Rogers Surveying, P.L.L.C.

HISTORIC AREA REMEDIATION SITE (H.A.R.S.)

FALL 2010

Prepared for:

United States Army Corps of Engineers
26 Federal Plaza
New York, New York 10278

Prepared by:
Rogers Surveying, P.L.L.C.
1632 Richmond Terrace
Staten Island, New York 10310

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 Introduction

As part of Rogers Surveying's Indefinite Delivery Contract with The United States Army Corps of Engineers. Rogers Surveying was tasked with surveying the HARS (Historic Area Remediation Site). The HARS, which was re-designated as a remediation site in September 1977 was formerly known as the Mud Dump Site (MDS), and was used for the deposit of sediments dredged from the New York / New Jersey Harbor Estuary. The remediation consists of placing a one-meter "cap" layer of uncontaminated dredged material on top of the existing surface sediments within the nine Priority Remediation Areas (PRA's) of the HARS.

2.0 Objective

The primary objective of this task order is to obtain current high-accuracy multibeam bathymetry of the site, to be used in the monitoring and planning of dredge placement. The site limits being bounded by North latitude of 40º 25.757, a South latitude of 40º 21.189' and East longitude of 73º 48.798, a West longitude of 73º 54.075'. The total survey coverage area being approximately 24.6 square miles. (Figure 2.0-1). Rogers Surveying was given a scope of work and proceeded to perform survey operations on 9/14/10 (Table 2.0-1).

3.0 Procedure

The survey data was collected utilizing multibeam technology, and collected in accordance with The U.S. Army Corps of Engineers Manual 1110-2-1003. All survey data was collected with the survey vessel "Red Rogers" (Table 3.0-1). The "Red Rogers" is a 36' long catamaran with a beam of 12' that has berthing for 2. Survey operations were run when fuel, weather and crew staffing permitted. The vessel is equipped with a *RESON* 7101 multibeam sonar. Vessel motion corrections are supplied by an *APPLANIX* 320 (POS/MV), Differential GPS corrections are supplied by a *TRIMBLE* Pro-Beacon receiver, and when available RTK corrections provided to the POS/MV with the addition of a USB cellular modem. Speed of sound profiles are recorded thru the water column with a *SEABIRD* SBE19 Plus CTD profiler V2 (Table 3.0-1).

A seabed mounted water pressure gauge was installed at latitude N 40 º24' 51.7" and longitude W 73º 51' 25.1". It was anchored in approximately 55' of water (Figures 3.0-1 and 3.0-2). An acoustic release system was incorporated for retrieval of the tide gauge. The gauge was preset to record data for 60 seconds every 5 minutes. The Real Time Kinematic GPS, which augmented the POS/MV position also provided real time water levels, which were used to calibrate the submersible tide gauge. The RTK and VRS corrections were provided via a cellular Internet GPS Network operated by Keystone Precision of PA.

Figure 2.0-1
Historic Area Restoration Site (HARS).

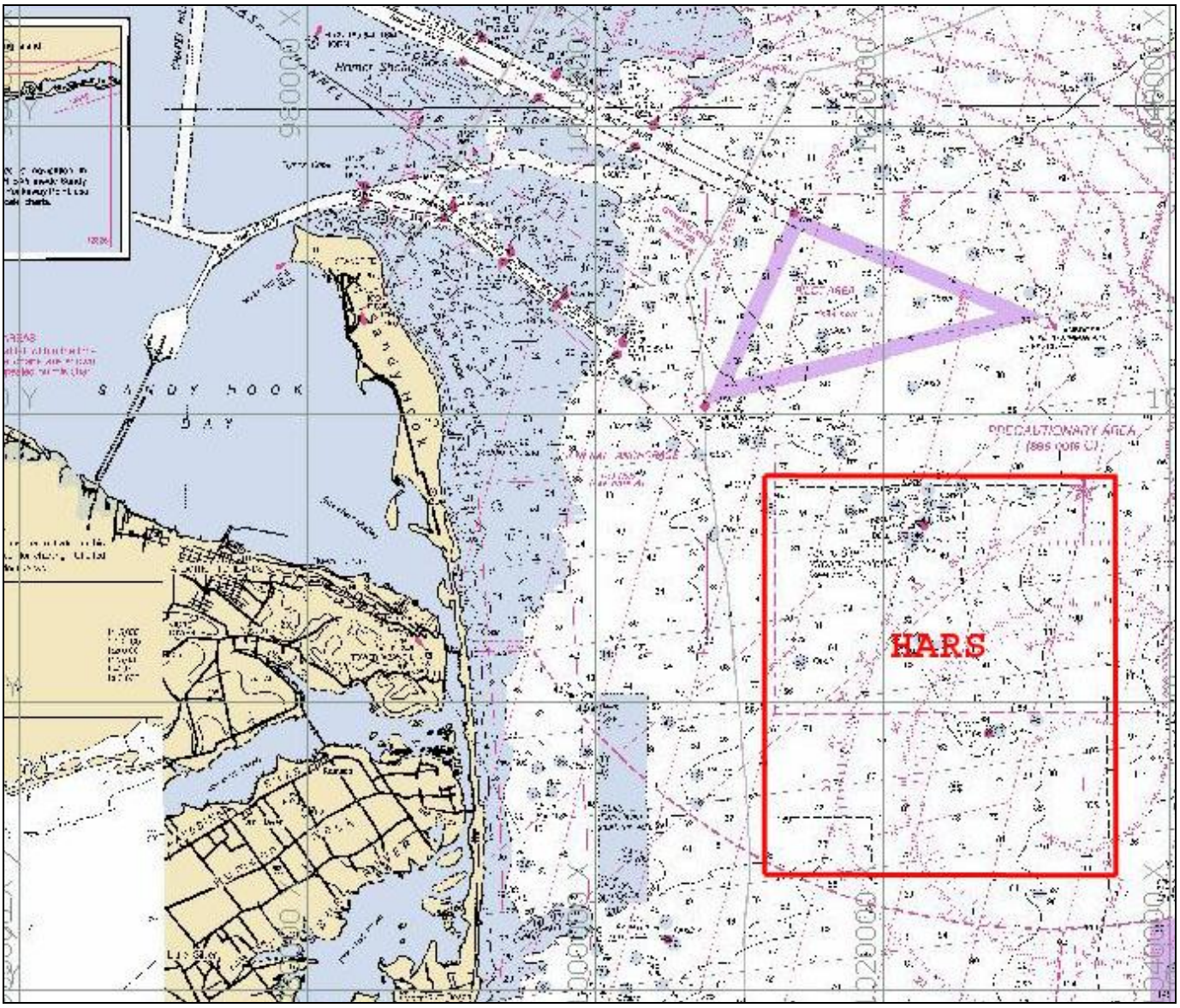


Table 2.0-1
Summary of survey operations on board survey vessel Red Rogers for the Fall 2010 multibeam survey at the HARS.

DATE	Operations
08/11/10	Patch Test performed on survey vessel Red Rogers for multibeam system calibration.
09/14/10	Mobilization to HARS. Deployed submersible tide recorder, checked RTK network coverage on site.
09/14/10	Commenced multibeam survey of HARS.
09/15/10	Continued Survey from previous day.
09/23/10	Continued Survey from 09/15/10
09/24/10	Continued Survey from previous day
10/06/10	Retrieved, Downloaded, Redeployed submersible tide recorder Continued Survey from 09/24/10
10/12/10	Continued Survey from 10/06/10
10/18/10	Continued Survey from 10/12/10
10/19/10	Continued Survey from previous day
10/20/10	Continued Survey from previous day.
11/02/10	Retrieved submersible tide recorder, Downloaded but could not redeploy. Continued Survey from 10/20/10
11/03/10	Continued Survey from previous day
11/15/10	Redeployed submersible tide recorder. Continued Survey from 11/03/10
11/16/10	Continued Survey from previous day. Survey Completed. Retrieved submersible tide recorder, and demobilized.

Table 3.0-1
Equipment used during the Fall 2010 multibeam survey at the HARS.

System	Model	*Accuracy
Multibeam	Reson Seabat 7101 (150 deg), Bathymetry, Sidescan & Snippets 240 kHz, beam width 1.5 degree along and across track, 511 horizontal beams.	12.5 mm resolution.
Position		
Differential GPS	Trimble Pro Beacon	3-5 meters DGPS USCG, 3 meters DGPS WAAS
Inertial Navigation System	TSS POS M/V 320 Motion (HPR) & Heading	Roll Pitch 0.02 (1 sigma DGPS, 2 sigma RTK) Heave 5cm or 5% 20 seconds or less Heading 0.02 (1 sigma) Position 0.5 - 2m (DGPS), 0.02 - 0.10 (RTK) Velocity 0.03 m/s horizontal
Data Acquisition and Navigation	Hypack 2010 Hysweep Survey Running on a Super Logic computer, with dual Aptec Raid removable disk drives .	
Sound Velocity	SeaBird SBE 19plusV2	
Tide Gauges		
Submersible Pressure Gauge	Valeport MiniTide (Deployed at HARS)	Range –5 to +35 deg (C). +/-0.01 deg (C)

Survey Vessel	
M/V Red Rogers	LOA= 36', Beam= 10', Draft= 2.5, Max Speed 25kts
Propulsion	Twin Volvo KAD 44P-C Turbo Diesel Engines with DPE Stern Drives
Power	Onan 6.5 kilowatt Generator with UPS & DC power supplies

R/V *Red Rogers*

Figure 3.0-1
Attaching Acoustic Release Buoy to Submersible Tide Gauge

Figure 3.0-2
Final multibeam coverage of the HARS, with submersible Tide Gauge location.

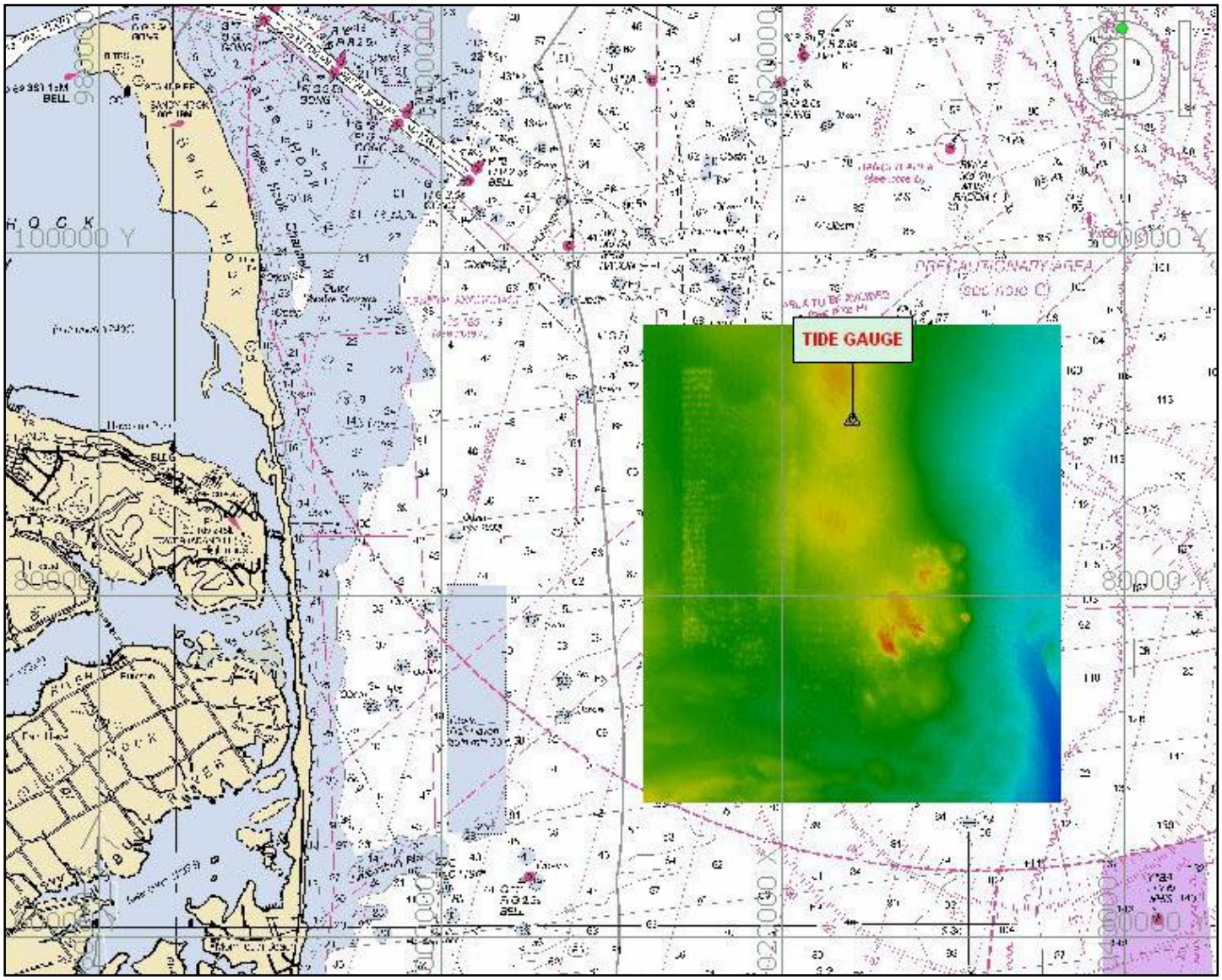


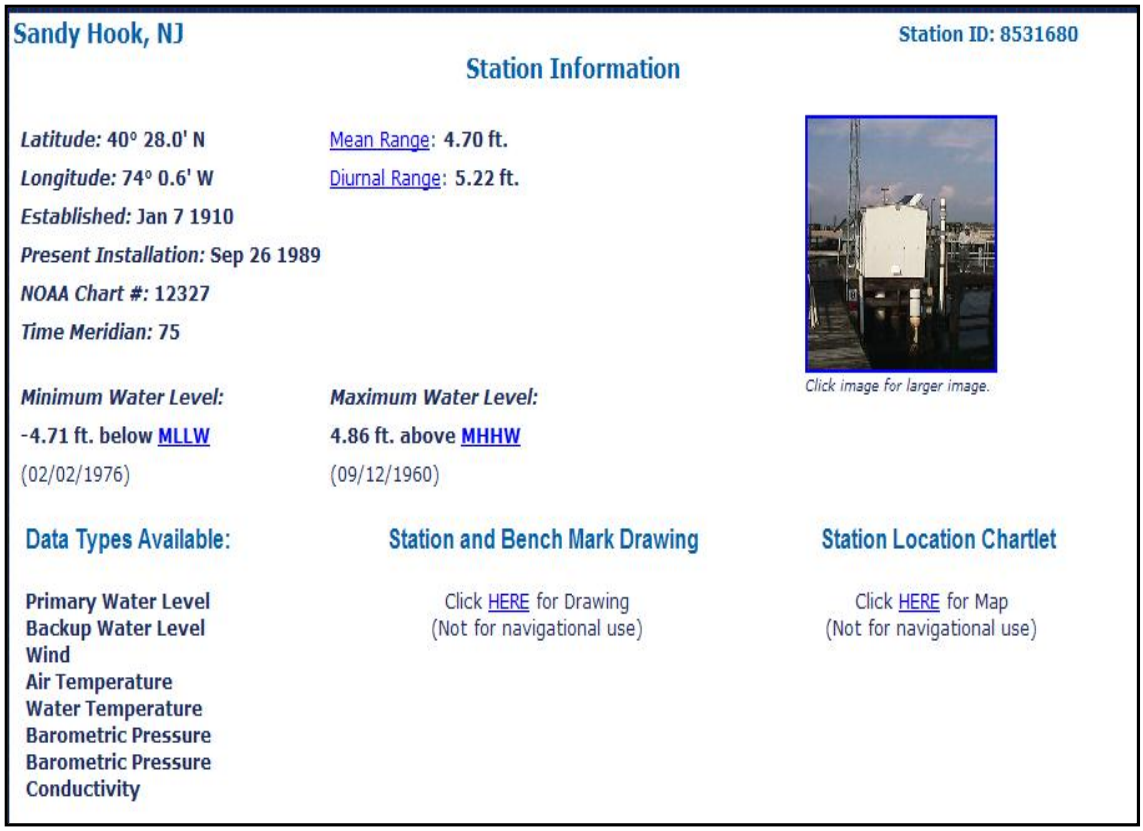
Figure 3.1-1

Portion of NGS Data Sheet for survey control disk KV0233 used at Elizabeth Marina.

```
KV0233  DESIGNATION -  PBM 65 33 USE
KV0233  PID         -  KV0233
KV0233  STATE/COUNTY-  NJ/UNION
KV0233  USGS QUAD   -  ELIZABETH (1995)
KV0233
KV0233                        *CURRENT SURVEY CONTROL
KV0233  ______________________________________________________________________
KV0233* NAD 83(1986)-  40 39 07.     (N)    074 11 11.     (W)     SCALED
KV0233* NAVD 88     -         7.441  (meters)      24.41   (feet)  ADJUSTED
KV0233  ______________________________________________________________________
KV0233  GEOID HEIGHT-         -32.35  (meters)                      GEOID09
KV0233  DYNAMIC HT  -           7.438 (meters)      24.40  (feet)  COMP
KV0233  MODELED GRAV-     980,222.8   (mgal)                        NAVD 88
KV0233
KV0233  VERT ORDER  -  FIRST     CLASS II
```

Figure 4.1-1

Sandy Hook Tidal Station information used to check Tide data at the HARS, during the Fall 2010 multibeam survey.



Sandy Hook, NJ

Station ID: 8531680

Station Information

Latitude: 40° 28.0' N

Longitude: 74° 0.6' W

Established: Jan 7 1910

Present Installation: Sep 26 1989

NOAA Chart #: 12327

Time Meridian: 75

Mean Range: 4.70 ft.

Diurnal Range: 5.22 ft.

Click image for larger image.

Minimum Water Level:

-4.71 ft. below MLLW

(02/02/1976)

Maximum Water Level:

4.86 ft. above MHHW

(09/12/1960)

Data Types Available:

Primary Water Level
Backup Water Level
Wind
Air Temperature
Water Temperature
Barometric Pressure
Barometric Pressure
Conductivity

Station and Bench Mark Drawing

Click HERE for Drawing
(Not for navigational use)

Station Location Chartlet

Click HERE for Map
(Not for navigational use)

3.1 Data Acquisition

The survey vessel *Red Rogers* is permanently berthed in Elizabeth, New Jersey. The voyage from the vessels homeport to the HARS is approximately 1.5 hours. Prior to multibeam survey operations a float test was performed to confirm that the RTK GPS tide reading from the POS M/V on the survey vessel agreed with the tide board at the dock at Elizabeth Marina, which had previously been referenced to National Geodetic Survey (NGS) disk KV0233 (Figure 3.1-1). This having been done the survey vessel transited to the HARS for commencement of multibeam data collection at the site.

Once at the HARS the initial task was to lower the multibeam transducer head and perform a sound velocity profile (SVP). The information from the SVP was used to provide the Reson 7101 multibeam processor with a sound velocity surface value used for beam steerage. In addition the sound velocity profile was used in the Hypack data acquisition and processing software to correct for speed of sound through the water column to be applied to the multibeam data.

Having performed and applied the SVP correction, multibeam data collection began. Survey lines were run in a general North-South direction with cross check lines (see Section 4.1) being run in an East-West direction.

Constant monitoring of the Reson 7101 screen and adjustment of range, transmit/ receive power settings were made if required to accurately map and encompass the swath width needed. The swath width was set to 60 deg. either side of nadir (center beam of multibeam) and lines were run to provide a 60% swath data coverage. In addition to monitoring the Reson 7101, it was also necessary to monitor the Hypack navigation software, which provided quality information on GPS and inertial navigation sensors, motion reference unit sensor and the multibeam data from the Reson 7101.

3.2 Sound Velocity Profiles

Sound velocity profiles were taken during the course of the survey using a SeaBird SBE 19plus Version 2 CTD. Casts were obtained before, during and after each survey period. During survey operations casts were taken not less than three hours apart and at opposite ends of the days survey area, to account for any spatial water column speed of sound changes. The SeaBird SBE 19plus was last calibrated by the manufacturer on 05/25/07 and is periodically checked against our Odom Digibar Pro velocity profiler. A total of 65 SVP casts were taken over the course of the multibeam survey (Table 3.2-0). Plots of all SVP casts are shown in Figures 3.2-1 to 3.2-65.

3.3 Survey Line Report

Multibeam survey lines were run in a North-South direction primarily to best facilitate vessel operation under wave and current conditions at the time of the survey. Table 3.3-1 lists survey line start times with location and direction run.

Table 3.2-0

Sound Velocity Profiles (SVP's) taken during the Fall 2010 multibeam survey at the HARS

Date	Time	CTD File #	NAD83 NY LI (Feet)		Water Depth	Latitude	Longitude
	GMT		Easting	Northing	Feet	N	W
09/14/10	14:48	091410_1448	1036229	95675	98	40.42912702	73.81329865
09/14/10	17:04	091410_1704	1034442	86464	108	40.40385470	73.81978535
09/14/10	18:06	091410_1806	1036359	95449	106	40.42850593	73.81283345
09/15/10	13:15	091510_1315	1033757	95828	98	40.42956110	73.82217659
09/15/10	14:56	091510_1456	1032282	86412	102	40.40372390	73.82754119
09/15/10	16:54	091510_1654	1030945	86254	98	40.40329734	73.83234276
09/15/10	18:36	091510_1836	1031361	95608	93	40.42897027	73.83078425
09/23/10	11:50	092310_1150	1029516	86463	91	40.40387841	73.83747215
09/23/10	13:51	092310_1351	1027978	95827	82	40.42958868	73.84293405
09/23/10	15:54	092310_1554	1026277	86434	62	40.40381471	73.84910195
09/23/10	17:57	092310_1757	1024971	95802	63	40.42953435	73.85373498
09/23/10	20:18	092310_2018	1036163	86571	110	40.40413851	73.81360530
09/23/10	21:27	092310_2127	1036272	77631	106	40.37959910	73.81328235
09/24/10	12:25	092410_1225	1035392	86632	112	40.40431041	73.81637312
09/24/10	14:28	092410_1428	1033254	77175	106	40.37836460	73.82411783
09/24/10	16:23	092410_1623	1031707	77183	92	40.37839495	73.82967016
09/24/10	18:26	092410_1826	1029590	86425	86	40.40377373	73.83720670
10/06/10	13:41	100610_1341	1028398	86627	69	40.40433418	73.84148526
10/06/10	14:14	100610_1414	1024070	77164	66	40.37838028	73.85708048
10/06/10	16:20	100610_1620	1025353	86569	54	40.40418958	73.85241875
10/06/10	18:15	100610_1815	1026220	86573	63	40.40419651	73.84930575
10/06/10	20:22	100610_2022	1027208	77321	65	40.37879661	73.84581679
10/12/10	12:19	101210_1219	1028364	85496	79	40.40122995	73.84161468
10/12/10	14:36	101210_1436	1036196	77303	102	40.37869924	73.81355764
10/12/10	16:45	101210_1645	1034655	77327	109	40.37877399	73.81908833
10/12/10	18:36	101210_1836	1032726	67868	100	40.35282135	73.82607921
10/12/10	20:46	101210_2046	1030996	76957	84	40.37777839	73.83222358
10/18/10	12:10	101810_1210	1031037	77282	82	40.37867024	73.83207419
10/18/10	14:06	101810_1406	1029694	77323	73	40.37878975	73.83689415
10/18/10	16:14	101810_1614	1028355	77295	49	40.37871963	73.84170020
10/18/10	16:34	101810_1634	1027322	67844	82	40.35278328	73.84546764
10/18/10	18:33	101810_1833	1025800	67865	80	40.35284816	73.85092808
10/19/10	12:19	101910_1219	1023980	77299	69	40.37875124	73.85740272
10/19/10	14:17	101910_1417	1025331	73292	69	40.36774655	73.85257797
10/19/10	16:17	101910_1617	1023082	77422	79	40.37909282	73.86062507
10/19/10	18:26	101910_1826	1021573	77292	73	40.37874245	73.86604185
10/19/10	20:25	101910_2025	1020099	67718	73	40.35246947	73.87138271
10/19/10	21:29	101910_2129	1019587	77054	79	40.37809730	73.87317114
10/20/10	12:39	102010_1239	1011552	76534	67	40.37669829	73.90201181
10/20/10	14:45	102010_1445	1012643	67659	52	40.35233445	73.89813320
10/20/10	16:58	102010_1658	1014272	77797	68	40.38015624	73.89224403
10/20/10	18:55	102010_1855	1015311	77542	72	40.37945274	73.88851599
10/20/10	20:38	102010_2038	1015960	67865	62	40.35288868	73.88623171
10/20/10	21:43	102010_2143	1016107	77304	75	40.37879666	73.88566010
11/02/10	13:06	110210_1306	1018392	77321	69	40.37883484	73.87745880
11/02/10	15:19	110210_1519	1018647	77333	73	40.37886679	73.87654350
11/02/10	18:17	110210_1817	1023987	86571	58	40.40420129	73.85732339
11/02/10	20:22	110210_2022	1022686	77037	76	40.37803778	73.86204856
11/03/10	12:49	110310_1249	1020923	86710	58	40.40459599	73.86832398
11/03/10	14:50	110310_1450	1019086	77118	77	40.37827494	73.87496896
11/03/10	16:59	110310_1659	1018857	86587	65	40.40426666	73.87574266
11/03/10	18:50	110310_1850	1018660	84676	69	40.39902205	73.87645967
11/03/10	21:00	110310_2100	1014458	77237	75	40.37861851	73.89157892
11/15/10	16:04	111510_1604	1011692	86508	73	40.40407483	73.90146908
11/15/10	18:05	111510_1805	1012902	76943	73	40.37781668	73.89716487
11/15/10	20:07	111510_2007	1011751	86457	73	40.40393466	73.90125744
11/15/10	21:45	111510_2142	1013184	86359	75	40.40366111	73.89611267
11/15/10	23:42	111510_2342	1014816	95948	66	40.42997583	73.89020984
11/16/10	1:52	111610_0152	1016482	95964	65	40.43001386	73.88422565
11/16/10	3:57	111610_0353	1018662	86416	71	40.40379805	73.87644368
11/16/10	6:02	111610_0602	1019404	94215	66	40.42520207	73.87373917
11/16/10	7:50	111610_0750	1020504	96124	69	40.43043753	73.86977817
11/16/10	9:59	111610_0959	1022365	95946	64	40.42994116	73.86309460
11/16/10	11:47	111610_1147	1023368	96001	59	40.43008777	73.85949161
11/16/10	12:56	111610_1256	1023957	93921	50	40.42437592	73.85738814

Table 3.3-1
Multibeam Survey Lines run during the Fall 2010 multibeam survey at the HARS

LINE #	DATE	TIME	LAT	LONG	DIRECTION
000_1506.RAW	9/14/2010	15:06	40 25.7476901	73 48.7978553	South
000_1522.RAW	9/14/2010	15:22	40 24.2297259	73 48.8536011	North
000_1539.RAW	9/14/2010	15:39	40 25.7792025	73 48.8651973	South
000_1556.RAW	9/14/2010	15:56	40 24.2262152	73 48.9564221	North
000_1613.RAW	9/14/2010	16:13	40 25.7774883	73 48.9930739	South
000_1630.RAW	9/14/2010	16:30	40 24.2283591	73 49.0731562	North
000_1647.RAW	9/14/2010	16:47	40 25.7786647	73 49.1049343	South
000_1712.RAW	9/14/2010	17:12	40 24.2312652	73 49.1870055	North
000_1728.RAW	9/14/2010	17:28	40 25.7737809	73 49.2194632	South
000_1744.RAW	9/14/2010	17:44	40 24.2237232	73 49.2967374	North
000_1802.RAW	9/14/2010	18:02	40 25.7371474	73 49.3259694	East (Check Line)
003_1325.RAW	9/15/2010	13:25	40 25.7736948	73 49.3306637	South
004_1341.RAW	9/15/2010	13:41	40 24.2294958	73 49.4167478	North
005_1404.RAW	9/15/2010	14:04	40 25.7703051	73 49.4279389	South
001_1420.RAW	9/15/2010	14:20	40 24.2283118	73 49.5290006	North
002_1438.RAW	9/15/2010	14:38	40 25.7756640	73 49.5369288	South
003_1501.RAW	9/15/2010	15:01	40 24.2233177	73 49.6524735	North
004_1519.RAW	9/15/2010	15:19	40 25.7749909	73 49.6361864	South
005_1537.RAW	9/15/2010	15:37	40 24.2255375	73 49.7627701	North
001_1554.RAW	9/15/2010	15:54	40 25.7799213	73 49.7595675	South
002_1611.RAW	9/15/2010	16:11	40 24.2239259	73 49.8772670	North
003_1629.RAW	9/15/2010	16:29	40 25.7417698	73 49.8590050	East (Check Line)
004A1638.RAW	9/15/2010	16:38	40 25.7692065	73 49.8620362	South
005_1659.RAW	9/15/2010	16:59	40 24.2308311	73 49.9866555	North
001_1725.RAW	9/15/2010	17:25	40 25.7783999	73 49.9544326	South
002_1742.RAW	9/15/2010	17:42	40 24.2254618	73 50.0891745	North
003_1759.RAW	9/15/2010	17:59	40 25.7785929	73 50.0385739	South
004_1816.RAW	9/15/2010	18:16	40 24.2227369	73 50.1910189	North
005_1833.RAW	9/15/2010	18:33	40 25.7402921	73 50.1575828	East (Check Line)
004_1159.RAW	9/23/2010	11:59	40 24.2326197	73 50.2483000	North
001_1215.RAW	9/23/2010	12:15	40 25.7746313	73 50.2161153	South
002_1230.RAW	9/23/2010	12:30	40 24.2261904	73 50.3633033	North
003_1247.RAW	9/23/2010	12:47	40 25.7732548	73 50.3270207	South
004_1302.RAW	9/23/2010	13:02	40 24.2280178	73 50.4831525	North
001_1319.RAW	9/23/2010	13:19	40 25.7770775	73 50.4403278	South
002_1334.RAW	9/23/2010	13:34	40 24.2266321	73 50.5961221	North
003_1354.RAW	9/23/2010	13:54	40 25.7753665	73 50.5760248	South
004_1410.RAW	9/23/2010	14:10	40 24.2256740	73 50.6940664	North
001_1426.RAW	9/23/2010	14:26	40 25.7767181	73 50.6690585	South
002_1442.RAW	9/23/2010	14:42	40 24.2673947	73 50.7695346	East (Check Line)
000_1451.RAW	9/23/2010	14:51	40 24.2327167	73 50.7763846	North
000_1507.RAW	9/23/2010	15:07	40 25.7788218	73 50.7747838	South
000A1522.RAW	9/23/2010	15:22	40 24.2281148	73 50.8717165	North

000_1538.RAW	9/23/2010	15:38	40 25.7813405	73 50.8646095	South
000_1558.RAW	9/23/2010	15:58	40 24.2288587	73 50.9461861	North
000_1614.RAW	9/23/2010	16:14	40 25.7716022	73 50.9600649	South
000A1630.RAW	9/23/2010	16:30	40 24.2300362	73 51.0287822	North
000_1646.RAW	9/23/2010	16:46	40 25.7776255	73 51.0473185	South
000_1703.RAW	9/23/2010	17:03	40 24.2287299	73 51.1129490	North
000_1718.RAW	9/23/2010	17:18	40 25.7730759	73 51.1356263	South
000_1736.RAW	9/23/2010	17:36	40 24.2670568	73 51.1659209	East (Check Line)
000_1742.RAW	9/23/2010	17:42	40 24.2318278	73 51.1737586	North
000_1800.RAW	9/23/2010	18:00	40 25.7721241	73 51.2242002	South
000_1818.RAW	9/23/2010	18:18	40 24.2283454	73 51.2621843	North
000_1833.RAW	9/23/2010	18:33	40 25.7768507	73 51.3021490	South
000_1850.RAW	9/23/2010	18:50	40 24.2300613	73 51.3355961	North
000_1905.RAW	9/23/2010	19:05	40 25.7749958	73 51.3652649	South
000_1927.RAW	9/23/2010	19:27	40 24.2334962	73 51.4100632	North
000_1942.RAW	9/23/2010	19:42	40 25.7739318	73 51.4409021	South
000_1956.RAW	9/23/2010	19:56	40 24.4680701	73 51.4340629	South
000_2000.RAW	9/23/2010	20:00	40 24.2704210	73 51.4398397	East (Check Line)
000_2027.RAW	9/23/2010	20:27	40 24.2554361	73 48.8070632	South
000_2045.RAW	9/23/2010	20:45	40 22.6969493	73 48.8397677	North
000_2102.RAW	9/23/2010	21:02	40 24.2564545	73 48.9350435	South
000_2123.RAW	9/23/2010	21:23	40 22.7544639	73 48.9877383	East (Check Line)
004_1234.RAW	9/24/2010	12:34	40 24.2586101	73 48.9824045	South
000_1251.RAW	9/24/2010	12:51	40 22.7036375	73 49.0580704	North
000_1306.RAW	9/24/2010	13:06	40 24.2564784	73 49.1282818	South
000_1323.RAW	9/24/2010	13:23	40 22.7017405	73 49.1895838	North
000_1339.RAW	9/24/2010	13:39	40 24.2572563	73 49.2710494	South
000_1356.RAW	9/24/2010	13:56	40 22.6991466	73 49.3244036	North
000_1411.RAW	9/24/2010	14:11	40 24.2613104	73 49.3864376	South
000_1433.RAW	9/24/2010	14:33	40 22.7017985	73 49.4471767	North
000_1449.RAW	9/24/2010	14:49	40 24.2548778	73 49.5274740	South
000A1506.RAW	9/24/2010	15:06	40 22.7010505	73 49.5584422	North
000B1522.RAW	9/24/2010	15:22	40 24.2251112	73 49.6374940	East (Check Line)
000_1533.RAW	9/24/2010	15:33	40 24.2610088	73 49.6433748	South
000_1550.RAW	9/24/2010	15:50	40 22.6959726	73 49.6709101	North
000_1606.RAW	9/24/2010	16:06	40 24.2648819	73 49.7887849	South
000_1626.RAW	9/24/2010	16:26	40 22.7037455	73 49.7802024	North
000_1643.RAW	9/24/2010	16:43	40 24.2527312	73 49.9041740	South
000_1701.RAW	9/24/2010	17:01	40 22.7001910	73 49.9049536	North
000A1718.RAW	9/24/2010	17:18	40 24.2585256	73 50.0190308	South
000_1735.RAW	9/24/2010	17:35	40 22.6964305	73 50.0067949	North
000_1751.RAW	9/24/2010	17:51	40 24.2664096	73 50.1271042	South
000_1808.RAW	9/24/2010	18:08	40 22.7052246	73 50.1119326	North
000_1829.RAW	9/24/2010	18:29	40 24.2263863	73 50.2323905	East (Check Line)
000_1839.RAW	9/24/2010	18:39	40 24.2503848	73 50.2288343	South
000_1856.RAW	9/24/2010	18:56	40 22.7043132	73 50.1921615	North
000_1913.RAW	9/24/2010	19:13	40 24.2585298	73 50.3494076	South
000_1931.RAW	9/24/2010	19:31	40 22.7087736	73 50.2699872	North

000_1947.RAW	9/24/2010	19:47	40 24.2529238	73 50.4454644	South
000_2005.RAW	9/24/2010	20:05	40 22.7406493	73 50.3422245	East (Check Line)
000_1349.RAW	10/6/2010	13:49	40 24.2601569	73 50.4891599	South
000_1417.RAW	10/6/2010	14:17	40 22.7028455	73 51.4246929	North
000_1434.RAW	10/6/2010	14:34	40 24.2616107	73 51.3895872	South
000A1451.RAW	10/6/2010	14:51	40 22.7052969	73 51.3455611	North
000_1509.RAW	10/6/2010	15:09	40 24.2520763	73 51.3110061	South
000_1526.RAW	10/6/2010	15:26	40 22.7019940	73 51.2466596	North
000_1543.RAW	10/6/2010	15:43	40 24.2616971	73 51.2261567	South
000_1559.RAW	10/6/2010	15:59	40 22.6987370	73 51.1593102	North
000_1625.RAW	10/6/2010	16:25	40 24.2513193	73 51.1451583	South
000_1641.RAW	10/6/2010	16:41	40 22.7034601	73 51.0820299	North
000_1659.RAW	10/6/2010	16:59	40 24.2583599	73 51.0828694	South
000_1716.RAW	10/6/2010	17:16	40 22.7336428	73 51.0604297	West (Check Line)
000_1723.RAW	10/6/2010	17:23	40 22.7066532	73 51.0553528	North
000_1741.RAW	10/6/2010	17:41	40 24.2610874	73 51.0178901	South
000_1757.RAW	10/6/2010	17:57	40 22.7043070	73 50.9904221	North
000A1818.RAW	10/6/2010	18:18	40 24.2517693	73 50.9583153	South
000_1835.RAW	10/6/2010	18:35	40 22.7091747	73 50.9370558	North
000_1854.RAW	10/6/2010	18:54	40 24.2656486	73 50.8756047	South
000_1911.RAW	10/6/2010	19:11	40 22.7006787	73 50.8855664	North
000A1931.RAW	10/6/2010	19:31	40 24.2486603	73 50.7694686	South
000A1947.RAW	10/6/2010	19:47	40 22.7005859	73 50.8201859	North
000_2006.RAW	10/6/2010	20:06	40 24.2573169	73 50.6898745	South
000A2027.RAW	10/6/2010	20:27	40 22.7278065	73 50.7488811	West (Check Line)
000_2033.RAW	10/6/2010	20:33	40 22.7078937	73 50.7380026	North
000_2052.RAW	10/6/2010	20:52	40 24.2563627	73 50.6016874	South
000_2107.RAW	10/6/2010	21:07	40 22.6994404	73 50.6493491	North
000_2126.RAW	10/6/2010	21:26	40 24.2194210	73 50.4714324	West (Check Line)
000_1232.RAW	10/12/2010	12:32	40 24.0738027	73 50.4968538	South
000_1247.RAW	10/12/2010	12:47	40 22.7024790	73 50.4271487	North
000_1301.RAW	10/12/2010	13:01	40 23.9746061	73 50.5684791	South
000_1315.RAW	10/12/2010	13:15	40 22.7025683	73 50.4895232	North
000_1326.RAW	10/12/2010	13:26	40 23.6997940	73 50.5634940	South
000_1337.RAW	10/12/2010	13:37	40 22.7008735	73 50.5626338	North
000_1346.RAW	10/12/2010	13:46	40 23.5885245	73 50.5574423	South
000A1356.RAW	10/12/2010	13:56	40 22.7040645	73 50.5817395	North
000_1402.RAW	10/12/2010	14:02	40 23.2587514	73 50.5735566	North
000_1407.RAW	10/12/2010	14:07	40 23.2214734	73 50.6026657	South
000_1414.RAW	10/12/2010	14:14	40 22.8149358	73 50.5812701	North
000A1417.RAW	10/12/2010	14:17	40 23.0395309	73 50.5518213	South
000_1420.RAW	10/12/2010	14:20	40 22.8082239	73 50.6683617	East (Check Line)
000_1425.RAW	10/12/2010	14:25	40 22.9372565	73 50.0295563	North
000A1425.RAW	10/12/2010	14:25	40 22.9797356	73 50.0176265	North
000_1426.RAW	10/12/2010	14:26	40 22.9905096	73 49.9754268	South
000A1426.RAW	10/12/2010	14:26	40 22.9489494	73 49.9646433	South
000_1442.RAW	10/12/2010	14:42	40 22.7220001	73 48.8134944	South
000_1501.RAW	10/12/2010	15:01	40 21.1684434	73 48.8712799	North

000_1519.RAW	10/12/2010	15:19	40 22.7292086	73 48.9068026	South
000_1541.RAW	10/12/2010	15:41	40 21.1641761	73 49.0026637	North
000_1602.RAW	10/12/2010	16:02	40 22.7291234	73 49.0292060	South
000_1622.RAW	10/12/2010	16:22	40 21.1640195	73 49.1473464	North
000_1652.RAW	10/12/2010	16:52	40 22.7264483	73 49.1452430	South
000_1709.RAW	10/12/2010	17:09	40 21.1624265	73 49.2926950	North
000_1730.RAW	10/12/2010	17:30	40 22.7272697	73 49.3028149	South
000_1746.RAW	10/12/2010	17:46	40 21.1626388	73 49.4238236	North
000_1809.RAW	10/12/2010	18:09	40 22.6661594	73 49.4398506	East (Check Line)
000_1820.RAW	10/12/2010	18:20	40 22.7282280	73 49.4285647	South
000_1841.RAW	10/12/2010	18:41	40 21.1693332	73 49.5648502	North
000_1900.RAW	10/12/2010	19:00	40 22.7372075	73 49.5628758	South
000_1916.RAW	10/12/2010	19:16	40 21.1637961	73 49.6941427	North
000_1936.RAW	10/12/2010	19:36	40 22.7309241	73 49.7028236	South
000_1952.RAW	10/12/2010	19:52	40 21.1590106	73 49.8169771	North
000_2011.RAW	10/12/2010	20:11	40 22.7345358	73 49.8267606	South
000B2027.RAW	10/12/2010	20:27	40 21.1623926	73 49.9403458	North
000_2049.RAW	10/12/2010	20:49	40 22.6666530	73 49.9334551	East (Check Line)
000_1220.RAW	10/18/2010	12:20	40 22.7202179	73 49.9243749	South
000_1236.RAW	10/18/2010	12:36	40 21.1685424	73 50.0467592	North
000_1253.RAW	10/18/2010	12:53	40 22.7301948	73 50.0313279	South
000_1310.RAW	10/18/2010	13:10	40 21.1681784	73 50.1715335	North
000_1328.RAW	10/18/2010	13:28	40 22.7279960	73 50.1367642	South
000A1346.RAW	10/18/2010	13:46	40 21.1688660	73 50.2879437	North
000_1409.RAW	10/18/2010	14:09	40 22.7273028	73 50.2137444	South
000_1429.RAW	10/18/2010	14:29	40 21.1680112	73 50.3993581	North
000_1450.RAW	10/18/2010	14:50	40 22.7332623	73 50.3141597	South
000_1510.RAW	10/18/2010	15:10	40 21.1694559	73 50.5017829	North
000_1531.RAW	10/18/2010	15:31	40 22.6806704	73 50.4064797	East (Check Line)
000A1539.RAW	10/18/2010	15:39	40 22.7146238	73 50.4121214	South
000_1555.RAW	10/18/2010	15:55	40 21.1658766	73 50.6140897	North
000_1617.RAW	10/18/2010	16:17	40 22.7231965	73 50.5020242	South
000_1637.RAW	10/18/2010	16:37	40 21.1670211	73 50.7280873	North
000A1701.RAW	10/18/2010	17:01	40 22.7267068	73 50.5868055	South
000B1718.RAW	10/18/2010	17:18	40 21.1678103	73 50.8440858	North
000_1747.RAW	10/18/2010	17:47	40 21.8736293	73 50.8272035	South
000_1755.RAW	10/18/2010	17:55	40 21.1634620	73 50.9476153	North
000_1815.RAW	10/18/2010	18:15	40 22.7283497	73 50.7489745	South
000_1836.RAW	10/18/2010	18:36	40 21.1708872	73 51.0556742	North
000_1855.RAW	10/18/2010	18:55	40 22.6940792	73 50.8391737	East (Check Line)
000_1859.RAW	10/18/2010	18:59	40 22.7037083	73 50.3789720	West
000_1904.RAW	10/18/2010	19:04	40 22.7248788	73 50.8258205	South
000_1924.RAW	10/18/2010	19:24	40 21.1698580	73 51.1689156	North
000_1944.RAW	10/18/2010	19:44	40 22.7254367	73 50.9114983	South
000_2004.RAW	10/18/2010	20:04	40 21.1746905	73 51.2726143	North
000_2025.RAW	10/18/2010	20:25	40 22.6883874	73 50.9585190	East (Check Line)
000_1228.RAW	10/19/2010	12:28	40 22.7250952	73 51.4440834	South
000_1244.RAW	10/19/2010	12:44	40 21.4857778	73 51.4488064	South

000_1250.RAW	10/19/2010	12:50	40 21.1751036	73 51.3930422	North
000_1307.RAW	10/19/2010	13:07	40 22.7273655	73 51.3437374	South
000_1325.RAW	10/19/2010	13:25	40 21.1755275	73 51.3147592	North
000_1342.RAW	10/19/2010	13:42	40 22.7311028	73 51.2560513	South
000_1400.RAW	10/19/2010	14:00	40 21.9349002	73 51.2006489	North
000A1409.RAW	10/19/2010	14:09	40 22.7341034	73 51.1699810	South
000_1421.RAW	10/19/2010	14:21	40 22.1091046	73 51.1248454	North
000_1428.RAW	10/19/2010	14:28	40 22.7279330	73 51.0856875	South
000_1432.RAW	10/19/2010	14:32	40 22.3743463	73 51.0641274	South
000_1435.RAW	10/19/2010	14:35	40 22.5235021	73 51.0540656	North
000_1438.RAW	10/19/2010	14:38	40 22.7317123	73 51.0181423	South
000_1440.RAW	10/19/2010	14:40	40 22.6042192	73 50.9844219	North
000_1441.RAW	10/19/2010	14:41	40 22.7271976	73 50.9686812	South
000_1443.RAW	10/19/2010	14:43	40 22.6503219	73 50.9496521	North
000_1444.RAW	10/19/2010	14:44	40 22.7100256	73 50.9412370	West (Check Line)
000_1456.RAW	10/19/2010	14:56	40 22.7264123	73 51.4380076	South
000_1512.RAW	10/19/2010	15:12	40 21.1745019	73 51.4863751	North
000_1528.RAW	10/19/2010	15:28	40 22.7317103	73 51.5214516	South
000_1544.RAW	10/19/2010	15:44	40 21.1738204	73 51.5961588	North
000_1600.RAW	10/19/2010	16:00	40 22.7358194	73 51.6229533	South
000_1621.RAW	10/19/2010	16:21	40 21.1714071	73 51.6881944	North
000_1638.RAW	10/19/2010	16:38	40 22.7245330	73 51.7234507	South
000_1655.RAW	10/19/2010	16:55	40 21.1720747	73 51.8029412	North
000_1711.RAW	10/19/2010	17:11	40 22.7340421	73 51.8177453	South
000A1728.RAW	10/19/2010	17:28	40 21.1679615	73 51.9091102	North
000A1744.RAW	10/19/2010	17:44	40 22.6793465	73 51.9016460	East (Check Line)
000_1754.RAW	10/19/2010	17:54	40 22.7281978	73 51.8975957	South
000_1810.RAW	10/19/2010	18:10	40 21.1684365	73 52.0140567	North
000_1828.RAW	10/19/2010	18:28	40 22.7245984	73 51.9938598	South
000_1847.RAW	10/19/2010	18:47	40 21.1638963	73 52.1263251	North
000_1903.RAW	10/19/2010	19:03	40 22.7360318	73 52.1052212	South
000_1919.RAW	10/19/2010	19:19	40 21.1615965	73 52.1750781	North
000A1936.RAW	10/19/2010	19:36	40 22.7342588	73 52.2142260	South
000_1953.RAW	10/19/2010	19:53	40 21.1642133	73 52.2702147	North
000_2009.RAW	10/19/2010	20:09	40 22.7301820	73 52.3026912	South
000_2030.RAW	10/19/2010	20:30	40 21.1587744	73 52.3360244	North
000_2047.RAW	10/19/2010	20:47	40 22.6875814	73 52.3970437	East (Check Line)
000_2055.RAW	10/19/2010	20:55	40 22.7276766	73 52.4069279	South
000_2111.RAW	10/19/2010	21:11	40 21.1751806	73 52.4319034	North
000_2127.RAW	10/19/2010	21:27	40 22.6898359	73 52.4910962	East (Check Line)
000_1259.RAW	10/20/2010	12:59	40 22.7194291	73 54.0816900	South
000_1314.RAW	10/20/2010	13:14	40 21.1762504	73 54.0218198	North
000_1329.RAW	10/20/2010	13:29	40 22.7288582	73 54.0034703	South
000_1344.RAW	10/20/2010	13:44	40 21.1765371	73 53.9838899	North
000A1400.RAW	10/20/2010	14:00	40 22.7294707	73 53.9169533	South
000A1414.RAW	10/20/2010	14:14	40 21.1755640	73 53.8962515	North
000_1430.RAW	10/20/2010	14:30	40 22.7251950	73 53.8241998	South
000B1451.RAW	10/20/2010	14:51	40 21.1718256	73 53.8309032	North

000_1508.RAW	10/20/2010	15:08	40 22.7321307	73 53.7457105	South
000_1524.RAW	10/20/2010	15:24	40 21.1763420	73 53.7568145	North
000A1541.RAW	10/20/2010	15:41	40 22.6824587	73 53.6429712	West (Check Line)
000_1548.RAW	10/20/2010	15:48	40 22.7317193	73 53.6402690	South
000_1604.RAW	10/20/2010	16:04	40 21.1689039	73 53.6773661	North
000_1620.RAW	10/20/2010	16:20	40 22.7363485	73 53.5354549	South
000_1636.RAW	10/20/2010	16:36	40 21.1819356	73 53.5824721	North
000_1705.RAW	10/20/2010	17:05	40 22.7382775	73 53.4518906	South
000_1803.RAW	10/20/2010	18:03	40 21.1616026	73 53.5360444	North
000_1819.RAW	10/20/2010	18:19	40 22.7371187	73 53.3577948	South
000A1839.RAW	10/20/2010	18:39	40 21.1750073	73 53.4287875	North
000_1901.RAW	10/20/2010	19:01	40 22.7443999	73 53.2442482	South
000A1919.RAW	10/20/2010	19:19	40 21.1710380	73 53.3525020	North
000_1934.RAW	10/20/2010	19:34	40 22.7216014	73 53.1053363	West (Check Line)
000_1943.RAW	10/20/2010	19:43	40 22.7316526	73 53.1555122	South
000_2001.RAW	10/20/2010	20:01	40 21.1732989	73 53.2599192	North
000_2015.RAW	10/20/2010	20:15	40 22.7319196	73 53.0243229	South
000A2047.RAW	10/20/2010	20:47	40 21.1732790	73 53.1738483	North
000_2103.RAW	10/20/2010	21:03	40 22.7345496	73 52.9129140	South
000_2124.RAW	10/20/2010	21:24	40 21.1773706	73 53.0733121	North
000_2140.RAW	10/20/2010	21:40	40 22.6766954	73 52.8169123	West (Check Line)
000A1315.RAW	11/2/2010	13:15	40 22.7238130	73 52.7921267	South
000_1331.RAW	11/2/2010	13:31	40 21.1736822	73 52.9852232	North
000B1356.RAW	11/2/2010	13:56	40 22.7255549	73 52.7401729	South
000_1415.RAW	11/2/2010	14:15	40 21.1724732	73 52.9011609	North
000_1437.RAW	11/2/2010	14:37	40 22.7298540	73 52.6591124	South
000A1456.RAW	11/2/2010	14:56	40 21.1671401	73 52.8382675	North
000A1526.RAW	11/2/2010	15:26	40 22.7262828	73 52.5789378	South
000A1543.RAW	11/2/2010	15:43	40 21.1684400	73 52.5213157	North
000A1550.RAW	11/2/2010	15:50	40 21.6400641	73 52.6123127	South
000A1556.RAW	11/2/2010	15:56	40 21.1650744	73 52.6007404	North
000A1602.RAW	11/2/2010	16:02	40 21.4467893	73 52.6507593	South
000A1606.RAW	11/2/2010	16:06	40 21.1658262	73 52.6881837	North
000_1609.RAW	11/2/2010	16:09	40 21.3606585	73 52.7115236	South
000_1612.RAW	11/2/2010	16:12	40 21.1666502	73 52.7765211	North
000A1614.RAW	11/2/2010	16:14	40 21.2956959	73 52.7942554	South
000_1619.RAW	11/2/2010	16:19	40 21.2115627	73 53.0784941	East (Check Line)
000A1638.RAW	11/2/2010	16:38	40 22.5572144	73 52.4955639	North
000A1829.RAW	11/2/2010	18:29	40 24.2482308	73 51.4435764	South
000_1844.RAW	11/2/2010	18:44	40 22.6995802	73 51.4712788	North
000A1903.RAW	11/2/2010	19:03	40 24.2501352	73 51.5029588	South
000A1916.RAW	11/2/2010	19:16	40 22.6989074	73 51.5580118	North
000_1935.RAW	11/2/2010	19:35	40 24.2581506	73 51.5803887	South
000_1949.RAW	11/2/2010	19:49	40 22.6898172	73 51.6640423	North
000_2007.RAW	11/2/2010	20:07	40 24.2497890	73 51.6668320	South
000_2026.RAW	11/2/2010	20:26	40 22.6898951	73 51.7479535	North
000A2045.RAW	11/2/2010	20:45	40 24.2627548	73 51.7481152	South
000_2059.RAW	11/2/2010	20:59	40 22.7060803	73 51.8722761	North

