OCS Study
BOEM 2017-027

Observing Cable Laying and Particle Settlement During the Construction of the Block Island Wind Farm

US Department of the Interior
Bureau of Ocean Energy Management
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ABOUT THE COVER

Cover photo: Block Island Wind Farm Facility. Courtesy of HDR RODEO Team. Used with permission.

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Assistance and support from all team members is greatly appreciated.

Observing Cable Laying and Particle Settlement During the Construction of the Block Island Wind Farm

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Abbreviations and Acronyms

ABS	Acoustic Backscatter
ADCP	Acoustic Doppler Current Profiler
BITS	Block Island Transmission System
BIWF	Block Island Wind Farm
BOEM	Bureau of Ocean Energy Management
cm	centimeters
CTD	Conductivity, Temperature and Depth
DGPS	Differential Global Positional System
DWW	Deepwater Wind
kHz	kilohertz
MBES	Multibeam Echosounder
OBS	Optical Backscatter
TSS	Total Suspended Solids
WGS84	World Geodetic System, 1984

Editorial Notes

- All coordinates used in this report are referenced to WGS84 unless stated otherwise.
- Current direction is the direction towards which the current is flowing.
- All times are in Coordinated Universal Time unless stated otherwise.

Executive Summary

Key observations, data, findings, and results from two different types of environmental monitoring surveys conducted in and around the Block Island Wind Farm (BIWF) Project Area during its second construction phase are presented in this report. The monitoring was conducted to gather real-time data during the installation of a submarine cable from the mainland at Scarborough State Beach to Block Island's Fred Benson Town Beach. The cable was installed using a customized jet plowing mechanism. Real-time monitoring included recording visual observations of the installation process and measuring suspended sediment concentrations in the water column.

The data collected during this monitoring will provide additional information necessary for the Bureau of Ocean Energy Management's (BOEM) evaluation of environmental effects of future facilities and generate data to improve the accuracy of models and analysis criteria employed to establish monitoring controls and mitigations.

Visual monitoring included recording visibility of construction activities from both offshore and shoreline, types of lighting used at the construction site, information on what aspects of the construction activity can be seen from the shoreline, and meteorological conditions. Real-time observations were recorded by dedicated observers from the shoreline and from a vessel adjacent to the cable lay operations. Both still photography and video footage were employed to document the process from Block Island to the mainland at Scarborough State Beach.

The monitoring team was onsite for a period of 27 days. The team arrived on 31 May 2016 and departed 26 June 2016. The initial cable pull on mainland at Scarborough Beach State Park was originally scheduled for 3 June but was delayed until 9 June due to weather and delays in placing the cable mats at crossings. Approximately 105,232 feet (19.93 miles) of the Block Island Transmission System (BITS) cable was successfully laid from Scarborough Beach to Block Island over a period of 16 days. The construction time frame appeared optimal since it appeared to minimize impacts on recreational beach visitors and avoided operational delays due to adverse weather. Scarborough Beach access was not limited as conduit was in place upon team arrival. Access to Town Beach on Block Island was restricted for only two days during winch pull of BITS to cofferdam. The jet plowing operation did not hinder recreational craft traffic. No sediment plume was observed offshore from the observation vessel.

Sediment monitoring included two days of background sampling and one full day of sampling during the cable laying operations. Suspended sediment monitoring was undertaken using two complimentary techniques; acoustic backscatter and optical backscatter. These two techniques respond differently to different sediment grain characteristics such as size, shape, and angularity. Therefore, using both techniques allows for the suspended sediment load to be characterized as robustly as possible. Data were collected at various points around the cable trench footprint from Block Island Town Beach to Scarborough State Beach in Narragansett. A vessel-mounted 600-kilohertz (kHz) Teledyne RDI Sentinel Workhorse ADCP was used to take current and acoustic backscatter (ABS) measurement transects around the cable route and the cable-laying vessel Big Max.

An Idronaut EA89 multiparameter probe was used to collect profiles of turbidity through the water column at 23 locations around the BITS cable route. Eight of these profiles were conducted along the cable route to provide background information while the jet plow was not operational. The remaining 15 profiles were conducted in the vicinity of Big Max and the jet plow during cable laying operations. In addition to turbidity, the Idronaut also recorded conductivity, temperature and depth (CTD) data through the water column. Water samples were collected using Niskin bottles and analyzed for total suspended solids and particle size distribution for calibrating the Idronaut data.

No sediment plume was observed as a result of the jet plow operations. Data obtained during the background and jet plow monitoring remained comparable across all datasets. Sediment concentration estimates derived from high frequency acoustic backscatter measurements were < 1 mg/l at the surface and < 6 mg/l at the seabed. This is supported by the low frequency Multibeam Echosounder (MBES) data that found no significant levels of sediment in the water column. Estimated concentrations from optical backscatter measurements were < 2 mg/l at the surface and < 9 mg/l at the seabed.

Efforts to "calibrate" the backscatter measurements (convert to concentration values) using the on-site water samples were unsuccessful. Therefore, Fugro provided indicative values based on significant previous experience in backscatter calibrations. The estimated maximum concentration derived from the Idronaut data (9 mg/l) can be considered a "worst case." Suspended sediment levels on site during jet plow activity were found to be up to 100 times lower than those predicted by the modeling work (RPS ASA 2012).

Trench morphology was evaluated at 11 cross section locations to estimate the amount and extent of material deposited outside the trench as an overspill levee. Analyses were performed at locations along the cable route from the mainland to near the mid-point of Rhode Island Sound where the plume monitoring was conducted. Pre- and post-lay MBES data were used in this evaluation. Overspill levees were interpreted to extend 1.5 to 7 meters beyond the trench and were up to 25 centimeters thick. The average distance from the trench and thickness were 3.8 m and 7 cm, respectively. It was noted that overspill sediments may have deposited beyond the interpreted extent of the overspill levee, but likely were too thin to resolve with the MBES data. RPS ASA (2012) estimated that sediments up to 1cm thick would be deposited within 10 to 30 meters from the trench. This analysis of overspill levee extent suggests that the modeled predictions did not underestimate the distance that overspill sediments deposited from the trench.

The estimated volume of the overspill levees was similar to the volume of the trench scar. This suggests that most of the overspill sediments deposited within the overspill levee. The volume of the overspill levee material was estimated to be 0.1 to 0.6 m^3 per meter travelled by the jet plow. The mean value of the overspill levee volumes in the cross sections analyzed is 0.24 m^3. For comparison, the modeling report prepared by RPS ASA (2012) estimated that approximately 25 percent of sediment release volume would occur for a 2.28 m^3 trench volume. This corresponds to a sediment release volume of 0.57 m^3 per meter travelled.

It should be noted that the mean value of our overspill levee volumes is approximately half of what was predicted but the upper limit of the range is very similar to what the modeling predicted. This could be attributed to conservatism in the modeling or more sediment was deposited outside of our interpreted overspill levee body.

The interpretations presented in this report are limited to seafloor elevation differences that could be discerned with MBES data. Near the trench, the levee was more pronounced and exhibited a larger elevation difference from the pre-lay survey. The toe of the levee was interpreted where the two surveyed seafloor elevations converged. A thin drape of overspill sediments may have extended beyond the interpreted levee toe and could not be confidently discerned using the MBES data. However, the OBS and acoustic analysis of the MBES did not reveal a sediment plume that extended upward into the water column and beyond the immediate vicinity of the trencher which supports that most of the overspill sediments deposited within the overspill levee.

The visual and sediment monitoring was conducted for BOEM by the HDR RODEO Team under Contract M15PC00002, Task Order M16PD00011.

1. Introduction

This report presents key observations, data, findings, and results from two different types of environmental monitoring surveys conducted in and around the Block Island Wind Farm (BIWF) Project Area (**Figure 1**) during its second construction phase. The BIWF is a commercial offshore wind farm in the United States, and it is located 2.8 miles (4.5 km) from Block Island, Rhode Island in the Atlantic Ocean. The five-turbine, 30-megawatt project is owned and operated by Deepwater Wind (DWW) Block Island, LLC. Power from the turbines is transmitted to the electric grid along a 19.93 miles (34 km) transmission submarine power cable buried under the ocean floor, making landfall north of Scarborough Beach in Narragansett. The facility primarily supplies power to Block Island, with excess power being transmitted to the mainland.

BIWF construction began in July 2015 and was completed in a phased manner by the end of November 2016. During Phase I, five steel jacket foundations were installed over 18 weeks from July 26 to October 26, 2015. Phase II was initiated in January 2016 and it included installation of the turbines on the foundations and laying of the submarine power transmission cables. Operational testing of the facility was conducted from August through November 2016. Operation of the facility commenced on 2 December 2016.

The monitoring was conducted under the United States (U.S.) Department of Interior's Bureau of Ocean Energy Management's (BOEM) Real-Time Opportunity for Development Environmental Observations (RODEO) Program. The purpose of this Program is to make direct, real-time measurements of the nature, intensity, duration of potential stressors during the construction and/or initial operations of selected proposed offshore wind facilities. It also includes recording direct observations during the testing of different types of monitoring equipment that may be used during future offshore development to measure or monitor activities and their impact producing factors.

Data collected under the RODEO Program may be used as input to analyses or models that are used to evaluate effects or impacts from future offshore activities. This Program is not intended to duplicate or substitute for any monitoring that may otherwise be required to be conducted by the developers of the proposed projects. Also, RODEO Program monitoring is coordinated with industry and is not intended to interfere with or result in delay of industry activities.

The BIWF is the first facility to be monitored under the RODEO Program. **Table 1** identifies the types of field data collected under the RODEO Program during the construction and/or initial operations of this facility.

1.1 Phase 2 Construction Activity Descriptions

Phase 2 construction began in January 2016 and included installation of the following key components:

a. **Sea2shore Cable System** – which included construction and installation of :
   - Inter-array submarine cable connecting the five wind turbine generators (WTGs).
   - Export cable connecting northernmost WTG to Block Island.
   - Block Island substation, located near New Shoreham on Block Island, and includes approximately 0.8 mile of underground cable from the beach to the new substation.
   - Block Island Transmission System (BITS), which includes a bi-directional 19.93-mile submarine cable from Block Island to Scarborough State Beach in Narragansett and 3.5 miles of underground cable from Scarborough State Beach to the Dillon's Corner substation.

b. **Turbines** – This included installation of turbine towers, blades, nacelles on the foundations that were constructed during Phase 1.

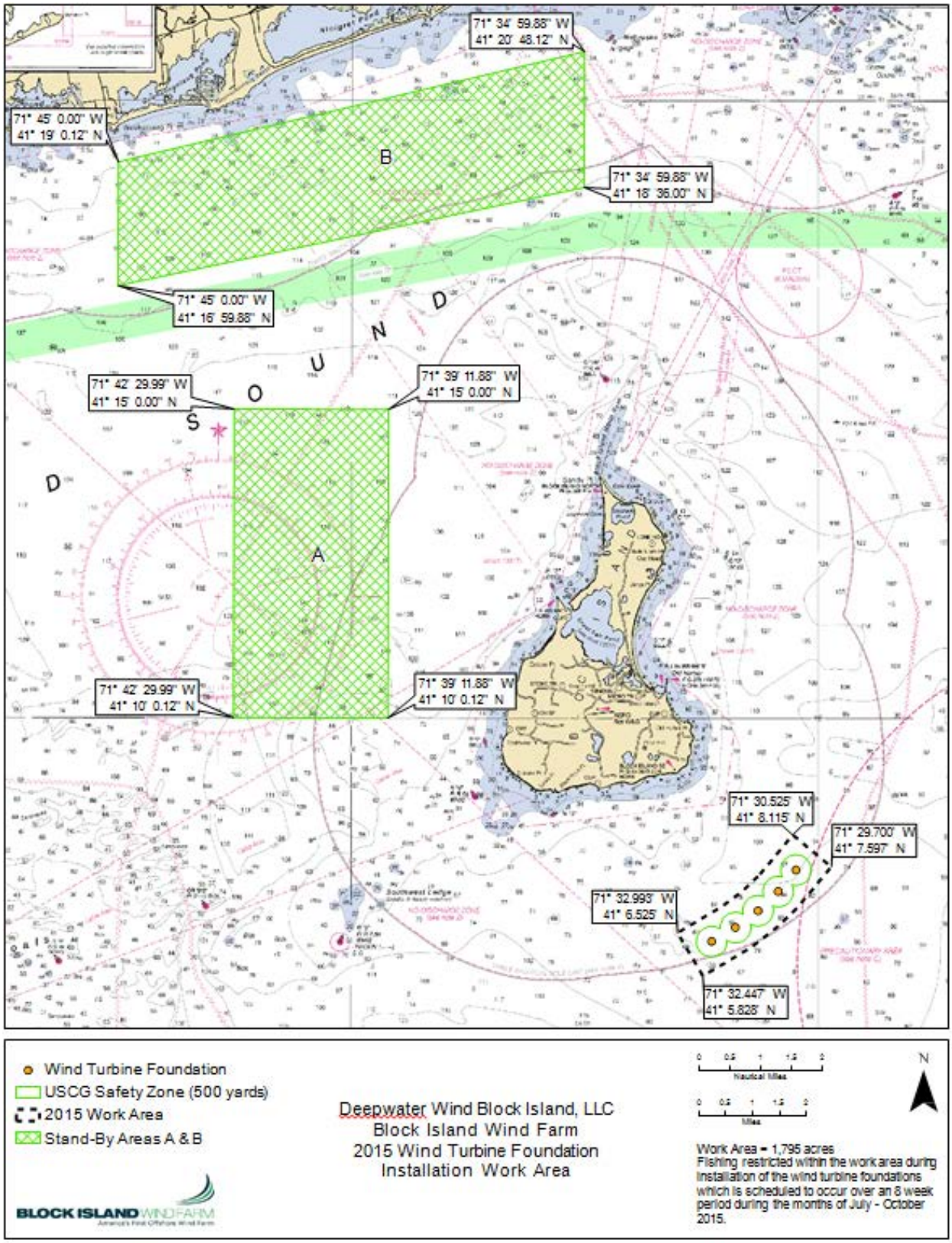


Figure 1. BIWF Work Area

Table 1. RODEO Program Monitoring Conducted at the BIWF

Phase	Construction Activity	Monitoring Surveys	Comment
Construction Phase 1	• Steel jacket foundations were installed on the seabed using two different types of pile driving techniques.	• Visual observations of the construction activities. • Airborne noise monitoring associated with the pile driving. • Underwater sound monitoring associated with the pile driving. • Seafloor sediment disturbance and recovery monitoring through bathymetry surveys conducted immediately after construction was completed. • Turbine platform scour monitoring through installation of 2 scour monitoring devices on selected WTG foundations.	See report entitled "*Field Observations During Wind Turbine Foundation Installation*[1]" for additional information.
Construction Phase 2	• Wind turbine generators installed on the steel foundations.	• Visual observations of the cable laying activities.	See Section 2 of this report for observations, findings, and results from the visual surveys.
	• Submarine transmission power cables connecting Block Island and mainland were laid using a jet plowing in the offshore portions and horizontal directional drilling in the near shore area.	• Seafloor sediment disturbance monitoring. • Post-construction seafloor recovery through bathymetry surveys.	See Section 3 of this report for observations, findings, and results from the sediment monitoring.
Initial Operations	• Testing of the newly installed turbines. • Testing of the submarine transmission power cables.	• Airborne noise monitoring. • Underwater sound monitoring. • Seafloor sediment disturbance and recovery monitoring. • Benthic monitoring.	See report entitled "*Field Observations During Wind Turbine Installation and Operation*[2]" for additional information.

[1] This report is currently under preparation.

[2] This report will be prepared after completion of the various surveys associated with the initial operations phase.

1.2 Cable Laying Operations

The BITS submarine cable was manufactured by LS Cable headquartered in South Korea and it has an expected life span of 40 years (Shuman 2016). National Grid managed the installation. LS Cable & System oversaw the installation operations, which were conducted by subcontractors Caldwell Marine International, LLC, and Kokosing Construction Company Inc. The cable route is shown in **Figure 2**.

A total of 105,232 feet of cable were installed using a customized jet plowing methodology from the mainland at Scarborough State Beach (North Beach) to Block Island's Fred Benson Town Beach. Jet plow operations began on 9 June 2016 and were completed on 25 June 2016. Cable Lay operations began at Scarborough Beach State Park. An offshore gravity cell containment system was utilized to transition the cable from sea to land. Once the BITS cable was connected to land, a jet plowing method was utilized at sea. When cable lay operations reached Block Island, horizontal directional drilling was utilized in the nearshore area for the land sea transition.

The cable lay vessel CLB Big Max is a 250 × 79.27-foot deck barge that was custom outfitted for the submarine cable storage and cable installation. Stable positioning is accomplished via six thrusters arranged in pairs with three on both starboard and port side (Deepwater Wind, LLC and National Grid, Inc. 2016). It includes the submarine cable spooled on deck along with a jet plow for installation. **Figure 3** shows the CLB Big Max actively laying cable as it approaches Block Island.

The 6-inch submarine cable was fed through a jet plow once in the water. The jet plow (**Figure 4**) liquefies the soil using water jets. The plow is hollow and the cable passes through it and buries the cable approximately 6 feet below the seabed (**Figure 5**). The disturbed area is expected to fill back as the sediment settles naturally. The jet plow allows for precise installation along the predetermined route.

The BITS cable was transitioned from sea to land on the mainland at Scarborough State Beach and the Block Island transition occurred at Fred Benson Town Beach. During land to sea transition at both locations, CLB Big Max positioned approximately 2,500 feet off the beach using a 4 point moor anchor pattern (Cox-Arslan 2016). A shore-based winch cable was pulled out to CLB Big Max and used to pull the BITS cable back towards shore. The BITS cable was connected to the terrestrial cable at the land/sea vault. Once cable was anchored, the jet plowed was used to create a trench for the cable from shore to CLB Big Max.

An advance rate of approximately 210 meters/hour (700 feet/hour) was observed during cable laying operations. From the known design of the jet plow rigging and observations on site, it was assumed that the plow was within 50 meters (164 feet) of the stern of Big Max. The marker buoys from the rigging, shown in **Figure 6**, provide guidance on the approximate position of the jet plow. However, the marker buoys would also be affected to an extent by the wind and currents. With this in mind and given the proximity restrictions from the Captain of Big Max, turbidity profiles were taken no closer than 80 m from the stern. This eliminated any risk of entanglement between the jet plow rigging and the survey equipment being deployed from the Jamie Hanna.

Figure 2. BITS Cable Route

Figure 3. Cable Lay Barge CLB Big Max

Figure 4. Jet Plow being lowered into water

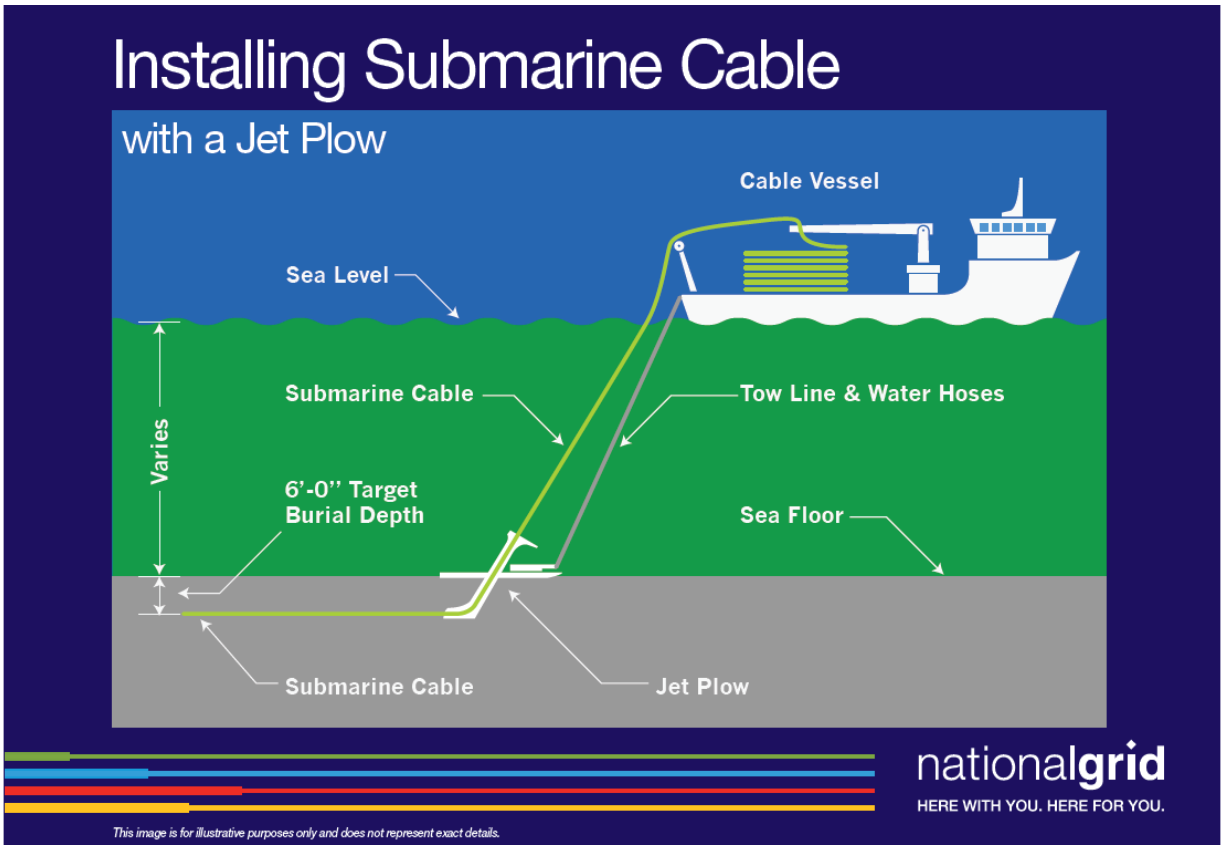


Figure 5. Installing Submarine Cable

Figure 6. Marker buoys from the jet plow rigging showing the approximate location of the plow on the seabed

2. Visual Observations

Submarine cable installation was monitored from Scarborough State Beach to Block Island's Fred Benson Town Beach over a 27-day period (31 May 2016 to 26 June 2016). Three HDR staff, Jamey Elliott, Peter Ouellette, and Amin Mivechi conducted the surveys along with supplemental assistance from URI graduate student Anthony Ragusa. The team mobilized to Narragansett, RI on 29 May and departed 27 June 2016. Upon arrival, the team conducted training and safety briefs, and in-person coordination with National Grid.

2.1 Onshore Visual Observations Methodology

Visual observations of construction from the shoreline and adjacent to the construction site were logged during submarine cable installation. Data collection methods are summarized below.

A dedicated onshore observer recorded the following from Scarborough State Beach and Fred Benson Town Beach during the initial cable deployment and final leg to Block Island, respectively:

- Visibility of construction activities from shoreline
- The types of lighting used at the construction site and what can be seen from the shoreline
- Meteorological conditions that affect visibility from shore including humidity.

Data were recorded morning, mid-day, sunset, and during significant changes in meteorological conditions (e.g., rain, fog, etc.) during each day that construction takes place. The observations included a set of photos taken from a fixed point as well as opportunistic photos to capture activities not in frame. Video recordings were made as necessary to document unusual sightings or significant events in the construction process.

2.1.1 Onshore Monitoring Locations

The onshore observer monitored from two separate locations during cable lay operations: Scarborough State Beach and Fred Benson Town Beach, Block Island. The observer started the observations at Scarborough State Beach on the mainland and transitioned to Block Island once construction ceased and CLB Big Max was out of sight of land.

Scarborough State Beach

During the initial cable lay which began at Scarborough State Beach, the observer was positioned in the parking lot at the intersection of Burnside Avenue and Ocean Avenue which is adjacent to North Beach. The physical address is 970 Ocean Road, Narragansett, Rhode Island 02882. The exact location for fixed monitoring occurred at the coordinates: N 41^{o}10.390', W 071^{o}33.576. Occasionally a car was parked in the designated location for fixed photos so the team would relocate to the nearest open location which was no more the 6 feet from the designated location. Once a fixed photo was captured, the onshore observer would move about the parking lot construction area to capture better angles of significant construction activities.

Figure 7 below shows monitoring position on the mainland at Scarborough State Beach parking lot utilized for monitoring and the cable transition to land. The land sea transition vault was a rectangle shaped hole dug in the parking lot used to connect the BITS cable to the terrestrial cable. An underground conduit for the BITS cable at the beach and the intersection of Ocean Road and Burnside Avenue was already complete upon the team's arrival.

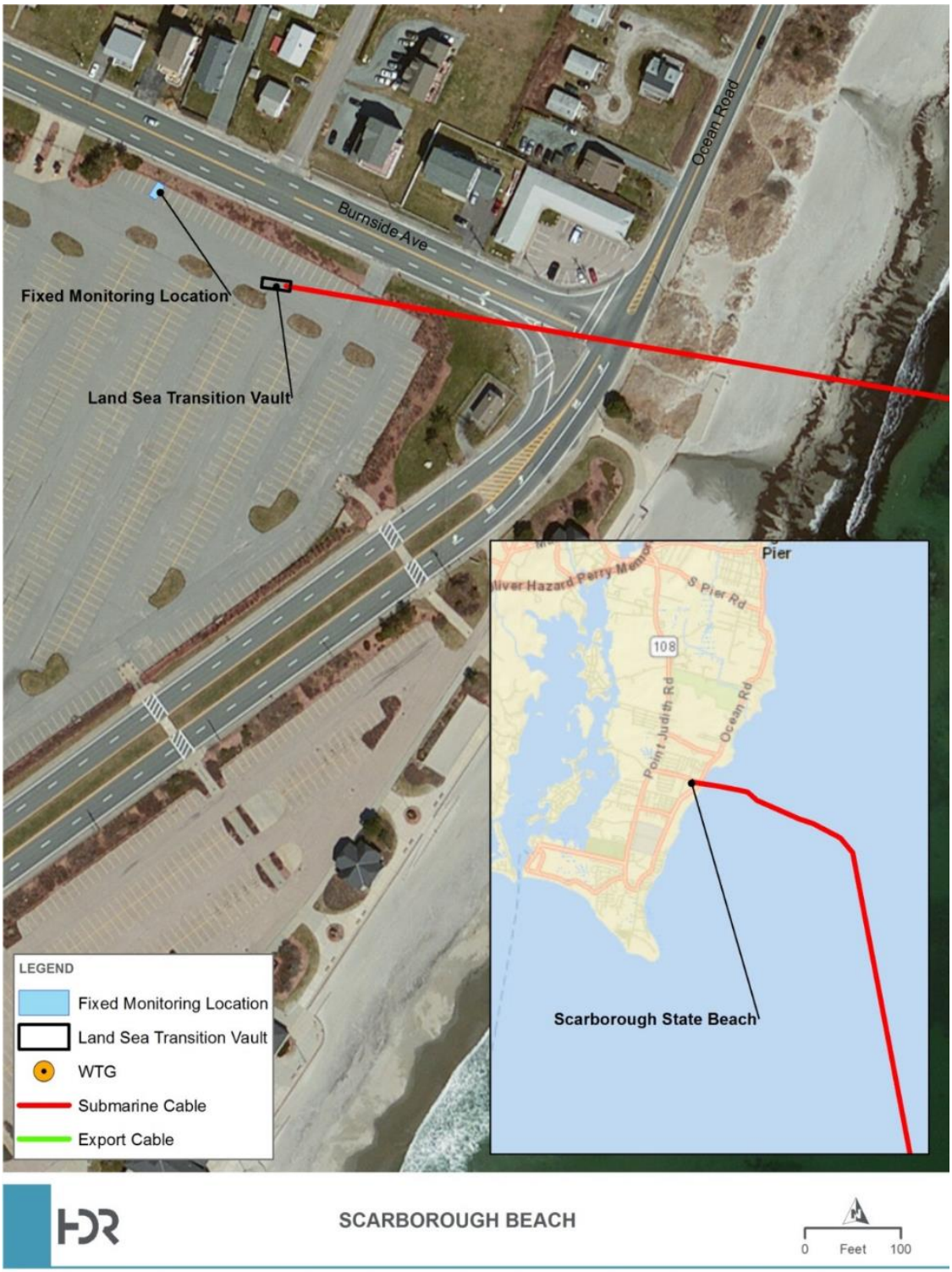


Figure 7. Onshore Monitoring Scarborough State Beach

Fred Benson Town Beach, Block Island

Observations were recorded from the Fred Benson Town Beach on Block Island. The stretch of beach located on Block Island's east coast from Old Harbor to Clay Head is known as Crescent Beach. Located centrally within Crescent Beach is the Fred Benson Town Beach. The sea to land transition point for the submarine cable is referred to as either Crescent Beach or Town Beach by locals. The observer was stationed at the Fredrick J. Benson Pavilion at Town Beach (**Figure 8**). The physical address is 7 Corn Neck Road, New Shoreham, Rhode Island 02807. The cofferdam was located approximately 50 yards to the north of the Pavilion.

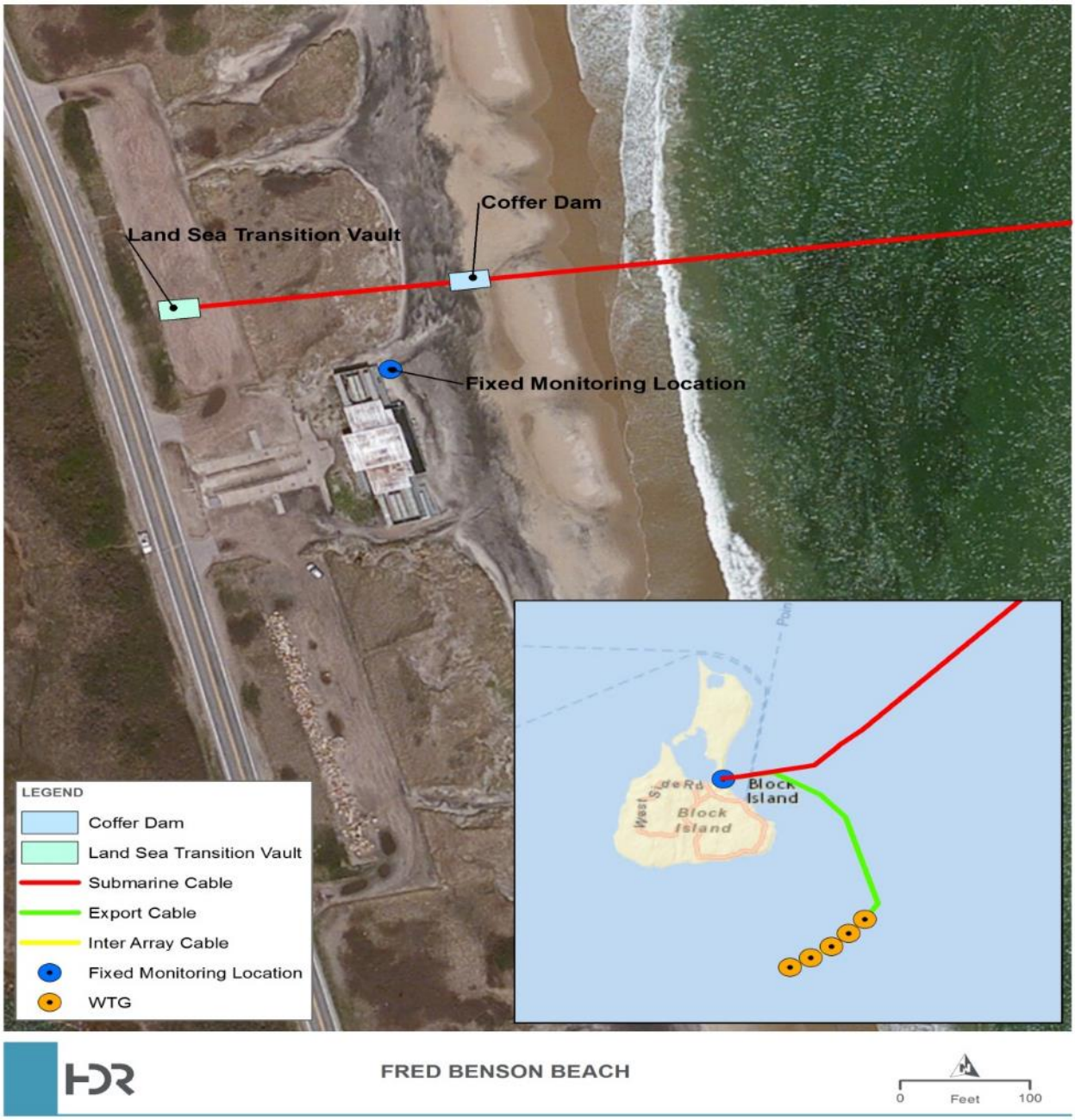


Figure 8. Fred Benson Town Beach

2.2 Offshore Visual Observations Methodology

A dedicated observer was located offshore on a boat adjacent to the construction site during cable installation, and observations related to the following were recorded:

- Number, size, and type of construction vessels on site
- Size and location of deployed anchors
- Number and nature of lighting used at the site
- Type of construction activities conducted and duration of each activity (meters of cable installed per hour).

Where possible, the observer recorded relevant information including incidental observations on the occurrence of marine species and other activities (e.g., fishing vessels, recreational vessels, etc.). The offshore observation vessel did not interfere with the on-going construction or with transit of the construction vessels. Construction activity observations were recorded using an iPad and customizable app database as described in **Section 2.3**.

The dedicated onshore observer also served as the safety contact to maintain communications with the vessel and verify return at the end of each day via VHF communications. The onshore observer also coordinated survey data download and performed initial quality checks each day.

The charter vessel Hula Dog and Captain Matt King were utilized for recording visual observations. Hula Dog is a 27-foot-long center console outfitted with radar, GPS, and communications. During the first half of cable laying, the Hula Dog transited from Block Island to Point Judith and there the observer boarded. Once the cable reached the mid-way point on route, the Hula Dog was moored at its permanent base at Old Harbor, Block Island. HDR staff took the high-speed ferry each morning once the Hula Dog transitioned to Block Island. The team then transited to the cable lay vessel for observation and returned to Block Island. HDR staff then took the ferry back to Point Judith to lodging accommodations.

2.2.1 Visual Monitoring Equipment

The onshore monitoring team used a Canon 5D Mark III camera with a 70–200-millimeter lens for this effort. The camera was mounted on a tripod to maintain consistency of images between observations and aid image stabilization. The offshore observer utilized a Canon 7D EOS with a 100–400-millimeter lens. The camera is capable of taking high-resolution video in addition to still photographs. The telephoto lenses were chosen because they are wide enough to capture support vessels, ambient lighting and environmental conditions but have the capability of zooming in if closer images are needed. The increased zoom capability of the offshore camera allowed close ups of barge operations. Additionally, the particular lens has an F-Stop of 2.8 allowing it to capture photographs and videos in lower light conditions.

ICOM M36 portable VHF radios were used for monitoring construction activities, weather, and communication between-shore and sea-based observer.

2.3 Visual Data Recording and Management

Data were recorded on a customized iPad app created specifically for logging salient information and other observations using the database platform FileMaker Go. The Team's GIS programmers worked closely with field observers to create and fine-tune the database for visual monitoring application prior to deployment. Data entry was standardized to maintain consistency among field staff. Observers took a photograph and then recorded the photo frame number along with notes on activity observed, time, and weather conditions. Specific meteorological conditions recorded were wind direction, wind speed, sea state, cloud cover, and humidity. These data were verified, edited, and synchronized with a dedicated hard drive at the end of each day. **Figure 9** is representative of the input screen used for recording construction-related activities during the visual surveys.

Figure 9. Sample Data Log Screen

2.4 Visual Observations Results and Findings

The survey team mobilized to South Kingston, Rhode Island, on 31 May 2016. Onshore visual monitoring was conducted on 1–7 June and 9–12 June. Onshore observations were also made from 22–26 June from Fred Benson Town Beach as the cable made land. Offshore monitoring occurred 9-12 and 14-22 June 2017.

A majority of the initial preparation for BITS cable landing and terrestrial route was already accomplished prior to the team's arrival including horizontal directional drilling in both Scarborough Beach State Park and Town Beach, Block Island. BITS construction schedule was delayed prior to monitoring team arrival due to granite rock discovered during geotechnical surveys which required state permit modifications to alter the cable route (Cox-Arslan 2016) near Scarborough Beach State Park. Monitoring efforts were focused on the actual BITS cable pull and connection to terrestrial cable onshore and the offshore cable installation utilizing the jet plow.

A gravity cell containment system was implemented at Scarborough Beach State Park in lieu of an offshore cofferdam as originally proposed. The gravity cell was temporarily positioned approximately 1,500 feet off Scarborough State Beach and removed in mid-May (CFCRI 2016). The gravity cell containment method is preferred in adverse sea conditions and requires less diver intervention (Caldwell Marine International, LLC 2015). The terrestrial portion was entirely buried within a state-owned right of way.

There are six existing cable crossings along the BITS route. National Grid placed articulated concrete mats over two active cables (CB-1 and TAT-12). The remaining four cables are inactive. The inactive cables were simply cut by divers to allow room for the BITS cable to transect. CLB Big Max took longer than expected to locate and then cut through the inactive cables. Once complete, the delays continued as CLB Big Max awaited a suitable weather window to anchor offshore to initiate the cable pull.

National Grid successfully buried 105,232 feet (19.93 miles) of BITS cable from Scarborough Beach to Block Island over a period of 16 days once jet plowing operations began on the cable lay vessel, CLB Big Max. National Grid averaged 6,577 feet (1.25 mile) per day. CLB Big Max speed was typically in the range of .05 to 0.22 knots. Fluctuations in speed were due to several factors including sea states, substrate density, and jet plow ability to maintain desired depth.

Table 2 below captures daily progress and amount of submarine cable buried per day in feet. CLB Big Max began jet plowing on 9 June 2016 and operations were conducted around the clock; however, HDR only monitored during daylight hours. The CLB Big Max daytime crew operated from 0700 to 1830, and the nighttime crew operated from 1830 to 0630. Note there are separate entries to denote daytime and overnight activities.

Table 2. Summary of Cable Operations

Date	Operation	BITS (ft) Day*	BITS total (ft)*
5/29/2016	CB-1 Cable Crossing– burial survey	0	0
5/30/2016	CB-1 Cable Crossing – difficulty locating	0	0
5/31/2016	CB-1 Cable Crossing – difficulty locating	0	0
6/1/2016	CB-1 Cable Crossing – place mat and grout	0	0
6/2/2016	TAT-6 Cable Crossing – burial surveys and place mats	0	0
6/3/2016	TAT-6 Cable Crossing –remove grapnel TAT-10 – located	0	0
6/4/2016	TAT-10 Cable Crossing- cut and clear for BITS route. Cable Crossing preparations complete	0	0
6/5/2016	CLB Big Max returned to dock, weather and sea states postpones scheduled pull at Scarborough Beach State Park	0	0
6/6/2016	Weather delay, CLB Big Max remained at dock	0	0
6/7/2016	Weather delay, CLB Big Max remained at dock	0	0
6/8/2016	Weather delay, CLB Big Max remained at dock	0	0
6/9/2016 Day	CLB Big Max transits to Scarborough Beach (departs 00:09 and arrives 05:50). 12:30 Jet plow deployed. 17:30 BITS connected to land winch cable on CLB Big Max	0	0
Night	18:50 BITS connected to Land winch cable to begin pull ashore 20:58 BITS cable at land sea transition vault 21:42 Start jet plow operations to Block Island	5,333.0	5,333.0
6/10/2016 Day	Jet Plow was down due to jet hose connection and repaired	166.0	5,499.0

Date	Operation	BITS (ft) Day*	BITS total (ft)*
Night	Jet plow operations	6,373.0	11,872.0
6/11/2016 Day	Jet plow operations. CLB Big Max speed up to 0.20kts	7,137.0	19,009.0
Night	Jet plow operations	11,126.0	30,135.0
6/12/2016 Day	Jet plow operations. Tow bridal broke on jet plow.	8,523.0	38,658.0
Night	Weather delayed repair of tow bridal.	0.0	38658.0
6/13/2016 Day	15:20 Divers repaired tow bridal and Jet plow operations resumed	1,426.0	40,084.0
Night	Jet plow operations	3,923.0	44,007.0
6/14/2016 Day	Jet plow operations. All stop due to blown fuse	5,095.0	49,102.0
Night	Diver inspection revealed damage to jet nozzles	0.0	49,102.0
6/15/2016 Day	Down for repair.	0.0	49,102.0
Night	Down for repair	0.0	49,102.0
6/16/2016 Day	Down for repair	0.0	49,102.0
Night	22:47 repairs complete. Jet plow operations	5,777.0	54,879.0
6/17/2016 Day	Jet plow operations	5,867.0	60,746.0
Night	Reached CB-1 Cable	2,621.0	63,367.0
6/18/2016 Day	Cross Cable CB-1. Jet plow operation	175.0	63,542.0
Night	Jet plow operations	6,035.0	69,577.0
6/19/2016 Day	15:00 Cross Cable TAT-12	641.0	70,218.0
Night	Jet plow operations	5,357.0	75,757.0
6/20/2016 Day	Jet plow operations	8,263.0	83,838.0
Night	Jet plow operations	8,897.0	92,735.0
6/21/2016 Day	Jet plow operations	4,483.0	97,218.0
Night	0400 CLB Big Max positioned for pull at Crescent Beach.	6,107.0	103,325.0
6/22/2016 Day	1605 Floated BITS cable	0	0
Night	Plow wire tow to CLB Big Max	0	0
6/23/2016 Day	0822 BITS Cable makes land. Diver walks cable through surf to complete	208.0	103,533.0
Night	Jet plow operations	1,387.0	104,920.0
6/24/2016 Day	0622 Jet Plow reaches cofferdam at Crescent Beach	312.0	105,232.0
Night	0420 tow jet plow back to CLB Big Max. 0548 jet plow placed on deck of CLB Big Max		
6/25/2016	1005 CLB Big Max departs Crescent Beach		

The most productive day was 11 June. National Grid was able to bury 7,137 feet (1.35 miles) of cable during daytime operations and the nighttime operations were able to bury 11,216 feet (2.12 miles) for a total of 18,353 feet (3.48 miles).

Weather conditions were calm and allowed safe working conditions for majority of operations. Temperatures during daylight hours ranged from a low of 59F to high of 80F with an average of 68F as recorded by HDR. The most significant weather delay occurred on 5-9 June 2016 which delayed the initial sea to shore transition at Scarborough Beach State Park due to sea states. On 13 June, sea states and weather were unsafe and the captain canceled HDR offshore monitoring.

On 22 June, CLB Big Max reached Town Beach and was anchored approximately 2,000 feet from shoreline. Prior to pulling cable ashore, Durocher Marine needed to remove the front of the cofferdam in order to bury the BITS cable as it came ashore. They experienced delays when removing the steel plates from cofferdam using the vibratory winch. The steel plates were stuck and difficult to remove. This is a common occurrence as the steel will often warp and corrode beneath the surface. Cofferdam issues continued through 23 June. Durocher Marine planned on pulling the plow to shore around 1600 at low tide in order to bury the last segment of cable from CLB Big Max to the cofferdam; however, the cofferdam was still not removed due to stuck plates. The plow eventually was pulled ashore at approximately 2200, completing the cable lay operations.

On 24–25 June, the survey team conducted final monitoring as the cofferdam was completely removed and site cleanup occurred.

During a majority of offshore cable laying operations, only three vessels were present: CLB Big Max, the crew/support vessel and a tow vessel (**Table 3**). Tug Realist and Tug Lucinda Smith served as the tow vessels. The Megan Miller and Joel Miller served as crew/support vessels.

Table 3. Vessels Supporting Cable Laying Operations

Vessels	Length (feet)	Breadth (feet)	Function
CLB Big Max	79.27	21.95	Cable Lay Barge
Black Lab (CLB Big Max)	unknown	unknown	Dive tender
Tuff Boat (CLB Big Max)	unknown	unknown	Dive tender
Skeeter Barge	unknown	unknown	Small barge for land sea transition
Hula Dog	27	9.3	Visual Observation Vessel
Abigail Miller	65	17	Crew
Joel Miller	65	17	Crew
Tug Lucinda Smith	85	28	Towing
Tug Realist	84.5	26.2	Towing
Joseph Miller	190	36	Utility Boat
Megan T. Miller	100	24	Utility (fueling/supplies)

Key observations from the visual monitoring surveys are summarized below:

- Given the complex nature of the operation, the cable laying process was efficiently completed and 105,232 feet (19.93 miles) of BITS cable was successfully laid from Scarborough Beach to Block Island over a period of 16 days.

- The time frame of the cable laying operations was optimal since it minimized impacts on recreational beach visitors and avoided operational delays due to weather and/or sea states. Scarborough Beach access was not limited as conduit was in place upon team arrival. Access to Town Beach on Block Island was restricted for only two days during winch pull of BITS to the cofferdam.
- Weather only affected the initial cable pull during 5-9 June 2016.
- The jet plowing operation did not hinder recreational craft traffic. A sail boat race passed CLB Big Max on 11 June 2016 with limited interference. The Tug Realist was onsite and diverted sail boats around CLB Big Max via VHF communications with no incidence of vessels coming too close to operations.
- No sediment plume was observed offshore from the observation vessel.

Visual monitoring photo logs are submitted electronically on the accompanying DVD. **Appendix 1** and **2** provide a key to the photos presented in the log along with observation notes. Records of meteorological observations made during the visual monitoring are contained in **Appendices 3** and **4**. **Appendix 5** presents key discrete observations made during the surveys during the cable lay installation.

3. Sediment Monitoring

3.1 Introduction

Fugro, Inc. was subcontracted by HDR to monitor suspended sediment concentrations in the water column during the BIWF submarine cable installation. Field data were compared to a model developed by RPS ASA in 2012. The aims of the survey were as follows:

- Characterize the spatial extent of any sediment plume associated with the cable installation operation and monitor its evolution over time
- Monitor the suspended sediment concentration within the plume.

The survey methodology was based upon previously successful campaigns such as the following:

- Collection of high-frequency acoustic backscatter (ABS) profiles using a vessel-mounted Teledyne RDI Acoustic Doppler Current Profiler (ADCP) to monitor and measure any sediment plume that is present in the water column
- Collection of optical backscatter (OBS) derived turbidity profiles using an Idronaut multiparameter probe
- Collection of water samples to quantify the total suspended solids (TSS) in the water column as a result of the cable laying operations
- Collection of low frequency ABS profiles using a vessel-mounted SeaBat 7125 ultra-high resolution multibeam echosounder (MBES).
- Evaluation of post-lay cable trench scar morphology to estimate the amount of sediments that deposited outside the trench as an overspill levee. Pre-lay and post-lay MBES surveys were used in this evaluation.

3.1.1 Summary of Operations

Two days of background sampling (16 and 19 June) were undertaken for comparison along the cable route while there was no jet plow activity (**Table 4**). One full day of sampling was undertaken (17 June) during cable laying operations approximately around the halfway point of the cable route. Sampling undertaken away from any cable laying operations is referred to within this report as 'Background' and the day surveying around the cable laying vessel, Big Max and the jet plow while operational is referred to as 'Jet Plow.'

Table 4. Summary of Operations

Date	Operations
14 June 2016	• Prepare instrumentation and mobilize survey vessel, R/V Jamie Hanna. • Liaise with Project Manager on board cable laying vessel, Big Max to coordinate operations and establish survey limits.
15 June 2016	• Deploy seabed frame as a part of an accompanying oceanographic monitoring survey of the BIWF.
16 June 2016	• Install instrumentation and conduct calibrations. • 'Background' Day One – surveying at various distances along the pre-laid cable route to obtain background data. Big Max was not operational due to a mechanical fault.
17 June 2016	• Instruments were reinstalled and configured, as they could not be left on deck overnight. Calibrations undertaken. • 'Jet Plow' Survey Day – surveying in the immediate vicinity of the Big Max and jet plow while the submarine cable was being laid.
18 June 2016	• Big Max took the jet plow out of the water and commenced cable crossing operations.
19 June 2016	• Reinstall instrumentation and conduct calibrations. • 'Background' Day Two – surveying along cable route while Big Max was still working on the cable crossings.
20 June 2016	• Field team and equipment demobilization

3.1.2 Survey Locations

Data were collected at various points around the cable trench footprint from Block Island Town Beach to Scarborough State Beach in Narragansett. **Table 5** below provides summary descriptions of where each transect and the corresponding turbidity profiles and water samples were conducted. Approximate proximities of the survey vessel Jamie Hanna to the jet plow at the closest point of the transect are provided. With ADCP transecting, there is an acoustic spread on the seabed caused by the four offset beams, detailed in **Section 6.1**. For this reason, proximities to the jet plow of the data obtained would be approximately 10 meters closer than listed below. **Figures 10** to **12** provide summary schematics of the approximate locations of ADCP transects in relation to the jet plow. Note that these figures are only approximately to scale and are provided for illustrative purposes only.

Table 5. ADCP transect descriptions with corresponding turbidity profiles and water samples

Transect	Date	Coinciding Turbidity Profile	Coinciding Water Sample Set	Description	Proximity to Jet Plow (m)
Background 1	16 June 2016	1	1	Along cable route	N/A – Jet Plow not in operation
Background 2	16 June 2016	2 & 3	2	Along cable route	N/A
Background 3, 4, 5	16 June 2016	4, 5, 6	3, 4, 5	Along cable route	N/A
Background 6	19 June 2016	7	6	Adjacent to cable route	N/A – Jet Plow not in operation
Background 7, 8	19 June 2016	-	-	Along cable route	N/A – Jet Plow not in operation
Background 9, 10, 11	19 June 2016	8	7	Over cable crossover	N/A
Background 12	19 June 2016	-	-	Expanding spiral over cable crossover	N/A
Jet Plow 1	17 June 2016	-	-	Transect across stern	300
Jet Plow 2, 3	17 June 2016	-	-	Transects across stern	150
Jet Plow 4	17 June 2016	1, 2, 3	1, 2, 3	Transect across stern	150
Jet Plow 5, 8	17 June 2016	-	-	Line to stern	130
Jet Plow 6, 7	17 June 2016	4	4	Parallel starboard	50
Jet Plow 9, 10	17 June 2016	5	5	Parallel port	50
Jet Plow 11, 12	17 June 2016	-	-	Transects across stern	200
Jet Plow 13	17 June 2016	6, 7, 8	6	Transect across stern	120
Jet Plow 14	17 June 2016	-	-	Transect across stern	110
Jet Plow 15	17 June 2016	9	7	Transect across stern	100
Jet Plow 16	17 June 2016	10, 11	8, 9	Starboard, stern, port	15, 80, 15
Jet Plow 17	17 June 2016	12	10	Box	50
Jet Plow 18	17 June 2016	-	-	Box	100
Jet Plow 19	17 June 2016	13	11	Box	300
Jet Plow 20	17 June 2016	14	12	Box	500
Jet Plow 21	17 June 2016	-	-	Expanding spiral	30 - 400

Note: For each set of water samples listed, three samples were obtained. One at the surface, one in the middle of the water column and one closer to at the seabed.

