CSYMB	29-52-19.24N	089-40-20.27W	INFORM=The charted channel entrance to Bayou Yscloskey was found to have depths of 6 to 9 feet. Recommend to revise the label "7 FT APR 1997" and changed to "6 FT JUN 2007."
US 0000572597 00001	$CSYMB	29-52-51.10N	089-35-51.11W	INFORM=The pier in ruins was not present during this survey disproved with 200% SSS. Recommend removal of the pier in ruins.
US 0000572598 00001	$CSYMB	29-56-07.18N	089-44-35.10W	INFORM=Charted submerged pile lies outside of the SSS coverage extents. Recommend to retain as charted.

D.2. ADDITIONAL RESULTS

D.2.1. Aids to Navigation

All navigational aids were addressed with H11614. No further considerations or recommendations are required.

D.3. MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. See Section D.1 of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey:

D.4. ADEQUACY OF SURVEY

The chart soundings derived from the single beam sounding set is adequate to supersede the charted bathymetry within the common area. The interferometric data set should not supersede the charted bathymetry in the common area, and for this reason the interferometric data was not included in the H-Cell. Any features not specifically addressed either in the H-Cell or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

APPROVAL SHEET
H11614

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, representation of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the Evaluation Report.

All final products have undergone a comprehensive reviews per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

Matthew J Wilson

Digitally signed by Matthew J Wilson
DN: cn=Matthew J Wilson, c=US, o=NOAA, ou=Atlantic Hydrographic Branch, email=matthew.wilson@noaa.gov
Date: 2008.10.30 11:20:18 -04'00'

Matthew J. Wilson
Physical Scientist
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.

Approved:

Shepard Smith
I am approving this document
2008.10.31 07:30:26 -04'00'

Shepard Smith
Commander, NOAA
Chief, Atlantic Hydrographic Branch

Digitally signed by Mark Lathrop
DN: cn=Mark Lathrop, o=NOAA, ou=HSD, email=mark.t.lathrop@noaa.gov, c=US
Reason: AWOIS/Surf Check
Date: 2008.11.07 14:22:13 -05'00'