000_2117.RAW	11/2/2010	21:17	40 24.2054009	73 51.8051547	East (Check Line)
000A2123.RAW	11/2/2010	21:23	40 24.2521678	73 51.8051539	South
000_2138.RAW	11/2/2010	21:38	40 22.7000846	73 51.9693860	North
000_2155.RAW	11/2/2010	21:55	40 24.2612010	73 51.9074296	South
000_2209.RAW	11/2/2010	22:09	40 22.7108395	73 52.0703628	North
000_2225.RAW	11/2/2010	22:25	40 24.2586131	73 51.9812440	South
000_2243.RAW	11/2/2010	22:43	40 22.7485257	73 52.1492842	East (Check Line)
000_1257.RAW	11/3/2010	12:57	40 24.2540286	73 52.0236058	South
000_1311.RAW	11/3/2010	13:11	40 22.7024431	73 52.1938071	North
000A1329.RAW	11/3/2010	13:29	40 24.2581891	73 52.0765245	South
000A1344.RAW	11/3/2010	13:44	40 22.6794782	73 52.2800838	North
000_1401.RAW	11/3/2010	14:01	40 24.2744700	73 52.1466351	South
000B1414.RAW	11/3/2010	14:14	40 22.8363577	73 52.3258048	South
000B1417.RAW	11/3/2010	14:17	40 22.6931479	73 52.3988759	North
000A1434.RAW	11/3/2010	14:34	40 24.2627323	73 52.2164403	South
000_1454.RAW	11/3/2010	14:54	40 22.6964418	73 52.4982411	North
000A1510.RAW	11/3/2010	15:10	40 24.2579778	73 52.3186141	South
000_1525.RAW	11/3/2010	15:25	40 22.6989861	73 52.5948734	North
000_1542.RAW	11/3/2010	15:42	40 24.1993511	73 52.3578051	East (Check Line)
000_1549.RAW	11/3/2010	15:49	40 24.2545285	73 52.3456452	South
000_1605.RAW	11/3/2010	16:05	40 22.7003590	73 52.6880139	North
000B1623.RAW	11/3/2010	16:23	40 24.2627479	73 52.4645844	South
000A1640.RAW	11/3/2010	16:40	40 22.7003469	73 52.7896105	North
000_1702.RAW	11/3/2010	17:02	40 24.2559996	73 52.5444506	South
000_1717.RAW	11/3/2010	17:17	40 22.7011839	73 52.9000847	North
000_1734.RAW	11/3/2010	17:34	40 24.2519298	73 52.6566109	South
000_1750.RAW	11/3/2010	17:50	40 22.6945746	73 53.0016449	North
000_1806.RAW	11/3/2010	18:06	40 24.2639203	73 52.7588941	South
000_1821.RAW	11/3/2010	18:21	40 22.7001133	73 53.1140020	North
000_1838.RAW	11/3/2010	18:38	40 24.2097528	73 52.8377935	East (Check Line)
000_1845.RAW	11/3/2010	18:45	40 23.9971466	73 52.6042776	South
000_1848.RAW	11/3/2010	18:48	40 23.8048772	73 52.5969670	North
000_1857.RAW	11/3/2010	18:57	40 24.2517104	73 52.8405637	South
000_1914.RAW	11/3/2010	19:14	40 22.6996422	73 53.2200780	North
000B1931.RAW	11/3/2010	19:31	40 24.2679840	73 52.9532985	South
000_1948.RAW	11/3/2010	19:48	40 22.7030694	73 53.3258185	North
000A2004.RAW	11/3/2010	20:04	40 24.2592007	73 53.0590177	South
000_2021.RAW	11/3/2010	20:21	40 22.6985731	73 53.4348978	North
000_2039.RAW	11/3/2010	20:39	40 24.2812152	73 53.1457754	South
000A2103.RAW	11/3/2010	21:03	40 22.7056867	73 53.5317792	North
000_2119.RAW	11/3/2010	21:19	40 24.2626162	73 53.2673463	South
000_2137.RAW	11/3/2010	21:37	40 22.7002694	73 53.6302910	North
000_2154.RAW	11/3/2010	21:54	40 24.2180554	73 53.3526254	East (Check Line)
000B1614.RAW	11/15/2010	16:14	40 24.2538444	73 54.0738304	South
000_1633.RAW	11/15/2010	16:33	40 22.6965403	73 54.0400252	North
000_1649.RAW	11/15/2010	16:49	40 24.2530447	73 53.9746287	South
000A1703.RAW	11/15/2010	17:03	40 22.7009863	73 53.9419660	North
000_1719.RAW	11/15/2010	17:19	40 24.2623505	73 53.8862994	South

000A1734.RAW	11/15/2010	17:34	40 22.6975783	73 53.8443287	North
000A1750.RAW	11/15/2010	17:50	40 24.2558121	73 53.7751417	South
000A1808.RAW	11/15/2010	18:08	40 22.6890863	73 53.7706105	North
000_1825.RAW	11/15/2010	18:25	40 24.2553863	73 53.6776736	South
000B1839.RAW	11/15/2010	18:39	40 22.7017046	73 53.6778018	North
000A1857.RAW	11/15/2010	18:57	40 24.2061695	73 53.5809299	West (Check Line)
000A1904.RAW	11/15/2010	19:04	40 24.2517126	73 53.6039842	South
000B1919.RAW	11/15/2010	19:19	40 23.0308562	73 53.5581776	North
000_1932.RAW	11/15/2010	19:32	40 24.2566338	73 53.4904325	South
000_1939.RAW	11/15/2010	19:39	40 23.3284992	73 53.5021579	South
000A1944.RAW	11/15/2010	19:44	40 23.5460552	73 53.4620644	North
000A1952.RAW	11/15/2010	19:52	40 24.2527183	73 53.4045410	South
000_1959.RAW	11/15/2010	19:59	40 24.0350240	73 53.3350309	North
000_2002.RAW	11/15/2010	20:02	40 24.2040734	73 53.3307898	West (Check Line)
000_2010.RAW	11/15/2010	20:10	40 24.2296043	73 54.0758011	North
000A2026.RAW	11/15/2010	20:26	40 25.7895732	73 54.0116935	South
000_2040.RAW	11/15/2010	20:40	40 24.2291520	73 53.9635539	North
000_2056.RAW	11/15/2010	20:56	40 25.7863102	73 53.8965785	South
000A2111.RAW	11/15/2010	21:11	40 24.2211686	73 53.8612310	North
000A2127.RAW	11/15/2010	21:27	40 25.7862345	73 53.7829674	South
000_2145.RAW	11/15/2010	21:45	40 24.2195793	73 53.7668808	North
000_2200.RAW	11/15/2010	22:00	40 25.7840621	73 53.6987641	South
000_2215.RAW	11/15/2010	22:15	40 24.2265288	73 53.6574852	North
000_2230.RAW	11/15/2010	22:30	40 25.7797456	73 53.5976903	South
000_2245.RAW	11/15/2010	22:45	40 24.2703353	73 53.5587947	West (Check Line)
000_2253.RAW	11/15/2010	22:53	40 24.2277557	73 53.5480534	North
000_2310.RAW	11/15/2010	23:10	40 25.7822890	73 53.4846003	South
000_2324.RAW	11/15/2010	23:24	40 24.2239546	73 53.4329224	North
000_2344.RAW	11/15/2010	23:44	40 25.7882784	73 53.3870922	South
000_0000.RAW	11/16/2010	00:00	40 24.2254090	73 53.3336606	North
000_0017.RAW	11/16/2010	00:17	40 25.7764019	73 53.2837862	South
000_0033.RAW	11/16/2010	00:33	40 24.2256257	73 53.2271861	North
000_0050.RAW	11/16/2010	00:50	40 25.7876832	73 53.1979543	South
000_0105.RAW	11/16/2010	01:05	40 24.2161851	73 53.1131105	North
000_0121.RAW	11/16/2010	01:21	40 25.7851019	73 53.1096129	South
000_0135.RAW	11/16/2010	01:35	40 24.2270667	73 53.0135285	North
000_0157.RAW	11/16/2010	01:57	40 25.7190594	73 53.0124026	West (Check Line)
000_0205.RAW	11/16/2010	02:05	40 25.7880058	73 53.0254763	South
000_0220.RAW	11/16/2010	02:20	40 24.2245371	73 52.9116635	North
000_0237.RAW	11/16/2010	02:37	40 25.7841410	73 52.9192741	South
000_0251.RAW	11/16/2010	02:51	40 24.2193830	73 52.8056476	North
000_0309.RAW	11/16/2010	03:09	40 25.7736463	73 52.8127549	South
000_0322.RAW	11/16/2010	03:22	40 24.2251497	73 52.7076757	North
000_0339.RAW	11/16/2010	03:39	40 25.7766647	73 52.7210996	South
000_0356.RAW	11/16/2010	03:56	40 24.2278741	73 52.5865605	North
000_0415.RAW	11/16/2010	04:15	40 25.7820535	73 52.6418598	South
000_0436.RAW	11/16/2010	04:36	40 24.2221109	73 52.4977293	North
000_0453.RAW	11/16/2010	04:53	40 25.7495079	73 52.5618114	West (Check Line)

000_0501.RAW	11/16/2010	05:01	40 25.7814703	73 52.5666320	South
000_0515.RAW	11/16/2010	05:15	40 24.2022283	73 52.4124929	North
000_0533.RAW	11/16/2010	05:33	40 25.7948034	73 52.4698209	South
000_0547.RAW	11/16/2010	05:47	40 24.2086908	73 52.3227212	North
000_0559.RAW	11/16/2010	05:59	40 25.3392458	73 52.4162729	North
000_0609.RAW	11/16/2010	06:09	40 25.7929965	73 52.4442602	South
000_0623.RAW	11/16/2010	06:23	40 24.2184815	73 52.1967956	North
000_0640.RAW	11/16/2010	06:40	40 25.7815965	73 52.2851493	South
000_0654.RAW	11/16/2010	06:54	40 24.2314502	73 52.1179148	North
000A0711.RAW	11/16/2010	07:11	40 25.7802952	73 52.1928592	South
000_0726.RAW	11/16/2010	07:26	40 24.2179353	73 52.0297056	North
000_0742.RAW	11/16/2010	07:42	40 25.7628249	73 52.0811029	West (Check Line)
000_0753.RAW	11/16/2010	07:53	40 25.7809133	73 52.0808269	South
000_0806.RAW	11/16/2010	08:06	40 24.9640736	73 52.0712202	South
000_0813.RAW	11/16/2010	08:13	40 24.2261176	73 51.9471970	North
000_0828.RAW	11/16/2010	08:28	40 25.7845713	73 52.0151662	South
000_0843.RAW	11/16/2010	08:43	40 24.2191844	73 51.8795899	North
000_0858.RAW	11/16/2010	08:58	40 25.7896521	73 51.9195211	South
000_0913.RAW	11/16/2010	09:13	40 24.2225746	73 51.7906633	North
000_0928.RAW	11/16/2010	09:28	40 25.7811563	73 51.8259186	South
000_0942.RAW	11/16/2010	09:42	40 24.2291329	73 51.7248231	North
000_1003.RAW	11/16/2010	10:03	40 25.7850922	73 51.7470394	South
000_1019.RAW	11/16/2010	10:19	40 24.2272140	73 51.6488377	North
000_1036.RAW	11/16/2010	10:36	40 25.7425099	73 51.6669638	West (Check Line)
000_1043.RAW	11/16/2010	10:43	40 25.7833387	73 51.6813878	South
000_1059.RAW	11/16/2010	10:59	40 24.2324712	73 51.5775957	North
000_1115.RAW	11/16/2010	11:15	40 25.7748326	73 51.5779101	South
000_1131.RAW	11/16/2010	11:31	40 24.2218136	73 51.4957449	North
000_1150.RAW	11/16/2010	11:50	40 25.7838701	73 51.5227502	South
000_1207.RAW	11/16/2010	12:07	40 24.2292317	73 51.4369038	North
000_1222.RAW	11/16/2010	12:22	40 25.7392895	73 51.4266205	West (Check Line)
000_1227.RAW	11/16/2010	12:27	40 25.7794704	73 51.4464091	South
000A1236.RAW	11/16/2010	12:36	40 24.9164598	73 51.4194805	South
000_1237.RAW	11/16/2010	12:37	40 24.8685580	73 51.4526420	North
000_1240.RAW	11/16/2010	12:40	40 25.1238136	73 51.4385444	North

Figure 3.2-1
SVP 091410_1448 taken during the Fall 2010 multibeam survey at the HARS.

1521.59	0.13
1521.60	0.74
1521.57	1.42
1521.54	2.11
1521.53	2.83
1521.51	3.51
1521.49	4.19
1521.49	4.89
1521.49	5.61
1521.49	6.30
1521.50	7.02
1521.50	7.73
1521.51	8.45
1521.51	9.18
1521.52	9.88
1521.53	10.60
1521.54	11.31
1521.55	12.02
1521.55	12.74
1521.56	13.45
1521.55	14.17
1521.55	14.88
1521.50	15.59
1521.37	16.30
1521.26	17.02
1521.01	17.74
1520.11	18.45
1519.32	19.16
1518.77	19.87
1518.49	20.57
1518.15	21.27
1517.41	21.98
1516.35	22.70
1513.92	23.43
1509.48	24.13
1505.77	24.84
1503.60	25.54
1502.43	26.26
1501.93	26.96
1501.75	27.67
1501.68	28.37
1501.61	29.08
1501.54	29.73
1501.50	29.92

CTD PROFILE # 091410_1448

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/14/2010	14:48	1036229	95675	98	N40-25.747598	W73-48.797826

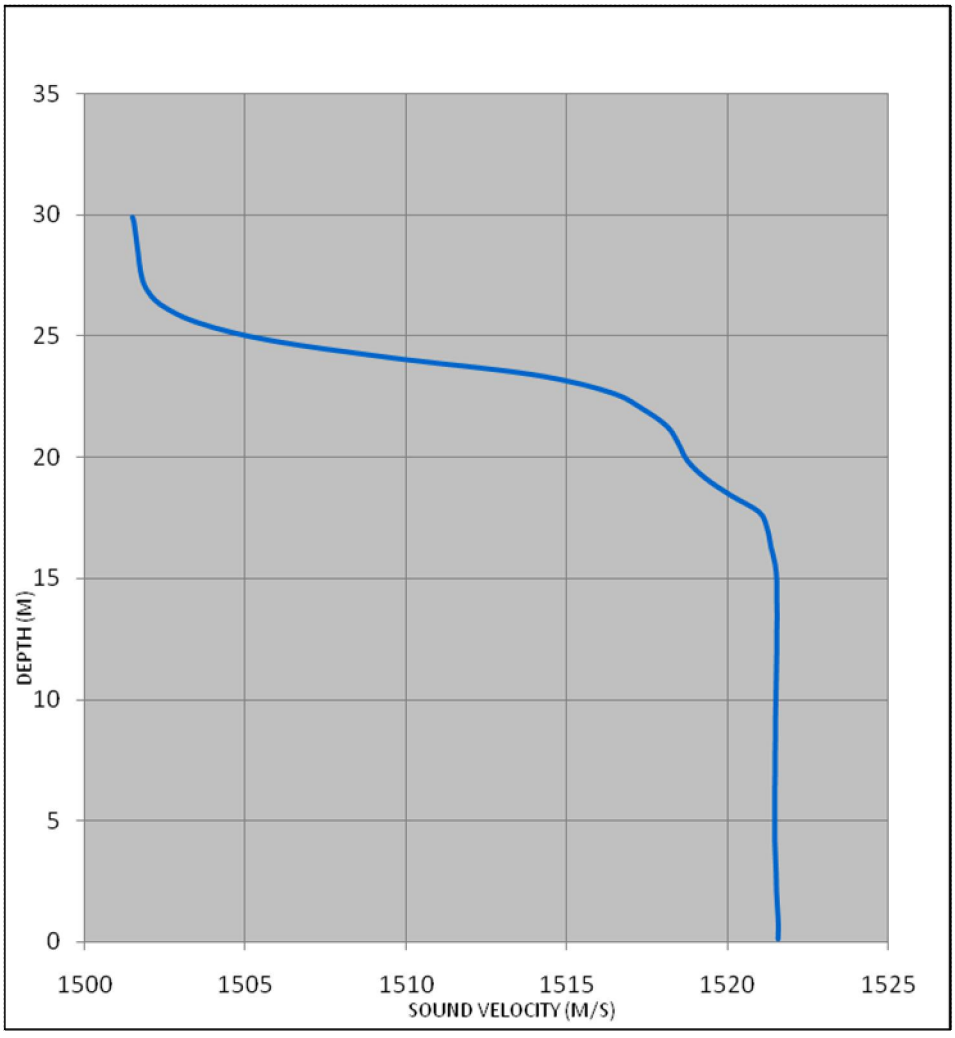


Figure 3.2-2
SVP 091410_1704 taken during the Fall 2010 multibeam survey at the HARS.

1522.52	0.64
1522.20	1.29
1521.85	1.98
1521.68	2.74
1521.61	3.52
1521.53	4.26
1521.48	4.96
1521.45	5.62
1521.45	6.26
1521.44	6.88
1521.43	7.49
1521.43	8.10
1521.43	8.73
1521.43	9.34
1521.44	9.97
1521.44	10.60
1521.44	11.25
1521.45	11.90
1521.44	12.56
1521.42	13.21
1521.38	13.86
1521.35	14.51
1521.31	15.17
1521.25	15.81
1521.15	16.48
1521.07	17.14
1520.99	17.81
1520.74	18.48
1520.15	19.15
1519.54	19.82
1519.05	20.50
1518.73	21.18
1518.40	21.86
1516.95	22.54
1514.45	23.22
1511.47	23.91
1507.95	24.61
1504.43	25.30
1502.31	26.00
1501.24	26.70
1500.76	27.40
1500.45	28.09
1500.17	28.80
1499.94	29.50
1499.72	30.20
1499.47	30.90
1499.14	31.60
1498.77	32.29
1498.48	32.98

CTD PROFILE # 091410_1704

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/14/2010	14:48	1034442	86464	108	40.40385470	73.81978535

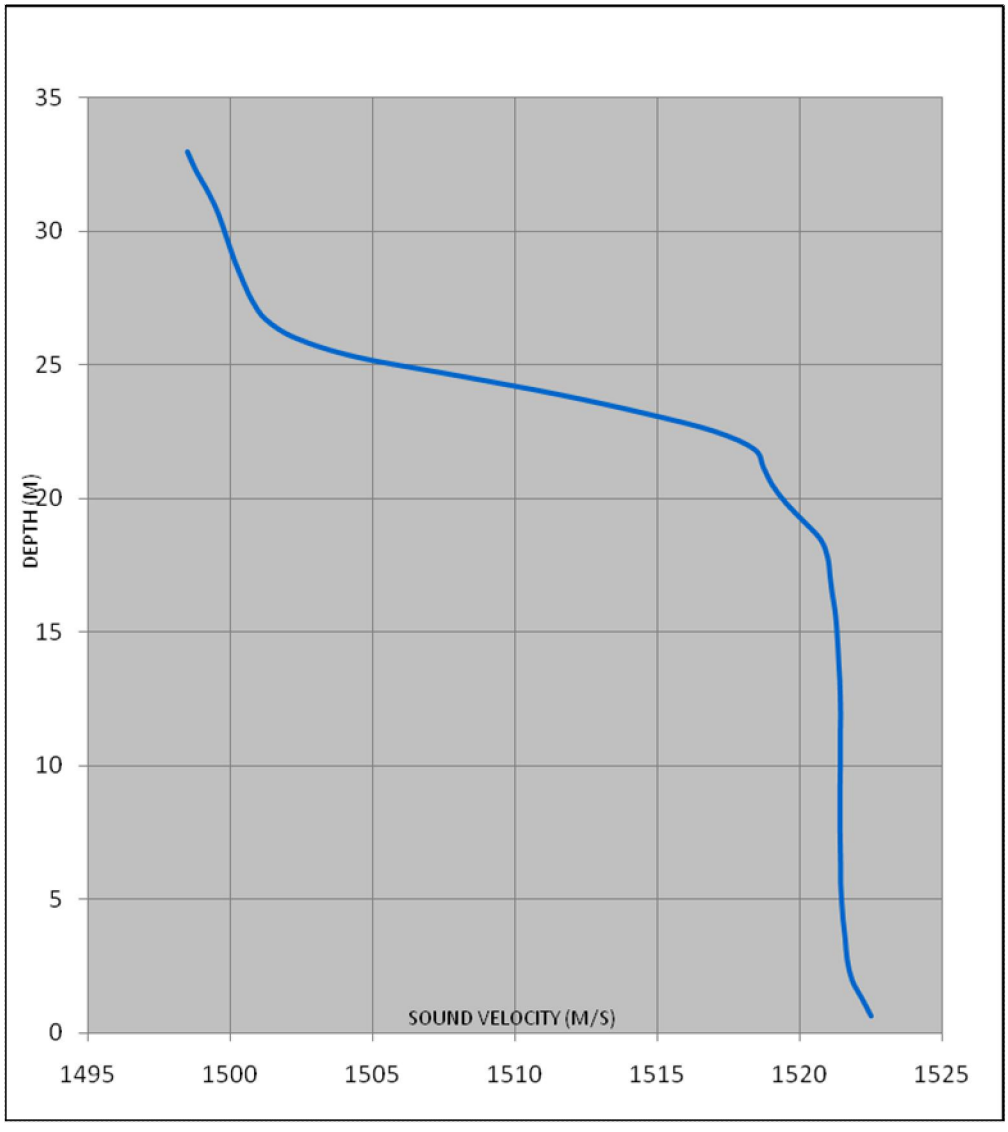


Figure 3.2-3

SVP 091410_1806 taken during the Fall 2010 multibeam survey at the HARS.

1522.33	0.46
1522.30	1.16
1522.27	1.86
1522.20	2.55
1522.07	3.24
1521.94	3.91
1521.88	4.58
1521.85	5.23
1521.81	5.90
1521.80	6.58
1521.80	7.27
1521.82	7.95
1521.80	8.63
1521.79	9.31
1521.78	10.00
1521.76	10.70
1521.74	11.38
1521.75	12.07
1521.76	12.75
1521.77	13.43
1521.77	14.12
1521.76	14.81
1521.77	15.50
1521.78	16.18
1521.79	16.87
1521.79	17.57
1521.80	18.27
1521.80	18.97
1521.78	19.68
1521.76	20.37
1521.71	21.07
1521.44	21.77
1520.57	22.48
1519.01	23.18
1517.36	23.89
1513.48	24.59
1507.10	25.29
1503.07	25.99
1501.53	26.69
1501.04	27.40
1500.69	28.11
1500.35	28.80
1500.15	29.49
1499.94	30.20
1499.70	30.88
1499.87	31.14

CTD PROFILE # 091410_1806

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/14/2010	18:06	1036359	95449	106	40.42850593	73.81283345

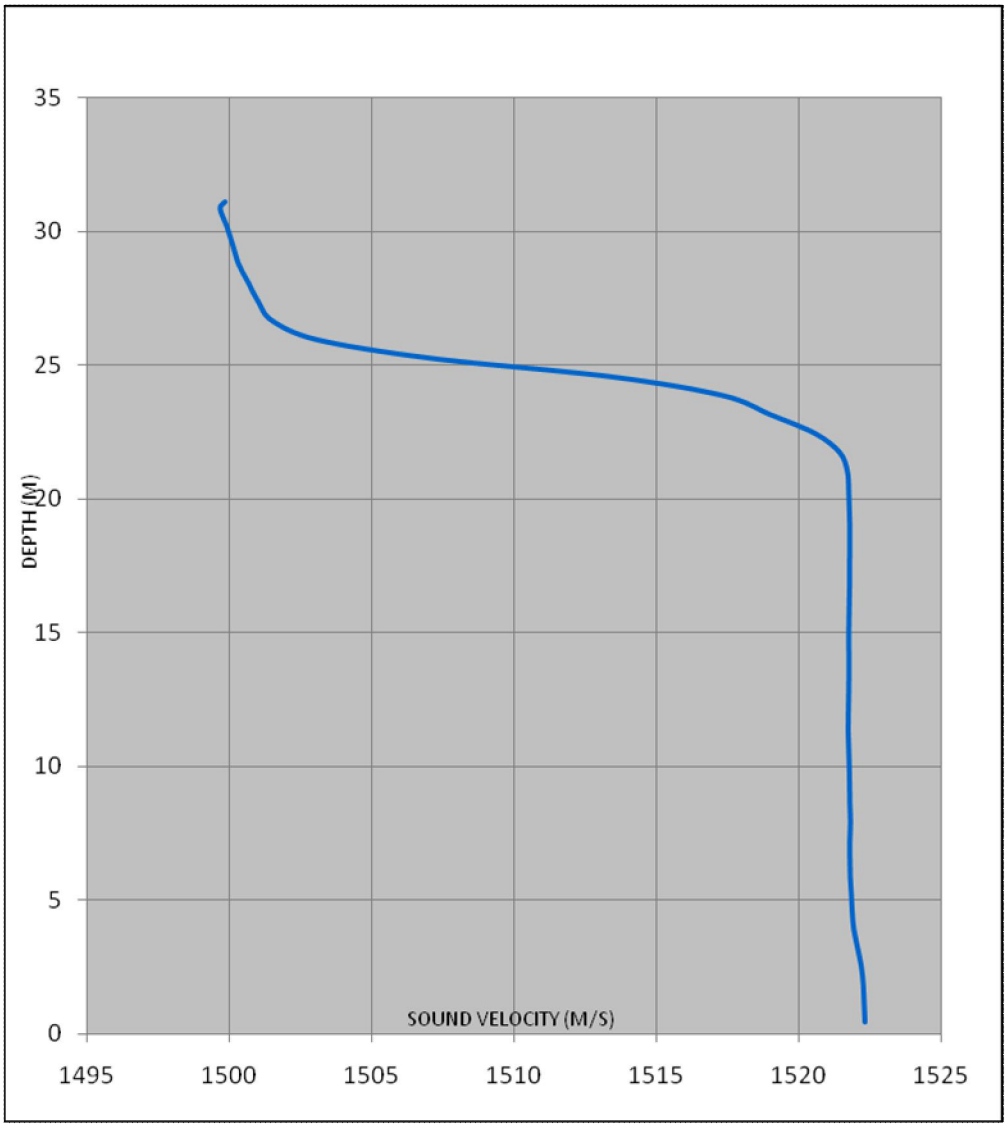


Figure 3.2-4
SVP 091510_1315 taken during the Fall 2010 multibeam survey at the HARS.

1520.71	0.50
1520.86	1.09
1520.92	1.72
1520.95	2.36
1520.97	3.00
1520.99	3.62
1521.00	4.23
1521.01	4.87
1521.02	5.49
1521.05	6.12
1521.07	6.76
1521.07	7.41
1521.10	8.05
1521.12	8.69
1521.13	9.32
1521.15	9.96
1521.16	10.60
1521.17	11.25
1521.18	11.90
1521.18	12.54
1521.19	13.19
1521.19	13.84
1521.20	14.50
1521.20	15.16
1521.20	15.82
1521.18	16.48
1521.05	17.13
1520.67	17.79
1520.17	18.45
1519.56	19.11
1518.38	19.77
1515.82	20.42
1512.26	21.07
1509.71	21.72
1508.32	22.37
1507.30	23.02
1506.12	23.65
1504.97	24.30
1504.10	24.95
1503.05	25.60
1501.73	26.26
1500.73	26.92
1500.29	27.59
1500.06	28.26
1500.01	28.69
1500.00	28.74
1500.02	28.76
1500.03	28.78
1500.00	28.81

CTD PROFILE # 091510_1315

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/15/2010	13:15	1033757	95828	95	40.42956110	73.82217659

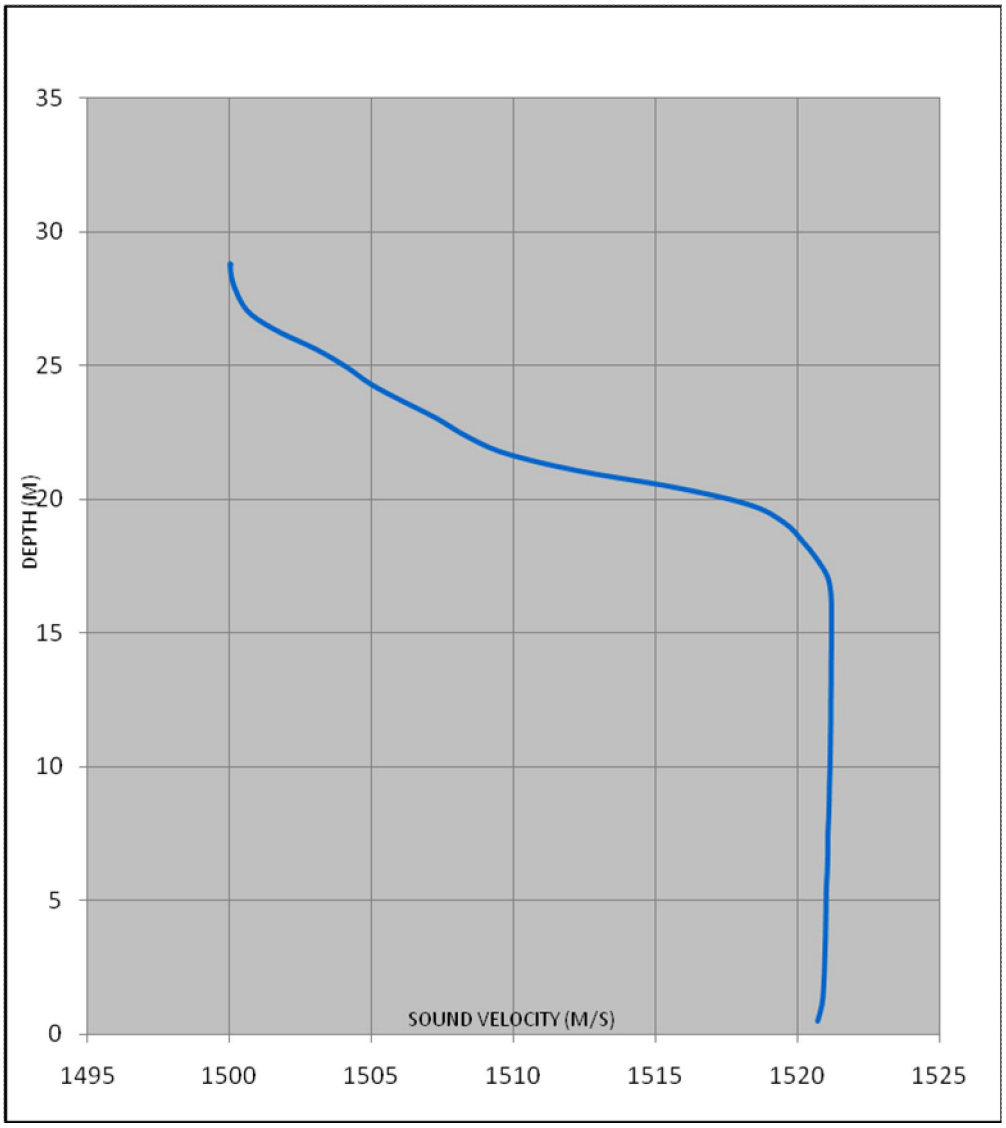


Figure 3.2-5

SVP 091510_1456 taken during the Fall 2010 multibeam survey at the HARS.

1520.66	0.68
1520.70	1.47
1520.72	2.28
1520.73	3.04
1520.74	3.75
1520.75	4.44
1520.77	5.11
1520.78	5.73
1520.79	6.34
1520.79	6.94
1520.80	7.55
1520.81	8.17
1520.81	8.78
1520.82	9.39
1520.83	9.99
1520.84	10.62
1520.84	11.26
1520.84	11.90
1520.79	12.51
1520.66	12.97
1520.39	13.55
1519.92	14.23
1519.23	14.92
1518.57	15.62
1517.97	16.31
1517.29	17.00
1516.75	17.70
1516.18	18.40
1515.31	19.11
1514.60	19.82
1514.17	20.52
1513.89	21.20
1513.32	21.88
1512.36	22.58
1511.13	23.28
1509.18	23.98
1507.70	24.69
1506.99	25.39
1506.66	26.09
1506.40	26.81
1505.32	27.54
1503.94	28.28
1502.87	29.00
1502.18	29.72
1501.63	30.43
1501.33	31.03
1501.50	31.14

CTD PROFILE # 091510_1456

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/15/2010	14:56	1032282	86412	102	40.40372390	73.82754119

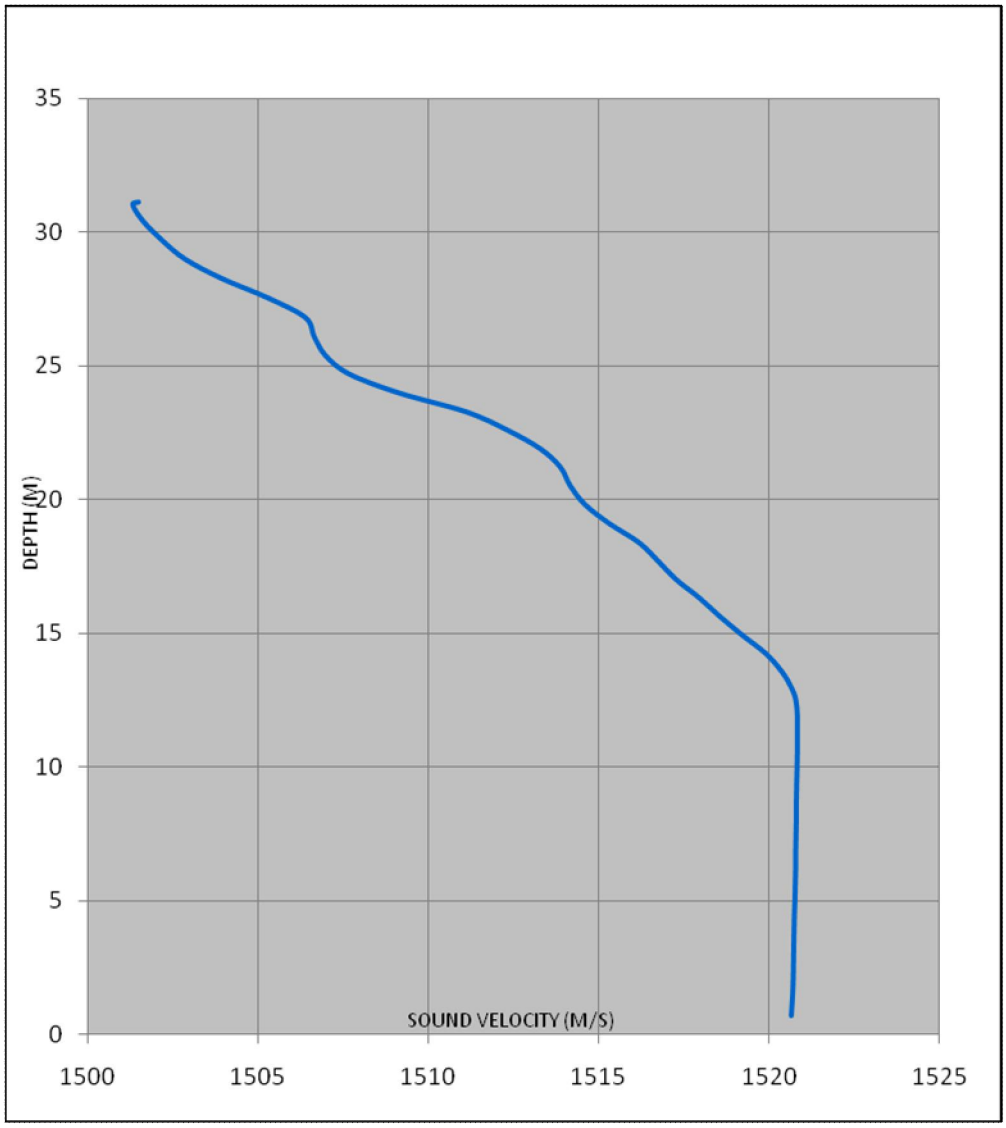


Figure 3.2-6
SVP 091510_1654 taken during the Fall 2010 multibeam survey at the HARS

1520.54	0.51
1520.58	1.27
1520.61	1.98
1520.63	2.64
1520.65	3.29
1520.67	3.95
1520.69	4.59
1520.68	5.20
1520.69	5.79
1520.70	6.37
1520.71	6.94
1520.71	7.51
1520.70	8.09
1520.71	8.67
1520.70	9.25
1520.70	9.83
1520.70	10.41
1520.69	11.01
1520.68	11.61
1520.67	12.21
1520.68	12.82
1520.68	13.43
1520.65	14.04
1520.62	14.66
1520.60	15.29
1520.57	15.92
1520.49	16.56
1520.11	17.21
1519.07	17.86
1518.03	18.50
1517.17	19.16
1515.93	19.80
1514.99	20.46
1514.31	21.12
1513.51	21.78
1511.88	22.46
1509.26	23.12
1507.13	23.79
1505.26	24.44
1503.75	25.11
1502.90	25.78
1502.48	26.46
1502.17	27.13
1501.91	27.81
1501.73	28.48
1501.64	29.15
1501.78	29.46
1502.14	29.50

CTD PROFILE # 091510_1654

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/15/2010	16:54	1030945	86254	98	40.40329734	73.83234276

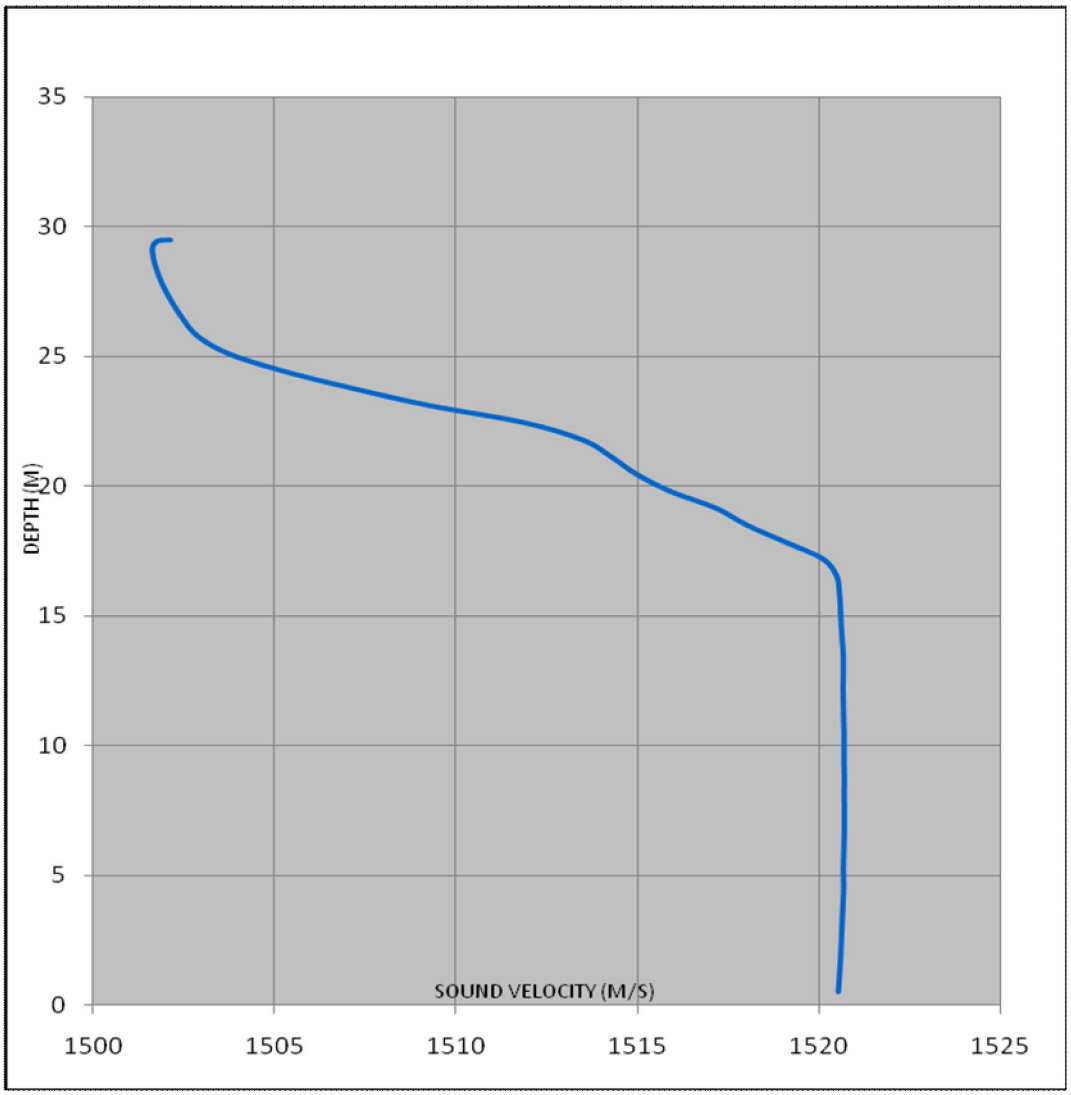


Figure 3.2-7
SVP 091510_1836 taken during the Fall 2010 multibeam survey at the HARS

1521.30	0.60
1521.32	1.26
1521.33	1.92
1521.35	2.62
1521.37	3.34
1521.38	4.07
1521.37	4.78
1521.36	5.46
1521.36	6.12
1521.37	6.79
1521.37	7.44
1521.38	8.11
1521.39	8.78
1521.40	9.45
1521.41	10.11
1521.42	10.76
1521.43	11.41
1521.43	12.07
1521.41	12.74
1521.35	13.41
1521.21	14.07
1521.07	14.73
1520.82	15.41
1520.31	16.09
1519.54	16.79
1518.47	17.49
1517.47	18.18
1516.76	18.88
1516.18	19.56
1515.19	20.25
1514.28	20.95
1513.13	21.63
1510.34	22.31
1507.27	23.01
1505.71	23.71
1504.86	24.41
1503.24	25.11
1501.12	25.81
1499.97	26.51
1499.57	27.20
1499.76	27.49

CTD PROFILE # 091510_1836

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/15/2010	18:36	1031361	95608	90	40.42897027	73.83078425

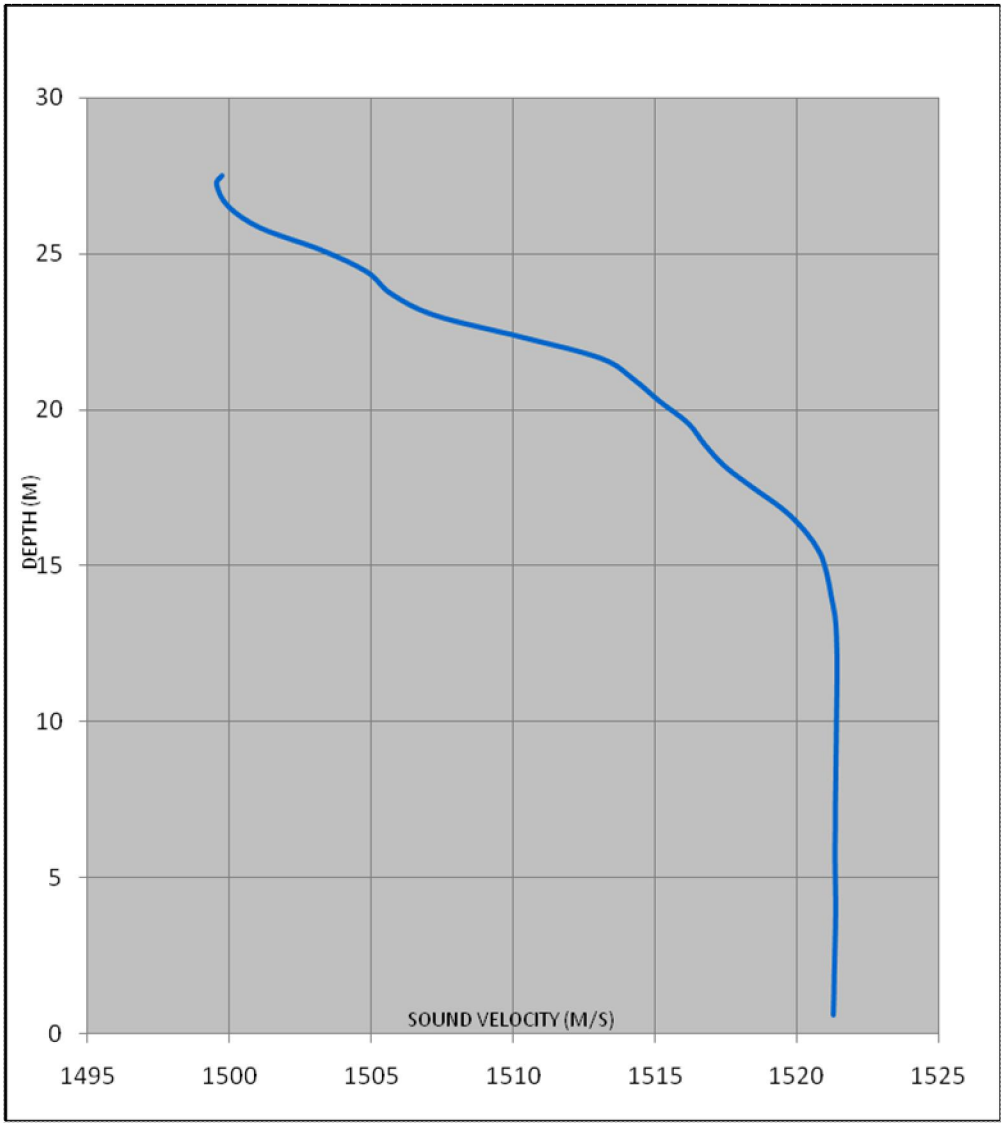


Figure 3.2-8
SVP 092310_1150 taken during the Fall 2010 multibeam survey at the HARS

1518.15	0.34
1518.12	1.12
1518.21	1.91
1518.40	2.70
1518.64	3.53
1518.89	4.34
1519.14	5.15
1519.32	5.93
1519.44	6.68
1519.48	7.42
1519.50	8.16
1519.49	8.91
1519.47	9.68
1519.47	10.45
1519.48	11.20
1519.45	11.93
1519.29	12.64
1519.03	13.30
1518.90	14.00
1518.95	14.72
1519.04	15.43
1519.11	16.12
1519.13	16.81
1519.06	17.49
1518.94	18.18
1518.68	18.87
1517.13	19.56
1510.91	20.26
1505.29	20.95
1502.88	21.65
1501.92	22.36
1501.41	23.08
1501.15	23.77
1501.01	24.42
1500.85	25.09
1500.71	25.79
1500.59	26.49
1500.53	27.19
1500.68	27.59

CTD PROFILE # 092310_1150

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/23/2010	11:50	1029516	86463	91	40.40387841	73.83747215

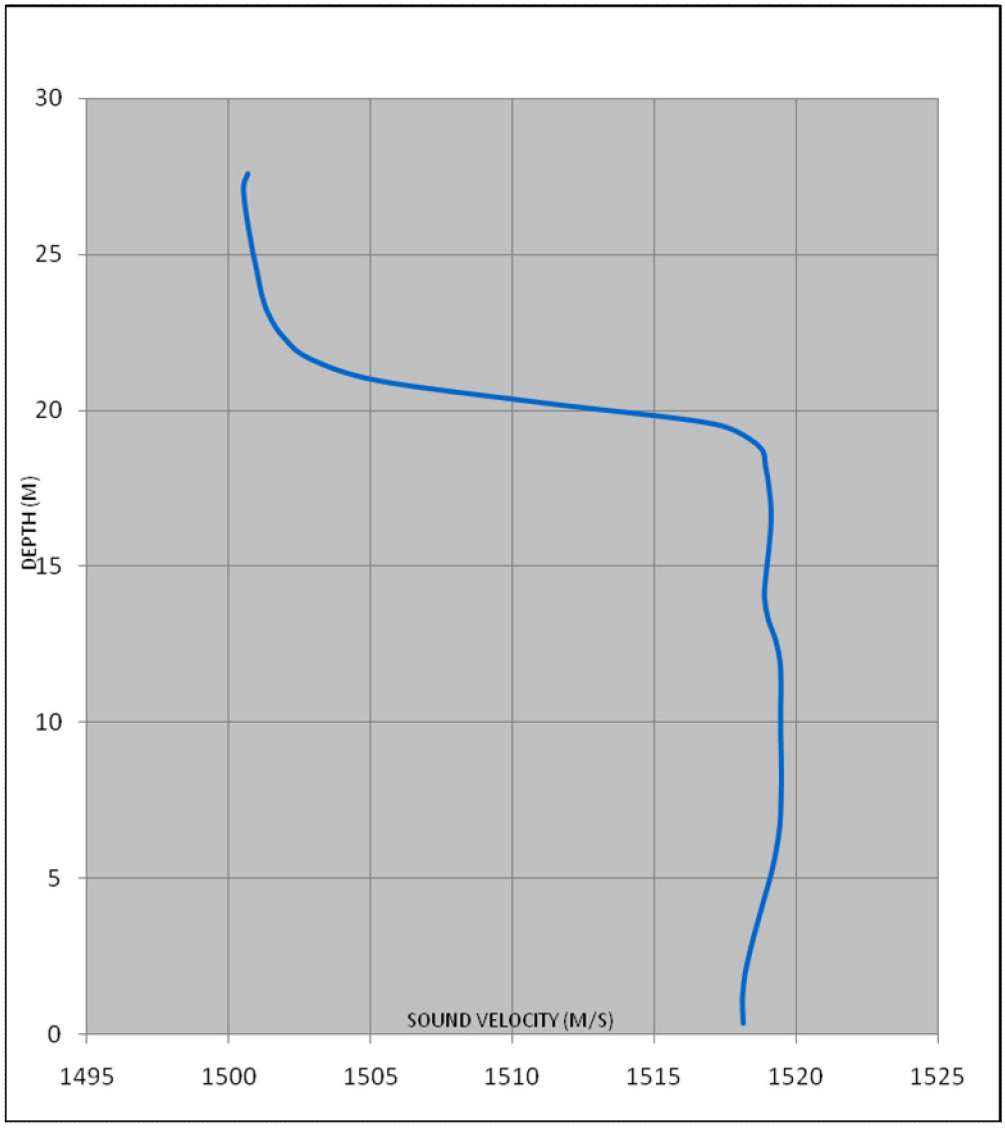


Figure 3.2-9
SVP 092310_1351 taken during the Fall 2010 multibeam survey at the HARS

1517.68	0.57
1517.54	1.32
1517.66	2.05
1517.77	2.77
1517.79	3.43
1517.89	4.05
1518.14	4.67
1518.36	5.28
1518.64	5.88
1518.94	6.49
1519.11	7.11
1519.16	7.77
1519.18	8.42
1519.15	9.06
1519.08	9.71
1519.03	10.35
1519.05	11.00
1519.10	11.64
1519.20	12.28
1519.31	12.93
1519.40	13.58
1519.47	14.24
1519.54	14.90
1519.59	15.57
1519.63	16.25
1519.62	16.92
1519.43	17.59
1519.00	18.25
1514.59	18.93
1506.65	19.61
1502.58	20.30
1501.17	20.99
1500.76	21.66
1500.61	22.34
1500.56	23.02
1500.52	23.70
1500.59	24.29
1500.97	24.41

CTD PROFILE # 092310_1351

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/23/2010	13:51	1027978	95827	80	40.42958868	73.84293405

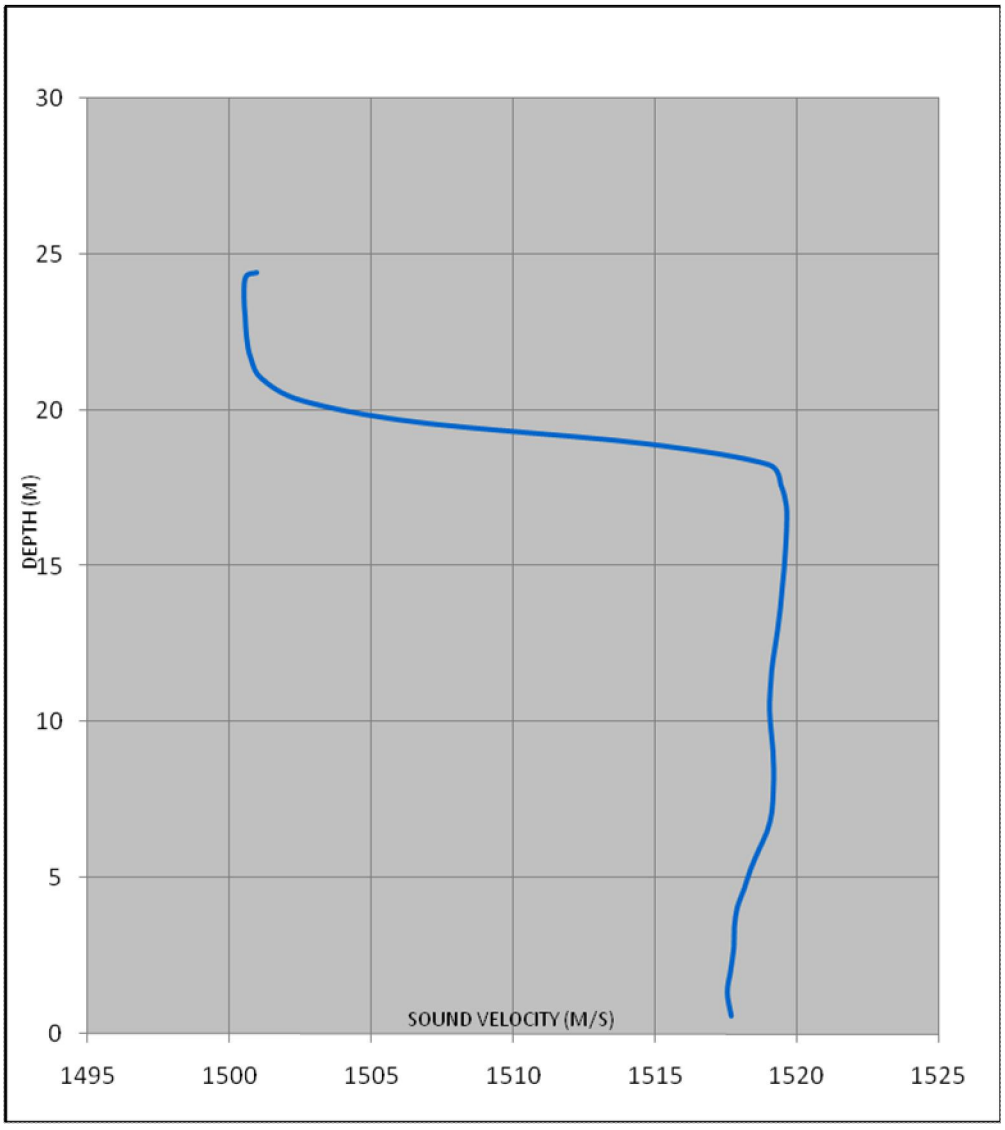


Figure 3.2-10
SVP 092310_1554 taken during the Fall 2010 multibeam survey at the HARS

1520.30	0.26
1519.95	0.98
1519.67	1.68
1519.47	2.34
1519.38	2.97
1519.33	3.57
1519.33	4.19
1519.35	4.81
1519.36	5.40
1519.31	6.01
1519.24	6.62
1519.18	7.24
1519.15	7.88
1519.13	8.52
1519.11	9.15
1519.10	9.77
1519.07	10.39
1519.00	11.01
1518.84	11.64
1518.53	12.29
1518.32	12.96
1518.25	13.64
1518.26	14.33
1518.24	15.03
1518.03	15.73
1517.73	16.43
1517.49	17.13
1517.00	17.83
1514.64	18.47
1512.01	18.64