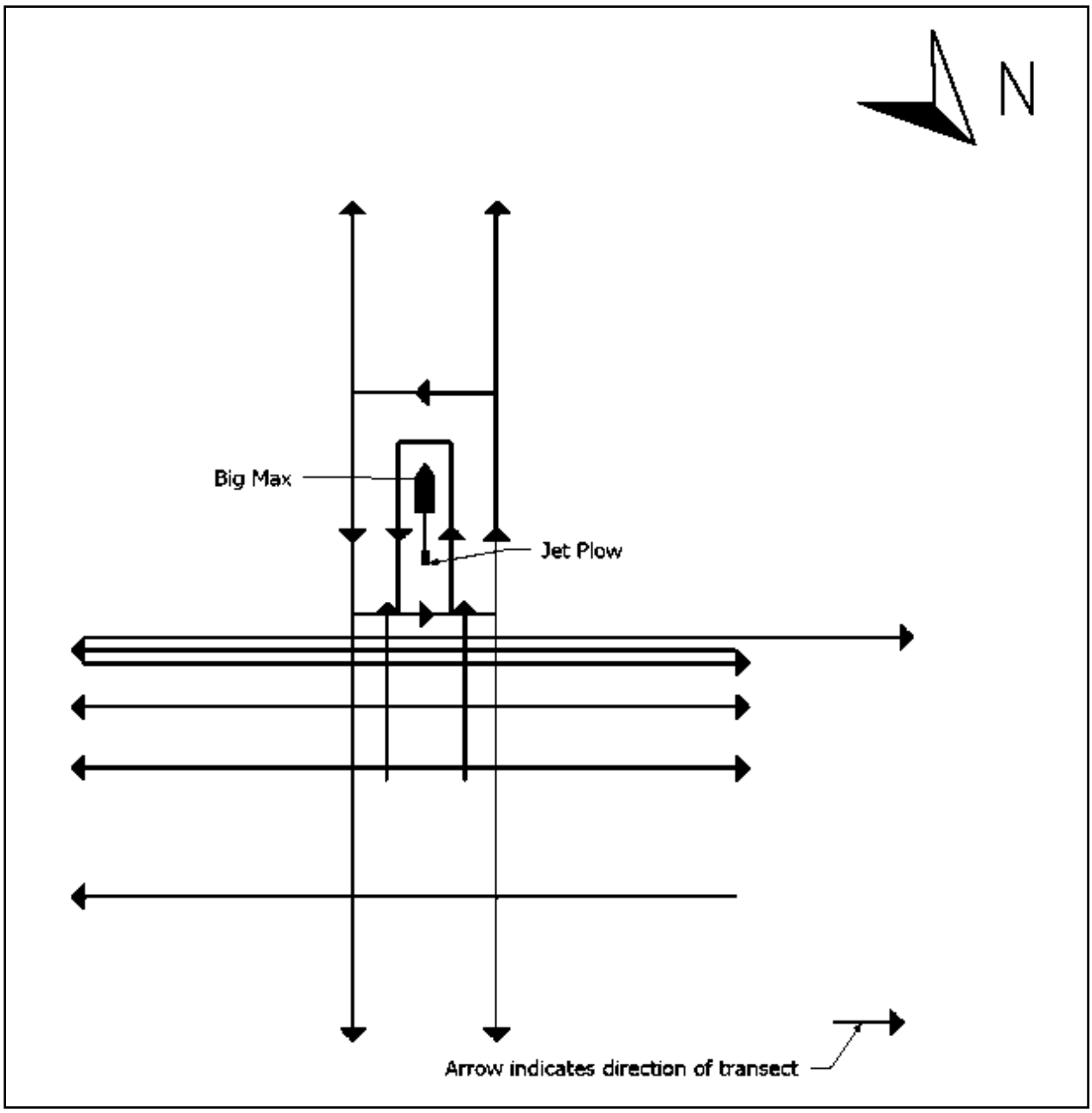


Figure 10. Summary of Jet Plow ADCP transects 1 through 17 on 17 June 2016

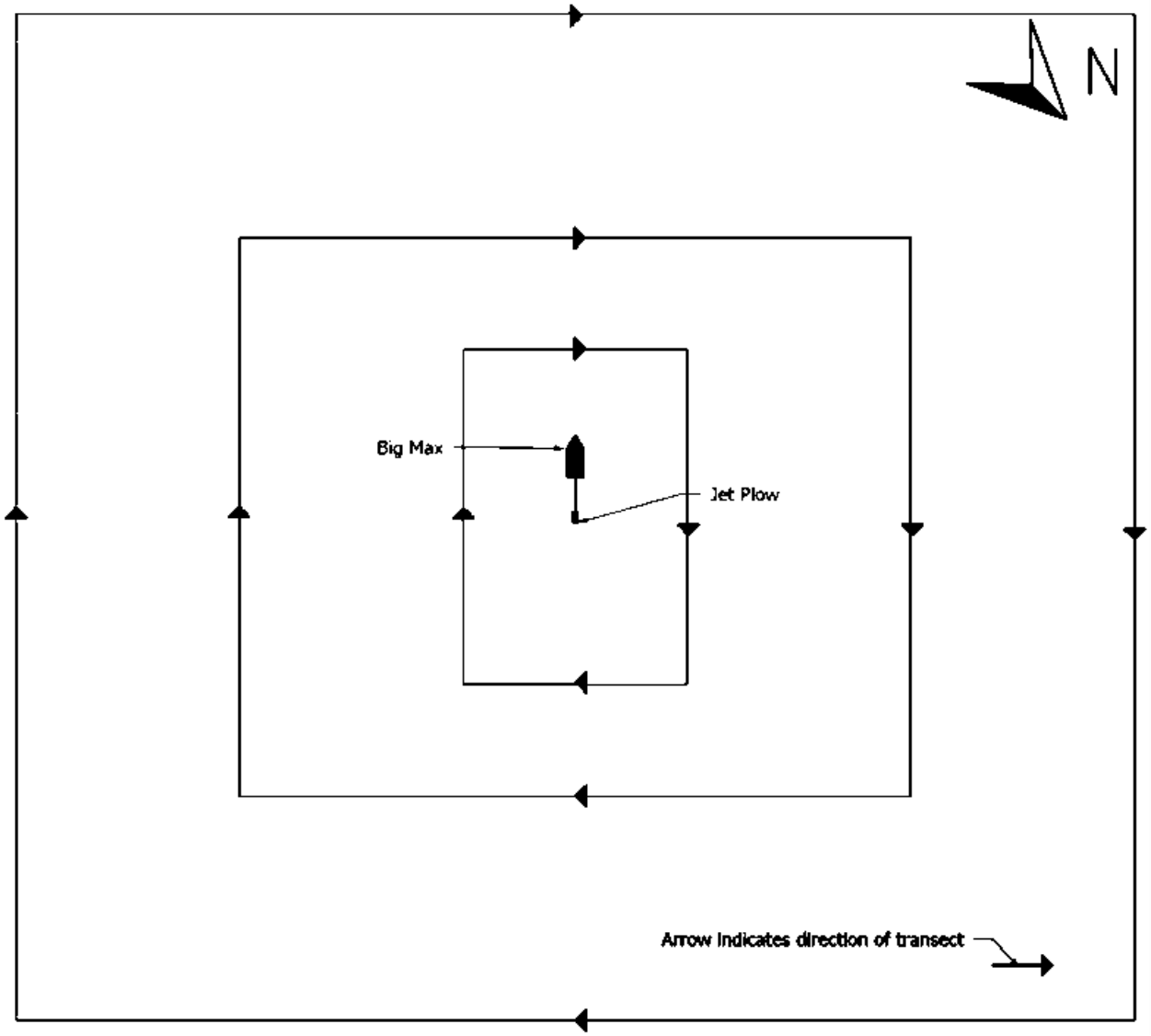


Figure 11. Summary of Jet Plow ADCP transects 18 through 20 on 17 June 2016

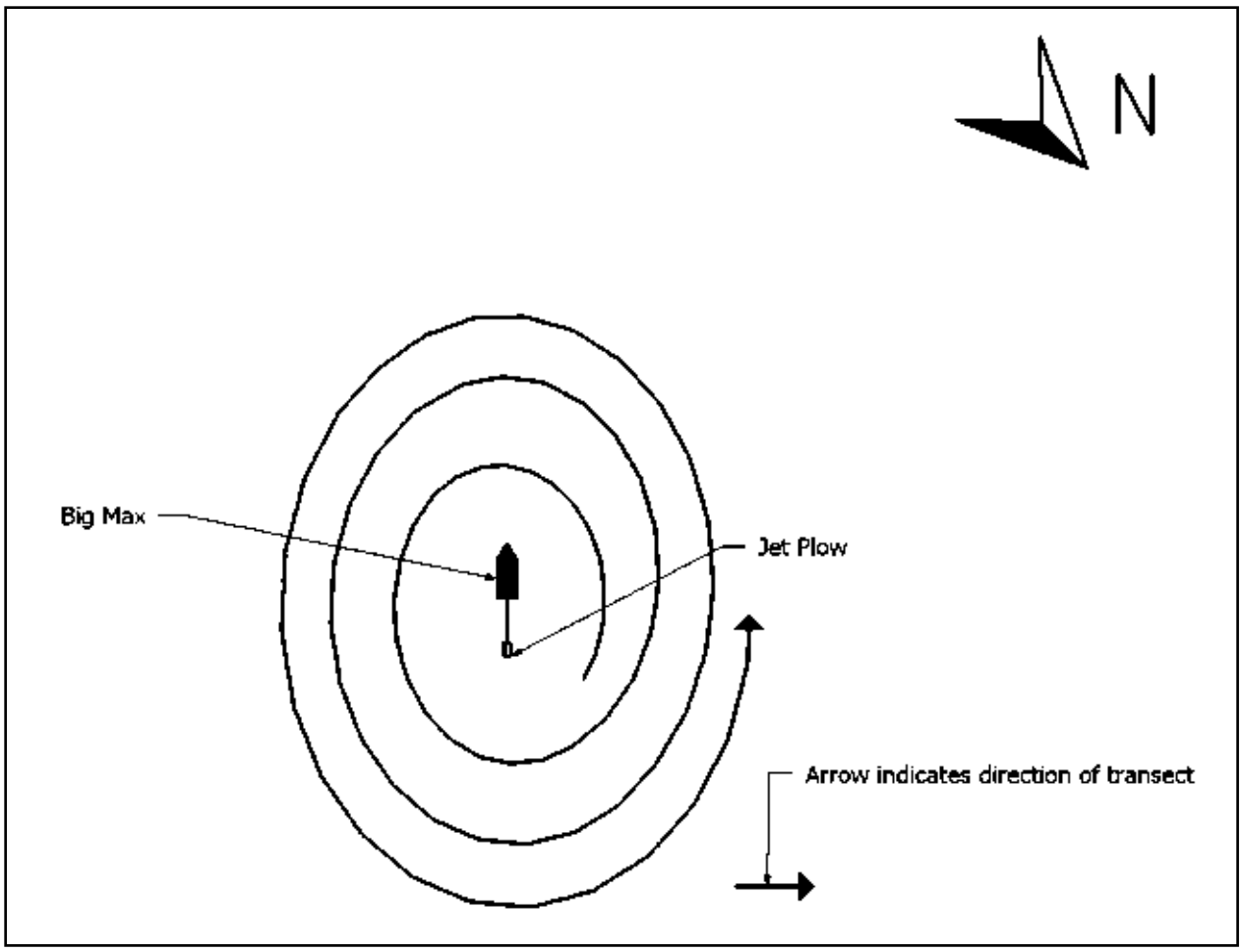


Figure 12. Summary of Jet Plow transect 21 on 17 June 2016

Idronaut turbidity profile and water sample locations are shown in **Table 6**. **Figures 13** shows the locations of the Idronaut turbidity profiles and water samples in relation to the BITS cable route. **Figure 14** shows the seafloor sediment types along the cable route based on data collected and analyzed by Deepwater Wind's planning and design partners (RPS ASA, 2012). Based on the sediment data (RPS ASA, 2012), the northeastern Idronaut turbidity profile and water sample locations were conducted where seafloor sediment type is predominantly fine-grained (clay and silt) and the southwestern monitoring sites is predominantly coarse sand. **Figure 15** shows location of Jet Plow Idronaut turbidity profiles and water samples All profiles and water samples were conducted concurrently with the ADCP and MBES transecting

Table 6. Turbidity profile and water sampling locations (All positions are in WGS84)

Turbidity Profile	Water Sample ID	Date	Latitude	Longitude
Background IDR 1	1	16 June 2016	41°17'14"N	071°24'49"W
Background IDR 2	N/A	16 June 2016	41°17'55"N	071°24'46"W
Background IDR 3	2	16 June 2016	41°17'56"N	071°24'45"W
Background IDR 4	3	16 June 2016	41°18'26"N	071°24'49"W
Background IDR 5	4	16 June 2016	41°18'59"N	071°24'57"W
Background IDR 6	5	16 June 2016	41°20'35"N	071°25'23"W
Background IDR 7	6	19 June 2016	41°15'56"N	071°27'32"W
Background IDR 8	7	19 June 2016	41°14'57"N	071°26'46"W
Jet Plow IDR 1	1	17 June 2016	41°15'56"N	071°25'44"W
Jet Plow IDR 2	2	17 June 2016	41°15'52"N	071°25'34"W
Jet Plow IDR 3	3	17 June 2016	41°15'45"N	071°25'27"W
Jet Plow IDR 4	4	17 June 2016	41°15'45"N	071°25'48"W
Jet Plow IDR 5	5	17 June 2016	41°15'40"N	071°25'42"W
Jet Plow IDR 6	N/A	17 June 2016	41°15'46"N	071°25'42"W
Jet Plow IDR 7	N/A	17 June 2016	41°15'45"N	071°25'52"W
Jet Plow IDR 8	6	17 June 2016	41°15'38"N	071°25'53"W
Jet Plow IDR 9	7	17 June 2016	41°15'32"N	071°26'03"W
Jet Plow IDR 10	8	17 June 2016	41°15'25"N	071°26'04"W
Jet Plow IDR 11	9	17 June 2016	41°15'25"N	071°26'10"W
Jet Plow IDR 12	10	17 June 2016	41°15'23"N	071°26'12"W
Jet Plow IDR 13	11	17 June 2016	41°15'30"N	071°26'21"W
Jet Plow IDR 14	12	17 June 2016	41°15'50"N	071°26'40"W
Jet Plow IDR 15	13	17 June 2016	41°15'11"N	071°26'32"W

Note: Each set of water samples consisted of three individual samples; one taken on the surface, one in the middle of the water column and one near the seabed (referred to as S, M and B respectively).

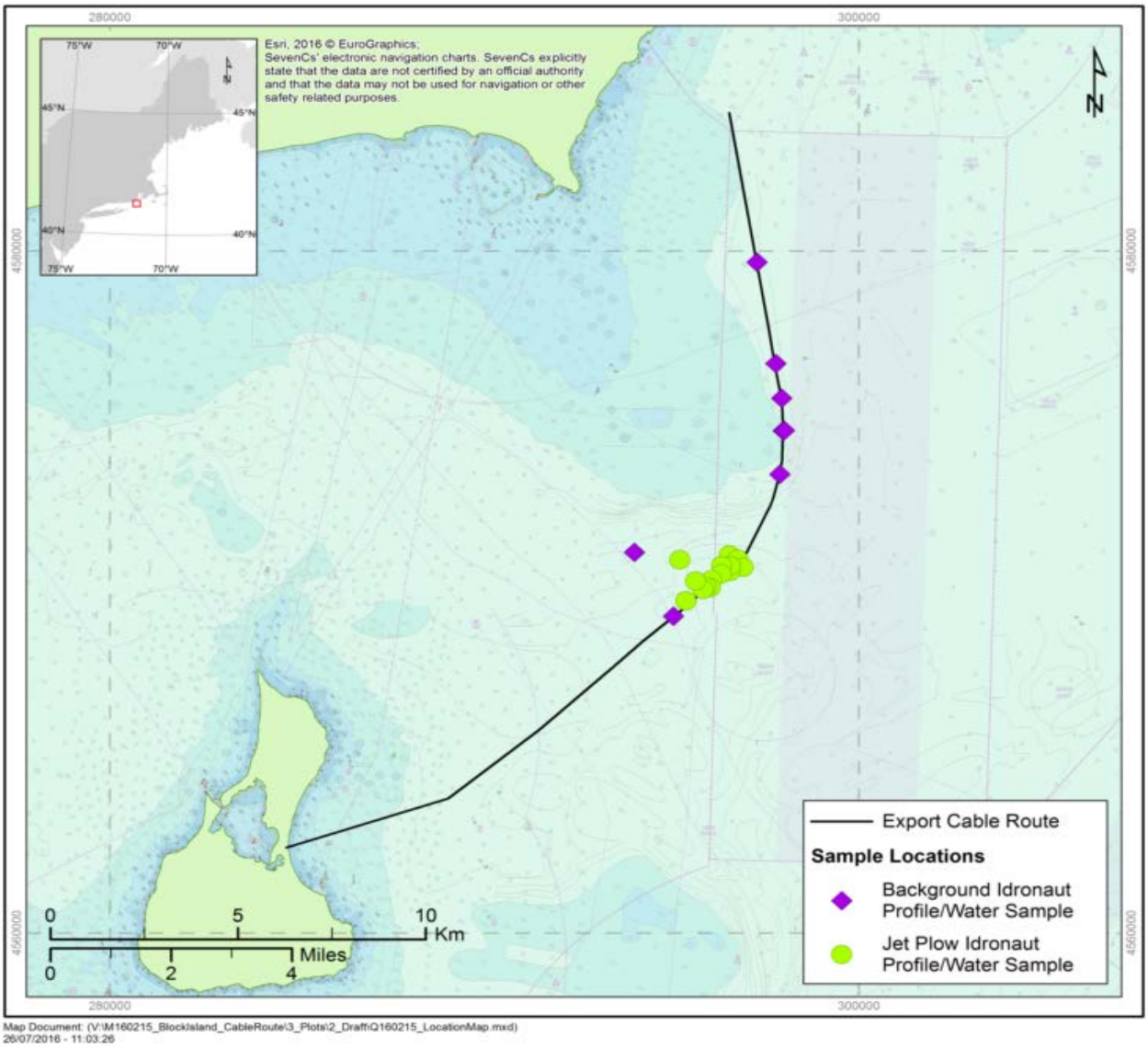


Figure 13. Locations of Idronaut turbidity profiles and water samples along cable route

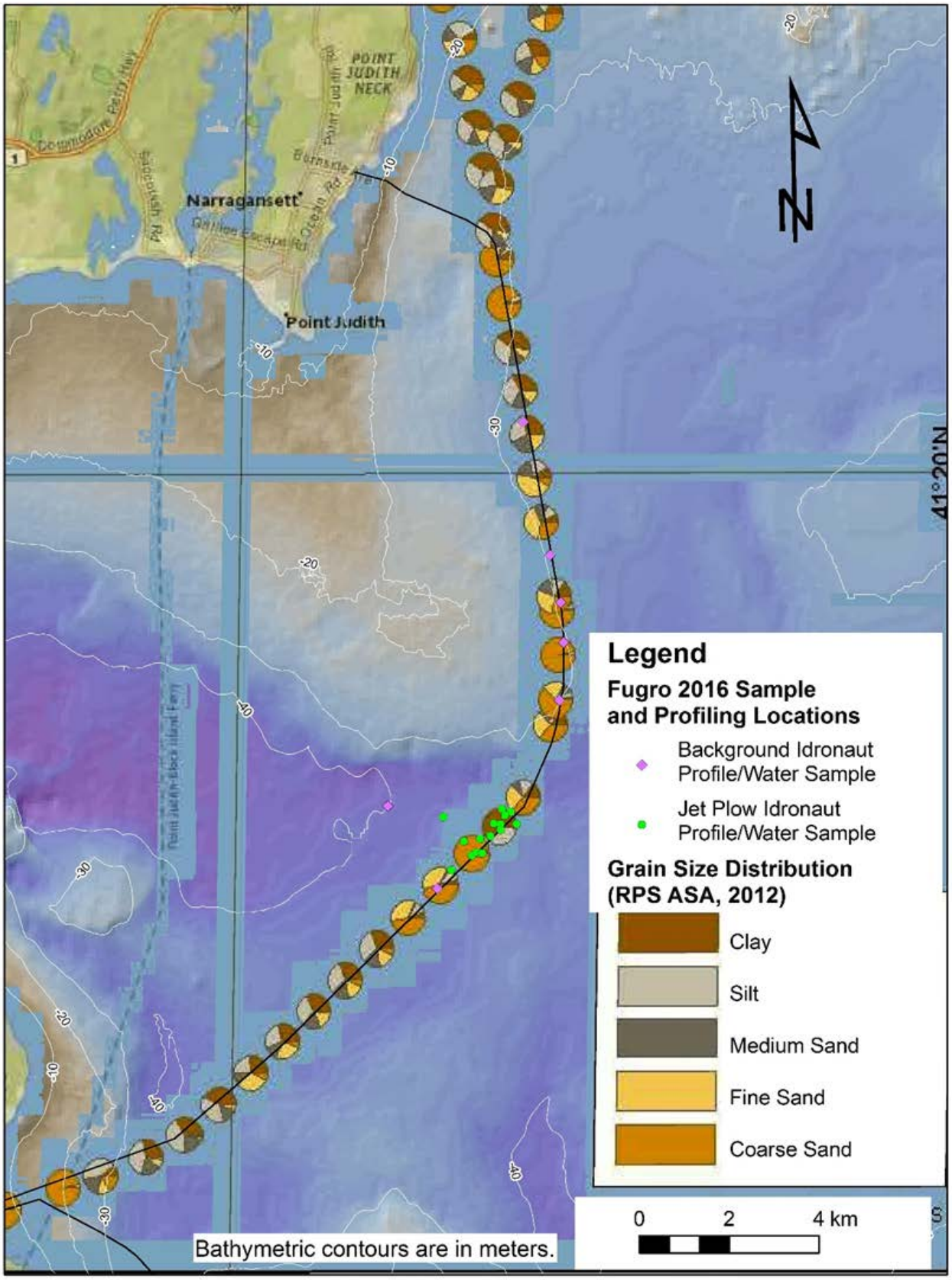


Figure 14. Seafloor sediment characteristics along cable route.

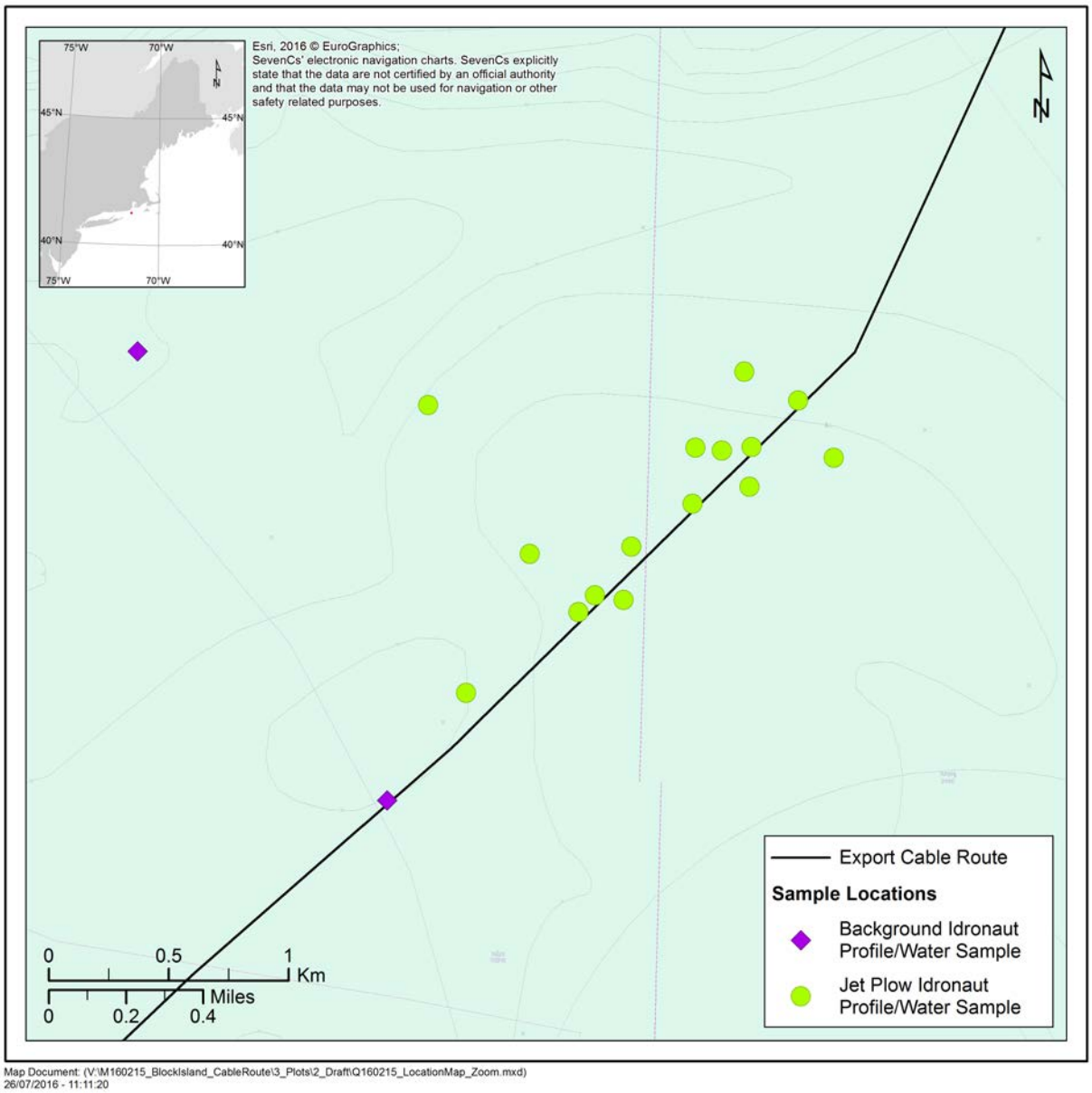


Figure 15. Location of Jet Plow Idronaut turbidity profiles and water samples

3.2 Data Collection Methodology

3.2.1 Vessel-mounted ADCP

A 600-kilohertz (kHz) Teledyne RDI Sentinel Workhorse ADCP was used to record current and acoustic backscatter (ABS) measurement transects around the cable route and the cable-laying vessel Big Max. This unit incorporates a bottom-tracking feature that allows water movement relative to the seabed to be obtained accurately.

The ADCP uses an acoustic signal at 600-kHz generated by four transceivers mounted on the head of the instrument (**Figures 16** and **17**). The transceivers are offset at 20° to the vertical. The ADCP produces a series of divergent acoustic signals which are propagated through the water column. The signals are reflected back to the instrument by particulate material in the water column. The return signal is "binned" (divided into separate sets) with respect to return intervals. The return interval divisions are calculated using the speed of sound, which is dependent on the salinity (pre-set at 35 practical salinity units), and a

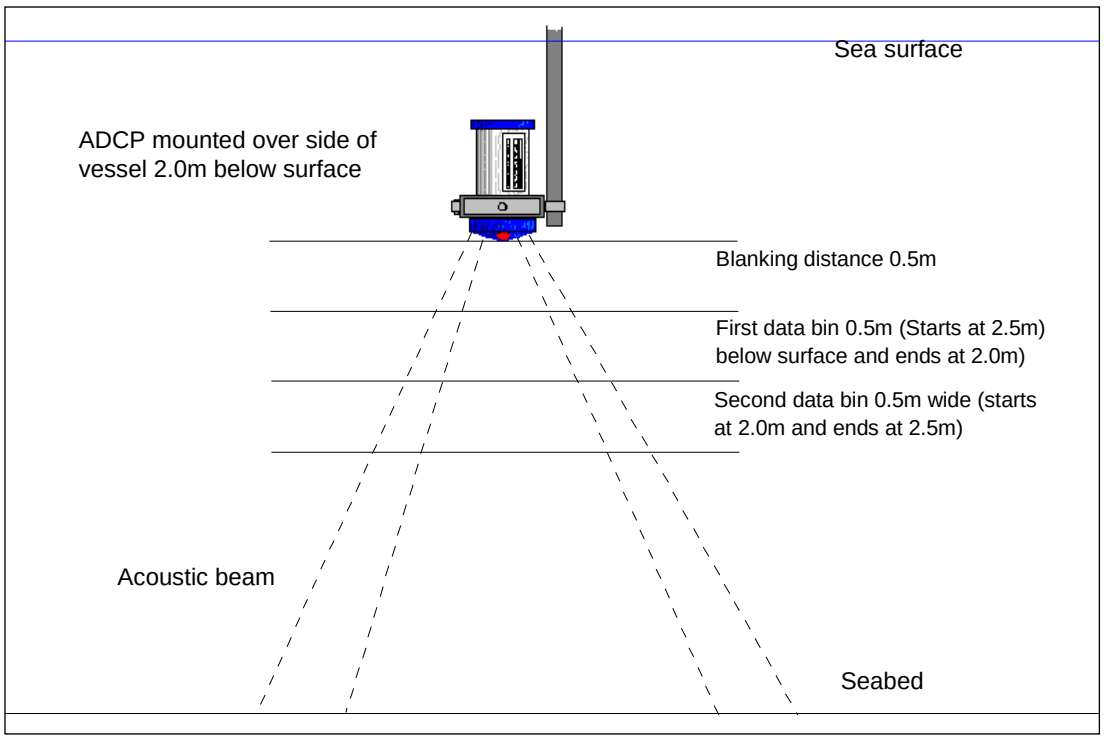


Figure 16. ADCP configuration for vessel-mounted works

Figure 17. RDI ADCP configured on pivoting arm

temperature (measured by the instrument). The returned data for each bin are average values over the range of the bin in question. For example, data returned to the instrument between approximately 1.3 milliseconds and 2 milliseconds after transmission would equate to data from a depth of 1 m to 1.5 m from the instrument head. The data are therefore not instantaneous, point specific measurements but an average return from the data bin. Each bin is 0.5 m in depth. The manufacturer's software, WinRiver, was used to collect data during the survey. The instrument configuration is detailed in **Figure 16**.

Table 7. Instrumentation Configuration – ADCP

Parameter	Setting	Notes
Bin Size (m)	0.5	This setting is automatic depending on the water depth
Blanking Distance (m)	0.5	The blanking distance is the distance between the instrument transducers and the start of the first measurement bin. Blanking distance was held constant during the survey.
Max Water Depth (m)	50	Expected depths up to 40 m
Max Water Speed (ms^{-1})	4	Maximum expected water speed including vessel movement
Transducer Depth (m)	2	Depth of instrument head below the surface

With an assumed water depth of 35 meters, an instrument depth of 2 meters and a blanking distance of 0.5 meter, the measurement depth equals 32.5 meters. With this measurement depth, the acoustic spread on the seabed is calculated to be 23.6 meters. The closest transect line took the survey vessel to within approximately 15 meters of the jet plow. With the acoustic spread described, the closest beam would have come within 5 meters of the jet plow on the seabed.

In addition to the standard processing of the received acoustic signal, vessel movement must also be taken into account. To achieve this, a Hemisphere Vector V113 Differential Global Positioning System (DGPS) was used to provide heading and location information. This system gives a maximum heading error of 0.30° and location error of 0.6 meter. The instrument was set to output standard NMEA 0183 GGA and HDT data strings that input to the WinRiver software. The DGPS unit was positioned directly above the ADCP unit to give the minimum possible offset. The DGPS heading output was used as a replacement for the ADCP compass to increase the update rate during continuous sampling.

Upon arrival at site, the equipment was deployed overboard and three compass calibration swings were performed. This allowed the bottom-tracking feature of the ADCP to align with the DGPS heading to provide an accurate heading value. The vessel would then transit to the start of the specified transect location before beginning sampling. During each transect that was undertaken, data were continuously displayed and checked for any errors or equipment malfunctions. Data were displayed in real-time to allow for any sediment plume to be visualized and tracked. Data were recorded at varying stages of the tidal cycle. All instrumentation was configured to record in Coordinated Universal Time and all latitudes and longitudes were recorded in WGS84.

3.2.2 Turbidity Profiles and Water Samples

An Idronaut EA89 multiparameter probe was used to collect profiles of turbidity through the water column at 23 locations around the BITS cable route. Eight of these profiles were conducted along the cable route to provide background information while the jet plow was not operational. The remaining 15 profiles were conducted in the vicinity of Big Max and the jet plow during cable laying operations. Water samples were taken in order to investigate calibrating the Idronaut data (converting from counts values to concentrations in mgl^{-1}). The Idronaut was lowered and raised using the winch and davit arm on the

survey vessel Jamie Hanna, as shown in **Figure 18**. In addition to turbidity, the Idronaut captured conductivity, temperature and depth (CTD) data through the water column.

Figure 18. ADCP and DGPS installed on a pivoting arm aboard the Jamie Hanna with the cable lay vessel Big Max and buoys marking the jet plow in the background

A Niskin bottle, mounted on the same winch wire was used to collect water samples at various depths in the water column by dropping a "messenger" weight down the winch wire to trigger the closure of the bottle at the desired depth (**Figure 19**). The depth and time of each sample was recorded from the direct read-out of the Idronaut (**Figure 20**). Water samples were subsequently transferred on the day of collection to the University of Rhode Island laboratory for analyses.

Figure 19. Idronaut profiler and Niskin water sampling bottle being prepared for deployment (left), Idronaut profiling and water sampling activities aboard Jamie Hanna (right)

Figure 20. Water samples taken at the surface, middle and bottom of the water column, 120 meter astern of the jet plow showing low sediment concentration

3.3 Data Processing

3.3.1 ADCP Data Overview

The vessel-mounted data acquisition system generates binary data files that store the combined ADCP data with the DGPS data. The data are stored as raw binary data files with the extension "000" which include the vessel position, range to the seabed, computer time and flow data (**Table 8**).

Table 8. File Format for ADCP Data

File Name	Columns
M160215_D1_Background_ADCP_Transect_Concatenated_Data.csv M160215_D2_Jet Plow_ADCP_Transect_Concatenated_Data.csv M160215_D3_Background_ADCP_Transect_Concatenated_Data.csv	Year, Month, Day, Hour, Minute, Second, Julian day, Burst Number, Latitude, Longitude, Boat Speed, Boat Direction, Boat East, Boat North, Bottom Track Average Range from Surface (m), Bottom Track Range from Surface Beam 1 (m), Bottom Track Range from Surface Beam 2 (m), Bottom Track Range from Surface Beam 3 (m), Bottom Track Range from Surface Beam 4 (m), Depth (m) n, Velocity (ms-1) n, Direction (°T) n, East (ms^{-1}) n, North (ms-1) n, Vertical (ms-1) n, Turbidity (mgl^{-1}) n (where n = the bin number)

The 000 file is converted to text values in engineering units using RDI's WinRiver software, at the native temporal and vertical resolution. In this case the data were recorded at approximately 0.36 Hertz (2.8 seconds), with a vertical resolution of 0.5 meter. The vertical data are "binned" into a series of predefined ranges by dividing the returned acoustic signal into times/ranges from the instrument. In addition, the return time of the peak signal return is recorded and converted to a range to the seabed.

The text files generated by RDI's software are converted to Fugro's bespoke time series data format. This format is uniform across all coastal oceanography studies with data stored as CSV (comma separated values) files with predefined metadata and an unlimited two-dimensional data array. Once the data are available in this format, Fugro's OceanV3 software can interrogate and present the data. Data files from each transect were compiled into one final file per day of data collection. Combined ADCP data are presented in **Appendices 6 and 7** in the form of color contour plots**.**

Acoustic Backscatter Calibration

ABS data were first range normalized in order to compensate for the effects of signal loss through the water column. Normalized decibel values which correspond both in time and water column height to each of the water sample results were selected in order to create a regression. Both linear and exponential regression lines were applied to the scatter of results. Fugro previously found that acoustic backscatter data conform more robustly to an exponential best-fit line. It was not possible to establish a strong correlation using only the on-site water sample results. Therefore, Fugro's stock ABS calibration appropriate to the frequency of the ADCP (600 kHz) was applied to this dataset (**Equation 1**).

$$mgl^{-1} = 0.0733e^{0.0559 \cdot NdB} \qquad \textbf{Equation 1}$$

In addition to calculating mgl^{-1} concentrations for each averaged data bin, data from each individual beam were also calibrated for the jet plow day to provide beam specific information across the entire acoustic spread. The aim of this additional element was to confirm that no sediment plume information had been lost in the beam averaging process.

3.3.2 Idronaut Turbidity Profiles

The raw profiles collected by the instrumentation consisted of multiple "casts" (upwards or downwards profiles through the water column). The pre and post-cast data were removed. All casts are visualized at this stage to allow the selection of the best available cast for each profile. The file is then trimmed to a single cast using Fugro's bespoke profile processing tool. These trimmed data files were exported for plotting.

Idronaut Profile Calibration

Water profile data files and figures present turbidity in unit less counts values, as reported by the instrument. The theoretical relationship between counts and mgl^{-1} is 1:1; however, this is affected by factors such as grain size and shape. In Fugro's experience of over 600 pairs of counts and mgl^{-1} values, the multiplier typically ranges from 0.5 to 3 depending on the suspended sediment's characteristics. As a calibration using on site water samples was not possible, this range of multipliers has been used to convert data from counts to minimum and maximum expected mgl^{-1} in **Table 9**. The maximum values, calculated using a multiplier of 3 can be considered a worst-case scenario. Turbidity profiles are presented in **Appendix 8**.

Table 9. File Format for Idronaut Data

File Name	Columns
M160215_Site Name_IDR_XX_Averaged.csv	Year, Month, Day, Hour, Minute, Second, Julian day, Depth (m), Temperature (°C), Conductivity (mS/cm), Salinity (ppt), Density (kg/m^3) and Turbidity (Counts)

3.3.3 Total Suspended Solids Analysis

Unforeseen issues with the analysis at the University of Rhode Island invalidated the water sample data. Concentration values reported were significantly higher than expected and this is believed to be due to issues with the analysis methodology. Following receipt of the results, sample filter papers were subsequently flown to the United Kingdom for examination at Fugro's in-house sediment laboratory. However, reanalysis was not possible due to the condition of the filter papers upon arrival.

Photos of the water samples prior to analysis (**Figure 20**) and the subsequent filter papers (see an example in **Figure 21** below), however, highlight the clarity of the water on site. Example filter papers from a previous study are shown in **Figure 22** in order to illustrate the suspect nature of the results. The invalidated TSS results are provided for reference in **Appendix 9**.

3.3.4 Particle Size Distribution

None of the water samples contained a sufficient concentration of sediment for accurate particle size distribution analysis.

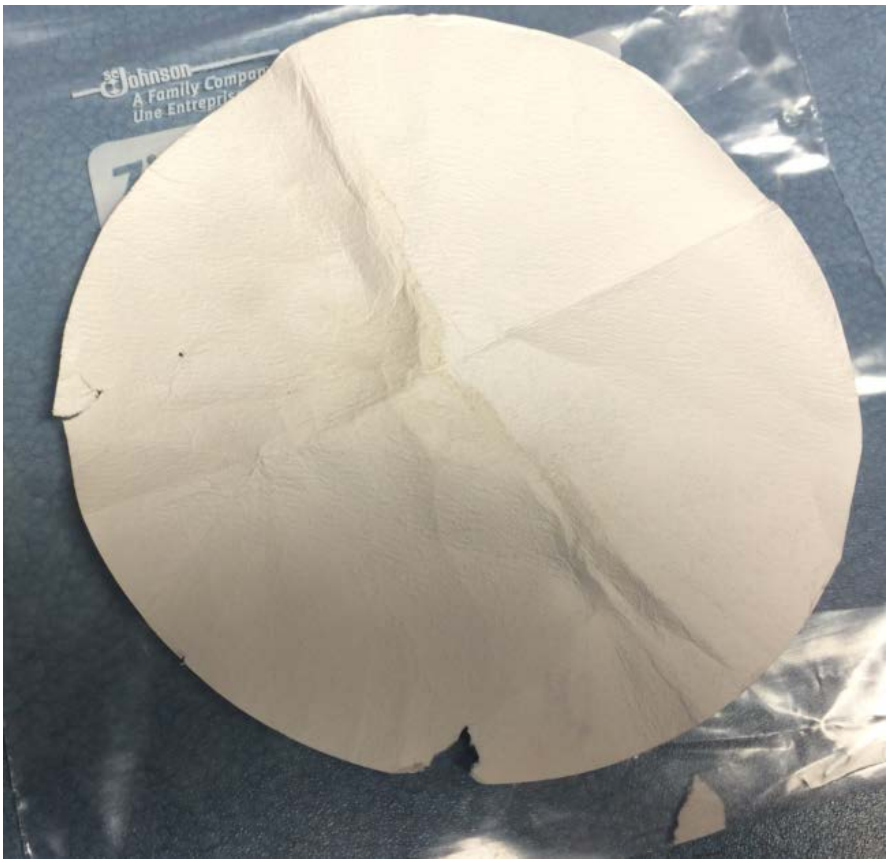
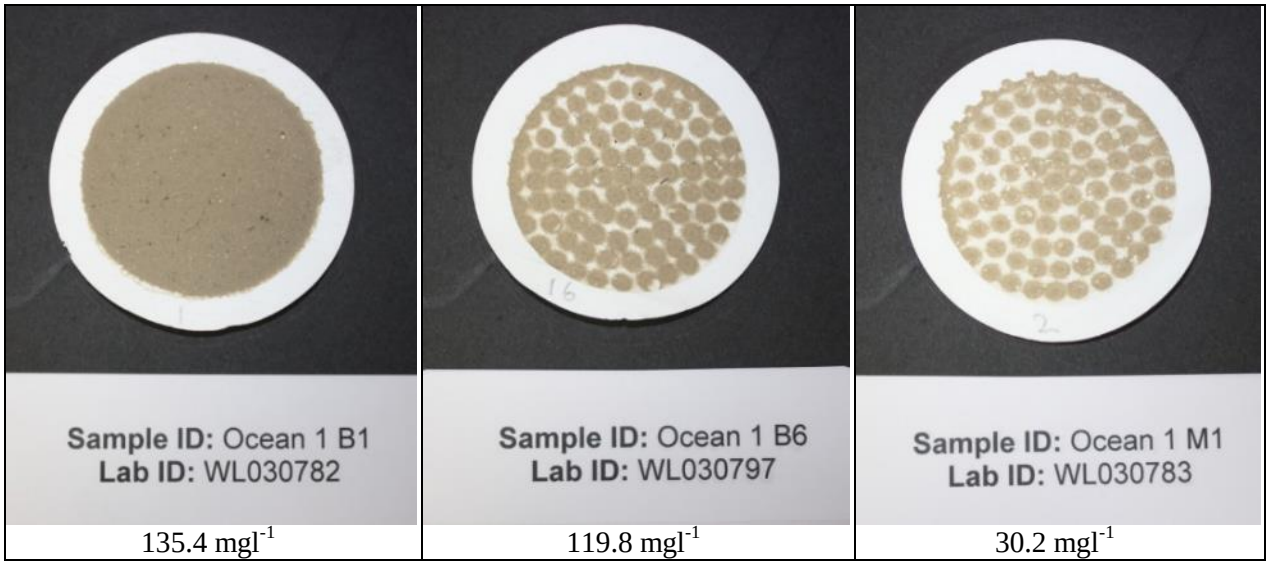


Figure 21. Filter paper from this study reported to contain 114 mgl^{-1}



135.4 mgl^{-1}	119.8 mgl^{-1}	30.2 mgl^{-1}

Figure 22. Example filter papers from a previous study with associated concentration results

3.4 Results

3.4.1 ADCP Plume Tracking

ABS readings collected during the ADCP plume tracking are presented in the form of color contour plots in **Appendices 6** and **7**. Representative transects have been combined from each day of monitoring and are presented in **Appendix 6**. Data from the individual transects on the jet plow monitoring day are presented in **Appendix 7**. ABS profiles for each of the four beams are presented separately in order to investigate whether evidence of the plume had been lost in the beam averaging process. Current velocity and direction are also displayed.

ADCP data are summarized in **Table 10**. A gradual increase in TSS is observed from the surface to the seabed when following the jet plow, as well as on the background days when no cable laying was undertaken.

Table 10. Summary Statistics for ADCP Transects Combined

	Minimum	Mean	Maximum	Standard Deviation
ADCP Transects Conducted on 16/06/2016 – Background Data				
Surface Turbidity (mgl^{-1})	0.52	0.58	0.80	0.04
Seabed Turbidity (mgl^{-1})	3.45	3.88	4.38	0.17
ADCP Transects Conducted on 19/06/2016 – Background Data				
Surface Turbidity (mgl^{-1})	0.63	0.70	1.08	0.06
Seabed Turbidity (mgl^{-1})	4.37	4.72	5.37	0.18
ADCP Conducted on 17/06/2016 – Jet Plow				
Surface Turbidity (mgl^{-1})	0.54	0.89	1.31	0.20
Seabed Turbidity (mgl^{-1})	3.86	4.79	5.57	0.33

Notes:

Surface turbidity data taken from first data bin – 2.5 m below surface

Seabed turbidity data taken from last data bin – 0.5 m from seabed, achieved using an inverted profile to negate depth changes

Five transects were undertaken on 16 June and eight on the 19 June 2016, representing the background dataset. A total of 21 transects around the jet plow were undertaken on 17 June 2016. Data from the nearest beam of the ADCP when within 5 meters of the jet plow, representing the closest transect, remained under 5 mgl^{-1} at the seabed.

Elevated levels of acoustic signal return were observed in both the ADCP and multibeam echosounder (MBES datasets down to approximately 16 m depth when the instruments passed by the dynamic positioning thrusters from the Big Max. The ADCP data shown in **Figure 23** illustrate this. Increased suspended sediment concentrations were not observed in the Idronaut profiles suggesting that this acoustic return was caused by bubbles rather than sediment. This turbulence on site was photographed and is displayed in **Figure 24**.

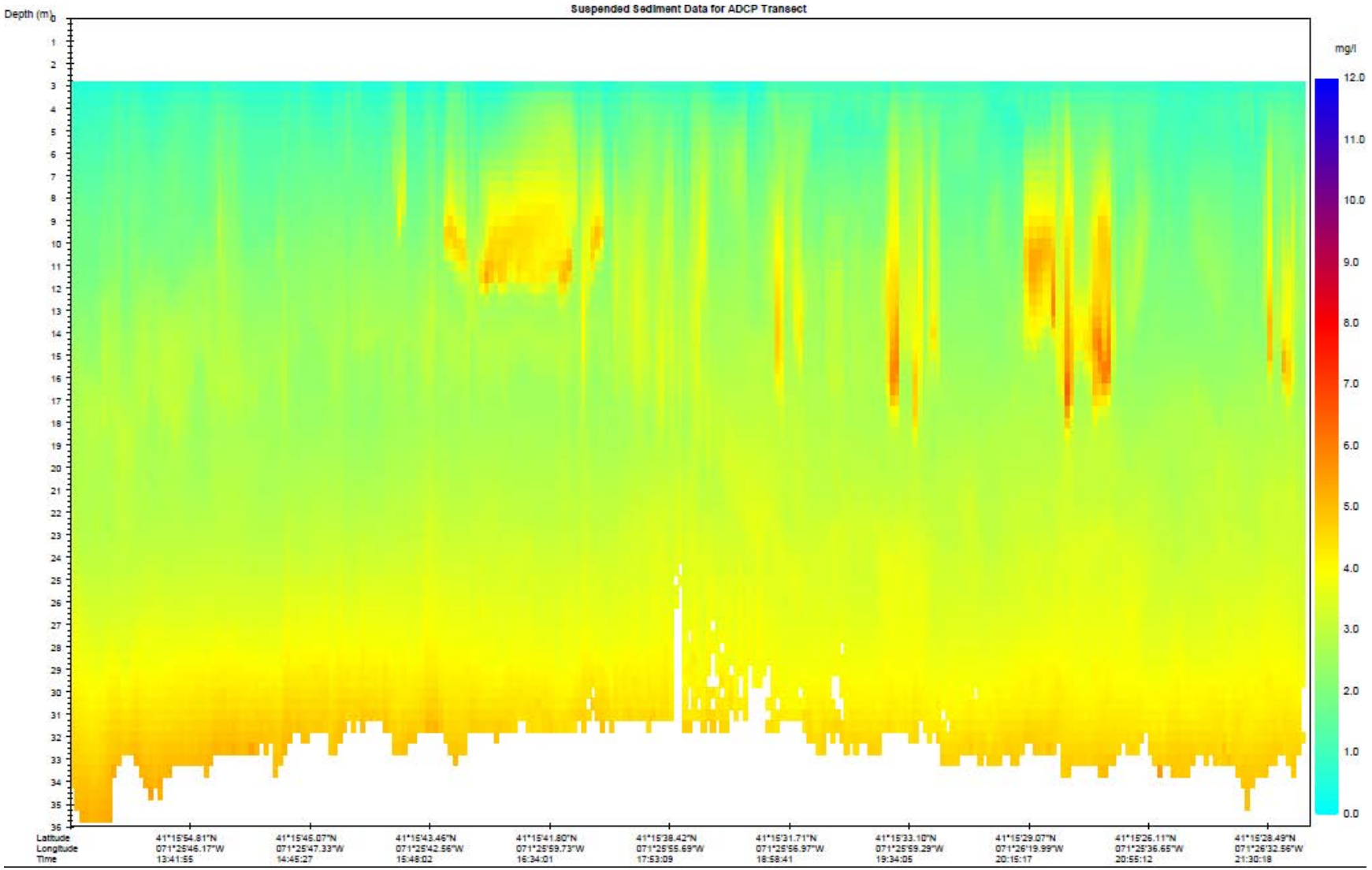


Figure 23. ADCP data showing increased turbidity as a result of instrumentation passing vessel thrusters

Figure 24. Turbulence around the jet plow caused by vessel thrusters

3.4.2 Idronaut Turbidity and CTD Profiles

Summary statistics for the vertical Idronaut profiles can be found in **Table 11**. Data presentations are included in **Appendix 8**.

Suspended sediment concentrations are displayed as an estimated range using multiplier values of 0.5 and 3 from the counts data. The maximum estimated Suspended sediment concentrations is 9.36 mgl^{-1} on Background day 1, 5.40 mgl^{-1} on Background day 2 and 8.58 mgl^{-1} on the Jet Plow day. The mean estimated concentrations over the three days of sampling show minimal variance, with a difference of only 0.27 mgl^{-1}. Turbidity increases closer to the seabed on all three days. An estimated increase of 6.9 mgl^{-1} using the most conservative calibration (multiplier of 3) was observed on Background day 1, with an increase of 3 mgl^{-1} on Background day 2 and 7.02 mgl^{-1} on the Jet Plow day.

A clear thermocline is observed in the water column between 12 and 18 meters, with a mean temperature decrease of 7.95 degrees Celsius (46.31F) between the surface and the seabed.

Figure 25 below shows a data snapshot from one of the closest transects undertaken which highlights the relatively uniform TSS concentrations in the water column. Turbidity from suspended sediment or bubbles appears as green specks in the water column. Bubbles from Big Max's dynamic positioning thrusters are visible down to 16 meters, as displayed below in **Figure 26**. As mentioned in **Section 8.1**, this turbulence was also detected by the ADCP.

Table 11. Summary Statistics for Idronaut Profiles

	Minimum	Mean	Maximum	Standard Deviation
Average Statistics for Profiles Conducted on 16/06/2016 – Background Data				
Turbidity (Counts)	0.82	1.28	3.12	0.23
Estimated Turbidity Range (mgl^{-1})	0.41 – 2.46	0.64 – 3.84	1.56 – 9.36	-
Conductivity (mS/cm)	34.91	37.76	41.67	2.38
Salinity (ppt)	31.25	32.02	32.50	0.24
Temperature (°C)	9.39	12.93	17.43	2.92
Density (kgm^{-3})	1022.88	1024.13	1025.10	0.77
Average Statistics for Profiles Conducted on 19/06/2016 – Background Data				
Turbidity (Counts)	0.80	1.21	1.80	0.29
Estimated Turbidity Range (mgl^{-1})	0.40 – 2.40	0.61 – 3.63	0.90 – 5.40	-
Conductivity (mS/cm)	35.25	37.87	41.57	2.31
Salinity (ppt)	31.33	32.02	32.74	0.22
Temperature (°C)	9.83	13.04	17.30	2.81
Density (kgm^{-3})	1022.95	1024.13	1025.02	0.76
Average Statistics for Profiles Conducted on 17/06/2016 – Jet Plow				
Turbidity (Counts)	0.52	1.19	2.86	0.33
Estimated Turbidity Range (mgl^{-1})	0.26 – 1.56	0.60 – 3.57	1.43 – 8.58	-
Conductivity (mS/cm)	34.66	37.59	41.97	2.24
Salinity (ppt)	31.13	32.10	32.98	0.19
Temperature (°C)	9.28	12.64	17.61	2.68
Density (kgm^{-3})	1023.07	1024.25	1025.47	0.67

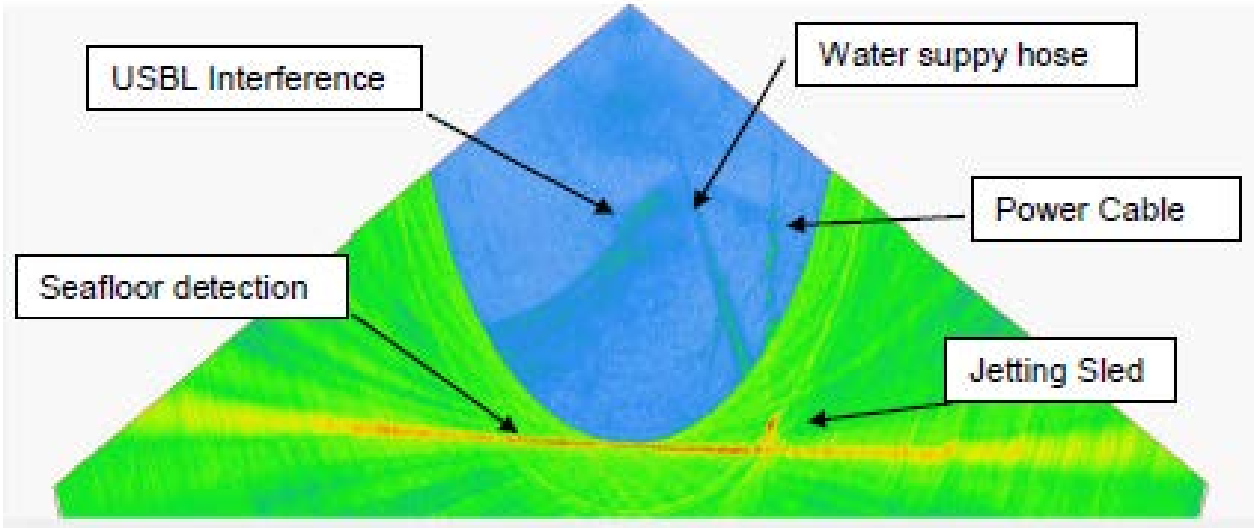


Figure 25. MBES data obtained from next to the jet plow. Image taken from Bathymetric Survey Plume Monitoring Report (Fugro Pelagos Inc., 2016)

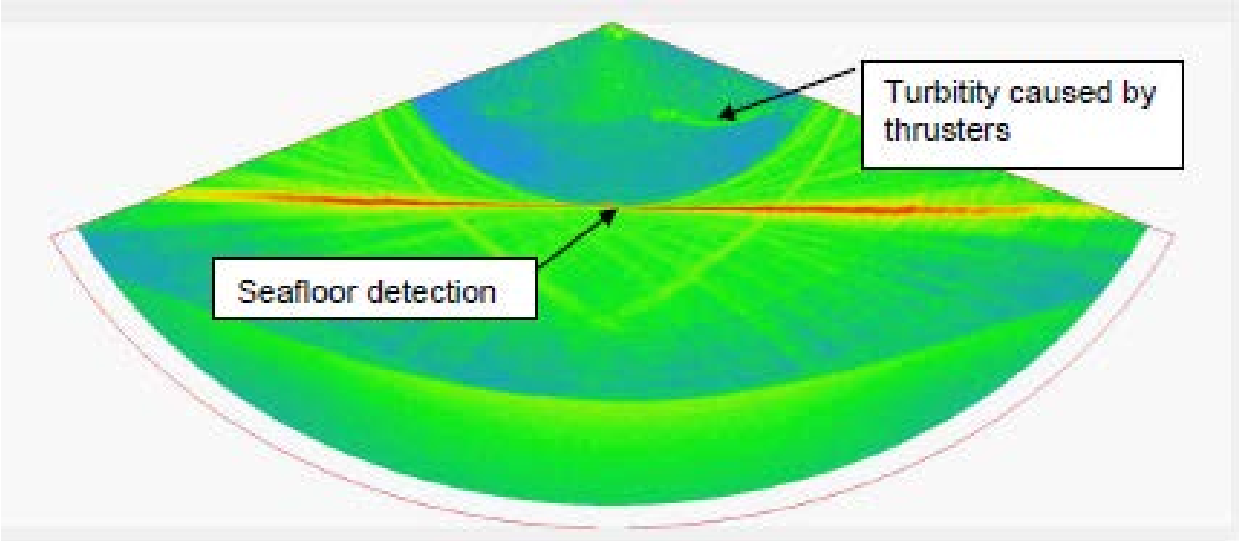


Figure 26. MBES data showing turbidity in the water column from the vessel thrusters. Taken from Bathymetric Survey Plume Monitoring Report (Fugro Pelagos Inc, 2016)

3.4.3 Bathymetric Survey

A bathymetric survey was conducted to detect the potential sediment plume in the water column and collect bathymetric data used to performed an evaluation of the trench morphology. The multibeam echosounder were used to detect anomalies (e.g. suspended sediment, bubbles, etc.) in the water column. Vessel transects were conducted with the multibeam echosounder to search for the sediment plume and define its spatial and vertical extents.

Figure 25 below shows a data snapshot from one of the closest transects undertaken which highlights the relatively uniform TSS concentrations in the water column. Turbidity from suspended sediment or bubbles appears as green specks in the water column. Bubbles from Big Max's dynamic positioning thrusters are visible down to 16 meters, as displayed below in **Figure 26**. As mentioned in Section 8.1, this turbulence was also detected by the ADCP.

In addition to being used to search for a sediment plume in the water column during jet plowing, bathymetric data were also collected to support evaluating the trench scar morphology and changes in the seafloor related to cable installation. Bathymetric data collected during the June 2016 plume monitoring were compared to bathymetric data collected by Fugro during a pre-lay survey conducted in May 2016. The two bathymetric data sets were used to estimate the amount and extent of sediments deposited outside the trench as an overspill levee. An overspill levee represents a mound of sediments that deposit outside the trench as sediments settle out of suspension. Generally, the overspill sediments are thickest closest to the trench and are thinner further from the trench. The sediments form a levee-like feature along the sides of the trench. Overspill levee examples and discussion of their character observed in this study are provided later in this report. Since the post-lay survey was conducted as part of the plume monitoring phase, only the section of the cable installed at the time of the plume monitoring was included in this analysis. The post-lay bathymetric survey encompassed the cable route from the Rhode Island mainland near Point Judith to the approximate mid-point of the Block Island to mainland export cable route as shown in **Figure 26.**

3.5 Discussion

3.5.1 Sediment Plume Modelling Summary

A modelling study (RPS ASA 2012) was conducted previously to this investigation to evaluate the sediment trajectory from the cable laying embedment operations, including both the jet plow and nearshore cofferdam re-fill activities. This investigation and discussion relates to the jet plow operations associated with the installation of the BITS line between Block Island and the Rhode Island mainland. A number of scenarios were modeled for the BITS line; including two alternative landing sites on Rhode Island and three jet plow speeds. During operations on 17 June, a cable laying rate of approximately 210 mhr^{-1} was observed. Therefore, BITS Alternative 1 with a jet plow speed of 180 mhr^{-1} is used here for comparison as it represents the most comparable scenario.

Conservative trench dimensions created by the jet plow were calculated to have a cross sectional area of 2.28 square meters. This is based on a surface width of 1.5 meters, a bottom width of 0.6 meter and an average depth of 2.1 meter (RPS ASA 2012). Therefore, for every meter travelled a trench volume of 2.28 cubic meters is created. The report states that a 25 percent sediment release volume (0.57 cubic meter per meter travelled) is assumed. This assumption is based on previous experience and not on data from the specific jet plow configuration used on the BITS route. A predefined vertical distribution was incorporated into the model which forecasts that 43 percent of this released sediment is re-suspended 1–6 meters above the seabed.

The model results for this scenario indicate that the TSS concentrations were spatially variable and dependent on current velocities and sediment type. Fugro's survey was conducted throughout various tidal states. The area surveyed was around the mid-point of the cable route in Block Island Sound which is associated with a seabed sediment mixture of clay, silt and sand. Under these circumstances, the sediment plume was modeled to extend the distances from the jet plow displayed in **Table 12**.

Table 12. Modeled time and distances from jet plow that TSS sediment concentrations remained in the water column

TSS Concentration (mgl^{-1})	Modelled Plume Extent (m)	Duration in Water Column (minutes)
500	300	10
200	350	240
10	2,250	1,440

3.5.2 Observed Results

Observed results were from one day of sampling while the cable was being buried, along approximately 1,800 meters of the BITS cable route. Background data away from the jet plow aided in understanding the underlying conditions when no cable laying operations were taking place. Although this can help inform assumptions for the cable route as a whole, it is important to emphasize that the full range of bathymetric, tidal and atmospheric conditions, as well as seabed sediment compositions were not covered. The investigation took place on a neap tide, during a period of relatively calm weather (significant wave heights up to 1 meter) with no storm activity.

TSS concentrations observed around the jet plow during operations were not significantly higher than the background data. Mean seabed turbidity recorded by the ADCP was 4.79 mgl^{-1} throughout the day around the jet plow, compared with 3.88 mgl^{-1} on Background day 1 and 4.72 mgl^{-1} on Background day 2. Due to the proximity restrictions imposed by the Project Manager on Big Max, the survey vessel was unable to pass directly over the jet plow which would have given the best possible results. However, transects were undertaken within 15 meters of the port and starboard sides of the Big Max and the jet plow, as well as

perpendicular to the direction of travel of the Big Max and jet plow at a minimum distance of approximately 80 meters – the limit as agreed with the cable laying Project Manager.

Due to the acoustic spread from the four beams of the ADCP, data were obtained from within 5 meters of the jet plow on the seabed by the nearest beam. At this closest point, the TSS concentration at the seabed still remained under 5 mgl^{-1}. Data from this closest transect to the jet plow showed no significant difference from the daily means for the background and jet plow sampling. Concentration estimates based on acoustic backscatter techniques were therefore a factor of 100 lower than predicted.

These findings and trends are supported by the OBS results from the Idronaut profiles as well as the ABS data from the MBES. Using a worst-case multiplier of 3 based on Fugro's experience with similar studies, the maximum OBS derived concentrations range from 5.40 mgl^{-1} to 9.36 mgl^{-1} on the two Background days and reach 8.58 mgl^{-1} on the Jet Plow day. Acoustic return recorded by the MBES survey showed no increase in turbidity with depth, or proximity to the jet plow during cable burial operations. Data do not significantly differ between the days collecting background data and the day following the jet plow.

Visual observations on site supported the data recorded by the ADCP, MBES and the Idronaut. There was no obvious discoloration in the water column and water samples remained clear throughout both the background and jet plow observations. Particle size distribution of the sediment in the water samples was also not possible as concentrations were not high enough for the analysis. At no point in the analysis is there any evidence of a sediment plume in the water column.

3.5.3 Trench Morphology Evaluation

We evaluated the trench morphology by analyzing bathymetric data. Bathymetric data collected during the June 2016 plume monitoring were compared to bathymetric data collected by Fugro during a pre-lay survey conducted in May 2016. The two bathymetric data sets were used to estimate the amount and extent sediments deposited outside the trench as an overspill levee. Since the post-lay survey was conducted as part of the plume monitoring phase, only the section of the cable installed at the time of the plume monitoring was included in this analysis. The post-lay bathymetric survey encompassed the cable route from the Rhode Island mainland near Point Judith to the approximate mid-point of the Block Island to mainland export cable route as shown in **Figure 13**.

As previously described, jet-trenchers utilize high-pressured water jets to fluidize soil as the machine traverses along the cable route. The cable descends into a temporary trench incised by the jetting swords and is subsequently buried as the eroded sediments deposit back inside the trench. **Figure 27** presents: 1) a schematic drawing of a jet-trenching machine in operation, and 2) an image from a jet-trenching laboratory study which shows the fluidization process. **Figure 28** presents the key mechanisms that occur during the jet-trenching process. The following description of the mechanisms is based primarily on work by Vanden Bergh et al. (2008), who studied the mechanisms of jet-trenching using physical experiments.

1. Longitudinal Processes. Longitudinal processes involve the erosion and entrainment of sediment from the trench floor and side wall by a jet-induced current that transports the sediment backwards. After flowing along the bed in the shooting flow regime, the jet-induced current undergoes an internal hydraulic jump across which the flow thickens and decelerates before depositing the sediment grains farther away to backfill the incised trench.

2. Lateral Processes. Lateral processes include erosion by the breaching and collapse of the trench side walls. This will occur to a greater extent in looser sediments and those with lower fines contents. Overspill occurs beyond the internal hydraulic jump once the upper boundary of the turbid current exceeds the trench wall. Once the turbid water rises above the trench wall, the plume expands laterally, and some sediment will redeposit outside the trench. The amount of sediment that deposits outside the trench will largely depend on the sediment particle sizes,

velocity of the ocean bottom current, and duration the sediments are in suspension. Ultimately, the lateral overspill results in a lower volume of sediment being redeposited in the trench body than was initially present and will create a depression in the seabed along the trench. The lateral overspill deposits may form a small levee on the sides of the trench (see lower graphic in **Figure 28**).

The amount of material that deposited outside the trench was estimated by analyzing the trench morphology using the pre- and post-lay bathymetric data sets. The analysis included interpreting the overspill levee extents, thickness, and volume of the overspill levee and trench scar depression (**Figure 29**).

In general, the overspill levees and trench scars were fairly well defined in the June 2016 bathymetric data. We attribute the ability to discern the overspill levees to surveying during jet-trenching and within a few days after the jet-trenching occurred from the mainland cable lay. We note that during a post-lay survey conducted during October 2016, the overspill levees were subdued and largely indistinguishable. This was likely due to sediment reworking from currents. We have noted that on post-lay surveys conducted 1 to 2 weeks after trenching, that overspill levees are rarely distinguishable. Therefore, surveying during jet-trenching activity and within days of it being performed was instrumental in being able to identify subtle trench morphological features. Another example of the subtle features and how quickly the trench morphology can change is illustrated in **Figure 30**.

Bathymetric data (**Figure 30)** collected during jet-trenching, reveal the hydraulic jump and initial sediment pile located behind the jet-trencher. The trench infill surface lowers with distance from the jet-trencher (or with time since the jet-trencher passed) due to self-weight consolidation (e.g. compaction) of the fluidized sediments. The time elapsed between the jet plow moving from distance offset station 120 to 70m in **Figure 30** was approximately 15 minutes.

Eleven cross sections were analyzed at locations shown on the inset map in Figure 9-3. The distance that each overspill levee extended from the edge of the trench and the maximum thickness of the overspill were interpreted and measured. Overspill levees were interpreted to extend from about 1.5 to 7 meters from the trench and were up to approximately 25 cm thick. **Table 13** provides a summary of the interpreted overspill levee dimensions. We note that the extents of the interpreted overspill levee distances and thicknesses are based solely on MBES data. We assume that the jet-trenching has resulted in deposition of sediments beyond the distances listed in **Table 13**; however, the thickness of those deposits are less than what can be resolved using MBES data.

We also estimated the volume of the overspill levee and trench scar (depression) to aid in evaluating the amount of material that deposited outside the trench. Volumes are based on a per meter travelled for the jet-trencher. **Table 13** provides a summary of the overspill levee and trench scar volume estimates for the 11 cross sections. Estimated trench scar volumes, varied from 0.11 m^3 (Location F on inset of **Figure 29**) to 0.41 m^3 (Location E on inset of **Figure 29**). Estimated overspill levee material volumes varied from 0.08 m^3 (Location A on the inset of **Figure 29**) to 1.33 m^3 (Location E on inset of **Figure 29**).

Where overspill levee volumes are less than trench scar volumes might indicate areas where the currents transported more sediment outside the interpreted overspill levee body area. Levee volumes that exceed trench scar volumes might reflect sediment bulking effects. When sediments are disturbed from their in situ (more compacted) condition through jetting or excavation, their total volume increases due to bulking. We estimate the bulking factor to be between 2 and 33% (mean value of about 9%) for the analyzed profiles.

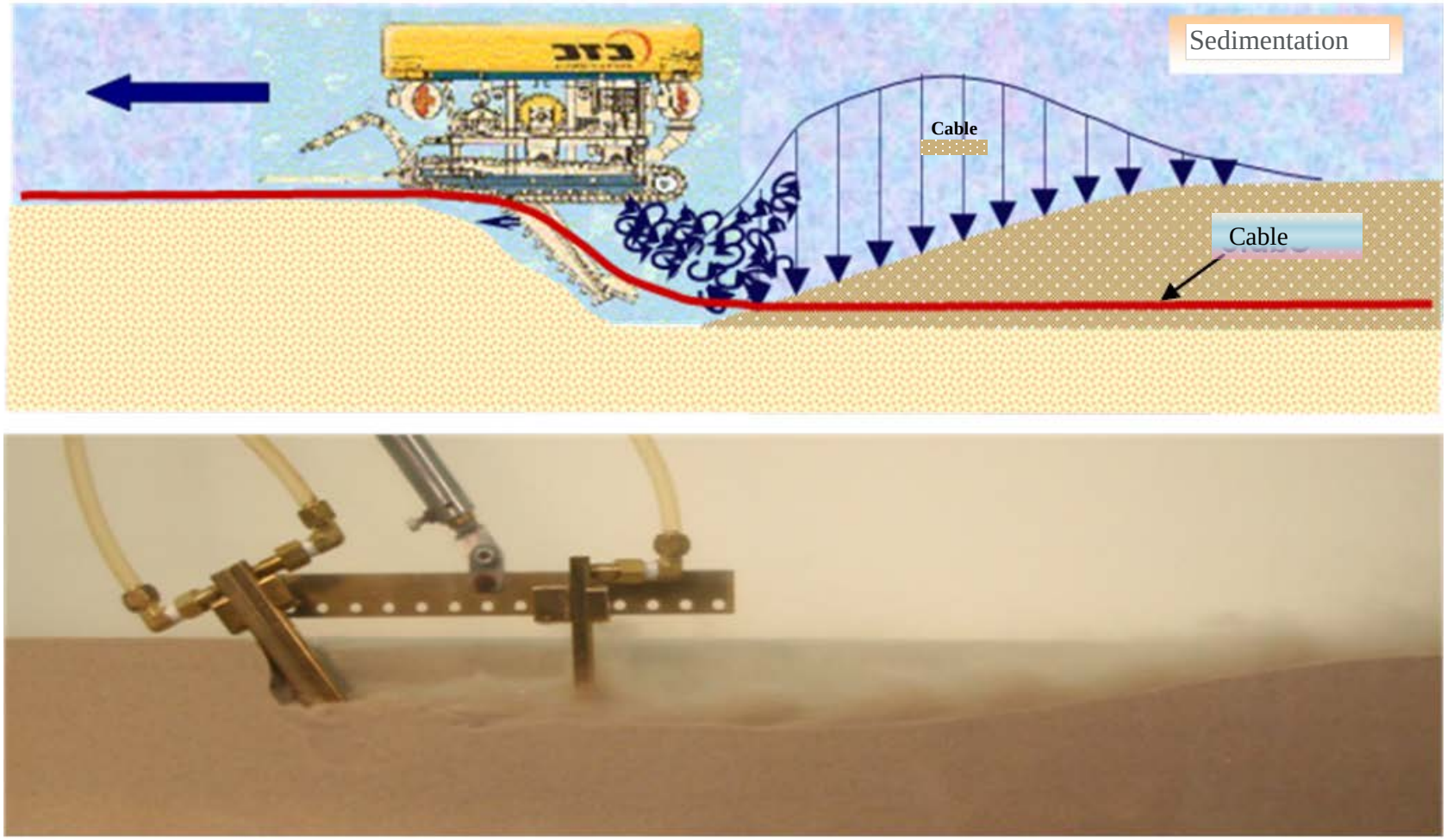


Figure 27. Schematic Illustration of a jet-trencher during operation (Van den Berghe et al., 2008)

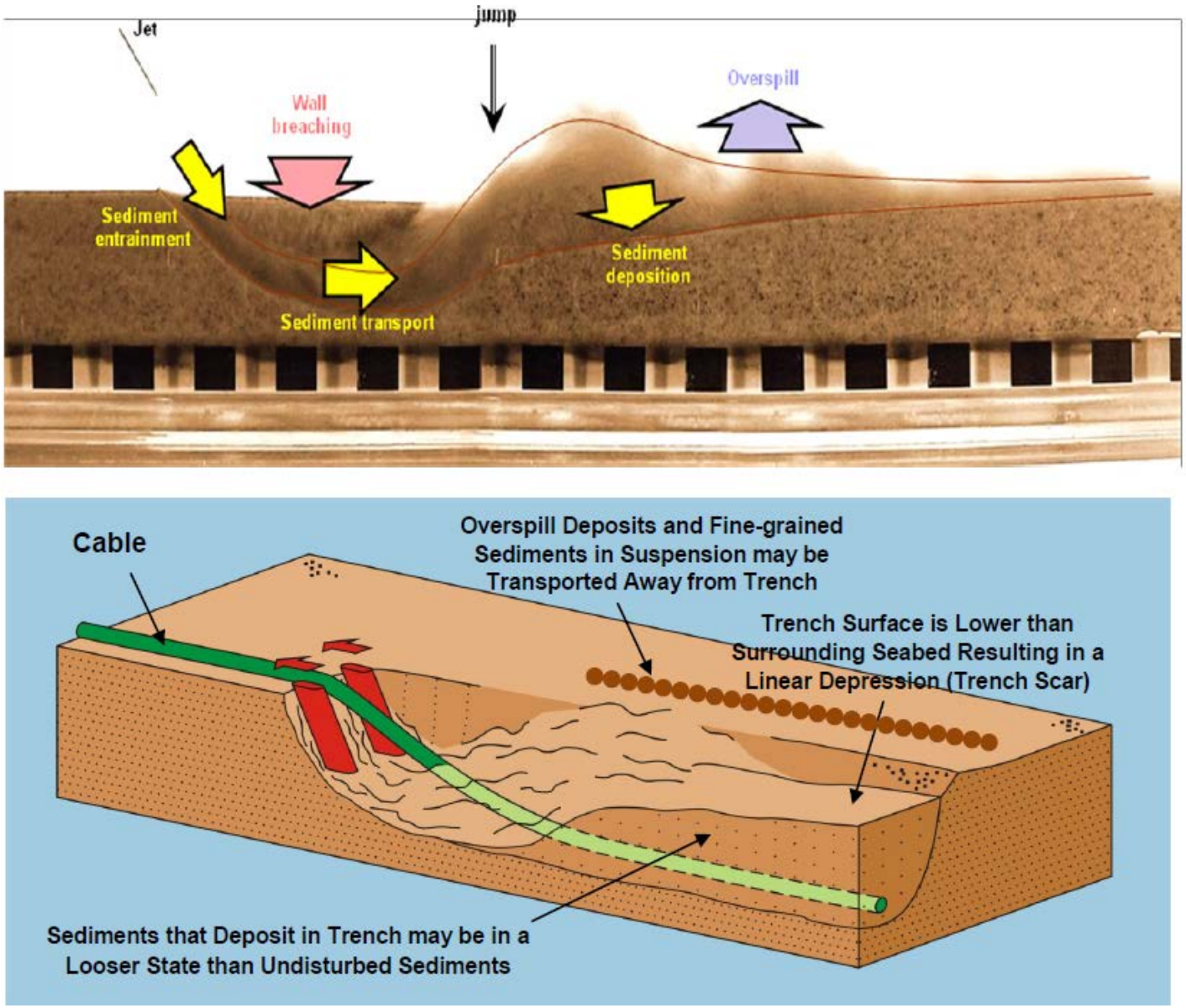


Figure 28. Schematic of jet-trenching process and trench morphology

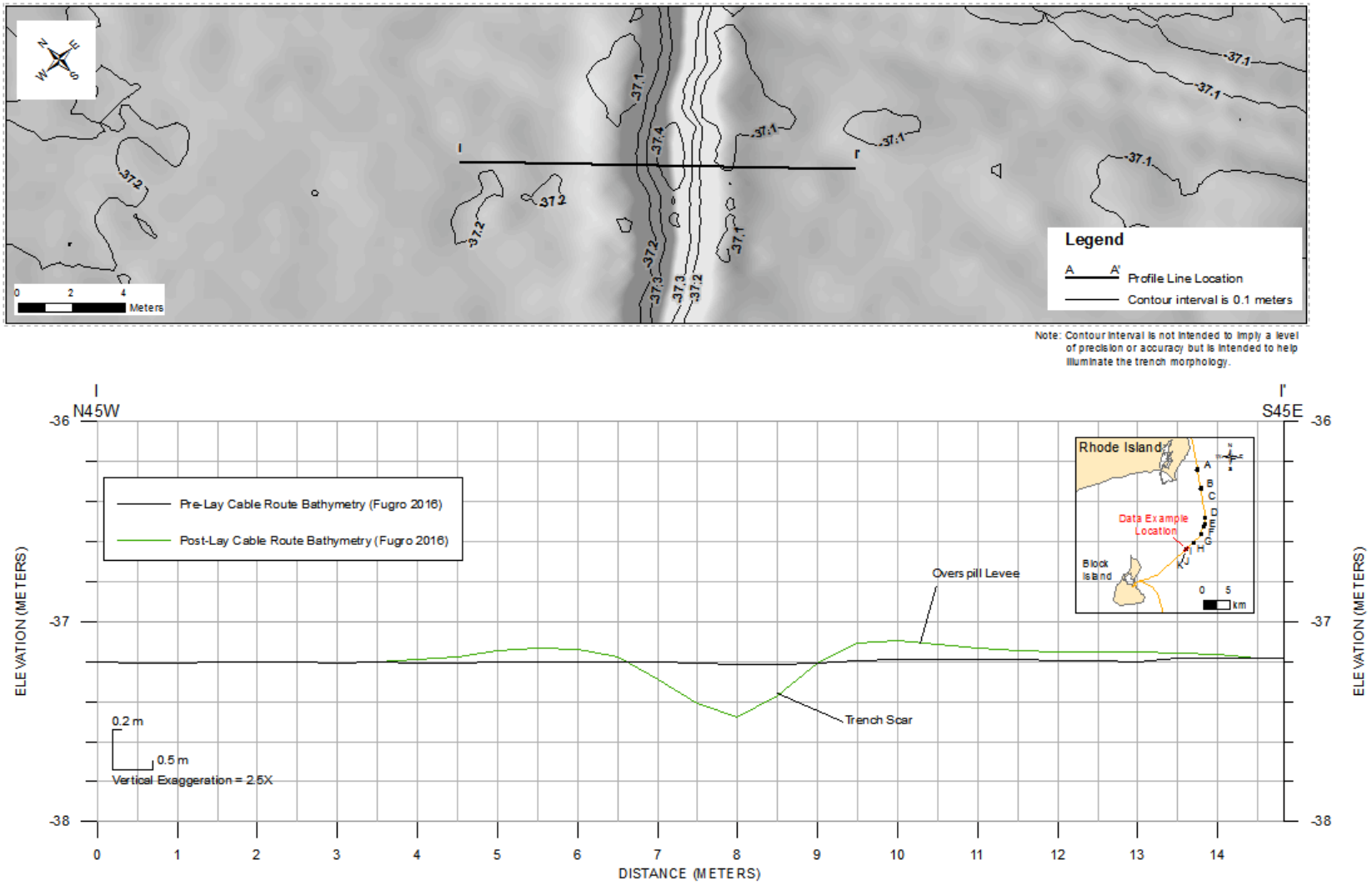


Figure 29. Trench morphology shown in cross section profile

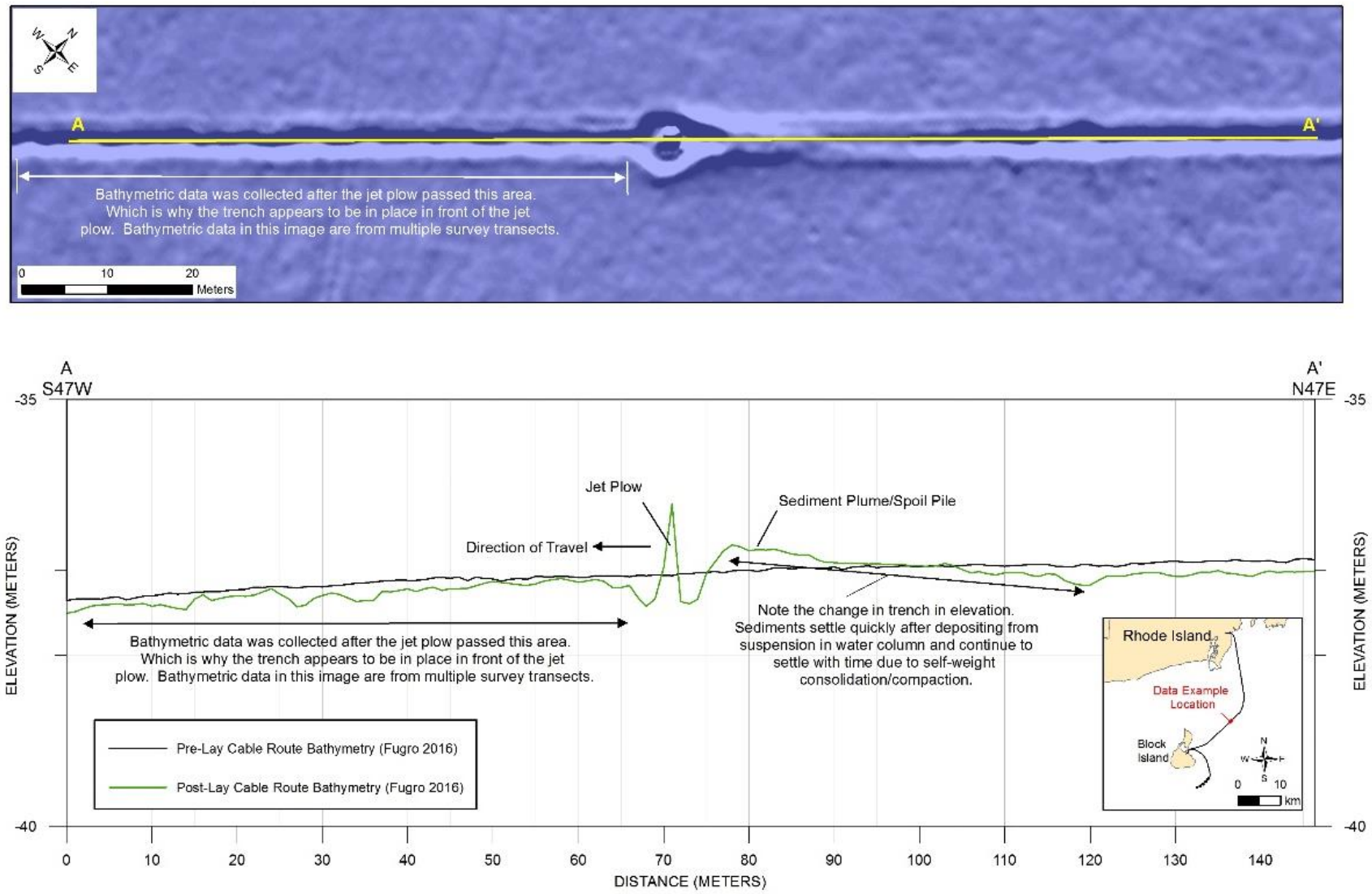


Figure 30. Bathymetric example of jet-trenching morphology from the June 2016 bathymetric survey

Table 13. Summary of Analyzed Trench Profiles

Profile	Volume of Trench Scar (m^3)	Volume of Overspill Levees (m^3)	North-western Overspill Levee Distance (m)	South-eastern Overspill Levee Distance (m)	Estimated Maximum Overspill Levee Thickness (cm)
A	0.15	0.08	3	1.5	7
B	0.28	0.21	3.4	5.7	6
C	0.26	0.2	3.1	5.5	4
D	0.28	0.26	5.9	2.6	6
E	0.59	0.52	5.3	2.3	12
F	0.19	0.24	3.1	2.2	12
G	0.19	0.15	3.2	5.5	5
H	0.11	0.12	4	2.9	5
I	0.35	0.39	3.5	5.5	10
J	0.24	0.13	2.5	2.2	4
K	0.29	0.31	4.9	5	7
Mean Value	*0.27*	*0.24*	*3.8*	*3.7*	*7*

Note that volume of trench scar and overspill levees are based on meter travelled by jet plow

3.6 Conclusions

No sediment plume was observed as a result of the jet plow operations on the BITS cable route on 17 June 2016. TSS concentrations remained at comparable levels with background data, with surface concentration estimates < 1 mgl^{-1} and concentrations at the seabed < 6 mgl^{-1} derived from acoustic backscatter measurements. Data from a second, independent measurement technique (OBS profiles) returned concentration estimates < 2 mgl^{-1} at the surface and < 9 mgl^{-1} at the seabed. Suspended sediment levels on site were found to be up to 100 times lower than those predicted by the modeling work.

Fugro evaluated the trench morphology at 11 cross section locations to estimate the amount and extent of material deposited outside the trench as an overspill levee (Figure 28). Analyses were performed at locations along the cable route from the mainland to near the mid-point of Rhode Island Sound where the plume monitoring was conducted. Pre- and post-lay MBES data were used in this evaluation. Overspill levees were interpreted to extend 1.5 to 7 meters beyond the trench and were up to 25 cm thick. The average distance from the trench and thickness were 3.8 m and 7 cm, respectively. Table 13 provides a summary of the analyzed cross sections. We note that overspill sediments may have deposited beyond the interpreted extent of the overspill levee, but likely were too thin to resolve with the MBES data. RPS ASA (2012) estimated that sediments up to 1cm thick would be deposited within 10 to 30 meters from the trench. Our interpretation of the overspill levee extents suggests that the modeled predictions were reasonable.

The estimated volume of the overspill levees was similar to the volume of the trench scar (depression below the former seafloor elevation; **Table 13**). This suggests that most of the overspill sediments deposited within the overspill levee. The volume of the overspill levee material was estimated to be 0.1 to 0.6 m^3 per meter travelled by the jet plow. The mean value of the overspill levee volumes in the cross sections analyzed is 0.24 m^3. For comparison, the modeling report prepared by RPS ASA (2012)

estimated that approximately 25% of sediment release volume would occur for a 2.28 m^3 trench volume. This corresponds to a sediment release volume of 0.57 m^3 per meter travelled. We note that the mean value of our overspill levee volumes is approximately half of what was predicted but the upper limit of the range is very similar to what the modeling predicted. This could be attributed to conservatism in the modeling or more sediment was deposited outside of our interpreted overspill levee body. We note that our interpretation was limited to seafloor elevation differences that could be discerned with MBES data. Near the trench, the levee was more pronounced and exhibited a larger elevation difference from the pre-lay survey. The toe of the levee was interpreted where the two surveyed seafloor elevations converged. A thin drape of overspill sediments may have extended beyond the interpreted levee toe and could not be confidently discerned using the MBES data. However, the OBS and acoustic analysis of the MBES did not reveal a sediment plume that extended upward into the water column and beyond the immediate vicinity of the trencher which supports the conclusion that most of the overspill sediments deposited within the overspill levee

4. References

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Appendix 1. Offshore Visual Observations – Photo Log with Observer Notes

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/04/2016 09:45:41	Planned first day of cable pull, CLB Big Max not onsite.	
06/04/2016 09:47:03	Fishing vessel and fish trap north of Scarborough State Beach	2686-2690
06/04/2016 09:48:02	Scarborough Beach State Park	2690
06/04/2016 09:48:31	400mm from offshore of parking lot	2691-2692
06/04/2016 09:49:01	Scarborough Beach State Park	2693
06/04/2016 09:52:31	Public on beach at Scarborough Beach State Park , just south of BITS route	2694
06/04/2016 09:53:23	Buoy for messenger cable	2695
06/04/2016 10:21:16	400mm shot from boat of work area	2697-2699
06/04/2016 10:22:00	100mm shot of work area	2700
06/04/2016 10:38:55	Fishing vessel leaving fish trap, no other boats onsite.	2701-2702
06/04/2016 10:52:31	Fishing vessel passing through	2706-2707
06/04/2016 11:14:07	Fishing vessel passing by	2711
06/04/2016 11:14:44	No cable laying occurring today	
06/09/2016 11:19:45	National Grid told us not pulling today; drove down to double check and crew and cable lay vessel in place; first day of cable pull. Too rough for Hula Dog to cross sound safely, fortunately close enough from beach to capture.	
06/09/2016 11:23:36	Big Max transitioned from harbor to Scarborough Beach at 4:00am this morning because wind in right direction and low surf.	2712
06/09/2016 12:07:26	Megan Miller	2713
06/09/2016 12:07:44	Tug Lucinda Smith, located 1000yds to south	2714
06/09/2016 12:08:29	Close up of BITS on Big Max	2717
06/09/2016 12:10:07	Big Max	2719
06/09/2016 12:11:44	Lifted jet plow off Big Max and set in water; took about 30 minutes; had to align vessel. it has dynamic thrusters and around 30,000 hp	2720-2770
06/09/2016 12:35:12	Shift change, Abigail Miller next to Big Max switching out crew	2772-2774
06/09/2016 12:52:33	Land crew tells us they are rigging Big Max to pull winch cable. The line will pass through plow which is why they set it first.	

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/09/2016 13:15:27	VHF communications indicate Big Max is preparing to put diver in water.	2775
06/09/2016 13:22:28	Megan Miller still located 1000yds to south	2776
06/09/2016 13:23:03	Tug Lucinda Smith approximately 2000 yds. south	2777
06/09/2016 13:35:25	Diver entering water to rig cable for pull	2780-2792
06/09/2016 14:48:01	Start to pull. Wide video 2805. Close video 2806. No movement yet. p gps 41 deg 23'30" 71 geg 28'14"	2793-2808
06/09/2016 15:02:37	Crew movement on deck. Drone operator arrived hired by National Grid.	2810-2812
06/09/2016 15:19:37	200 ft out. 1000 ft to go. about 3 m/min speed	none
06/09/2016 15:22:07	2100 ft out	
06/09/2016 15:25:27	Cable stopped. 2168 ft.	
06/09/2016 15:31:19	Cable going overboard. unsure of rate	2813
06/09/2016 15:37:19		
06/09/2016 15:37:44	Crew getting ready for the cable.	2814-2815
06/09/2016 15:47:02	False start	2817-2818
06/09/2016 16:27:07	Asking for cable strength	
06/09/2016 16:31:31	Begin pulling up cable. waiting now	
06/09/2016 16:39:11	Start	2819-2828
06/09/2016 16:55:35	Thread another 15 ft	
06/09/2016 17:26:43	After Big Max pulls cable out, then mandatory break for 30 minutes. All stop. they then put cap on cable and connect to BITS	
06/09/2016 17:46:59	BITS cable exiting shoot Big Max	2826-2831
06/09/2016 18:00:18	Big Max is 1500ft offshore; Big Max runs 24 hrs 12 hour shifts. crew switches at 12 and 0600	
06/09/2016 18:05:54	Pulling BITS cable	2832-2836
06/09/2016 18:10:07	100mm Big Max	2837
06/09/2016 18:10:30	Megan Miller	2838
06/09/2016 18:10:47	Tug Lucinda Smith	2839
06/09/2016 18:11:08	Shot of beach during pull	2840-2842
06/09/2016 18:11:46	400mm taken from beach looking back at parking lot during pull	2843
06/09/2016 18:25:58	Crew tender Abigail Miller coming out for shift change	2845-2847
06/09/2016 19:39:34	Big Max with BITS cable being pulled to shore	2848 video
06/09/2016 19:40:34	400mm Big Max	2849

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/09/2016 19:40:58	Megan Miller	2850
06/09/2016 19:41:14	Tug	2851
06/09/2016 19:41:36	400mm Big Max	2856
06/10/2016 09:17:26	Big Max. Waiting on BITS cable to be anchored at mainland. They first have to trim it.	2857-2860
06/10/2016 09:18:37	Tug	2861
06/10/2016 09:18:50	Megan Miller	2862-2864
06/10/2016 10:02:04	They are anchoring cable on mainland.	
06/10/2016 10:03:01	Big Max 100mm	2867
06/10/2016 10:03:25	100mm Megan Miller located 500 yards to the south of Big Max	2868
06/10/2016 10:03:46	100mm tug located 500 yards to east of Big Max	2869
06/10/2016 10:05:10	400mm tug	2870
06/10/2016 10:05:25	400mm support vessel	2871
06/10/2016 10:05:52	400mm Big Max	2872-2874
06/10/2016 10:46:23	Unable to pick up Big Max communications, difficult to determine what they are doing	
06/10/2016 10:47:25	Megan Miller	2875
06/10/2016 10:48:38	Small tender next to Big Max, assume diver support	2876-2884
06/10/2016 10:49:13	2 support vessels, there's a total of 3 onsite now	2885
06/10/2016 10:49:45	Tug Lucinda Smith	2886
06/10/2016 11:10:16	Onshore report , they are still underground anchoring the cable	
06/10/2016 11:13:34	Small tender next to barge, 3 support vessels still onsite	2891
06/10/2016 11:37:20	Big Max 100 mm	2892
06/10/2016 11:37:51	100mm; 3 support vessels onsite	2893-2894
06/10/2016 11:38:34	Aft crane	2896
06/10/2016 11:38:56	Front crane , believe it's connected to plow	2897-2898
06/10/2016 11:57:08	One support vessel is Smith.	
06/10/2016 11:58:46	Big Max has divers in water, Megan Miller is shown directing traffic away. had to run off several sailboats	2899
06/10/2016 12:30:56	Megan Miller support vessel relocated to the north of Big Max in order to divert traffic away from operations	2900
06/10/2016 12:41:11	Tender vessel arrived for shift change. picked up 8 and dropped off 8	2901-2904

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/10/2016 13:19:51	Spoke with David Campilii, they are having trouble with instrumentation on plow. Divers in water attempting to repair. They plowed about a mile offshore then had to stop last night.	2905-2906
06/10/2016 14:00:31	Big Max 100mm assume attempting to repair plow	2906-2908
06/10/2016 14:02:09	Support vessel Megan Miller	2909
06/10/2016 14:02:38	Tug	2910
06/10/2016 14:10:18	Megan Miller and tug still onsite	2911-2914
06/10/2016 14:55:24	Crew tender arrived to deliver some supplies	2914-2918
06/10/2016 14:57:28	Megan Miller, tug have been onsite all day, with occasional visit from crew tender	
06/10/2016 15:30:33	Big Max and support vessel. They are still trying to repair plow. Megan Miller and tow still onsite	2919-2922
06/10/2016 15:40:20	Tug is moored next to Big Max. land crew indicates still having trouble with plow	
06/11/2016 08:57:09	Big Max located at N41 22.551 W71 25.567. appears to plowing	2923
06/11/2016 08:58:16	Tug Realist	2924
06/11/2016 08:58:50	Megan Miller	2925
06/11/2016 09:35:17	Shot of Big Max, crew tender vessel, and Megan Miller. picture size at 100mm	2926
06/11/2016 09:36:16	Close up of Big Max vessel. picture size 400mm	2927
06/11/2016 09:55:24	Close up of BITS on Big Max	2928/2929
06/11/2016 10:04:25	Big Max located at N41 22.434 W71 25.955. Big Max has moved roughly 1/3 mile in 1 hour	
06/11/2016 10:22:03	Crew tender Abigail Miller left work area	2930-2931
06/11/2016 10:22:43	100mm Big Max and A frame support vessel	2932
06/11/2016 11:03:34	Tug is "Realist"	
06/11/2016 11:05:21	Big Max. N41 22.258 W71 25.955. has moved about 1/5 mile in 1 hour	2933-2934
06/11/2016 11:05:34	Tug Realist	2935
06/11/2016 11:05:50	Close up of Tug Realist	2936/2937
06/11/2016 11:55:18	Sailboat race currently off to the east of Big Max. approx 40 sailboats in area	2938-2941
06/11/2016 11:57:15	Megan Miller support vessel and Big Max	2942-2944
06/11/2016 11:57:35	Tug Realist	2943
06/11/2016 12:09:55	100mm of Big Max with sailboats passing by. N41 22.258 W71 25.955 Big Max does not appear to have moved in last hour.	2945

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/11/2016 12:11:57	Sailboats to east of Big Max	2946/2947
06/11/2016 14:53:20	Big storm moving into area. Captain Andy ended survey b/c of storms. We checked weather and it's predicted to last all afternoon with lightning.	
06/12/2016 09:08:37	N 41 19.484 W071 25.017 location of Big Max	2949-2950
06/12/2016 09:13:26	Support tug	2952-2953
06/12/2016 09:13:55	Megan Miller support vessel.	2954-2955
06/12/2016 09:14:51	Big Max made significant progress 2 support vessels in area , no other boats around	
06/12/2016 09:30:54	Big Max is currently located about 1 mile SE of Pt Judith lighthouse	
06/12/2016 10:11:52	N 41 19.205 W71 25.009	
06/12/2016 10:12:22	Big Max has gone about 1/4 mile since last reading	
06/12/2016 10:16:53	CLB Big Max	2957-2958
06/12/2016 10:17:03	Megan Miller support vessel	2959
06/12/2016 10:17:26	Support Tug Realist	2960
06/12/2016 10:19:06	Tug Realist	2962
06/12/2016 10:38:46	3-5 ft swells with wind advisory this afternoon. May have to end early	
06/12/2016 10:54:47	N 41 19.054 W 71 24.907	
06/12/2016 10:55:36	Big Max	2963-2965
06/12/2016 10:55:59	Megan Miller	2966
06/12/2016 10:56:28	Tug	2967-2968
06/12/2016 10:56:45	100mm Big Max and support vessel	2969
06/12/2016 10:57:39	Big Max and 2 support vessels have been only boats onsite all day	
06/12/2016 11:32:12	CLB Big Max	2970-2975
06/12/2016 11:32:33	Tug	2976
06/12/2016 11:32:52	A frame	2977
06/12/2016 11:46:14	Sailboat headed north, passed about 1 mile to west of Big Max; no other boats on the water today	2978-2979
06/12/2016 11:57:48	N 41 18.681 W 71 24.798 about 2.5 miles south of Point Judith	
06/12/2016 12:02:31	4 sailboat race committee boats passing to south of Big Max	2980-2981

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/12/2016 12:03:42	Big Max, travelled about 1/2 mile since last mark	2983-2986
06/12/2016 15:41:51	Ocean swells 6-7 ft., gale advisory was issued, so captain called off survey. Predicted to worsen throughout the day.	
06/14/2016 08:48:50	N 41 17.348 W71 25.058	3050
06/14/2016 08:49:39	Traveled about 1.5 miles since 6/12/16 @ 1200	
06/14/2016 08:53:49	Big Max	2992-2995
06/14/2016 08:54:24	Crew tender	2996-2997
06/14/2016 08:54:41	Tug Realist	2998
06/14/2016 09:00:00	Big Max is 5 miles south of Point Judith	
06/14/2016 09:23:20	400m cable chute on Big Max	2999-3000
06/14/2016 09:31:18	Big Max currently 9 miles from block Island	
06/14/2016 09:42:58	400mm cable chute, they do not appear to be laying cable.	3001-3004
06/14/2016 10:14:08	Granted permission to come in close N41 17.449 W071 24.583	
06/14/2016 10:15:04	100mm 1/2mile from Big Max	3033
06/14/2016 10:16:02	Travelled about a 1/3 mile since last reading	
06/14/2016 10:18:21	Big Max drive by	3005-3009
06/14/2016 10:19:16	Tug Realist	3010
06/14/2016 10:19:36	Crew tender Joel Miller	3011-3012
06/14/2016 10:20:04	Plow buoy	3014
06/14/2016 10:20:50	Great pics Big Max	3015-3028
06/14/2016 10:21:57	Video of cable	3025
06/14/2016 10:22:19	Tug Realist	3029
06/14/2016 10:22:50	Cable chute	3030
06/14/2016 10:23:07	Big Max and tug	3031
06/14/2016 10:23:27	Video	3032
06/14/2016 11:27:07	N 41 17.129 W 071 24.891 moved about 1/2 mile	
06/14/2016 11:33:05	400mm Big Max	3034-3035
06/14/2016 11:33:23	Tug Realist	3036
06/14/2016 11:33:40	Crew tender Joel Miller	3037
06/14/2016 12:25:49	Fishing vessel approaching and passing to south of Big Max	3038-3042

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/14/2016 12:32:37	Shift change Joel Miller arrived with 12 crew members. 9 went aboard Big Max. 2 went aboard Joseph and 1 went on tug Realist	3043-3047
06/14/2016 12:50:12	Joel Miller crew tender departing	3048-3049
06/14/2016 13:10:52	Big Max is 3 miles southeast of pt Judith per security call	
06/14/2016 13:14:29	N 41 16.937 W 071 24.892 travels about 1/3 of a mile	
06/14/2016 13:18:40	Crew tender Joel Miller	3051
06/14/2016 13:19:08	Tug Realist	3052
06/14/2016 14:09:00	Big Max with block island in background	3053
06/14/2016 14:09:36	Plow buoys behind Big Max	3054-3055
06/14/2016 14:10:55	Realist tug and support vessel still onsite	
06/14/2016 14:28:01	N 41 16.937 W071 24.892 same spot not or moving since last measurements	
06/14/2016 15:06:11	N41 16.846 W071 24.943 moved about 1/10 mile	
06/14/2016 15:10:14	approximately 9.5 miles to block island	
06/14/2016 15:10:23	100mm Big Max	3056
06/14/2016 15:10:42	400mm Big Max	3057
06/14/2016 15:11:17	Support vessel	3058-3059
06/14/2016 15:11:38	Tug Realist	3059-3060
06/14/2016 20:08:50	Ended survey to get back for conference call with Subacoustech	
06/15/2016 08:59:12	N 41 17.057 W71 24.839	3062-3064
06/15/2016 09:00:25	Subacoustech texted that Big Max is down for maintenance for next 12 hrs. Problem with nozzles and divers will have to repair.	
06/15/2016 09:03:45	Sailing boat passing north of Big Max	3065
06/15/2016 09:06:00	A frame	3066
06/15/2016 09:06:17	Tug Realist	3067
06/15/2016 09:47:10	Big Max granted permission for a close pass, we were about 500 ft. approached from starboard went around bow and took some shots from port	
06/15/2016 09:47:46	Big Max	3068-3071
06/15/2016 09:47:57	Atlantic Pioneer with Deep Water executives	3072
06/15/2016 09:48:46	Big Max close ups	3073-3088

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/15/2016 09:49:03	Atlantic pioneer	3089
06/15/2016 09:49:43	Big Max	3090-3095
06/15/2016 09:55:27	Big Max is about 9 miles to closet point on block island. Approx 11 miles to harbor	
06/15/2016 09:56:35		
06/15/2016 10:29:56	Abigal Miller arrived to drop off POV.	3096-3097
06/15/2016 11:22:20	Big Max	3098-3103
06/15/2016 11:22:38	Support vessel	3104
06/15/2016 11:23:00	Tug Realist	3105
06/15/2016 12:50:14	Close up and drive by Big Max	3106-3140
06/15/2016 12:52:02	WTG 1 lift boat	3141-3143
06/15/2016 12:53:04	WTG2	3144-3145
06/15/2016 13:02:05	WTG3 lift boat	3146-3148
06/15/2016 13:03:16	WTG4	3149-3150
06/15/2016 13:03:35	WTG5	3151-3152
06/15/2016 13:27:13	Bulk head on town beach block island	3153-3156
06/16/2016 11:14:12	Captured video with Blue Land Media on block island. Big Max still down due to jet nozzle, expect to be running tomorrow in morning.	
06/16/2016 11:15:11	WTG1 with lift boat Michael Eymard	3170 - 3175
06/16/2016 11:31:35	WTG1 l Lift Boat Michael Eymard apply coating to foundations	3176-3180
06/16/2016 11:36:03	BITS cable visible on wtg1	3181-382
06/16/2016 11:41:40	WTG2	3183-3187
06/16/2016 11:47:50	LB Lacie Eymard at wtg3 with Atlantic pioneer in background	3188-3198
06/16/2016 11:55:22	WTG4	3202-3203
06/16/2016 11:55:48	WTG5	3204-3205
06/16/2016 11:56:19	Filming with Blue Land Media on boat	
06/16/2016 13:27:53	Tug Realist	3207-3208
06/16/2016 13:28:21	Megan Miller	3209-3210
06/16/2016 13:28:55	Big Max	3211-3223
06/16/2016 13:32:11	Big Max still not repaired. Estimate is operating again tomorrow (6-17)	
06/16/2016 13:34:52	Big Max close pass, starboard	3224-3230
06/16/2016 13:42:49	N41 16.913 w 71 24.622	

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/17/2016 09:22:32	Close up of Big Max as the hula dog arrived at the site.	3231/3235
06/17/2016 09:23:17	Megan Miller on site with Big Max	3232
06/17/2016 09:23:50	Realist on site with Big Max	3233-3234
06/17/2016 09:31:41	Fugro's Phillip and Josh doing acoustic transects	3236
06/17/2016 09:46:31	Realist leaving the site and crew tender vessel coming in	3238/3239
06/17/2016 10:12:32	Small fishing vessel drove within the 1/2 mile radius of Big Max	3240
06/17/2016 10:27:14	Big Max underway with cable laying. located at N41 15.696 W71 25.894	3241/3243
06/17/2016 10:27:45	Megan Miller still on site as support vessel. Realist still away from site	3242
06/17/2016 10:28:19	Acoustic survey vessel still running transects behind the Big Max	3244
06/17/2016 10:44:12	Acoustic vessel doing surveys beside Big Max	3245/3246/3247
06/17/2016 11:08:58	Acoustic vessel running survey on port side of Big Max	3248/3249/3250
06/17/2016 11:23:30	Big Max located at N41 15.668 W71 25.950. Big Max still laying cable.	3251/3252/3253
06/17/2016 12:27:40	Big Max continuing to lay cable. Located at N41 15.658 W71 25.950. Fugro's acoustic vessel (Jamie Hanna) located off the bow of Big Max.	3254/3255/3256
06/17/2016 12:47:46	Big Max going 0.10 knots. Vessel Joell Miller coming in to Big Max.	
06/17/2016 12:53:53	Joell Miller coming in to Big Max to pick up a box and drop crew off. Took 9 crew off Big Max; dropped off 11 crew to Big Max.	3257-3261
06/17/2016 13:09:01	Acoustic vessel running another transect on the port side of Big Max	3262-3267
06/17/2016 13:33:49	Big Max located at N41 15.630 W71 25.948. Big Max is barely moving.	3258/3269/3270
06/17/2016 13:42:02	Megan Miller on stand by. acoustic vessel waiting off the stern of Big Max	3271
06/17/2016 14:25:53	Big Max located at N41 15.614 W71 25.948. acoustic vessel waiting off bow of Big Max to do another transect	3272/3273
06/17/2016 15:04:26	Big Max laying cable.	3272-3278
06/17/2016 15:26:01	Big Max located at N41 15.602 W71 25.957	
06/18/2016 09:48:20	Big Max 100mm from 1/2 mile	3279