CTD PROFILE # 092310_1554

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/23/2010	15:54	1026277	86434	62	40.40381471	73.84910195

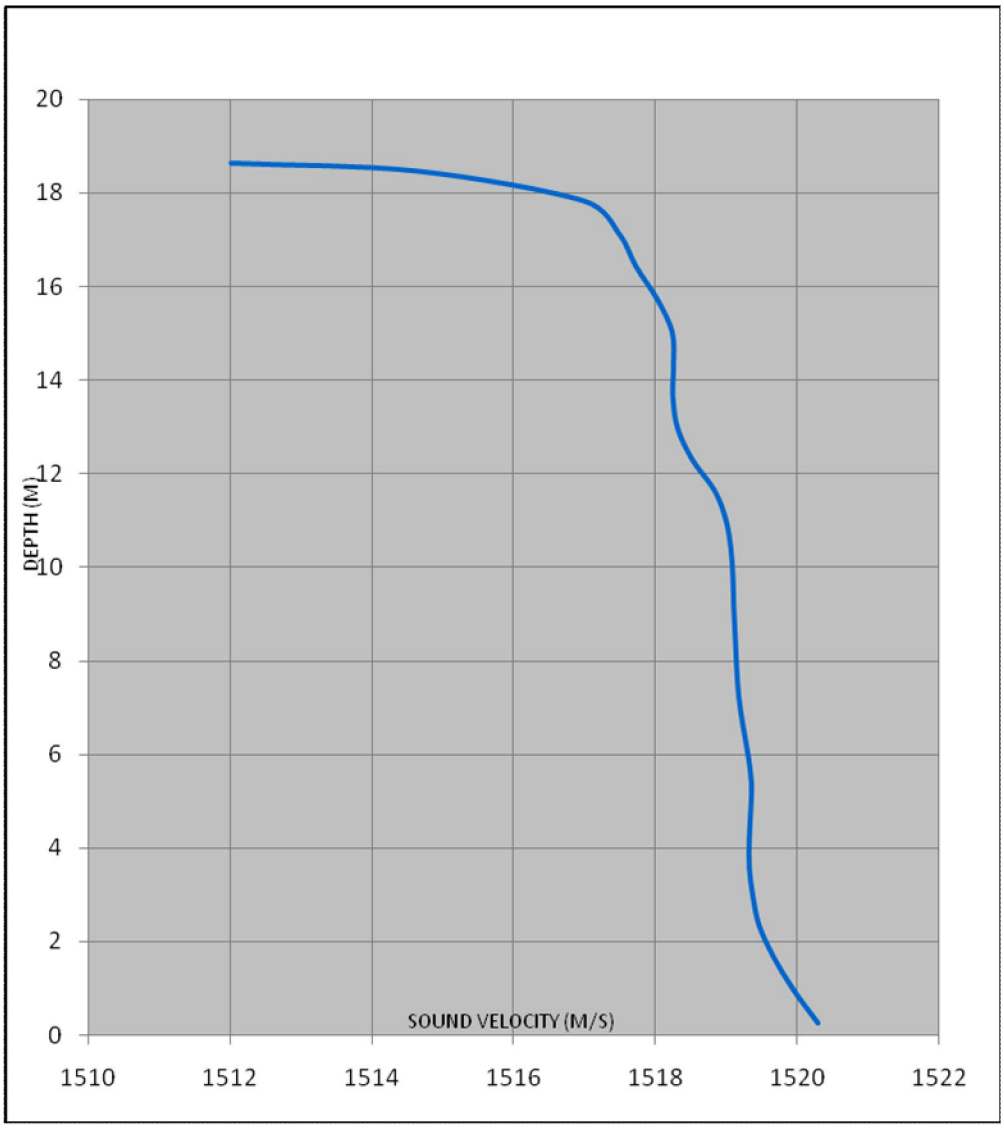


Figure 3.2-11
SVP 092310_1757 taken during the Fall 2010 multibeam survey at the HARS

1520.75	0.44
1520.26	1.17
1519.56	1.86
1519.16	2.53
1518.94	3.15
1518.86	3.77
1518.85	4.38
1518.86	5.01
1518.86	5.65
1518.95	6.28
1519.05	6.91
1519.17	7.56
1519.29	8.22
1519.42	8.87
1519.73	9.53
1519.57	10.19
1518.97	10.84
1518.63	11.51
1518.45	12.17
1518.26	12.83
1518.12	13.48
1517.96	14.14
1517.65	14.81
1517.18	15.48
1516.64	16.15
1516.20	16.82
1514.29	17.50
1510.27	18.17
1507.67	18.81
1507.05	19.06

CTD PROFILE # 092310_1757

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/23/2010	17:57	1024971	95802	63	40.42953435	73.85373498

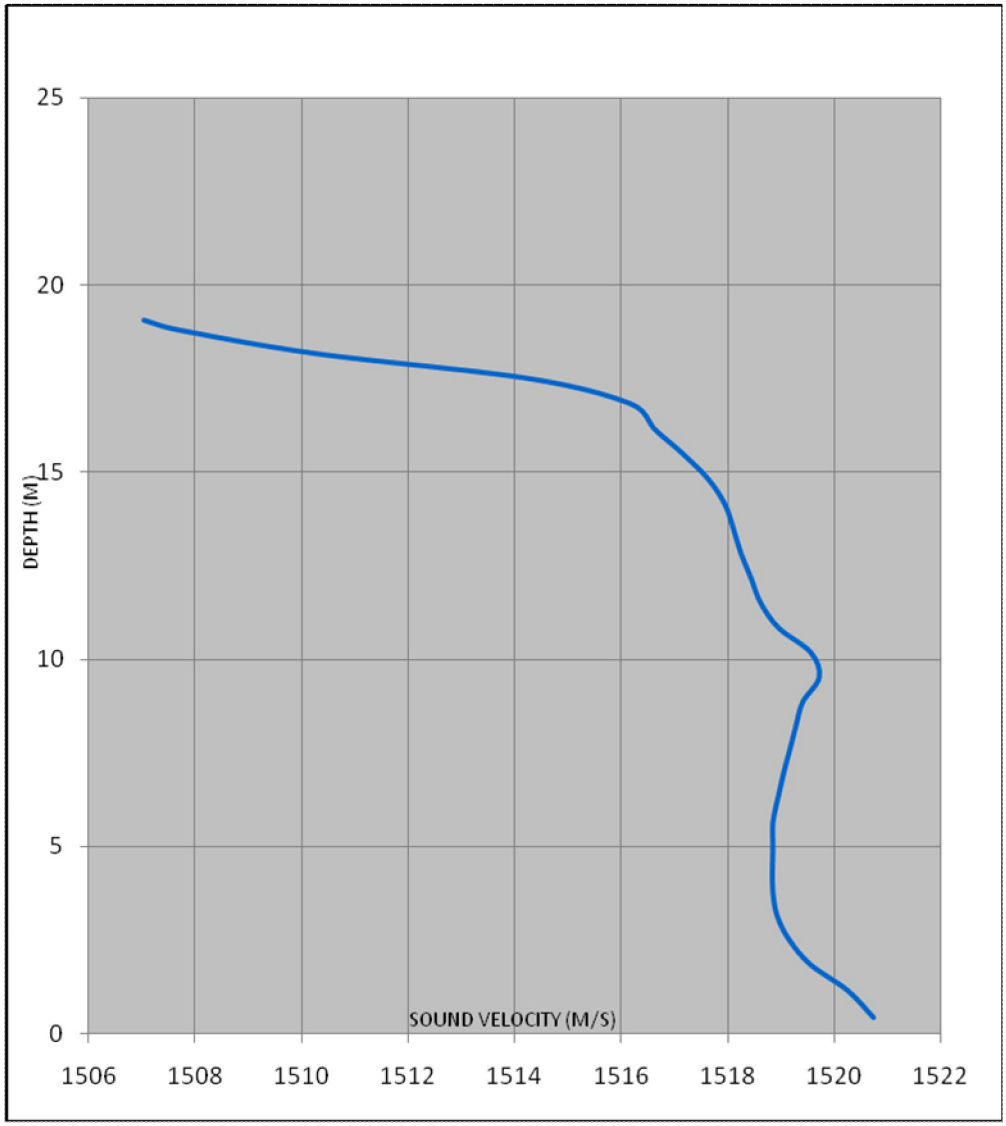


Figure 3.2-12
SVP 092310_2018 taken during the Fall 2010 multibeam survey at the HARS

1520.39	0.59
1520.36	1.29
1520.32	1.92
1520.31	2.54
1520.33	3.16
1520.30	3.75
1520.22	4.34
1520.12	4.93
1519.99	5.53
1519.85	6.14
1519.73	6.76
1519.61	7.37
1519.47	7.98
1519.31	8.60
1519.24	9.23
1519.32	9.86
1519.41	10.51
1519.41	11.15
1519.38	11.81
1519.41	12.44
1519.45	13.10
1519.38	13.76
1519.26	14.41
1519.13	15.08
1519.03	15.75
1518.96	16.43
1518.89	17.12
1518.20	17.80
1517.06	18.48
1512.24	19.16
1506.00	19.84
1502.40	20.53
1500.46	21.22
1499.22	21.91
1498.38	22.59
1497.45	23.26
1496.63	23.93
1496.17	24.62
1495.89	25.30
1495.69	25.98
1495.57	26.65
1495.47	27.33
1495.39	28.01
1495.35	28.69
1495.33	29.39
1495.32	30.09
1495.32	30.80
1495.32	31.52
1495.34	32.22
1495.35	32.91
1495.54	33.31

CTD PROFILE # 092310_2018

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/23/2010	20:18	1036163	86571	110	40.40413851	73.81360530

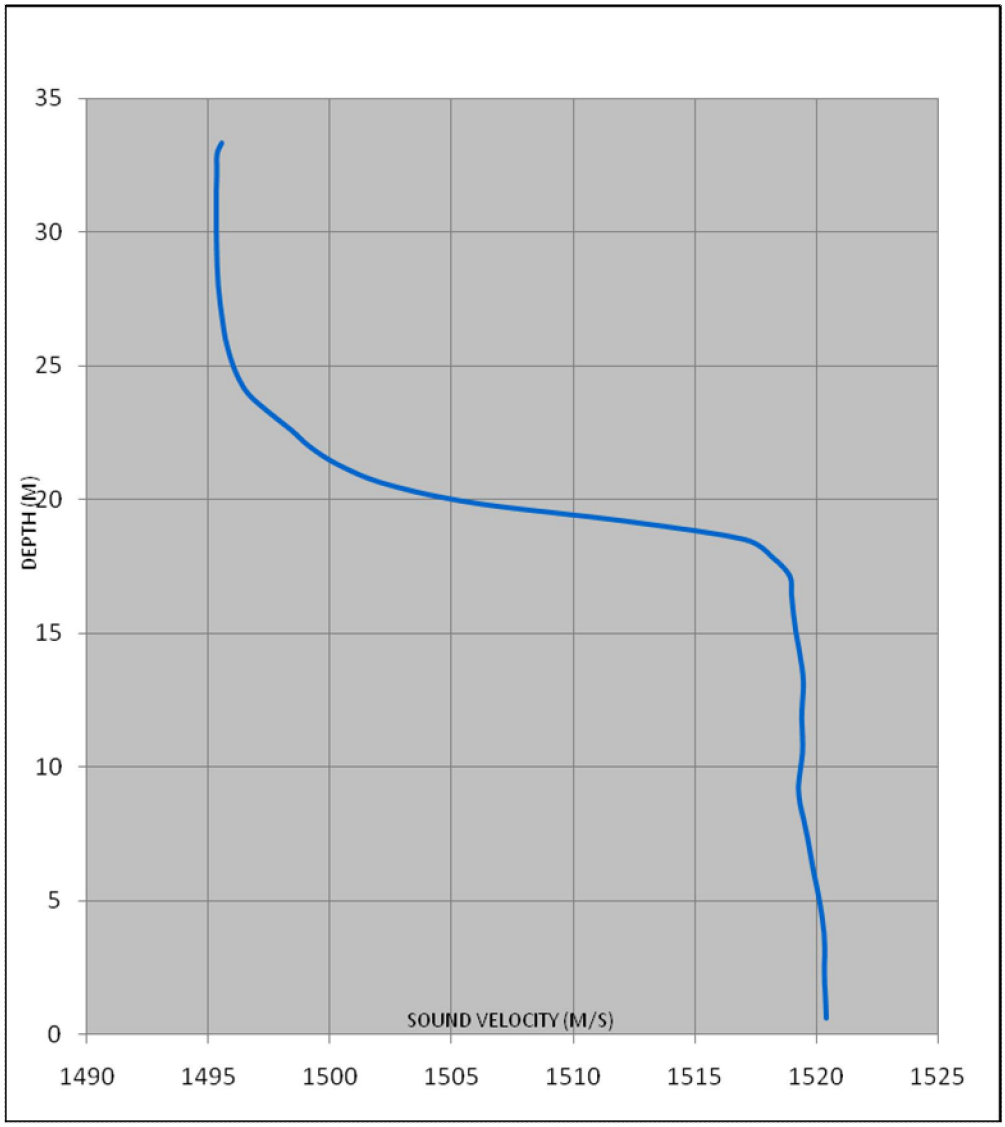


Figure 3.2-13
SVP 092310_2127 taken during the Fall 2010 multibeam survey at the HARS

1520.56	0.13
1520.39	0.87
1520.37	1.57
1520.37	2.21
1520.38	2.80
1520.39	3.36
1520.39	3.92
1520.38	4.48
1520.35	5.05
1520.29	5.61
1520.21	6.18
1520.10	6.75
1520.01	7.33
1519.93	7.93
1519.87	8.53
1519.75	9.14
1519.60	9.75
1519.47	10.35
1519.28	10.94
1519.13	11.53
1519.02	12.12
1518.91	12.71
1518.85	13.31
1518.85	13.91
1518.86	14.50
1518.87	15.09
1518.79	15.69
1518.51	16.30
1518.13	16.92
1516.87	17.55
1513.92	18.17
1510.34	18.79
1507.00	19.42
1504.33	20.04
1502.19	20.67
1500.03	21.32
1498.69	21.96
1497.40	22.61
1496.03	23.26
1495.25	23.91
1494.92	24.57
1494.81	25.23
1494.76	25.90
1494.74	26.56
1494.72	27.23
1494.69	27.90
1494.68	28.58
1494.67	29.26
1494.67	29.95
1494.68	30.62
1494.68	31.30
1494.68	31.97
1494.77	32.47

CTD PROFILE # 092310_2127

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/23/2010	21:27	1036272	77631	106	40.37959910	73.81328235

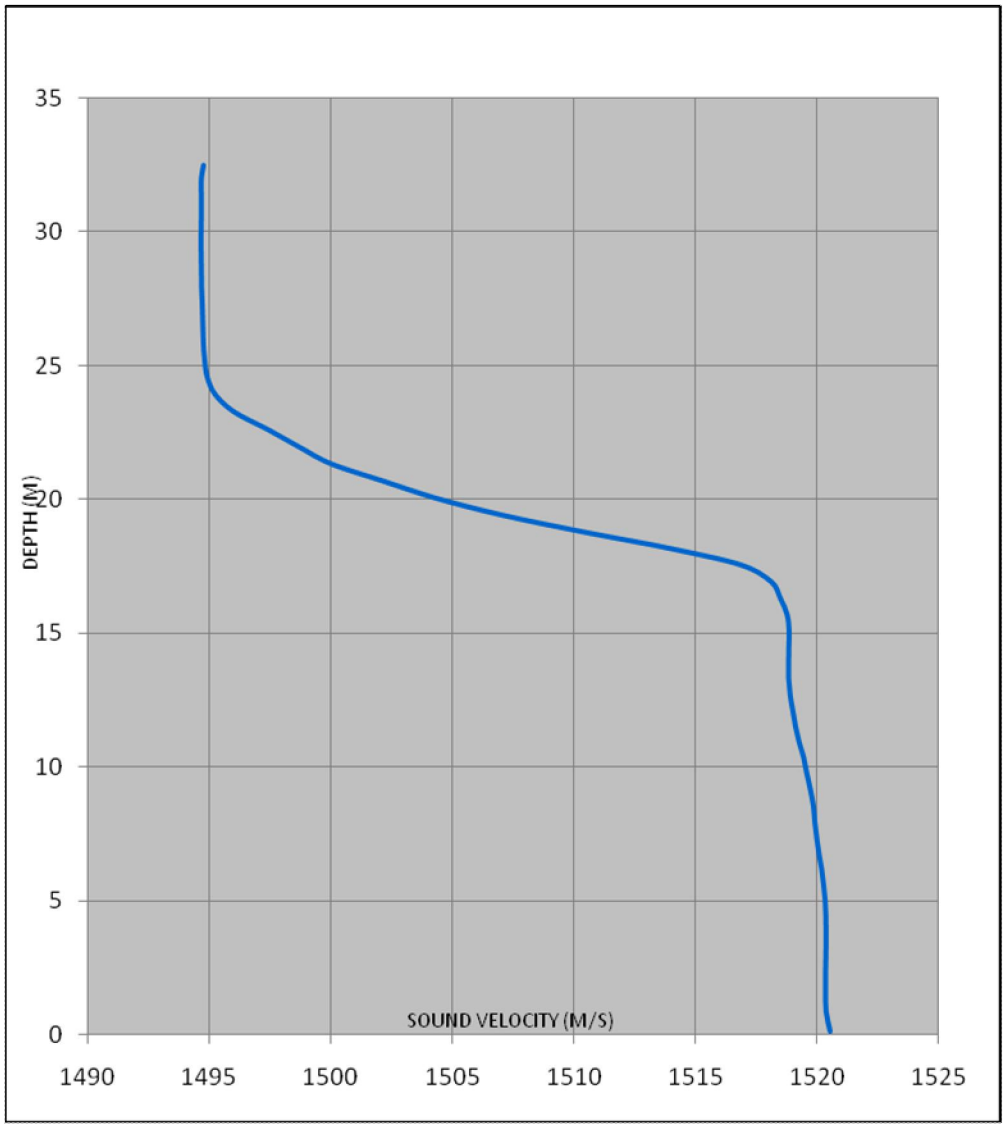


Figure 3.2-14
SVP 092410_1225 taken during the Fall 2010 multibeam survey at the HARS

1519.56	0.11
1519.59	0.87
1519.61	1.68
1519.63	2.44
1519.64	3.11
1519.65	3.77
1519.66	4.39
1519.66	4.96
1519.67	5.54
1519.68	6.14
1519.69	6.73
1519.69	7.33
1519.70	7.93
1519.72	8.55
1519.73	9.17
1519.73	9.78
1519.70	10.38
1519.68	10.98
1519.67	11.59
1519.63	12.21
1519.65	12.82
1519.61	13.43
1519.47	14.05
1519.37	14.67
1519.09	15.29
1517.95	15.93
1516.54	16.57
1514.14	17.21
1511.77	17.84
1510.38	18.46
1509.23	19.09
1507.68	19.73
1504.51	20.38
1500.85	21.05
1498.94	21.71
1497.88	22.37
1496.67	23.03
1495.77	23.69
1495.38	24.35
1495.25	24.99
1495.20	25.64
1495.17	26.28
1495.16	26.94
1495.15	27.59
1495.13	28.24
1495.10	28.90
1495.07	29.56
1495.04	30.23
1495.00	30.89
1494.96	31.57
1494.92	32.25
1494.91	32.92
1494.89	33.60
1494.89	34.20

CTD PROFILE # 092410_1225

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/24/2010	12:25	1035392	86632	112	40.40431041	73.81637312

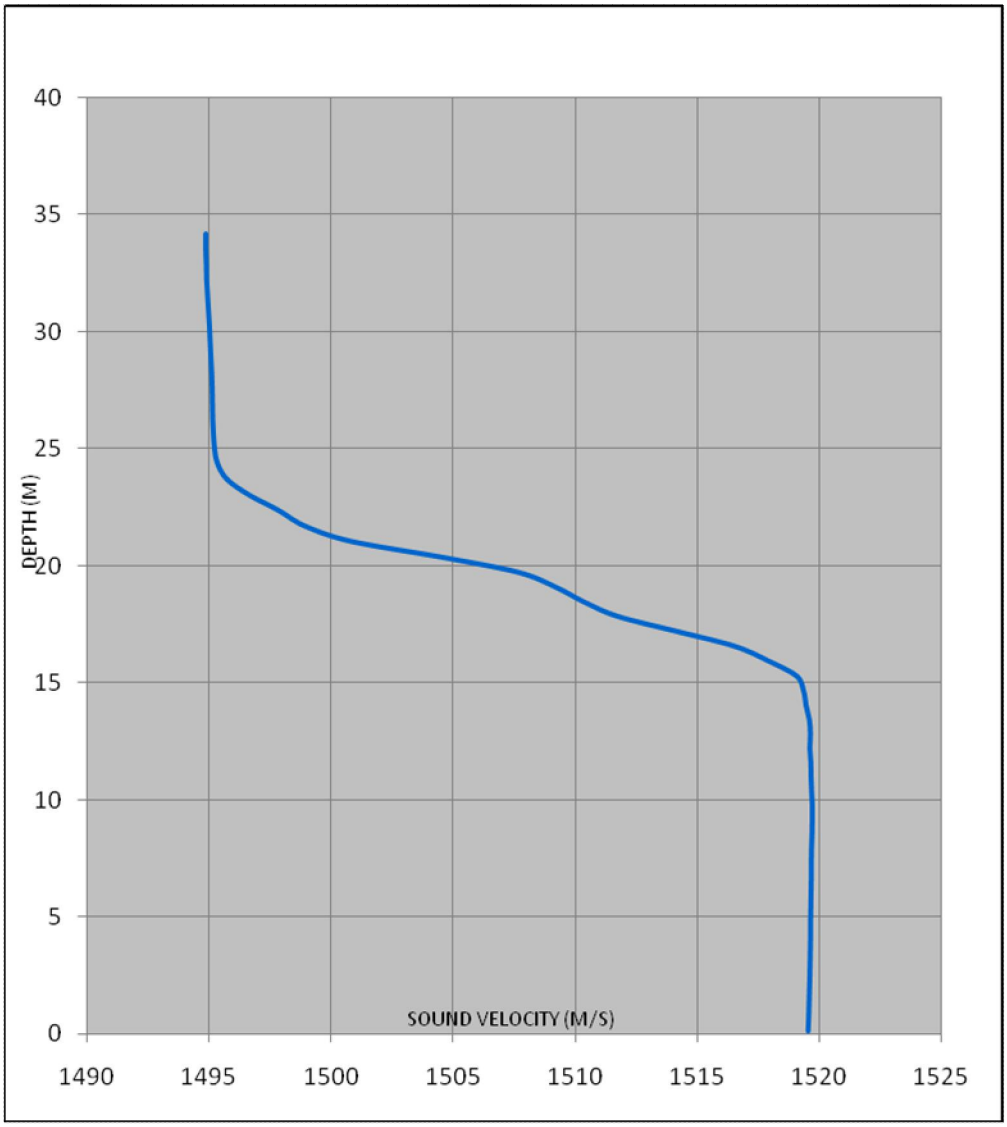


Figure 3.2-15
SVP 092410_1428 taken during the Fall 2010 multibeam survey at the HARS

1519.21	0.65
1519.21	1.36
1519.22	2.04
1519.23	2.70
1519.24	3.32
1519.25	3.92
1519.25	4.51
1519.24	5.10
1519.24	5.70
1519.23	6.32
1519.20	6.92
1519.10	7.53
1518.97	8.14
1518.88	8.74
1518.82	9.35
1518.77	10.00
1518.72	10.66
1518.70	11.30
1518.71	11.95
1518.73	12.61
1518.74	13.27
1518.75	13.93
1518.66	14.58
1518.28	15.25
1517.24	15.91
1516.07	16.56
1514.39	17.22
1512.37	17.86
1510.42	18.52
1508.51	19.17
1506.21	19.82
1503.91	20.45
1502.21	21.09
1501.24	21.73
1500.50	22.38
1499.79	23.02
1498.67	23.68
1497.48	24.34
1496.62	25.00
1496.19	25.66
1495.95	26.34
1495.76	27.01
1495.52	27.69
1495.28	28.36
1495.06	29.05
1494.97	29.72
1494.92	30.38
1494.86	31.05
1494.80	31.71
1494.97	31.95

CTD PROFILE # 092410_1428

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/24/2010	14:28	1033254	77175	106	40.37836460	73.82411783

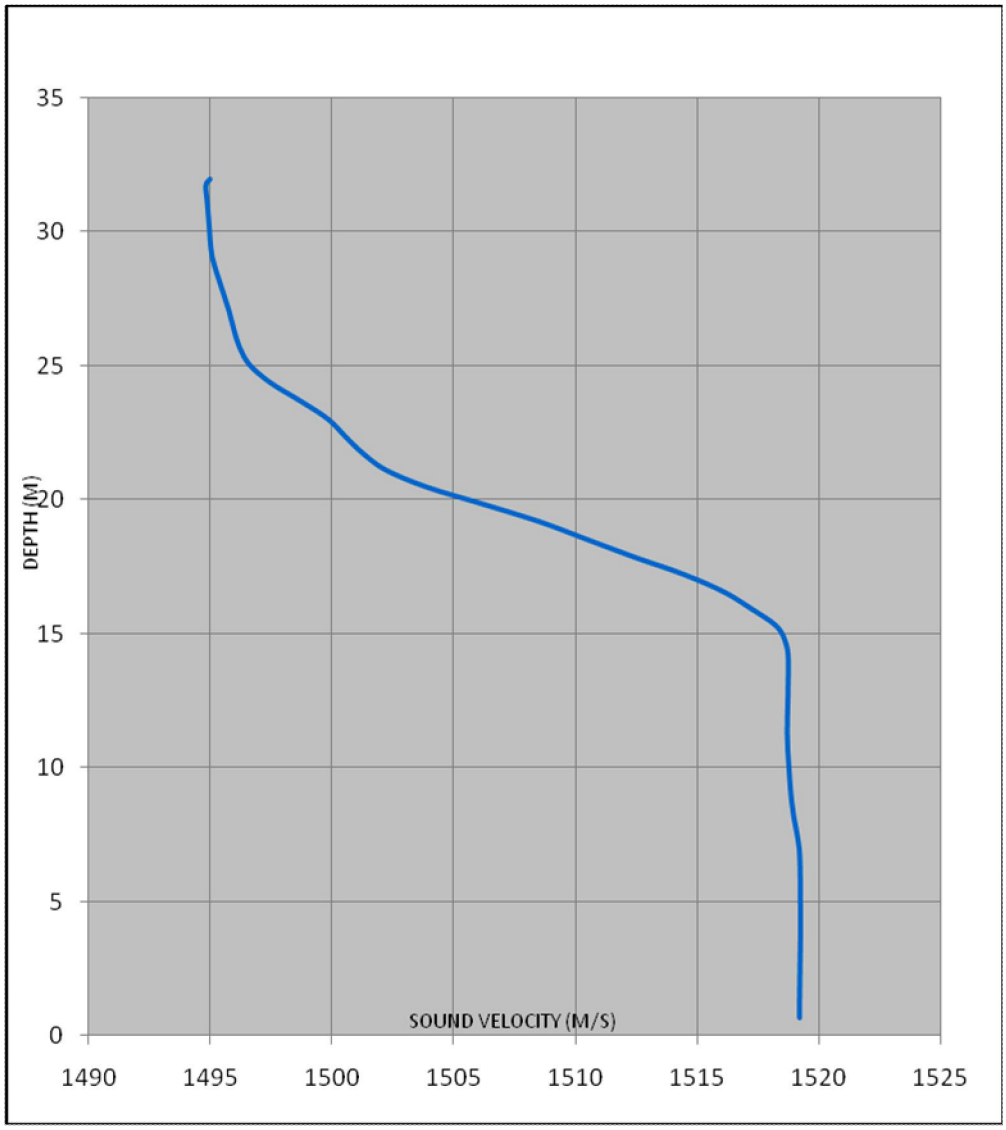


Figure 3.2-16
SVP 092410_1623 taken during the Fall 2010 multibeam survey at the HARS

1519.92	0.27
1519.86	1.03
1519.74	1.80
1519.65	2.52
1519.60	3.17
1519.58	3.79
1519.56	4.34
1519.56	4.84
1519.59	5.36
1519.65	5.88
1519.72	6.42
1519.77	6.97
1519.78	7.54
1519.63	8.10
1519.38	8.67
1519.21	9.22
1519.12	9.77
1519.07	10.34
1519.05	10.91
1519.01	11.48
1518.92	12.06
1518.76	12.63
1518.65	13.21
1518.59	13.78
1518.55	14.34
1518.52	14.92
1518.40	15.51
1518.17	16.10
1517.43	16.69
1515.64	17.29
1513.53	17.90
1511.52	18.53
1510.11	19.16
1508.69	19.79
1505.67	20.44
1502.66	21.08
1500.94	21.72
1500.27	22.35
1499.79	22.98
1498.54	23.61
1497.35	24.24
1496.79	24.89
1496.51	25.54
1496.39	26.20
1496.33	26.87
1496.38	27.47
1496.68	27.64

CTD PROFILE # 092410_1623

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/24/2010	16:23	1031707	77183	92	40.37839495	73.82967016

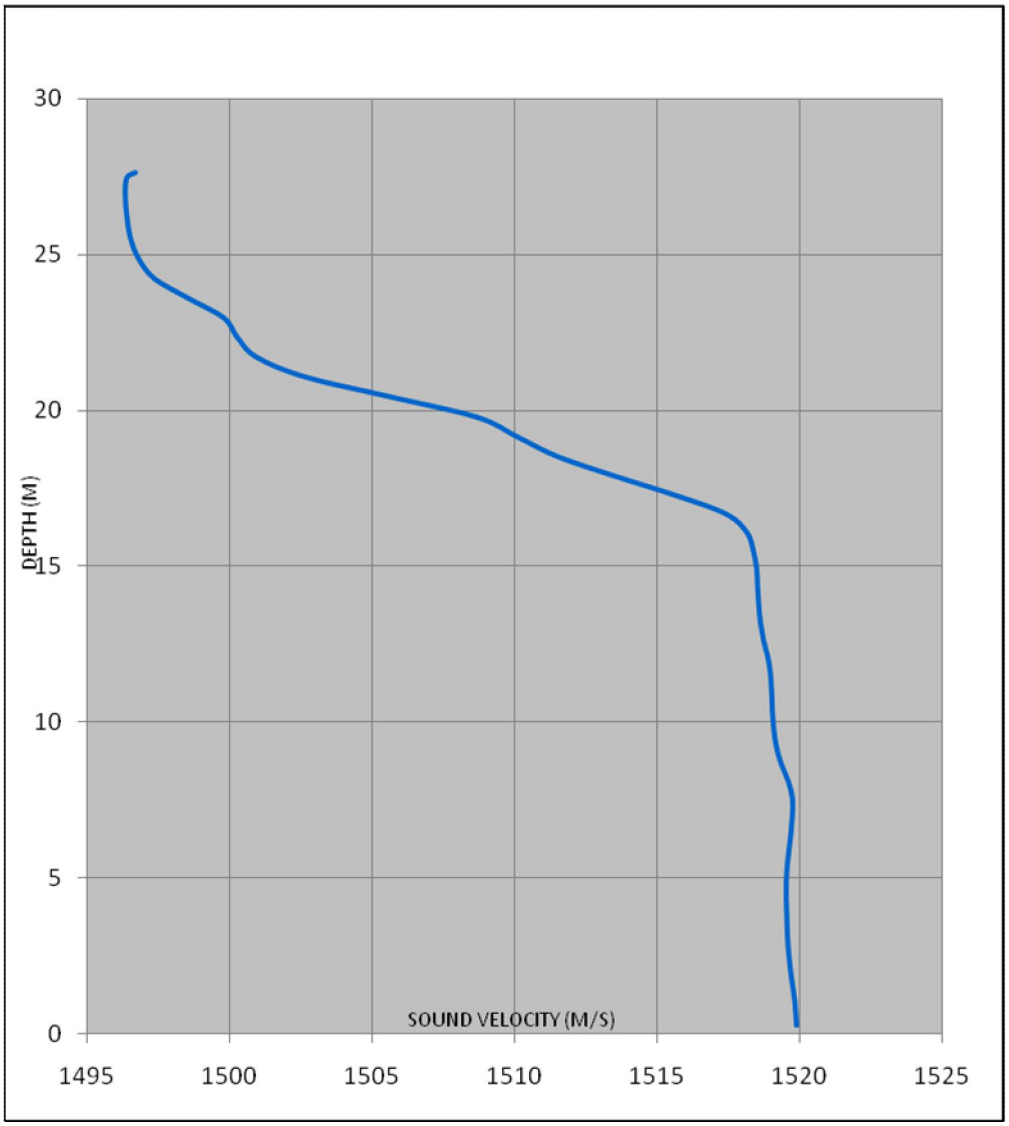


Figure 3.2-17
SVP 092410_1826 taken during the Fall 2010 multibeam survey at the HARS

1521.75	0.34
1520.99	1.08
1520.23	1.89
1519.84	2.67
1519.69	3.38
1519.65	4.04
1519.53	4.65
1519.39	5.25
1519.20	5.84
1518.96	6.44
1518.84	7.03
1518.82	7.61
1518.81	8.20
1518.79	8.79
1518.73	9.39
1518.64	9.99
1518.56	10.60
1518.53	11.22
1518.49	11.83
1518.45	12.45
1518.41	13.08
1518.33	13.72
1518.24	14.37
1518.20	15.02
1518.01	15.67
1516.90	16.31
1514.03	16.96
1508.80	17.63
1504.11	18.28
1501.79	18.92
1500.72	19.56
1500.01	20.19
1499.41	20.82
1499.03	21.45
1498.22	22.10
1497.41	22.76
1497.04	23.42
1496.90	24.08
1496.80	24.75
1496.65	25.41
1496.47	25.71
1496.40	25.79
1496.44	25.82

CTD PROFILE # 092410_1826

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
9/24/2010	18:26	1029590	86425	86	40.40377373	73.83720670

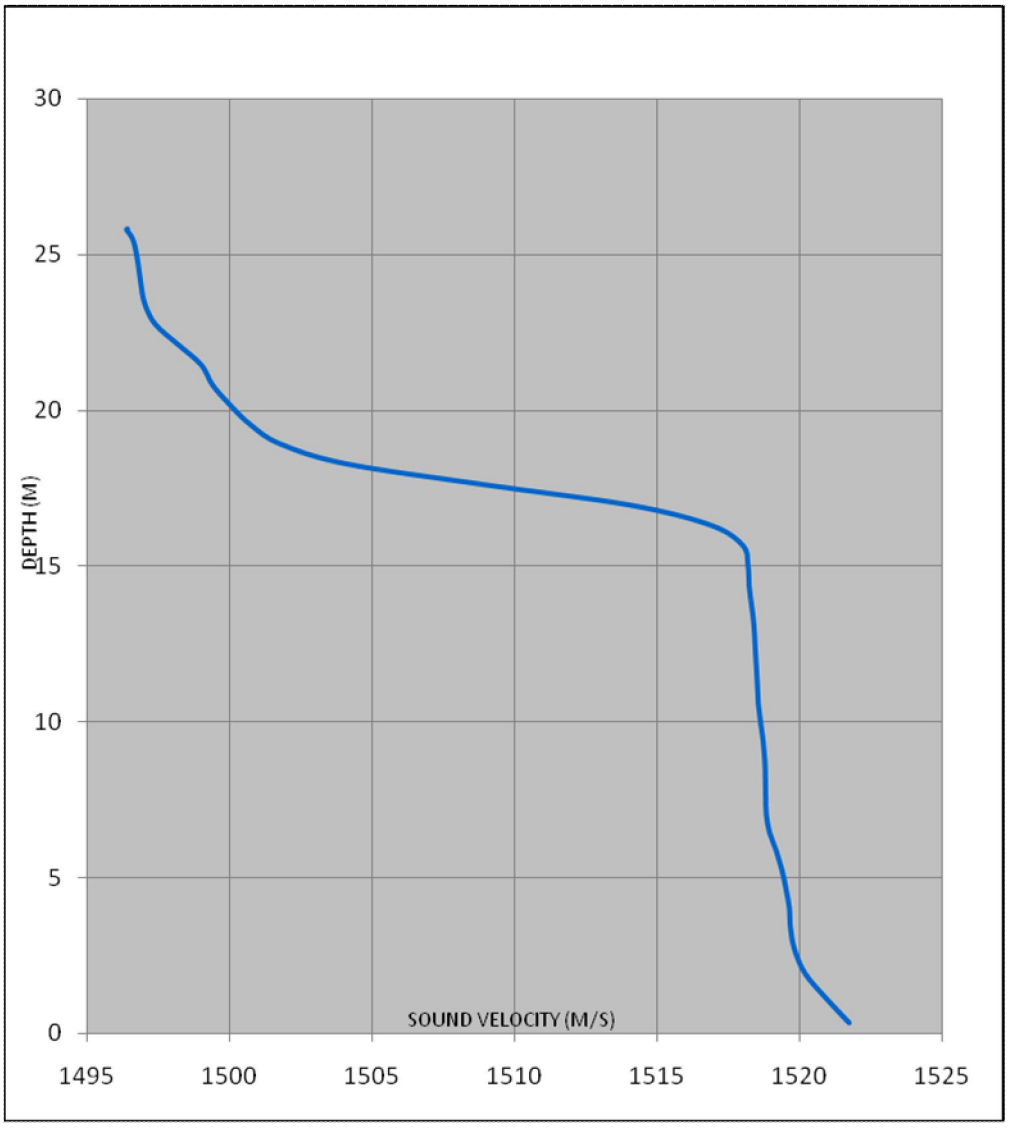


Figure 3.2-18
SVP 100610_1341 taken during the Fall 2010 multibeam survey at the HARS

1511.59	0.67
1512.52	1.47
1514.32	2.26
1515.26	3.00
1515.56	3.73
1515.73	4.47
1515.79	5.17
1515.81	5.87
1515.82	6.57
1515.83	7.27
1515.85	7.95
1515.87	8.63
1515.90	9.31
1515.92	10.00
1515.94	10.71
1515.96	11.42
1515.96	12.13
1515.97	12.83
1515.97	13.54
1515.98	14.26
1515.99	14.96
1515.99	15.66
1516.00	16.37
1516.01	17.06
1516.02	17.73
1516.03	18.40
1516.04	19.06
1516.05	19.71
1516.06	20.38
1516.06	20.91
1516.03	20.97
1515.99	21.02

CTD PROFILE # 100610_1341

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/6/2010	13:41	1028398	86627	69	40.40433418	73.84148526

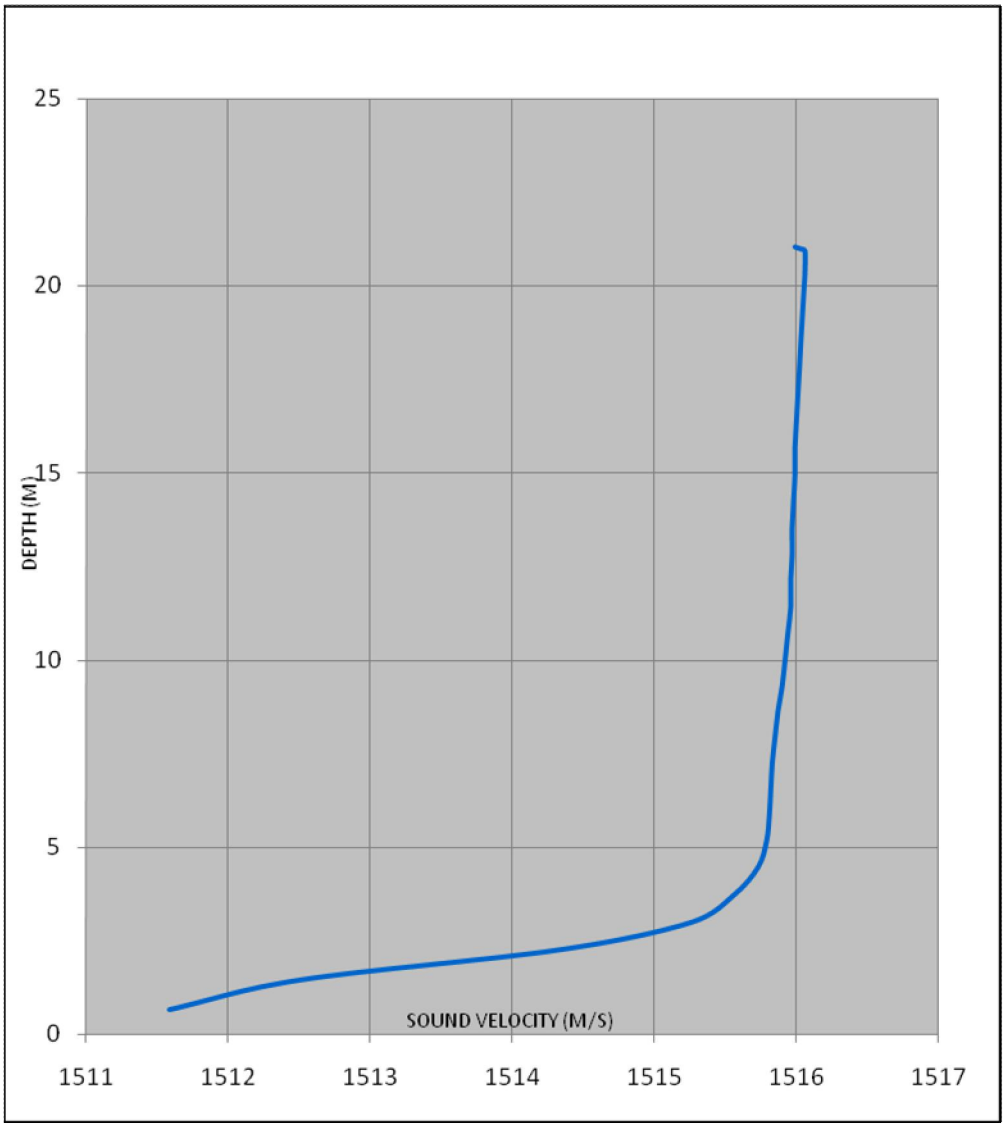


Figure 3.2-19
SVP 100610_1414 taken during the Fall 2010 multibeam survey at the HARS

1511.61	0.13
1511.77	0.79
1512.69	1.43
1514.48	2.06
1515.17	2.70
1515.46	3.36
1515.61	4.04
1515.69	4.74
1515.74	5.44
1515.76	6.13
1515.79	6.83
1515.81	7.52
1515.84	8.22
1515.86	8.91
1515.88	9.62
1515.90	10.32
1515.91	11.01
1515.93	11.70
1515.95	12.40
1515.98	13.10
1515.99	13.79
1516.01	14.47
1516.02	15.14
1516.04	15.81
1516.05	16.49
1516.06	17.18
1516.07	17.88
1516.09	18.59
1516.10	19.31
1516.10	19.88
1516.06	19.99

CTD PROFILE # 100610_1414

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/6/2010	14:14	1024070	77164	66	40.37838028	73.85708048

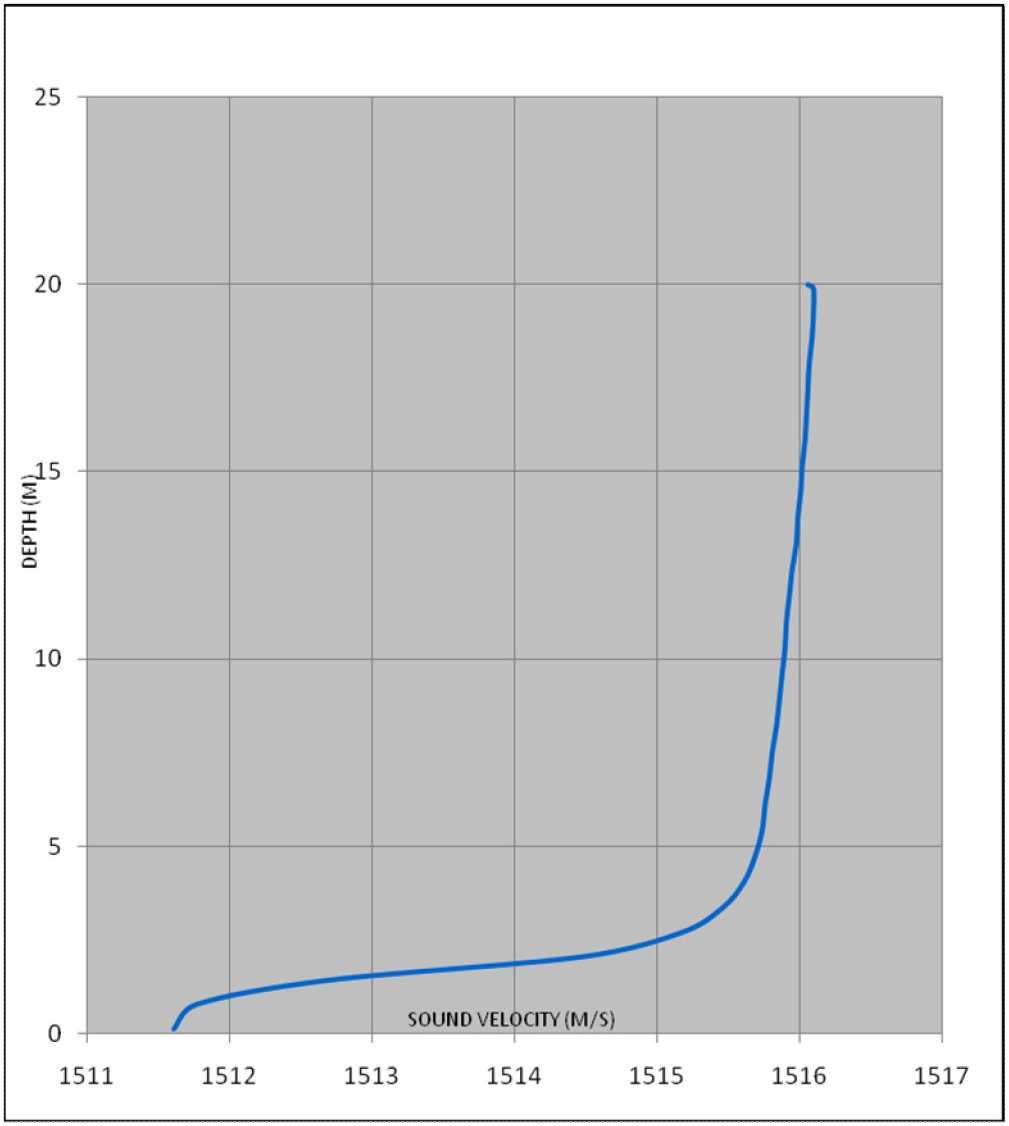


Figure 3.2-20
SVP 100610_1620 taken during the Fall 2010 multibeam survey at the HARS

1510.21	0.11
1510.79	0.85
1512.92	1.59
1514.35	2.29
1514.85	2.94
1515.13	3.55
1515.41	4.14
1515.60	4.71
1515.68	5.27
1515.72	5.82
1515.76	6.37
1515.78	6.93
1515.80	7.50
1515.82	8.08
1515.84	8.66
1515.85	9.24
1515.87	9.82
1515.89	10.40
1515.91	11.00
1515.92	11.61
1515.93	12.23
1515.95	12.86
1515.96	13.50
1515.97	14.14
1515.98	14.79
1515.99	15.43
1516.00	16.06
1516.01	16.34
1516.03	16.40

CTD PROFILE # 100610_1620

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/6/2010	16:20	1025353	86569	58	40.40418958	73.85241875

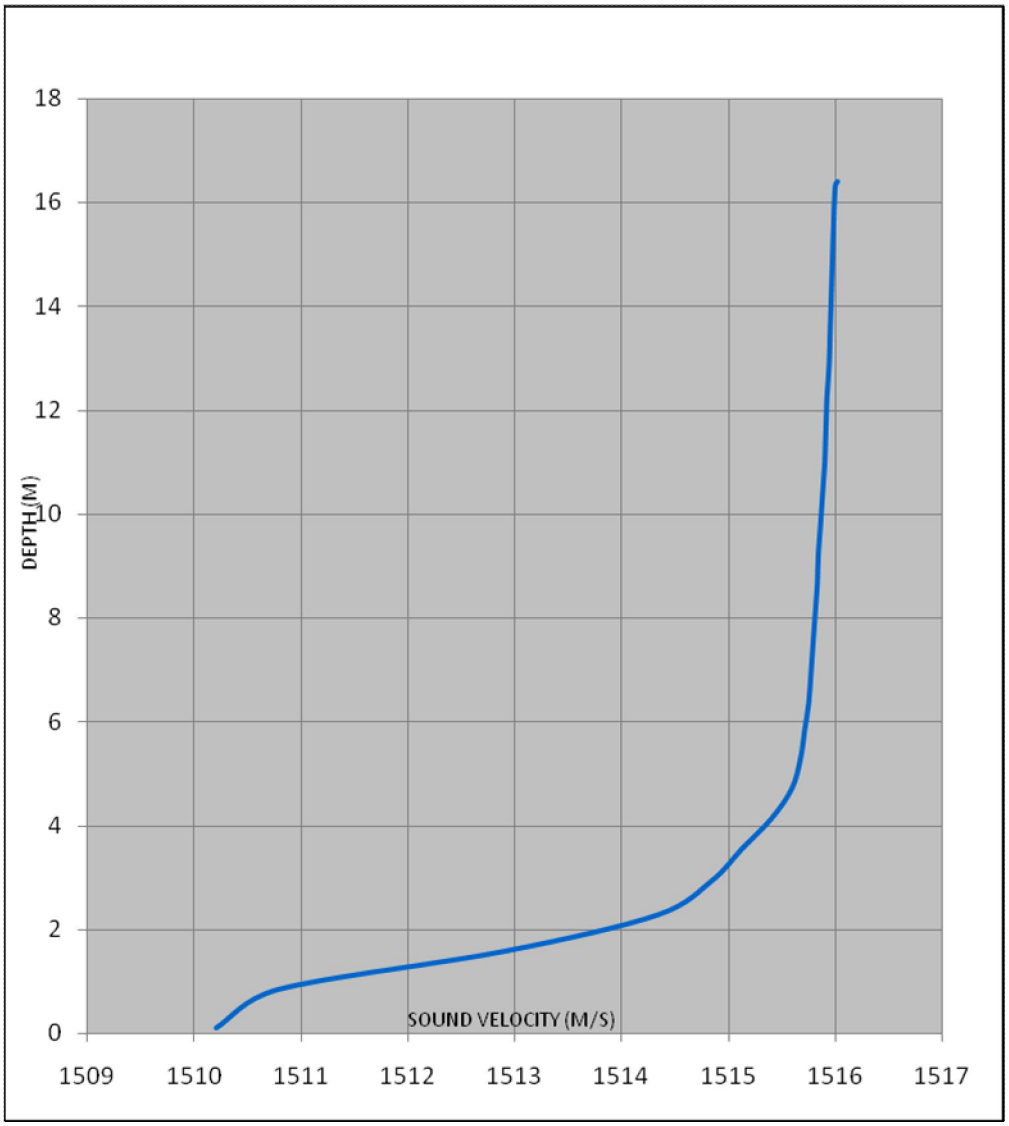


Figure 3.2-21
SVP 100610_1815 taken during the Fall 2010 multibeam survey at the HARS

1509.74	0.02
1509.81	0.76
1509.85	1.45
1509.88	2.08
1510.04	2.70
1510.76	3.28
1511.17	3.85
1511.27	4.41
1511.30	4.97
1511.38	5.53
1511.64	6.09
1512.53	6.66
1513.83	7.23
1514.88	7.80
1515.31	8.37
1515.54	8.94
1515.66	9.52
1515.73	10.11
1515.79	10.72
1515.82	11.36
1515.87	12.01
1515.90	12.68
1515.93	13.37
1515.95	14.06
1515.97	14.75
1515.98	15.46
1515.99	16.16
1516.00	16.85
1516.02	17.54
1516.01	17.93
1515.97	17.98
1515.95	18.00

CTD PROFILE # 100610_1815

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/6/2010	18:15	1026220	86573	63	40.40419651	73.84930575