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/18/2016 09:48:40	tender behind Big Max	3280-3282
06/18/2016 09:49:13	3 support vessels onsite 1 tug and 2 crew tenders	3283
06/18/2016 09:49:39	Tug	3284
06/18/2016 09:49:57	Support vessel	3282
06/18/2016 09:51:19	Big Max crossing submarine cable will not allow us within 1/2 mile today	
06/18/2016 10:57:34	Fugro's Jamie Hannah was on the horizon, we moved to their position, they were running bathymetry along cable rout located just south of Pt Judith	3289-3291
06/18/2016 10:58:05	N41 15.070 W 71 26.875.	big max
06/18/2016 10:58:33	They are crossing cable,	
06/18/2016 11:01:25	Big Max	3292
06/18/2016 11:02:15	Joel Miller, tender vessel, barge located aft of Big Max during cable crossing	3293-3294
06/18/2016 12:18:55	Platform and tender behind Big Max	3295-3296
06/18/2016 12:20:15	Big Max	3297-3298
06/18/2016 12:20:47	Tug Realist	3299
06/18/2016 12:21:23	Joel Miller	3300
06/18/2016 12:41:22	Josephine Miller arrived for crew change. dropped off 11 and picked up 11	3301-3303
06/18/2016 12:51:30	VHF communications indicate that we have crossed cable.	
06/18/2016 14:01:49	N 41 14.960 W071 26.782	
06/18/2016 14:07:27	100mm Big Max	3303
06/18/2016 14:07:54	400mm Big Max still working on cable	3304-3306
06/18/2016 14:08:22	Tug Realist, 2 other support vessels onsite	3307
06/18/2016 14:08:35	Megan Miller	3308-3309
06/18/2016 14:09:09	Support vessel Abigail Miller	3310-3311
06/18/2016 14:17:05	Joseph Miller and Abigail Miller are 2 support vessels onsite	
06/18/2016 15:33:51	N 41 14.973 W 071 26.793	
06/18/2016 15:34:11	100mm Big Max	3312
06/18/2016 15:34:46	400mm Big Max	3313-3314
06/18/2016 15:35:07	Megan Miller	3315
06/18/2016 15:35:24	Tug Realist	3316-3317

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/18/2016 15:35:52	Crew tender	3318
06/18/2016 17:19:37	Big Max still looks like they are at cable crossing not moved	3319-3323
06/19/2016 10:00:58	N 41 14.233 W 71 27.866 Start of observation. service boat and a tug in the site	3324-3326
06/19/2016 10:47:54	Looks like they are crossing the cables, 2 service vessel on site, sediment observer boat (Jamie Hanna) on site.	3337-3346
06/19/2016 11:02:08	Still crossing the cable. No new activity. 2 service boat and sediment observation boat on site. There is a small boat (diver's boat) on site.	3332-3336
06/19/2016 13:25:16	Return to site after dropping off Blue Land Media to Block Island harbor at 12:15	
06/19/2016 13:28:27	Still no new activity on the site. The sediment observer boat left the seen. 2 service barge on site. Possibly divers in water. n 41 14.204 w71 27.816	
06/19/2016 14:21:04	N41 14.211 W71 27.769 2 service boat and small diving boat on site. Didn't move at all. Probably doing cable cross. Decided to end the survey due to sea state	3347-3352
06/20/2016 12:00:58	Started late b/c observer had food poisoning	
06/20/2016 13:14:38	Big Max, tug Realist , Joseph Miller onsite	
06/20/2016 13:16:49	N 41 13 .042 W071 29.263	
06/20/2016 13:19:20	Big Max is approximately 3 miles from block island	3353-3354
06/20/2016 13:19:45	Joel Miller	3355
06/20/2016 13:20:19	Tug Realist	3356
06/20/2016 13:20:36	Big Max has crossed last cable	
06/20/2016 13:23:56	Joel Miller	3357
06/20/2016 14:08:15	Fisherman passing to west of Big Max	3358
06/20/2016 14:54:31	N41 12.919 W071 29.477	
06/20/2016 15:02:35	Big Max with block island in background	3359-3362
06/20/2016 15:03:16	Joel Miller	3363
06/20/2016 15:03:46	Tug Realist	3364
06/20/2016 16:00:31	Sorensen Miller headed out to lift boats	3364-3367
06/20/2016 16:20:31	N 41 12.876 W 071 29.588	
06/20/2016 16:22:04	Big Max	3368-3369

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/20/2016 16:22:21	Joel Miller	3371
06/21/2016 10:13:07	Big Max located at N41 11.663 W71 31.586. Cable laying underway.	3372/3373
06/21/2016 10:15:14	Realist and Megan Miller on site as support vessels.	3374/3375
06/21/2016 11:00:27	Big Max located at N41 11.542 W71 31.927. Vessel is moving southwest towards the beach location on block island	3376/3377
06/21/2016 11:02:19	Realist and Megan Miller on stand by. No other vessels have come through or by the work site	3378
06/21/2016 11:58:57	Big Max located at N41 11.513 W71 32.028. Cable laying continuing uninterrupted.	3379/3380
06/21/2016 12:03:24	Realist and Megan Miller remained anchored on site.	3381/3382
06/21/2016 12:47:26	Abigail Miller approaching Big Max. Crews switching out on Big Max.	3383-3395
06/21/2016 12:58:55	Big Max located at N41 11.508 W71 32.105. Took 10 crew off Abigail Miller and put 10 crew on Abigail Miller	3396/3397
06/21/2016 13:57:58	Big Max located at N41 11.471 W71 32.234. Cable laying still underway without interruption.	3398/3399
06/21/2016 14:00:00	Realist and Megan Miller remain anchored on site.	3400/3401
06/21/2016 14:28:42	Megan Miller requested the ferries to start moving to the east of Big Max as they move closer to shore.	
06/21/2016 14:57:36	Big Max located at N41 11.461 W71 32.308. Cable laying entering where the ferry normally passes through. Ferries are now going around to the east of Big Max.	3402/3403
06/21/2016 15:00:19	Megan Miller has moved to where the ferries normally pass through.	3404/3405
06/21/2016 15:48:30	Big Max located at N41 11.419 W71 32.450	3406/3407
06/21/2016 16:31:49	Big Max	3406-3410
06/21/2016 16:33:05	Videos of Big Max laying cable and the work site	3411/3412/ 34153422 /3423/3426
06/21/2016 16:33:59	Close up picture of cable coming off Big Max.	3419-3421
06/21/2016 16:34:52	Pictures of front of Big Max.	3427-3431
06/21/2016 16:35:30	Pictures and video of Megan Miller the support vessel as the hula dog approached	3432-3437
06/21/2016 16:36:35	Pictures of the cofferdam on the beach. video is frame 3446	3440-3455

Date/Timestamp	Observation Notes	Photo Frames ID (Photos delivered on accompanying DVD)
06/21/2016 16:56:03	Big Max located at N41 11.375 W71 32.514. Close up of cable coming off the back of Big Max.	3456-3459
06/22/2016 08:10:10	Start of observation. The Big Max is close to the shore less than half mile. GPS cords N 41 11.221' W 071 33.584 a tug and Joe Miller is on the site. Looks like the divers boats out of Big Max.	3460-3465
06/22/2016 08:35:15	A smaller barge towed by another tug boat has entered the site from north.	3483-3489
06/22/2016 08:41:29	It looks like they switch the tug boats for small barge	3490-3494
06/22/2016 08:45:05	Radio call from Big Max, divers are in water, the 2nd barge will contact to Big Max from port side for deploying goods.	
06/22/2016 08:45:44	The small gray boat is coming back from Block Island to the Big Max	3496-3497
06/22/2016 08:48:53	Barge 2 (Megan Miller) contacted the port side of Big Max	3499-3505
06/22/2016 09:11:28	Megan Miller has separated from Big Max	3506-3507
06/22/2016 09:18:28	GPS coordinates update N 41 11.195 W 71 33.603	3510-3513
06/22/2016 09:26:50	VHF comms: Joel Miller requested to join the Big Max from port side.	3515-3522
06/22/2016 10:12:24	Joel Miller and Megan Miller on site. Small barge and tug boat on site. N 41 11.179 W 71 33.648	3523-3526
06/22/2016 10:33:10	Big Max start to turn.	3527-3729
06/22/2016 11:16:41	N 41 11.150 W 71 33.624 Big Max still turning, counter clockwise.	3532-3540
06/22/2016 11:44:41	Photos from north east side of the site	3553-3572
06/22/2016 11:59:53	N 41 11.183 W 71 33.594 Joel and Megan Miller on site small barge and tug on site	3573-3574

Appendix 2. Visual Observations – Onshore Photo Log with Observer Notes

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
05/31/2016 19:30:49	Test	
06/01/2016 13:27:25	WTG5	2674
06/01/2016 13:27:56	WTG4	2675
06/01/2016 13:28:12	WTG3 with jack up vessel	2676
06/01/2016 13:28:44	WTG2 with jackpot apply coating to platform	2677
06/01/2016 13:36:25	First day at Scarborough Beach, no activity, so took BLM out to block island to capture b roll	
06/01/2016 13:38:09	Cable vessel -laying matts over Verizon cable taken from ferry	2663-2673
06/02/2016 10:32:29	Parking lot at Scarborough Beach State Park North	0017-
06/02/2016 10:35:14	Workers continue to work on preparing for cable pull	0018
06/02/2016 10:46:31	Section of parking lot cut for cable pull	0019-0021
06/02/2016 10:47:28	Winch for pulling cable	0022
06/02/2016 15:02:57	Winch cable going into ground. not visible but it is connected to a messenger cable which the barge will use to pull out winch cable, then bits cable is pulled from barge back to mainland.	23-27
06/03/2016 08:24:02	Start	
06/03/2016 09:08:40	Start stationary. No activity crew has not arrived. 70mm zoom. GPS 41deg23.625' 71deg28.423'	0029-0032
06/03/2016 10:07:25	Still no crew. starting to rain	0033-0036
06/03/2016 11:38:34	Still no crew.	0037-0040
06/03/2016 13:18:29	No crew. took some close up shots of equipment	041-050
06/03/2016 14:22:10	Took pictures of street crew near site at 200mm. still no crew for static shots	0051-0056
06/04/2016 08:45:30	Equipment set up on site. Ready to pull the cable.	0057
06/04/2016 09:44:09	Delay due to telecommunication wire being cut. Pulling of the cable may not happen today.	
06/04/2016 10:28:28	Safety briefing for video crew.	0060
06/04/2016 10:50:08	Video crew taking photos and video of the work site	0061
06/04/2016 12:29:17	Cable will not be pulled in today. Construction will start tomorrow at 10:00am.	
06/05/2016 08:28:03	Utility truck connected to the winch	0064-0066
06/05/2016 09:01:53	The cable laying barge left the shore. The project coordinator informed us due to weather condition, the project delayed until Tuesday morning.	0071-0072

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/05/2016 09:13:25	National Grid representatives left the site. Their team are preparing to leave the site.	
06/06/2016 09:57:20	No activity scheduled for June 6 (Monday). I visited site and confirmed no activity.	0073-0074
06/06/2016 09:59:45	Lighting portable	0075
06/06/2016 10:00:17	Land sea transition vault	0076-0077
06/06/2016 10:00:40	Close up potable lighting	0078
06/06/2016 10:01:09	Winch	0079
06/06/2016 10:01:22	Winch cable	0080-0081
06/06/2016 10:02:06	Parking lot from beach	0082-0083
06/07/2016 07:55:57	No crew present.	0084-0085
06/07/2016 08:55:31	No crew, someone on their phone near the site	0086-0087
06/07/2016 09:10:06	Two crew members making measurements in the hole.	0088-0090
06/07/2016 09:46:29	Cable pulling crew (talked to Paul-National Grid) came to cover the trench.	0091-0106
06/07/2016 11:03:46	No crew.	0107-0109
06/07/2016 12:14:01	No crew.	0111-0113
06/07/2016 13:37:09	No crew.	0114-0116
06/09/2016 10:10:46	Operations not scheduled today, but checked and barge is here. National Grid moved barge from Quonsett around 4 am this morning to take advantage of unexpected weather window.	
06/09/2016 12:21:01	Setting up for pull. Waiting for the cable. still shots	0168-0170
06/09/2016 13:17:55	People starting to get things ready. still no pull	0171-0173
06/09/2016 13:35:34	Setting up caution tape around the trench.	0174-0175
06/09/2016 14:00:04	Diver in water rigging cable winch through jet plow	
06/09/2016 14:16:29	Cable pull starting, Big Max pulling winch cable out	0176-0178
06/09/2016 14:18:11	Captured video	0179
06/09/2016 14:25:24	Video	0180
06/09/2016 14:30:00	13 workers onsite	0181
06/09/2016 14:31:10	Equipment onsite	0182-0184
06/09/2016 14:57:40	Winch cable is approximately 1/2 to Big Max. Cable is traveling 30ft/minute	
06/09/2016 14:58:46	Different angle shot during cable pull	0185
06/09/2016 15:28:07	Winch cable stop pull. Line is slack	0187-0189
06/09/2016 16:00:30	Cable winch is at Big Max, waiting for them to connect BITS cable	

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/09/2016 16:01:10	The streets and beaches were not closed off during cable pull. since cable is underground they expect little hazard if it breaks	
06/09/2016 16:05:03	Total distance from land sea transition vault to big max is 3000ft	
06/09/2016 16:07:38	Stationary shot	0190-1092
06/09/2016 16:20:38	Started pulling more winch cable to mad max	
06/09/2016 16:23:56	Stopped pulling cable winch	
06/09/2016 16:39:19	Pulling BITs cable from big max to mainland	0193-0194
06/09/2016 16:43:34	Stopped pulling cable off big max	
06/09/2016 16:44:21	Started back pulling	
06/09/2016 16:46:31	Stopped again	
06/09/2016 16:56:31	Pulling cable	
06/09/2016 17:02:10	Pulled cable then stopped after few minutes	
06/09/2016 17:39:37	Stationary shot. Still waiting.	0195-0198
06/09/2016 17:52:28	Start pull. False start	
06/09/2016 18:07:15	Start. Begin pull. video 199	0200
06/09/2016 18:17:47	Moved light	0201
06/09/2016 18:21:56	Pulling goes for about 15-30 seconds then stops for several minutes	
06/09/2016 18:43:20	Break possible shift change	
06/09/2016 19:08:16	Started pulling bits cable, had some trouble with tension but looks like they are ready to roll continuous	0202 video
06/09/2016 19:23:06	Spraying high pressure water on winch cable to wash salt water off	0203-0204
06/09/2016 19:51:50	Spraying water on line	0206-0208
06/09/2016 20:50:04	BITS cable pulled through to mainland, next step is to anchor line.	
06/10/2016 07:40:44	Close up shots of cable	215-217
06/10/2016 07:45:46	Long shot barge in background	218-219
06/10/2016 07:51:17	Stationary shot. Move yellow truck for set up. begin anchor	219-224
06/10/2016 07:59:35	Winched up cable start pealing back.	
06/10/2016 07:59:45	Pull mechanism	235
06/10/2016 08:15:04	Pictures and videos of the, stripping outer shell of cable.	225-254
06/10/2016 08:54:19	Still trimming cable	255
06/10/2016 09:32:09	Cable going back in trench. Possible anchoring or splicing. trimming cable	256-261
06/10/2016 09:59:23	Possible start to anchoring.	262

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/10/2016 10:28:27	Close up shots during break	263-265
06/10/2016 10:58:01	Stationary shot. Working underground on anchoring.	266
06/10/2016 11:41:21	Stationary shot. all work is now underground	267
06/10/2016 13:04:54	Reeling the winch cable. No real activity.	268-271
06/10/2016 13:23:43	Packing up equipment.	272-275
06/10/2016 14:07:47	Shots of crew working near trench. Close up of cable.	278-282
06/10/2016 14:26:02	Taking away winch	283-284
06/10/2016 14:33:36	Brought crane over to manhole	285
06/10/2016 15:01:31	Cable coiling	286-289
06/10/2016 15:52:45	Stationary shot. Low activity.	290
06/10/2016 16:16:45	Coiling cable I hole.	291-292
06/11/2016 08:16:35	The work in Scarborough beach is complete. Contractor has covered the land-sea transition vault. Cable laying barge (Big Mac) on site	0293-0297
06/11/2016 09:03:43	Big Mac on the move , 3 vessels close by	0303-0304
06/11/2016 09:24:14	On shore photos. 1 barge + two other vessel close to Big Mac	0307-308
06/11/2016 10:02:42	Big Mac still on the move. Three vessel close by.	0309-0310
06/11/2016 10:58:10	No activity on Scarborough beach. Big Mac on the move. 3 vessels close by	0311-0312
06/11/2016 11:50:48	The Big Mac on the move. Not visible from location in parking lot because of the building. will take series of photos on the beach as well	0315-0316
06/11/2016 12:08:21	From the shoreline, the cable laying barge (Big Mac) is on the move . Due to presence of sailing boats it's difficult to recognize the support vessel. I could distinguish the barge and service vessel close the barge	0317-0318
06/11/2016 12:33:41	A service vessel getting close to the cable laying barge from north	0326-0327
06/11/2016 12:36:02	Moved the camera to have the barge in frame	0328-0329
06/12/2016 08:13:13	Pictures of area. No work being done today. parking lot no activity	0330-0336
06/12/2016 08:15:37	70mm big max barely visible	0337
06/12/2016 08:16:18	200mm zoom in of big max.	0338
06/12/2016 09:48:39	Stationary shot. 70mm	339-341
06/12/2016 09:49:05	200mm shot of big max.	341
06/12/2016 10:43:13	200mm shot of big max	343
06/12/2016 10:43:32	70mm stationary shot around lot. no activity	344-347
06/12/2016 11:33:35	70mm stationary	348-350
06/12/2016 11:33:54	200mm stationary shot big max	351

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/12/2016 12:38:26	70mm stationary	352-354
06/12/2016 12:38:50	200mm big max	355
06/12/2016 14:12:07	70mm stationary	356-358
06/12/2016 14:12:33	200mm big max	359
06/12/2016 18:36:48	70mm parking lot. no activity	361
06/12/2016 18:37:29	big max on horizon 70mm	362
06/12/2016 18:37:51	200mm big max horizon	363
06/12/2016 18:40:39	Burnside avenue, where cable turns into parking lot,	365
06/12/2016 18:41:25	Burnside avenue	366
06/12/2016 18:46:27	Corner of Burnside and RI108, street work	367
06/12/2016 18:47:14	Looking north on RI 108	369
06/21/2016 10:30:41	Hard rain when arrived on block island. Delayed walking down to site until it passed (1.5hr)	
06/21/2016 10:32:48	View of crescent beach from road	0370
06/21/2016 10:33:18	Big max view from Crescent Beach	0371
06/21/2016 10:33:48	Crescent beach	0372
06/21/2016 10:34:10	Cranes onsite	0373-0375
06/21/2016 10:34:39	Temporary fencing	0376
06/21/2016 10:35:07	Cofferdam	0377
06/21/2016 10:40:33	Just moved excavator next to cofferdam	0378
06/21/2016 11:04:59	Second excavator being moved onsite	0379
06/21/2016 11:39:06	Ferries passing by Big Max	380-382
06/21/2016 12:17:27	Barrier fence erected	383
06/21/2016 12:37:21	Construction area west of town beach building adjacent to parking lot	384-386
06/21/2016 13:36:30	Posts	387
06/21/2016 13:36:55	Construction area	388-389
06/21/2016 13:37:45	Cofferdam and 2 excavators	390-391
06/21/2016 14:17:56	HDR offshore observers on Hula Dog	392
06/21/2016 14:18:09	Atlantic Pioneer	393
06/21/2016 14:18:26	Big max	394
06/21/2016 14:18:41	Joel Miller	395
06/21/2016 14:18:55	Tug Resilant	396
06/21/2016 15:06:31	Temporary fence next to beach	397
06/21/2016 15:07:06	Construction area	399-402
06/21/2016 15:07:26	Cofferdam	403
06/21/2016 15:07:40	Big max	404

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/21/2016 15:15:51	Spoke with Kane of Durocher construction, expect big max to arrive around 2:00am tonight.	
06/21/2016 16:05:33	Crane building sand berm	405
06/21/2016 16:06:03	Excavator	406
06/21/2016 16:06:40	Construction area	407-411
06/21/2016 16:06:56	Image of Frederick J Benson Town Beach Pavilion	412
06/21/2016 16:07:19	Construction access to beach, north side of Pavilion	413-414
06/21/2016 16:29:56	Excavator creating pile of sand next to cofferdam	415-417
06/21/2016 16:32:12	Hula dog	418-422
06/21/2016 16:55:07	Generator and sump pump	423
06/21/2016 16:56:22	Sand berm next to cofferdam	424-425
06/21/2016 16:56:49	Solar powered lighting	426-427
06/21/2016 17:08:07	Big max	428-431
06/21/2016 17:08:53	Cofferdam	432-
06/22/2016 08:22:20	Big max close to shore	433-434
06/22/2016 08:32:03	Joel miller	435
06/22/2016 08:32:19	Cofferdam	437-440
06/22/2016 08:33:04	Types of lighting by cofferdam	441-443
06/22/2016 09:05:40	Big max	444
06/22/2016 09:06:43	VHF big max said he needed to pull out	
06/22/2016 09:17:22	Small center console just came out and picked up someone off big max	446
06/22/2016 09:26:38	Inside cofferdam	447-449
06/22/2016 09:27:49	Crew plans on pulling cable from parking lot to barge today, will float BITS cable tomorrow.	
06/22/2016 09:46:26	Widening beach access so large crane can get out to beach	450-451
06/22/2016 09:47:21	2 cranes onsite	452
06/22/2016 09:47:34	Smaller crane	453
06/22/2016 09:47:51	2 winches onsite	454
06/22/2016 09:49:41	Lighting	456
06/22/2016 09:50:22	Winch similar to what was used at Scarborough Beach	452
06/22/2016 09:53:00	3 support vessels onsite	458-463
06/22/2016 10:08:40	Megan Miller is A frame. Joel Miller is smaller support boat.	
06/22/2016 10:18:11	Small support barge moored next to tug Realists	464
06/22/2016 10:32:54	They are in process of turning Big Max. Bow was facing beach.	465-466
06/22/2016 10:49:31	Video of Big Max 70 mm zoom	467

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/22/2016 10:49:46	Video of big max 200mm zoom	468
06/22/2016 12:31:42	Video of crane operating	469
06/22/2016 12:32:06	Video of front of town beach	470
06/22/2016 12:32:31	Video of crane creating temporary road of railroad ties in order to access beach	471
06/22/2016 12:32:51	Pictures of all equipment in the staging area	472-480
06/22/2016 12:33:57	Conduit by Corn Neck Road that cable will be pulled through	480-484
06/22/2016 12:34:49	View facing south of cofferdam	486-493
06/22/2016 12:35:27	Big max	494-497
06/22/2016 12:35:51	Workers taking lunch break	
06/22/2016 12:48:33	Megan Miller close to shore something on aft, not sure	499
06/22/2016 12:55:31	2 center consoles and John boat are in shallow water. they are surveying for big max anchor locations.	500-502
06/22/2016 13:24:15	Moving winch to beach	503
06/22/2016 13:24:40	Temporary beach access.	504-505
06/22/2016 14:16:24	Setting big max anchor	506
06/22/2016 14:16:46	Megan Miller setting big max anchor	507-510
06/22/2016 14:18:19	Video Megan Miller setting big max anchor	511
06/22/2016 14:36:34	Orange buoys are messenger winch on big max. it will be pulled to shore and then pull land cable out to big max	512-517
06/22/2016 15:04:36	Winch on land	518-519
06/22/2016 15:04:55	Video of messenger cable connected to big max	520
06/22/2016 15:51:06	Video of crane making beach road	521
06/22/2016 15:51:41	Floating messenger cable	522-523
06/22/2016 15:52:01	Beach road	524
06/22/2016 16:51:41	Continue moving large crane into place	525-526
06/22/2016 16:52:12	Messenger cable has been floated out	527-530
06/22/2016 16:52:37	Joel Miller	531
06/22/2016 17:24:12	Big max with messenger cable stretched out behind it	532-535
06/22/2016 17:27:26	Majority of equipment preparing to take cable out to big max	536
06/22/2016 18:23:35	Shift change	537
06/22/2016 18:24:07	Video sunset 2 guys with big max in background	542
06/22/2016 18:24:36	Video panning the vessels	543
06/22/2016 18:24:58	Lowering steel beam into cofferdam	544
06/23/2016 08:31:10	Ballards Marina, putting small shed on back of Joel miller	546-547
06/23/2016 08:32:26	Diver coming out of water at beach	548-549
06/23/2016 08:32:57	Big Max	550-551

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/23/2016 08:33:13	Joel Miller	552
06/23/2016 08:33:32	tug Resilent	553
06/23/2016 08:45:19	Conduit in construction area	554
06/23/2016 08:45:58	Spool of cable, winch, and crane. they are preparing to pull BITS today	555-557
06/23/2016 09:39:54	Picture and video of pulling BITS to shore!!!	558-589
06/23/2016 10:53:35	Floated bits cable	590
06/23/2016 10:53:57	Big Max	591
06/23/2016 10:54:11	Beach construction	592
06/23/2016 10:54:45	BITS coming ashore	593-594
06/23/2016 10:55:11	Construction area by Corn Neck Rd	595-596
06/23/2016 10:55:50	BITS makes it to conduit located at corn neck rd	598-607
06/23/2016 11:05:09	Abigail Miller, Joel Miller, Tug Realist, 2 center consoles and dive tender onsite	
06/23/2016 11:20:02	Tender Black Lab picking up divers	608-609
06/23/2016 11:20:26	Winch at cofferdam	610-611
06/23/2016 11:37:22	Big Max moving generator around pad deck	613
06/23/2016 11:42:47	Joel Miller moving the small support barge into position	614
06/23/2016 12:03:14	Workers stopped for lunch	615
06/23/2016 12:03:37	Joel Miller and tug resilent	616
06/23/2016 12:03:57	Abigail Miller	617
06/23/2016 13:03:59	BITS cable coming out of conduit by corn neck road	618-619
06/23/2016 13:04:36	Equipment in construction area by Corn Neck Rd	620-624
06/23/2016 13:05:56	Seems to be lull in action on land, guessing they are waiting on divers to get plow ready	
06/23/2016 14:44:17	Crane using yellow vice to move steel beams	625-626
06/23/2016 14:49:30	Preparing to pull plow	
06/23/2016 15:24:11	Winch just started for pull plow	
06/23/2016 15:24:19	Set up tent by cofferdam to view plow coming out	628
06/23/2016 15:36:16	Have not started pull yet. have to remove steel flaps from cofferdam before they can star	
06/23/2016 15:50:03	Spoke with national grid, having trouble pulling steel plates, they have twisted. They want to pull sled in a low tide so cable is level with conduit. the excavator will dig out last bit in front of cofferdam	
06/23/2016 16:05:22	Big max has re-positioned so that aft is facing beach	629-630
06/23/2016 16:56:56	Steel plates are stuck. national grid and workers indicate that will not plow until next low tide at 4am	631

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/23/2016 16:57:58	Big max	629-630
06/23/2016 16:58:27	Support vessels	632-635
06/24/2016 08:25:42	Jet plow next to cofferdam upon arrival. hard to see as excavator has dug so it's level	
06/24/2016 08:28:23	Beach construction site	0636/0637
06/24/2016 08:28:38	Small barge just off shore	0638
06/24/2016 08:29:23	Big max located off shore	0639
06/24/2016 08:29:52	Beach construction site	0640-0642
06/24/2016 08:30:20	Beach construction site. Come along pulled up to winch.	0644-0647
06/24/2016 08:31:48	Excavator moving in to place.	0649/0650
06/24/2016 08:32:30	Diver moving buoy into place	0651
06/24/2016 08:58:47	Work site next to road and conduit box with bits cable coming out.	0652-0659
06/24/2016 09:06:54	Divers in the water tending the cable	0660-0662
06/24/2016 09:18:24	Diver returning to small barge	0663-0666
06/24/2016 09:26:18	Excavator taking down the sand berm	0667
06/24/2016 09:26:59	Barge tender vessels repositioning, portable lighting	0668
06/24/2016 09:27:30	Equipment being moved so berm can be made and cofferdam can be taken out	0669-0677
06/24/2016 09:30:55	Video of berm construction	0678
06/24/2016 09:32:42	Small barge leaving the site	0679-0682
06/24/2016 10:26:12	Moving components from in front of the cofferdam	0683-0694
06/24/2016 10:26:47	Divers leaving the site	0695-0698
06/24/2016 10:27:16	Taking in the winch cable	0699-0706
06/24/2016 10:38:57	Crane lifting equipment out of the way and front loader moving equipment off site	0707-0718
06/24/2016 10:53:39	Porta-potties being transferred to small barge	0719-0724
06/24/2016 11:09:51	Removing I beam from cofferdam. frame 0734 is a video	0725-0727/0729-0742
06/24/2016 11:10:21	Megan Miller escorting the small barge back to the harbor in Point Judith	0728
06/24/2016 11:48:28	Divers removing buoys	0743-0751
06/24/2016 11:58:03	Continuing to move I beams	0752-0757
06/24/2016 12:41:30	Big Max pulling buoys onboard	0760-0764
06/24/2016 13:21:01	Starting to make dam to remove the sled from in front of the cofferdam	0765-0768
06/24/2016 15:56:25	Continuing to build the dam to remove the sled	0769-0770
06/24/2016 15:57:08	Crane picking up chains for sled	0771-0773

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/24/2016 15:57:41	Excavator removing water from behind the dam	0774-0778
06/25/2016 09:26:41	Site hasn't changed since yesterday. Only some metal sheets were removed from the cofferdam. Big Max with support vessel remains off shore. Sled was removed early this morning. Today's work plan is to ensure the cable is 10 feet deep. Civil engineers are on site for this task.	0781-0785
06/25/2016 10:19:01	Civil engineers using tools to monitor cable depth	0786
06/25/2016 10:19:29	Crane moving equipment used to remove sheets from cofferdam	0787-0788
06/25/2016 10:20:03	Front of cofferdam removed. burying the cable has started	0789-0793
06/25/2016 10:23:30	Big max leaving the site with support vessel	0794-0795
06/25/2016 10:53:27	Deconstruction of the cofferdam has begun	0796-0801
06/25/2016 11:39:50	Removing gear from site	0802-0803
06/25/2016 11:54:51	Removing rollers for the cable. the rollers were used to take stress off the cable as they pulled it through the cofferdam	0804-0805
06/25/2016 13:03:16	Continuing to bury the cable in the sand	0806-0809
06/25/2016 13:10:10	Front loader taking rollers off site	0810-0812
06/25/2016 14:00:00	Excavator digging inside the cofferdam	0813-0819
06/25/2016 14:47:29	Civil engineers check depth inside the cofferdam	0820-0823
06/25/2016 15:22:56	Excavators starting to fill in the cofferdam and bury the cable	0824-0829
06/25/2016 15:57:33	Excavators still taking dirt from in front of the cofferdam. it does not appear that they are ready to remove the cofferdam and fill in the hole	0830-0833
06/25/2016 16:01:05	Starting to fill in the cofferdam	0834-0840
06/26/2016 09:38:53	Start the day by getting update from Mike: "The workers will finish work on the beach by afternoon and start to pull out equipment and we are going to clear the beach by tonight. There would be no more construction in tomorrow"	
06/26/2016 09:40:40	Seems the work is done in the beach they are. filling up the hole and taking out the cofferdams (most of them are out)	841-846
06/26/2016 10:18:59	Crane is replacing it's base stability plates. yellow excavator stop working and red one still filling the hole	866-876
06/26/2016 10:22:19	20 second video of excavators working	848
06/26/2016 10:23:43	12 framed photo of excavator operation	850- 861
06/26/2016 10:51:37	Crane and front-lifter moved the shaker and it's generator for pulling out a plate.	880-887
06/26/2016 10:52:05	They are pulling out plates beside the Crain	892-901
06/26/2016 10:52:33	Video of shaker pulling out the plate	900
06/26/2016 10:55:05	Start pulling out all the plate	
06/26/2016 11:02:11	Pulling the plate out of sand with shaker in frames	902-914

Observations: Timestamp	Observations: Observation Notes	Observations: Photo Frames
06/26/2016 11:21:38	Pictures and videos inside the construction site. the hole is filled completely and they are just pulling out the plates	920-936
06/26/2016 11:25:23	Big max visible from the site couple miles of the coast	937-938
06/26/2016 11:41:57	They pulled all the remaining plates half way and about to pick them up one by one	939-940
06/26/2016 12:03:38	Crew is pulling a plate each 10-15 minutes. The escalators and front-lifter waiting to even out the ground.	941-943
06/26/2016 12:08:16	Mike: “they are going to finish by sunset and pulled everything to back parking lot. then they have till Thursday to take all equipment out of the parking lot"	
06/26/2016 12:37:43	Still working on pulling out the plates	944-947
06/26/2016 12:45:38	They lift the limits on the shore access for people who want to go to the other side of the beach under super vision.	948-852
06/26/2016 13:24:50	The excavator starts to even out the sand over the construction site.	957-958
06/26/2016 13:54:50	Still even out the beach on site the Crane is still pulling out the plates from the ground	959-964
06/26/2016 14:26:50	Looks like the crane winch has problems, they stop pulling out the plates out of the ground.	965-972
06/26/2016 14:59:35	The problem with winch has been fixed, leveling out the beach surface is continues.	975-977
06/26/2016 15:51:52	There are 3 more plate left to dig out. The leveling the beach ground is almost done.	978-996
06/26/2016 16:06:38	All plates has been removed from the ground, they start to move the equipment out of site	998-1005

Appendix 3. Visual Observations – Onshore Meteorological Conditions

Timestamp	General Weather	Wind Direction	Beaufort	% Cloud Cover (%)	Temperature (F)	Humidity (%)	Wind Speed (mph)
06/02/2016 10:33:22	Cloudy	NE		75	63	77	9
06/03/2016 09:14:21	Cloudy	NE		100	61	88	2
06/03/2016 10:08:32	Cloudy	NE		100	63	83	3
06/03/2016 11:38:23	Light Rain	NE		100	63	86	3
06/03/2016 13:19:10	Cloudy	NE		100	63	89	7
06/03/2016 14:23:16	Cloudy	NE		100	63	91	7
06/04/2016 08:46:57	Cloudy	SW	2	100	63	95	5
06/04/2016 10:33:33	Sunny	SSW	2	20	65	93	7
06/05/2016 08:42:38	Cloudy	SE	1	100	17	92	7
06/05/2016 09:06:00	Light Rain	E	1	100	17	92	5
06/05/2016 09:18:56	Heavy Rain	SE	1	100	17	92	3
06/05/2016 09:25:22	Cloudy	SE	1	100	17	92	3
06/07/2016 07:58:08	Sunny	S		50	66	84	9
06/07/2016 08:56:30	Sunny	S		60	68	81	8
06/07/2016 10:02:39	Sunny	SSW		75	70	83	10
06/07/2016 11:04:22	Sunny	S		60	70	83	13
06/07/2016 12:15:31	Cloudy	SSW		80	70	81	17
06/07/2016 13:37:45	Sunny	SSW		60	70	81	13
06/09/2016 12:21:34	Sunny	WNW		30	63	48	17

Timestamp	General Weather	Wind Direction	Beaufort	% Cloud Cover (%)	Temperature (F)	Humidity (%)	Wind Speed (mph)
06/09/2016 14:19:24	Sunny	NW		30	66	45	21
06/09/2016 15:30:27	Sunny	NW			68	37	23
06/09/2016 16:03:59	Sunny	NW		20	63	37	23
06/09/2016 16:47:23	Sunny	NE		15	70	32	23
06/09/2016 20:06:38	almost dark	WNW		30	66	32	23
06/10/2016 15:08:51	Sunny	E		60	66	51	6
06/10/2016 16:17:36	Sunny	E		50	66	52	14
06/11/2016 08:27:30	Sunny	NNW	1	50	17	69	4
06/11/2016 09:29:02	Cloudy	S	1	80	19	53	7
06/11/2016 10:06:57	Cloudy	S	1	100	19	53	7
06/11/2016 11:00:07	Cloudy	S	1	100	19	52	11
06/11/2016 11:58:44	Cloudy	SSW	1	100	19	54	8
06/11/2016 12:45:08	Light Rain	S	1	100	18	59	9
06/11/2016 12:58:16							
06/12/2016 08:13:20	Sunny	SW		20	70	47	9
06/12/2016 11:17:42	Sunny	W		25	79	47	14
06/12/2016 12:38:58	Sunny	NW		10	79	43	14
06/12/2016 14:13:07	Sunny	NW		20	75	40	14
06/21/2016 10:35:40	Sunny	S		50	67	97	17
06/21/2016 12:18:26		SW		30	70	81	19

Timestamp	General Weather	Wind Direction	Beaufort	% Cloud Cover (%)	Temperature (F)	Humidity (%)	Wind Speed (mph)
06/21/2016 13:39:05	Sunny	WSW		20	74	73	17
06/21/2016 14:19:13	Sunny	WSW		20	74	73	17
06/21/2016 15:08:43		WSW		15	75		13
06/21/2016 16:13:19	Sunny	WSW		30	80	50	16
06/21/2016 16:57:52		WSW		25	80	50	16
06/22/2016 08:34:32	Sunny	SSW		25	70	65	7
06/22/2016 09:54:33		S		1525	72	59	8
06/22/2016 12:35:59	Sunny	SSW		15	72	63	11
06/22/2016 14:38:23		S		25	72	78	16
06/22/2016 16:05:08	Sunny	SSW		13	70	84	13
06/22/2016 16:53:55		SW		35	70		10
06/22/2016 18:12:10	Sunny	N		30	69	78	9
06/23/2016 08:47:17	Hazy/ Foggy	ENE		40	67	67	9.9
06/23/2016 10:17:35	Hazy/ Foggy	E		50	70	70	5
06/23/2016 11:21:40		SE		40	70	73	8
06/23/2016 13:06:33	Cloudy	ESE		60	72	68	9.9
06/23/2016 15:25:15	Sunny	SW		30	77	57	9.9
06/23/2016 16:59:35		SSW		50	74	71	10
06/24/2016 08:33:15	Sunny	NNE	2	0	65	82	11
06/24/2016 12:25:58	Sunny	E	3	0	74	64	10

Timestamp	General Weather	Wind Direction	Beaufort	% Cloud Cover (%)	Temperature (F)	Humidity (%)	Wind Speed (mph)
06/24/2016 16:26:29		ESE	3	0	72	56	10
06/25/2016 09:28:31	Sunny	ESE	3	0	69	78	6
06/25/2016 12:00:15	Sunny	E	3	0	70	74	7
06/25/2016 14:27:59	Sunny	SE	3	0	73	55	8
06/25/2016 15:58:35	Sunny	ESE	2	0	72	48	6
06/26/2016 10:09:24	Sunny	SSE	1	20	21	68	7
06/26/2016 11:59:15	Sunny	S	1	0	22	58	8
06/26/2016 15:43:10	Sunny	S	0	0	22	61	8

Appendix 4. Visual Observations – Offshore Meteorological Conditions

Date/Time	General Weather	Wind Direction	Beaufort	% Cloud Cover	Temperature (F)	Humidity (%)	Wind Speed (mph)
06/04/2016 09:54:48	Sunny	N	2	25	72	73	5
06/04/2016 10:15:26	Sunny	S	2	15	72	73	11
06/04/2016 10:53:56	Sunny	S	2		72	73	11
06/09/2016 11:21:12	Sunny	WNW	3	40	63	48	17
06/09/2016 12:48:03	Sunny	NW	2	30	63	45	18
06/09/2016 13:25:11	Sunny	NW		20	63	45	18
06/09/2016 14:53:32	Sunny	NW		20	66	43	16
06/09/2016 16:19:27	Sunny	NW		20	66	39	17
06/09/2016 17:27:42	Sunny	N	1	30	68	32	23
06/09/2016 19:42:23	Sunny	WNW	1	35	68	32	16
06/10/2016 09:21:06	Sunny	N	3	20	59	51	17
06/10/2016 10:07:33	Sunny	N	3	20	61	48	17
06/10/2016 10:53:42	Sunny	N	2	20	63	48	14
06/10/2016 12:01:18	Sunny	N	2	35	64	48	21
06/10/2016 12:45:08	Sunny	N	2	40	66	42	15
06/10/2016 14:06:34		N	2	50	66	42	15
06/10/2016 14:57:42	Cloudy	NNW	2	600	69	48	10
06/10/2016 15:32:55	Cloudy	NNW	2	60	72	37	1
06/11/2016 08:52:59	Sunny	SSW	1	90	62	77	6

Date/Time	General Weather	Wind Direction	Beaufort	% Cloud Cover	Temperature (F)	Humidity (%)	Wind Speed (mph)
06/11/2016 09:56:32	Cloudy	S	2	95	64	74	9
06/11/2016 11:08:12	Cloudy	SW	2	95	67	72	9
06/11/2016 11:58:44	Cloudy	WSW	1	90	70	37	8
06/12/2016 08:48:24	Cloudy	WSW	2	40	67	81	10
06/12/2016 09:31:23	Cloudy	SW	3	40	75	73	5
06/12/2016 10:20:04	Sunny	WNW	3	40	79	61	15
06/12/2016 10:58:46	Sunny	WNW	3	50	79	61	15
06/12/2016 11:47:38	Sunny	NW	3	30	77	48	21
06/14/2016 09:11:53	Sunny	N	2	10	61	62	10
06/14/2016 09:45:38	Sunny	W	2	5	61	62	10
06/14/2016 10:25:17	Sunny	W	2	5	63	58	14
06/14/2016 11:28:02	Sunny	WNW	2	10	66	56	9
06/14/2016 12:27:35	Sunny	WNW	2	11	68	54	11
06/14/2016 13:15:43	Sunny	WNW	2	20	68	54	11
06/14/2016 14:06:24	Sunny	W	2	15	71	47	9
06/14/2016 15:12:36		WSW	2	10	72	45	16
06/15/2016 09:08:30	Sunny	W	2	10	66	65	7
06/15/2016 10:31:46	Sunny	W	3	10	68	60	11
06/15/2016 11:28:22	Sunny	W	3	13	70	58	13
06/15/2016 13:04:47	Sunny	W	3	10	73	53	13

Date/Time	General Weather	Wind Direction	Beaufort	% Cloud Cover	Temperature (F)	Humidity (%)	Wind Speed (mph)
06/16/2016 11:18:52		NE	1	40	69	73	5
06/16/2016 11:57:34	Sunny	NE	1	40	69	73	5
06/16/2016 13:30:39	Sunny	ESS	1	40	72	59	6
06/17/2016 09:18:28	Sunny	S	2	40	70	60	5
06/17/2016 12:06:33	Sunny	S	2	20	74	25	4
06/17/2016 14:28:12	Sunny	SSE	2	40	69	35	4
06/18/2016 09:52:29	Sunny	W	2	0	64	75	9.9
06/18/2016 11:04:08	Sunny	W	2	0	64	75	8
06/18/2016 12:23:33	Sunny	W	2	0	64	75	9.9
06/18/2016 12:44:22	Sunny		2				
06/18/2016 12:44:28	Sunny	W	2	0	64	75	9.9
06/18/2016 14:03:31	Sunny	SSW	2	10	74	48	5
06/18/2016 15:03:37	Sunny	SSE	2	5	74	51	9
06/18/2016 17:20:28	Sunny	SSW	2	0	72	49	8
06/19/2016 10:04:26	Sunny	SSE	2	0	19	72	13
06/19/2016 11:10:29	Sunny	S	2	0	20	70	15
06/19/2016 13:40:00	Sunny	S	2	0	20	70	14
06/20/2016 12:01:31	Sunny	S	2	35	67	75	17
06/20/2016 13:14:26							
06/20/2016 13:21:54	Sunny	SSW	2	35	68	73	14

Date/Time	General Weather	Wind Direction	Beaufort	% Cloud Cover	Temperature (F)	Humidity (%)	Wind Speed (mph)
06/20/2016 14:35:10		S	3	30	69	7333	13
06/20/2016 15:40:27		SSW	3	20	69	70	14
06/20/2016 16:07:48							
06/21/2016 10:16:14	Cloudy	SSW	3	100	65	96	13
06/21/2016 10:58:34	Sunny	SSW	5	40	65	96	16
06/21/2016 12:04:18	Sunny	SW	5	15	66	94	19
06/21/2016 13:01:15	Sunny	SW	5	10	69	89	15
06/21/2016 14:00:33	Sunny	SW	5	5	70	84	13
06/21/2016 15:01:00	Sunny	WSW	4	5	76	71	14
06/21/2016 16:38:22	Sunny	SW	3	10	74	62	19
06/22/2016 08:04:40	Sunny	S	0	40	20	71	11

Appendix 5. Discrete Observations

6/6/2016 Scarborough Beach State Park – Photo 0074: Utility truck, winch spool, and winch prepared for BITS cable pull to shore. The land sea transition vault is surrounded by cones.

6/7/2016 Scarborough Beach State Park – Photo 0106: Land Sea Transition Vault prior to cable pull.

6/9/2016 Scarborough Beach State Park – Photo 2719: CLB Big Max anchored just off beach.

6/9/2016 Scarborough Beach State Park – Photo 2740: Jet Plow being lowered into the water aft of CLB Big Max.

6/9/2016 Scarborough Beach State Park – Photo 0171: Cable pull initiation. Utility truck, winch spool, trailer with water and pressure washer used to spray salt water off the winch cable upon retrieval.

6/9/2016 Scarborough Beach State Park – Photo 0194: Trucks, winch, and backhoe located west of the land sea transition vault during cable pull.

6/9/2016 Scarborough Beach State Park – Photo 2843: Facing west from beach during winch pull operation.

6/9/2016 Scarborough Beach State Park – Photo 0207: Portable lighting brought to site around dusk during cable pull. The winch cable is being washed as it is pulled back into shore.

6/10/2016 Scarborough Beach State Park – Photo 0207: BITS cable attached to winch cable at the land sea transition vault.

6/10/2016 Scarborough Beach State Park-Photo 0252: Stripping outer casing of BITS cable in order to splice into terrestrial cable.

6/11/2016 Scarborough Beach State Park-Photo0293: Onshore work complete at Scarborough Beach State Park. CLB Big Max on horizon laying cable at sea.

6/10/2016 Scarborough Beach State Park – Photo2873: Close up of spooled cable on deck of CLB Big Max.

6/10/2016 Scarborough Beach State Park – Photo2875: Megan T. Miller support vessel with Narragansett in background. Primarily used to divert recreational boaters from area.

6/10/2016 Scarborough Beach State Park – Photo 2886: Tug Lucinda A Smith anchored south of CLB Big Max off Scarborough Beach.

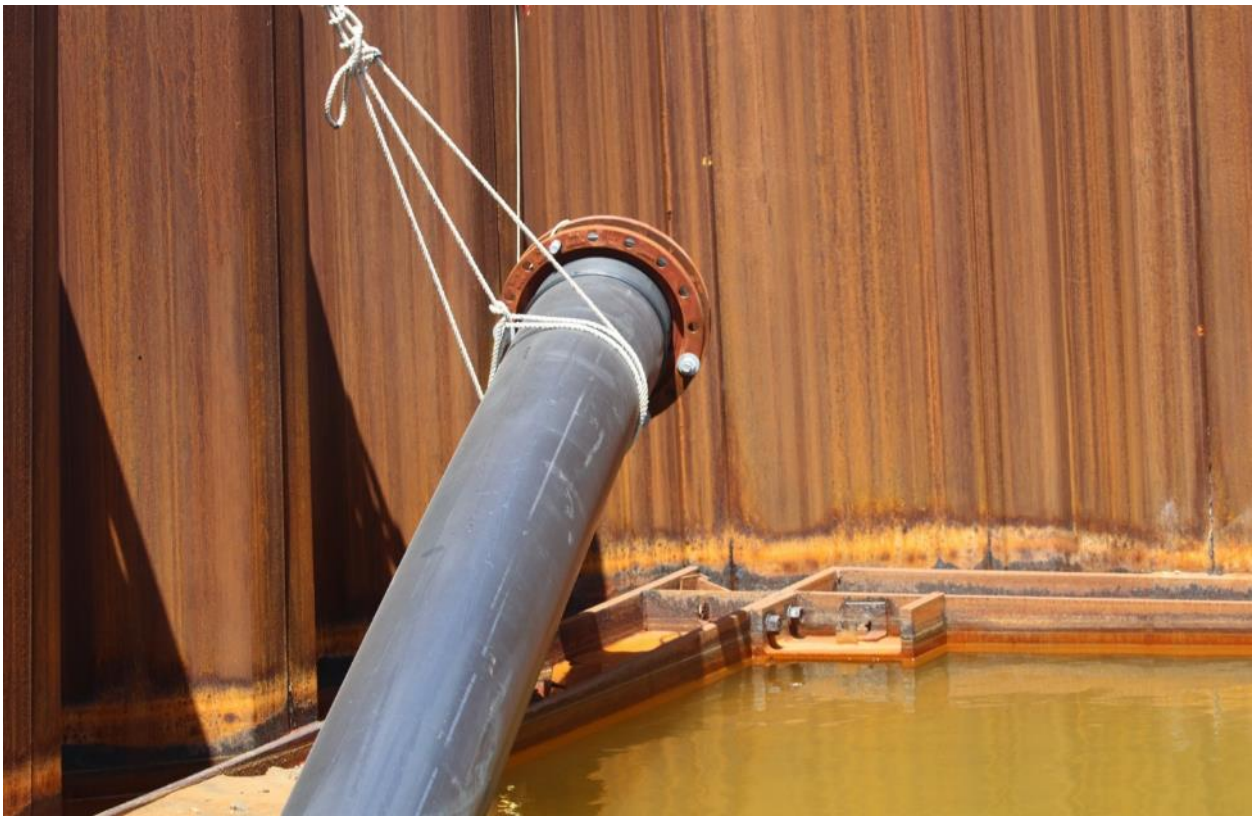
6/10/2016 Scarborough Beach State Park – Photo 2900: Support Vessel Melodie Miller anchored to north of CLB Big Max to divert recreational boaters.

6/14/2016 Offshore – Photo 3011: Support Vessel Joel Miller.

6/14/2016 Offshore – Photo 3009: BITS cable exiting chute on CLB Big Max and feed to jet plow.

6/15/2016 Block Island Town Beach – Photo 3156: Cofferdam prior to arrival of CLB Big Max. Construction equipment parked behind sand dune.

6/15/2016 Block Island Town Beach – Photo 3162: Close up of cofferdam prior to land sea transition.



6/15/2016 Block Island Town Beach – Photo 3164: Interior of cofferdam, BITS cable conduit.

6/17/2016 Offshore – Photo 3250: Fugro conducted sediment survey about Jamie Hanna.

6/17/2016 Offshore – Photo 3348: CLB Big Max crossing CB-1cable. Tender barge, dive tender, and support vessel Meghan Miller are supporting.

6/17/2016 Block Island Town Beach – Photo 0432: Crew preparing for land sea transition. Excavator removing sand from inside and in front of cofferdam.

6/22/2016 Offshore – Photo 3560: CLB Big Max anchored off Crescent Beach preparing for land sea transition of BITS cable. Fredrick J. Benson Pavilion at Town Beach in background.

6/22/2016 Block Island Town Beach – Photo 04650: CLB Big Max anchored off Crescent Beach preparing for land sea transition of BITS cable.

6/22/2016 Block Island Town Beach – Photo 0513: Construction area west of sand dune located north side of Fredrick J. Benson Pavilion adjacent to Corn Neck Road. Winch spool and winch visible used for pulling BITS to shore. Orange barrels surround land sea transition vault.

6/23/2016 Block Island Town Beach – Photo 0570: “Floating the cable”, orange buoys floating the remaining BITS cable to the surface in preparation for pulling to shore.

6/23/2016 Block Island Town Beach – Photo 0580: BITS cable coming ashore in front of cofferdam.

6/23/2016 Block Island Town Beach – Photo 0603: BITS cable pulled through land sea vault on north side of Fredrick J. Benson Pavilion adjacent to Corn Neck Road.

6/23/2016 Block Island Town Beach – Photo 0631: Removal of the cofferdam via vibrator gripper.

6/26/2016 Block Island Town Beach – Photo 1003: Cofferdam removed and backfilling excavated sand.

6/22/2016 Onshore – Photo 0522: Messenger cable was pulled of CLB Big Max, orange buoys were attached by divers and used to float messenger cable. The messenger cable is then connected to onshore cable winch which is pulled back to CLB Big Mad. The cable winch is used to pull BITS to shore. Support vessels Joel Miller and Meghan Miller visible.

Appendix 6. Combined ADCP Data Presentations

Data presentations for the vessel-mounted ADCP data are found below. Representative transects have been combined from each day of monitoring.

Figure/Table (see below)	Location / Source	Presentation Type	Parameters
Figure A001	Background Day One	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure A002	Background Day One	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure A003	Jet Plow	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure A004	Jet Plow	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure A005	Background Day Two	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure A006	Background Day Two	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})

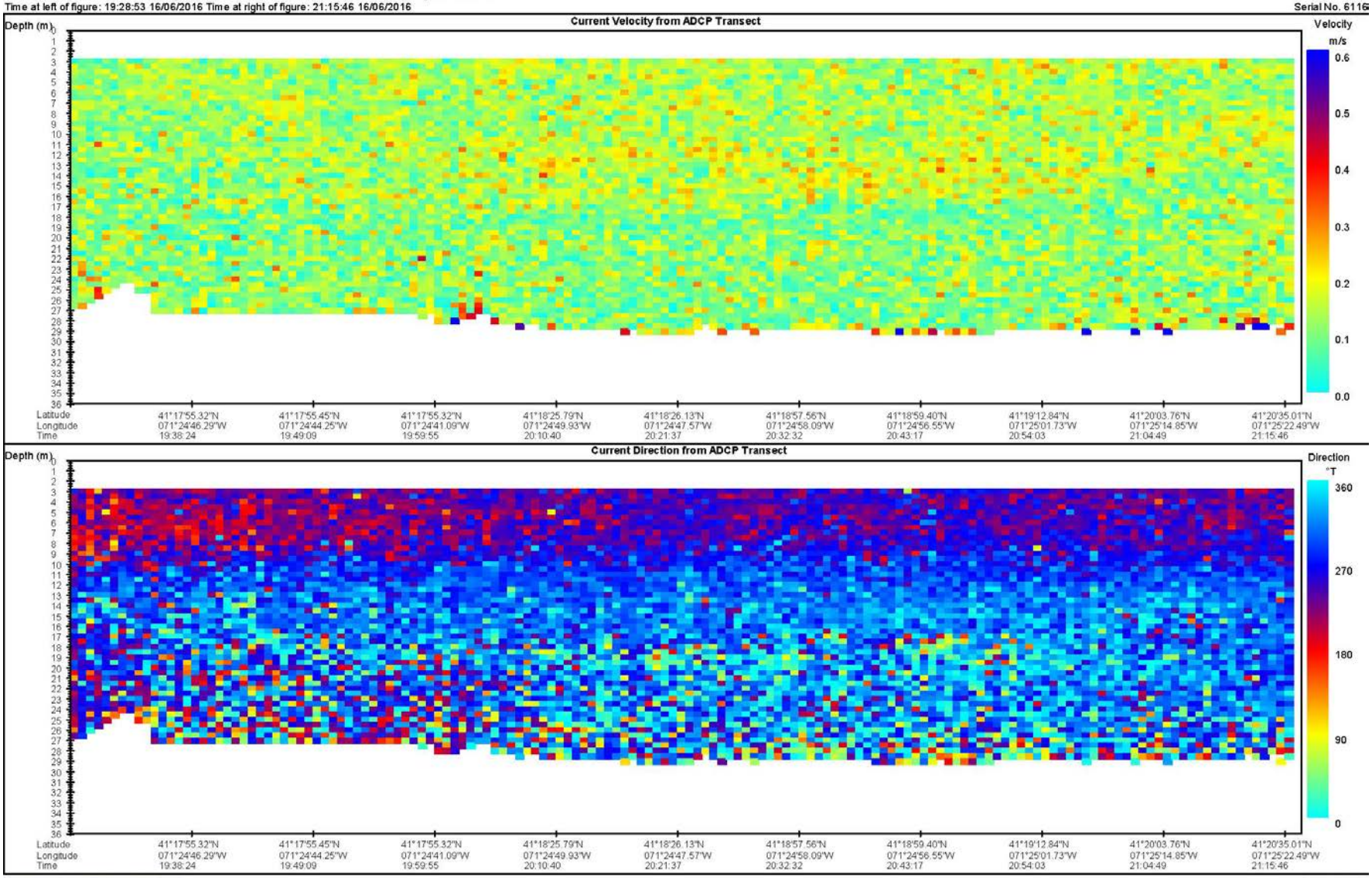
HDR Environmental, Operations and Construction, Inc.

Plots of Current Speed, Current Direction and Turbidity
Block Island Sediment Plume Monitoring,Background Day 1

Figure A001

Transect Start: Lat: 41°17'19"N Long: 071°24'48"W Transect End: Lat: 41°20'35"N Long: 071°25'22"W
Time at left of figure: 19:28:53 16/06/2016 Time at right of figure: 21:15:46 16/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

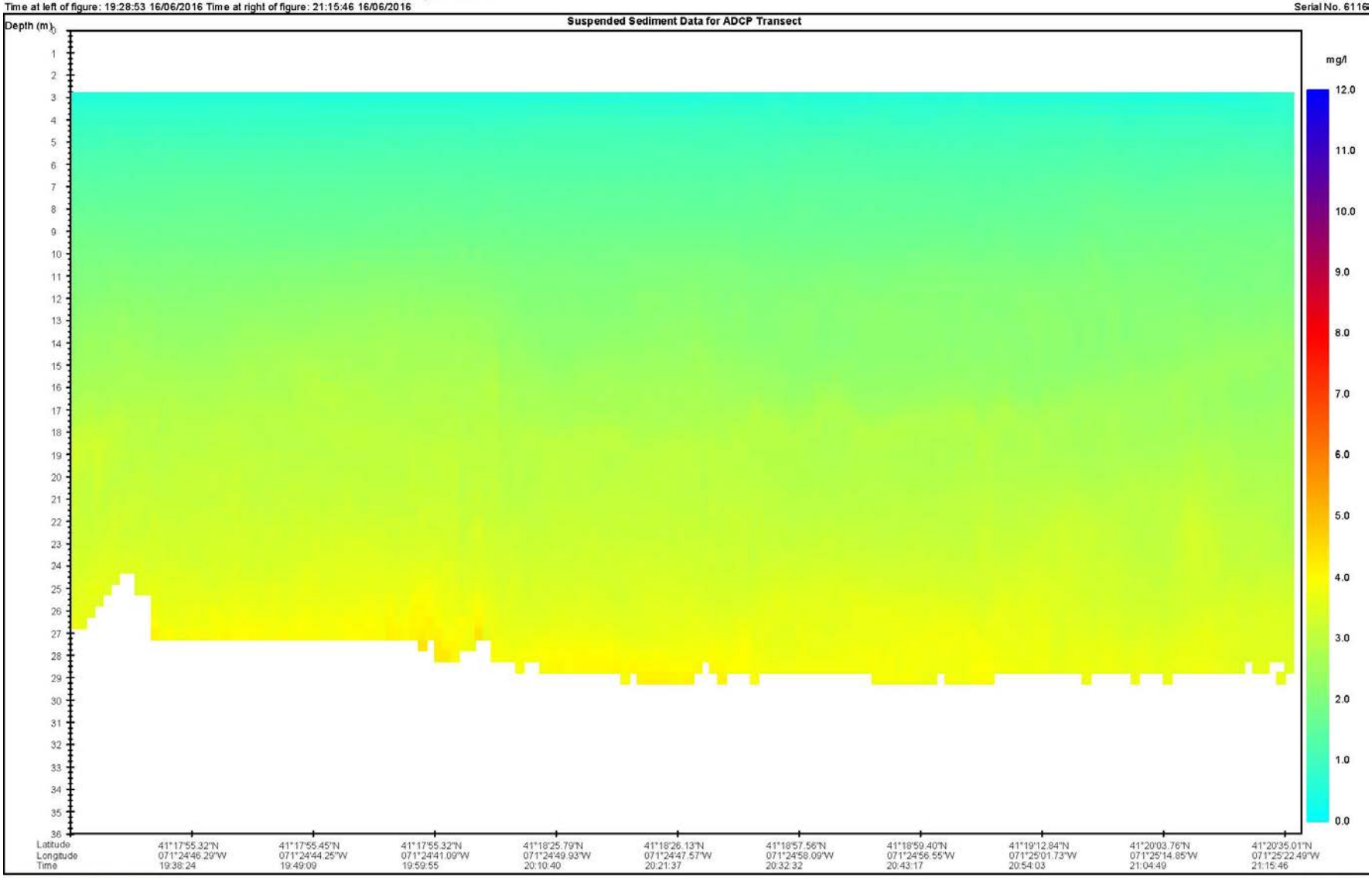
HDR Environmental, Operations and Construction, Inc.

Plots of Current Speed, Current Direction and Turbidity
Block Island Sediment Plume Monitoring,Background Day 1

Figure A002

Transect Start: Lat: 41°17'19"N Long: 071°24'48"W Transect End: Lat: 41°20'35"N Long: 071°25'22"W
Time at left of figure: 19:28:53 16/06/2016 Time at right of figure: 21:15:46 16/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

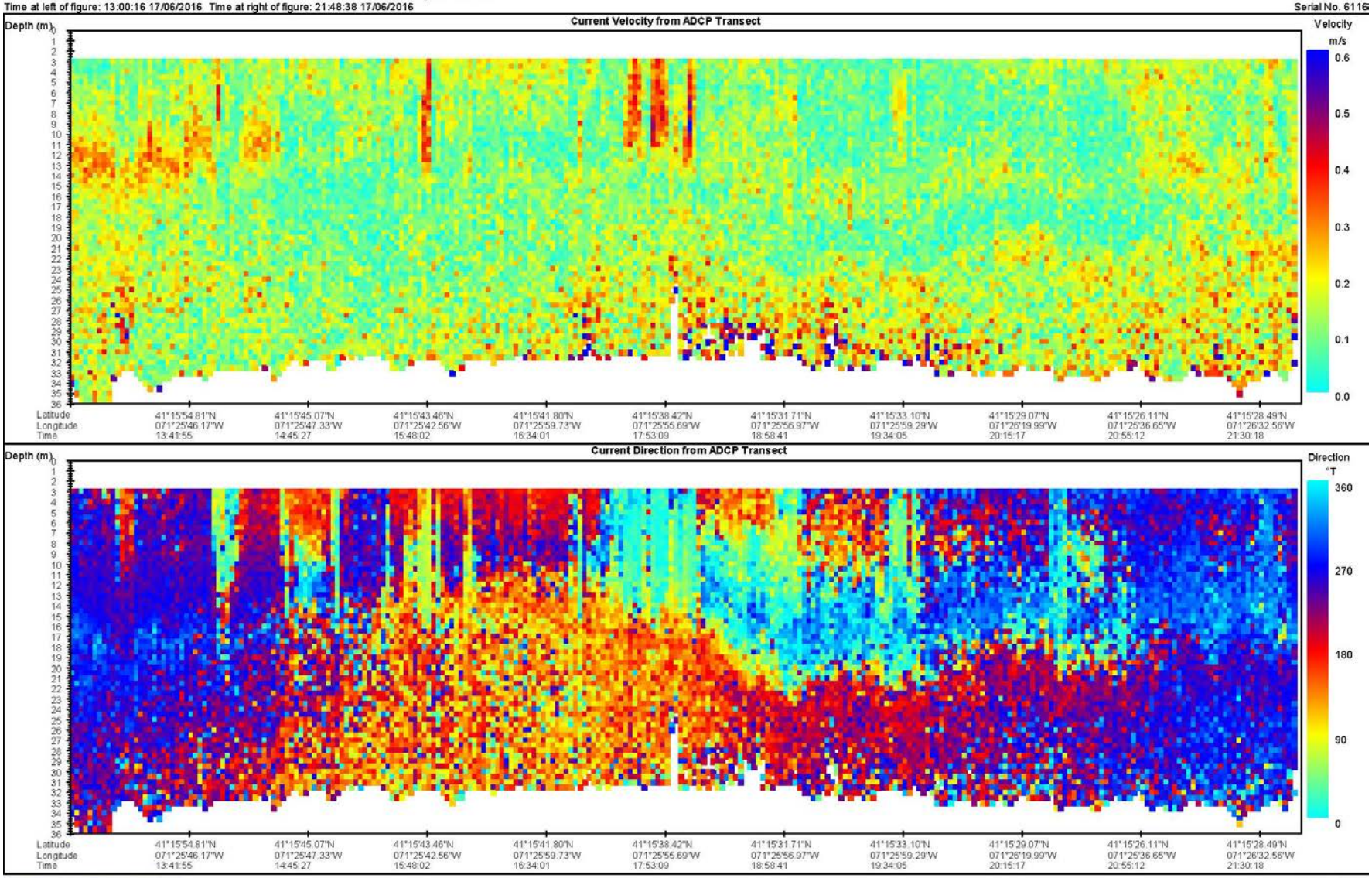
HDR Environmental, Operations and Construction, Inc.

Plots of Current Speed, Current Direction and Turbidity
Block Island Sediment Plume Monitoring, Jet Plow

Figure A003

Transect Start: Lat: 41°16'33"N Long: 071°26'27"W Transect End: Lat: 41°15'18"N Long: 071°26'16"W
Time at left of figure: 13:00:16 17/06/2016 Time at right of figure: 21:48:38 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

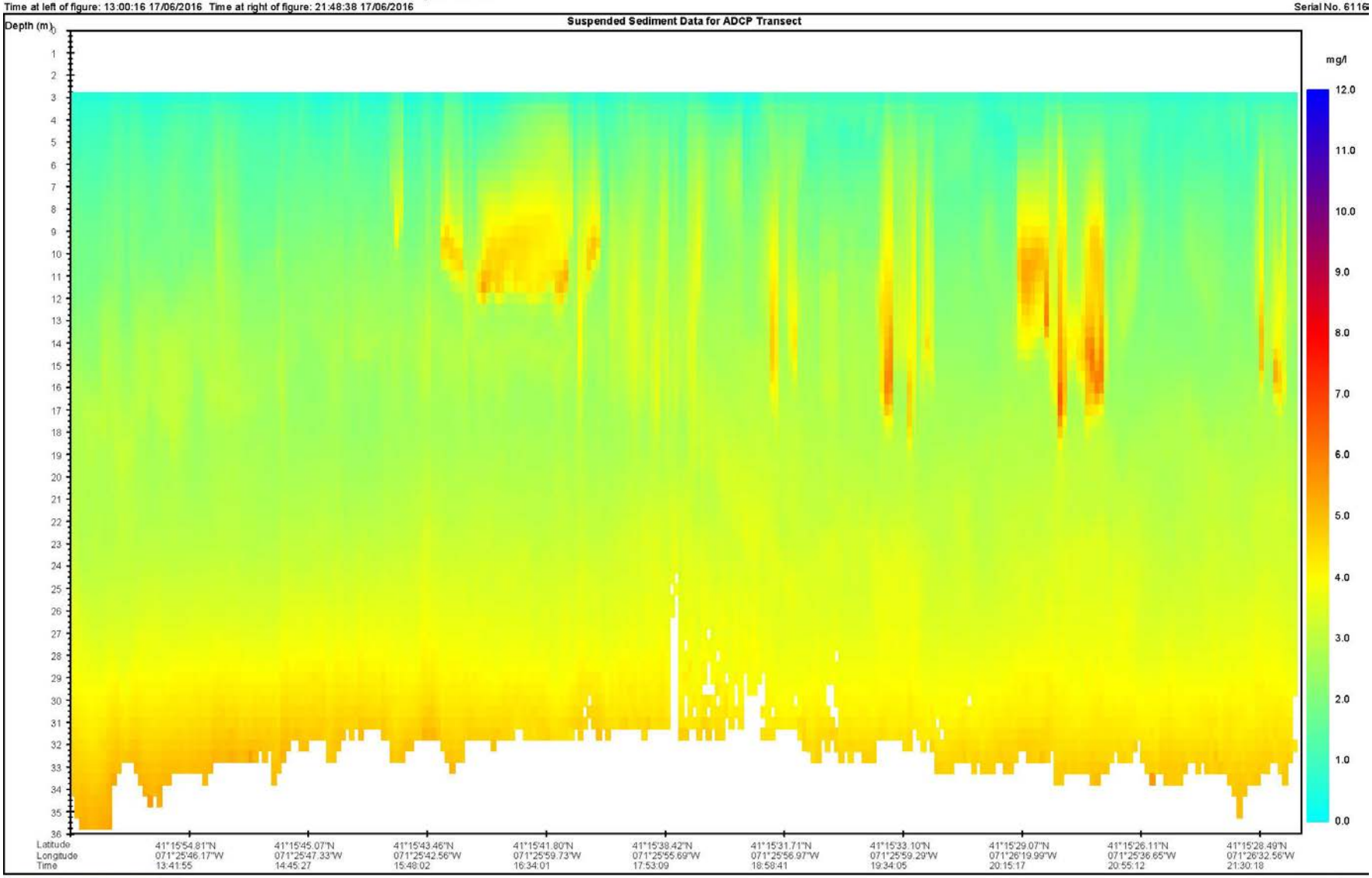
HDR Environmental, Operations and Construction, Inc.

Plots of Current Speed, Current Direction and Turbidity
Block Island Sediment Plume Monitoring, Jet Plow

Figure A004

Transect Start: Lat: 41°16'33"N Long: 071°26'27"W Transect End: Lat: 41°15'18"N Long: 071°26'16"W
Time at left of figure: 13:00:16 17/06/2016 Time at right of figure: 21:48:38 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

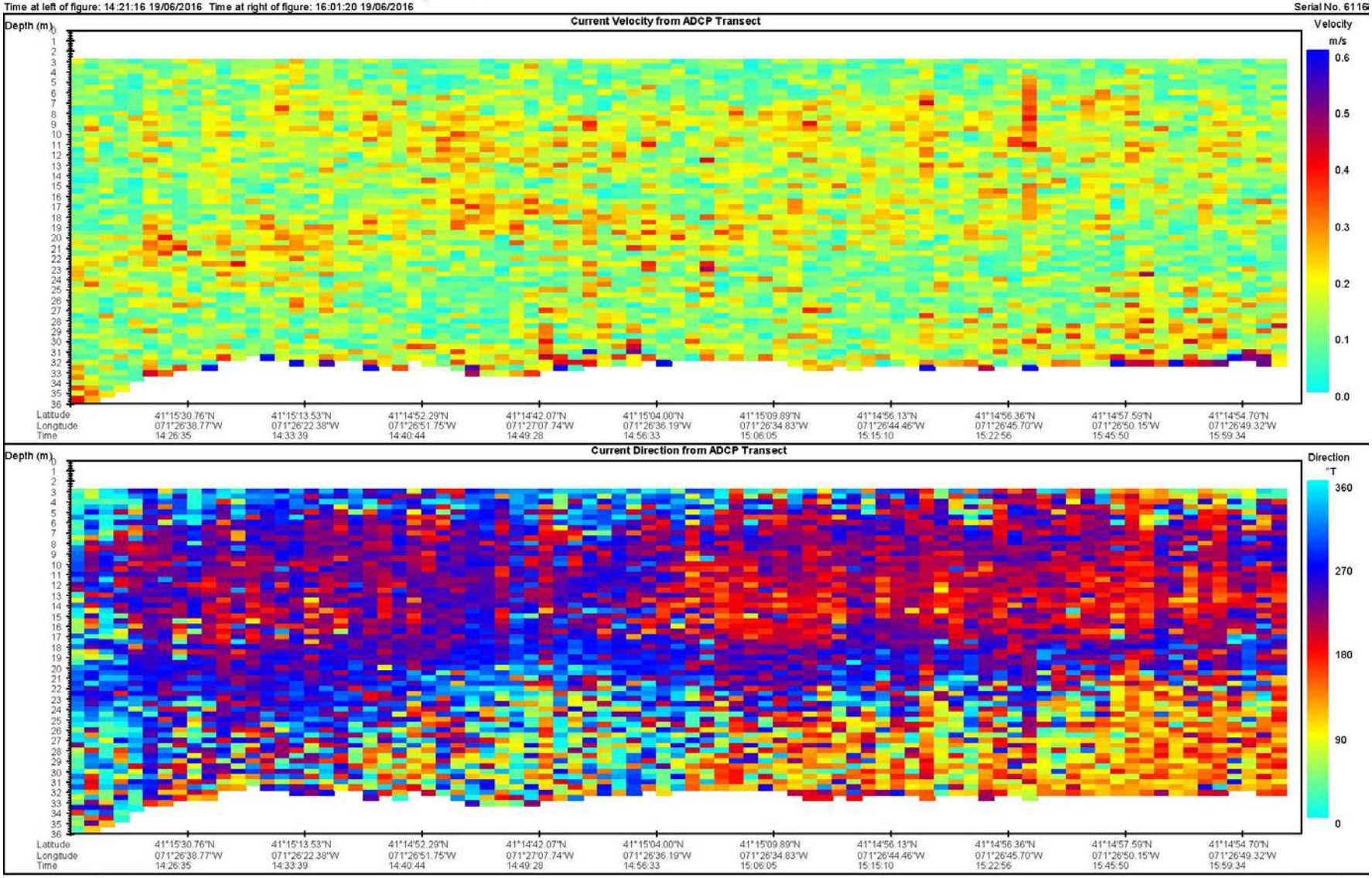
HDR Environmental, Operations and Construction, Inc.

Plots of Current Speed, Current Direction and Turbidity
Block Island Sediment Plume Monitoring, Background Day 2

Figure A005

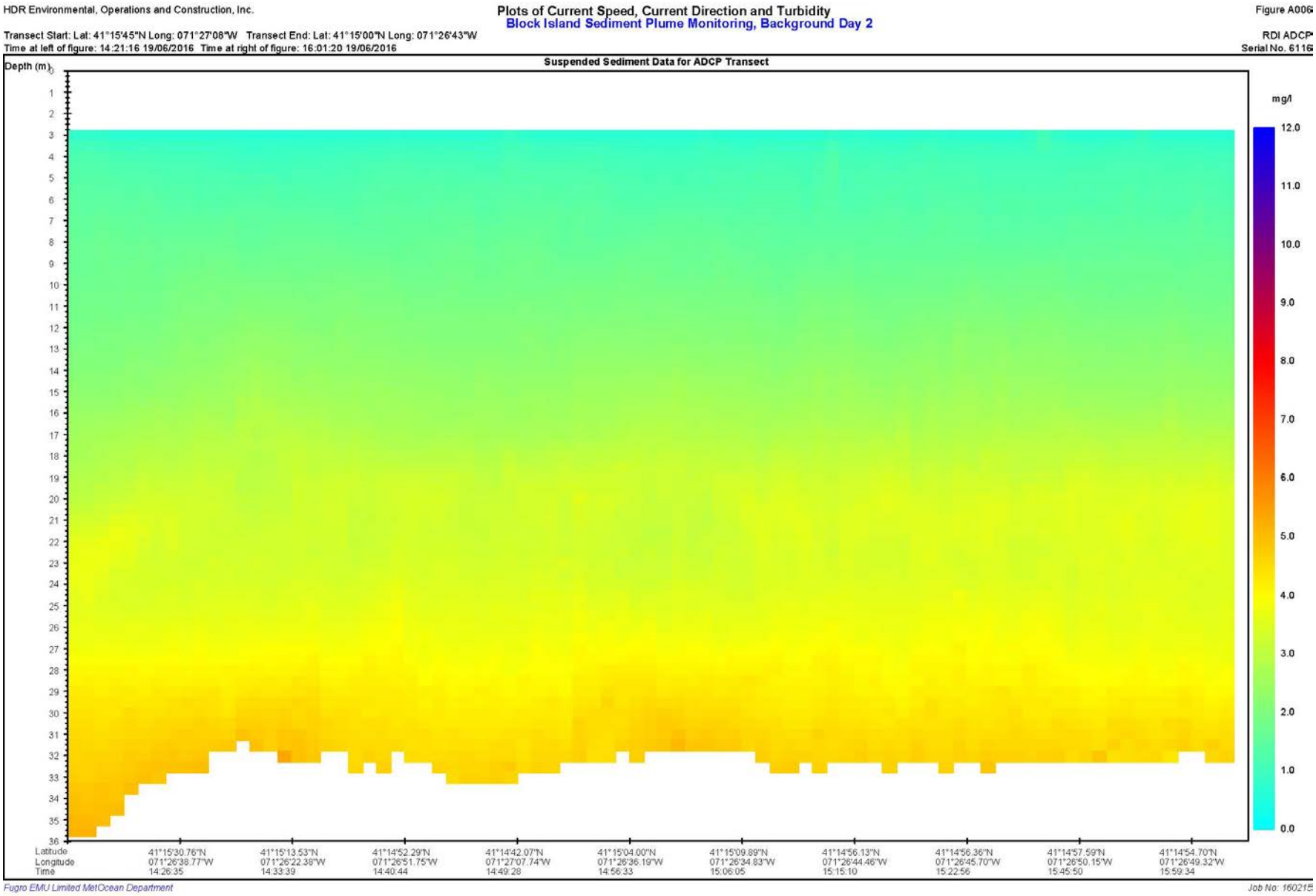
Transect Start: Lat: 41°15'45"N Long: 071°27'08"W Transect End: Lat: 41°15'00"N Long: 071°26'43"W
Time at left of figure: 14:21:16 19/06/2016 Time at right of figure: 16:01:20 19/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215


HDR Environmental, Operations and Construction, Inc.
Plots of Current Speed, Current Direction and Turbidity
Block Island Sediment Plume Monitoring, Background Day 2
Figure A006
Transect Start: Lat: 41°15'45"N Long: 071°27'08"W Transect End: Lat: 41°15'00"N Long: 071°26'43"W
Time at left of figure: 14:21:16 19/06/2016 Time at right of figure: 16:01:20 19/06/2016
RDI ADCP
Serial No. 6116
Suspended Sediment Data for ADCP Transect
Depth (m)
mg/l
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Latitude
Longitude
Time
41°15'30.76"N 071°26'38.77"W 14:26:35
41°15'13.53"N 071°26'22.38"W 14:33:39
41°14'52.29"N 071°26'51.75"W 14:40:44
41°14'42.07"N 071°27'07.74"W 14:49:28
41°15'04.00"N 071°26'36.19"W 14:56:33
41°15'09.89"N 071°26'34.83"W 15:06:05
41°14'56.13"N 071°26'44.46"W 15:15:10
41°14'56.36"N 071°26'45.70"W 15:22:56
41°14'57.59"N 071°26'50.15"W 15:45:50
41°14'54.70"N 071°26'49.32"W 15:59:34
Fugro EMU Limited MetOcean Department
Job No: 160215

Appendix 7. ADCP Data Presentations – Individual Beams Jet Plow Day

Data from individual transects on the jet plow monitoring day are presented below. Turbidity data are separated into each of the four beams.

Figure/Table **(see below)**	**Location/Source**	**Presentation Type**	**Parameters**
Figure B001	Jet Plow – Transect 1	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B002-B005	Jet Plow – Transect 1 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B006	Jet Plow – Transect 2	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B007-B010	Jet Plow – Transect 2 – Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B011	Jet Plow – Transect 3	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B012-B015	Jet Plow – Transect 3 – Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B016	Jet Plow – Transect 4	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B017-B020	Jet Plow – Transect 4 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B021	Jet Plow – Transect 7	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B022-B025	Jet Plow – Transect 7 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B026	Jet Plow – Transect 10	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B027-B030	Jet Plow – Transect 10 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B031	Jet Plow – Transect 12	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B032-B035	Jet Plow – Transect 12 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B036	Jet Plow – Transect 13	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B037-B040	Jet Plow – Transect 13 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B041	Jet Plow – Transect 15	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B042-B045	Jet Plow – Transect 15 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})

Figure/Table **(see below)**	**Location/Source**	**Presentation Type**	**Parameters**
Figure B042	Jet Plow – Transect 16	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B043-B050	Jet Plow – Transect 16 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B051	Jet Plow – Transect 17	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B052-B055	Jet Plow – Transect 17 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B056	Jet Plow – Transect 18	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B057-B060	Jet Plow – Transect 18 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B061	Jet Plow – Transect 19	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B062-B065	Jet Plow – Transect 19 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B066	Jet Plow – Transect 20	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B066-B070	Jet Plow – Transect 20 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})
Figure B071	Jet Plow – Transect 21	Colour Contour Time Series	Current Velocity (m/s), Current Direction (°T)
Figure B072-B075	Jet Plow – Transect 21 - Beam 1-4	Colour Contour Time Series	Estimated Turbidity (mgl^{-1})

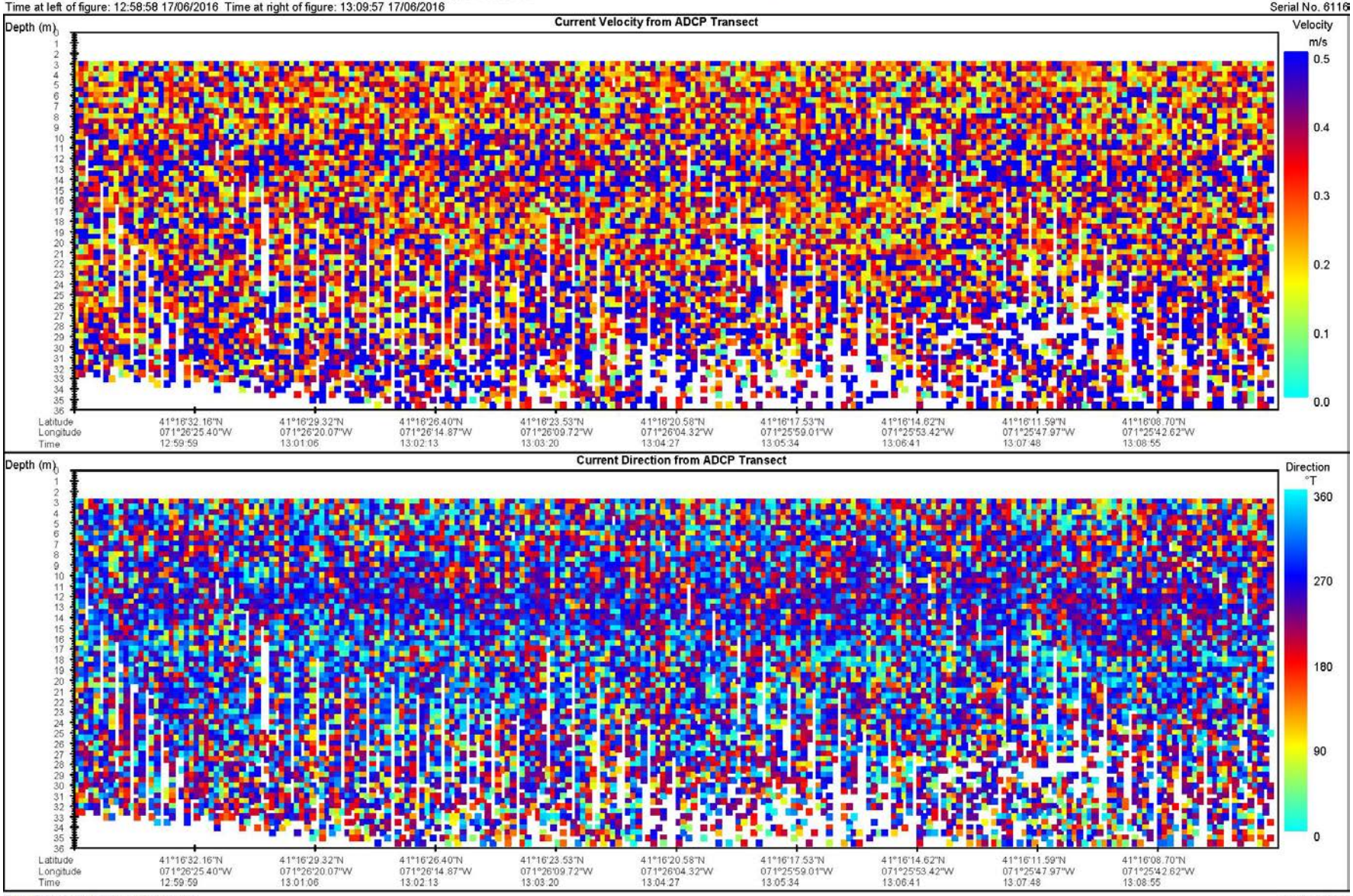
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 1

Figure B001

Transect Start: Lat: 41°16'34"N Long: 071°26'30"W Transect End: Lat: 41°16'06"N Long: 071°25'37"W
Time at left of figure: 12:58:58 17/06/2016 Time at right of figure: 13:09:57 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

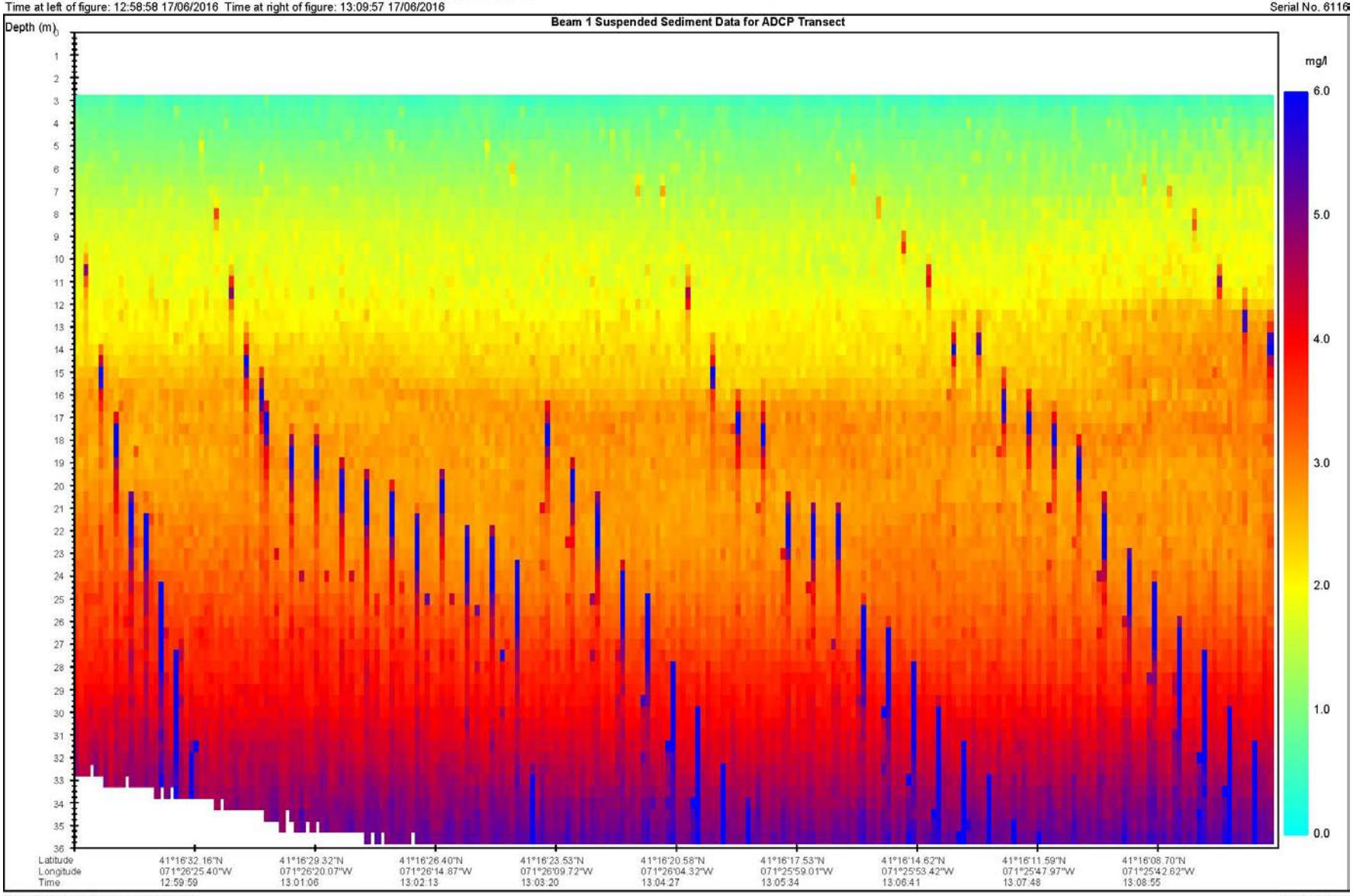
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 1

Figure B002

Transect Start: Lat: 41°16'34"N Long: 071°26'30"W Transect End: Lat: 41°16'06"N Long: 071°25'37"W
Time at left of figure: 12:58:58 17/06/2016 Time at right of figure: 13:09:57 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 1

Figure B003

Transect Start: Lat: 41°16'34"N Long: 071°26'30"W Transect End: Lat: 41°16'06"N Long: 071°25'37"W
Time at left of figure: 12:58:58 17/06/2016 Time at right of figure: 13:09:57 17/06/2016

RDI ADCP
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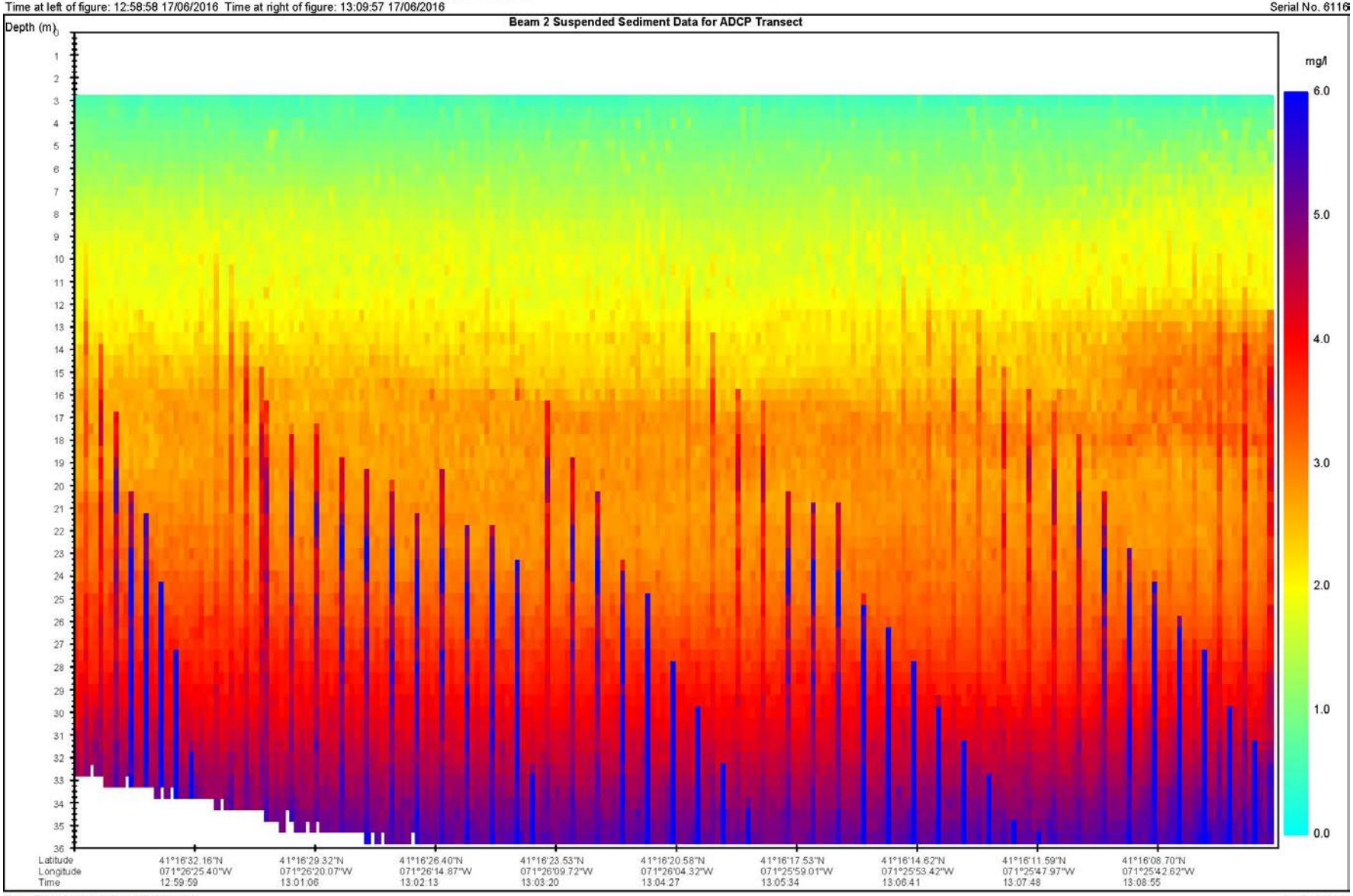

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Job No: 160215

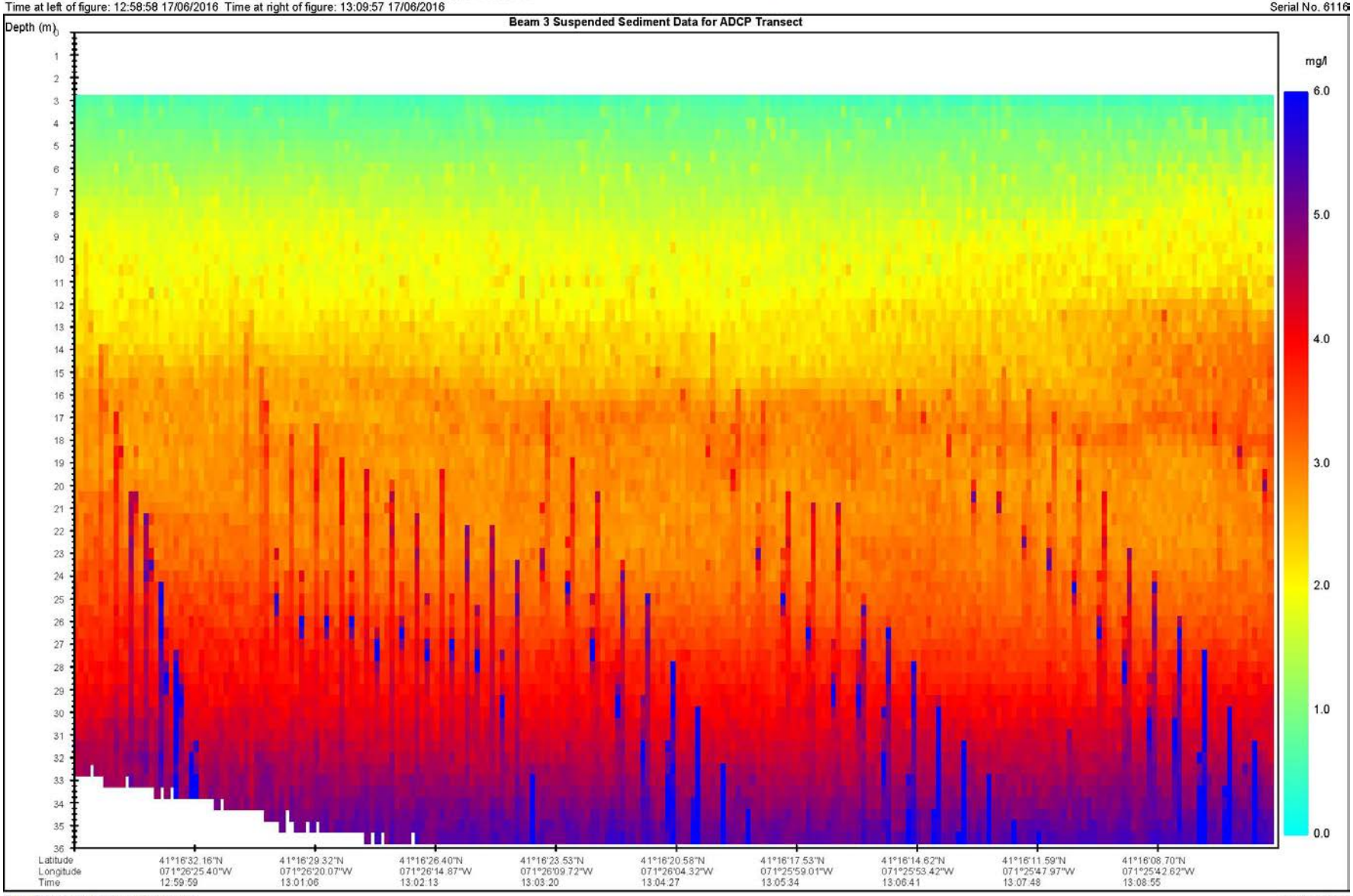
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 1

Figure B004

Transect Start: Lat: 41°16'34"N Long: 071°26'30"W Transect End: Lat: 41°16'06"N Long: 071°25'37"W
Time at left of figure: 12:58:58 17/06/2016 Time at right of figure: 13:09:57 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

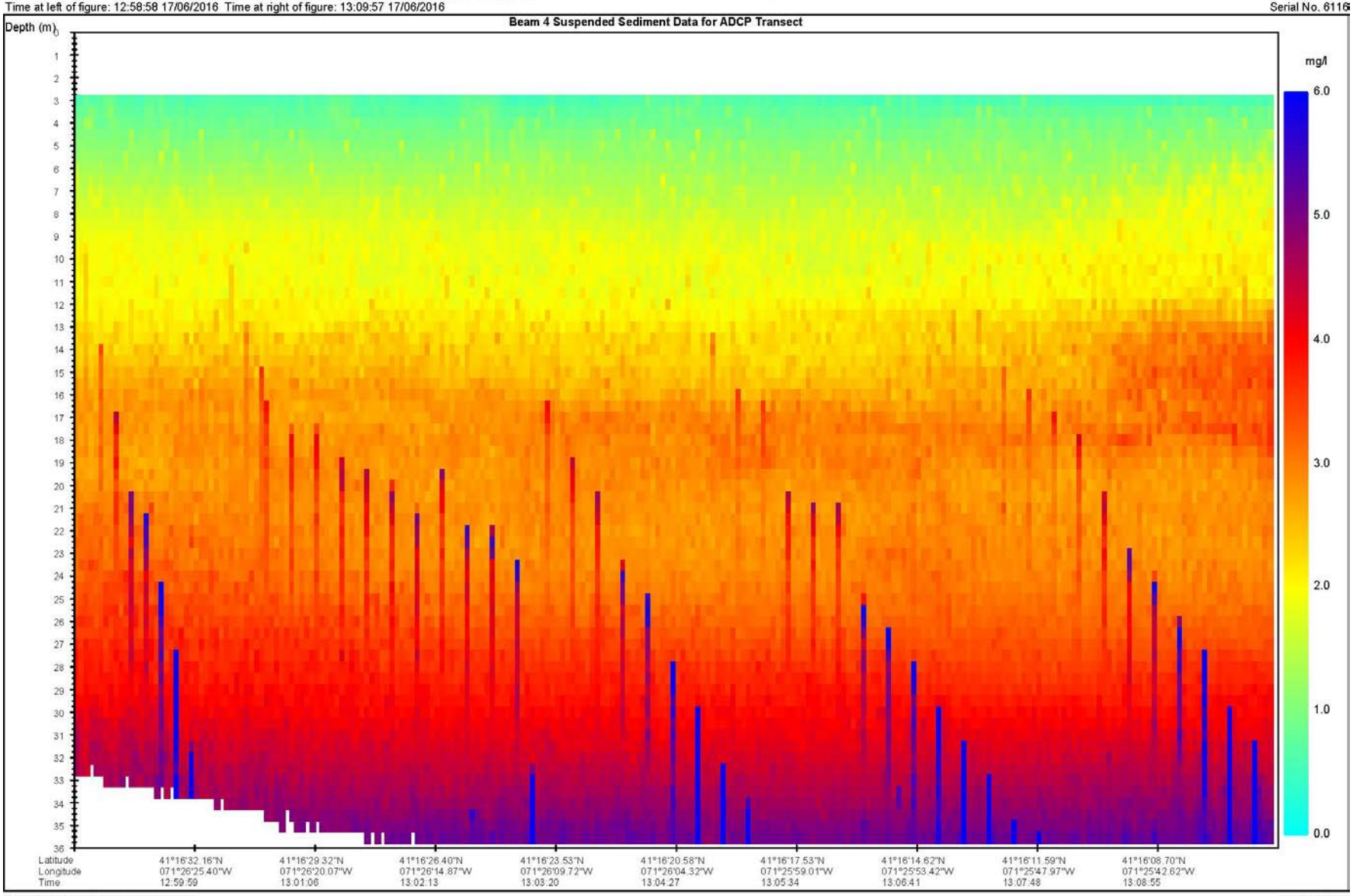
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 1

Figure B005

Transect Start: Lat: 41°16'34"N Long: 071°26'30"W Transect End: Lat: 41°16'06"N Long: 071°25'37"W
Time at left of figure: 12:58:58 17/06/2016 Time at right of figure: 13:09:57 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

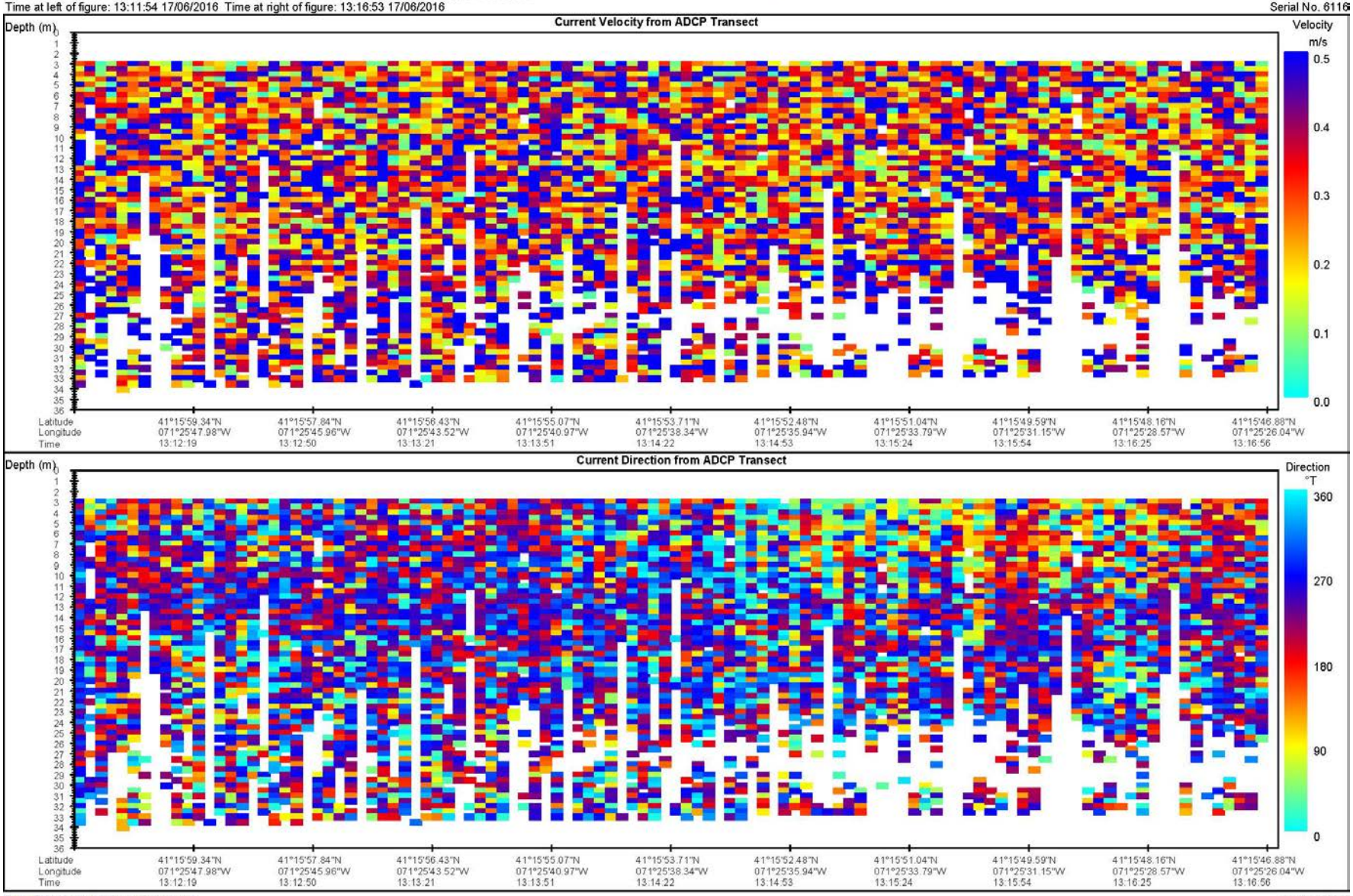
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 2

Figure B006

Transect Start: Lat: 41°16'01"N Long: 071°25'47"W Transect End: Lat: 41°15'46"N Long: 071°25'26"W
Time at left of figure: 13:11:54 17/06/2016 Time at right of figure: 13:16:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

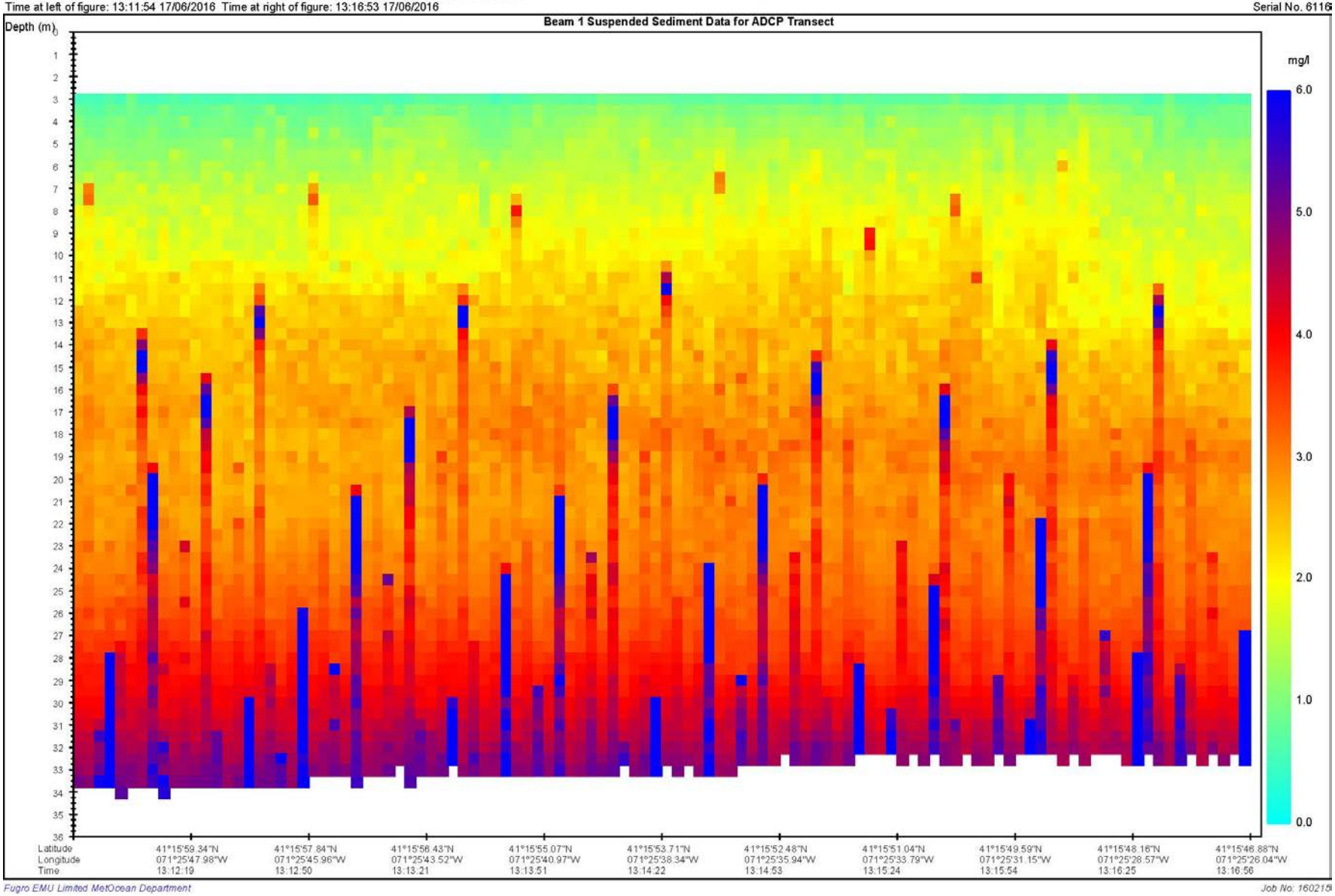
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 2