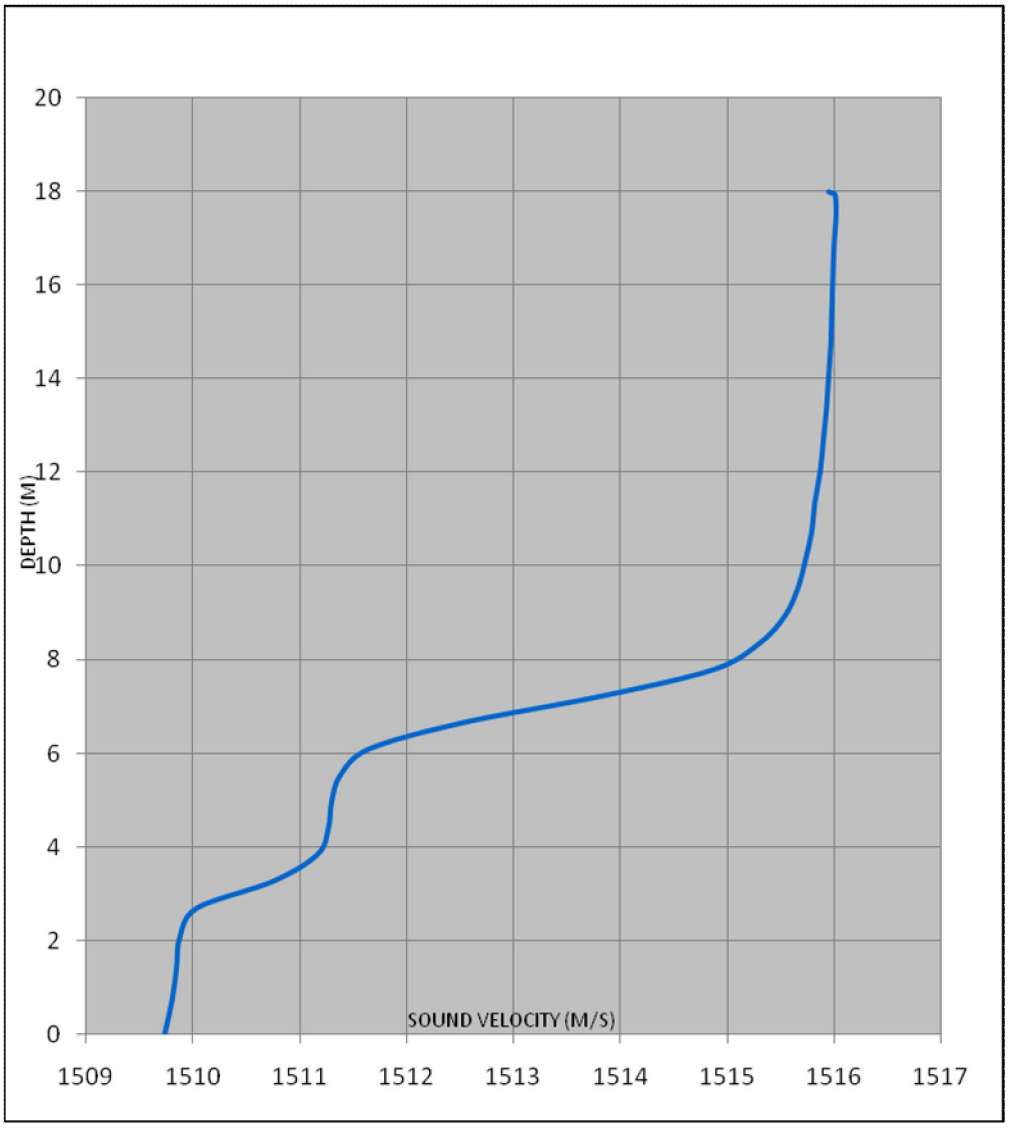


Figure 3.2-22
SVP 100610_2022 taken during the Fall 2010 multibeam survey at the HARS

1510.14	0.58
1510.04	1.28
1510.02	1.97
1510.03	2.65
1510.13	3.32
1510.61	4.00
1511.35	4.67
1512.02	5.35
1512.60	6.05
1513.49	6.75
1514.66	7.41
1515.33	8.09
1515.68	8.76
1515.90	9.44
1515.99	10.11
1516.04	10.79
1516.08	11.46
1516.09	12.14
1516.09	12.83
1516.07	13.54
1516.07	14.24
1516.07	14.96
1516.08	15.67
1516.09	16.37
1516.10	17.04
1516.11	17.69
1516.12	17.90

CTD PROFILE # 100610_2022

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/6/2010	20:22	1027208	77321	65	40.37879661	73.84581679

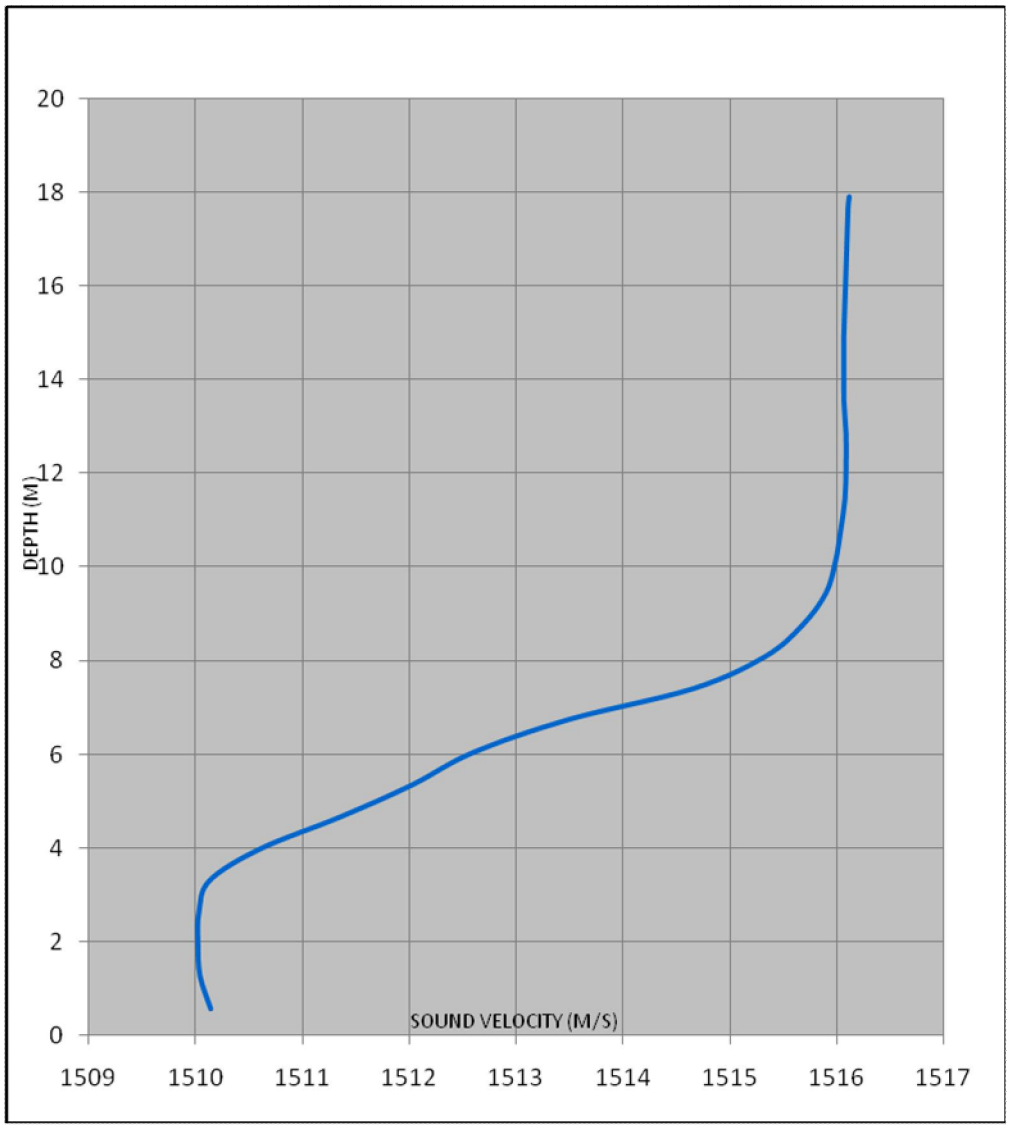


Figure 3.2-23
SVP 101210_1219 taken during the Fall 2010 multibeam survey at the HARS

1508.81	0.36
1509.03	1.05
1510.62	1.71
1512.12	2.31
1512.79	2.90
1513.39	3.48
1513.78	4.05
1513.98	4.60
1514.11	5.14
1514.22	5.71
1514.28	6.29
1514.34	6.89
1514.39	7.49
1514.46	8.07
1514.57	8.66
1514.75	9.25
1515.00	9.85
1515.22	10.46
1515.29	11.06
1515.20	11.69
1515.10	12.34
1515.00	12.96
1514.91	13.59
1514.76	14.22
1514.52	14.84
1513.94	15.48
1512.83	16.11
1511.34	16.74
1509.97	17.38
1507.32	18.02
1503.18	18.67
1500.66	19.31
1499.62	19.96
1499.27	20.61
1499.14	21.27
1499.10	21.94
1499.08	22.61
1499.07	23.30
1499.12	23.91
1499.36	24.07

CTD PROFILE # 101210_1219

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/12/2010	12:19	1028364	85496	79	40.40122995	73.84161468

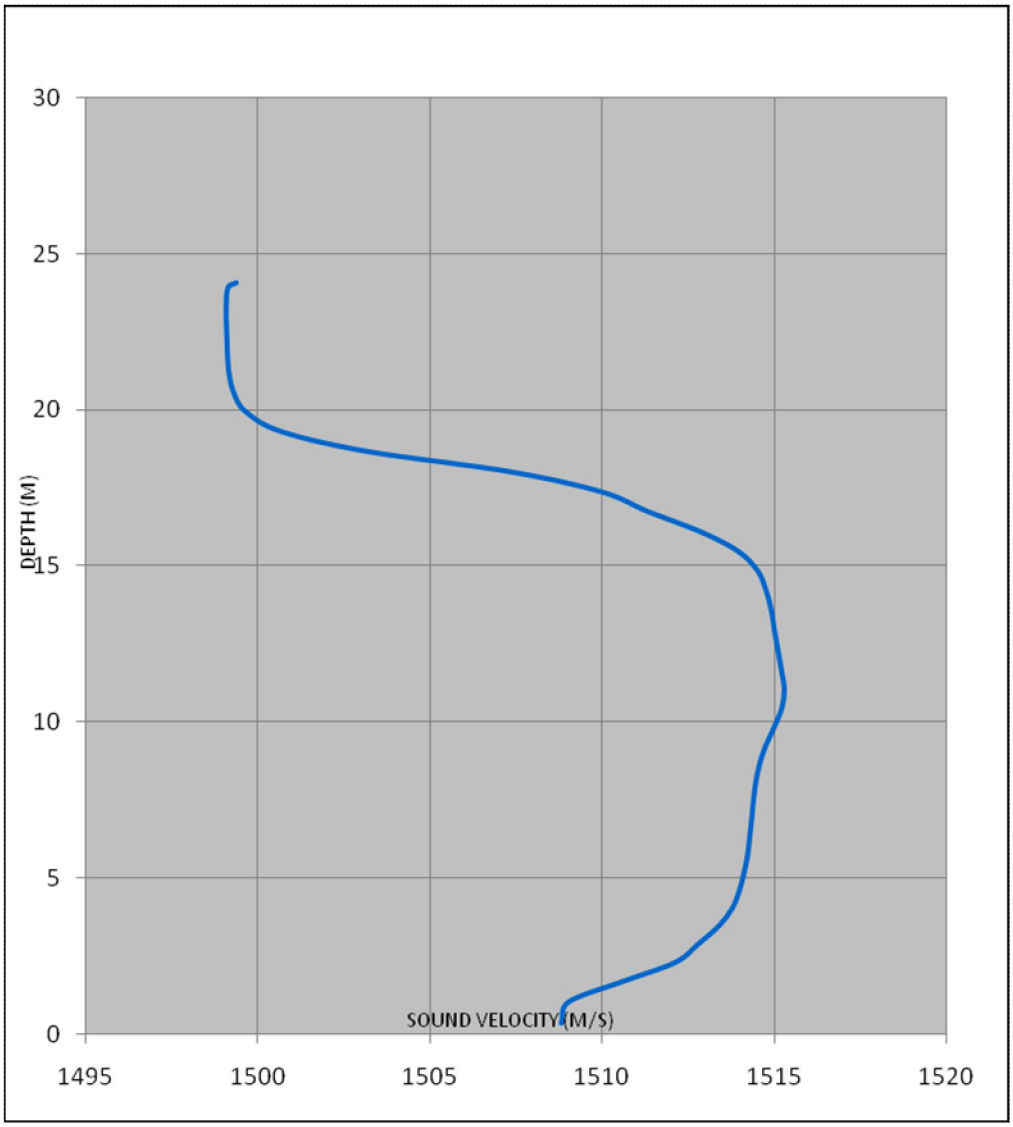


Figure 3.2-24
SVP 101210_1436 taken during the Fall 2010 multibeam survey at the HARS

1512.12	0.24
1513.07	1.01
1513.68	1.80
1513.85	2.58
1513.82	3.32
1513.86	3.99
1514.09	4.65
1514.20	5.30
1514.13	5.92
1513.97	6.52
1513.84	7.13
1513.71	7.73
1513.60	8.31
1513.54	8.88
1513.49	9.44
1513.47	10.02
1513.43	10.61
1513.39	11.21
1513.32	11.81
1513.26	12.41
1513.21	13.01
1513.18	13.63
1513.15	14.25
1513.09	14.88
1513.04	15.52
1513.02	16.16
1512.99	16.81
1512.97	17.46
1512.95	18.11
1512.87	18.77
1512.76	19.44
1512.55	20.10
1511.87	20.77
1511.24	21.43
1510.98	22.10
1510.86	22.77
1510.01	23.44
1508.03	24.09
1505.09	24.75
1500.84	25.41
1497.44	26.07
1495.90	26.73
1495.30	27.40
1495.09	28.06
1495.01	28.73
1494.97	29.41
1494.94	30.06
1495.01	30.63

CTD PROFILE # 101210_1436

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/12/2010	14:36	1036196	77303	102	40.37869924	73.81355764

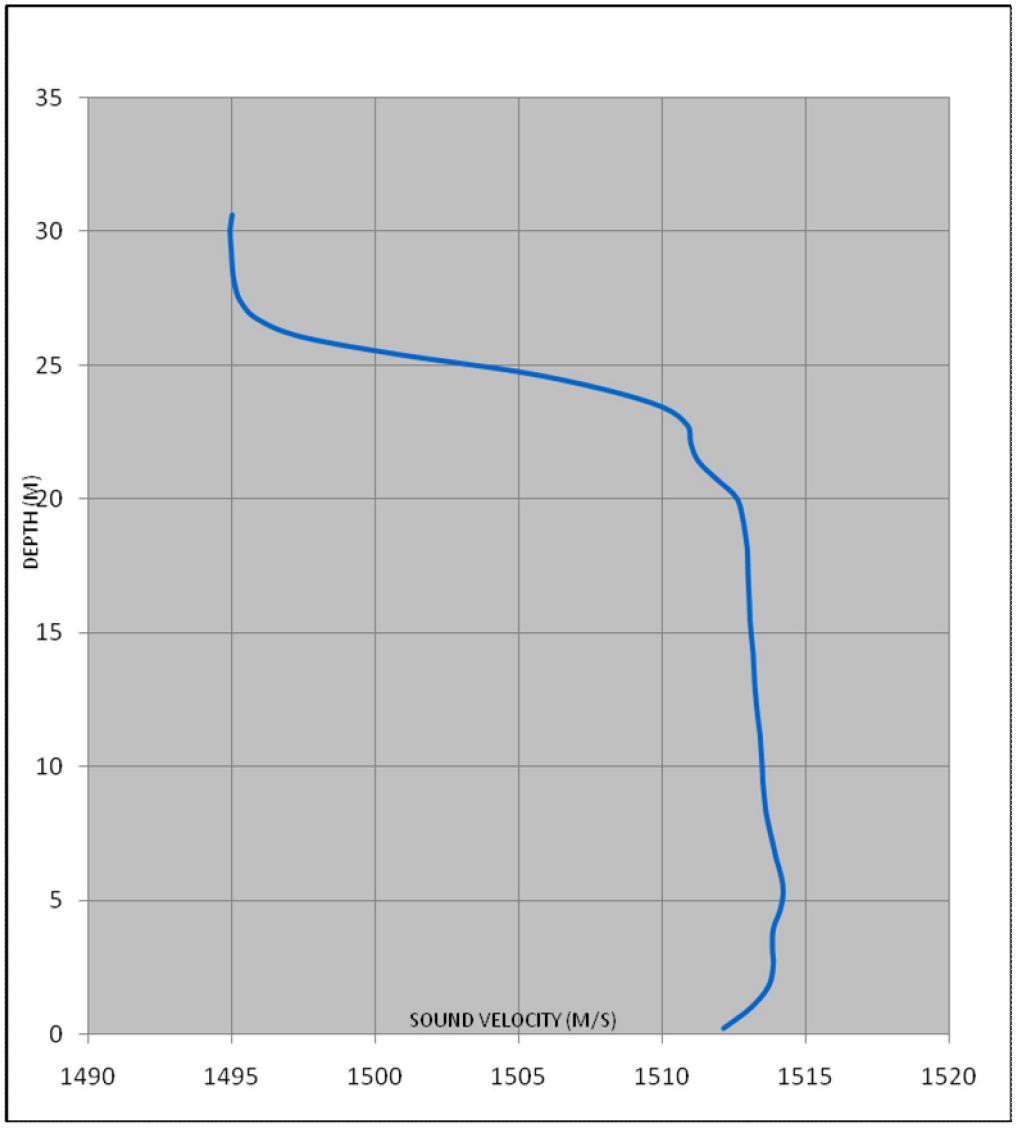


Figure 3.2-25
SVP 101210_1645 taken during the Fall 2010 multibeam survey at the HARS

1509.11	0.29
1510.44	1.07
1512.19	1.76
1512.76	2.41
1513.09	2.98
1513.22	3.56
1513.31	4.13
1513.44	4.70
1513.58	5.26
1513.67	5.85
1513.80	6.43
1514.02	7.01
1514.15	7.60
1514.12	8.19
1514.01	8.81
1513.89	9.43
1513.82	10.05
1513.80	10.68
1513.80	11.32
1513.74	11.95
1513.69	12.59
1513.75	13.25
1513.81	13.90
1513.90	14.54
1513.91	15.19
1513.78	15.83
1513.61	16.48
1513.47	17.14
1513.36	17.79
1513.15	18.45
1512.94	19.11
1512.65	19.77
1512.40	20.42
1512.22	21.08
1512.11	21.76
1511.91	22.43
1511.41	23.10
1510.68	23.77
1509.06	24.44
1507.15	25.12
1503.86	25.80
1499.91	26.49
1497.96	27.17
1497.08	27.86
1496.67	28.55
1496.44	29.23
1496.22	29.90
1495.80	30.57
1495.33	31.22
1495.06	31.90
1494.95	32.57
1495.01	33.14

CTD PROFILE # 101210_1645

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/12/2010	16:45	1034655	77327	109	40.37877399	73.81908833

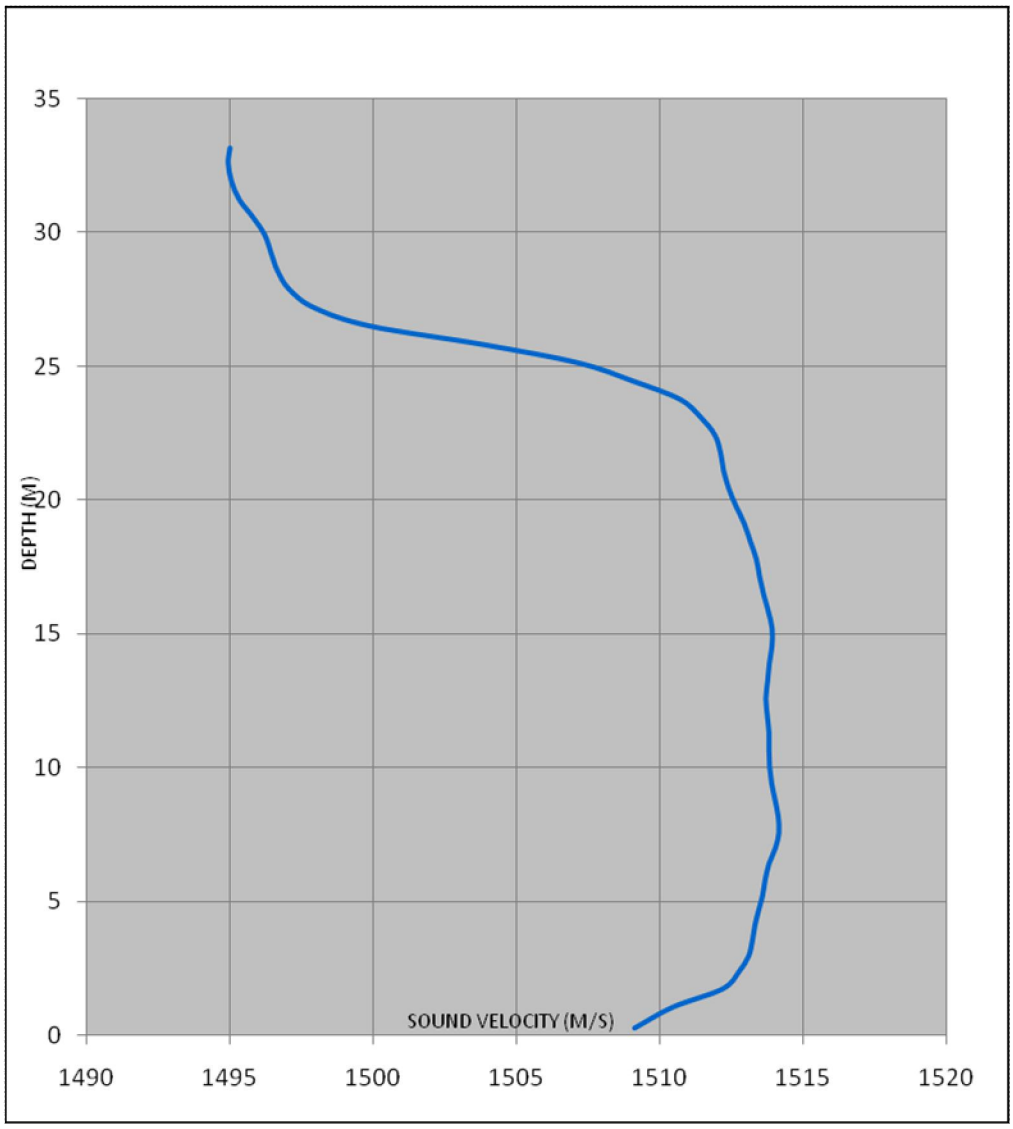


Figure 3.2-26
SVP 101210_1836 taken during the Fall 2010 multibeam survey at the HARS

1510.10	0.16
1511.35	0.89
1512.59	1.66
1513.06	2.43
1513.42	3.15
1513.67	3.83
1513.81	4.47
1513.87	5.08
1513.91	5.68
1513.96	6.27
1514.00	6.85
1514.14	7.42
1514.40	7.99
1514.61	8.59
1514.75	9.19
1515.01	9.79
1515.20	10.41
1515.28	11.02
1515.35	11.63
1515.38	12.25
1515.37	12.87
1515.37	13.51
1515.25	14.14
1514.79	14.77
1514.38	15.41
1514.22	16.07
1514.08	16.73
1513.92	17.39
1513.81	18.05
1513.57	18.72
1513.15	19.39
1512.74	20.07
1512.41	20.74
1512.11	21.39
1511.65	22.07
1510.72	22.75
1509.76	23.43
1508.56	24.11
1507.11	24.79
1505.24	25.46
1503.41	26.13
1501.95	26.80
1500.89	27.47
1499.95	28.16
1498.68	28.85
1497.24	29.55
1496.41	30.19
1496.53	30.37

CTD PROFILE # 101210_1836

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/12/2010	18:36	1032726	67868	100	40.35282135	73.82607921

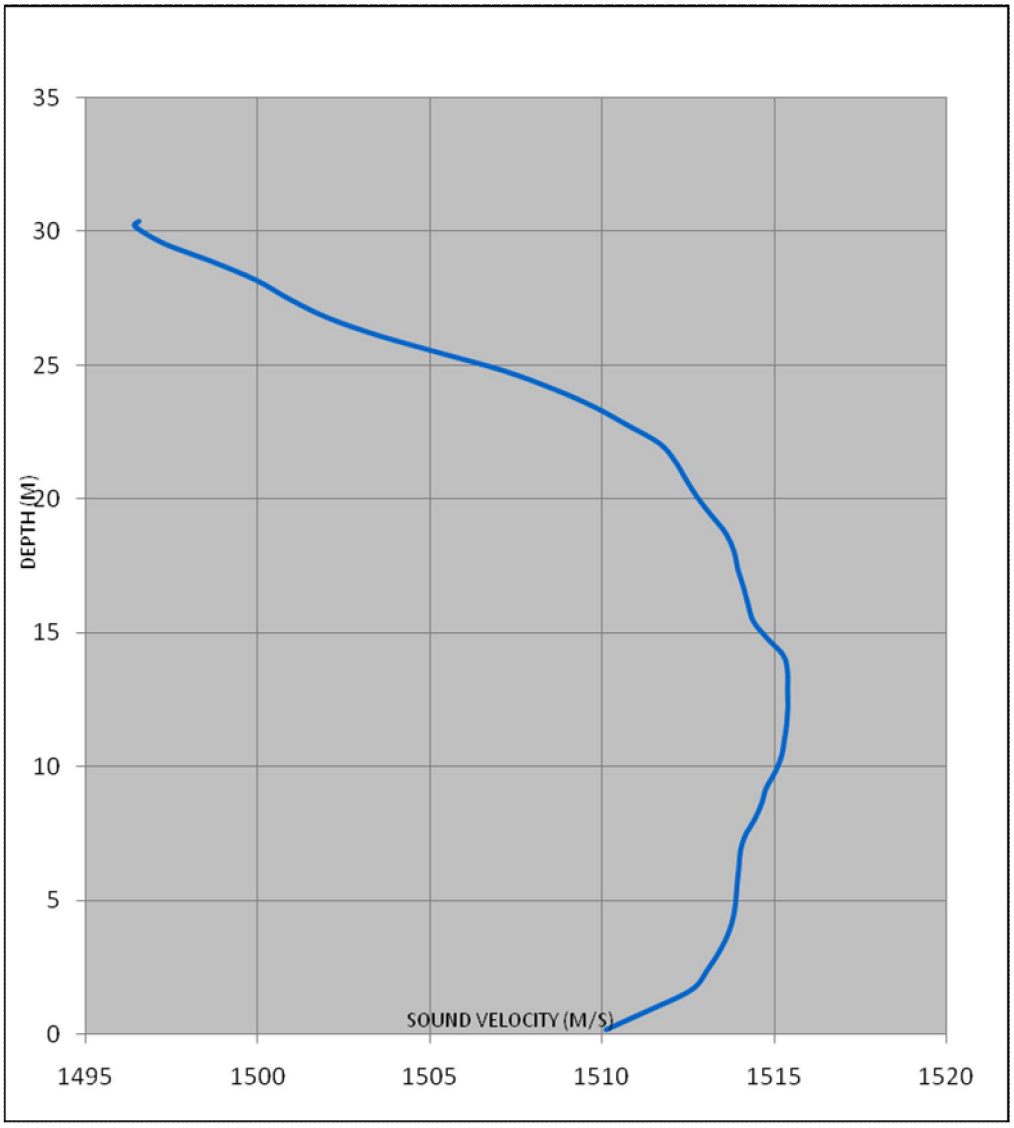


Figure 3.2-27
SVP 101210_2046 taken during the Fall 2010 multibeam survey at the HARS

1508.98	0.56
1509.94	1.36
1511.93	2.18
1512.98	3.00
1513.60	3.83
1513.83	4.63
1514.05	5.39
1514.21	6.12
1514.49	6.84
1514.74	7.55
1514.93	8.25
1515.13	8.95
1515.10	9.66
1514.58	10.37
1514.01	11.07
1513.70	11.77
1513.59	12.48
1513.53	13.18
1513.31	13.87
1512.95	14.56
1512.75	15.25
1512.65	15.93
1512.55	16.62
1512.50	17.30
1512.45	17.99
1512.27	18.67
1511.96	19.35
1511.66	20.02
1511.31	20.71
1510.03	21.41
1507.92	22.12
1505.45	22.82
1502.24	23.53
1500.06	24.24
1499.27	24.97
1499.27	25.40

CTD PROFILE # 101210_2046

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/12/2010	20:46	1030996	76957	84	40.37777839	73.83222358

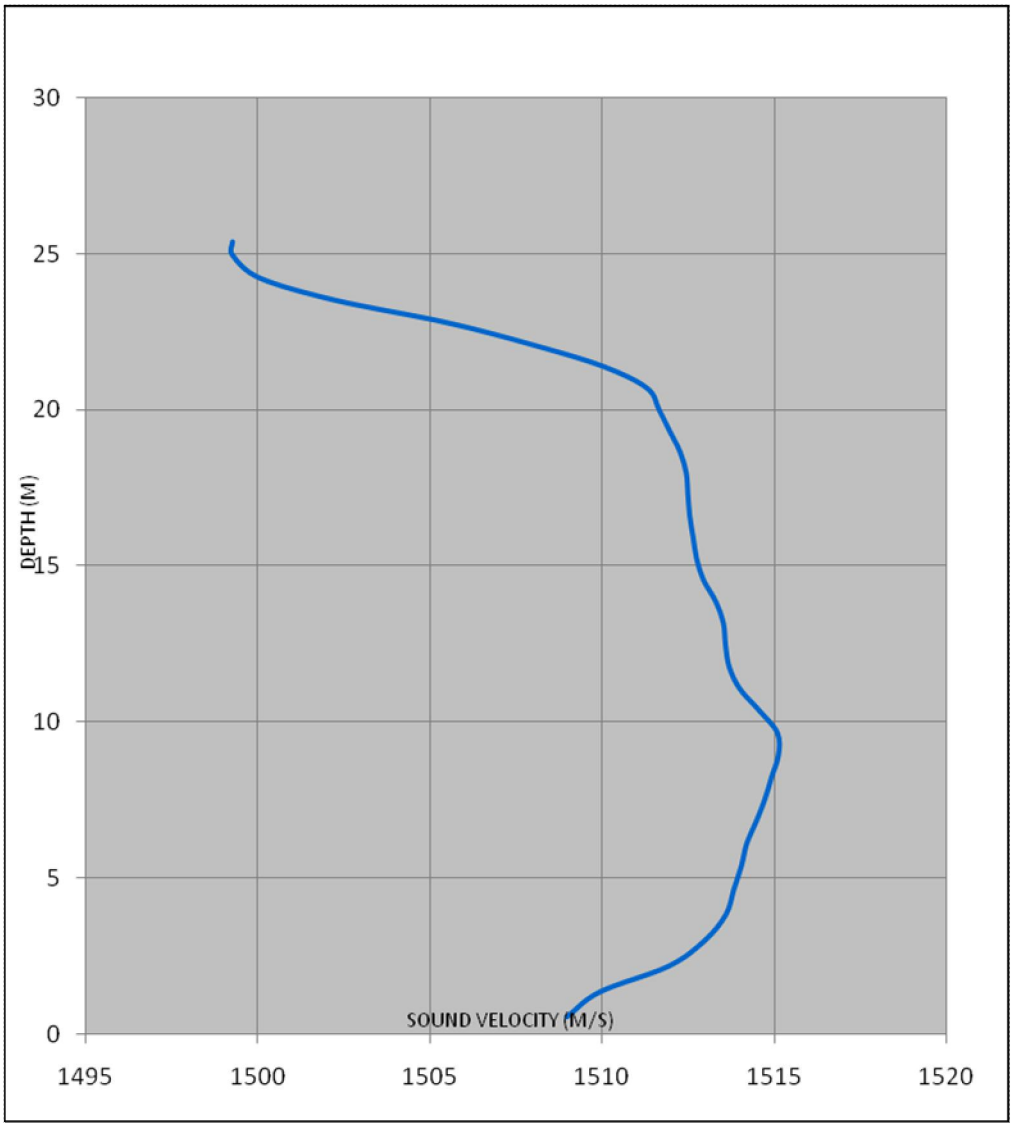


Figure 3.2-28
SVP 101810_1210 taken during the Fall 2010 multibeam survey at the HARS

1506.04	0.45
1506.23	1.10
1506.35	1.70
1506.42	2.25
1506.46	2.83
1506.49	3.39
1506.77	3.95
1507.10	4.51
1507.31	5.07
1507.42	5.64
1507.51	6.22
1507.59	6.82
1507.73	7.42
1507.97	8.02
1508.23	8.63
1508.33	9.25
1508.35	9.87
1508.34	10.51
1508.38	11.15
1508.47	11.80
1508.56	12.44
1508.66	13.07
1508.77	13.70
1508.98	14.35
1509.22	14.99
1509.31	15.64
1509.40	16.30
1509.56	16.96
1509.83	17.63
1509.81	18.30
1509.59	18.97
1509.27	19.64
1508.96	20.31
1508.72	20.99
1508.45	21.67
1508.04	22.37
1507.41	23.07
1506.00	23.77
1503.69	24.48
1501.55	24.79
1501.02	24.80

CTD PROFILE # 101810_1210

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/18/2010	12:10	1031037	77282	82	40.37867024	73.83207419

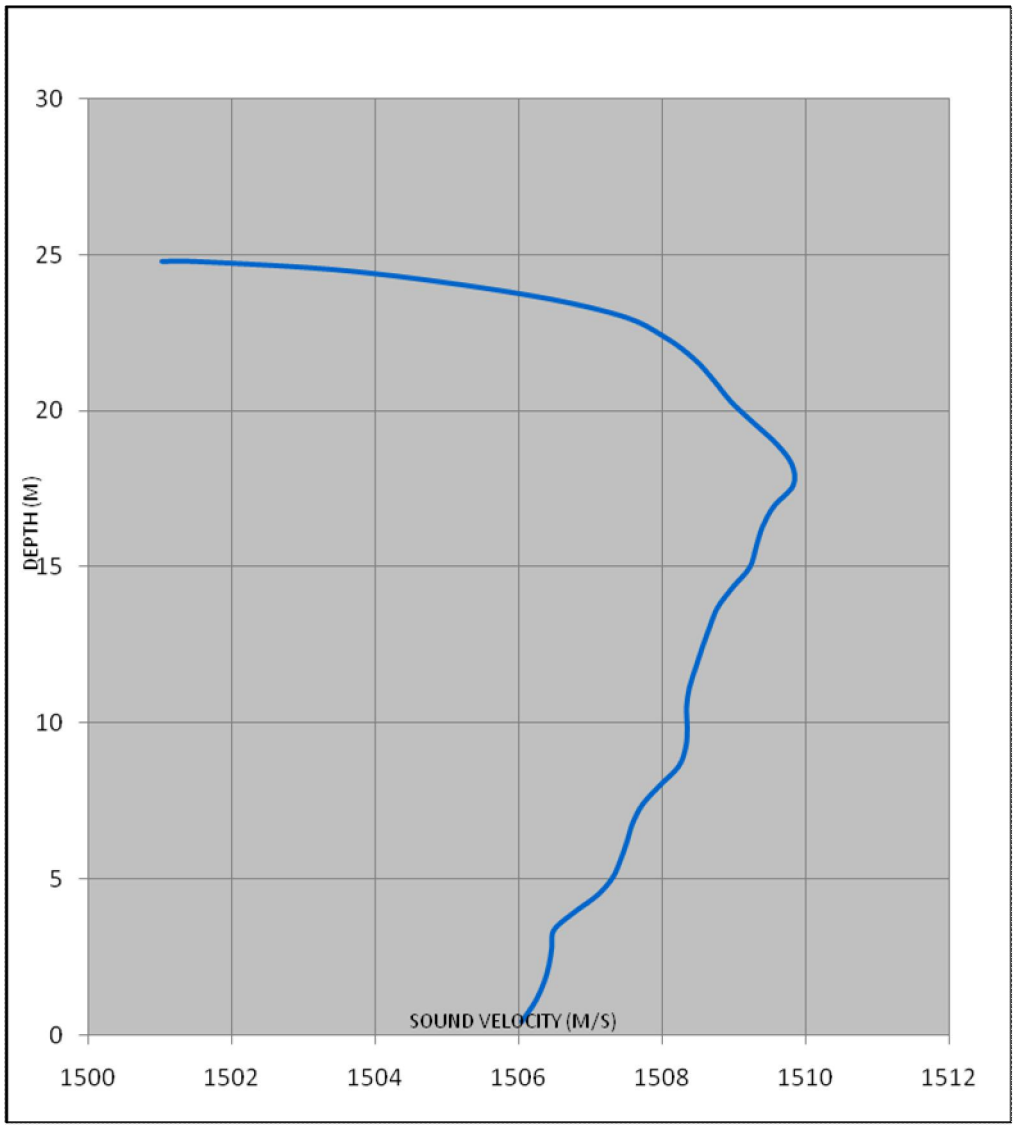


Figure 3.2-29
SVP 101810_1406 taken during the Fall 2010 multibeam survey at the HARS

1506.31	0.27
1506.38	0.99
1506.48	1.80
1506.76	2.56
1507.03	3.24
1507.61	3.90
1507.95	4.53
1508.12	5.14
1508.20	5.73
1508.29	6.30
1508.36	6.87
1508.41	7.46
1508.44	8.05
1508.49	8.64
1508.56	9.24
1508.63	9.85
1508.70	10.47
1508.75	11.10
1508.82	11.72
1508.88	12.34
1509.01	12.98
1509.12	13.61
1509.17	14.26
1509.30	14.92
1509.44	15.57
1509.49	16.23
1509.46	16.87
1509.37	17.52
1509.22	18.17
1509.13	18.83
1509.09	19.48
1509.07	20.13
1509.04	20.78
1509.01	21.40
1509.00	21.63
1509.01	21.65

CTD PROFILE # 101810_1406

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/18/2010	14:06	1029694	77323	73	40.37878975	73.83689415

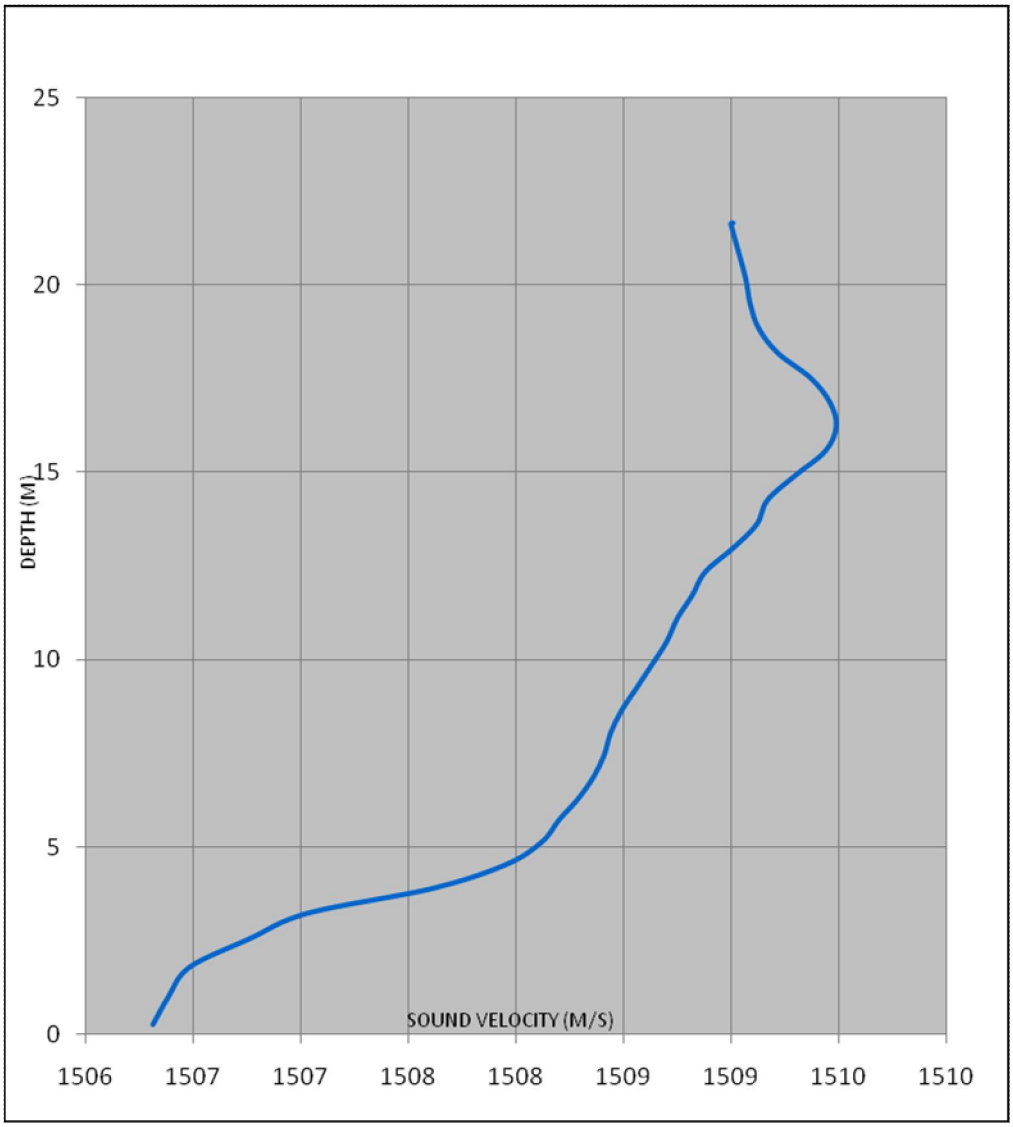


Figure 3.2-30
SVP 101810_1614 taken during the Fall 2010 multibeam survey at the HARS

1506.97	0.36
1507.37	1.13
1507.90	1.84
1508.30	2.47
1508.36	3.03
1508.38	3.60
1508.57	4.16
1508.53	4.72
1508.32	5.29
1508.21	5.87
1508.20	6.47
1508.31	7.06
1508.42	7.66
1508.65	8.27
1508.92	8.89
1509.05	9.52
1509.09	10.17
1509.09	10.82
1509.06	11.46
1509.02	12.11
1508.97	12.77
1508.96	13.43
1508.94	14.09
1508.90	14.69
1508.92	14.87
1509.00	14.92

CTD PROFILE # 101810_1614

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/18/2010	16:14	1028355	77295	49	40.37871963	73.84170020

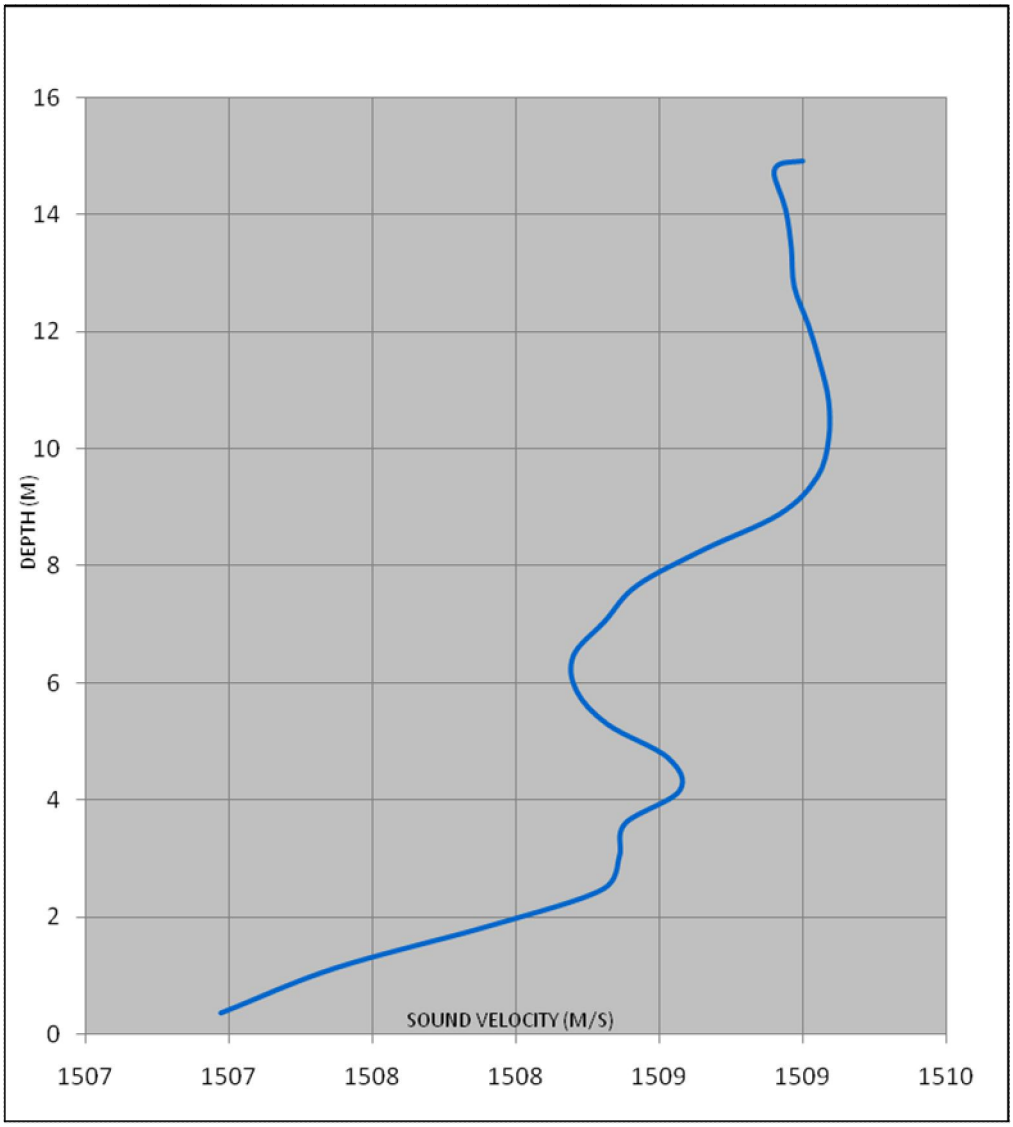


Figure 3.2-31
SVP 101810_1634 taken during the Fall 2010 multibeam survey at the HARS

1506.96	0.11
1507.11	0.83
1507.19	1.56
1507.24	2.26
1507.28	2.94
1507.32	3.64
1507.35	4.36
1507.45	5.11
1507.51	5.85
1507.55	6.60
1507.61	7.34
1507.63	8.06
1507.65	8.77
1507.72	9.48
1507.81	10.19
1507.92	10.91
1507.96	11.63
1508.07	12.32
1508.29	13.04
1508.61	13.74
1509.06	14.44
1509.32	15.13
1509.37	15.83
1509.36	16.53
1509.47	17.23
1509.69	17.94
1509.81	18.65
1509.76	19.35
1509.70	20.06
1509.64	20.76
1509.24	21.45
1508.08	22.16
1507.08	22.87
1506.47	23.58
1506.02	24.31
1504.93	24.97
1503.95	25.16

CTD PROFILE # 101810_1634

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/18/2010	16:34	1027322	67844	82	40.35278328	73.84546764

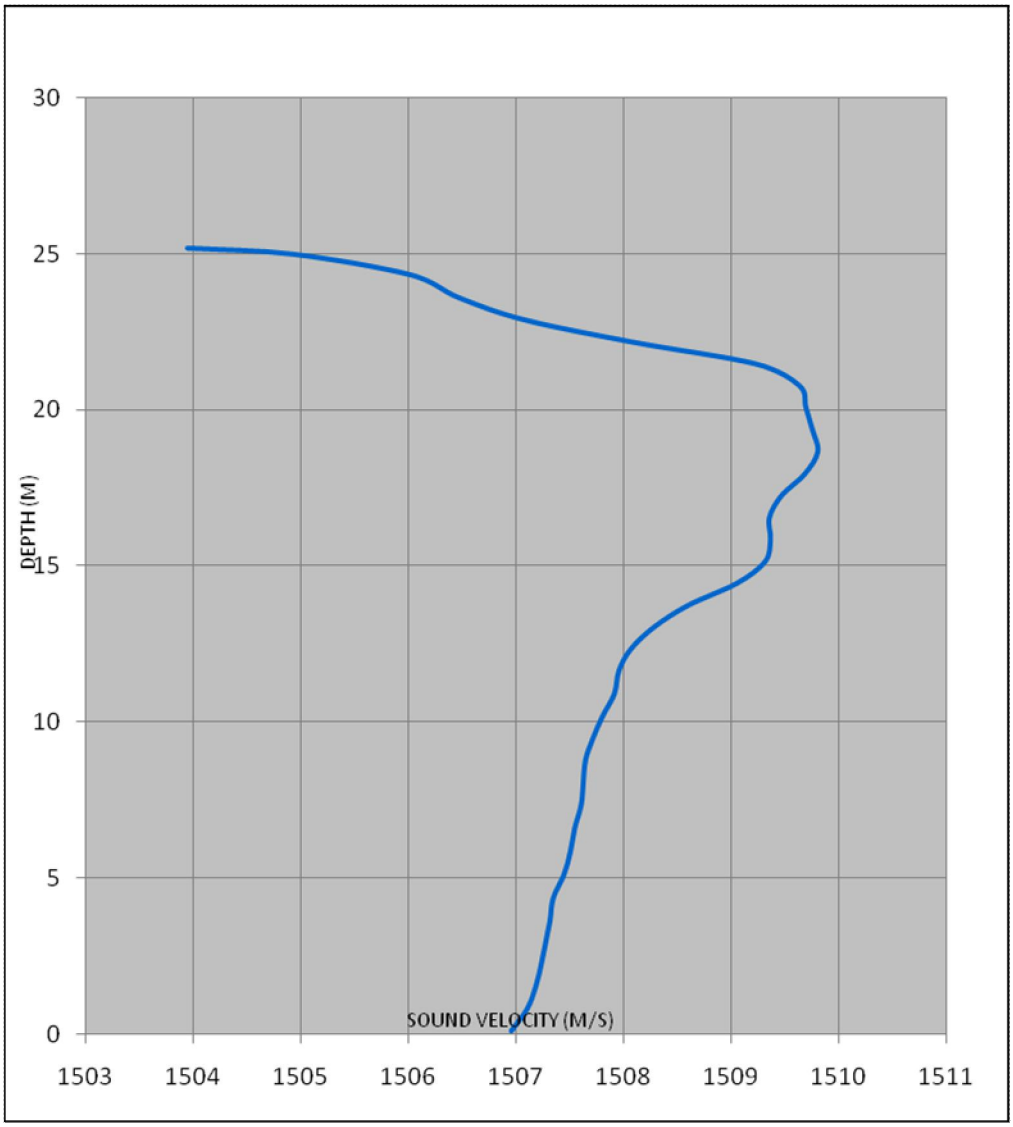


Figure 3.2-32
SVP 101810_1833 taken during the Fall 2010 multibeam survey at the HARS

1507.11	0.05
1507.02	0.71
1507.02	1.36
1507.13	2.01
1507.29	2.63
1507.43	3.25
1507.54	3.87
1507.59	4.49
1507.62	5.11
1507.64	5.74
1507.70	6.38
1507.75	6.99
1507.76	7.61
1507.80	8.23
1507.85	8.85
1507.88	9.50
1507.97	10.16
1508.12	10.81
1508.28	11.46
1508.54	12.12
1508.94	12.77
1509.34	13.42
1509.54	14.06
1509.60	14.70
1509.65	15.35
1509.65	16.00
1509.61	16.68
1509.55	17.36
1509.49	18.04
1509.46	18.72
1509.45	19.40
1509.08	20.09
1508.04	20.78
1507.05	21.47
1506.27	22.16
1505.86	22.85
1505.66	23.54
1505.59	24.16
1505.65	24.31

CTD PROFILE # 101810_1833

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/18/2010	18:33	1025800	67865	80	40.35284816	73.85092808

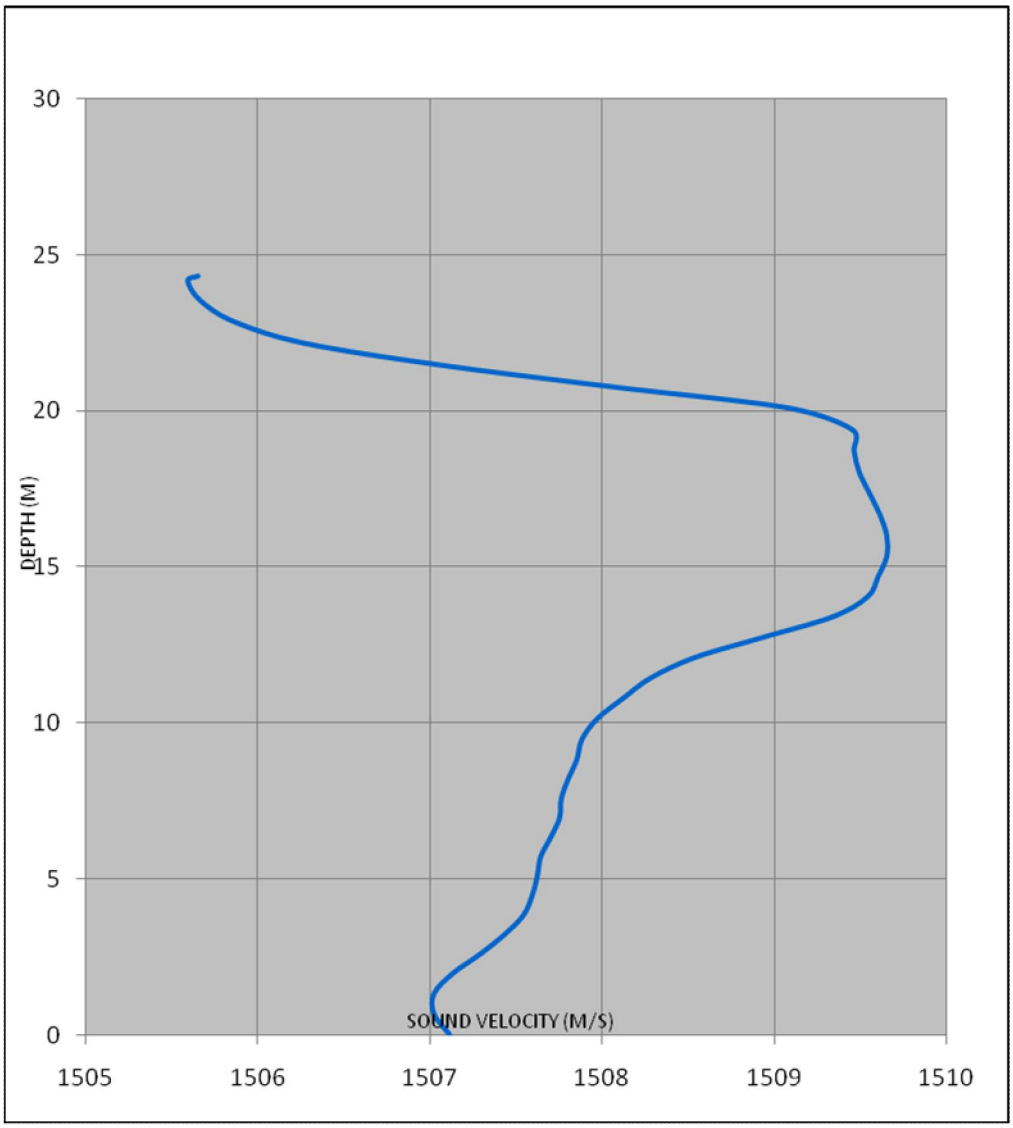


Figure 3.2-33
SVP 101910_1219 taken during the Fall 2010 multibeam survey at the HARS