Figure B007

Transect Start: Lat: 41°16'01"N Long: 071°25'47"W Transect End: Lat: 41°15'46"N Long: 071°25'26"W
Time at left of figure: 13:11:54 17/06/2016 Time at right of figure: 13:16:53 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

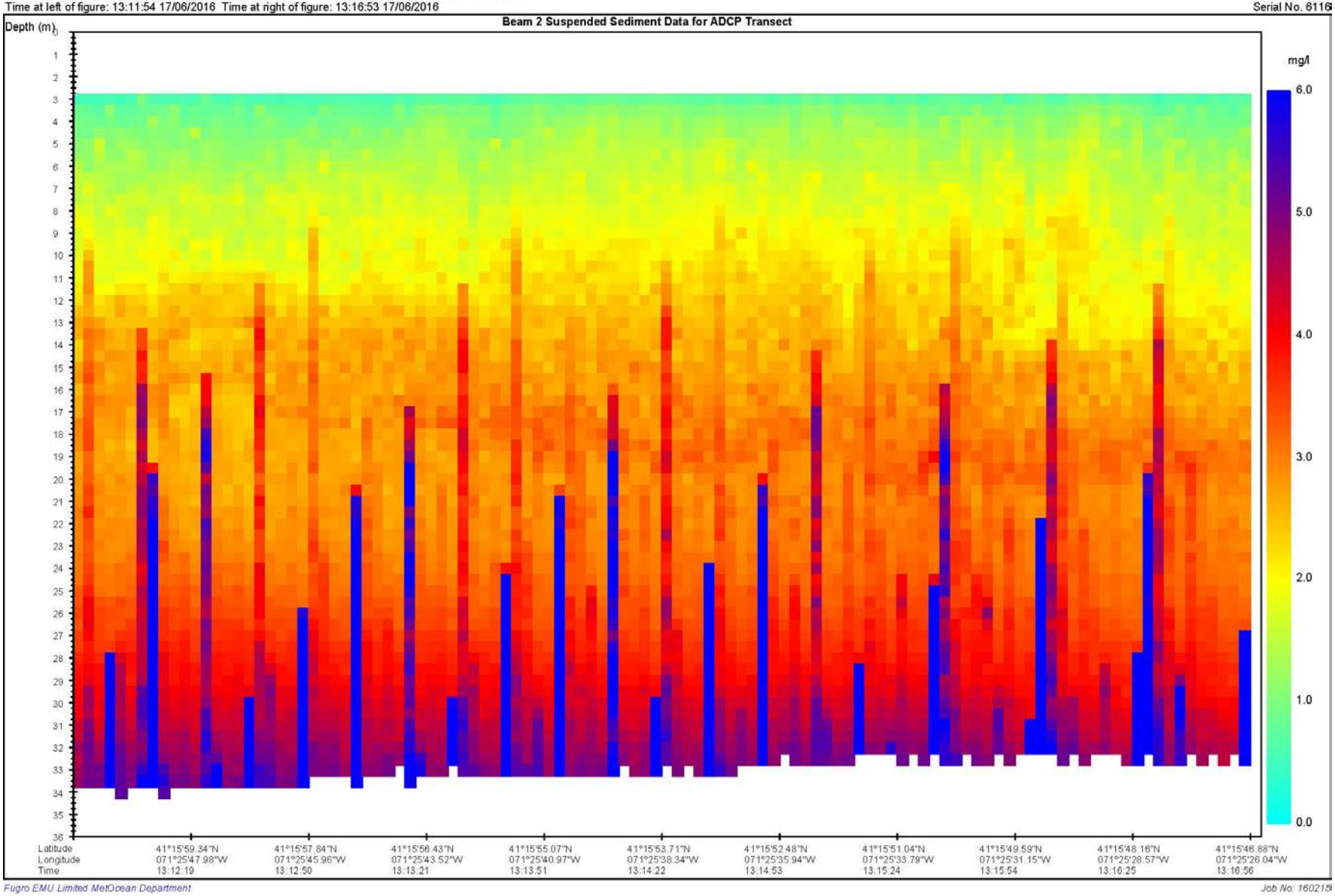
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 2

Figure B008

Transect Start: Lat: 41°16'01"N Long: 071°25'47"W Transect End: Lat: 41°15'46"N Long: 071°25'26"W
Time at left of figure: 13:11:54 17/06/2016 Time at right of figure: 13:16:53 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 2

Figure B009

Transect Start: Lat: 41°16'01"N Long: 071°25'47"W Transect End: Lat: 41°15'46"N Long: 071°25'26"W
Time at left of figure: 13:11:54 17/06/2016 Time at right of figure: 13:16:53 17/06/2016

RDI ADCP
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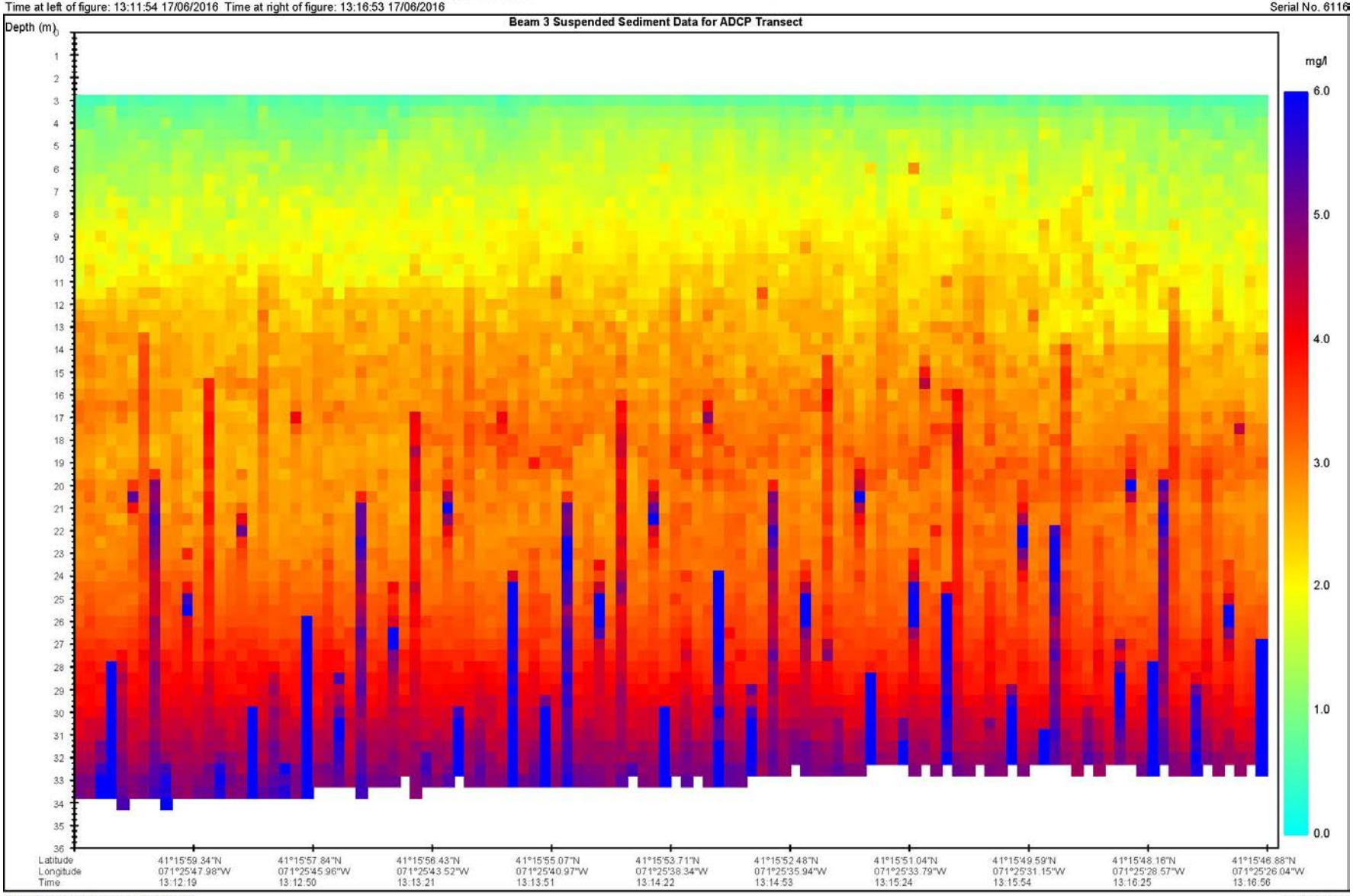

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Job No: 160215

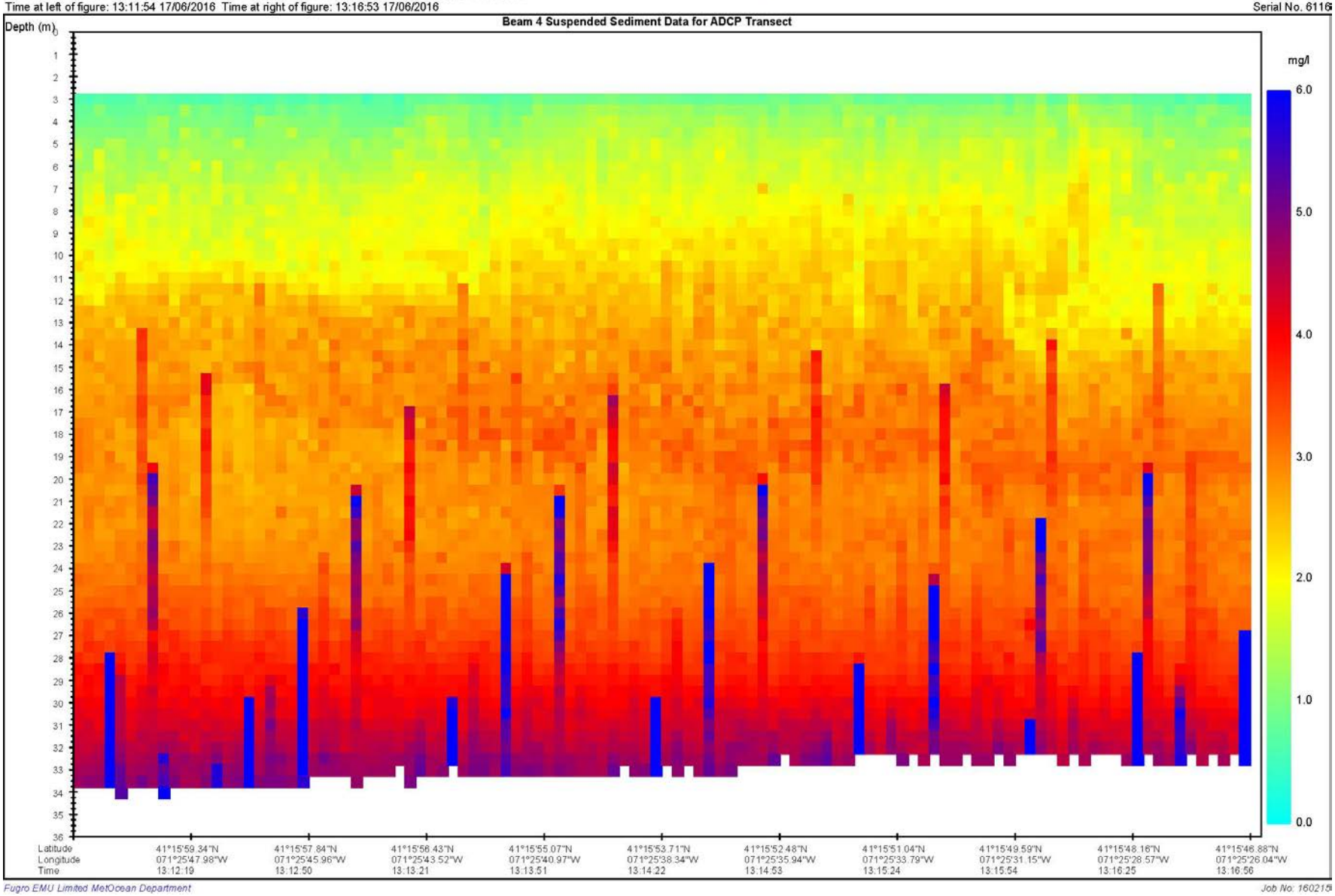
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 2

Figure B010

Transect Start: Lat: 41°16'01"N Long: 071°25'47"W Transect End: Lat: 41°15'46"N Long: 071°25'26"W
Time at left of figure: 13:11:54 17/06/2016 Time at right of figure: 13:16:53 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

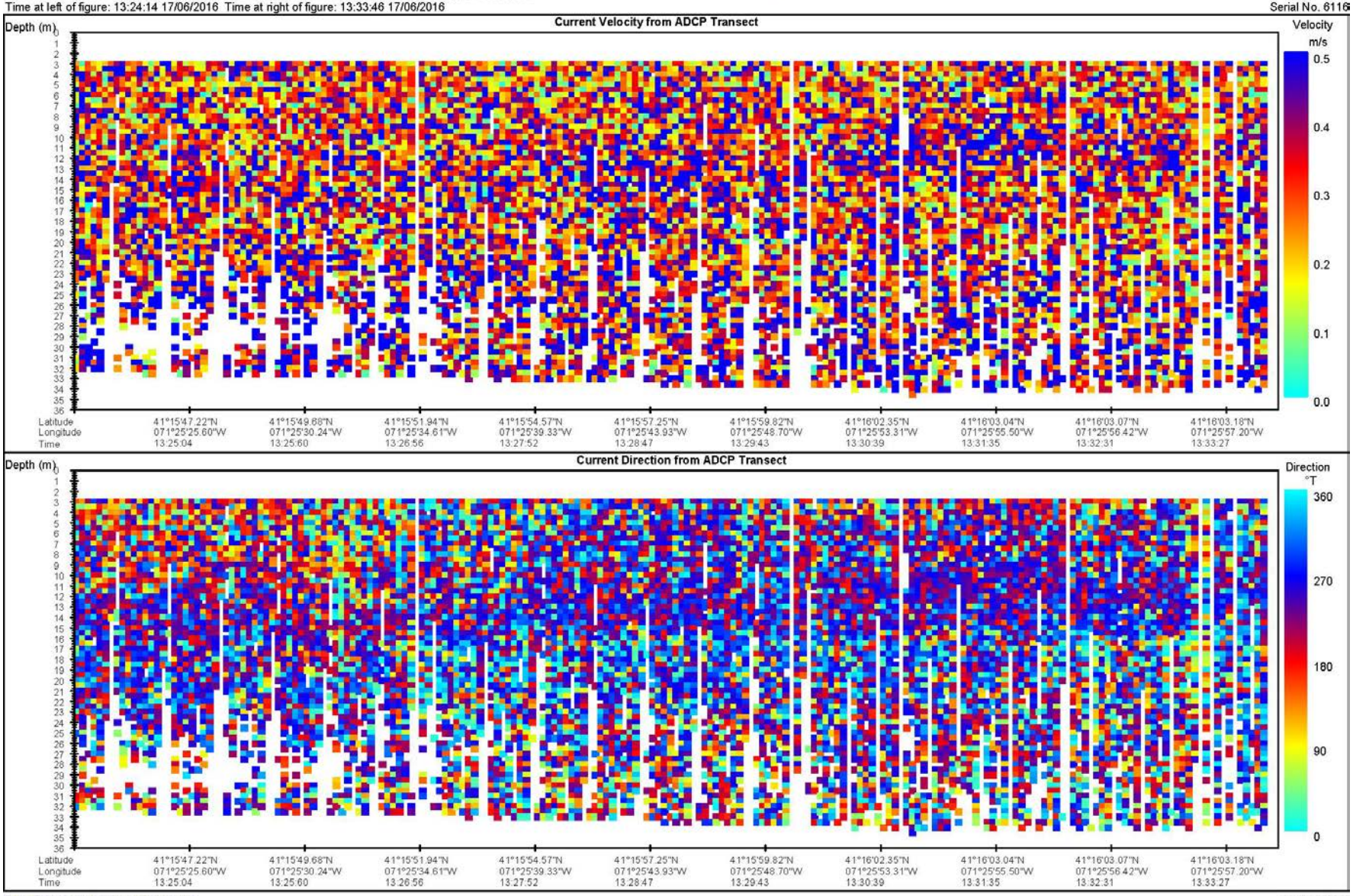
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 3

Figure B011

Transect Start: Lat: 41°15'44"N Long: 071°25'21"W Transect End: Lat: 41°16'03"N Long: 071°25'56"W
Time at left of figure: 13:24:14 17/06/2016 Time at right of figure: 13:33:46 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

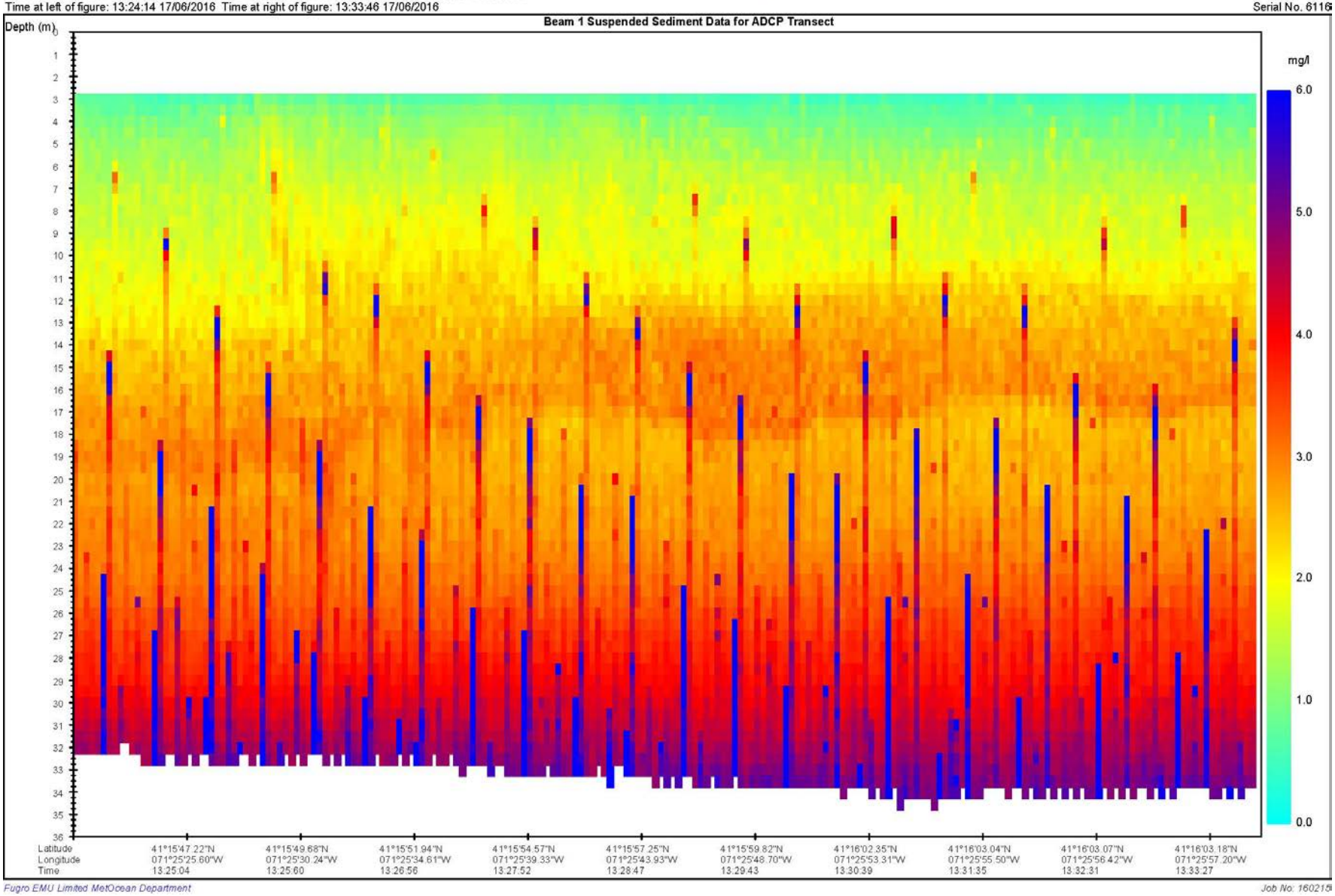
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 3

Figure B012

Transect Start: Lat: 41°15'44"N Long: 071°25'21"W Transect End: Lat: 41°16'03"N Long: 071°25'56"W
Time at left of figure: 13:24:14 17/06/2016 Time at right of figure: 13:33:46 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

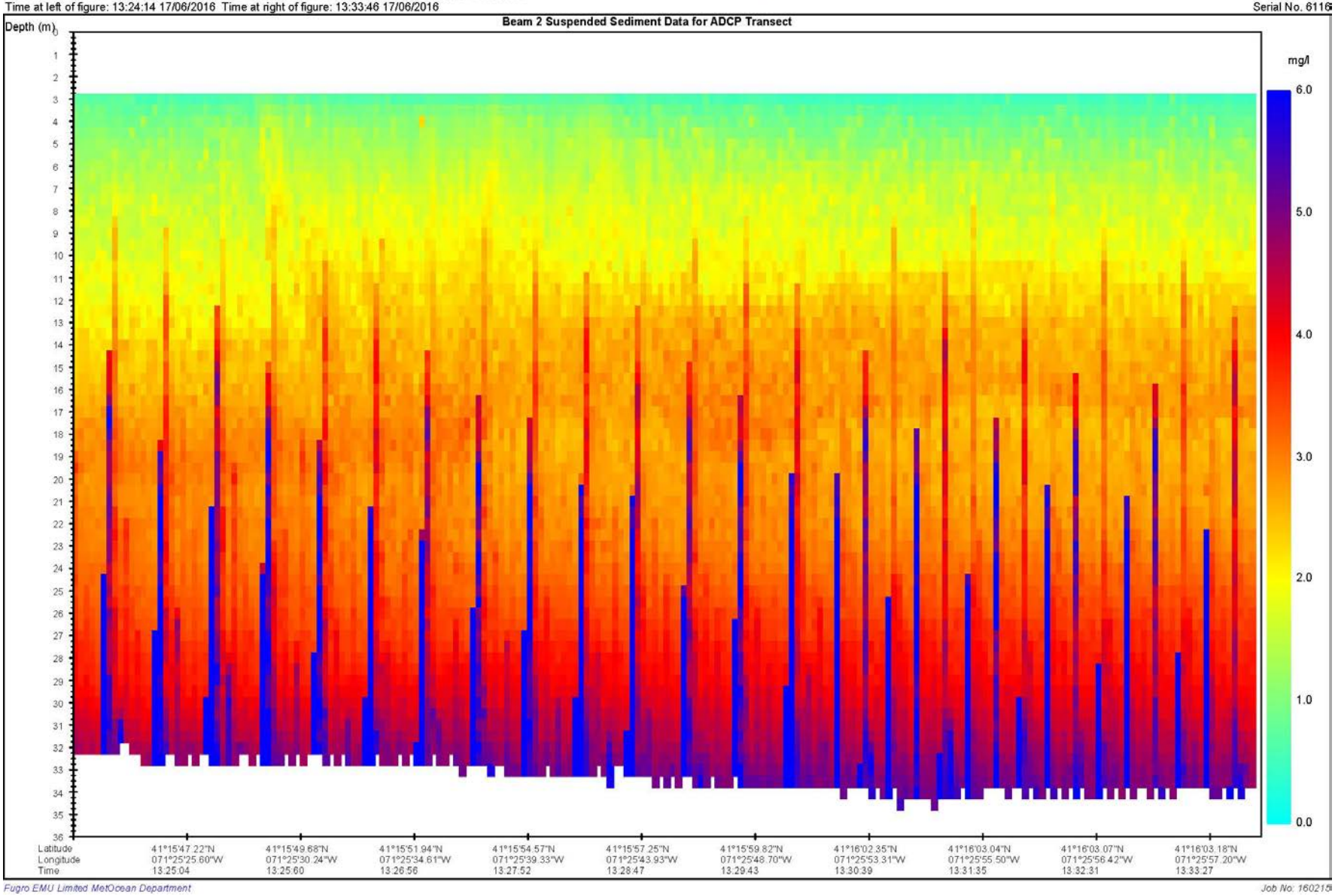
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 3

Figure B013

Transect Start: Lat: 41°15'44"N Long: 071°25'21"W Transect End: Lat: 41°16'03"N Long: 071°25'56"W
Time at left of figure: 13:24:14 17/06/2016 Time at right of figure: 13:33:46 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

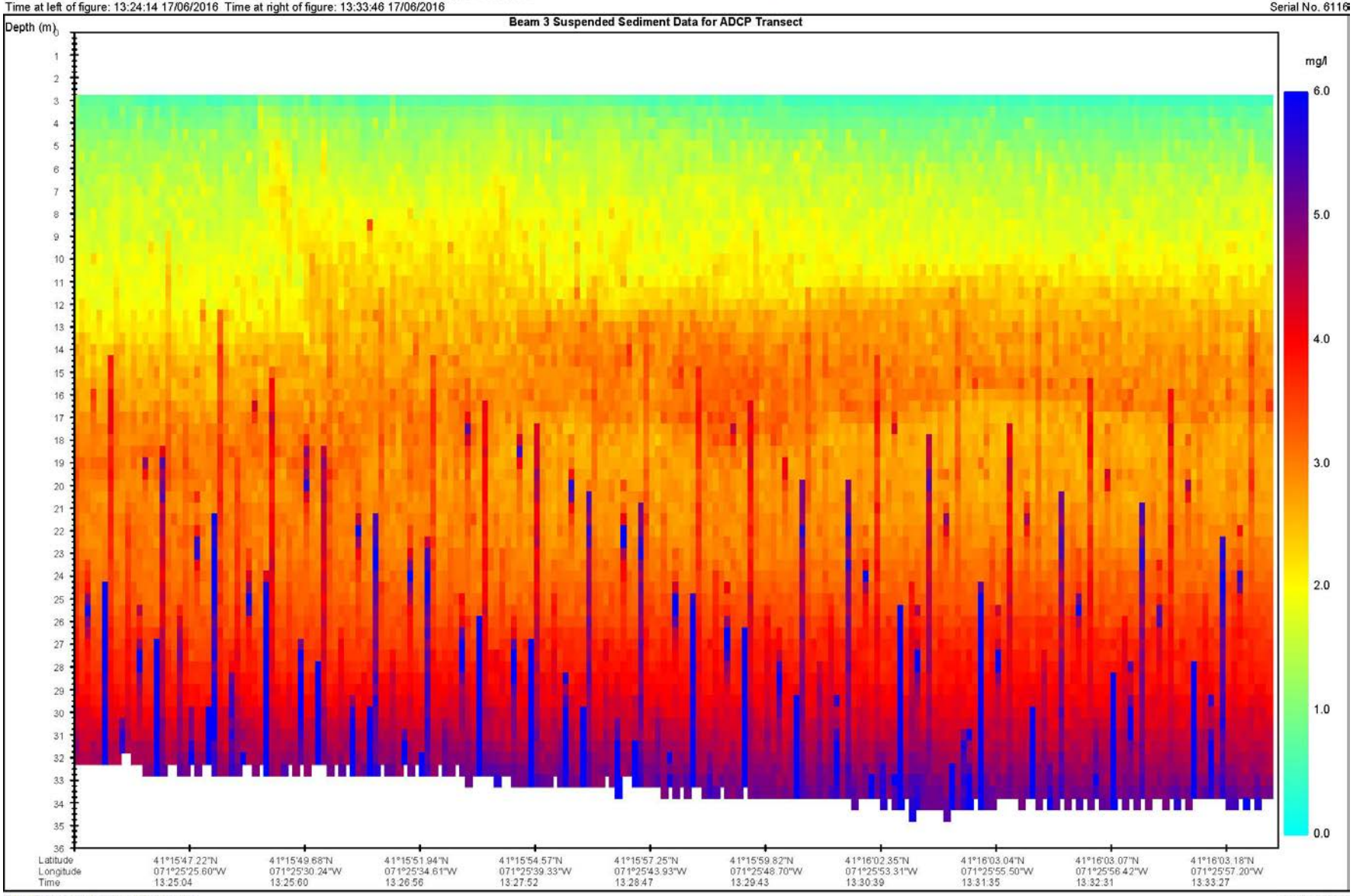
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 3

Figure B014

Transect Start: Lat: 41°15'44"N Long: 071°25'21"W Transect End: Lat: 41°16'03"N Long: 071°25'56"W
Time at left of figure: 13:24:14 17/06/2016 Time at right of figure: 13:33:46 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

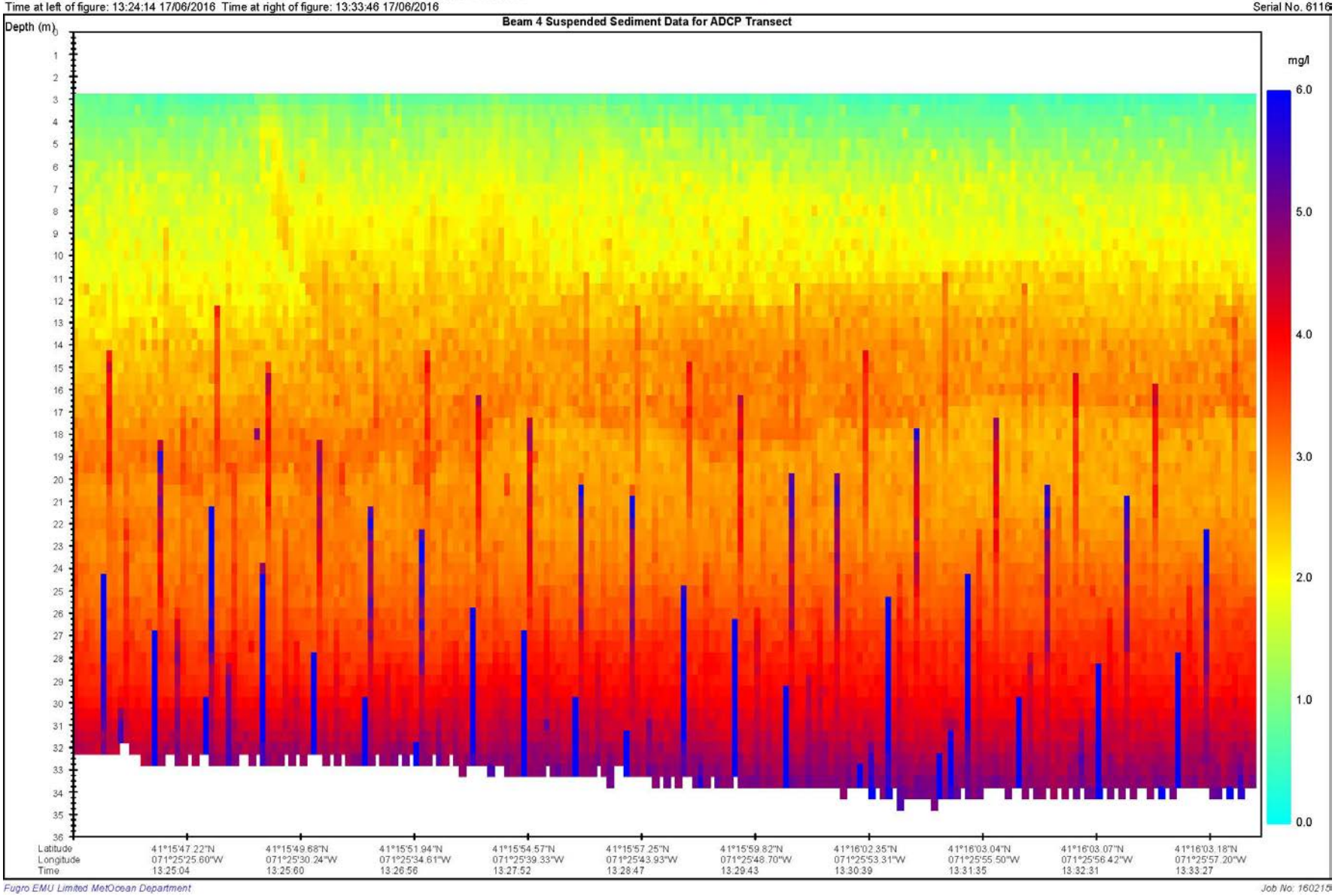
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 3

Figure B015

Transect Start: Lat: 41°15'44"N Long: 071°25'21"W Transect End: Lat: 41°16'03"N Long: 071°25'56"W
Time at left of figure: 13:24:14 17/06/2016 Time at right of figure: 13:33:46 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

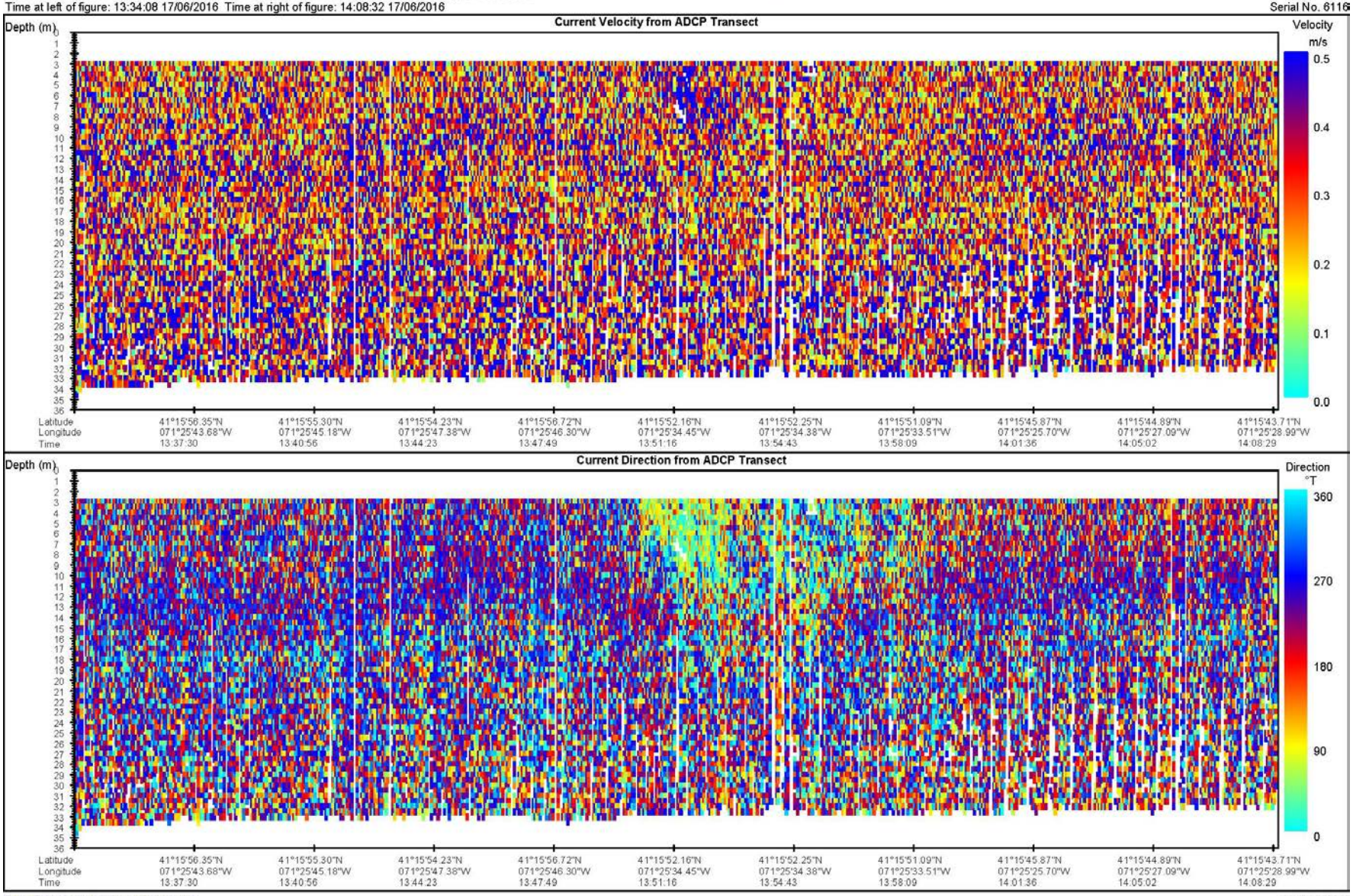
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 4

Figure B016

Transect Start: Lat: 41°16'02"N Long: 071°25'55"W Transect End: Lat: 41°15'43"N Long: 071°25'29"W
Time at left of figure: 13:34:08 17/06/2016 Time at right of figure: 14:08:32 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

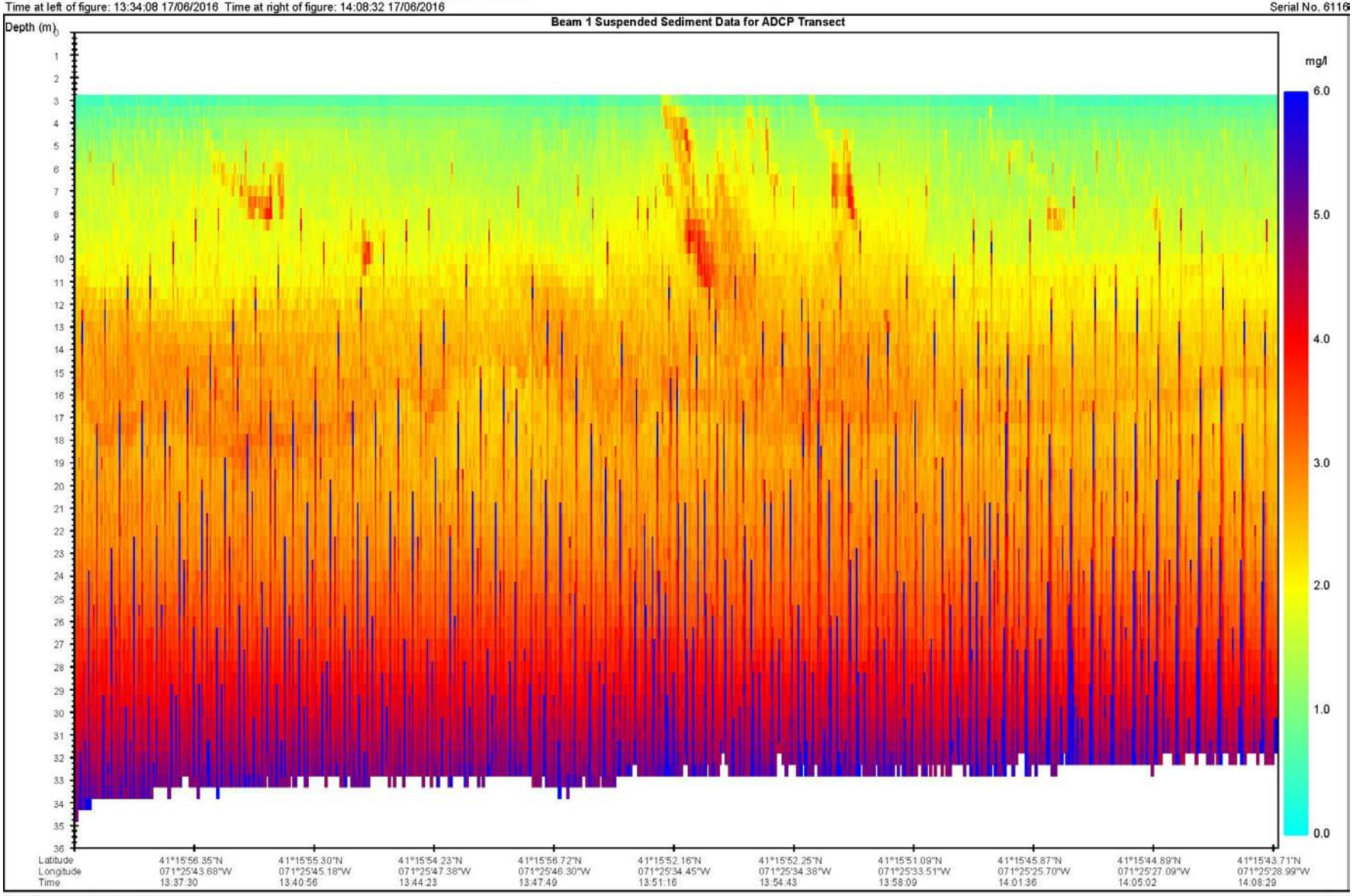
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 4

Figure B017

Transect Start: Lat: 41°16'02"N Long: 071°25'55"W Transect End: Lat: 41°15'43"N Long: 071°25'29"W
Time at left of figure: 13:34:08 17/06/2016 Time at right of figure: 14:08:32 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

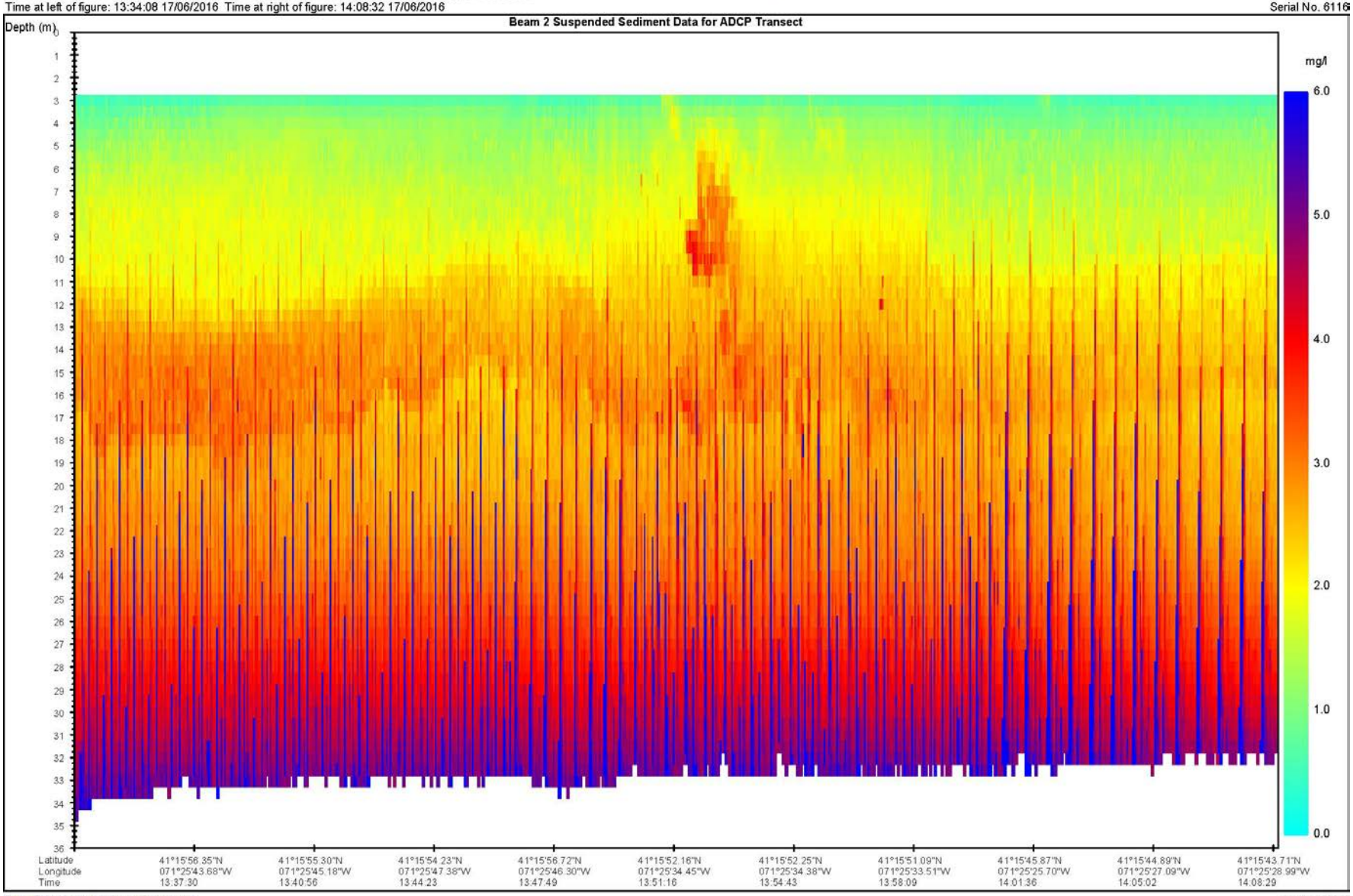
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 4

Figure B018

Transect Start: Lat: 41°16'02"N Long: 071°25'55"W Transect End: Lat: 41°15'43"N Long: 071°25'29"W
Time at left of figure: 13:34:08 17/06/2016 Time at right of figure: 14:08:32 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

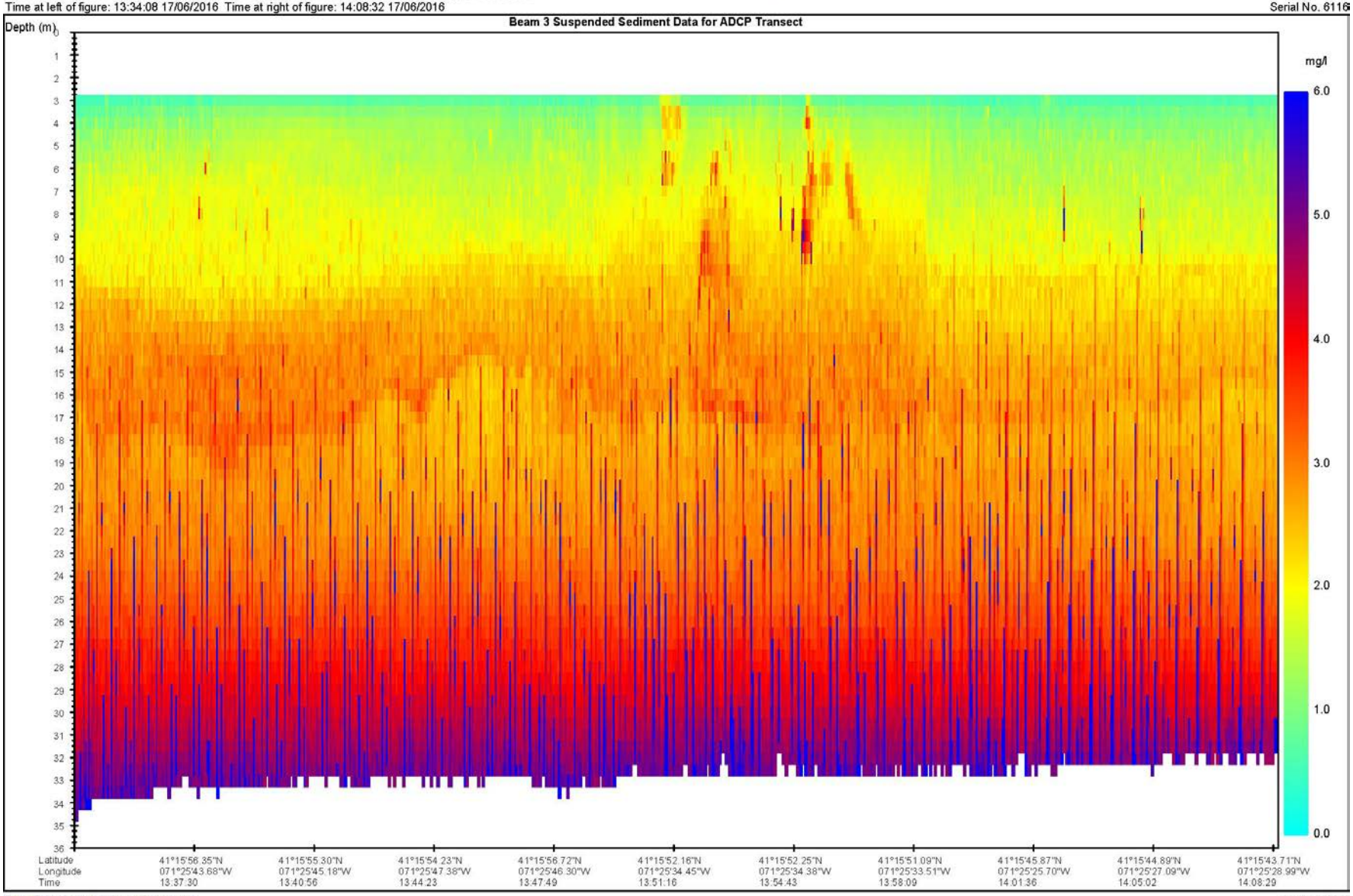
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 4

Figure B019

Transect Start: Lat: 41°16'02"N Long: 071°25'55"W Transect End: Lat: 41°15'43"N Long: 071°25'29"W
Time at left of figure: 13:34:08 17/06/2016 Time at right of figure: 14:08:32 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

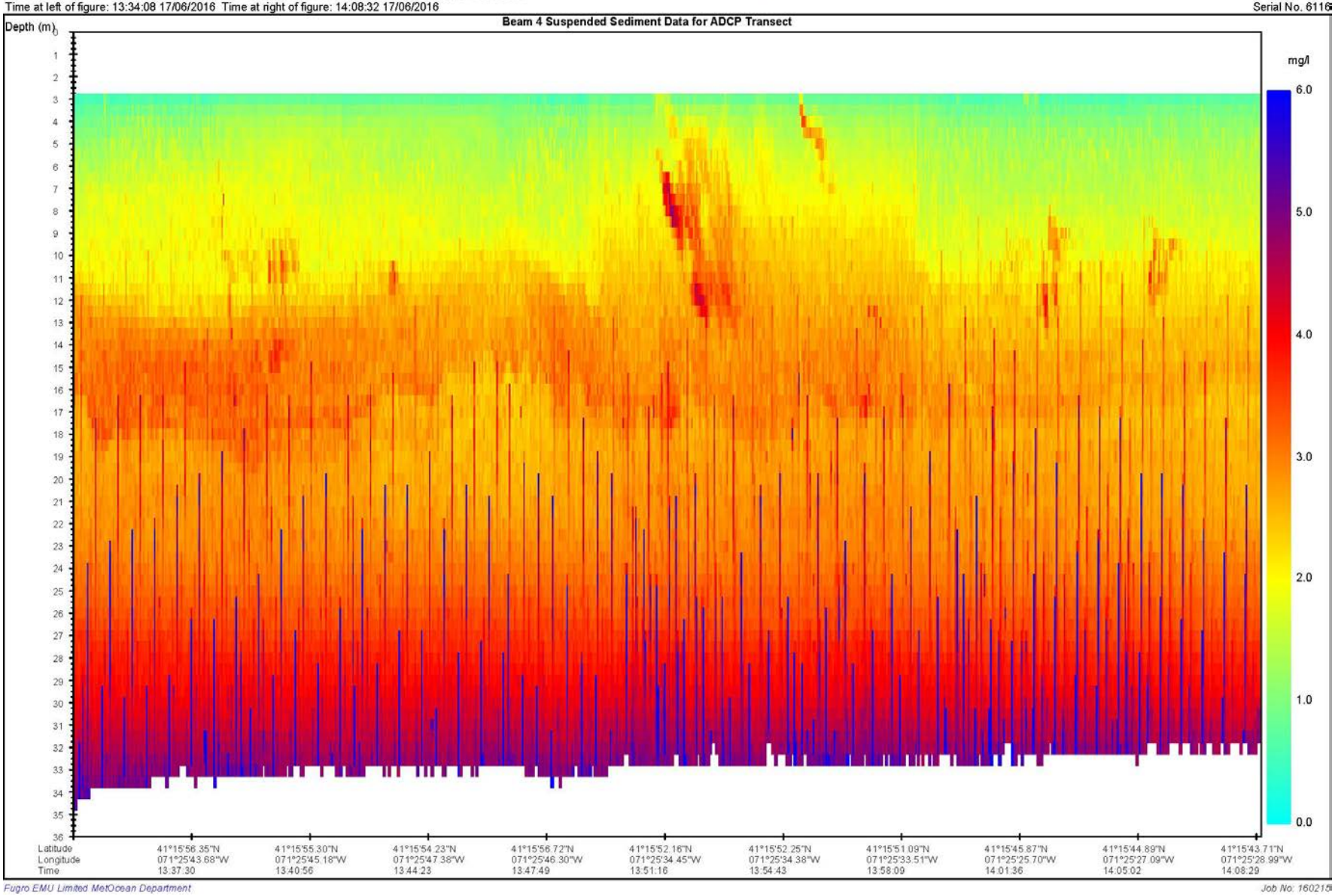
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 4

Figure B020

Transect Start: Lat: 41°16'02"N Long: 071°25'55"W Transect End: Lat: 41°15'43"N Long: 071°25'29"W
Time at left of figure: 13:34:08 17/06/2016 Time at right of figure: 14:08:32 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

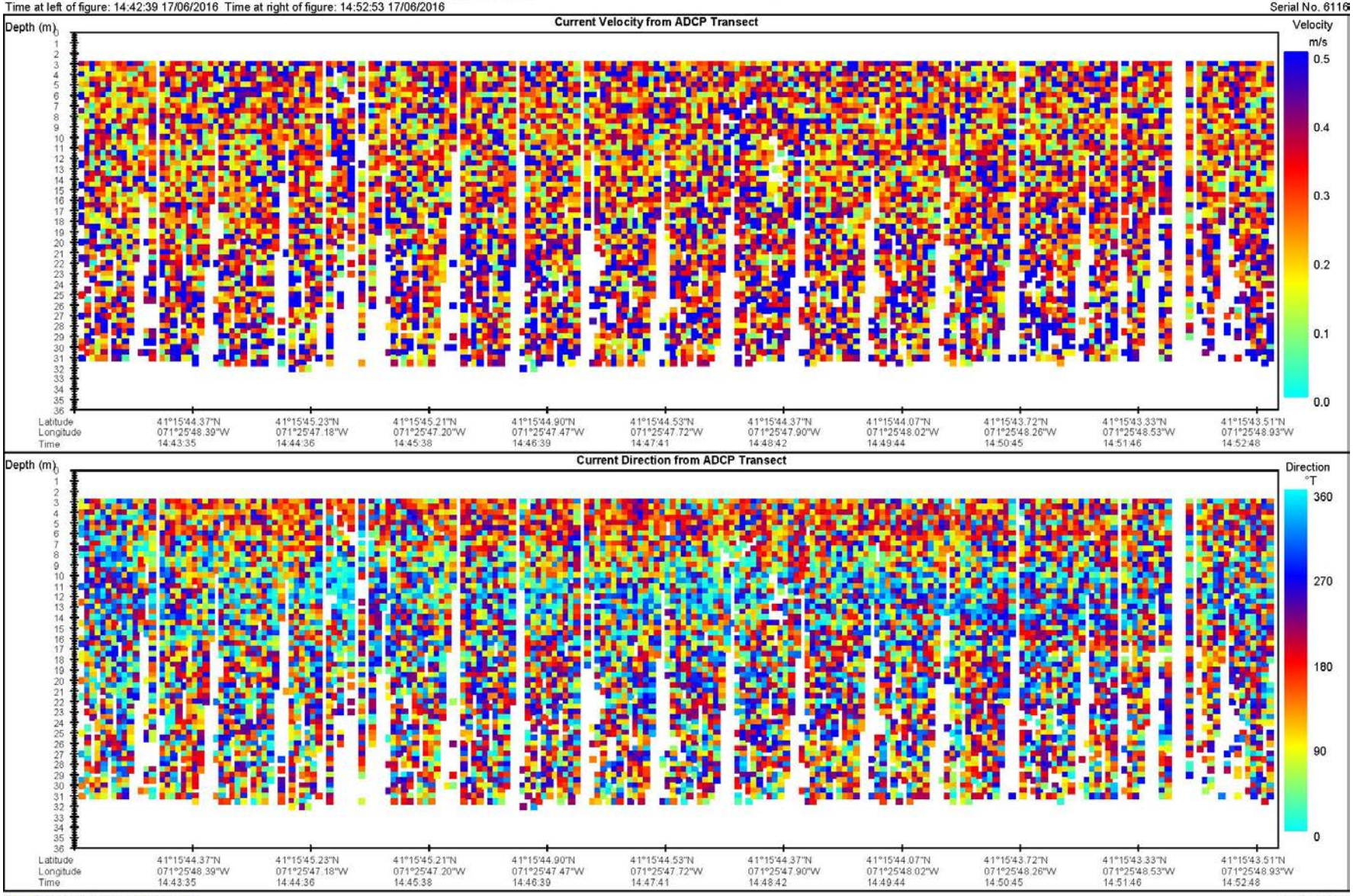
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 7

Figure B021

Transect Start: Lat: 41°15'40"N Long: 071°25'50"W Transect End: Lat: 41°15'44"N Long: 071°25'48"W
Time at left of figure: 14:42:39 17/06/2016 Time at right of figure: 14:52:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

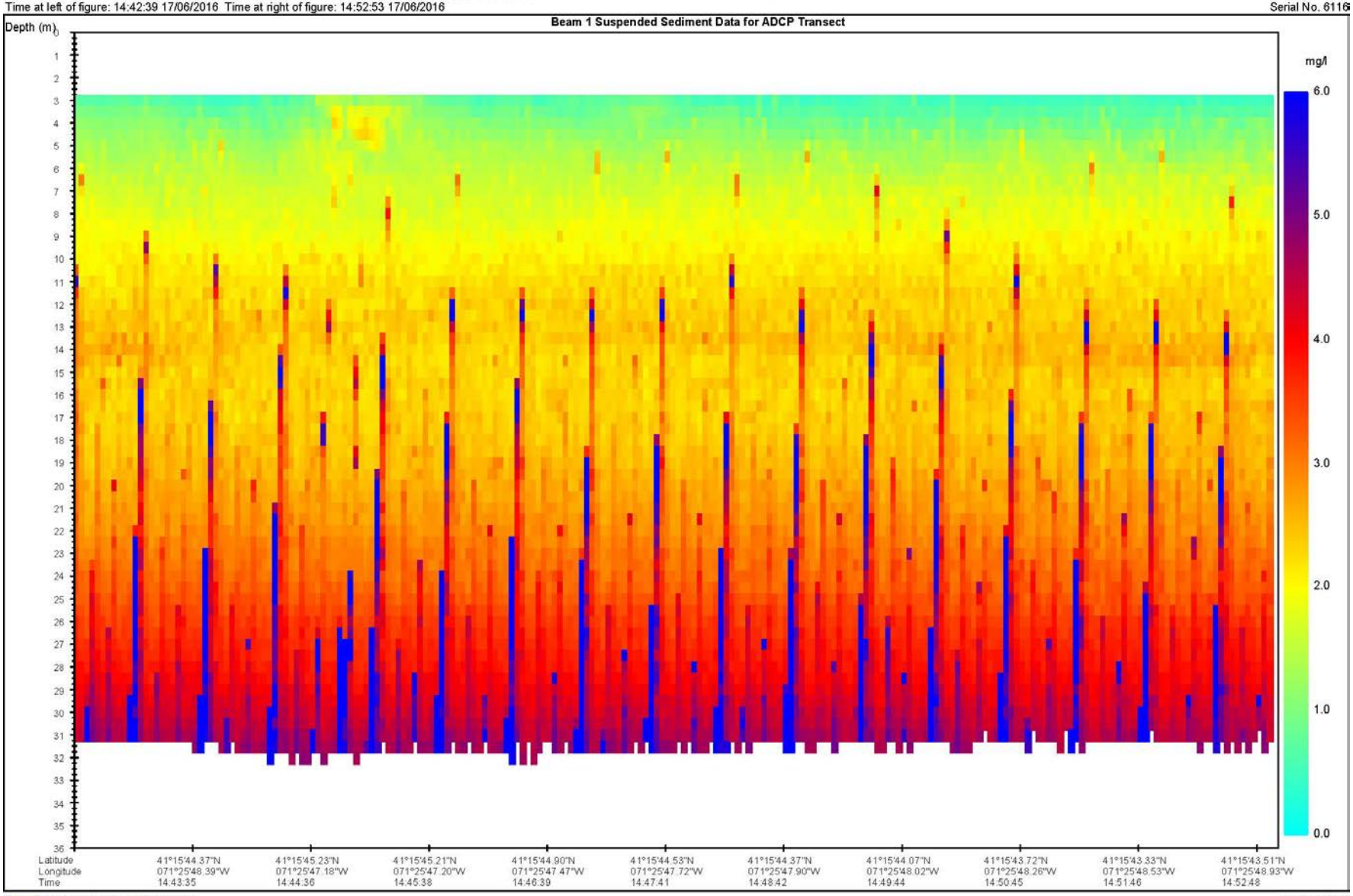
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 7

Figure B022

Transect Start: Lat: 41°15'40"N Long: 071°25'50"W Transect End: Lat: 41°15'44"N Long: 071°25'48"W
Time at left of figure: 14:42:39 17/06/2016 Time at right of figure: 14:52:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

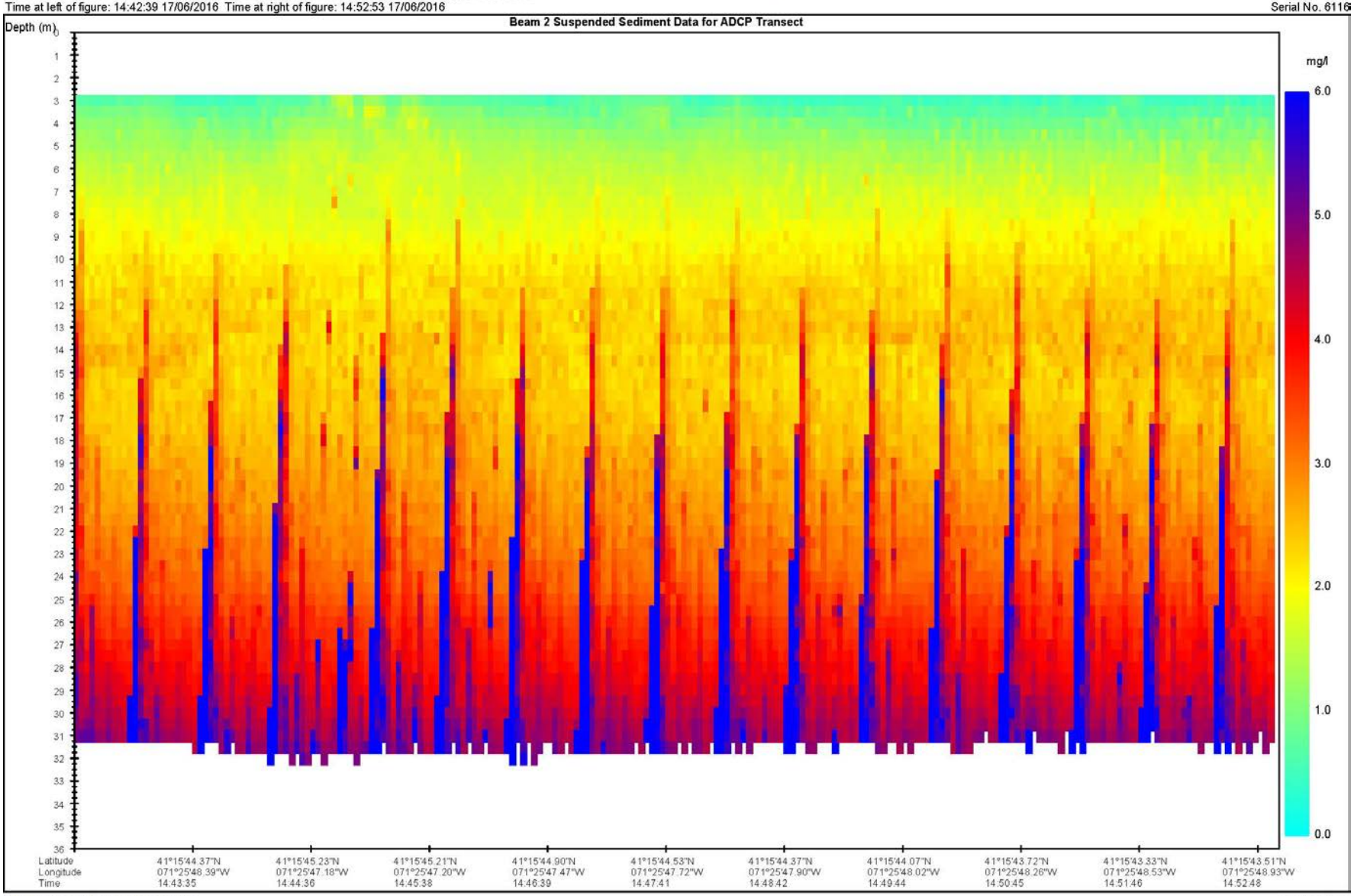
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 7

Figure B023

Transect Start: Lat: 41°15'40"N Long: 071°25'50"W Transect End: Lat: 41°15'44"N Long: 071°25'48"W
Time at left of figure: 14:42:39 17/06/2016 Time at right of figure: 14:52:53 17/06/2016

RDI ADCP
Serial No. 6116



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Job No: 160215

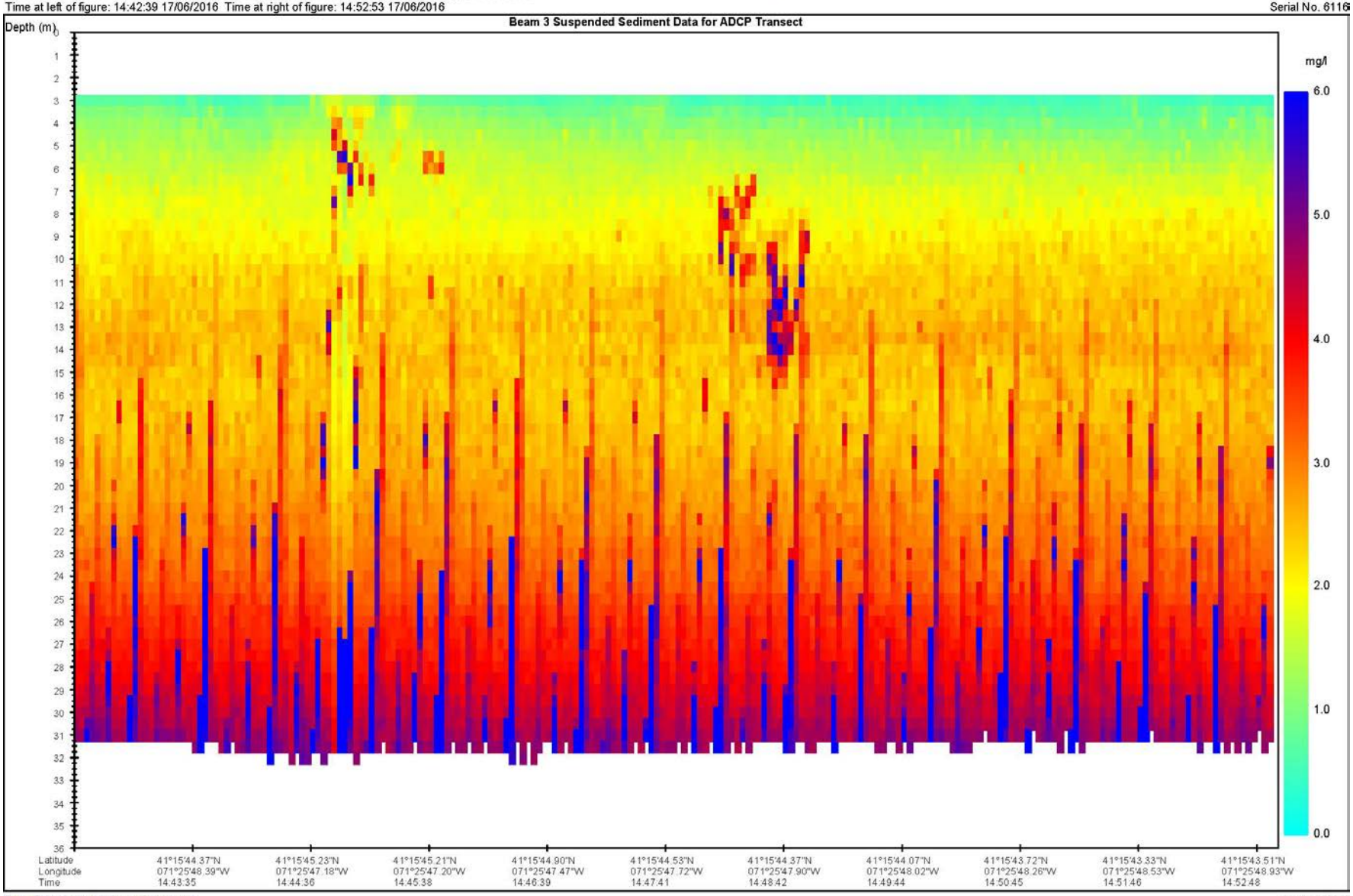
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 7

Figure B024

Transect Start: Lat: 41°15'40"N Long: 071°25'50"W Transect End: Lat: 41°15'44"N Long: 071°25'48"W
Time at left of figure: 14:42:39 17/06/2016 Time at right of figure: 14:52:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

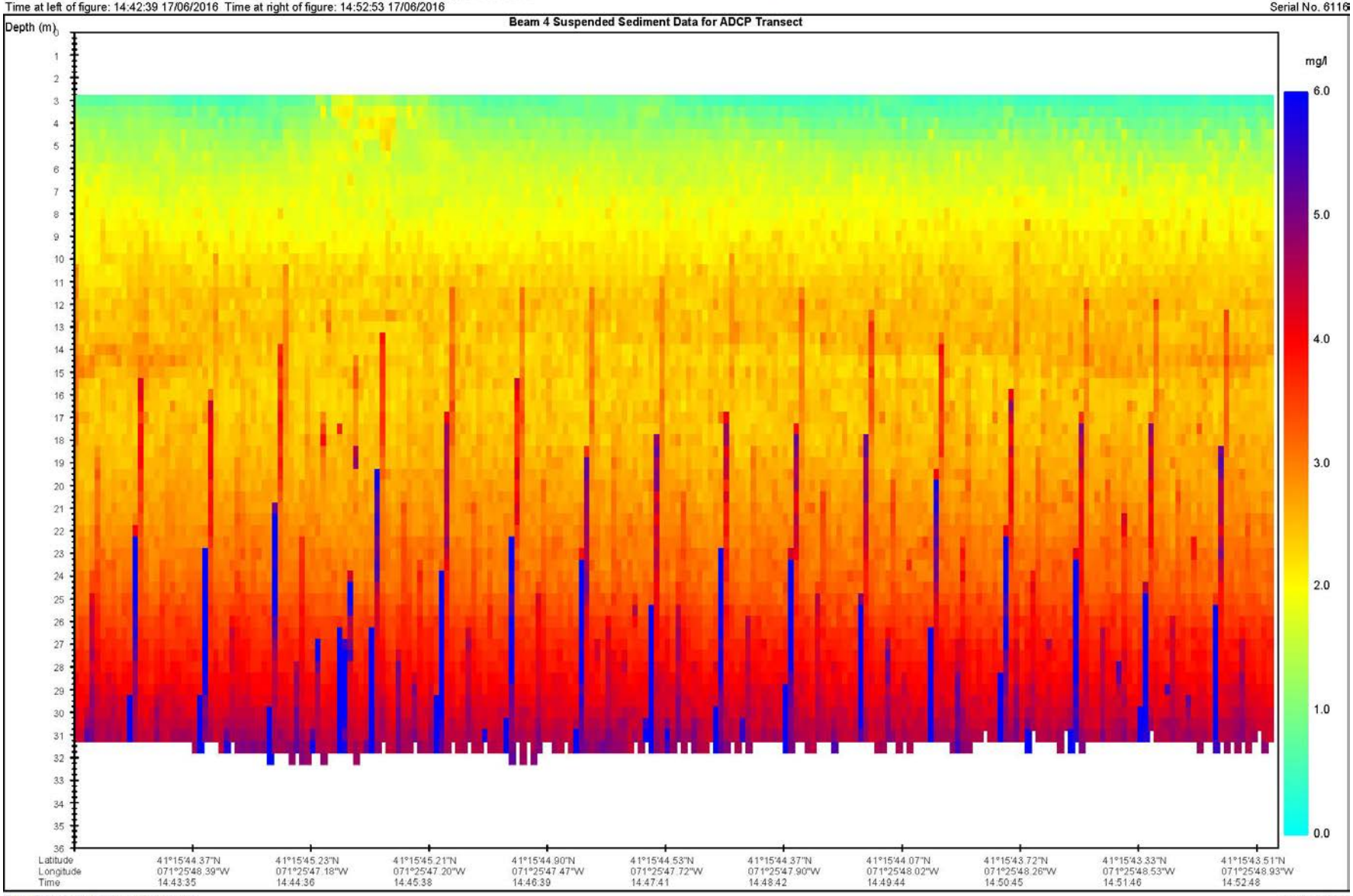
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 7

Figure B025

Transect Start: Lat: 41°15'40"N Long: 071°25'50"W Transect End: Lat: 41°15'44"N Long: 071°25'48"W
Time at left of figure: 14:42:39 17/06/2016 Time at right of figure: 14:52:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

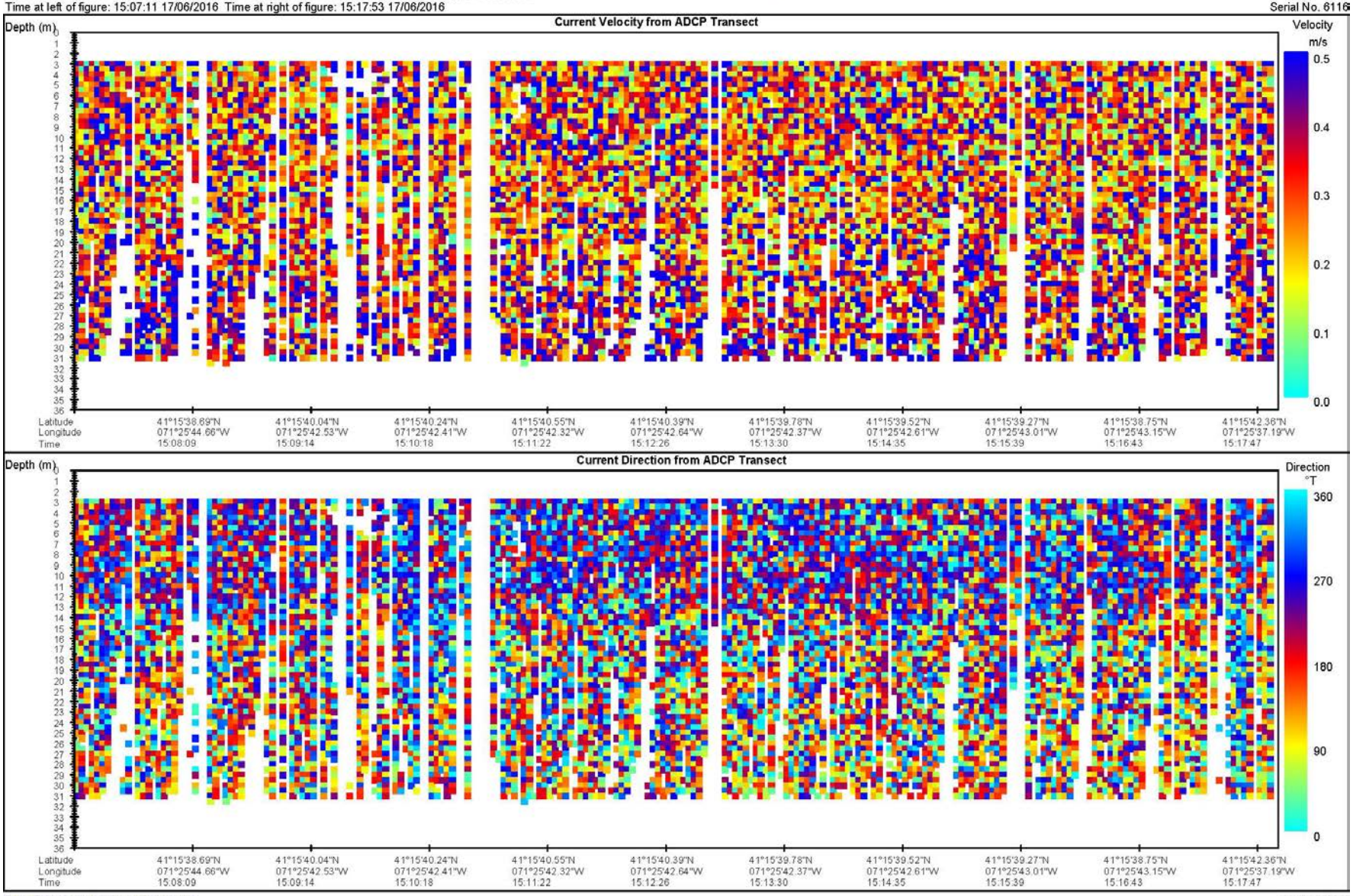
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 10

Figure B026

Transect Start: Lat: 41°15'35"N Long: 071°25'49"W Transect End: Lat: 41°15'42"N Long: 071°25'36"W
Time at left of figure: 15:07:11 17/06/2016 Time at right of figure: 15:17:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

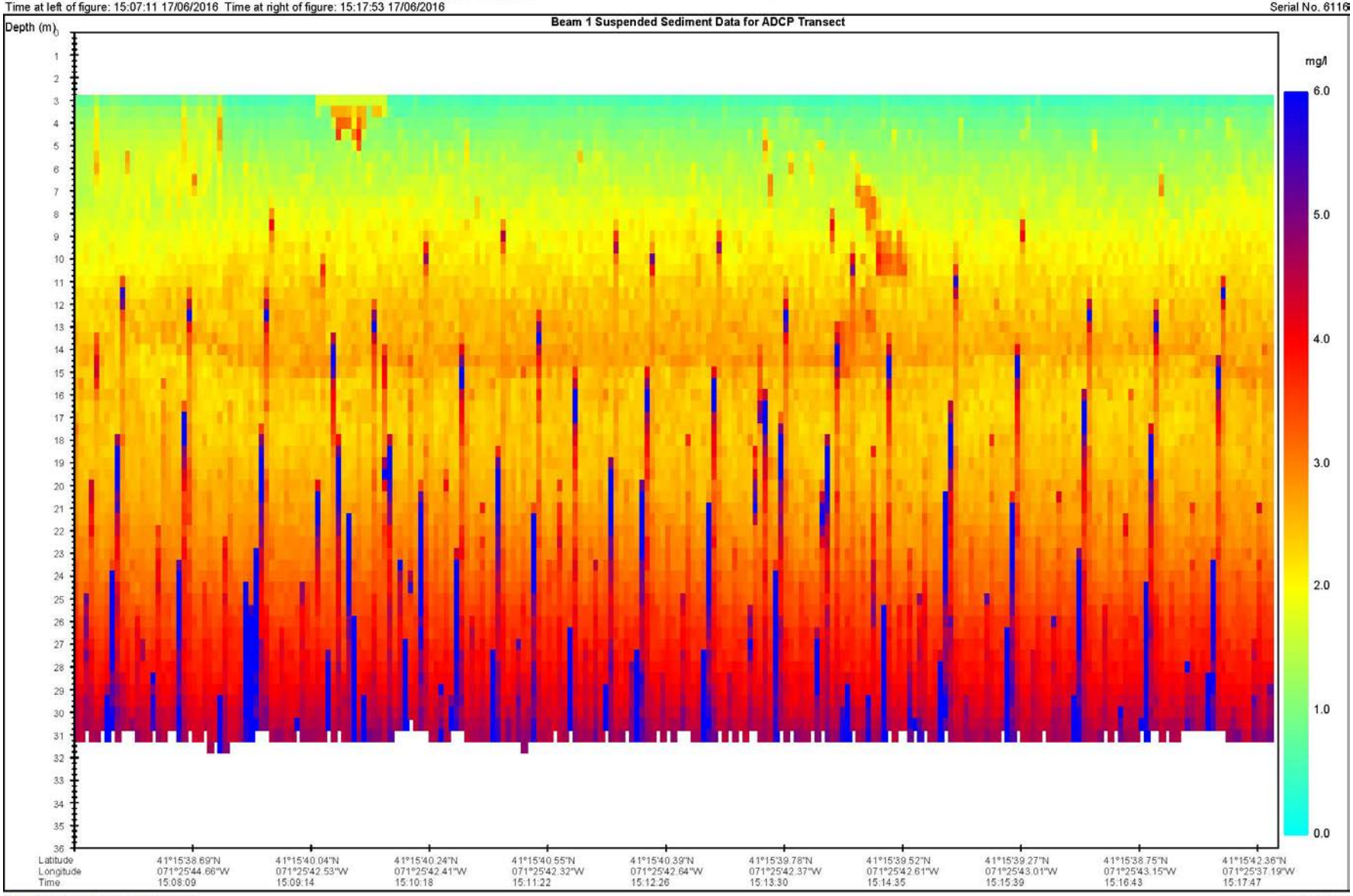
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 10

Figure B027

Transect Start: Lat: 41°15'35"N Long: 071°25'49"W Transect End: Lat: 41°15'42"N Long: 071°25'36"W
Time at left of figure: 15:07:11 17/06/2016 Time at right of figure: 15:17:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

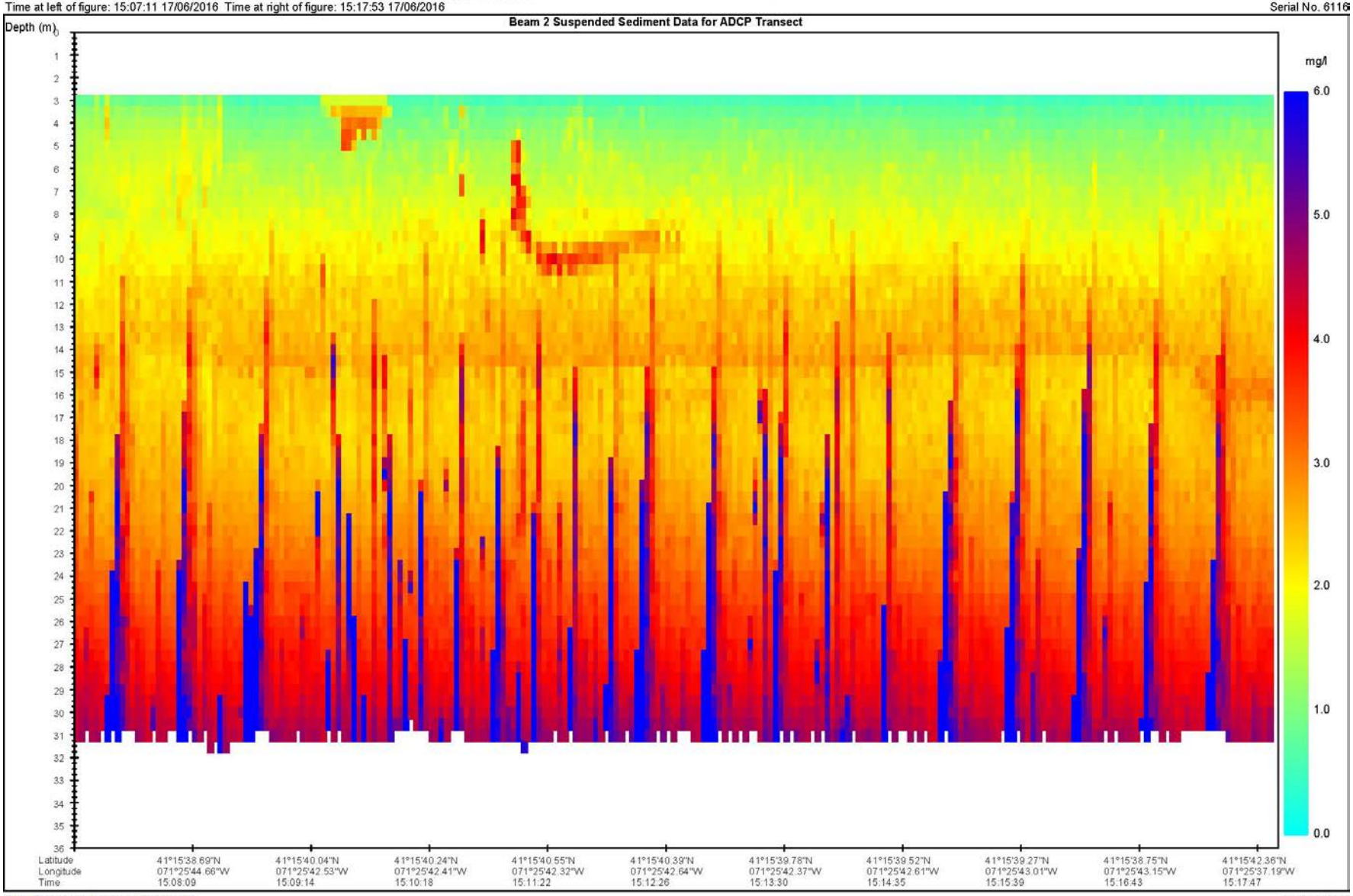
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 10

Figure B028

Transect Start: Lat: 41°15'35"N Long: 071°25'49"W Transect End: Lat: 41°15'42"N Long: 071°25'36"W
Time at left of figure: 15:07:11 17/06/2016 Time at right of figure: 15:17:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

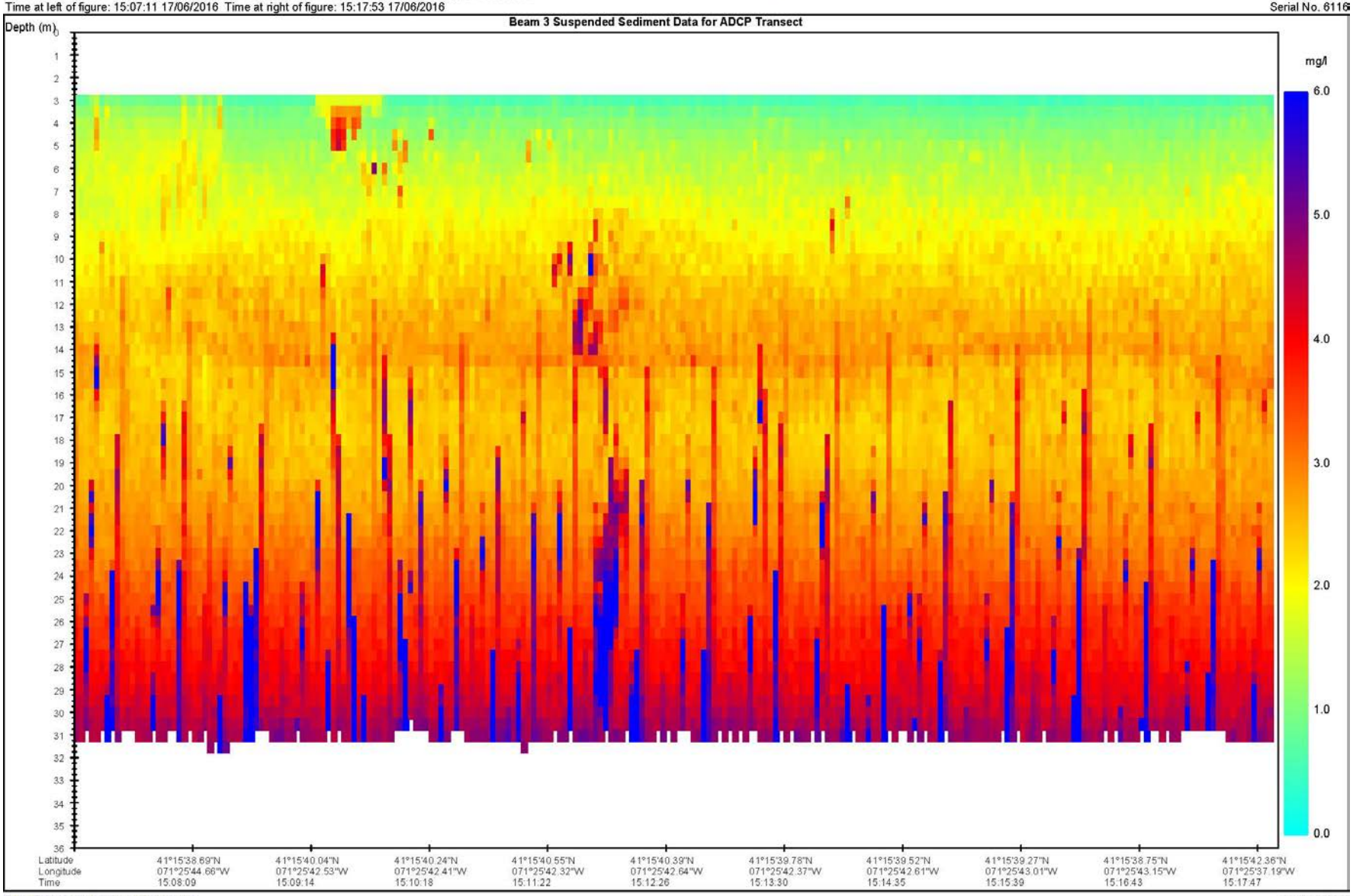
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 10

Figure B029

Transect Start: Lat: 41°15'35"N Long: 071°25'49"W Transect End: Lat: 41°15'42"N Long: 071°25'36"W
Time at left of figure: 15:07:11 17/06/2016 Time at right of figure: 15:17:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

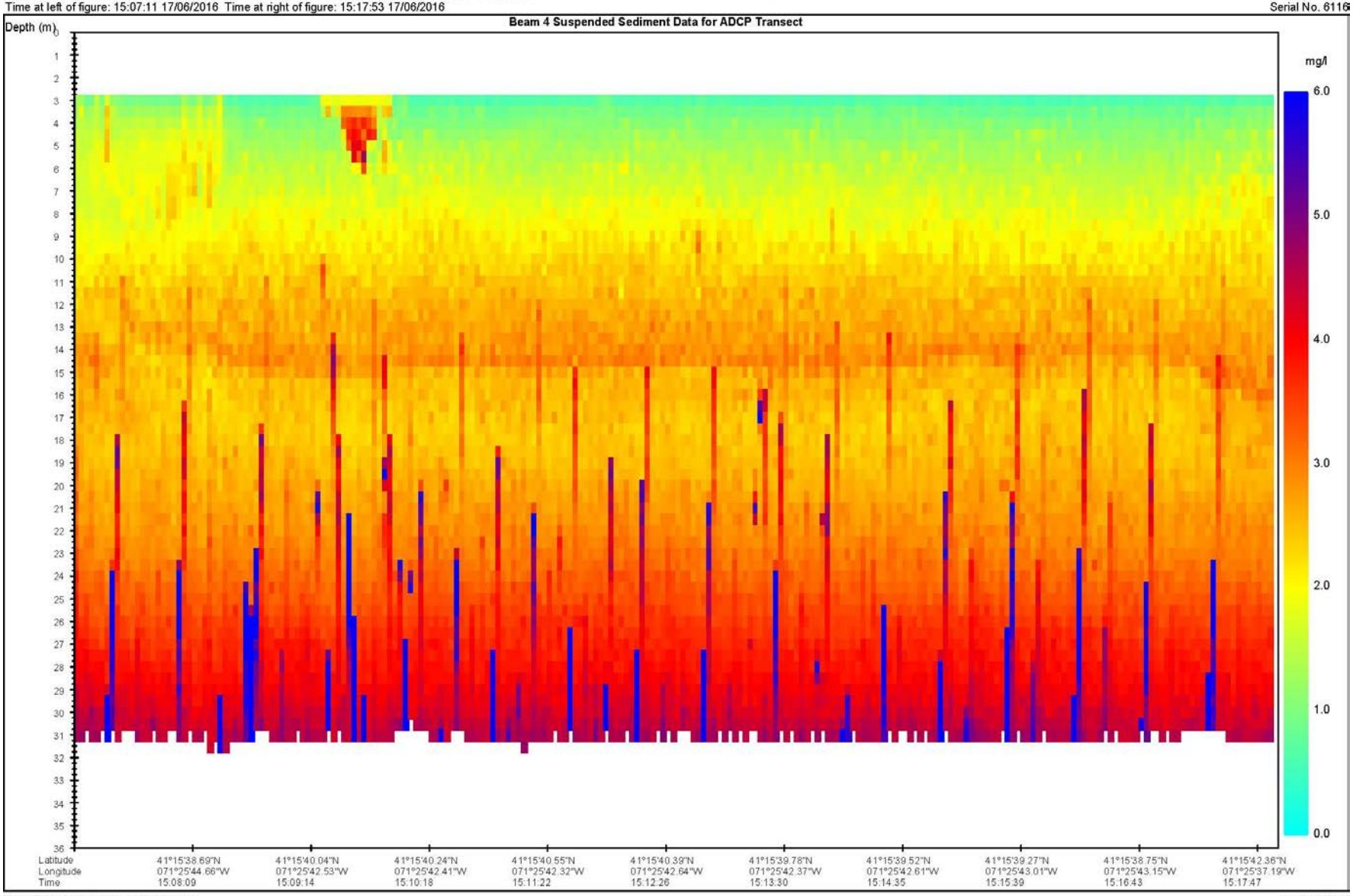
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 10

Figure B030

Transect Start: Lat: 41°15'35"N Long: 071°25'49"W Transect End: Lat: 41°15'42"N Long: 071°25'36"W
Time at left of figure: 15:07:11 17/06/2016 Time at right of figure: 15:17:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

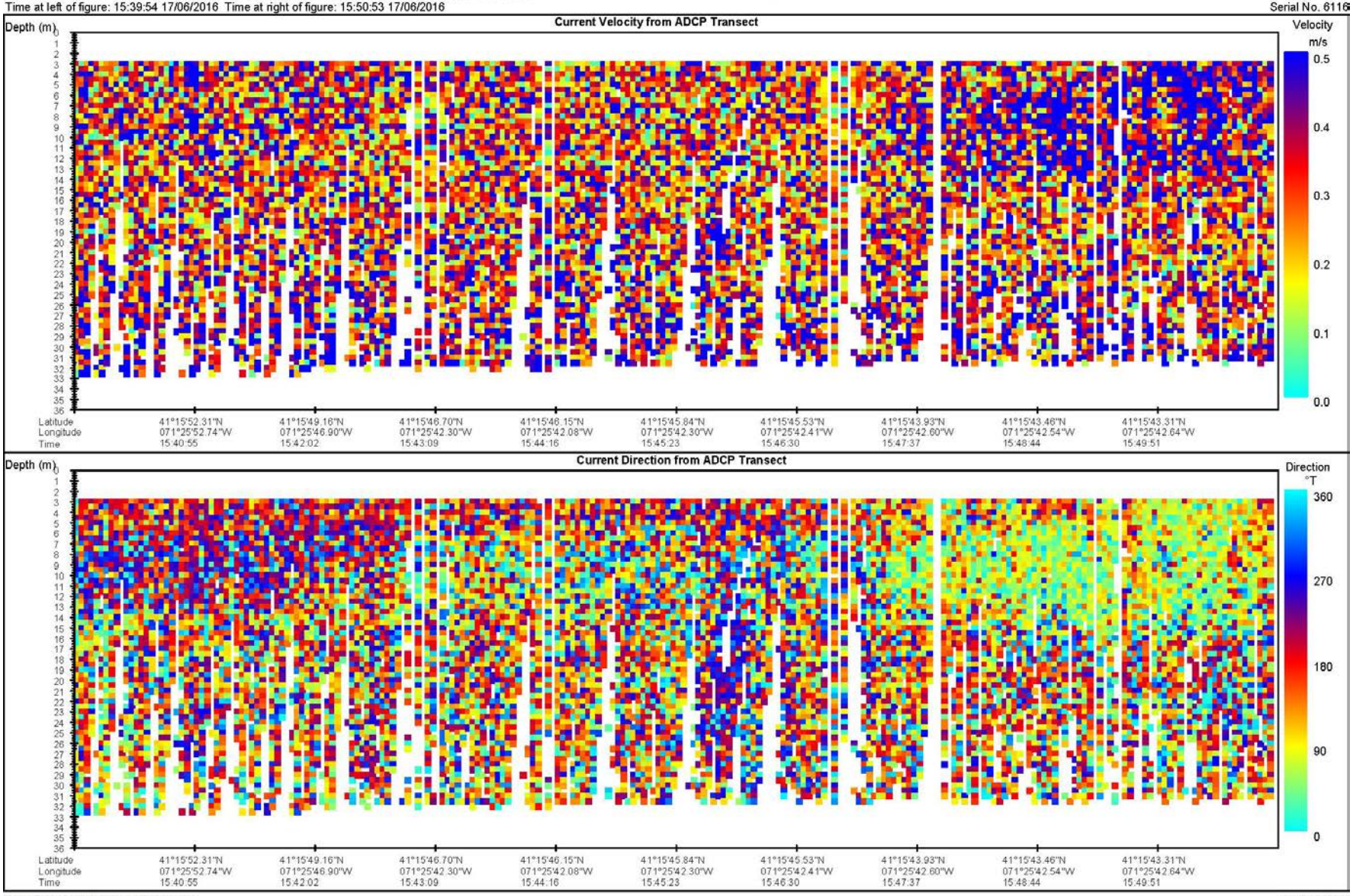
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 12

Figure B031

Transect Start: Lat: 41°15'55"N Long: 071°25'58"W Transect End: Lat: 41°15'43"N Long: 071°25'42"W
Time at left of figure: 15:39:54 17/06/2016 Time at right of figure: 15:50:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

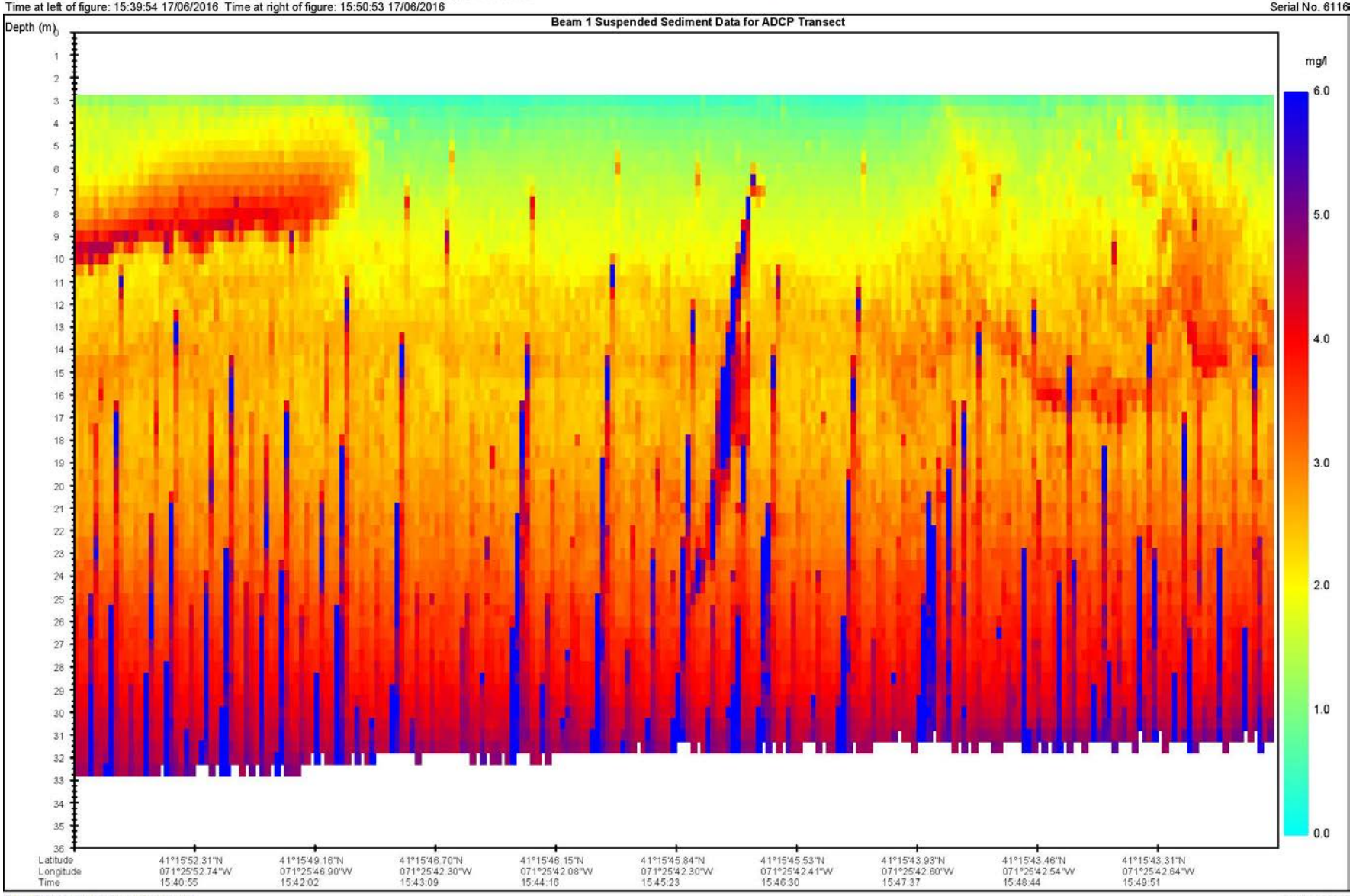
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 12

Figure B032

Transect Start: Lat: 41°15'55"N Long: 071°25'58"W Transect End: Lat: 41°15'43"N Long: 071°25'42"W
Time at left of figure: 15:39:54 17/06/2016 Time at right of figure: 15:50:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

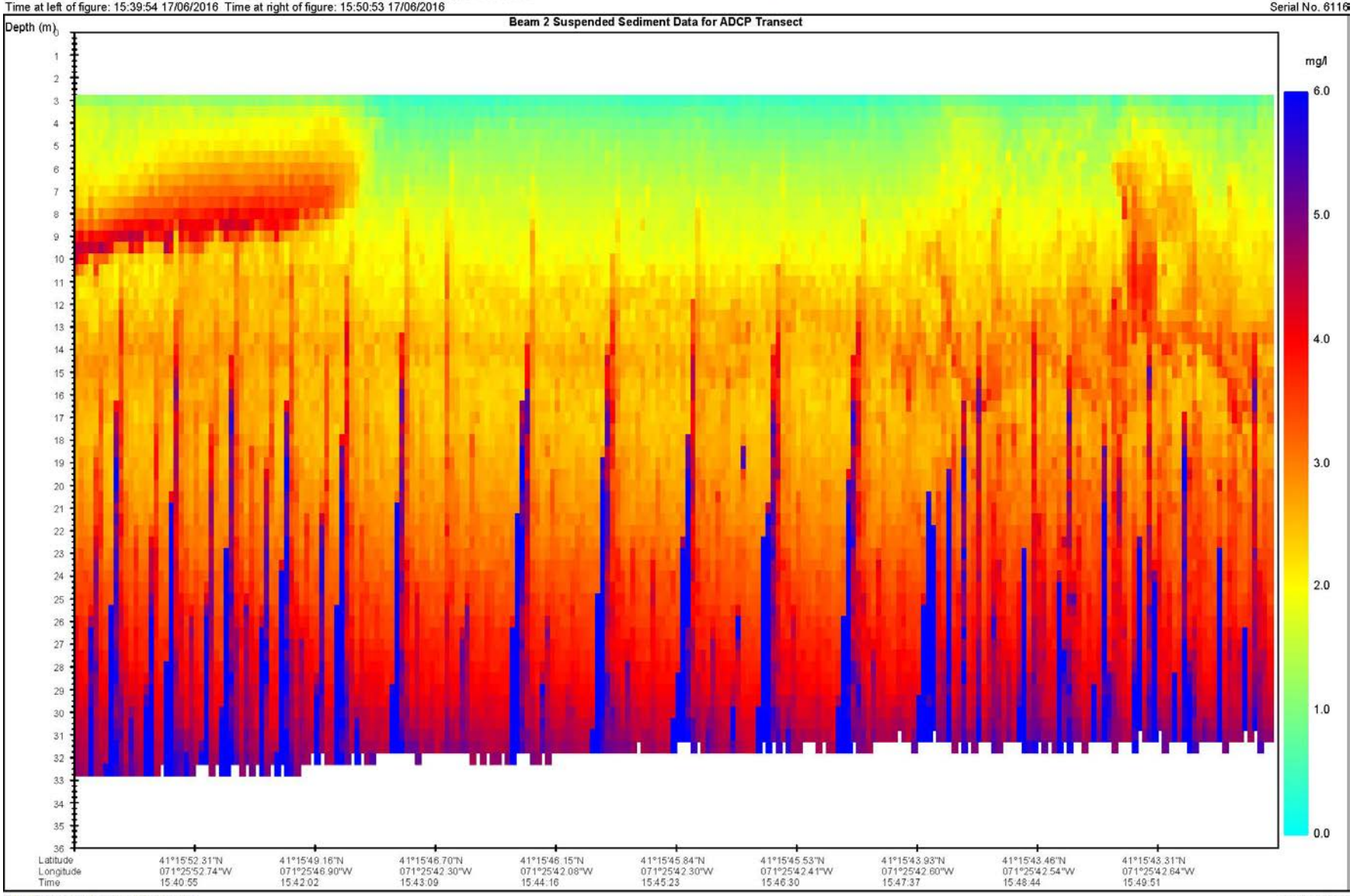
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 12