1503.86	0.07
1504.11	0.75
1504.39	1.42
1504.78	2.03
1505.25	2.61
1505.68	3.15
1506.05	3.70
1506.37	4.24
1506.65	4.80
1506.95	5.36
1507.26	5.93
1507.50	6.50
1507.67	7.07
1507.81	7.65
1508.17	8.23
1508.58	8.81
1509.03	9.41
1509.52	10.00
1509.74	10.60
1509.81	11.19
1509.80	11.79
1509.73	12.40
1509.69	13.01
1509.67	13.63
1509.65	14.25
1509.64	14.88
1509.63	15.51
1509.51	16.16
1509.05	16.80
1508.20	17.44
1507.33	18.09
1506.68	18.75
1506.12	19.41
1505.76	20.07
1505.53	20.48
1505.54	20.57

CTD PROFILE # 101910_1219

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/19/2010	12:19	1023980	77299	69	40.37875124	73.85740272

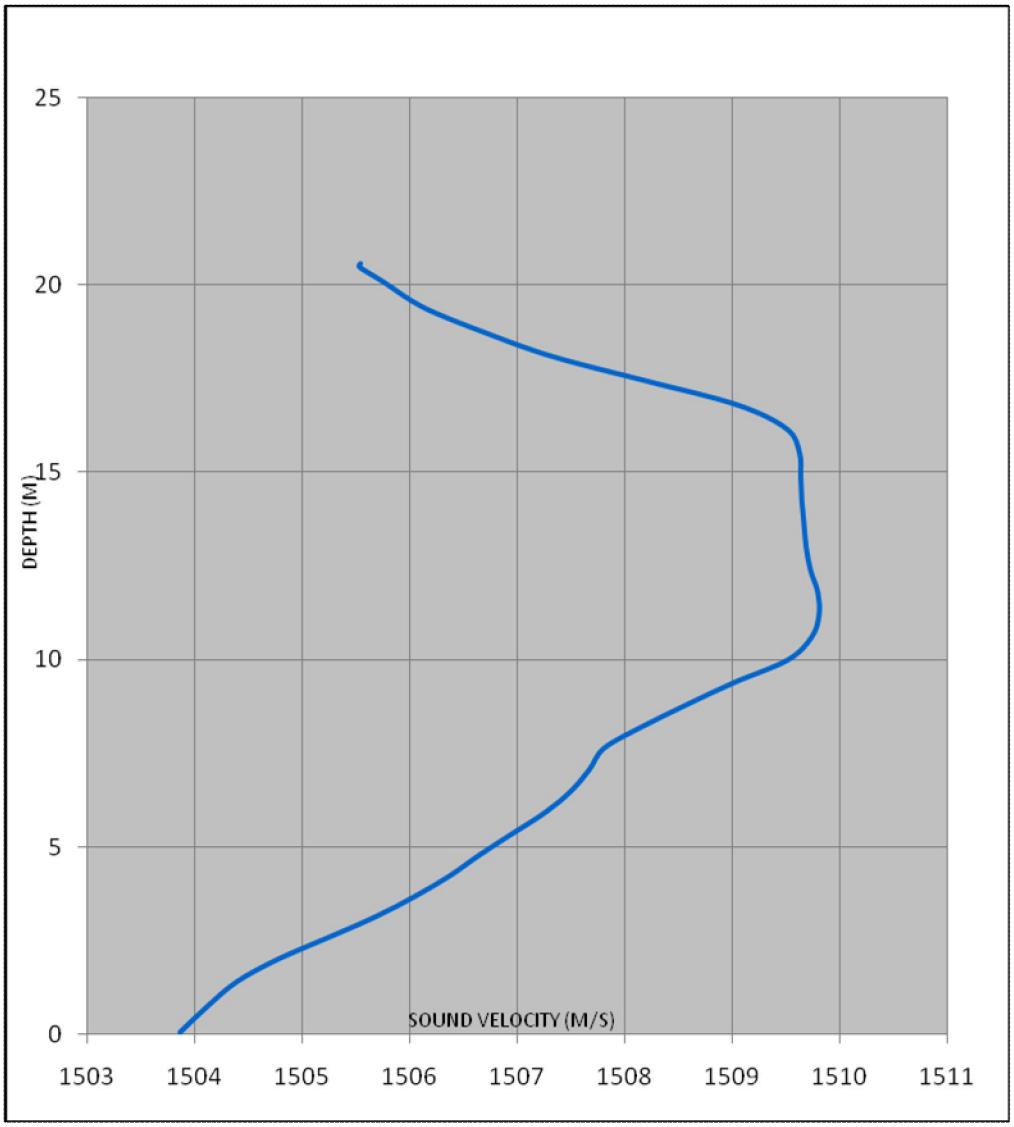


Figure 3.2-34
SVP 101910_1417 taken during the Fall 2010 multibeam survey at the HARS

1507.38	0.47
1507.43	1.24
1507.47	2.02
1507.49	2.73
1507.51	3.40
1507.53	4.04
1507.53	4.66
1507.54	5.26
1507.47	5.85
1507.38	6.44
1507.37	7.04
1507.65	7.63
1508.42	8.25
1508.90	8.88
1509.07	9.51
1509.22	10.14
1509.49	10.78
1509.65	11.42
1509.74	12.07
1509.83	12.73
1509.86	13.40
1509.88	14.07
1509.91	14.73
1509.91	15.40
1509.89	16.07
1509.84	16.74
1509.76	17.41
1509.41	18.07
1508.89	18.74
1508.41	19.41
1507.48	20.07
1505.26	20.74
1503.50	21.12

CTD PROFILE # 101910_1417

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/19/2010	14:17	1025331	73292	69	40.36774655	73.85257797

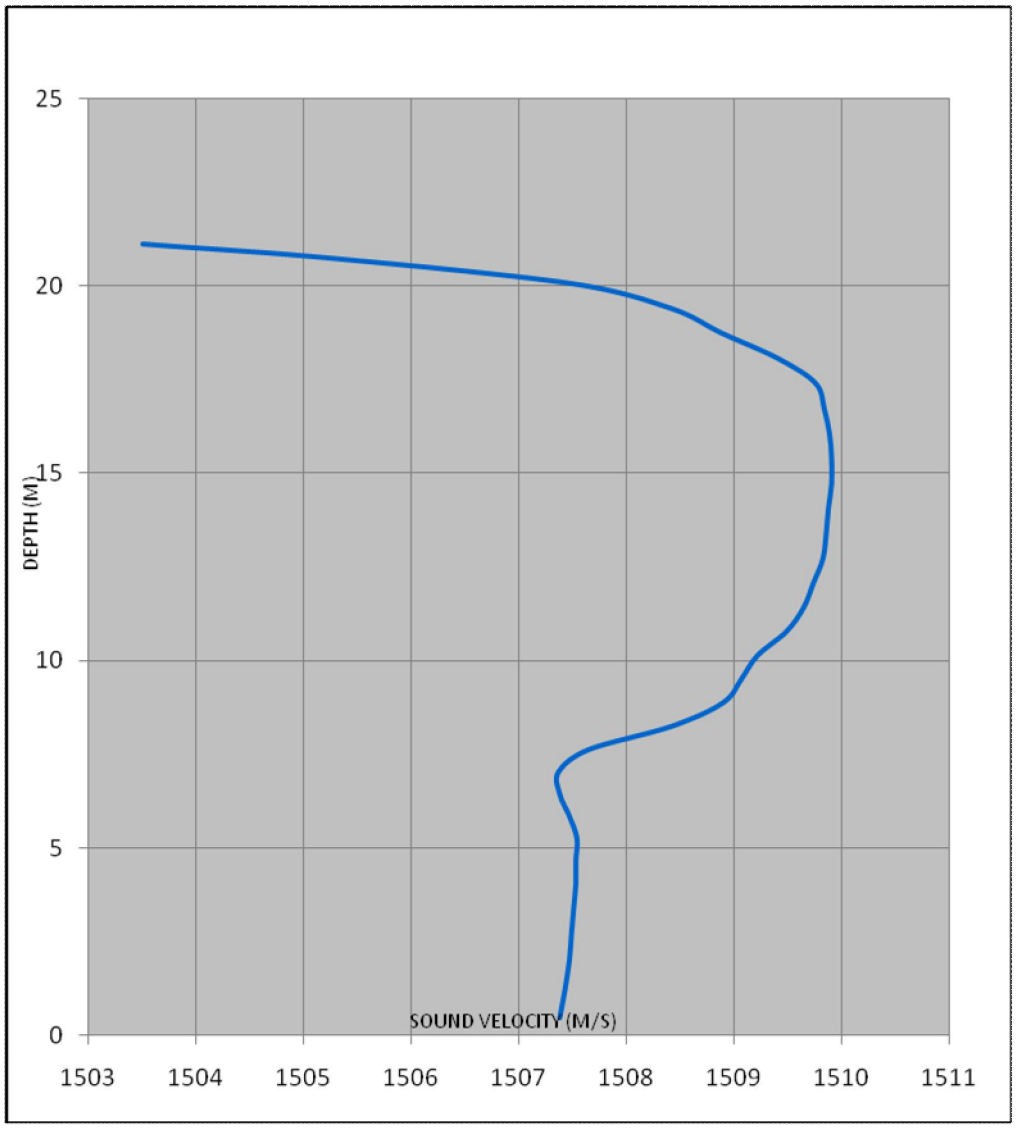


Figure 3.2-35
SVP 101910_1617 taken during the Fall 2010 multibeam survey at the HARS

1507.24	0.05
1507.45	0.73
1507.55	1.50
1507.59	2.31
1507.61	3.12
1507.62	3.95
1507.61	4.78
1507.58	5.54
1507.61	6.25
1507.80	6.95
1508.36	7.64
1508.84	8.31
1509.14	8.97
1509.33	9.65
1509.46	10.33
1509.39	11.01
1509.23	11.70
1509.28	12.39
1509.59	13.09
1509.81	13.78
1509.89	14.47
1509.90	15.16
1509.91	15.84
1509.94	16.51
1509.80	17.19
1509.41	17.87
1508.62	18.56
1507.91	19.26
1505.66	19.95
1501.63	20.65
1497.39	21.34
1495.44	22.04
1494.82	22.73
1494.77	23.24
1495.17	23.31

CTD PROFILE # 101910_1617

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/19/2010	16:17	1023082	77422	79	40.37909282	73.86062507

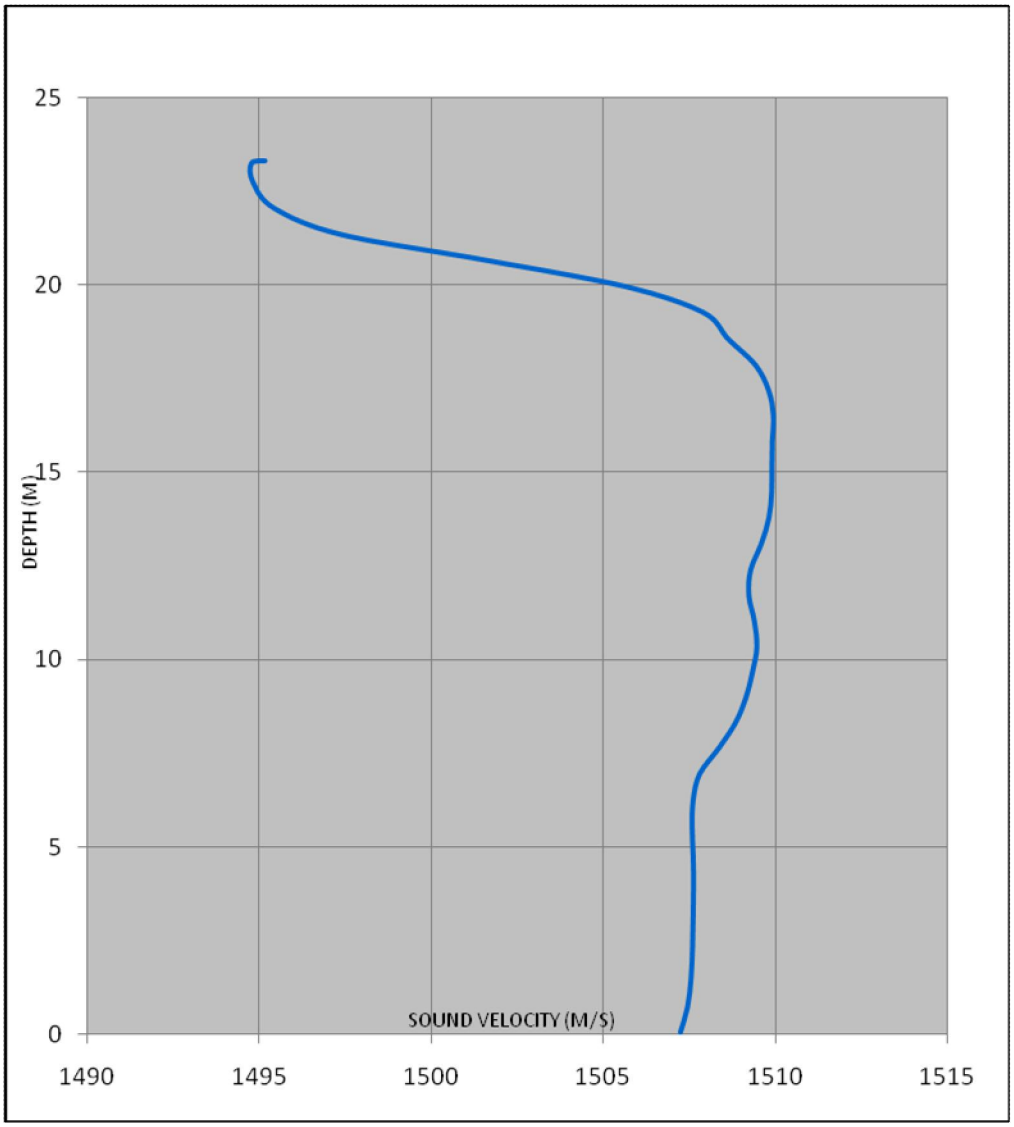


Figure 3.2-36
SVP 101910_1826 taken during the Fall 2010 multibeam survey at the HARS

1506.64	0.46
1506.73	1.19
1507.05	1.97
1507.29	2.73
1507.42	3.43
1507.44	4.12
1507.47	4.77
1507.56	5.40
1507.69	6.01
1508.09	6.59
1508.87	7.18
1509.57	7.76
1509.87	8.34
1509.98	8.93
1510.05	9.53
1510.05	10.13
1510.01	10.75
1509.98	11.38
1509.98	12.02
1509.97	12.66
1509.94	13.32
1509.90	13.96
1509.80	14.61
1509.47	15.25
1509.12	15.89
1508.86	16.53
1508.32	17.18
1507.26	17.83
1506.15	18.48
1505.02	19.14
1503.40	19.80
1501.52	20.46
1500.15	21.12
1499.63	21.41

CTD PROFILE # 101910_1826

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/19/2010	18:26	1021573	77292	73	40.37874245	73.86604185

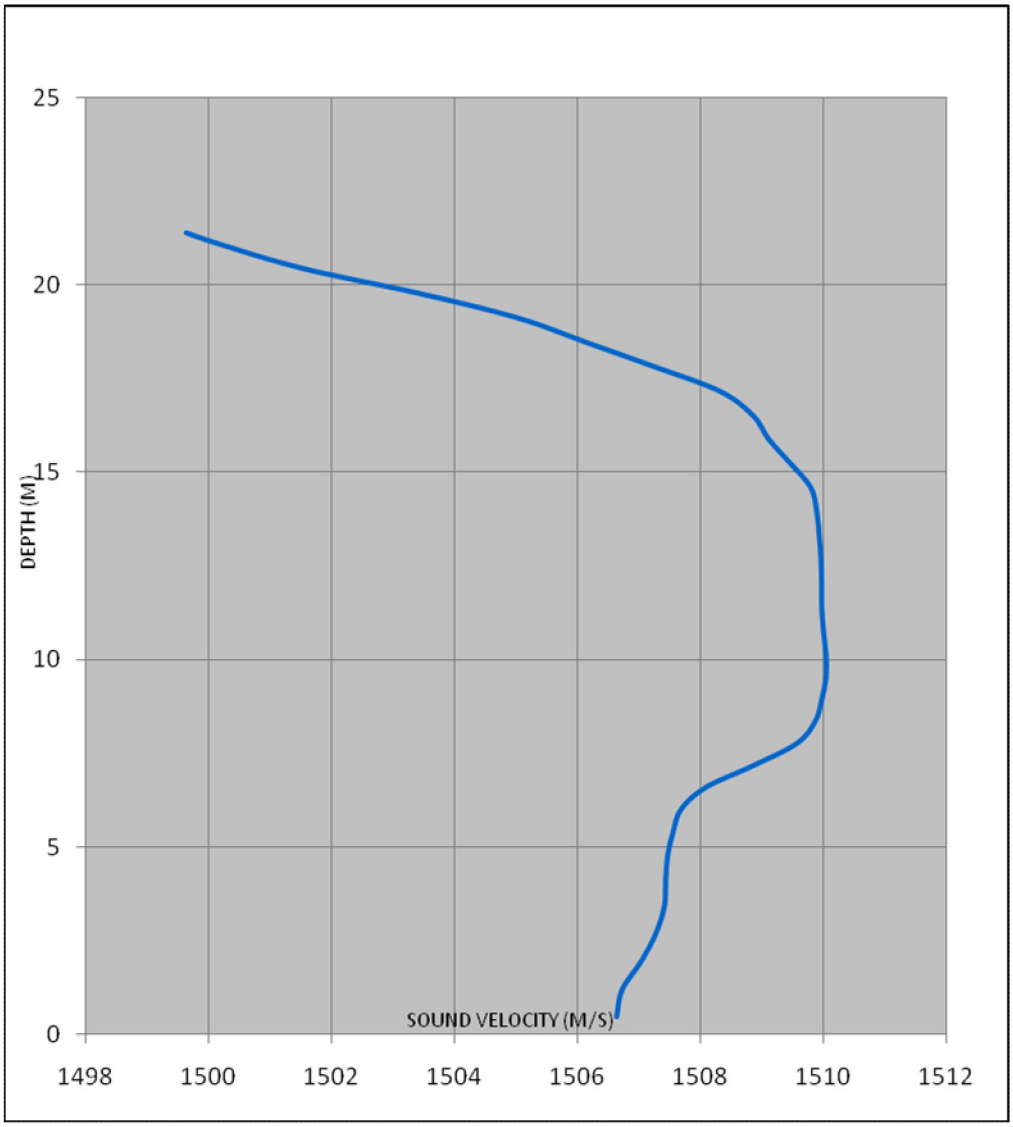


Figure 3.2-37
SVP 101910_2025 taken during the Fall 2010 multibeam survey at the HARS

1508.83	0.36
1508.64	1.14
1508.58	1.93
1508.48	2.71
1508.33	3.47
1508.24	4.23
1508.21	4.98
1508.22	5.73
1508.16	6.47
1508.24	7.21
1508.38	7.95
1508.59	8.69
1508.85	9.42
1509.31	10.16
1509.70	10.90
1509.90	11.63
1509.96	12.36
1509.86	13.09
1509.68	13.84
1509.58	14.58
1509.45	15.33
1509.06	16.05
1508.48	16.76
1507.11	17.47
1505.32	18.17
1503.64	18.88
1500.86	19.55
1498.37	20.24
1496.91	20.95
1496.22	21.67
1496.25	21.95

CTD PROFILE # 101910_2025

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/19/2010	20:25	1020099	67718	73	40.35246947	73.87138271

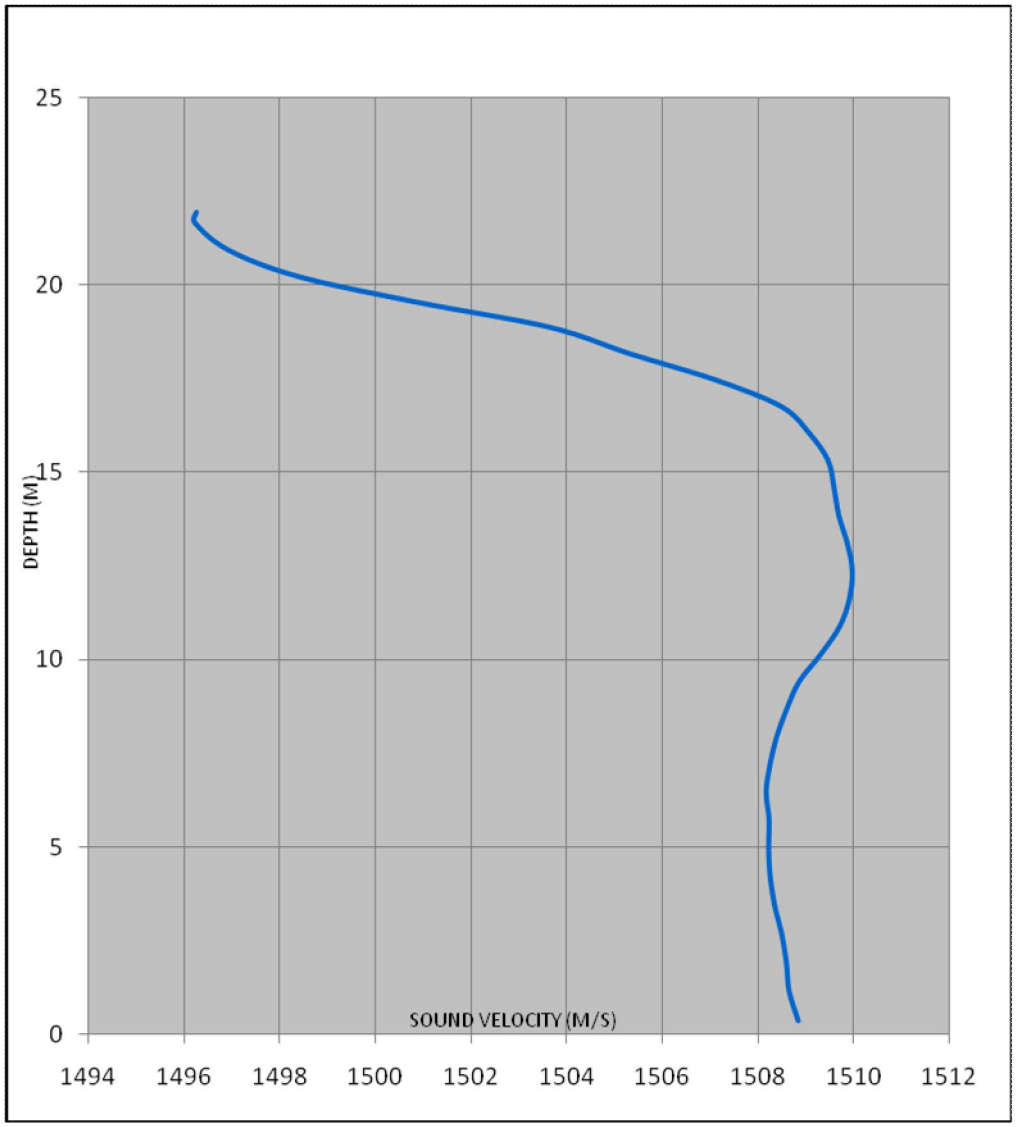


Figure 3.2-38
SVP 101910_2129 taken during the Fall 2010 multibeam survey at the HARS

1506.45	0.05
1506.69	0.85
1506.92	1.67
1507.10	2.42
1507.59	3.13
1507.90	3.81
1507.92	4.49
1507.85	5.16
1508.05	5.83
1508.64	6.50
1508.94	7.16
1509.03	7.84
1509.22	8.52
1509.54	9.22
1509.79	9.91
1509.84	10.59
1509.83	11.25
1509.79	11.93
1509.72	12.60
1509.69	13.27
1509.67	13.95
1509.61	14.62
1509.38	15.30
1508.83	15.99
1508.22	16.69
1507.78	17.38
1507.43	18.06
1507.04	18.75
1506.20	19.45
1503.97	20.16
1501.76	20.87
1500.18	21.57
1499.12	22.28
1498.58	23.00
1498.35	23.68

CTD PROFILE # 101910_2129

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/19/2010	21:29	1019587	77054	79	40.37809730	73.87317114

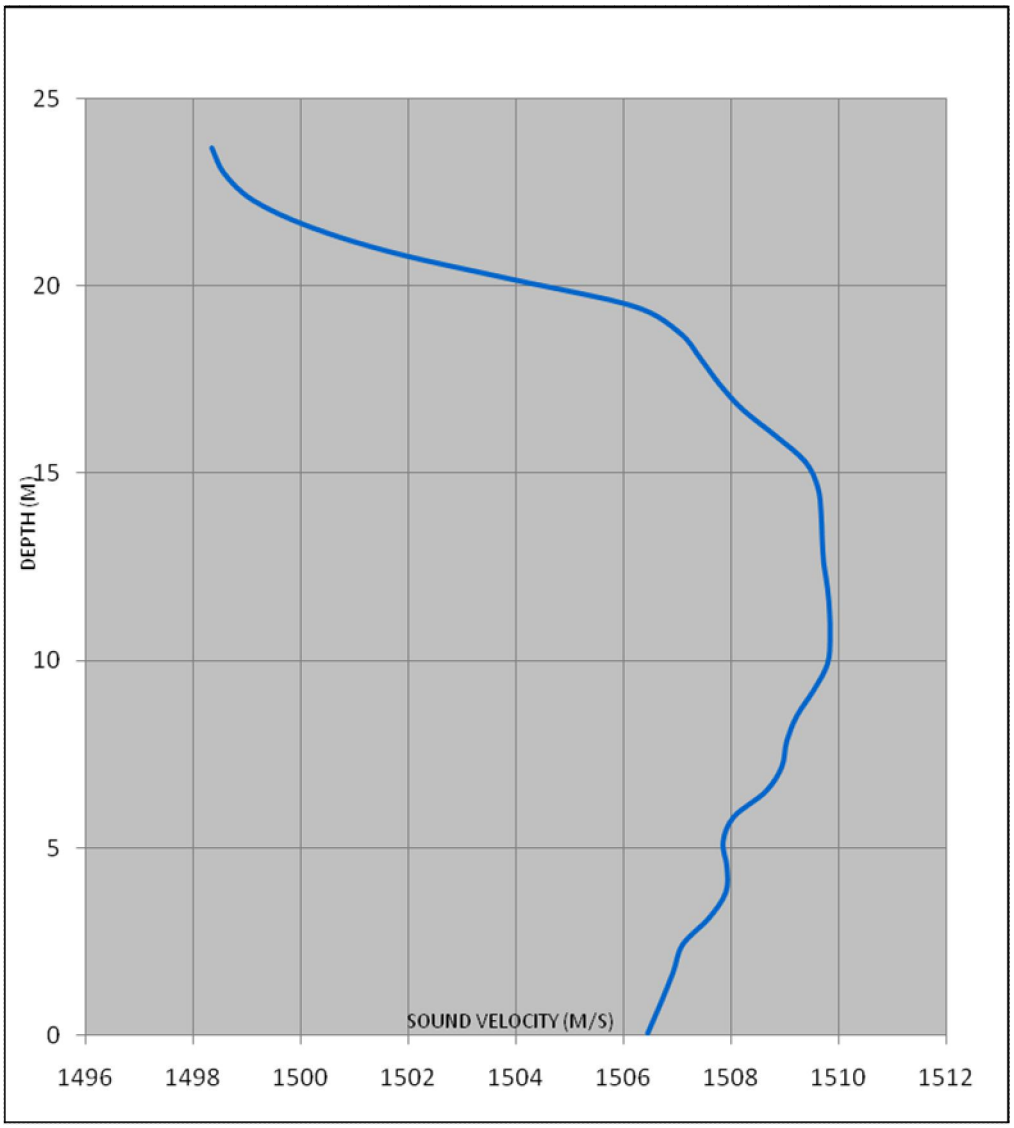


Figure 3.2-39
SVP 102010_1239 taken during the Fall 2010 multibeam survey at the HARS

1500.38	0.39
1502.00	1.12
1502.60	1.91
1503.68	2.72
1505.61	3.44
1507.24	4.08
1507.93	4.63
1508.24	5.15
1508.58	5.74
1508.91	6.35
1509.12	6.93
1509.28	7.59
1509.45	8.31
1509.57	9.03
1509.63	9.75
1509.66	10.45
1509.66	11.13
1509.66	11.82
1509.67	12.51
1509.69	13.21
1509.67	13.92
1509.10	14.59
1508.20	15.26
1507.30	15.94
1506.43	16.60
1503.96	17.25
1500.29	17.89
1498.17	18.35
1496.91	18.95
1496.30	19.46
1496.47	19.51

CTD PROFILE # 102010_1239

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/20/2010	12:39	1011552	76534	67	40.37669829	73.90201181

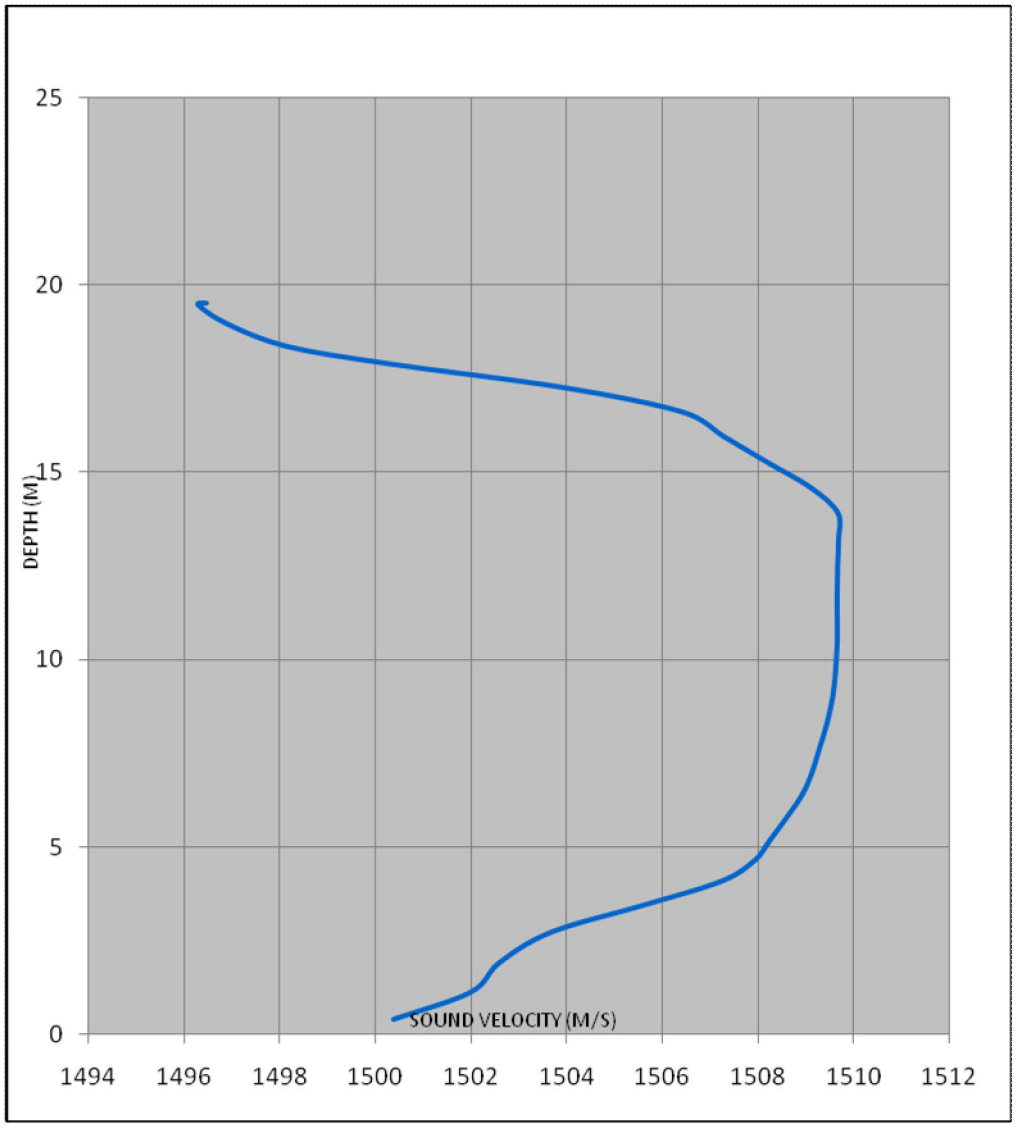


Figure 3.2-40
SVP 102010_1445 taken during the Fall 2010 multibeam survey at the HARS

1501.99	0.56
1502.66	1.34
1503.70	2.05
1505.77	2.75
1507.81	3.40
1508.63	4.04
1508.94	4.68
1509.10	5.32
1509.27	5.98
1509.46	6.65
1509.57	7.32
1509.64	7.99
1509.64	8.67
1509.62	9.32
1509.62	9.96
1509.62	10.61
1509.57	11.24
1509.53	11.85
1509.57	12.47
1509.59	13.05
1509.47	13.60
1509.20	14.19
1508.62	14.82
1507.23	15.43
1505.87	15.64
1505.88	15.69

CTD PROFILE # 102010_1445

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/20/2010	14:45	1012643	67659	52	40.35233445	73.89813320

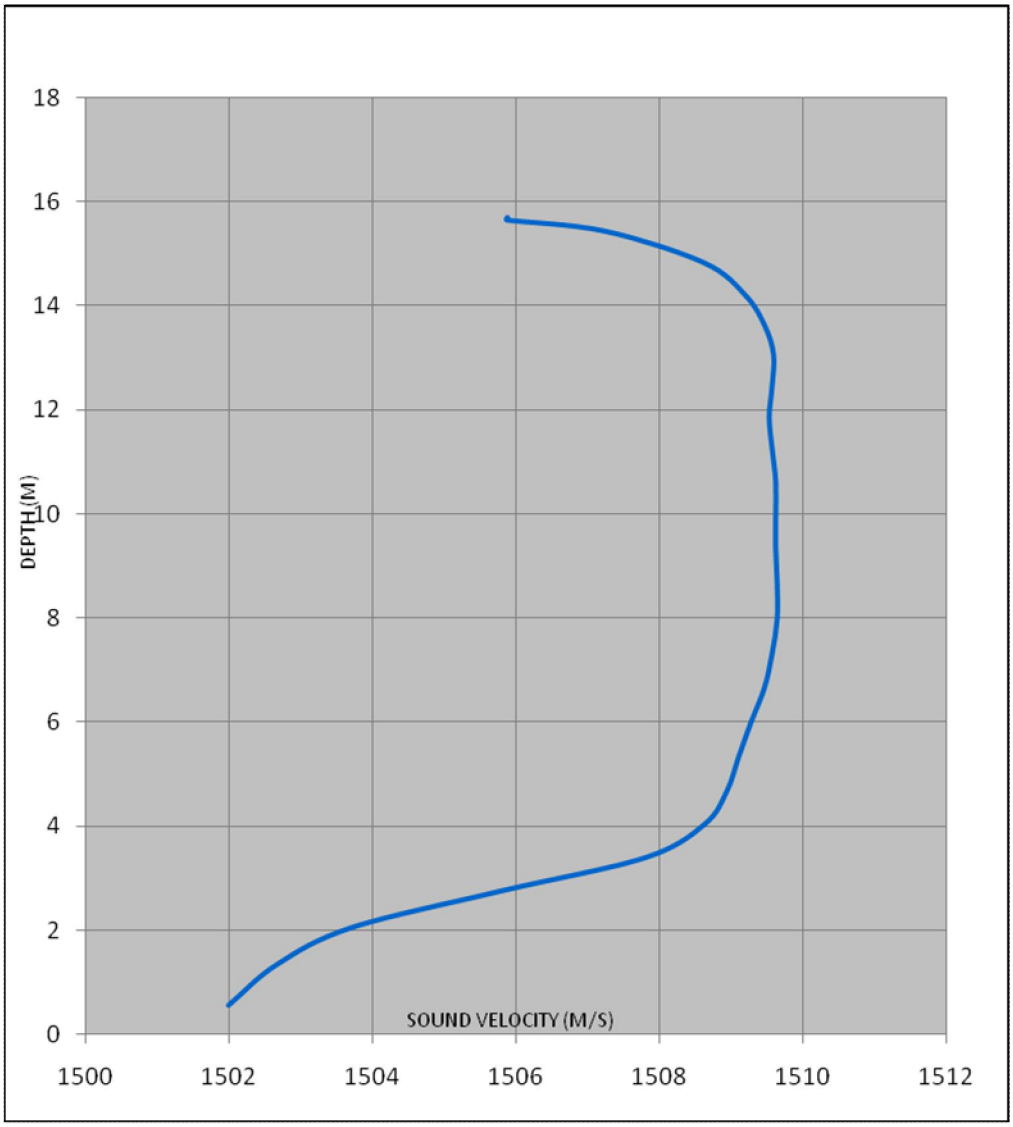


Figure 3.2-41
SVP 102010_1658 taken during the Fall 2010 multibeam survey at the HARS

1503.64	0.68
1505.78	1.49
1506.52	2.27
1507.16	3.00
1507.69	3.68
1508.00	4.32
1508.15	4.96
1508.22	5.60
1508.55	6.23
1509.09	6.85
1509.41	7.48
1509.57	8.15
1509.63	8.80
1509.66	9.45
1509.69	10.10
1509.69	10.73
1509.66	11.38
1509.50	12.01
1509.22	12.66
1508.76	13.29
1507.86	13.89
1506.50	14.51
1504.34	15.06
1502.74	15.57
1501.99	16.07
1501.59	16.53
1501.26	17.01
1500.95	17.52
1500.59	18.01
1499.84	18.48
1499.16	18.92
1498.68	19.35
1498.11	19.70
1497.57	20.03
1497.26	20.39
1497.41	20.66

CTD PROFILE # 102010_1658

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/20/2010	16:58	1014272	77797	68	40.38015624	73.89224403

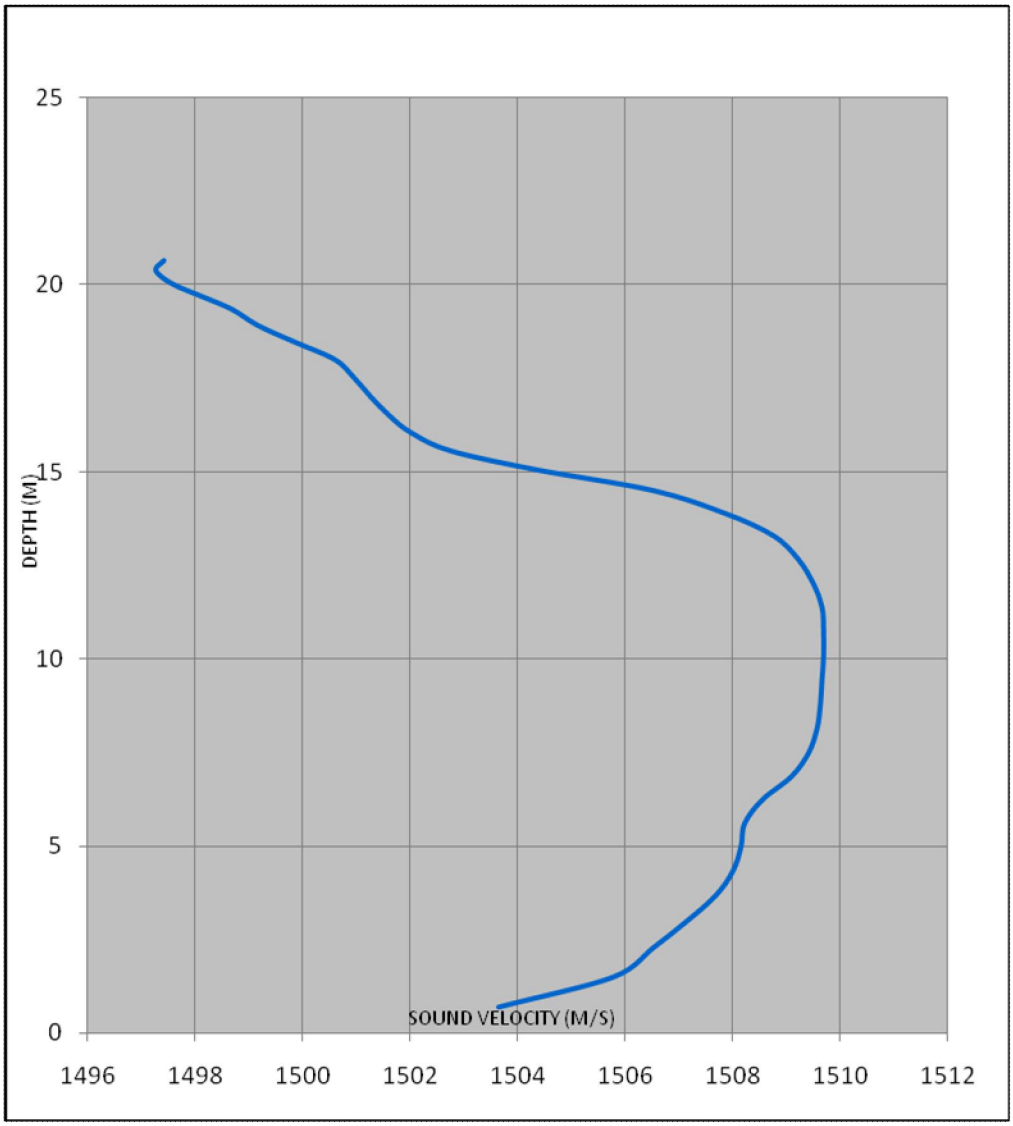


Figure 3.2-42
SVP 102010_1855 taken during the Fall 2010 multibeam survey at the HARS

1506.28	0.27
1506.92	1.02
1507.11	1.75
1507.22	2.46
1507.34	3.13
1507.79	3.79
1508.07	4.40
1508.23	4.99
1508.50	5.56
1508.89	6.14
1509.17	6.72
1509.44	7.32
1509.62	7.93
1509.69	8.59
1509.71	9.25
1509.73	9.91
1509.73	10.55
1509.74	11.19
1509.74	11.83
1509.57	12.47
1509.19	13.11
1508.58	13.75
1507.77	14.38
1506.79	15.01
1505.66	15.65
1504.46	16.28
1503.40	16.93
1501.57	17.58
1499.73	18.23
1498.33	18.88
1497.50	19.53
1496.80	20.18
1496.22	20.83
1496.02	21.33
1496.32	21.41

CTD PROFILE # 102010_1855

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/20/2010	18:55	1015311	77542	72	40.37945274	73.88851599

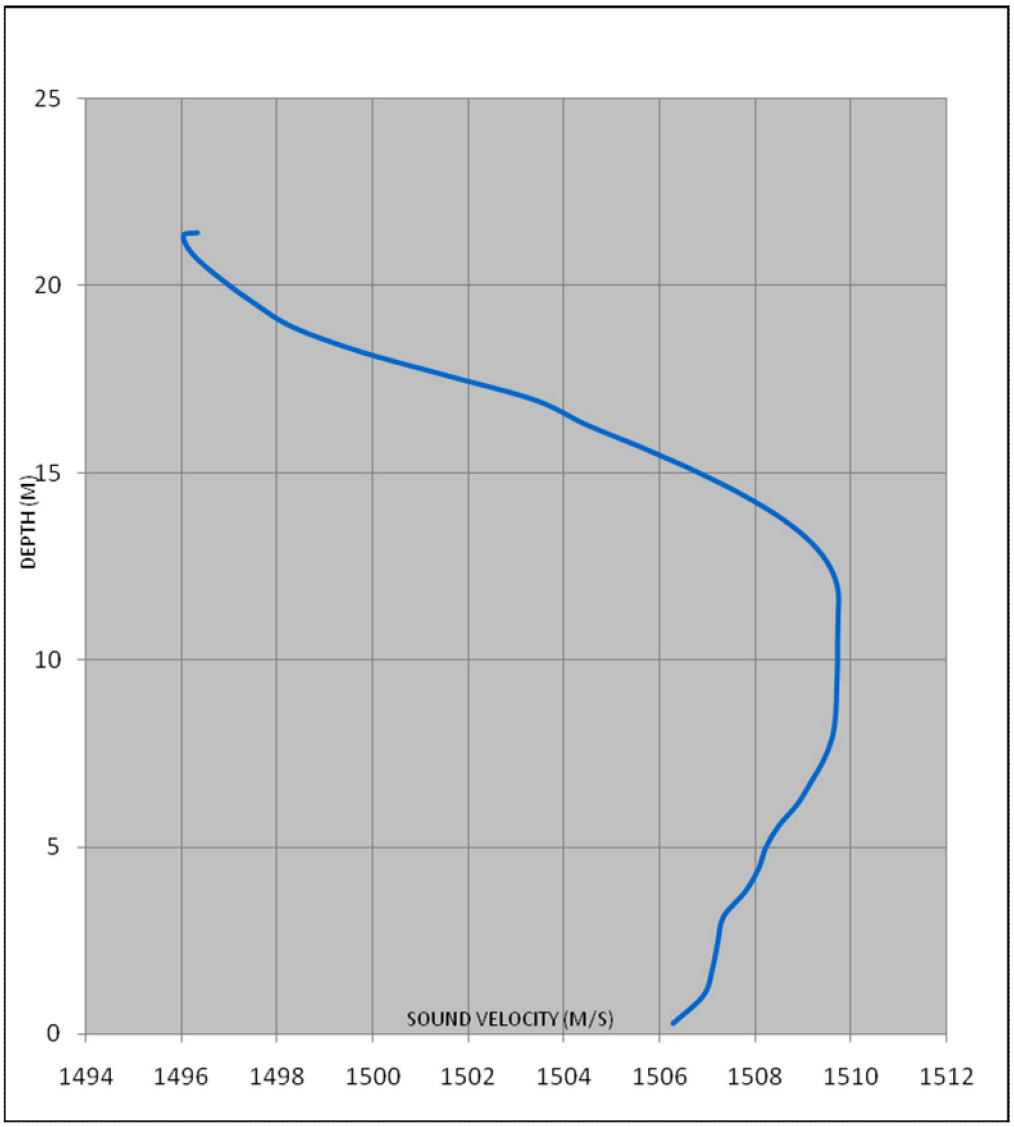


Figure 3.2-43
SVP 102010_2038 taken during the Fall 2010 multibeam survey at the HARS

1504.46	0.18
1504.34	0.94
1504.59	1.66
1506.21	2.31
1507.68	2.93
1508.40	3.52
1508.98	4.10
1509.35	4.68
1509.50	5.26
1509.59	5.83
1509.65	6.41
1509.68	6.99
1509.64	7.58
1509.57	8.16
1509.51	8.75
1509.48	9.33
1509.47	9.93
1509.46	10.51
1509.42	11.09
1509.39	11.69
1509.44	12.28
1509.59	12.90
1509.65	13.51
1509.58	14.15
1509.38	14.80
1508.97	15.46
1507.89	16.11
1504.82	16.76
1501.57	17.42
1499.53	18.07
1498.29	18.71
1497.96	19.01

CTD PROFILE # 102010_2038

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/20/2010	20:38	1015960	67865	62	40.35288868	73.88623171

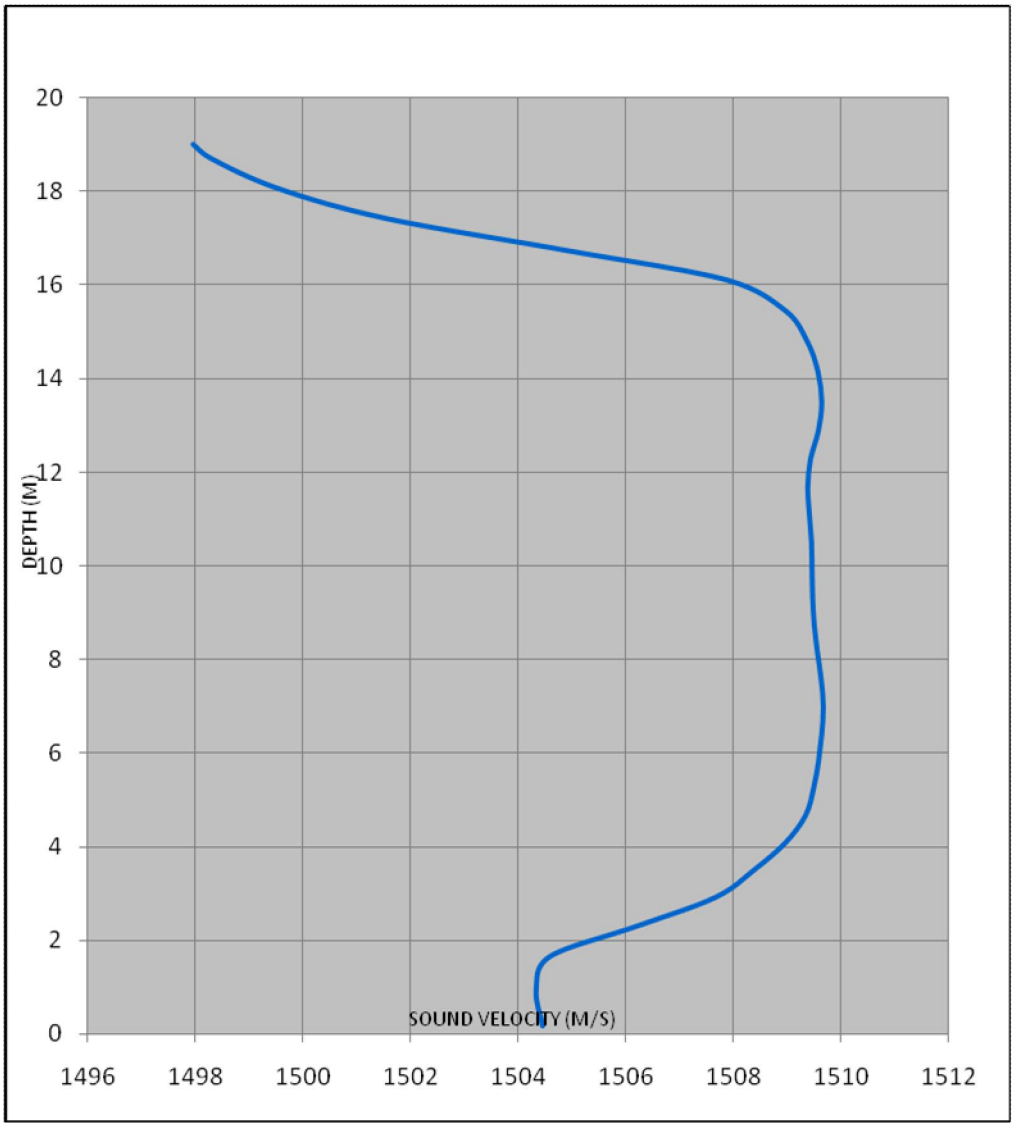


Figure 3.2-44
SVP 102010_2143 taken during the Fall 2010 multibeam survey at the HARS

1505.10	0.32
1505.41	1.10
1506.58	1.85
1507.98	2.54
1508.72	3.20
1509.12	3.80
1509.38	4.38
1509.55	4.95
1509.65	5.51
1509.70	6.07
1509.72	6.64
1509.74	7.22
1509.75	7.81
1509.75	8.39
1509.73	8.98
1509.68	9.57
1509.62	10.17
1509.57	10.77
1509.53	11.38
1509.51	11.98
1509.51	12.59
1509.54	13.19
1509.61	13.81
1509.58	14.42
1509.37	15.04
1508.95	15.66
1508.27	16.29
1506.36	16.93
1503.16	17.58
1500.69	18.23
1498.84	18.88
1497.67	19.52
1496.94	20.17
1496.50	20.82
1496.23	21.47
1496.04	22.12
1495.92	22.77
1496.05	23.07

CTD PROFILE # 102010_2143

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
10/20/2010	21:43	1016107	77304	75	40.37879666	73.88566010

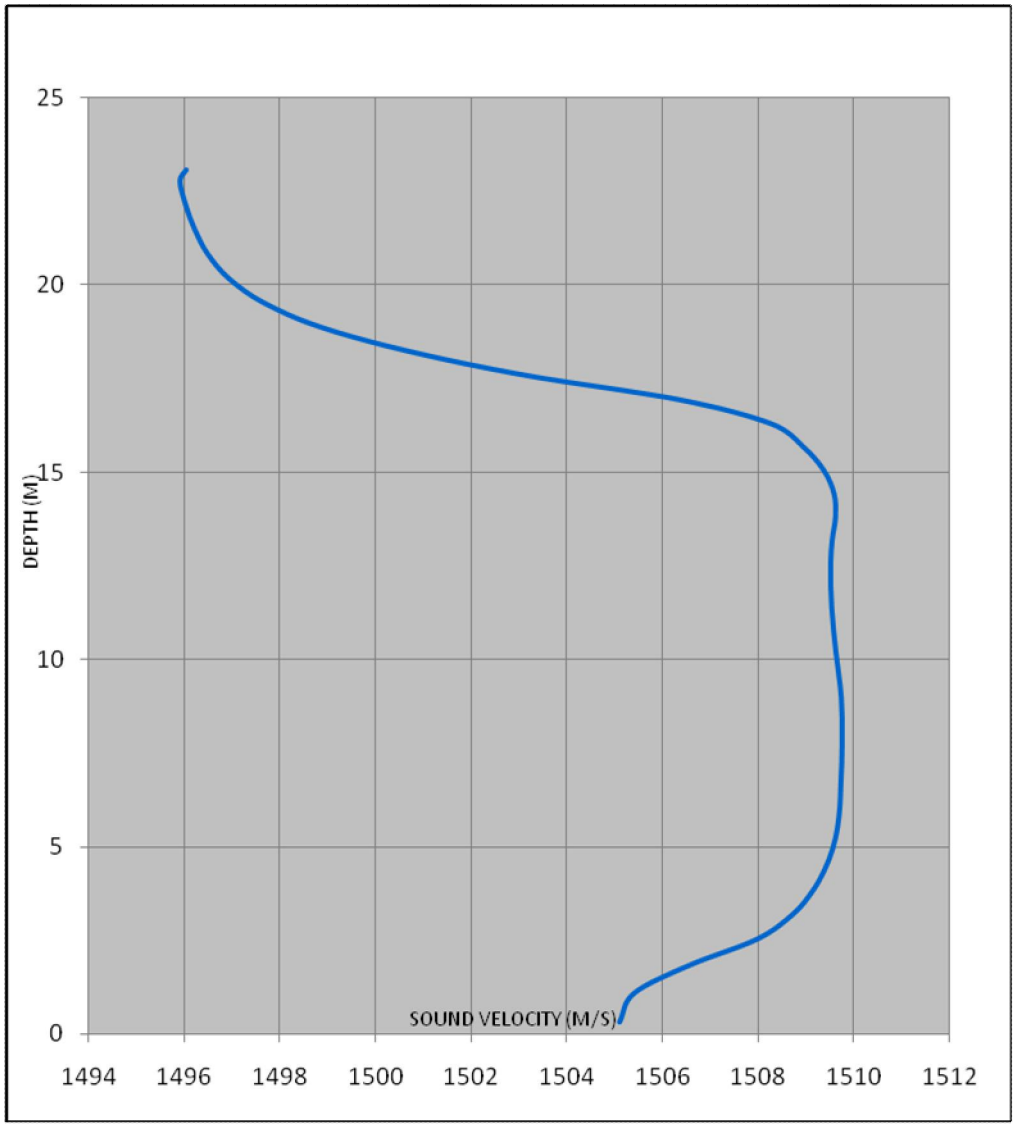


Figure 3.2-45
SVP 110210_1306 taken during the Fall 2010 multibeam survey at the HARS

1500.47	0.40
1500.59	1.01
1500.62	1.56
1500.63	2.11
1500.64	2.67
1500.64	3.23
1500.64	3.79
1500.66	4.36
1500.68	4.94
1500.71	5.54
1500.74	6.13
1500.77	6.74
1500.80	7.35
1500.81	7.95
1500.82	8.56
1500.82	9.16
1500.79	9.77
1500.79	10.38
1500.81	11.00
1500.75	11.64
1500.66	12.28
1500.58	12.92
1500.54	13.57
1500.52	14.21
1500.52	14.86
1500.53	15.52
1500.55	16.17
1500.54	16.83
1500.51	17.49
1500.66	18.15
1500.63	18.82
1500.15	19.48
1499.99	20.14
1499.82	20.71
1499.74	20.85
1499.72	20.89
1499.72	20.90

CTD PROFILE # 110210_1306

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/2/2010	13:06	1018392	77321	69	40.37883484	73.87745880

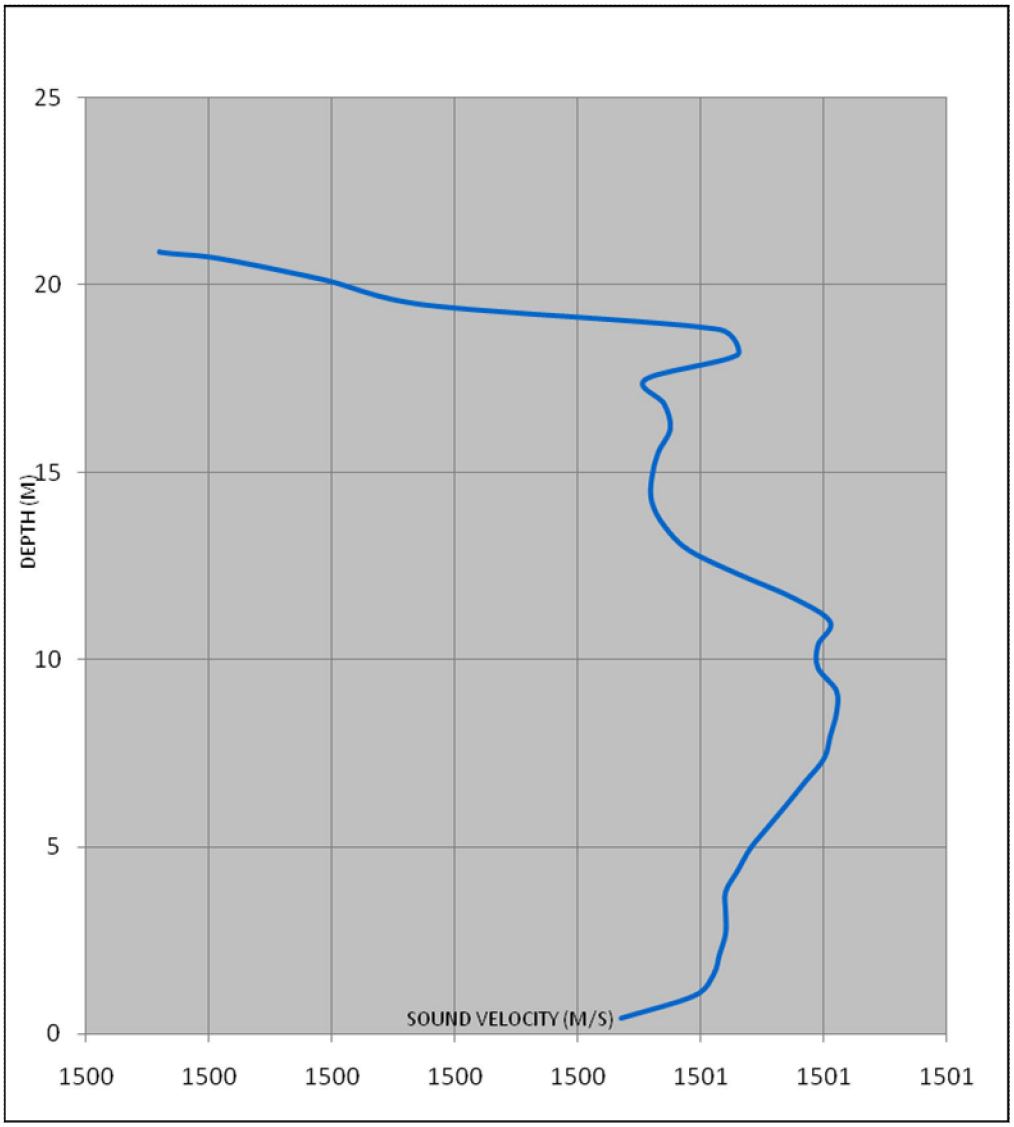


Figure 3.2-46
SVP 110210_1519 taken during the Fall 2010 multibeam survey at the HARS

1498.02	0.13
1497.70	0.82
1497.56	1.49
1497.53	2.11
1497.52	2.69
1497.56	3.24
1497.60	3.76
1497.64	4.29
1497.65	4.85
1497.69	5.43
1497.82	6.00
1498.00	6.54
1498.23	7.08
1498.52	7.66
1498.77	8.24
1498.99	8.84
1499.22	9.41
1499.47	9.97
1499.69	10.54
1499.86	11.12
1499.97	11.71
1500.04	12.30
1500.08	12.92
1500.15	13.52
1500.22	14.14
1500.40	14.77
1500.55	15.41
1500.18	16.05
1500.03	16.71
1499.91	17.37
1499.83	18.02
1499.79	18.67
1499.75	19.31
1499.70	19.96
1499.63	20.60
1499.60	21.25
1499.61	21.73
1499.66	21.81

CTD PROFILE # 110210_1519

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/2/2010	15:19	1018647	77333	73	40.37886679	73.87654350

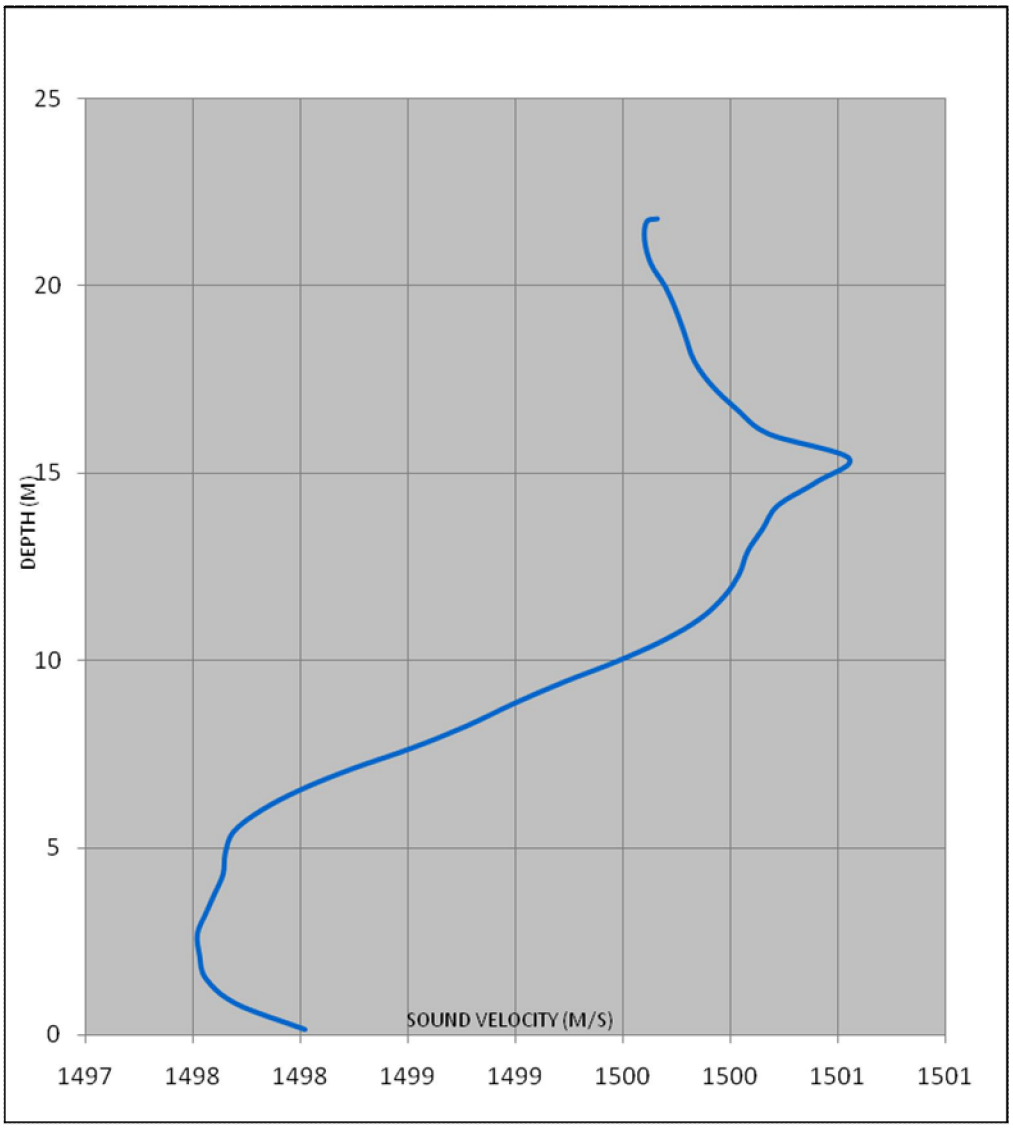


Figure 3.2-47
SVP 110210_1817 taken during the Fall 2010 multibeam survey at the HARS

1491.80	0.69
1493.07	1.40
1493.72	2.02
1494.39	2.60
1495.00	3.22
1495.68	3.85
1496.48	4.50
1497.59	5.13
1498.96	5.77
1499.85	6.39
1500.48	7.02
1500.93	7.64
1501.20	8.26
1501.44	8.88
1501.60	9.51
1501.63	10.14
1501.58	10.77
1501.51	11.41
1501.40	12.05
1501.25	12.69
1501.04	13.33
1500.36	13.98
1499.89	14.64
1499.64	15.30
1499.50	15.95
1499.45	16.59
1499.45	17.17
1499.46	17.32
1499.47	17.33
1499.47	17.37

CTD PROFILE # 110210_1817

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/2/2010	18:17	1023987	86571	58	40.40420129	73.85732339

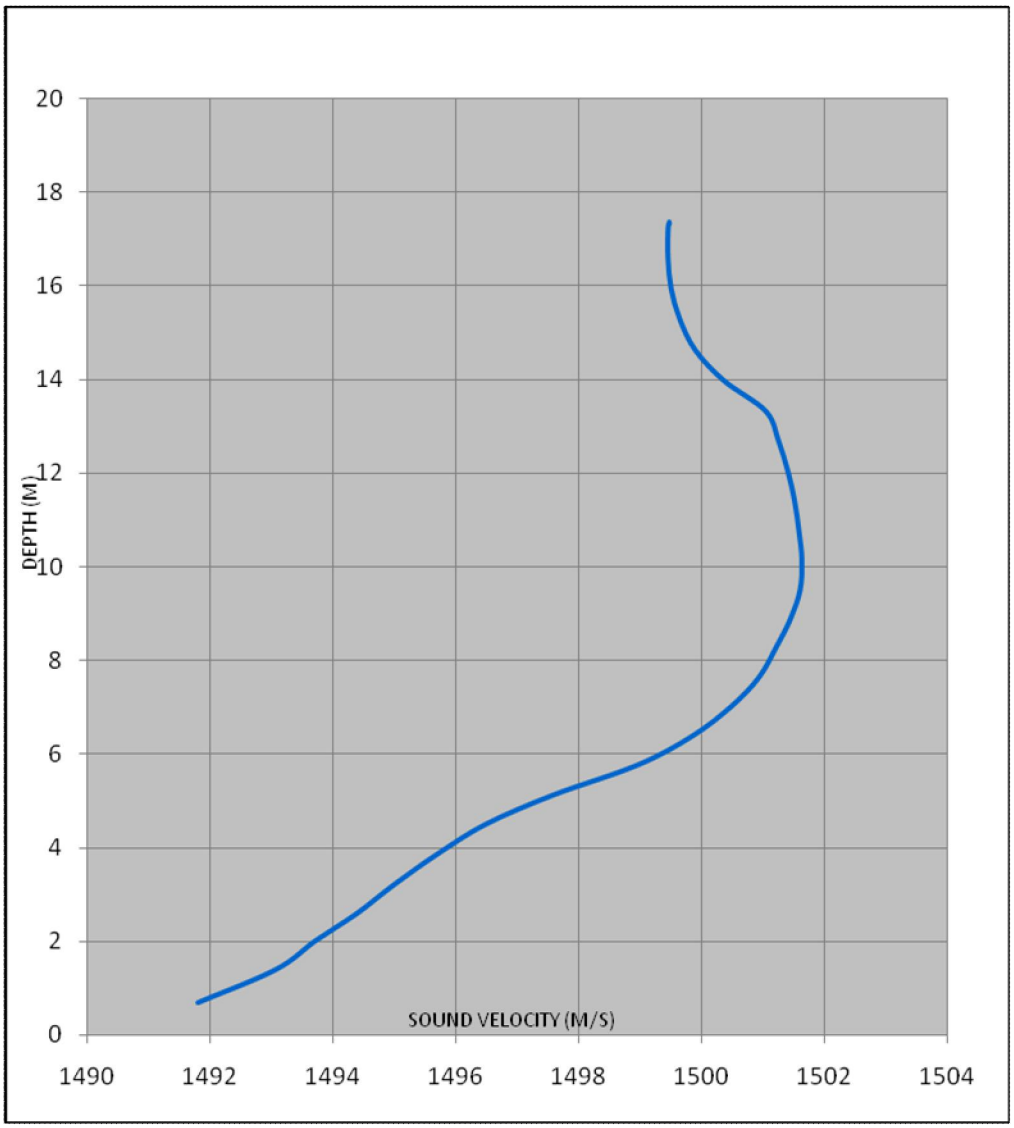


Figure 3.2-48
SVP 110210_2022 taken during the Fall 2010 multibeam survey at the HARS

1496.99	0.43
1498.17	1.25
1499.50	2.01
1500.51	2.68
1501.20	3.30
1501.61	3.90
1501.85	4.49
1502.00	5.11
1502.13	5.73
1502.26	6.35
1502.34	6.97
1502.31	7.61
1502.22	8.26
1502.10	8.91
1501.99	9.56
1501.84	10.22
1501.65	10.89
1501.51	11.56
1501.44	12.23
1501.42	12.90
1501.42	13.56
1501.45	14.23
1501.57	14.88
1501.71	15.54
1501.61	16.19
1501.36	16.85
1501.19	17.51
1501.04	18.18
1500.87	18.86
1500.67	19.55
1500.46	20.25
1500.21	20.94
1499.97	21.63
1499.79	22.32
1499.74	22.81

CTD PROFILE # 110210_2022

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/2/2010	20:22	1022686	77037	76	40.37803778	73.86204856

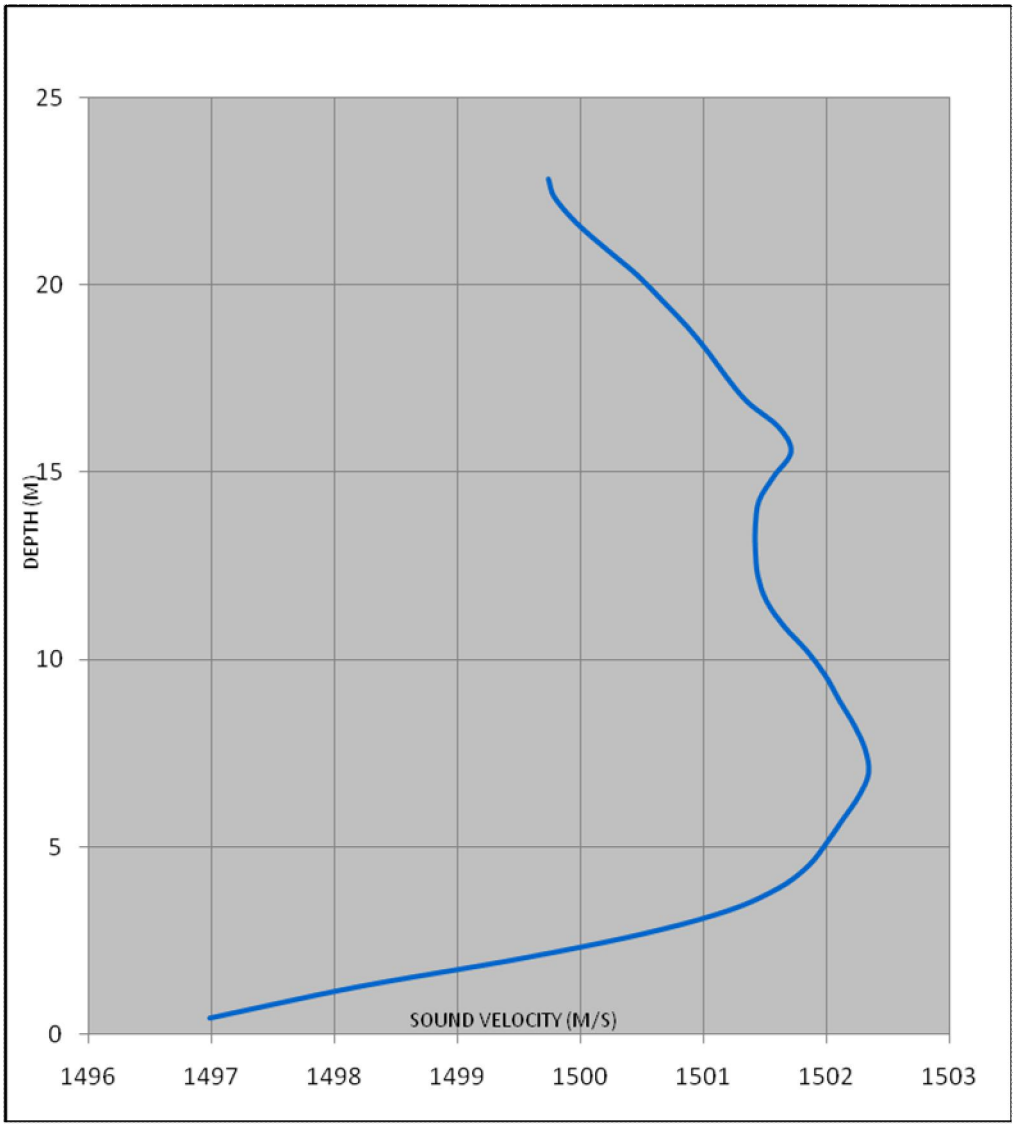


Figure 3.2-49
SVP 110310_1249 taken during the Fall 2010 multibeam survey at the HARS

1509.74	0.02
1509.81	0.76
1509.85	1.45
1509.88	2.08
1510.04	2.70
1510.76	3.28
1511.17	3.85
1511.27	4.41
1511.30	4.97
1511.38	5.53
1511.64	6.09
1512.53	6.66
1513.83	7.23
1514.88	7.80
1515.31	8.37
1515.54	8.94
1515.66	9.52
1515.73	10.11
1515.79	10.72
1515.82	11.36
1515.87	12.01
1515.90	12.68
1515.93	13.37
1515.95	14.06
1515.97	14.75
1515.98	15.46
1515.99	16.16
1516.00	16.85
1516.02	17.54
1516.01	17.93
1515.97	17.98
1515.95	18.00

CTD PROFILE # 110310_1249

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/3/2010	12:49	1020923	86710	58	40.40459599	73.86832398

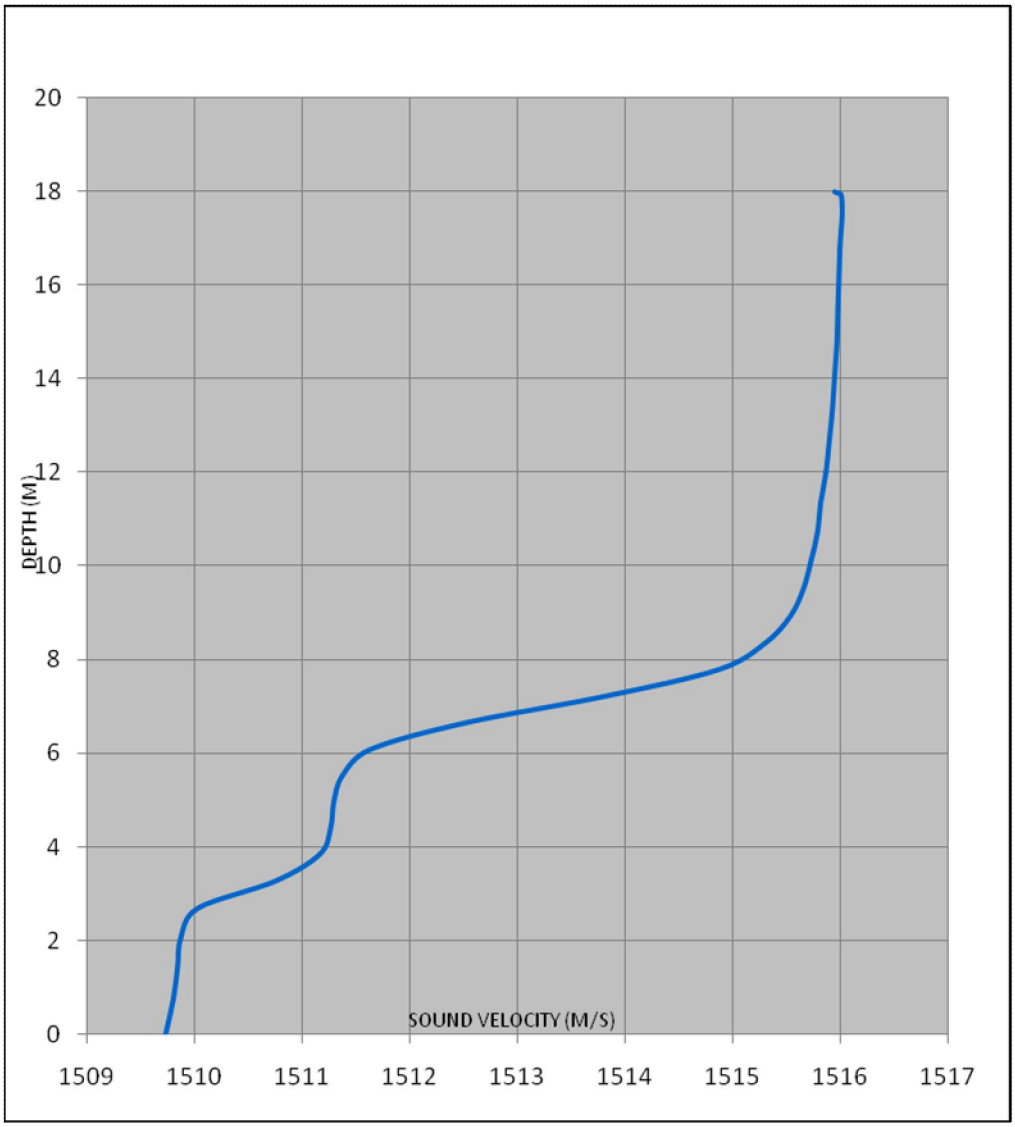


Figure 3.2-50
SVP 110310_1450 taken during the Fall 2010 multibeam survey at the HARS

1490.21	0.73
1491.52	1.50
1493.76	2.26
1496.87	3.01
1498.16	3.71
1498.61	4.37
1498.91	5.04
1499.27	5.72
1499.82	6.42
1500.48	7.12
1500.99	7.85
1501.18	8.54
1501.20	9.18
1501.15	9.79
1501.07	10.40
1500.93	11.04
1500.82	11.66
1500.71	12.26
1500.51	12.84
1500.42	13.42
1500.43	14.00
1500.37	14.57
1500.26	15.17
1500.20	15.78
1500.15	16.42
1500.05	17.06
1499.96	17.74
1499.86	18.41
1499.73	19.10
1499.60	19.81
1499.52	20.51
1499.45	21.18
1499.40	21.84
1499.40	22.40
1499.46	22.49

CTD PROFILE # 110310_1450

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/3/2010	14:50	1019086	77118	77	40.37827494	73.87496896

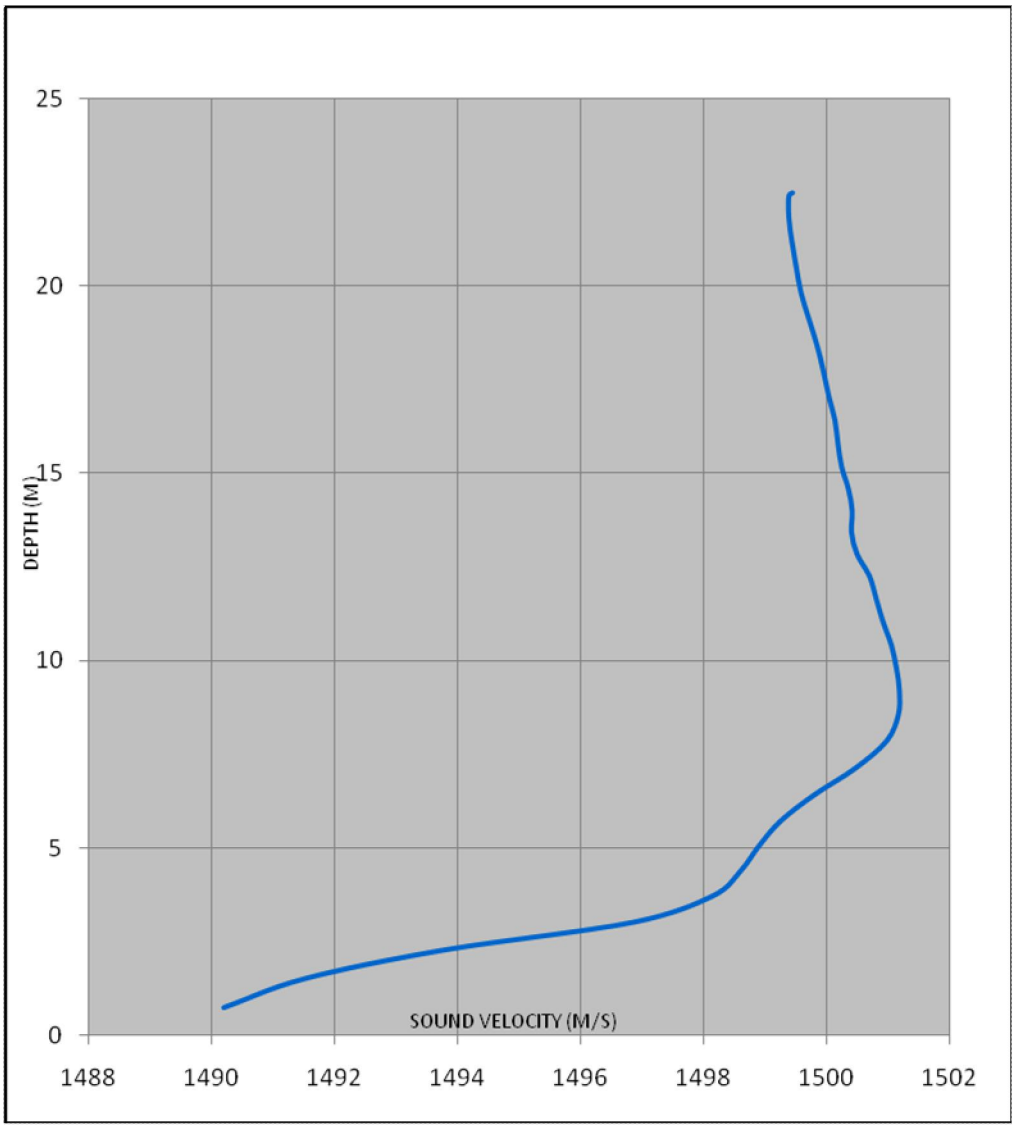


Figure 3.2-51
SVP 110310_1659 taken during the Fall 2010 multibeam survey at the HARS

1492.68	0.48
1492.12	1.25
1492.09	1.96
1492.20	2.64
1492.46	3.26
1492.64	3.88
1492.82	4.49
1493.04	5.13
1493.23	5.85
1493.54	6.59
1493.86	7.27
1494.12	7.94
1494.68	8.62
1495.18	9.27
1495.76	9.88
1496.31	10.51
1496.89	11.15
1497.77	11.76
1498.24	12.34
1498.49	12.93
1498.75	13.52
1499.13	14.11
1499.31	14.69
1499.80	15.28
1499.97	15.88
1500.00	16.47
1499.76	17.07
1499.50	17.68
1499.41	18.31
1499.39	18.96
1499.39	19.59
1499.46	19.86
1499.57	19.94
1499.66	19.97

CTD PROFILE # 110310_1659

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/3/2010	16:59	1018857	86587	65	40.40426666	73.87574266

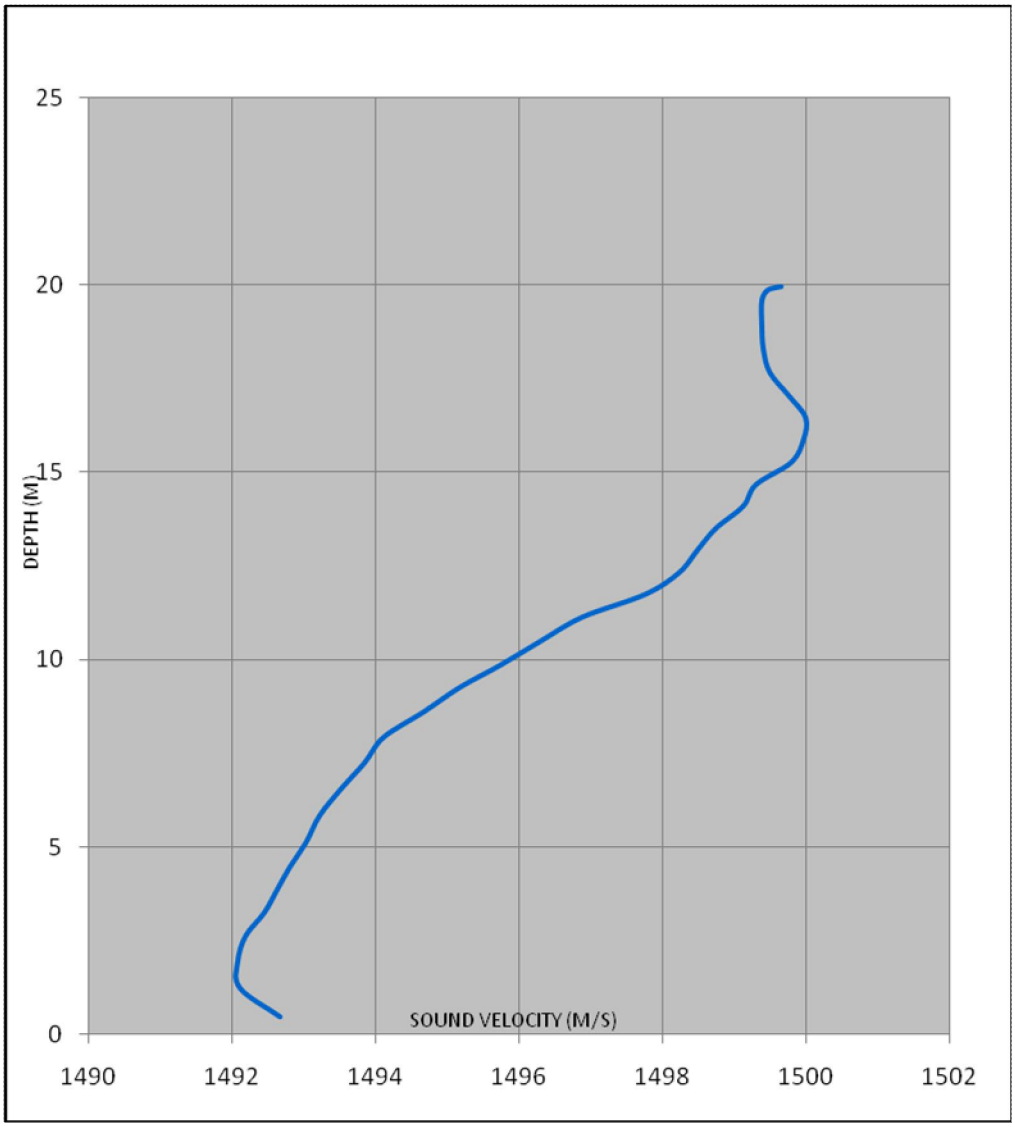


Figure 3.2-52
SVP 110310_1850 taken during the Fall 2010 multibeam survey at the HARS

1493.63	0.01
1492.88	0.81
1493.10	1.62
1493.14	2.36
1493.16	2.99
1493.17	3.53
1493.18	4.06
1493.23	4.59
1493.29	5.12
1493.36	5.67
1493.55	6.23
1493.88	6.81
1494.22	7.38
1494.80	7.97
1495.67	8.54
1496.87	9.12
1497.92	9.71
1498.46	10.29
1498.68	10.88
1498.84	11.48
1499.07	12.08
1499.65	12.68
1500.20	13.28
1500.25	13.88
1500.18	14.47
1500.23	15.07
1500.30	15.66
1500.36	16.26
1500.38	16.86
1500.10	17.46
1499.76	18.07
1499.56	18.69
1499.50	19.32
1499.47	19.94
1499.45	20.57
1499.48	21.05
1499.56	21.14

CTD PROFILE # 110310_1850

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/3/2010	18:50	1018660	84676	69	40.39902205	73.87645967

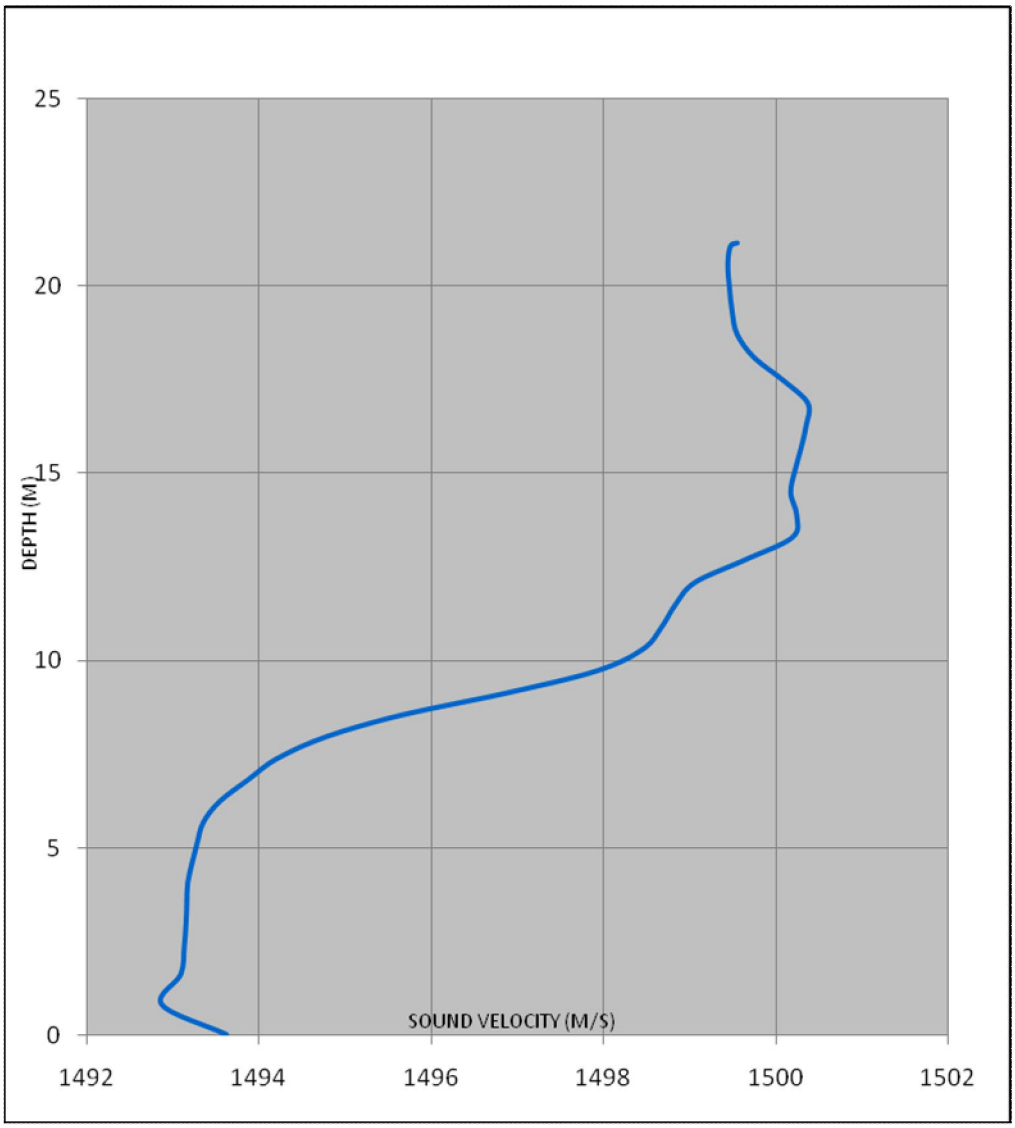


Figure 3.2-53
SVP 110310_2100 taken during the Fall 2010 multibeam survey at the HARS

1492.32	0.59
1492.33	1.37
1492.37	2.18
1492.51	2.99
1492.50	3.81
1492.49	4.62
1492.90	5.37
1493.23	6.11
1494.10	6.85
1496.25	7.52
1498.69	8.18
1500.19	8.93
1500.64	9.70
1500.58	10.41
1500.63	11.10
1500.91	11.80
1501.23	12.47
1501.33	13.13
1501.35	13.79
1501.36	14.45
1501.35	15.11
1501.31	15.77
1501.19	16.42
1500.93	17.06
1500.72	17.70
1500.47	18.32
1500.15	18.96
1499.82	19.58
1499.62	20.22
1499.42	20.87
1499.33	21.52
1499.31	22.18
1499.31	22.80
1499.34	22.98
1499.39	23.03

CTD PROFILE # 110310_2100

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/3/2010	21:00	1014458	77237	75	40.37861851	73.89157892

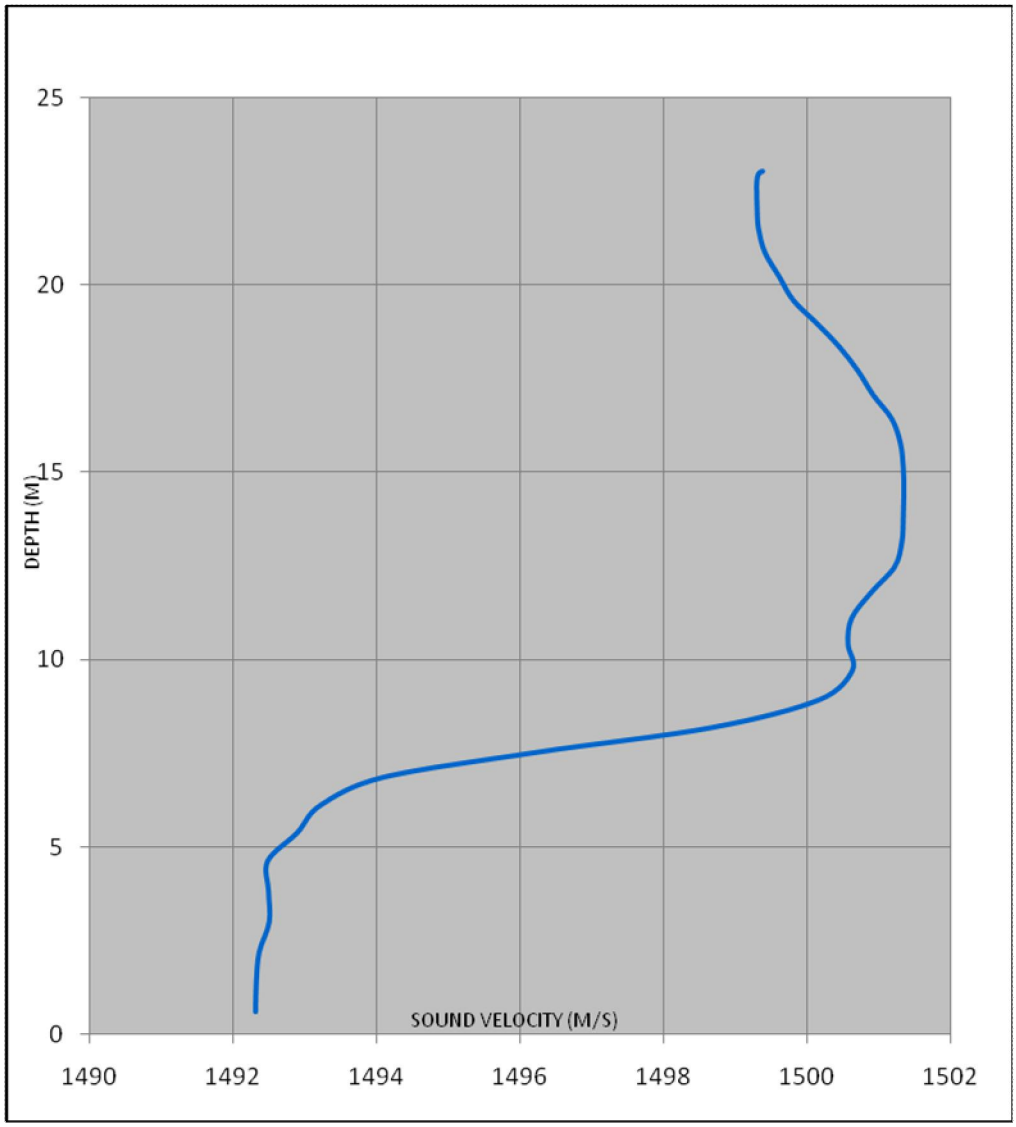


Figure 3.2-54
SVP 111510_1604 taken during the Fall 2010 multibeam survey at the HARS

1481.94	0.18
1481.49	0.89
1481.61	1.62
1483.01	2.31
1484.82	3.02
1487.79	3.75
1489.83	4.45
1491.17	5.16
1492.17	5.93
1492.87	6.73
1493.55	7.48
1493.96	8.21
1494.27	8.92
1494.58	9.61
1494.87	10.30
1495.01	10.97
1495.07	11.61
1495.10	12.27
1495.12	12.95
1495.13	13.61
1495.16	14.27
1495.19	14.92
1495.22	15.57
1495.24	16.22
1495.26	16.83
1495.28	17.45
1495.29	18.06
1495.30	18.66
1495.31	19.28
1495.32	19.88
1495.33	20.45
1495.34	20.99
1495.35	21.33

CTD PROFILE # 111510_1604

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/15/2010	16:04	1011692	86508	73	40.40407483	73.90146908

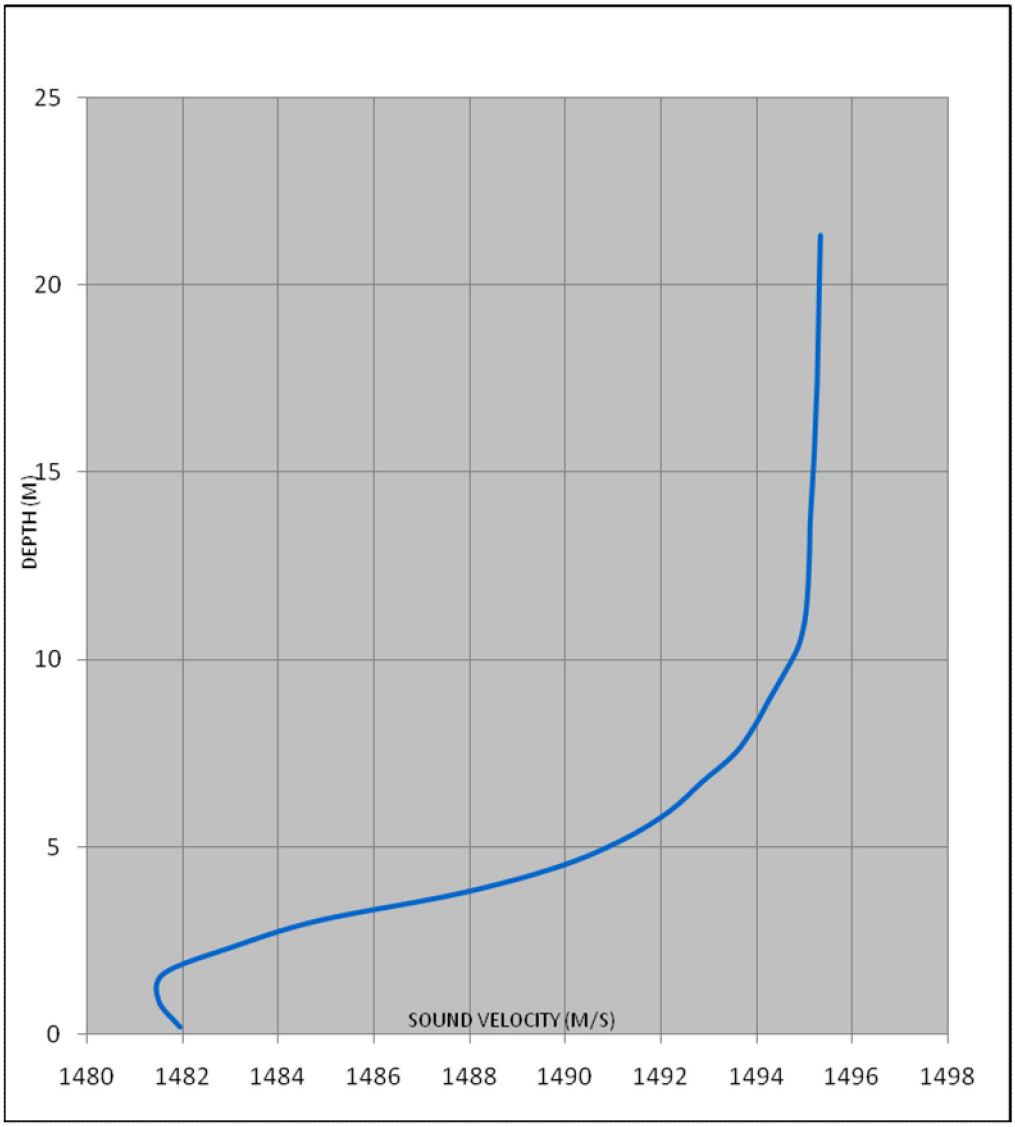


Figure 3.2-55
SVP 111510_1805 taken during the Fall 2010 multibeam survey at the HARS

1486.24	0.16
1486.03	0.87
1486.76	1.59
1489.08	2.24
1490.34	2.86
1490.75	3.49
1491.04	4.12
1491.17	4.75
1491.42	5.39
1491.73	6.02
1492.50	6.65
1493.23	7.28
1493.65	7.94
1494.15	8.61
1494.78	9.27
1495.25	9.93
1495.72	10.57
1496.03	11.23
1496.12	11.88
1496.02	12.54
1495.91	13.19
1495.84	13.85
1495.80	14.51
1495.79	15.17
1495.78	15.83
1495.78	16.49
1495.78	17.17
1495.79	17.83
1495.80	18.50
1495.81	19.17
1495.82	19.84
1495.83	20.49
1495.84	21.13
1495.88	21.40

CTD PROFILE # 111510_1805

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/15/2010	18:05	1012902	76943	73	40.37781668	73.89716487

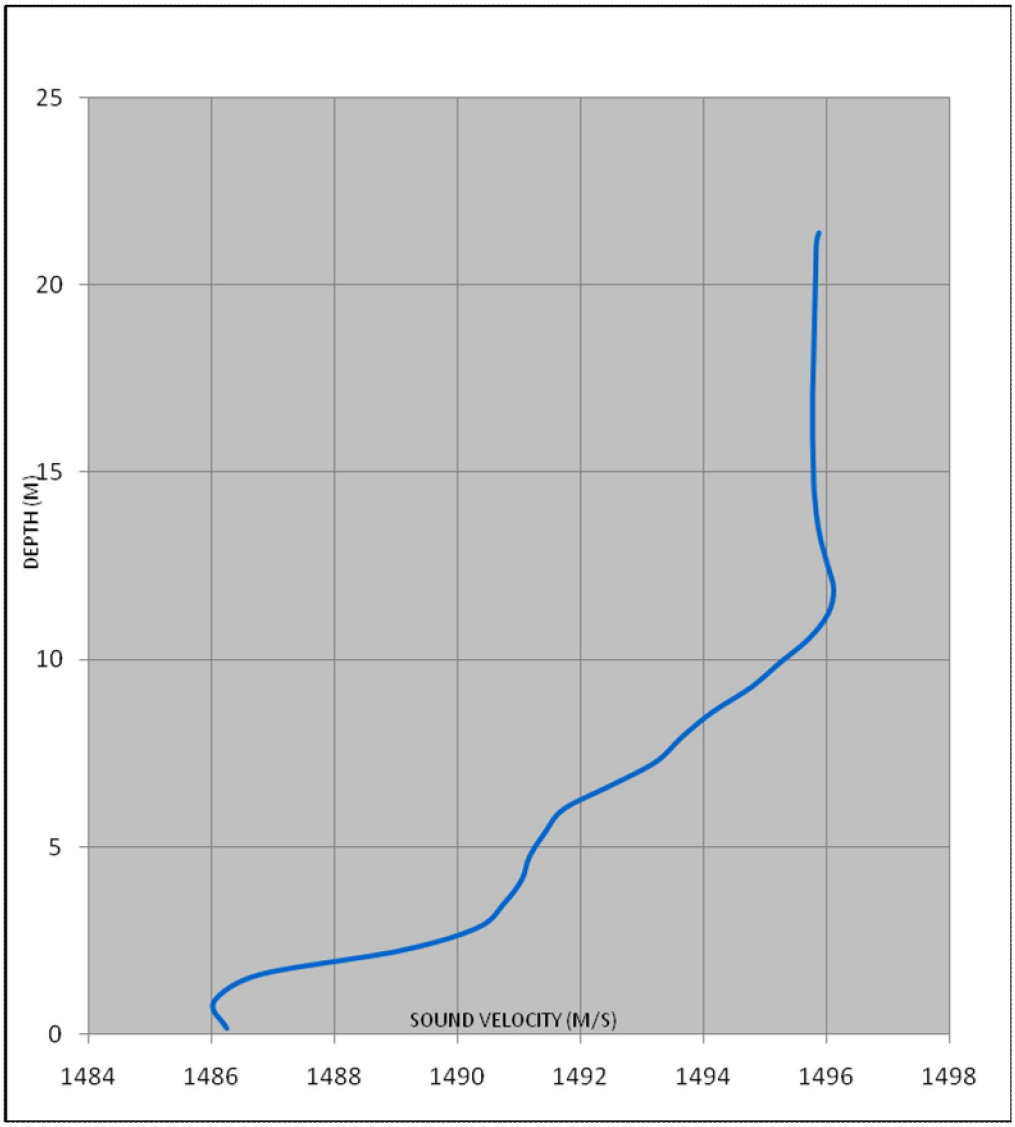


Figure 3.2-56
SVP 111510_2007 taken during the Fall 2010 multibeam survey at the HARS

1487.84	0.60
1489.40	1.26
1490.08	1.88
1490.37	2.49
1490.55	3.08
1490.69	3.67
1490.98	4.27
1491.65	4.89
1492.12	5.51
1492.33	6.13
1492.53	6.74
1493.06	7.37
1493.66	8.00
1493.94	8.63
1494.17	9.25
1494.70	9.85
1495.15	10.44
1495.37	11.01
1495.54	11.56
1495.68	12.08
1495.69	12.58
1495.65	13.12
1495.61	13.67
1495.58	14.28
1495.57	14.95
1495.57	15.64
1495.57	16.35
1495.58	17.06
1495.59	17.76
1495.60	18.47
1495.60	19.16
1495.61	19.84
1495.61	20.50
1495.62	21.14
1495.64	21.72
1495.70	21.87

CTD PROFILE # 111510_2007

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/15/2010	20:07	1011751	86457	73	40.40393466	73.90125744

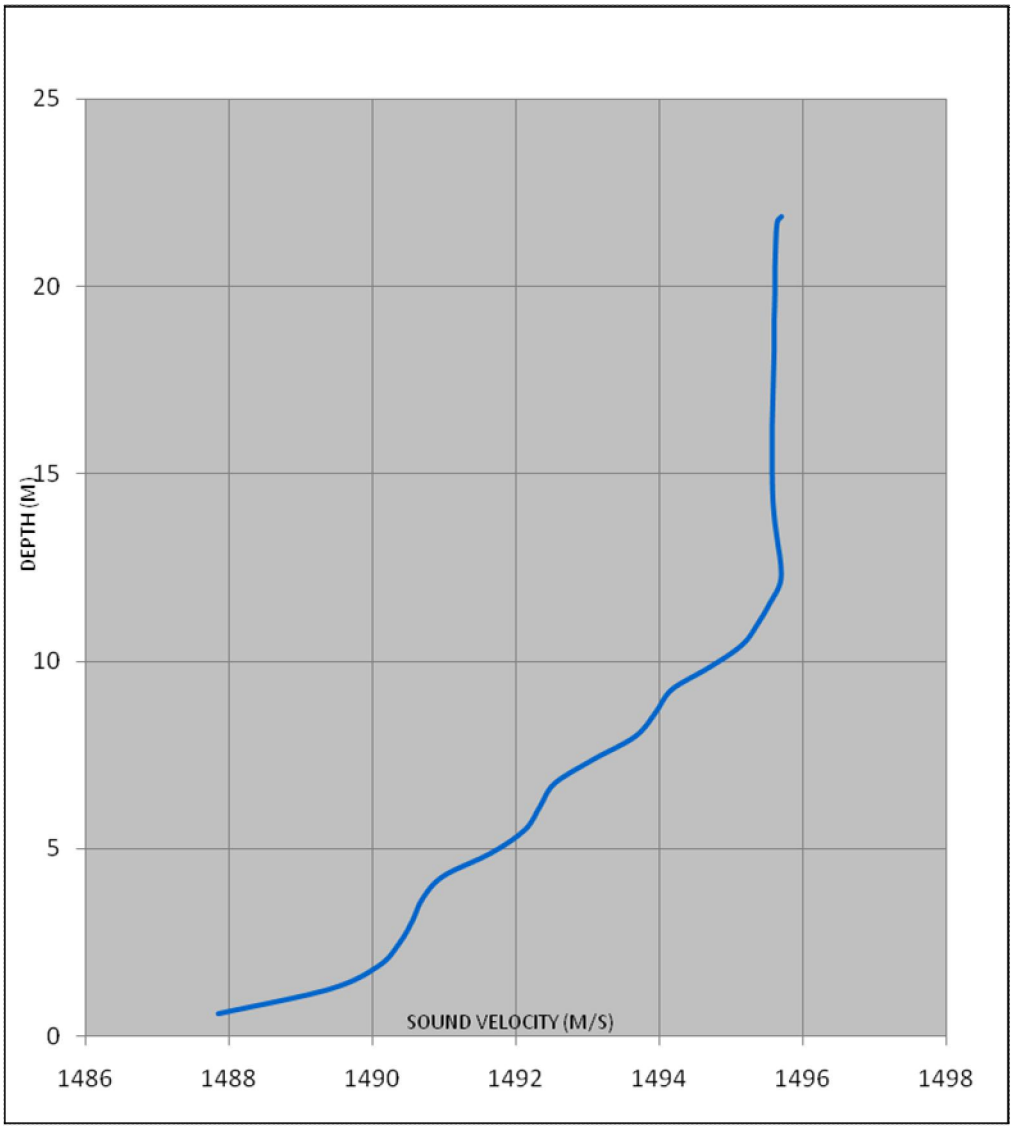


Figure 3.2-57
SVP 111510_2142 taken during the Fall 2010 multibeam survey at the HARS

1487.30	0.54
1488.16	1.35
1489.14	2.18
1490.32	3.03
1490.58	3.83
1491.14	4.55
1491.94	5.26
1492.37	5.93
1492.65	6.57
1492.96	7.20
1493.28	7.83
1493.92	8.45
1494.53	9.09
1494.90	9.74
1495.13	10.40
1495.25	11.06
1495.46	11.71
1495.71	12.35
1495.78	13.00
1495.71	13.64
1495.64	14.30
1495.63	14.97
1495.65	15.65
1495.66	16.35
1495.69	17.06
1495.71	17.79
1495.73	18.50
1495.74	19.22
1495.75	19.92
1495.76	20.63
1495.77	21.32
1495.78	22.00
1495.79	22.55
1495.85	22.61

CTD PROFILE # 111510_2142

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/15/2010	21:42	1013184	86359	75	40.40366111	73.89611267

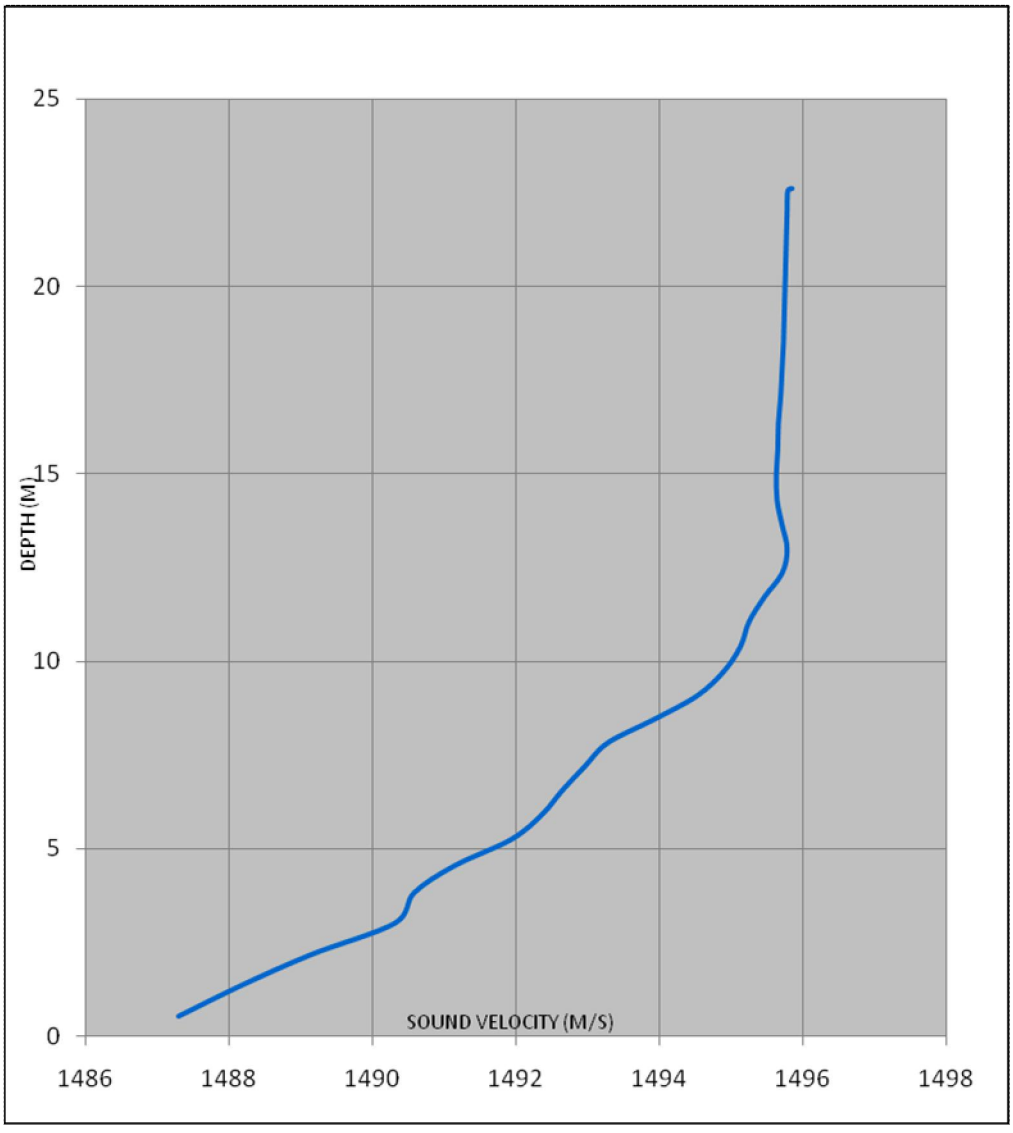


Figure 3.2-58
SVP 111510_2342 taken during the Fall 2010 multibeam survey at the HARS

1486.10	0.14
1485.78	0.29
1485.35	0.68
1485.33	1.10
1486.32	1.50
1487.40	1.90
1488.46	2.39
1489.94	3.00
1491.13	3.60
1491.97	4.15
1492.40	4.55
1492.59	4.84
1492.81	5.11
1493.02	5.49
1493.30	6.00
1493.63	6.59
1494.09	7.19
1494.40	7.80
1494.56	8.40
1494.65	8.99
1494.75	9.57
1494.85	10.14
1494.99	10.72
1495.00	11.30
1494.91	11.91
1494.85	12.52
1494.80	13.12
1494.78	13.72
1494.79	14.31
1494.81	14.89
1494.83	15.39
1494.85	15.79
1494.90	16.04
1494.89	16.29
1494.89	16.67
1494.90	17.11
1494.90	17.61
1494.91	18.12
1494.94	18.65
1494.99	19.21
1495.09	19.75
1495.22	20.14
1495.28	20.24
1495.33	20.26
1495.36	20.29

CTD PROFILE # 111510_2342

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/15/2010	23:42	1014816	95948	66	40.42997583	73.89020984

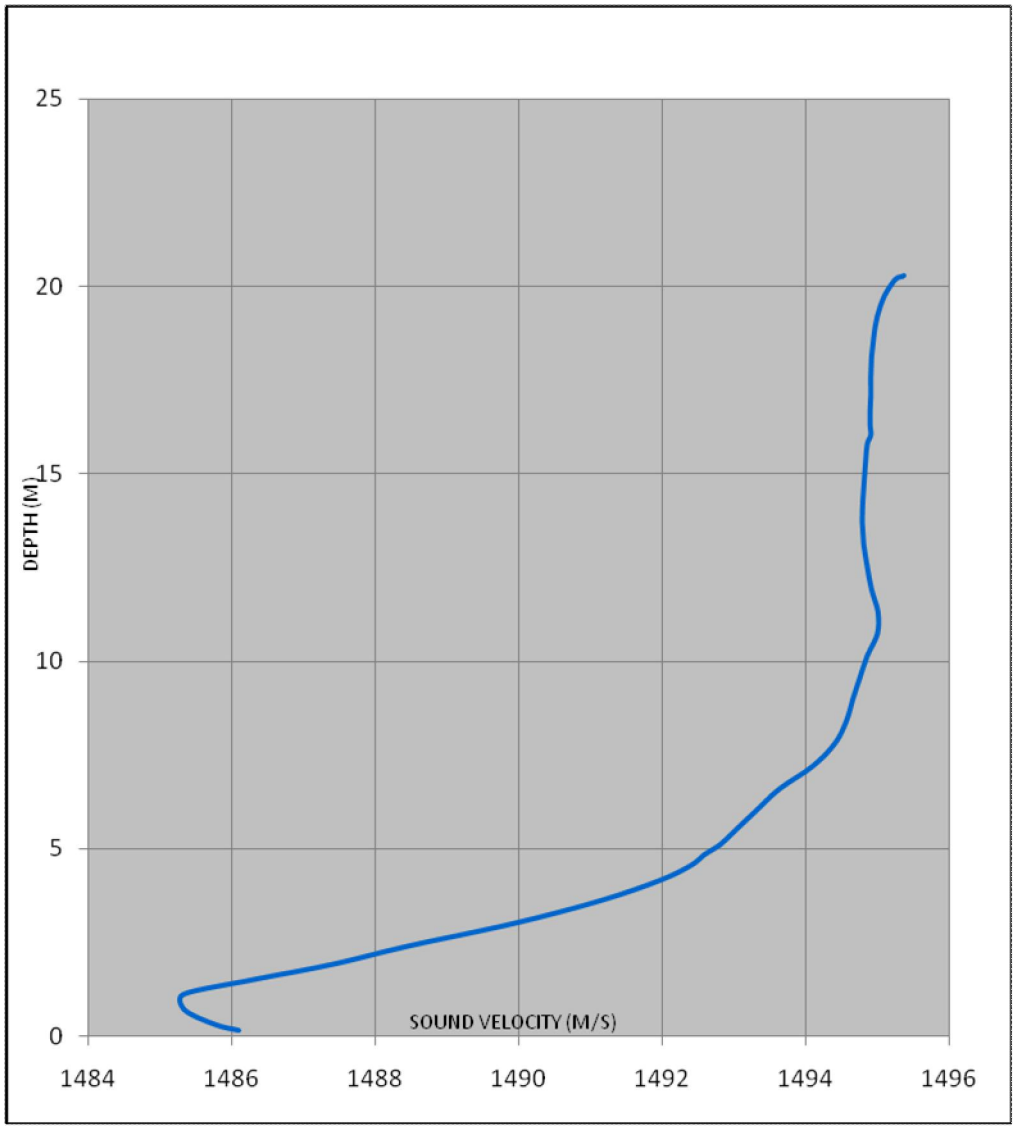


Figure 3.2-59
SVP 111610_0152 taken during the Fall 2010 multibeam survey at the HARS

1483.14	0.07
1483.12	0.69
1484.17	1.30
1485.64	1.91
1487.54	2.54
1489.51	3.17
1491.19	3.79
1491.91	4.42
1492.38	5.09
1493.13	5.76
1493.83	6.42
1494.29	7.09
1494.61	7.73
1494.74	8.38
1494.76	9.04
1494.73	9.70
1494.71	10.35
1494.72	10.99
1494.76	11.62
1494.78	12.25
1494.79	12.89
1494.81	13.52
1494.82	14.14
1494.84	14.75
1494.86	15.38
1494.89	16.03
1494.93	16.71
1495.01	17.41
1495.17	18.12
1495.54	18.82
1495.75	19.16
1495.82	19.27
1495.85	19.37
1495.90	19.41
1495.92	19.44
1495.94	19.45

CTD PROFILE # 111610_0152

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/16/2010	1:52	1016482	95964	65	40.43001386	73.88422565

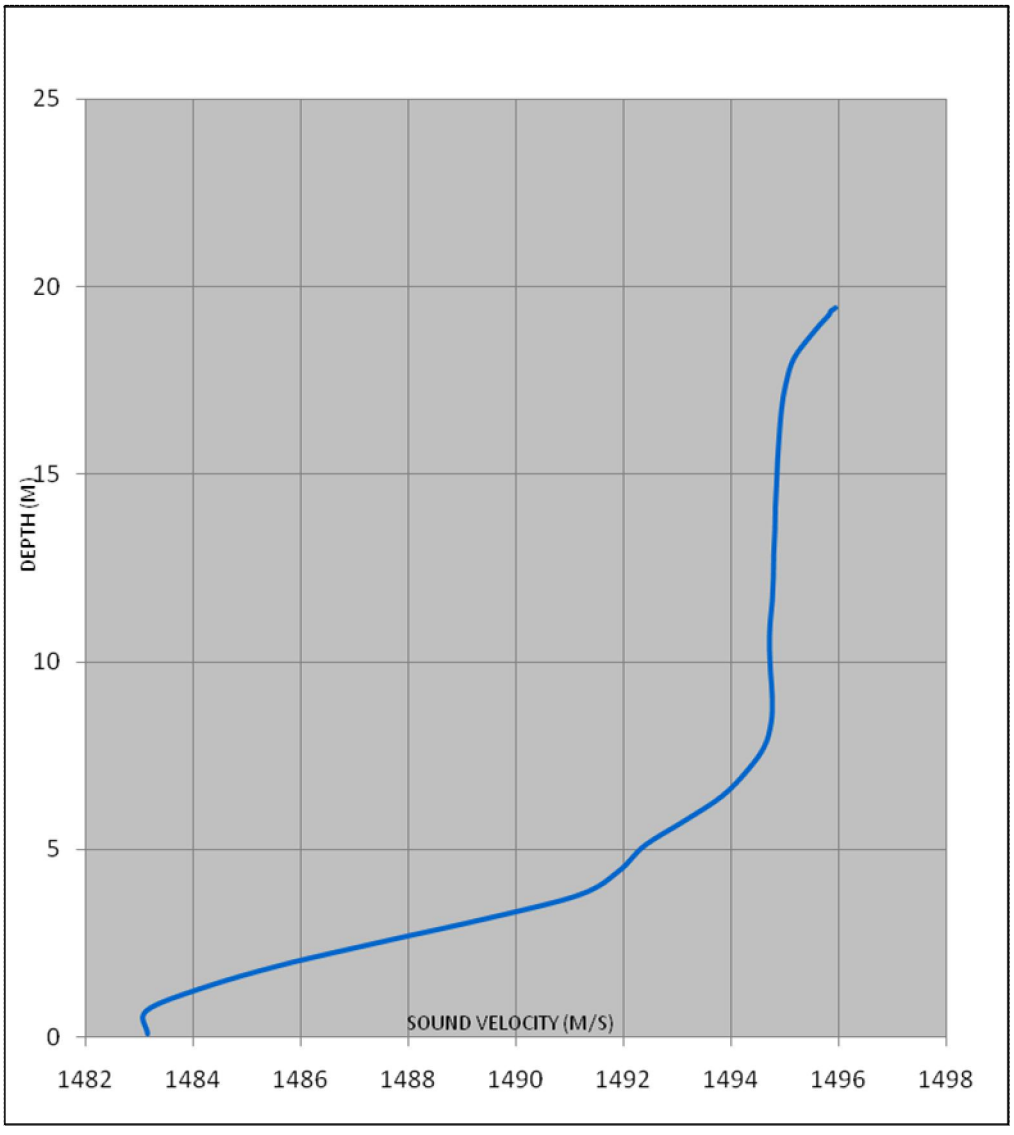


Figure 3.2-60
SVP 111610_0353 taken during the Fall 2010 multibeam survey at the HARS

1483.09	0.67
1483.09	1.42
1484.03	2.12
1486.22	2.77
1487.24	3.42
1488.64	4.06
1490.44	4.69
1491.78	5.32
1492.53	5.94
1493.02	6.56
1493.43	7.18
1493.84	7.79
1494.18	8.40
1494.53	9.01
1494.92	9.64
1495.38	10.29
1495.79	10.95
1496.00	11.61
1495.97	12.28
1495.82	12.95
1495.68	13.62
1495.60	14.27
1495.58	14.94
1495.57	15.60
1495.57	16.26
1495.59	16.92
1495.60	17.57
1495.61	18.23
1495.62	18.89
1495.64	19.56
1495.65	20.24
1495.66	20.93
1495.69	21.44
1495.76	21.51
1495.81	21.56

CTD PROFILE # 111610_0353

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/16/2010	3:53	1018662	86416	71	40.40379805	73.87644368

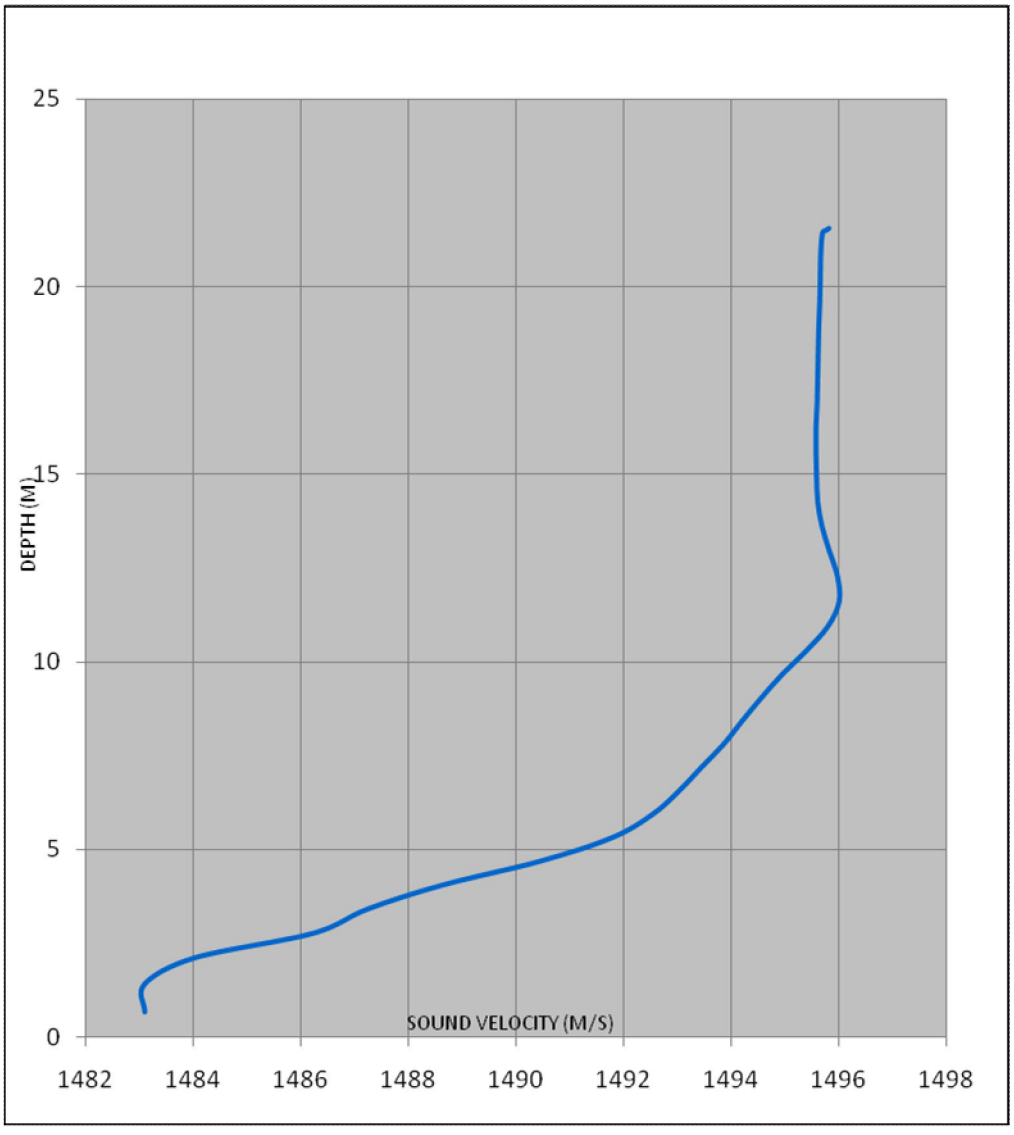
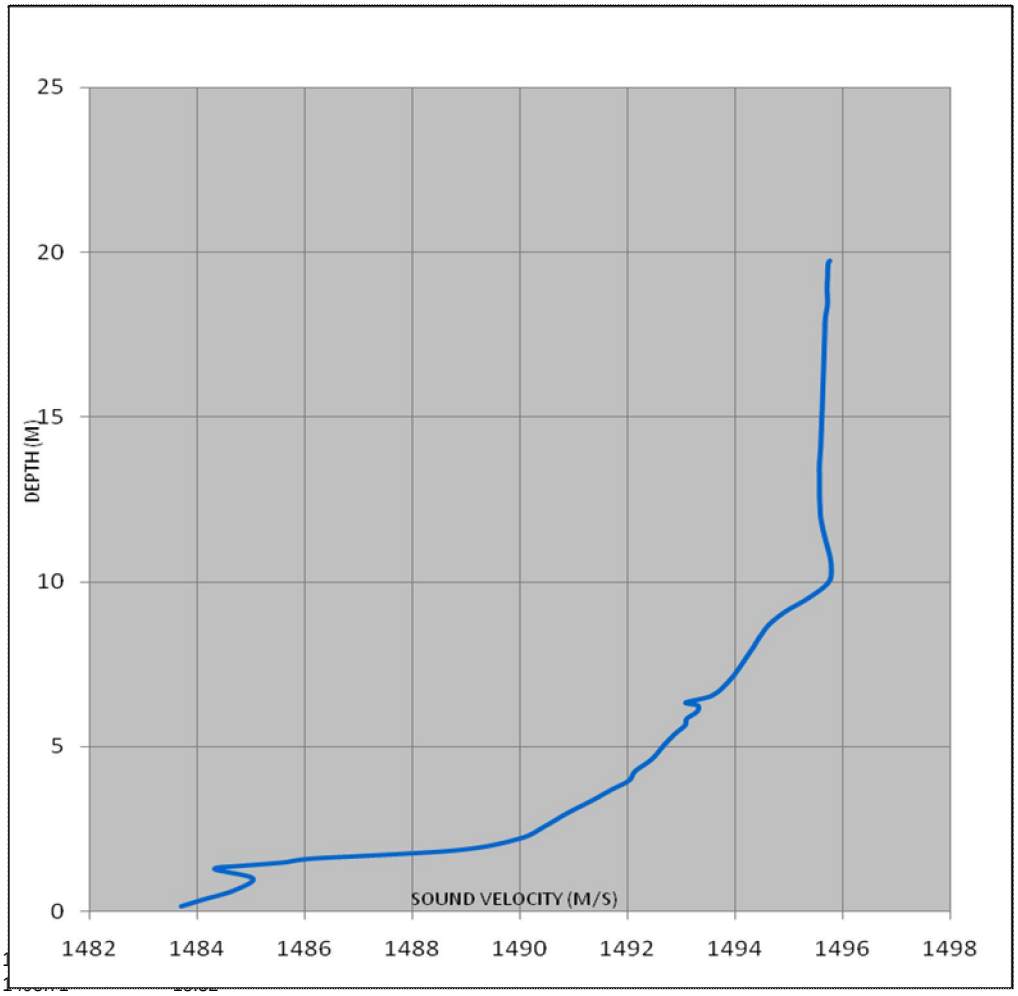


Figure 3.2-61
SVP 111610_0602 taken during the Fall 2010 multibeam survey at the HARS

CTD PROFILE # 111610_0602

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/16/2010	6:02	1019404	94215	66	40.42520207	73.87373917



1483.69	0.17
1484.07	0.36
1484.67	0.65
1485.02	1.02
1484.31	1.30
1484.83	1.40
1485.61	1.50
1486.07	1.61
1488.82	1.87
1489.98	2.22
1490.46	2.60
1490.88	3.00
1491.35	3.39
1491.69	3.70
1492.02	3.98
1492.14	4.27
1492.45	4.63
1492.67	5.05
1492.88	5.40
1493.07	5.66
1493.10	5.86
1493.29	6.07
1493.30	6.26
1493.08	6.35
1493.56	6.55
1493.86	6.95
1494.06	7.36
1494.21	7.72
1494.34	8.03
1494.41	8.22
1494.48	8.39
1494.63	8.71
1494.92	9.09
1495.36	9.51
1495.73	9.97
1495.79	10.38
1495.76	10.80
1495.69	11.22
1495.63	11.62
1495.59	11.97
1495.58	12.25
1495.57	12.61
1495.57	13.07
1495.57	13.59
1495.59	14.03
1495.60	14.44
1495.61	14.87
1495.62	15.27
1495.63	15.72
1495.64	16.19
1495.65	16.67
1495.66	17.17
1495.67	17.66
1495.72	18.52
1495.71	18.85
1495.72	19.26
1495.73	19.64
1495.76	19.74

Figure 3.2-62
SVP 111610_0750 taken during the Fall 2010 multibeam survey at the HARS

1489.16	0.36
1491.41	1.12
1492.06	1.94
1492.51	2.71
1492.91	3.46
1493.23	4.14
1493.52	4.85
1493.83	5.57
1494.10	6.29
1494.33	6.99
1494.71	7.71
1495.28	8.40
1495.63	9.09
1495.64	9.80
1495.53	10.51
1495.42	11.25
1495.39	11.99
1495.41	12.73
1495.45	13.49
1495.51	14.25
1495.57	15.04
1495.61	15.81
1495.64	16.57
1495.66	17.33
1495.68	18.10
1495.69	18.87
1495.70	19.65
1495.72	20.34
1495.77	20.56

CTD PROFILE # 111610_0750

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/16/2010	7:50	1020504	96124	69	40.43043753	73.86977817

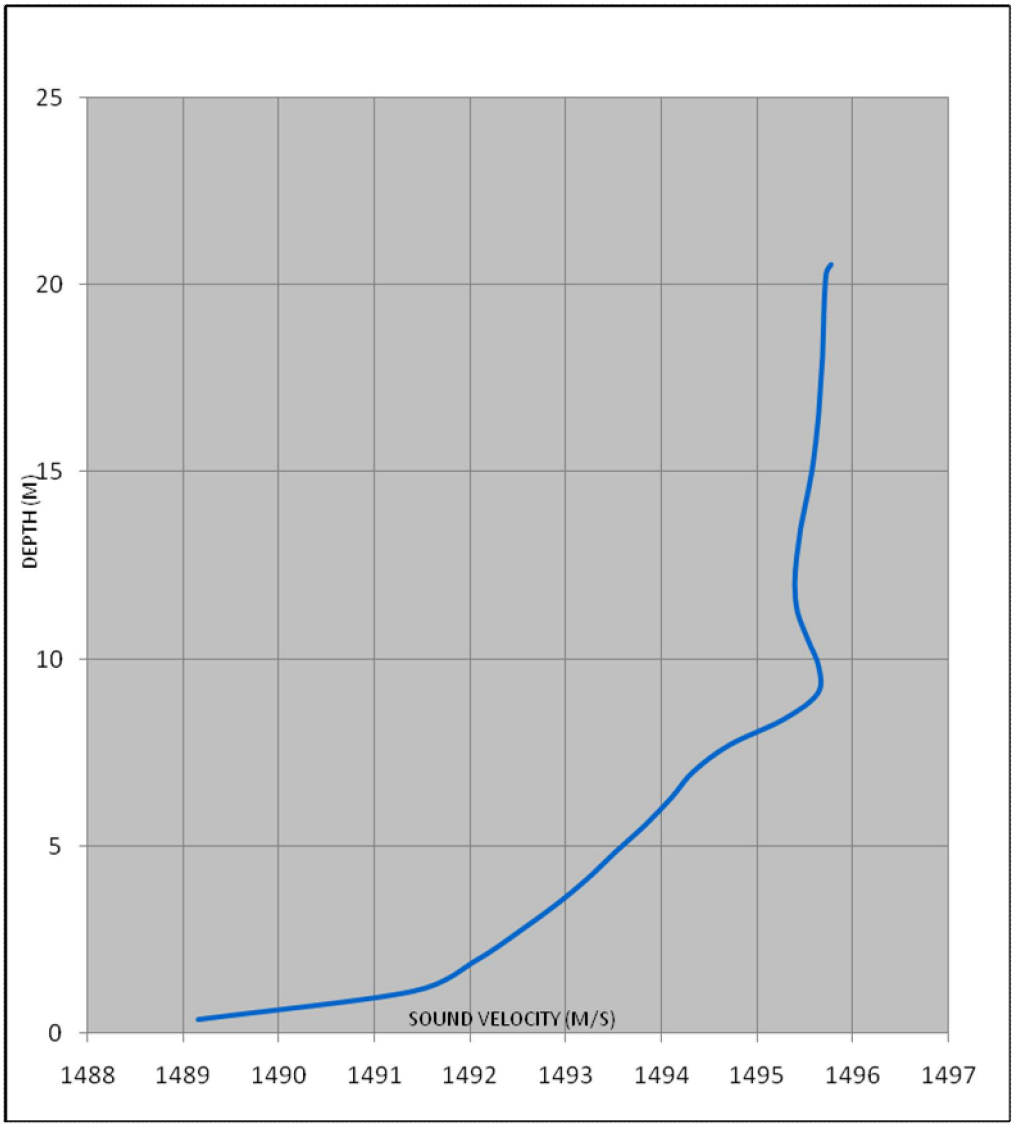


Figure 3.2-63
SVP 111610_0959 taken during the Fall 2010 multibeam survey at the HARS

1487.79	0.55
1490.87	1.24
1492.09	1.90
1492.54	2.51
1492.72	3.10
1492.86	3.68
1493.07	4.25
1493.34	4.83
1493.65	5.42
1493.89	6.01
1494.05	6.61
1494.28	7.21
1494.70	7.82
1495.14	8.42
1495.52	9.01
1495.59	9.58
1495.52	10.15
1495.40	10.72
1495.35	11.30
1495.36	11.88
1495.39	12.50
1495.42	13.15
1495.42	13.82
1495.42	14.50
1495.42	15.20
1495.41	15.92
1495.42	16.64
1495.43	17.37
1495.49	18.08
1495.58	18.76
1495.64	19.40
1495.70	19.64

CTD PROFILE # 111610_0959

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/16/2010	9:59	1022365	95946	64	40.42994116	73.86309460

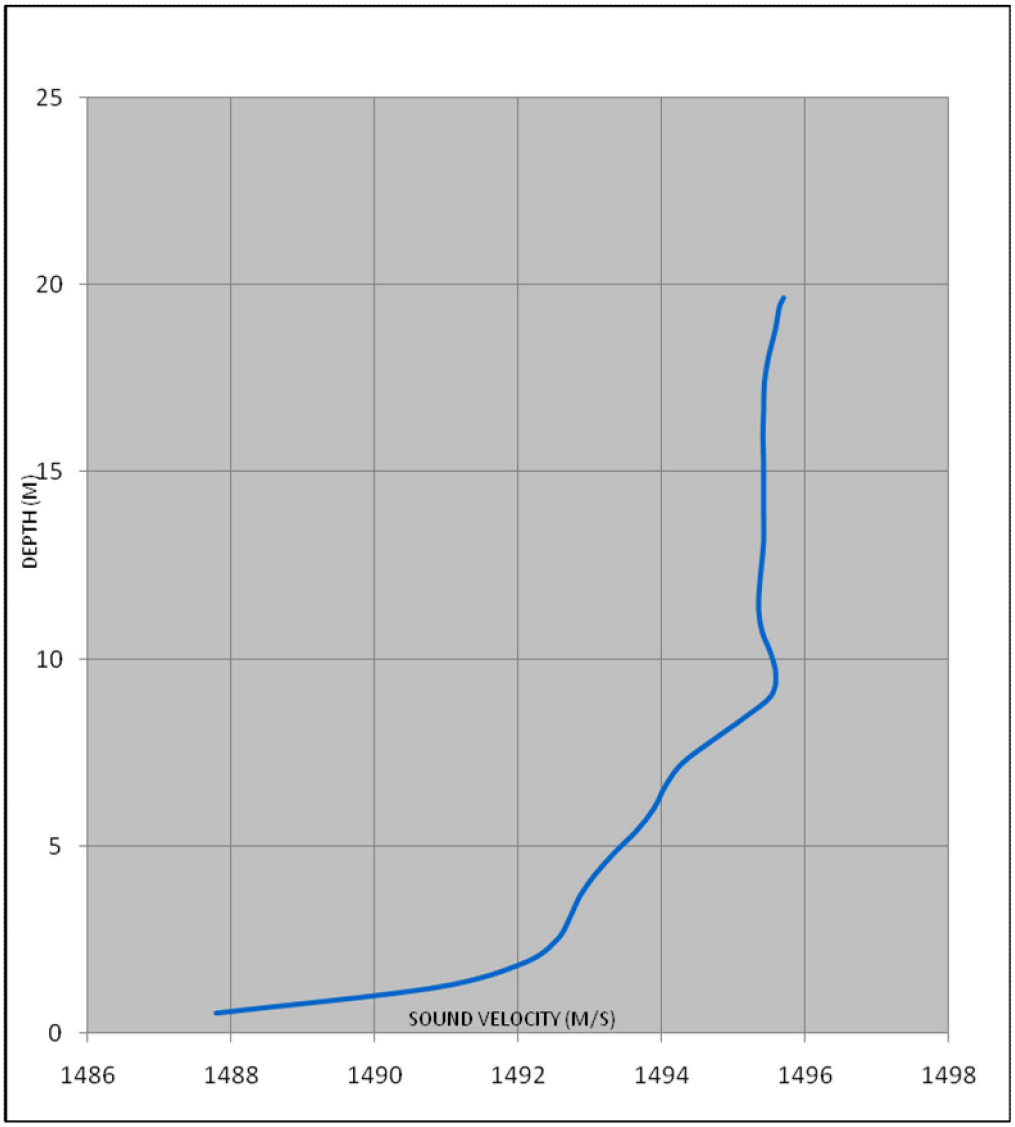


Figure 3.2-64
SVP 111610_1147 taken during the Fall 2010 multibeam survey at the HARS

1487.48	0.04
1488.20	0.74
1490.60	1.43
1491.70	2.00
1492.22	2.51
1492.46	2.98
1492.74	3.44
1493.06	3.91
1493.35	4.38
1493.61	4.85
1493.82	5.33
1494.09	5.86
1494.39	6.42
1494.66	6.96
1494.89	7.48
1495.33	7.99
1495.64	8.47
1495.75	8.93
1495.72	9.42
1495.61	9.92
1495.50	10.45
1495.47	11.01
1495.49	11.56
1495.52	12.11
1495.54	12.68
1495.56	13.26
1495.57	13.81
1495.57	14.34
1495.55	14.84
1495.55	15.32
1495.54	15.76
1495.55	16.15
1495.62	16.57
1495.67	16.95
1495.69	17.36
1495.70	17.83
1495.72	17.99
1495.76	17.98
1495.78	17.98
1495.80	18.00
1495.80	18.04
1495.81	18.09

CTD PROFILE # 111610_1147

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/16/2010	11:47	1023368	96001	59	40.43008777	73.85949161

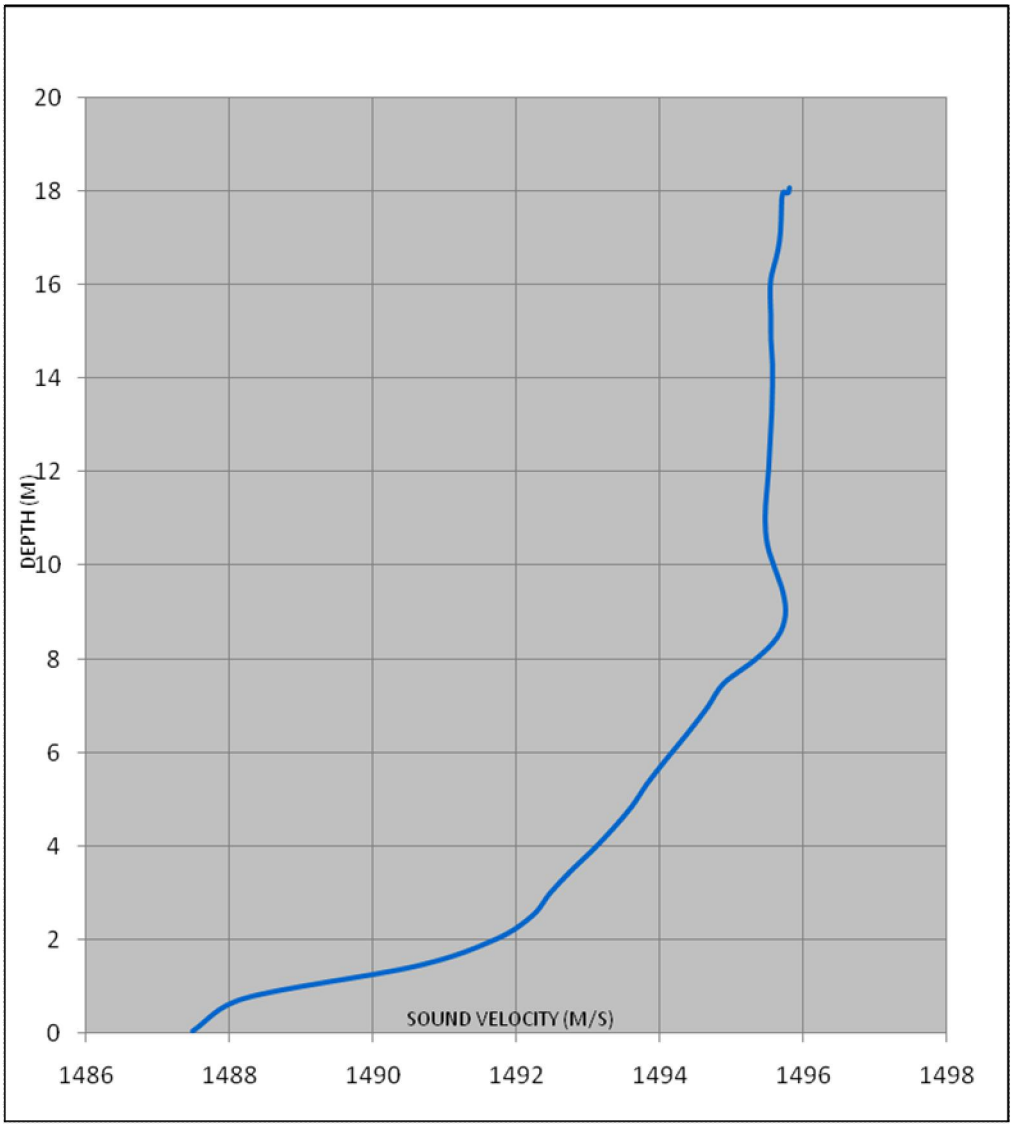
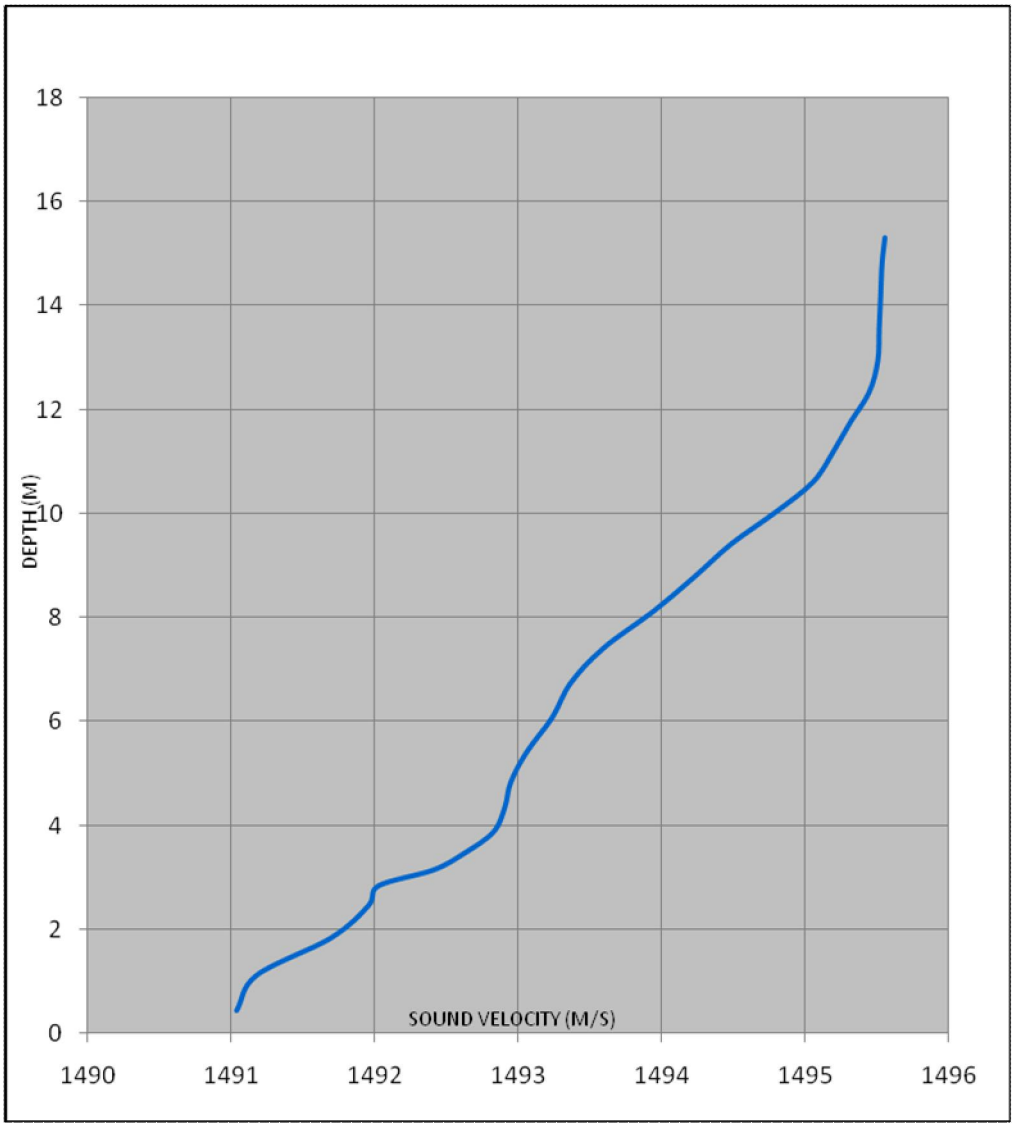


Figure 3.2-65
SVP 111610_1256 taken during the Fall 2010 multibeam survey at the HARS

1491.04	0.45
1491.18	1.13
1491.70	1.85
1491.96	2.47
1492.03	2.85
1492.41	3.15
1492.62	3.46
1492.83	3.88
1492.91	4.36
1492.95	4.83
1493.06	5.41
1493.24	6.08
1493.37	6.75
1493.60	7.42
1493.94	8.11
1494.23	8.78
1494.49	9.42
1494.80	10.03
1495.06	10.61
1495.20	11.19
1495.32	11.76
1495.45	12.33
1495.51	12.93
1495.52	13.55
1495.53	14.18
1495.54	14.82
1495.56	15.30

CTD PROFILE # 111610_1256

DATE	TIME	NAD83	NY-LI (Feet)	DEPTH	LATITUDE	LONGITUDE
		Easting	Northing	Feet	N	W
11/16/2010	12:56	1023957	93921	50	40.42437592	73.85738814



4.0 Tidal Corrections

For the 2010 bathymetry survey the “Valeport Midas WLR” submersible tide gauge was deployed prior to collection of multibeam data at the HARS. This gauge which measures pressure was located on the sea floor attached to an anchor with an additional attachment to an acoustic release buoy (see Figure 3.0-1).
For the Fall 2010 bathymetry survey it was also decided to utilize the Real Time Kinematic GPS (RTK) option of the POS/MV on board the survey vessel to provide real time water level elevations. This system was referenced to NAVD88 during data collection. The RTK water elevation readings were used to check and calibrate the submersible tide data.

As with previous surveys at the HARS site, tide data from NOAA’s reference tide station at Sandy Hook (Figure 4.1-1) was downloaded from N.O.A.A.’s web site. This NAVD88 tide data was then referenced to MLW as per the USACOE SOW, (0’ MLW is 1.73’ below 0’ NGVD29 and 2.84’ below NAVD88). Historic range and time correctors (used since 2006) of 0.94 and -30 minutes were then used to correct the Sandy Hook NOAA tide data for the HARS survey area.

4.1 Cross-Track Analysis

Cross-track analysis was performed to provide a quality check on the accuracy of the multibeam data. Cross-track lines are run perpendicular to the main direction of survey lines to produce areas of overlapping data that can be analyzed and errors quantified to provide an indication of the overall quality of data.

For the Fall 2010 survey the main body of survey lines were run in a North-South direction and for approximately every ten (10) main body lines a cross-track line was run in an East-West direction. This yielded a total of forty (40) cross-track lines, which were then analyzed utilizing the Beam Angle Test module within the Hypack Processing software. The Beam Angle Test compares multibeam check lines to a reference surface and estimates the depth accuracy of the multibeam system at different angle limits. The estimated accuracy can be used to determine if the multibeam system meets survey specifications. In this case the reference surface used was the final 10x10 xyz of the processed main body multibeam data. Results from this analysis are seen in Section 4.2.

4.2 Cross-Track Analysis Results

Table 4.1-1 show the results from the Hypack Beam Analysis for each crossing. The analysis software generates; Max Outlier, Mean Difference, Standard Deviation and 95% Confidence for the beam angle limits specified. At the +/- 60 deg. beam angle limit, the averages for all crossings show that the 95% confidence is 0.81', while the mean difference for all crossings averages out to less than 0.04', the standard deviation for all crossings averages out to less than 0.43', and the maximum outlier is 3.64'. Figure 4.1-1 show screen captures of the summary plots for the errors at +/- 60 deg. for each crossing.

Table 4.1-1

Summary of Beam Analysis Results for all crossings during HARS 2010 survey

	Beam Angle	Max. Outlier	Mean Diff.	Std Dev.	95%	Crossing	Beam Angle	Max. Outlier	Mean Diff.	Std Dev.	95%	Crossing	Beam Angle	Max. Outlier	Mean Diff.	Std Dev.	95%
0914-1833	+/-20	1.05	0.02	0.28	0.54	0915-1629	+/-20	1.02	-0.01	0.26	0.51	0915-1802	+/-20	0.95	0.01	0.24	0.47
	+/-25	1.45	0.03	0.26	0.51		+/-25	1.15	-0.04	0.26	0.52		+/-25	1.05	0.01	0.24	0.48
	+/-30	1.05	0.00	0.28	0.55		+/-30	1.08	-0.03	0.29	0.56		+/-30	0.92	0.02	0.23	0.45
	+/-35	1.57	0.02	0.25	0.49		+/-35	1.34	-0.01	0.31	0.61		+/-35	0.92	0.05	0.24	0.48
	+/-40	1.60	0.05	0.29	0.58		+/-40	1.28	0.04	0.32	0.63		+/-40	1.18	0.06	0.25	0.5
	+/-45	1.38	0.08	0.31	0.60		+/-45	1.31	0.10	0.35	0.68		+/-45	1.19	0.06	0.26	0.52
	+/-50	1.34	0.07	0.31	0.61		+/-50	1.57	0.16	0.34	0.66		+/-50	1.58	0.08	0.29	0.57
	+/-55	1.15	0.07	0.32	0.64		+/-55	1.74	0.22	0.37	0.73		+/-55	1.11	0.09	0.3	0.59
	+/-60	1.34	0.11	0.35	0.69		+/-60	2.14	0.29	0.45	0.87		+/-60	1.51	0.09	0.35	0.68
0923-1442	+/-20	1.05	-0.01	0.29	0.56	0923-1736	+/-20	3.41	-0.02	0.23	0.46	0923-2000	+/-20	1.15	-0.05	0.24	0.47
	+/-25	1.28	0.02	0.29	0.57		+/-25	0.92	-0.01	0.26	0.51		+/-25	1.12	-0.05	0.24	0.48
	+/-30	1.05	0.04	0.31	0.61		+/-30	1.02	-0.03	0.28	0.56		+/-30	1.31	-0.05	0.21	0.42
	+/-35	1.15	0.04	0.29	0.57		+/-35	1.05	0.01	0.28	0.54		+/-35	1.70	-0.03	0.23	0.46
	+/-40	1.21	0.06	0.32	0.63		+/-40	1.74	0.06	0.31	0.60		+/-40	1.18	-0.03	0.24	0.48
	+/-45	1.34	0.08	0.35	0.69		+/-45	1.71	0.09	0.31	0.60		+/-45	0.89	0.00	0.25	0.49
	+/-50	2.33	0.14	0.39	0.77		+/-50	1.57	0.11	0.33	0.65		+/-50	1.58	0.02	0.27	0.53
	+/-55	1.71	0.25	0.44	0.87		+/-55	3.25	0.19	0.41	0.80		+/-55	1.58	0.08	0.30	0.59
	+/-60	3.64	0.35	0.51	1.01		+/-60	2.03	0.22	0.45	0.89		+/-60	2.00	0.14	0.36	0.70
0923-2123	+/-20	1.05	-0.09	0.32	0.62	0924-1522	+/-20	1.41	-0.07	0.32	0.63	0924-1829	+/-20	1.05	-0.01	0.30	0.59
	+/-25	2.10	-0.08	0.37	0.73		+/-25	1.31	-0.07	0.31	0.62		+/-25	1.74	-0.02	0.29	0.56
	+/-30	1.02	-0.03	0.30	0.59		+/-30	1.51	-0.06	0.31	0.61		+/-30	1.67	-0.01	0.27	0.52
	+/-35	1.54	-0.04	0.33	0.65		+/-35	1.74	-0.02	0.30	0.60		+/-35	1.28	-0.04	0.27	0.54
	+/-40	1.41	-0.05	0.36	0.70		+/-40	1.58	-0.03	0.31	0.60		+/-40	1.35	0.00	0.28	0.55
	+/-45	1.54	-0.01	0.41	0.81		+/-45	1.25	0.03	0.32	0.62		+/-45	1.51	0.00	0.33	0.64
	+/-50	2.43	0.03	0.45	0.88		+/-50	1.64	0.04	0.33	0.65		+/-50	1.38	-0.02	0.35	0.69
	+/-55	4.20	0.04	0.57	1.11		+/-55	1.44	0.05	0.37	0.72		+/-55	1.45	-0.04	0.34	0.67
	+/-60	2.89	0.10	0.56	1.10		+/-60	2.52	0.06	0.42	0.83		+/-60	1.71	-0.04	0.38	0.74
0924-2005	+/-20	1.02	-0.09	0.25	0.50	1006-1716	+/-20	1.54	-0.01	0.29	0.57	1006-2027	+/-20	1.18	-0.07	0.28	0.55
	+/-25	0.82	-0.07	0.21	0.40		+/-25	1.45	-0.08	0.29	0.57		+/-25	1.05	-0.05	0.28	0.55
	+/-30	0.88	-0.07	0.20	0.40		+/-30	1.77	-0.05	0.26	0.50		+/-30	1.45	-0.08	0.29	0.57
	+/-35	0.89	-0.05	0.18	0.36		+/-35	1.41	-0.03	0.27	0.54		+/-35	1.41	-0.12	0.32	0.63
	+/-40	0.82	-0.08	0.20	0.39		+/-40	1.74	-0.04	0.27	0.53		+/-40	2.20	-0.07	0.32	0.62
	+/-45	1.44	-0.05	0.20	0.39		+/-45	1.70	0.00	0.27	0.54		+/-45	2.59	-0.03	0.31	0.60
	+/-50	2.00	-0.05	0.22	0.44		+/-50	1.58	0.00	0.36	0.70		+/-50	1.67	-0.01	0.30	0.59
	+/-55	2.16	0.00	0.27	0.54		+/-55	1.55	0.00	0.35	0.68		+/-55	2.17	-0.01	0.36	0.71
	+/-60	2.73	0.00	0.28	0.54		+/-60	1.80	-0.03	0.35	0.69		+/-60	2.07	-0.03	0.36	0.70

1006-2126	+/-20	1.45	-0.05	0.34	0.67	1012-1420	+/-20	1.93	-0.03	0.28	0.55	1012-1809	+/-20	1.87	-0.01	0.33	0.65
	+/-25	1.28	-0.03	0.27	0.54		+/-25	1.48	-0.05	0.24	0.47		+/-25	2.82	-0.03	0.30	0.59
	+/-30	1.25	-0.02	0.30	0.58		+/-30	1.41	-0.04	0.22	0.44		+/-30	1.80	-0.01	0.25	0.49
	+/-35	1.15	-0.01	0.28	0.55		+/-35	1.38	-0.02	0.26	0.50		+/-35	2.10	-0.02	0.30	0.58
	+/-40	1.44	0.00	0.29	0.56		+/-40	1.87	-0.02	0.26	0.50		+/-40	2.56	-0.02	0.33	0.66
	+/-45	1.57	-0.01	0.35	0.68		+/-45	1.77	-0.01	0.26	0.51		+/-45	2.72	-0.03	0.30	0.59
	+/-50	1.22	0.02	0.33	0.64		+/-50	2.10	0.00	0.28	0.55		+/-50	4.43	-0.08	0.37	0.73
	+/-55	1.48	0.09	0.40	0.78		+/-55	2.00	-0.04	0.30	0.59		+/-55	3.28	-0.11	0.38	0.75
	+/-60	1.35	0.07	0.40	0.78		+/-60	2.46	-0.06	0.34	0.66		+/-60	2.66	-0.16	0.36	0.71

1012-2049	+/-20	1.57	-0.02	0.22	0.44	1018-1531	+/-20	0.99	0.03	0.24	0.46	1018-1855	+/-20	1.12	-0.01	0.22	0.42
	+/-25	1.28	0.00	0.24	0.46		+/-25	0.92	0.01	0.23	0.44		+/-25	2.24	-0.02	0.22	0.42
	+/-30	1.67	0.01	0.24	0.47		+/-30	1.24	0.02	0.21	0.41		+/-30	2.27	-0.03	0.25	0.49
	+/-35	2.14	0.00	0.24	0.47		+/-35	1.34	0.01	0.21	0.41		+/-35	1.09	0.02	0.22	0.42
	+/-40	1.34	0.01	0.23	0.45		+/-40	1.21	0.04	0.23	0.46		+/-40	1.02	0.04	0.22	0.43
	+/-45	1.90	0.04	0.26	0.51		+/-45	1.60	0.08	0.23	0.45		+/-45	1.15	0.04	0.25	0.49
	+/-50	2.96	0.04	0.29	0.57		+/-50	1.80	0.07	0.25	0.48		+/-50	2.20	0.07	0.28	0.55
	+/-55	2.92	0.03	0.30	0.59		+/-55	1.34	0.08	0.25	0.49		+/-55	1.94	0.10	0.30	0.58
	+/-60	3.25	0.04	0.32	0.62		+/-60	1.97	0.10	0.27	0.52		+/-60	1.93	0.15	0.29	0.57

1018-2025	+/-20	1.28	-0.10	0.25	0.50	1019-1444	+/-20	1.87	-0.07	0.29	0.57	1019-1744	+/-20	1.48	-0.02	0.24	0.47
	+/-25	1.34	-0.10	0.28	0.56		+/-25	4.98	-0.04	0.35	0.69		+/-25	2.29	-0.02	0.22	0.44
	+/-30	2.07	-0.06	0.30	0.58		+/-30	6.03	-0.02	0.32	0.63		+/-30	2.95	-0.04	0.28	0.55
	+/-35	0.92	-0.04	0.28	0.54		+/-35	1.44	-0.04	0.26	0.50		+/-35	3.08	-0.05	0.29	0.57
	+/-40	1.25	-0.04	0.22	0.44		+/-40	3.18	-0.02	0.30	0.58		+/-40	1.87	-0.01	0.26	0.51
	+/-45	1.28	-0.05	0.21	0.41		+/-45	2.03	0.03	0.28	0.55		+/-45	2.13	0.00	0.27	0.53
	+/-50	1.08	-0.07	0.26	0.51		+/-50	1.68	0.05	0.28	0.54		+/-50	3.31	-0.03	0.31	0.61
	+/-55	1.90	-0.07	0.31	0.62		+/-55	3.08	0.04	0.32	0.62		+/-55	3.28	-0.03	0.35	0.68
	+/-60	1.25	-0.09	0.30	0.58		+/-60	2.56	0.07	0.32	0.63		+/-60	2.75	-0.01	0.39	0.76

1019-2047	+/-20	1.71	0.08	0.27	0.53	1019-2127	+/-20	0.85	-0.07	0.20	0.39	1020-1541	+/-20	0.72	-0.01	0.18	0.36
	+/-25	1.80	0.04	0.27	0.53		+/-25	0.65	-0.06	0.20	0.38		+/-25	0.66	-0.02	0.19	0.36
	+/-30	1.80	0.01	0.25	0.49		+/-30	0.72	-0.10	0.16	0.32		+/-30	0.82	-0.03	0.20	0.40
	+/-35	2.33	0.00	0.27	0.54		+/-35	1.31	-0.04	0.17	0.34		+/-35	0.76	0.00	0.19	0.37
	+/-40	2.19	0.03	0.27	0.54		+/-40	1.31	-0.01	0.22	0.43		+/-40	0.92	-0.01	0.20	0.39
	+/-45	1.28	0.02	0.27	0.53		+/-45	1.61	0.02	0.24	0.47		+/-45	1.05	-0.01	0.21	0.42
	+/-50	1.47	0.00	0.26	0.52		+/-50	1.61	0.02	0.26	0.50		+/-50	0.98	-0.02	0.21	0.42
	+/-55	1.54	-0.07	0.28	0.55		+/-55	1.51	0.01	0.27	0.52		+/-55	1.02	-0.03	0.22	0.43
	+/-60	1.51	-0.12	0.29	0.57		+/-60	1.94	0.04	0.31	0.62		+/-60	0.95	-0.04	0.25	0.48

1020-1934	+/-20	2.24	0.10	0.39	0.76	1020-2140	+/-20	0.92	-0.10	0.30	0.60	1102-1619	+/-20	0.53	0.02	0.18	0.36
	+/-25	1.78	0.12	0.37	0.72		+/-25	1.12	-0.05	0.31	0.60		+/-25	0.72	0.00	0.21	0.42
	+/-30	2.62	0.13	0.34	0.68		+/-30	1.18	-0.04	0.28	0.55		+/-30	0.59	0.00	0.21	0.41
	+/-35	4.04	0.13	0.39	0.77		+/-35	1.38	-0.03	0.31	0.60		+/-35	0.59	0.02	0.20	0.39
	+/-40	4.04	0.17	0.43	0.84		+/-40	1.38	-0.01	0.37	0.73		+/-40	0.68	0.07	0.20	0.39
	+/-45	1.90	0.26	0.38	0.75		+/-45	1.02	0.04	0.33	0.64		+/-45	0.79	0.08	0.24	0.47
	+/-50	2.59	0.29	0.41	0.81		+/-50	1.35	0.11	0.37	0.72		+/-50	0.96	0.13	0.27	0.53
	+/-55	2.59	0.40	0.48	0.94		+/-55	1.51	0.08	0.41	0.80		+/-55	1.18	0.21	0.28	0.55
	+/-60	2.56	0.55	0.46	0.90		+/-60	1.31	0.13	0.42	0.82		+/-60	1.22	0.31	0.33	0.65

1102-2117	+/-20	0.82	0.16	0.20	0.39	1102-2243	+/-20	2.33	0.20	0.65	1.27	1103-1542	+/-20	1.58	0.42	0.30	0.59
	+/-25	0.89	0.14	0.21	0.41		+/-25	2.53	0.17	0.65	1.27		+/-25	1.42	0.39	0.32	0.63
	+/-30	0.88	0.08	0.20	0.39		+/-30	2.33	0.10	0.60	1.18		+/-30	1.47	0.37	0.29	0.56
	+/-35	0.85	0.05	0.20	0.40		+/-35	2.69	0.10	0.59	1.16		+/-35	1.44	0.31	0.30	0.59
	+/-40	0.82	0.03	0.20	0.40		+/-40	2.99	0.08	0.62	1.22		+/-40	1.64	0.30	0.31	0.61
	+/-45	0.82	0.04	0.22	0.43		+/-45	2.60	0.19	0.55	1.07		+/-45	1.28	0.32	0.31	0.60
	+/-50	0.79	0.01	0.22	0.42		+/-50	2.23	0.16	0.57	1.12		+/-50	1.31	0.30	0.30	0.58
	+/-55	1.32	0.00	0.25	0.49		+/-55	3.28	0.20	0.55	1.08		+/-55	1.34	0.30	0.32	0.63
	+/-60	0.82	0.00	0.24	0.47		+/-60	3.21	0.22	0.62	1.21		+/-60	1.38	0.28	0.32	0.63

1103-1838	+/-20	0.79	0.04	0.23	0.45	1103-2154	+/-20	2.00	0.12	0.33	0.65	1115-1857	+/-20	1.84	0.09	0.41	0.80
	+/-25	0.85	0.01	0.21	0.41		+/-25	1.64	0.14	0.32	0.63		+/-25	1.48	0.06	0.39	0.76
	+/-30	0.79	-0.01	0.19	0.38		+/-30	1.77	0.12	0.30	0.59		+/-30	1.41	0.07	0.41	0.81
	+/-35	1.21	-0.04	0.21	0.41		+/-35	2.13	0.11	0.31	0.62		+/-35	1.37	0.08	0.39	0.77
	+/-40	1.05	-0.08	0.22	0.42		+/-40	2.46	0.13	0.31	0.61		+/-40	1.61	0.09	0.39	0.76
	+/-45	0.85	-0.06	0.23	0.46		+/-45	2.00	0.12	0.34	0.67		+/-45	1.51	0.07	0.42	0.83
	+/-50	0.89	-0.10	0.24	0.47		+/-50	2.69	0.16	0.37	0.73		+/-50	1.48	0.00	0.42	0.82
	+/-55	0.92	-0.13	0.24	0.48		+/-55	2.49	0.19	0.40	0.78		+/-55	1.47	-0.08	0.44	0.86
	+/-60	0.85	-0.18	0.24	0.47		+/-60	1.80	0.24	0.39	0.77		+/-60	1.09	-0.17	0.39	0.76

1115-2002	+/-20	2.83	-0.03	0.61	1.20	1115-2245	+/-20	1.08	0.03	0.36	0.71	1116-0157	+/-20	1.15	-0.01	0.42	0.82
	+/-25	3.38	-0.10	0.64	1.25		+/-25	1.02	0.03	0.35	0.68		+/-25	1.09	0.06	0.40	0.77
	+/-30	2.69	-0.14	0.62	1.21		+/-30	1.18	0.04	0.34	0.66		+/-30	1.22	-0.03	0.41	0.80
	+/-35	3.31	-0.05	0.61	1.20		+/-35	1.31	0.04	0.37	0.72		+/-35	1.22	0.04	0.41	0.81
	+/-40	2.86	-0.05	0.65	1.27		+/-40	1.38	0.05	0.35	0.69		+/-40	1.22	-0.01	0.43	0.85
	+/-45	2.99	-0.03	0.64	1.26		+/-45	1.34	0.07	0.38	0.75		+/-45	1.31	0.01	0.46	0.91
	+/-50	3.08	0.02	0.62	1.21		+/-50	1.12	0.08	0.37	0.73		+/-50	1.32	0.02	0.44	0.87
	+/-55	2.59	-0.03	0.64	1.25		+/-55	1.38	0.04	0.37	0.73		+/-55	1.61	0.04	0.44	0.87
	+/-60	1.84	-0.19	0.66	1.28		+/-60	1.47	0.05	0.39	0.76		+/-60	1.61	0.06	0.47	0.92

1116-0453	+/-20	1.94	-0.05	0.42	0.83	1116-0742	+/-20	1.51	-0.04	0.46	0.90	1116-1036	+/-20	1.28	-0.05	0.43	0.84
	+/-25	2.23	-0.01	0.40	0.79		+/-25	1.44	0.01	0.45	0.89		+/-25	1.35	-0.01	0.40	0.78
	+/-30	1.48	0.01	0.41	0.80		+/-30	1.65	-0.05	0.44	0.85		+/-30	1.38	0.02	0.40	0.79
	+/-35	1.38	-0.02	0.42	0.83		+/-35	1.51	-0.05	0.45	0.88		+/-35	1.25	0.05	0.44	0.85
	+/-40	1.41	0.00	0.45	0.88		+/-40	1.42	-0.10	0.44	0.87		+/-40	1.55	0.09	0.44	0.86
	+/-45	1.58	-0.01	0.45	0.88		+/-45	1.51	-0.10	0.47	0.92		+/-45	1.31	0.12	0.43	0.84
	+/-50	1.45	0.01	0.47	0.93		+/-50	1.64	-0.18	0.45	0.89		+/-50	1.45	0.11	0.42	0.82
	+/-55	1.34	-0.02	0.48	0.95		+/-55	1.80	-0.33	0.45	0.88		+/-55	1.54	0.09	0.41	0.80
	+/-60	1.35	-0.02	0.43	0.84		+/-60	1.87	-0.46	0.47	0.92		+/-60	1.38	0.06	0.39	0.77

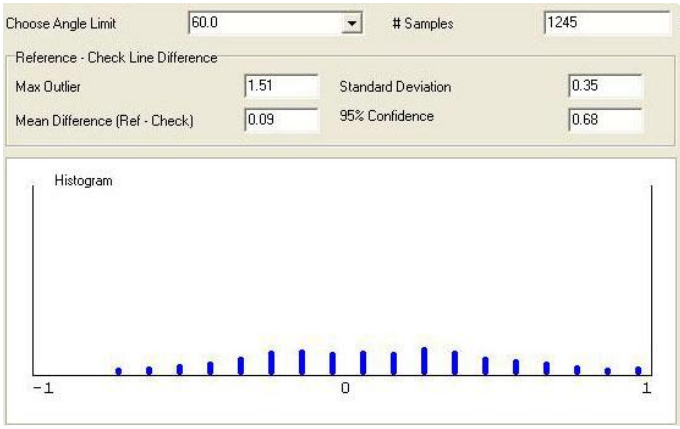
1116-1222	+/-20	1.28	0.04	0.50	0.98
	+/-25	1.31	-0.09	0.44	0.86
	+/-30	1.28	-0.01	0.48	0.95
	+/-35	1.18	-0.04	0.46	0.90
	+/-40	1.18	0.00	0.49	0.95
	+/-45	1.37	0.01	0.48	0.93
	+/-50	1.54	-0.01	0.49	0.96
	+/-55	1.55	-0.03	0.46	0.90
	+/-60	1.22	-0.07	0.46	0.91

Beam Angle	Max. Outlier	Mean Diff.	Std Dev.	95%
+/-20	3.41	0.05	0.40	0.78
+/-25	4.98	0.04	0.38	0.75
+/-30	6.03	0.03	0.38	0.74
+/-35	4.04	0.04	0.39	0.76
+/-40	4.04	0.04	0.40	0.78
+/-45	2.99	0.05	0.41	0.80
+/-50	4.43	0.04	0.41	0.80
+/-55	4.20	0.01	0.42	0.82
+/-60	3.64	-0.03	0.42	0.81

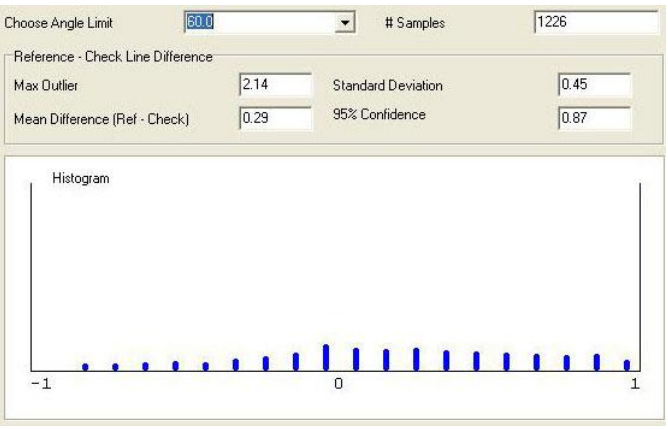
Summary of averages for all crossings

Figure 4.1-1

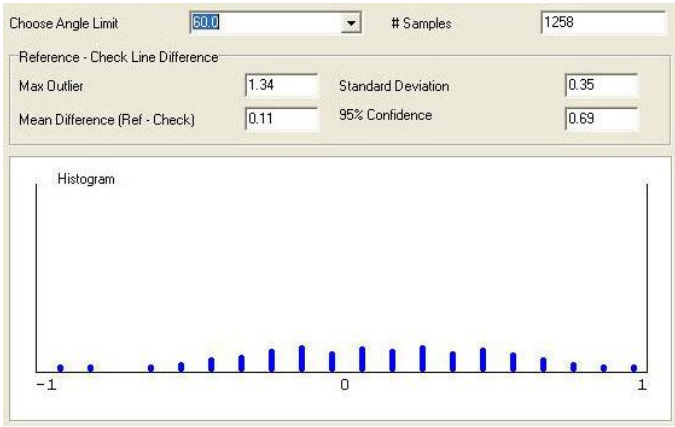
Plots of +/- 60 Deg. Beam Analysis Results for crossings 09/14 to 11/16 during HARS Fall 2010 survey.



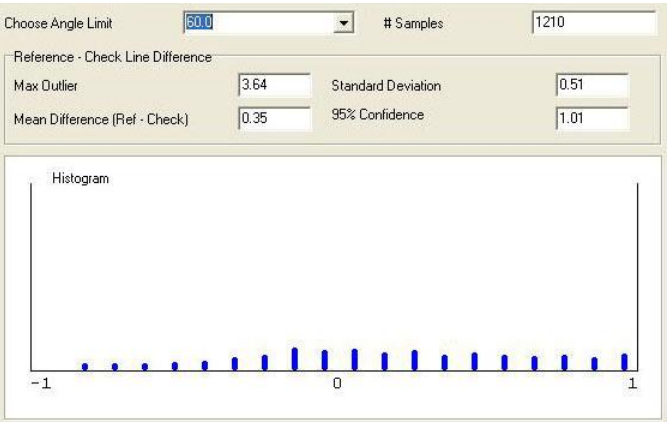
09/14_1802



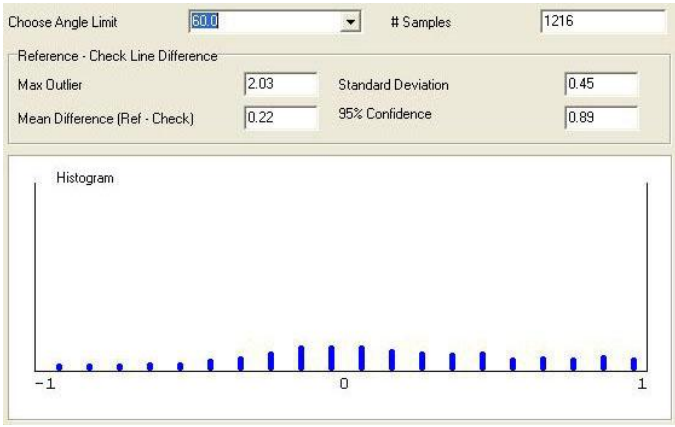
09/15_1629



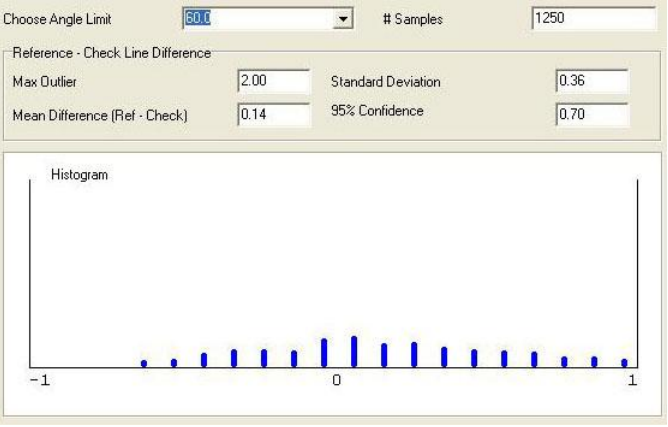
09/15_1833



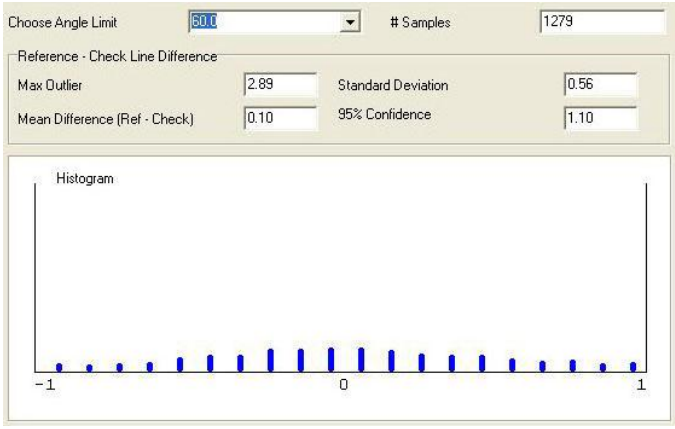
09/23_1442



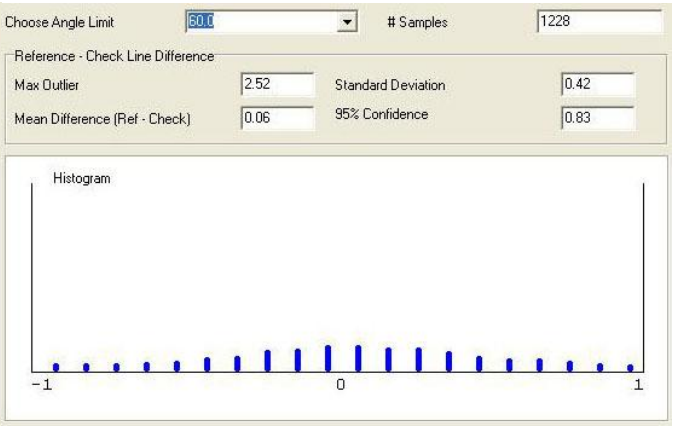
09/23_1736



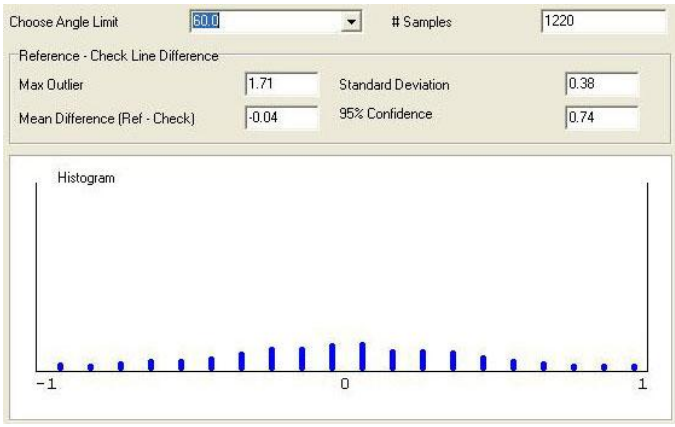
09/23_2000



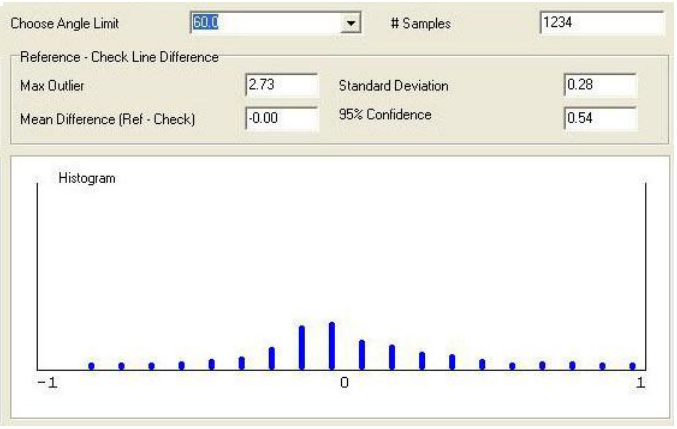
09/23_2123



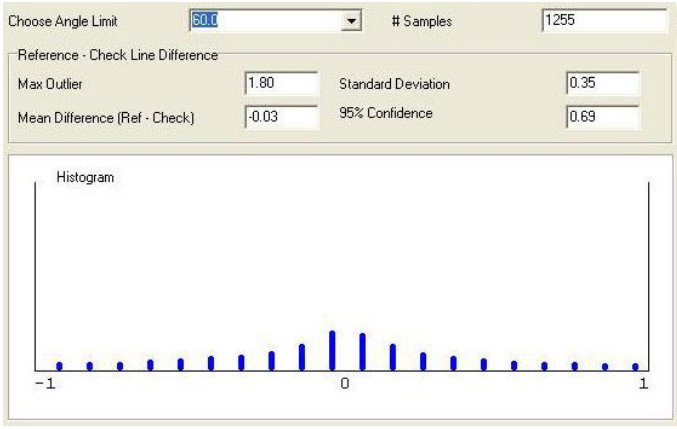
09/24_1522



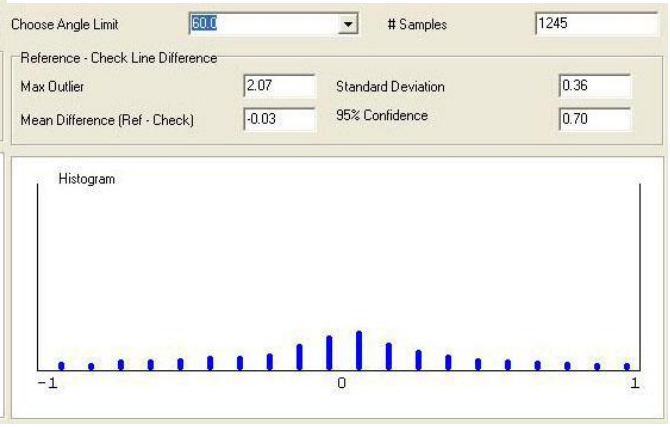
09/24_1829



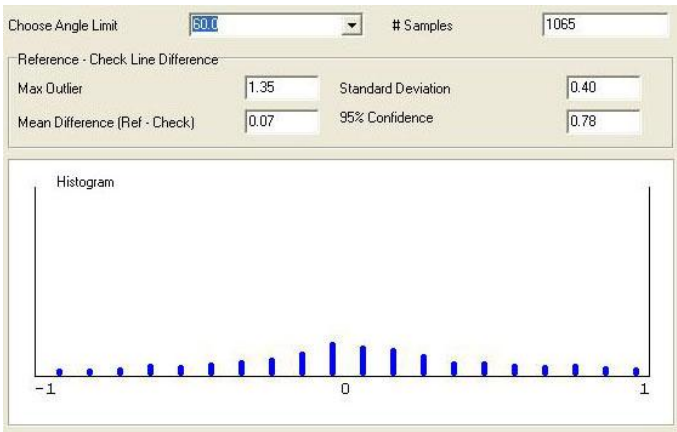
09/24_2005



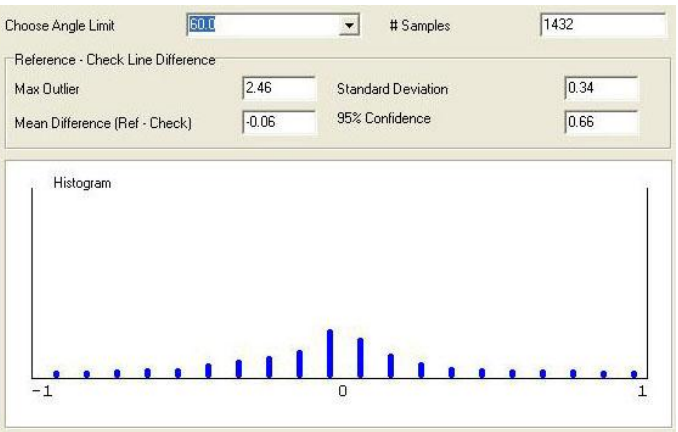
10/06_1716



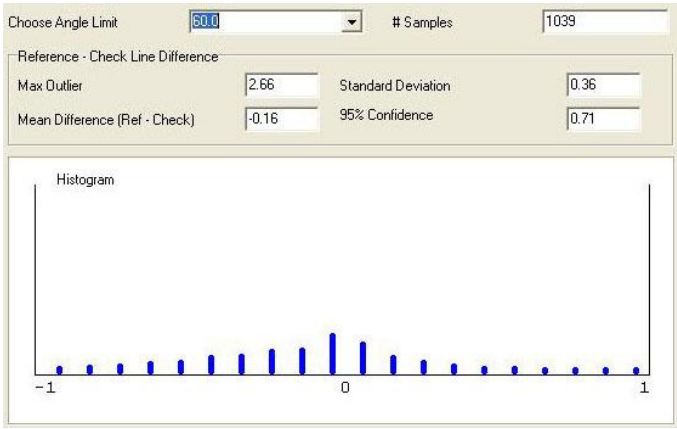
10/06_2027



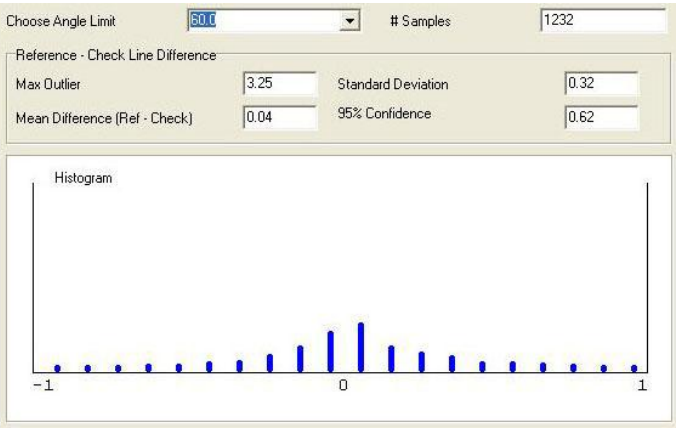
10/06_2126



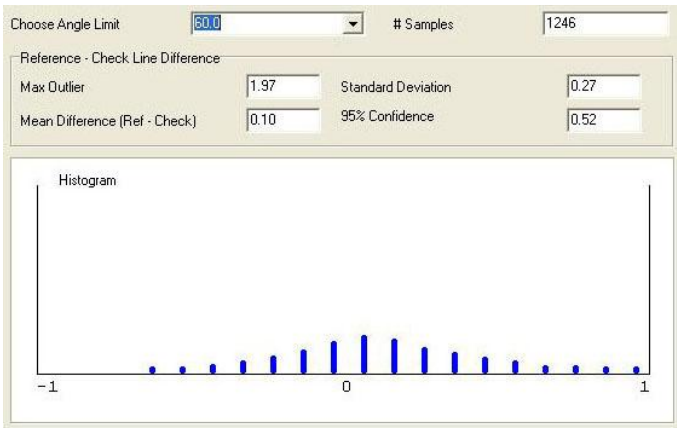
10/12_1420



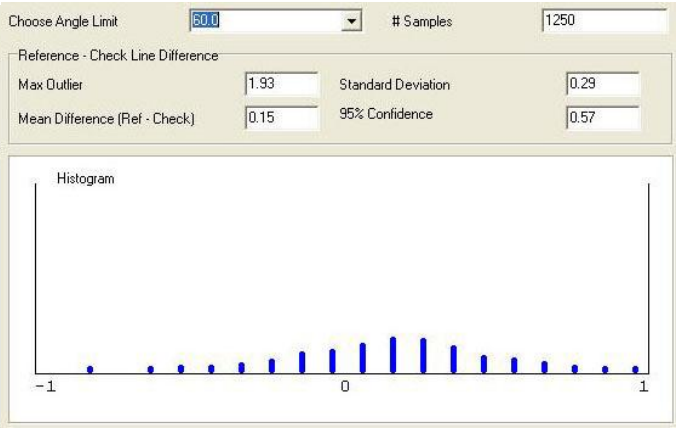
10/12_1809



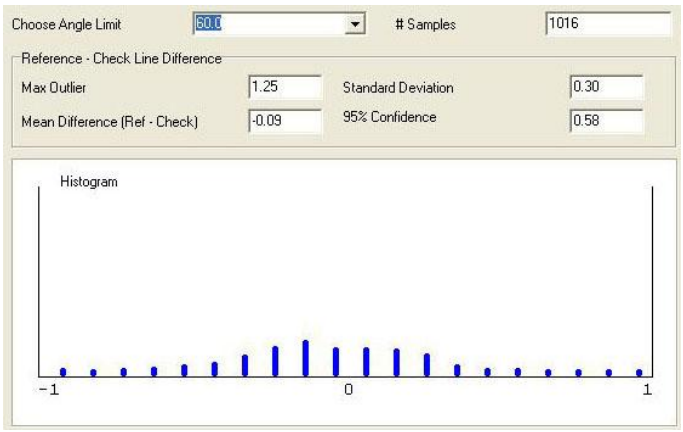
10/12_2049



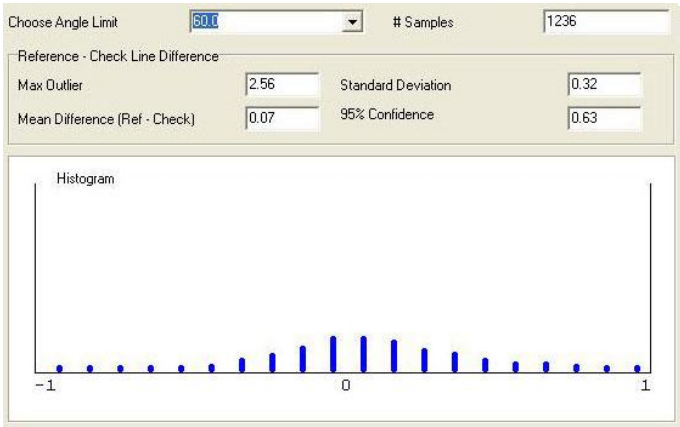
10/18_1531



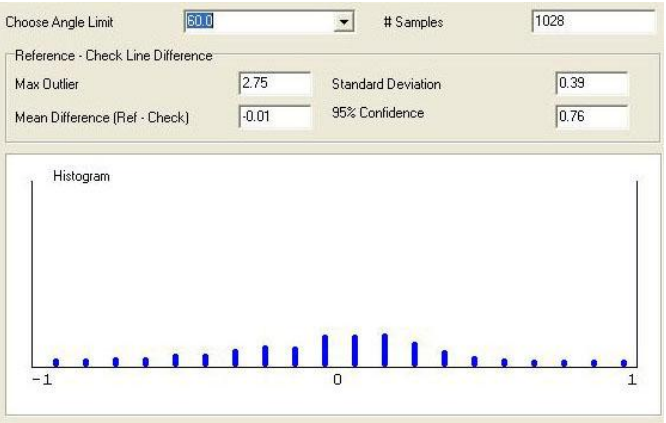
10/18_1855



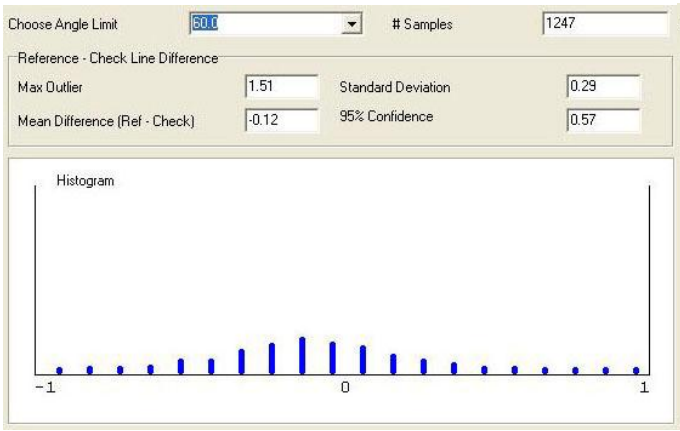
10/18_2025



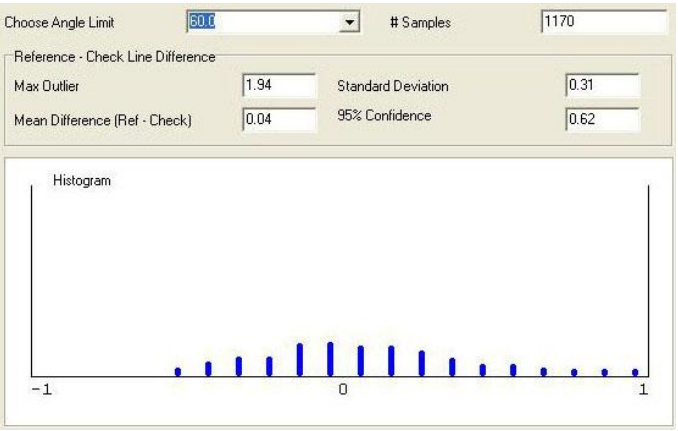
10/19_1444



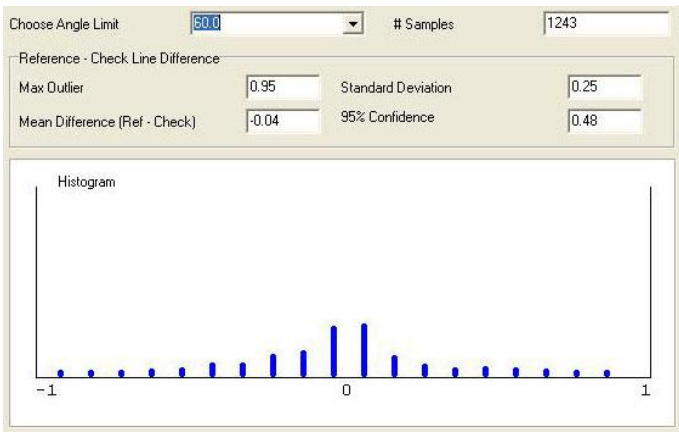
10/19_1744



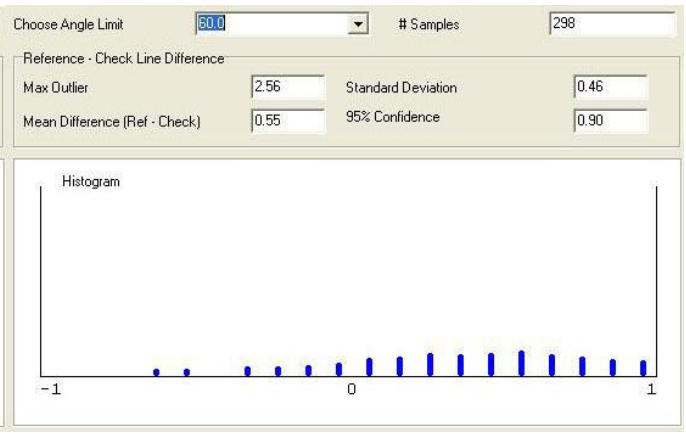
10/19_2047



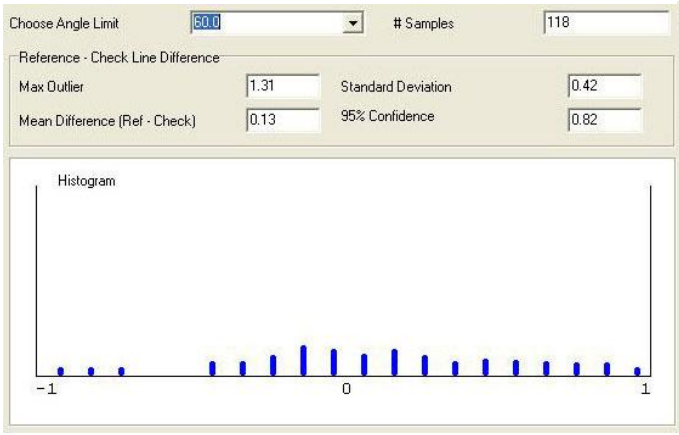
10/19_2127



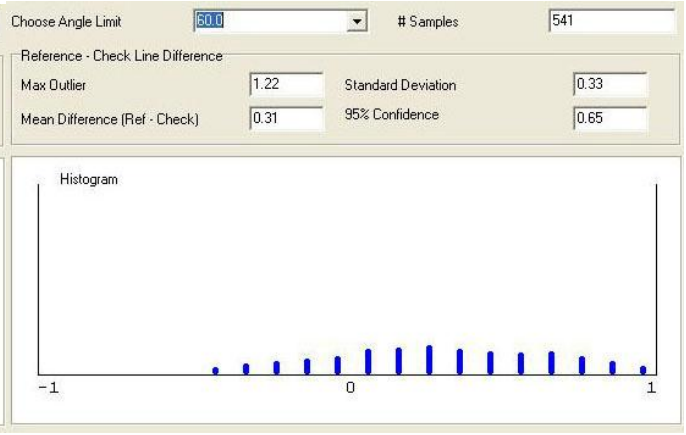
10/20_1541



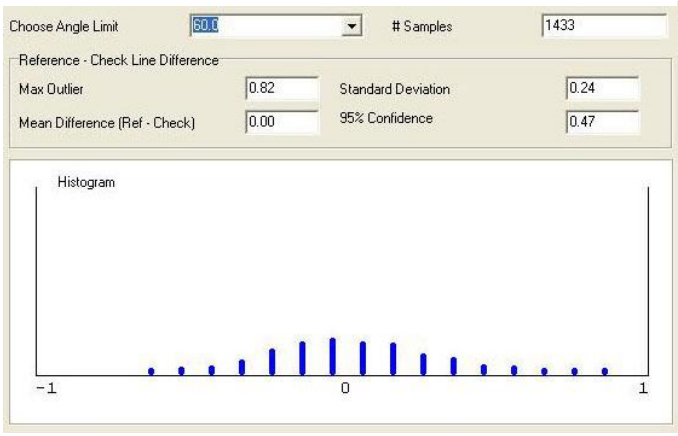
10/20_1934



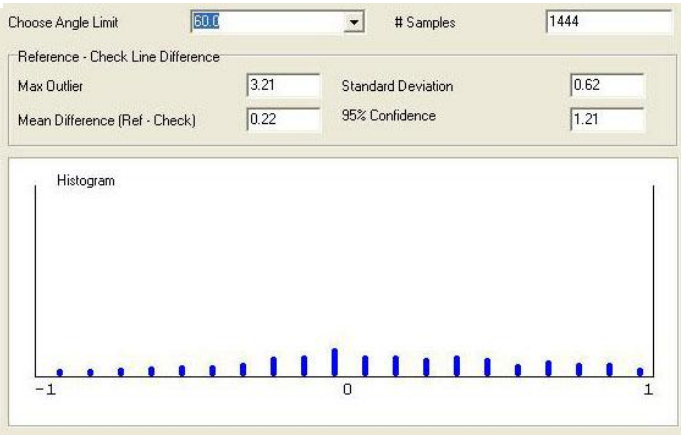
10/20_2140



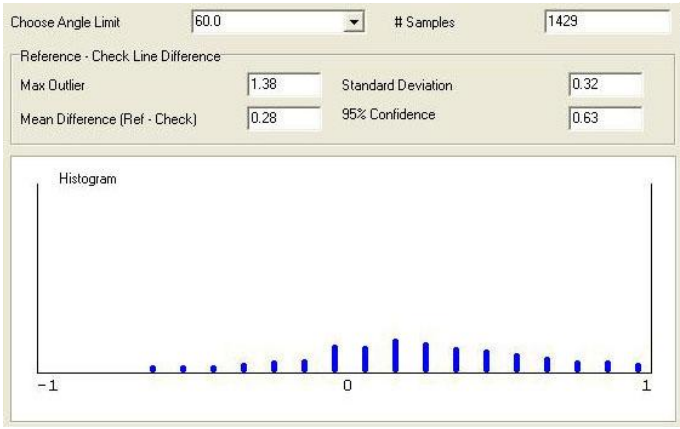
11/02_1619



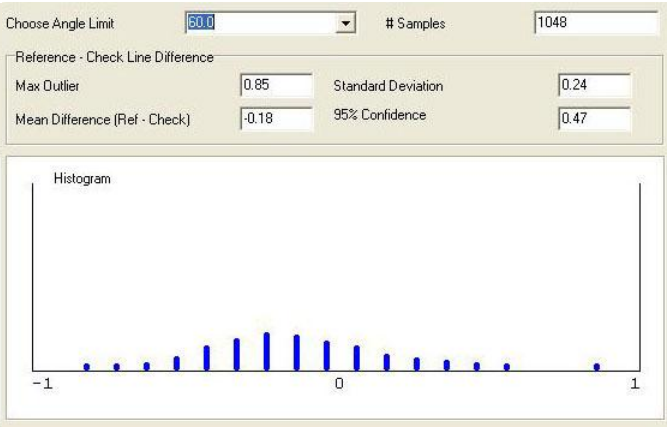
11/02_2117



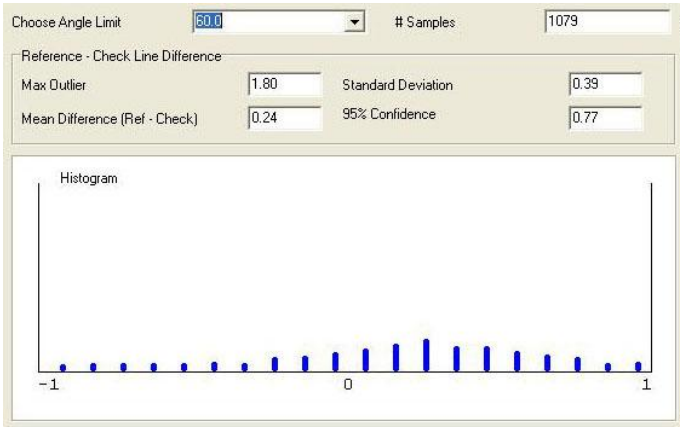
11/02_2243



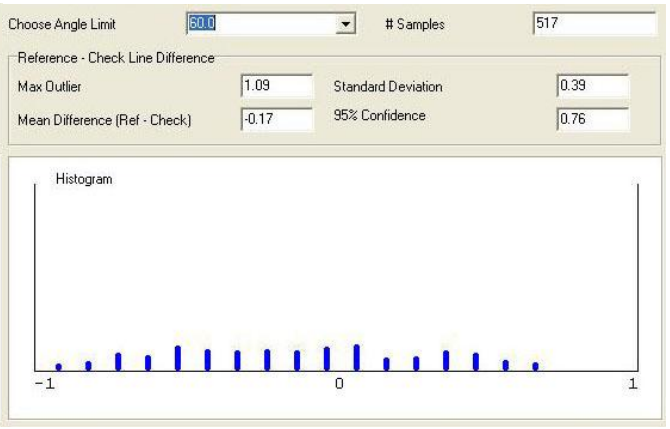
11/03_1542



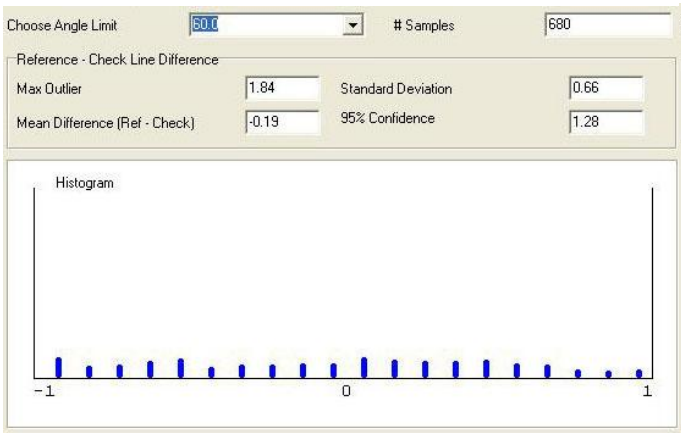
11/03_1838



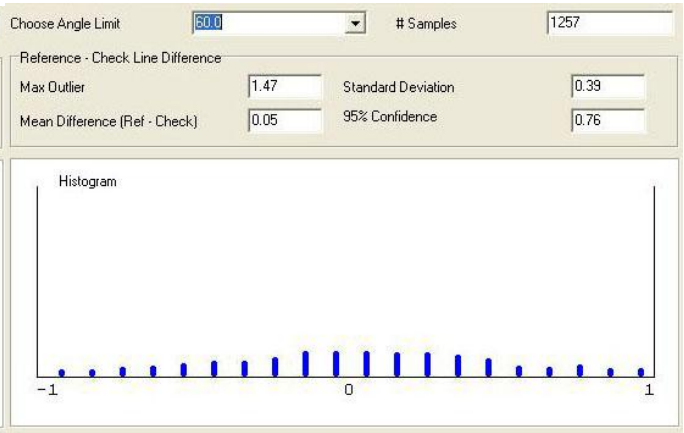
11/03_2154



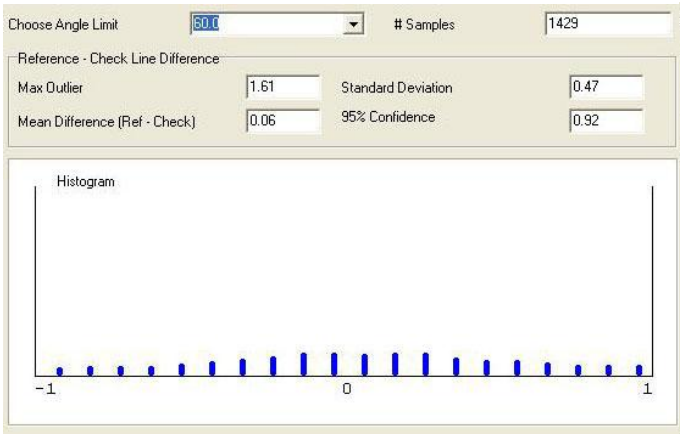
11/15_1857



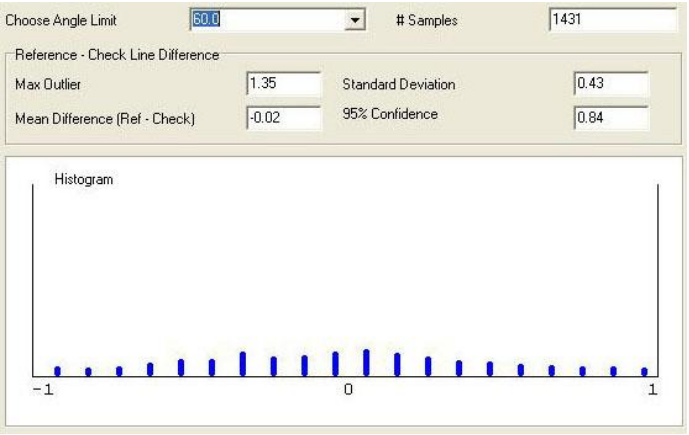
11/15_2002



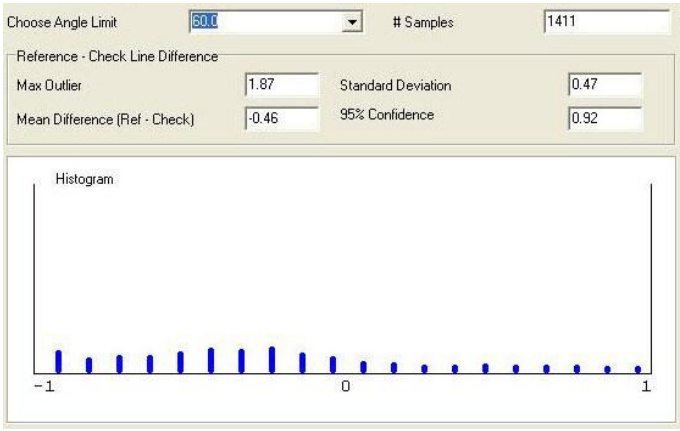
11/15_2245



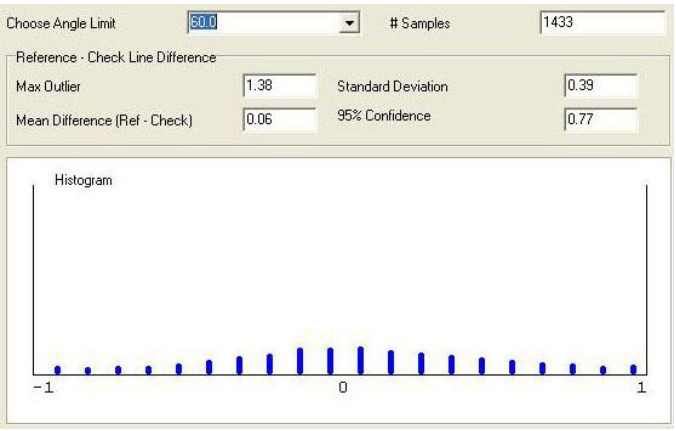
11/16_0157



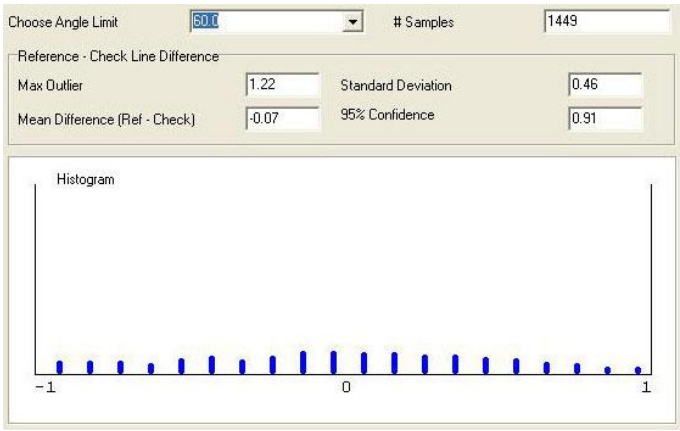
11/16_0453



11/16_0742



11/16_1036



11/16_1222

5.0 Back Scatter Data

For the 2010 bathymetry survey the SOW required collection of backscatter data. The Reson 7101 operates at 240 kHz and generates 511 equidistant soundings per ping at a max rate of 40 to 50 pings per second depending on user setting. Bottom detection is achieved using magnitude, phase or a blend of the two depending on bottom characteristics and beam angle. The 7101 produces three types of data; bathymetry, side-scan and snippet.

Snippet backscatter data was simultaneously collected and recorded in the 7K binary file along side the HSX files which contain the bathymetric data. This co-registration of backscatter and bathymetry data provides for low signal to noise ratio and precise positioning between the two data sets. It is processed through Geocoder; a program developed by Dr. Luciano Fonseca for the Center for Coastal and Ocean Mapping at The University of New Hampshire. Geocoder is licensed by and included in the Hypack software to create multibeam backscatter mosaics.

For Geocoder to process the snippet data it first has to be saved to GSF (Generic Sensor Format) files. GSF files are created as the bathymetric data is processed though Hypacks Multibeam Editor. HSX files are loaded into the MB editor. After corrections are applied, the appropriate backscatter records are pulled automatically from the 7K binary files as the data is saved to GSF. The GSF files are loaded into Geocoder then enhanced by applying the Angular Varied Gain. This is done by loading a gridded XYZ file of the area surveyed into Geocoder which will then be factored into the AVG calculations. From this an intensity mosaic is assembled and is saved as a geo-referenced TIF.

Figure 5.0-1
Final backscatter coverage of the HARS.