Figure B033

Transect Start: Lat: 41°15'55"N Long: 071°25'58"W Transect End: Lat: 41°15'43"N Long: 071°25'42"W
Time at left of figure: 15:39:54 17/06/2016 Time at right of figure: 15:50:53 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

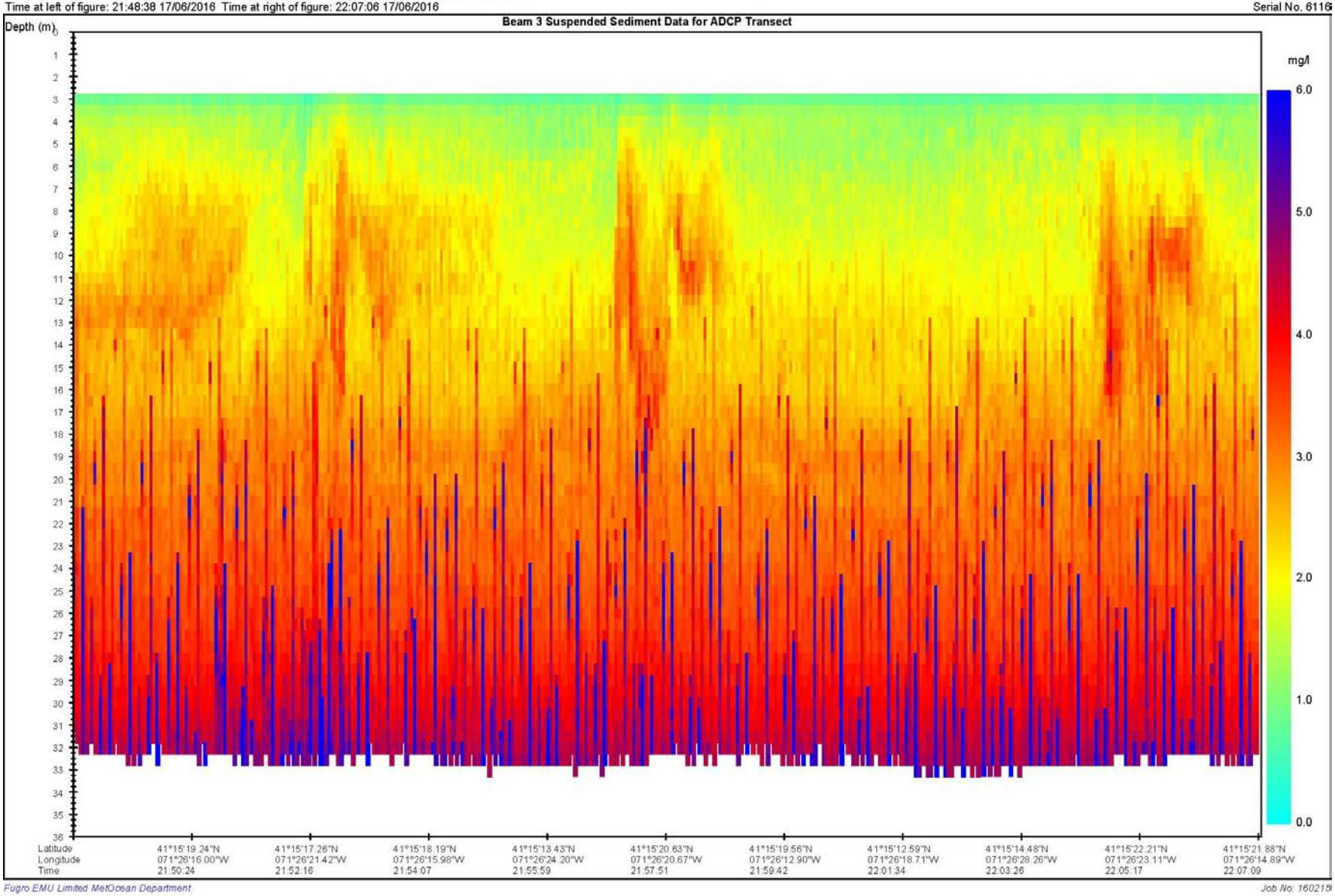
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 12

Figure B034

Transect Start: Lat: 41°15'27"N Long: 071°26'10"W Transect End: Lat: 41°15'21"N Long: 071°26'14"W
Time at left of figure: 21:48:38 17/06/2016 Time at right of figure: 22:07:06 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

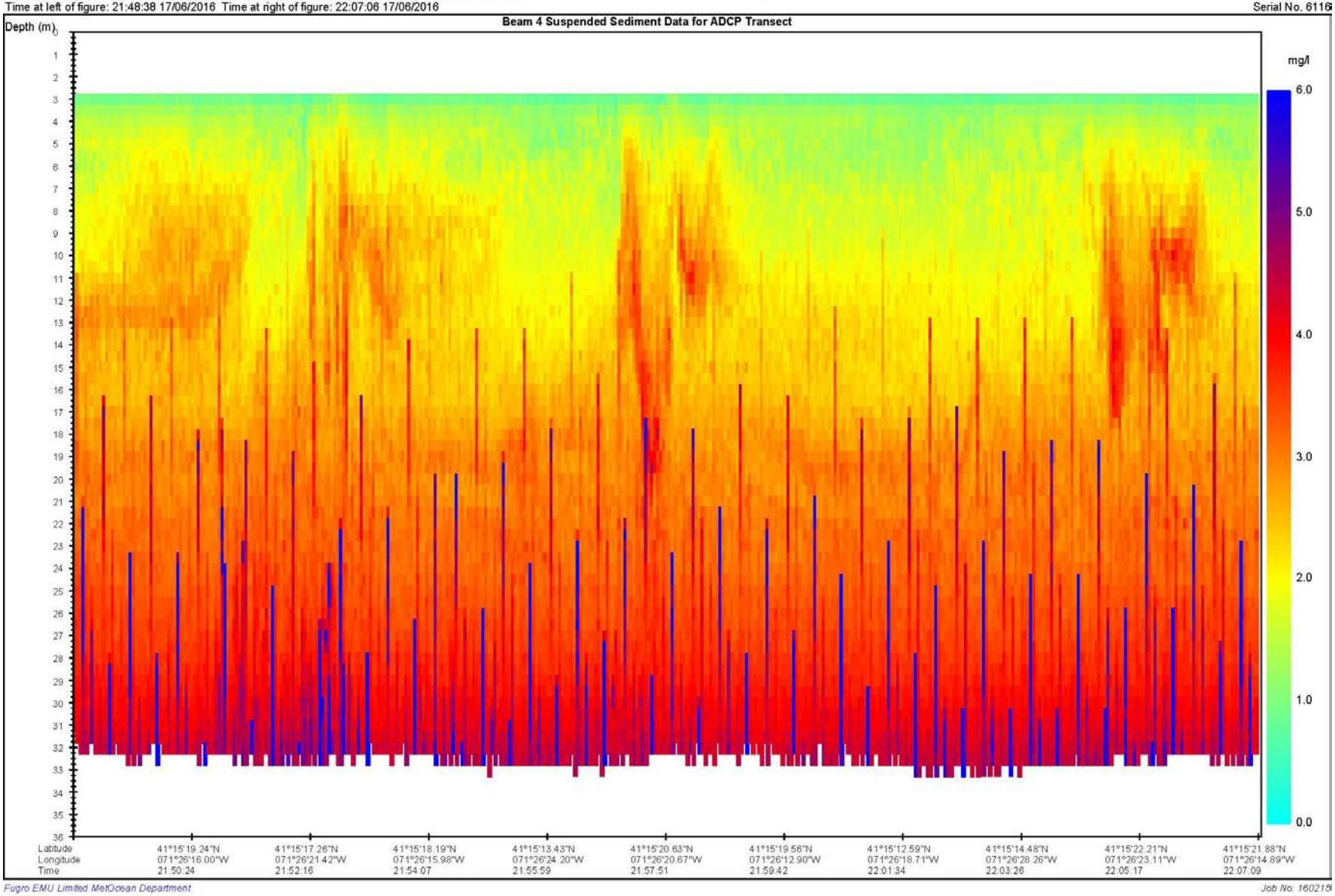
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 12

Figure B035

Transect Start: Lat: 41°15'27"N Long: 071°26'10"W Transect End: Lat: 41°15'21"N Long: 071°26'14"W
Time at left of figure: 21:48:38 17/06/2016 Time at right of figure: 22:07:06 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

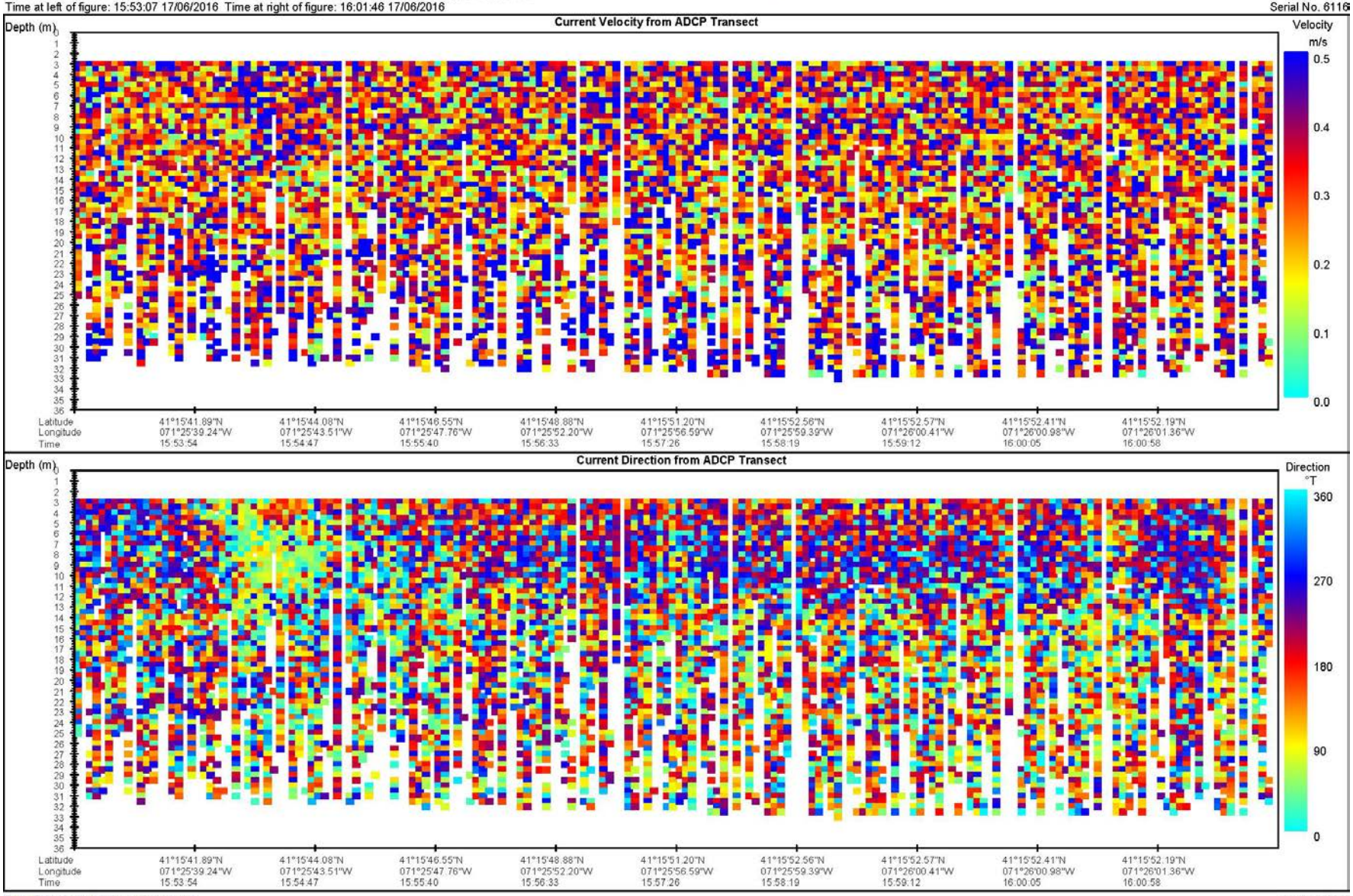
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 12

Figure B036

Transect Start: Lat: 41°15'39"N Long: 071°25'34"W Transect End: Lat: 41°15'51"N Long: 071°26'01"W
Time at left of figure: 15:53:07 17/06/2016 Time at right of figure: 16:01:46 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

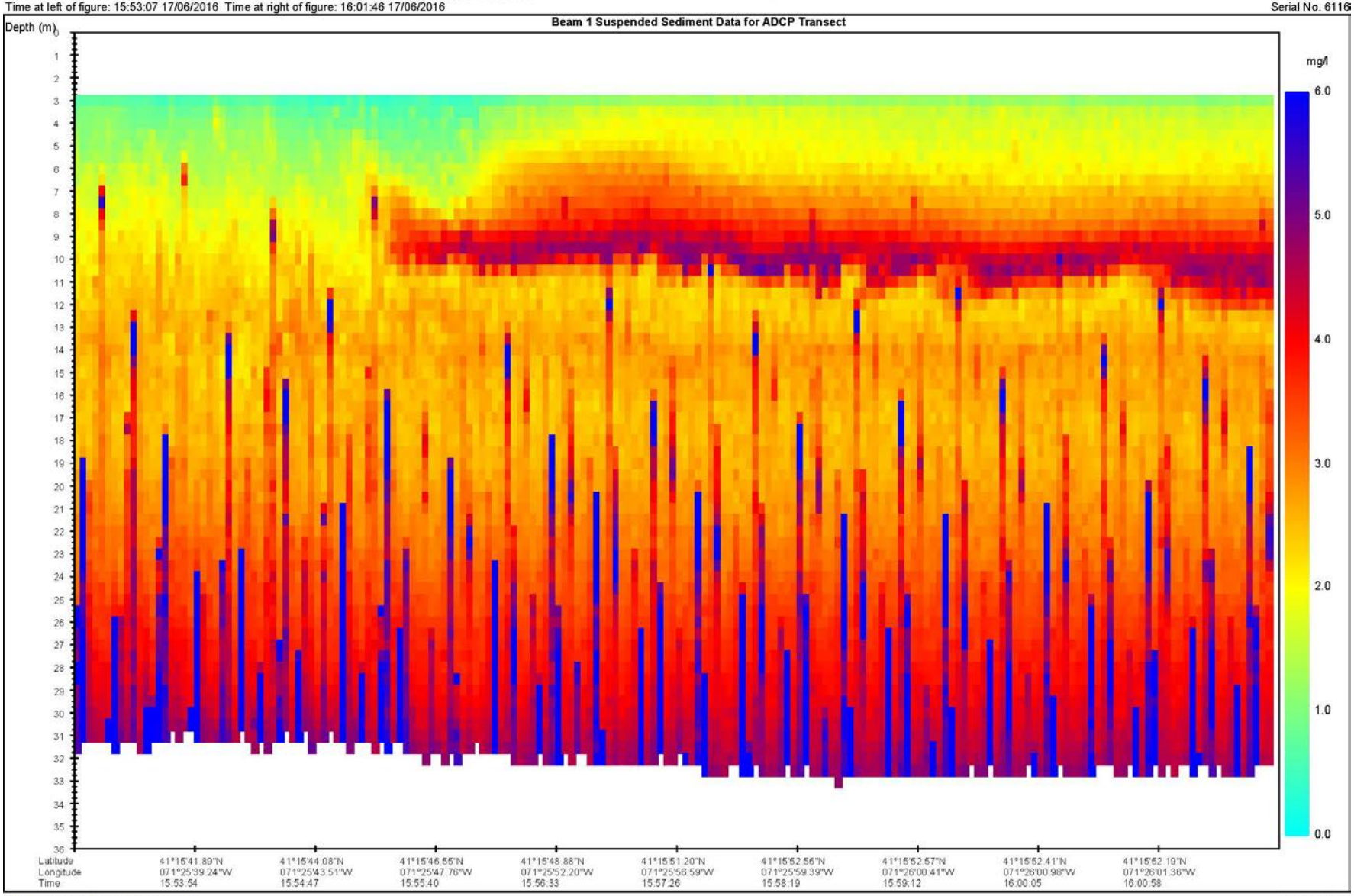
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 13

Figure B037

Transect Start: Lat: 41°15'39"N Long: 071°25'34"W Transect End: Lat: 41°15'51"N Long: 071°26'01"W
Time at left of figure: 15:53:07 17/06/2016 Time at right of figure: 16:01:46 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

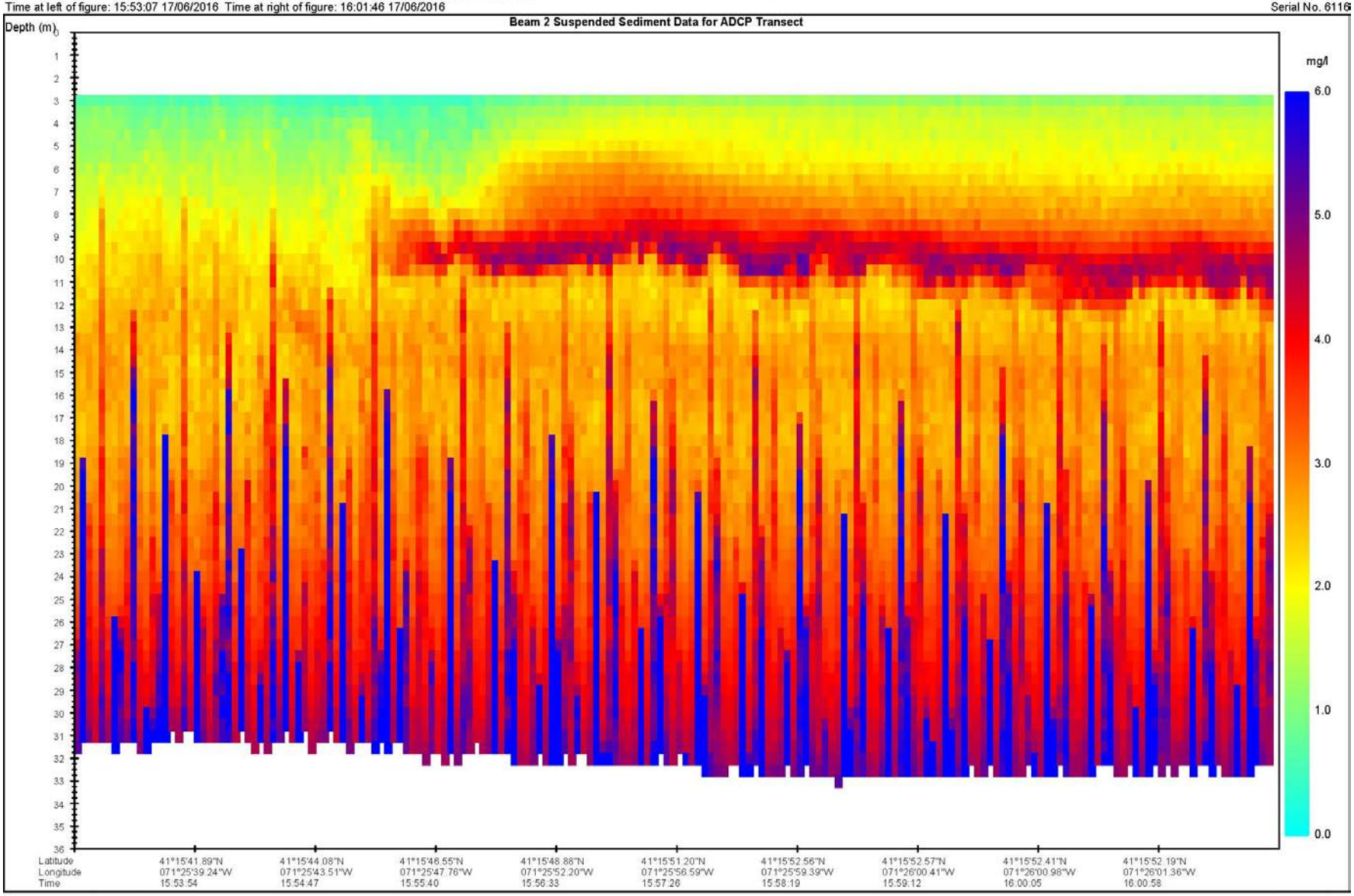
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 13

Figure B038

Transect Start: Lat: 41°15'39"N Long: 071°25'34"W Transect End: Lat: 41°15'51"N Long: 071°26'01"W
Time at left of figure: 15:53:07 17/06/2016 Time at right of figure: 16:01:46 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

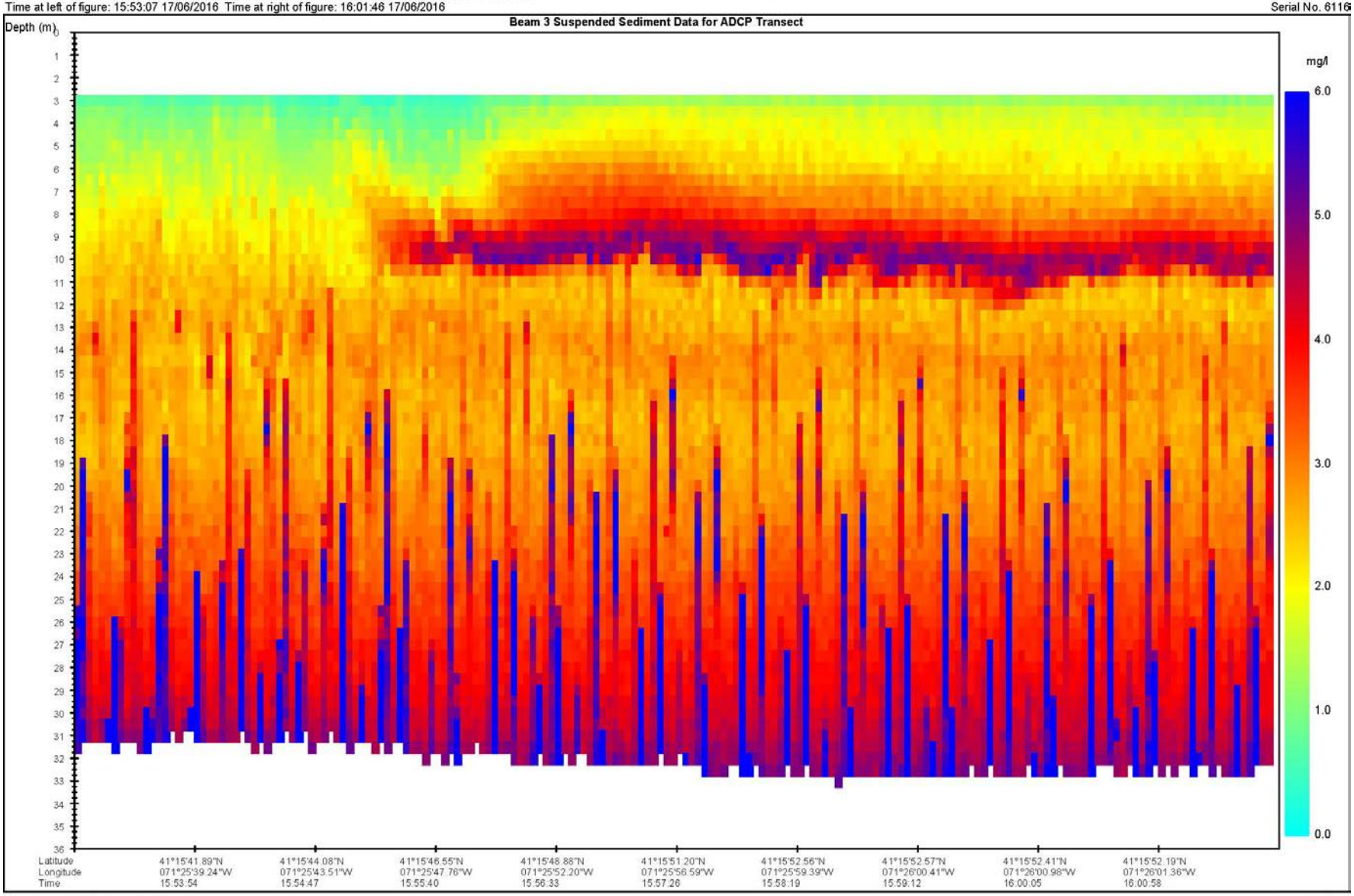
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 13

Figure B039

Transect Start: Lat: 41°15'39"N Long: 071°25'34"W Transect End: Lat: 41°15'51"N Long: 071°26'01"W
Time at left of figure: 15:53:07 17/06/2016 Time at right of figure: 16:01:46 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

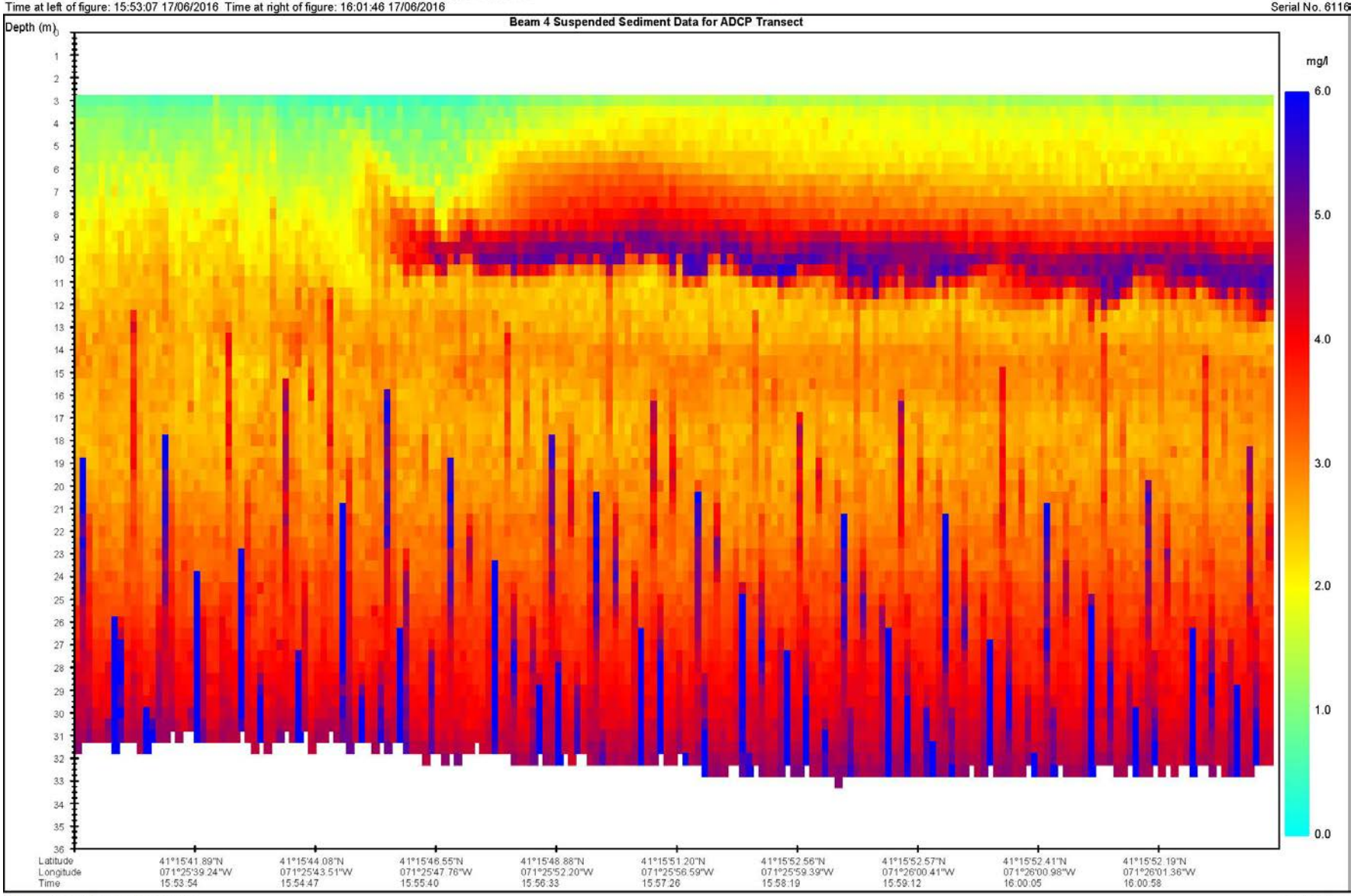
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 13

Figure B040

Transect Start: Lat: 41°15'39"N Long: 071°25'34"W Transect End: Lat: 41°15'51"N Long: 071°26'01"W
Time at left of figure: 15:53:07 17/06/2016 Time at right of figure: 16:01:46 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

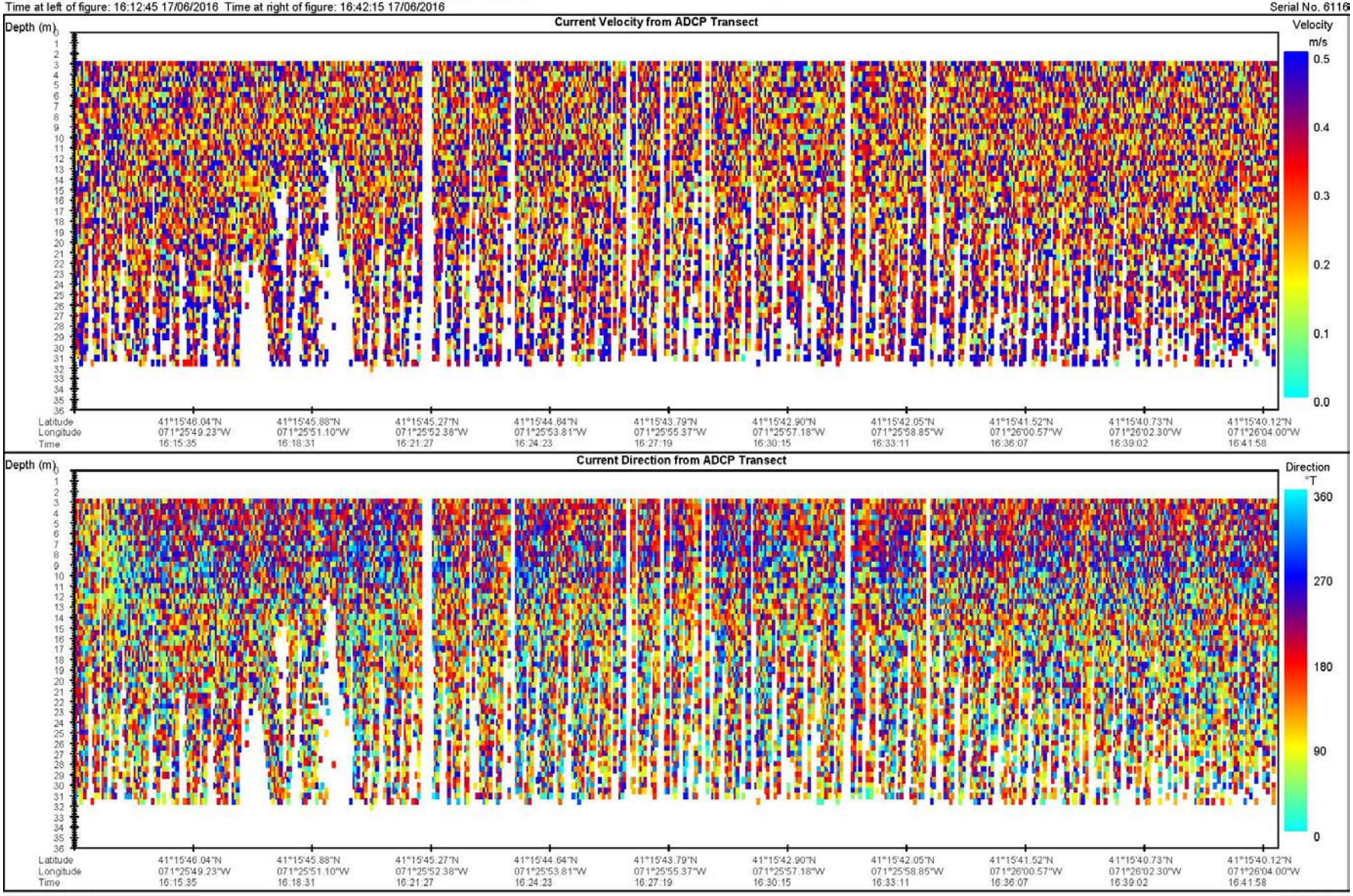
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 15

Figure B041

Transect Start: Lat: 41°15'40"N Long: 071°25'38"W Transect End: Lat: 41°15'40"N Long: 071°26'04"W
Time at left of figure: 16:12:45 17/06/2016 Time at right of figure: 16:42:15 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

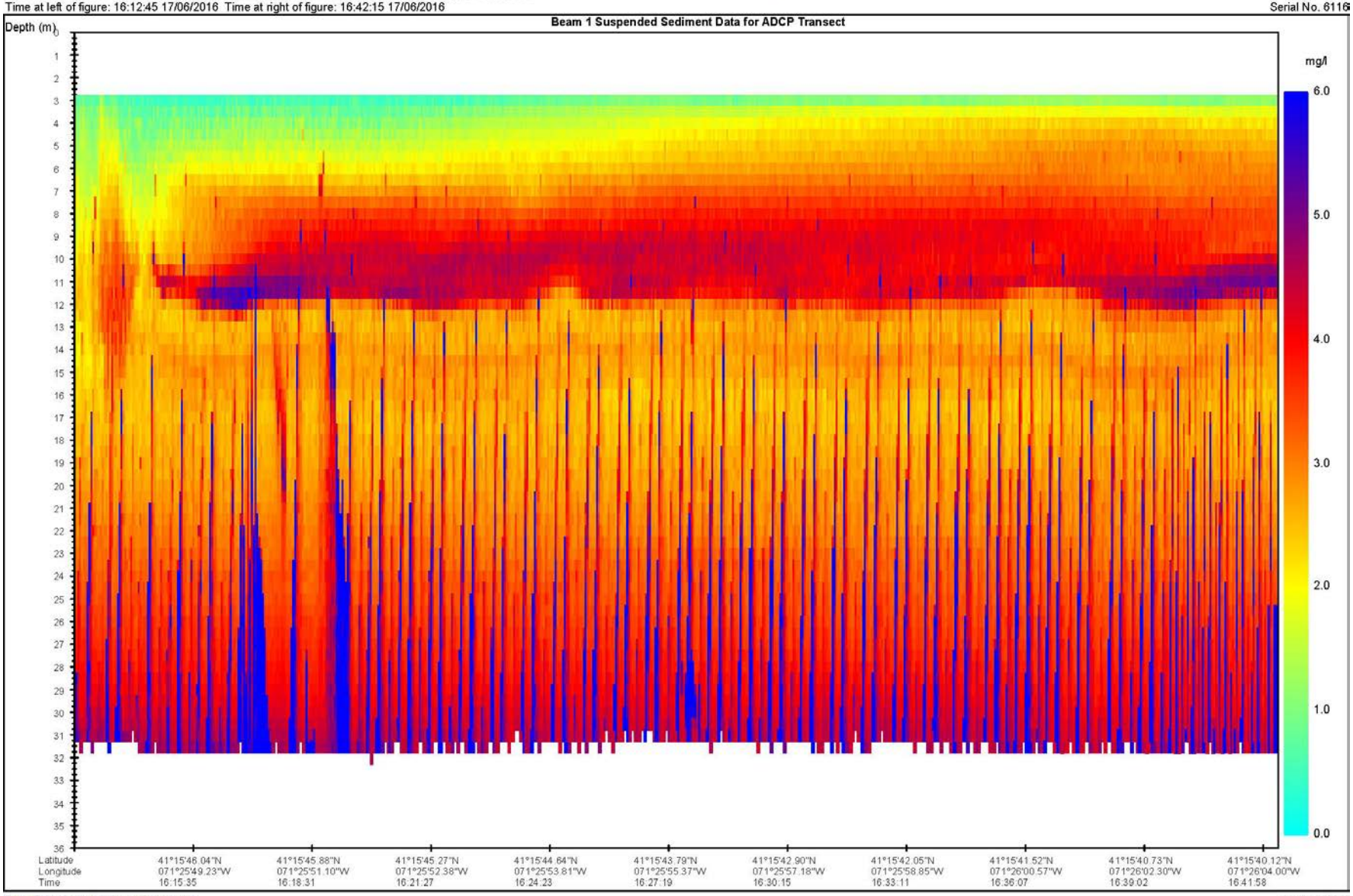
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 15

Figure B042

Transect Start: Lat: 41°15'40"N Long: 071°25'38"W Transect End: Lat: 41°15'40"N Long: 071°26'04"W
Time at left of figure: 16:12:45 17/06/2016 Time at right of figure: 16:42:15 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

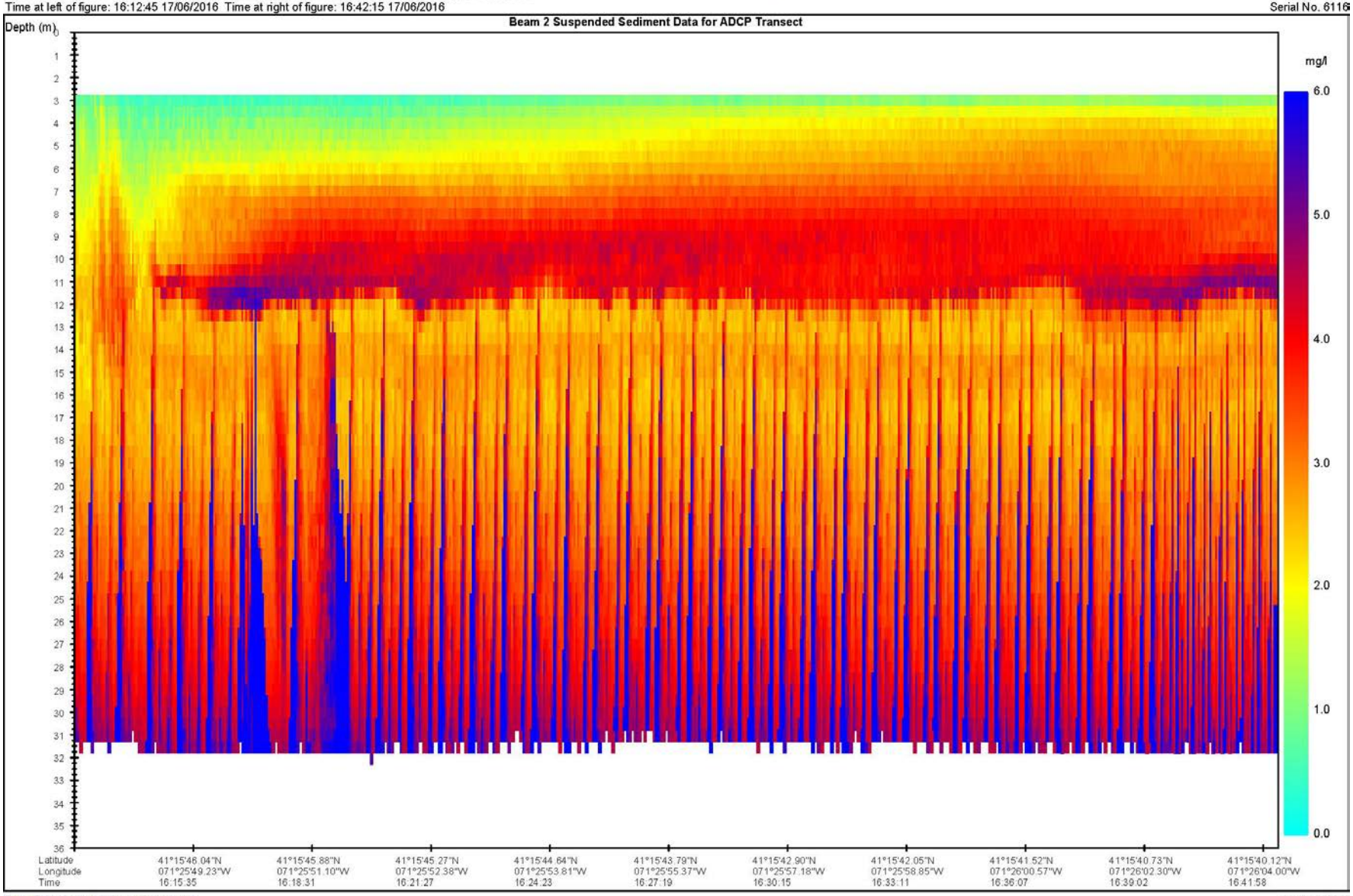
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 15

Figure B043

Transect Start: Lat: 41°15'40"N Long: 071°25'38"W Transect End: Lat: 41°15'40"N Long: 071°26'04"W
Time at left of figure: 16:12:45 17/06/2016 Time at right of figure: 16:42:15 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

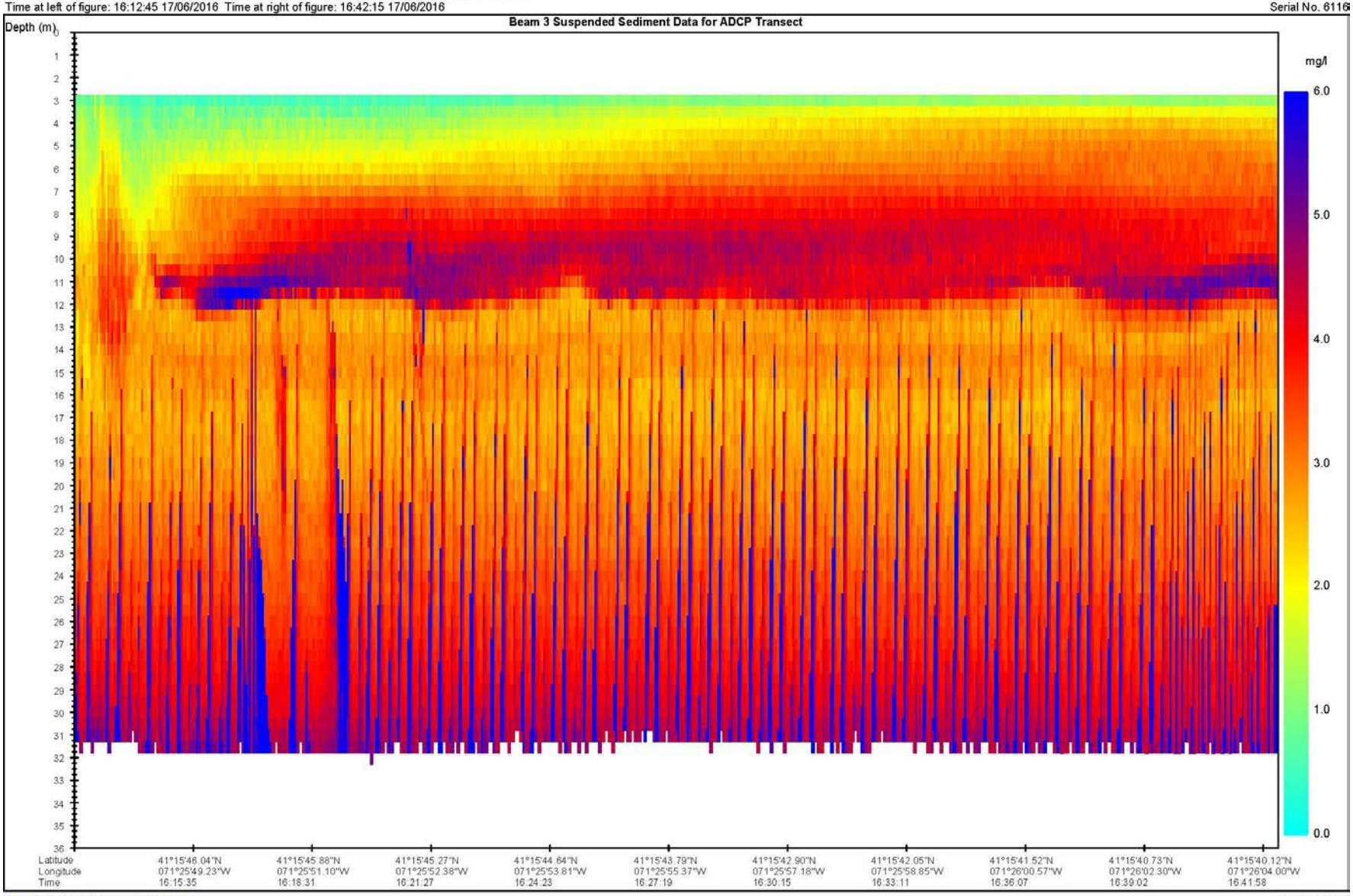
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 15

Figure B044

Transect Start: Lat: 41°15'40"N Long: 071°25'38"W Transect End: Lat: 41°15'40"N Long: 071°26'04"W
Time at left of figure: 16:12:45 17/06/2016 Time at right of figure: 16:42:15 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

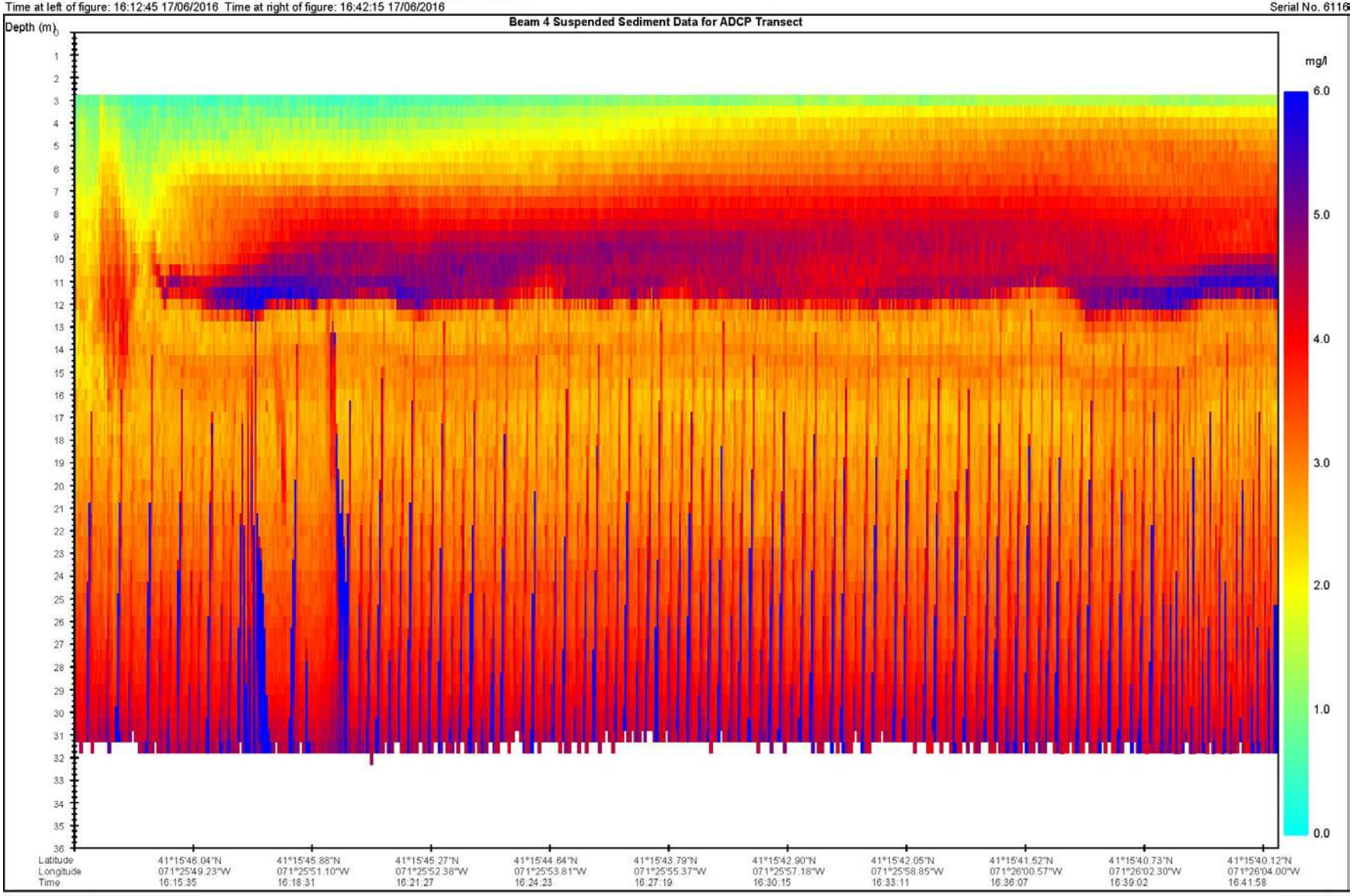
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 15

Figure B045

Transect Start: Lat: 41°15'40"N Long: 071°25'38"W Transect End: Lat: 41°15'40"N Long: 071°26'04"W
Time at left of figure: 16:12:45 17/06/2016 Time at right of figure: 16:42:15 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

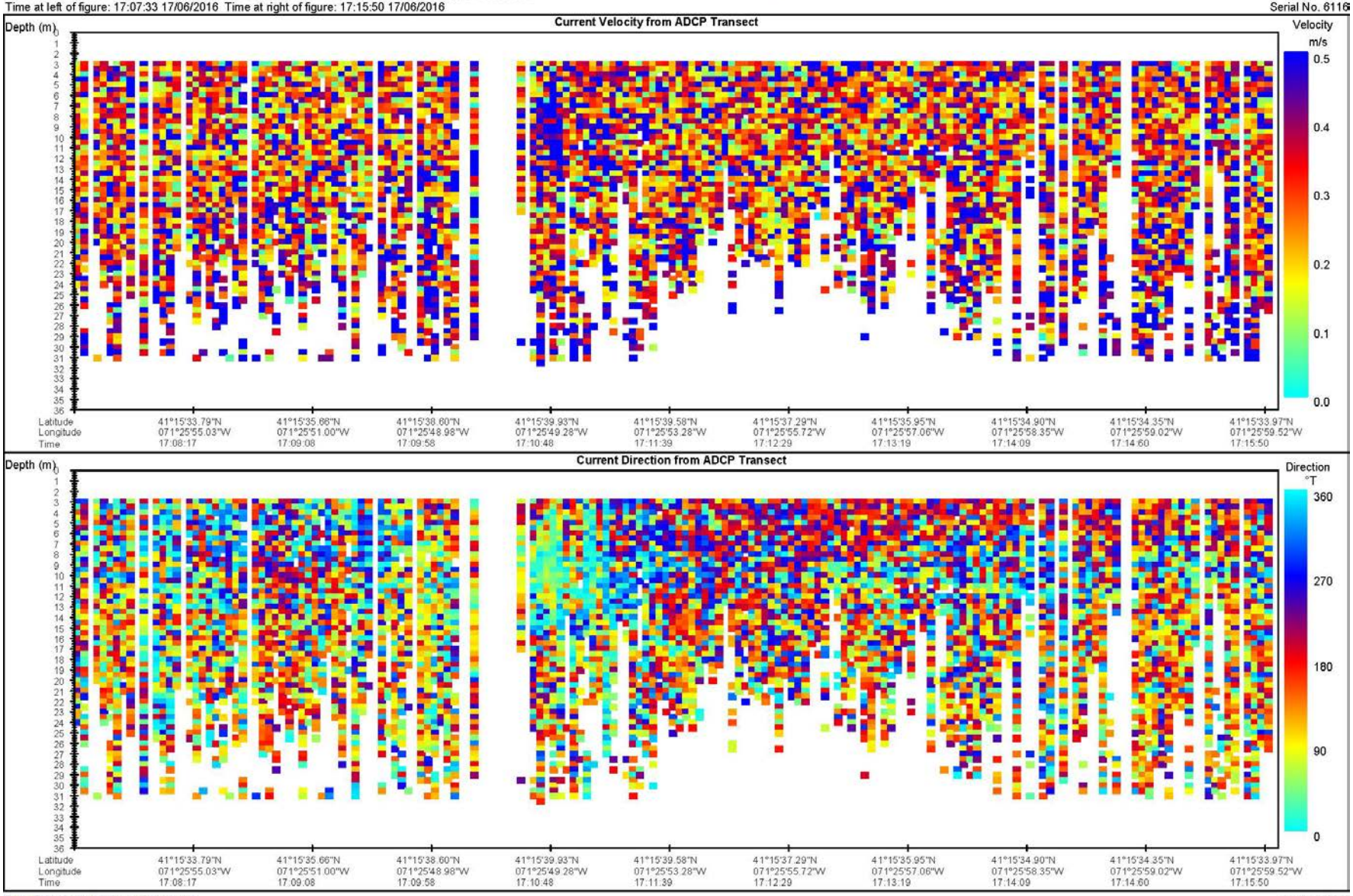
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 16

Figure B046

Transect Start: Lat: 41°15'31"N Long: 071°25'58"W Transect End: Lat: 41°15'33"N Long: 071°25'59"W
Time at left of figure: 17:07:33 17/06/2016 Time at right of figure: 17:15:50 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

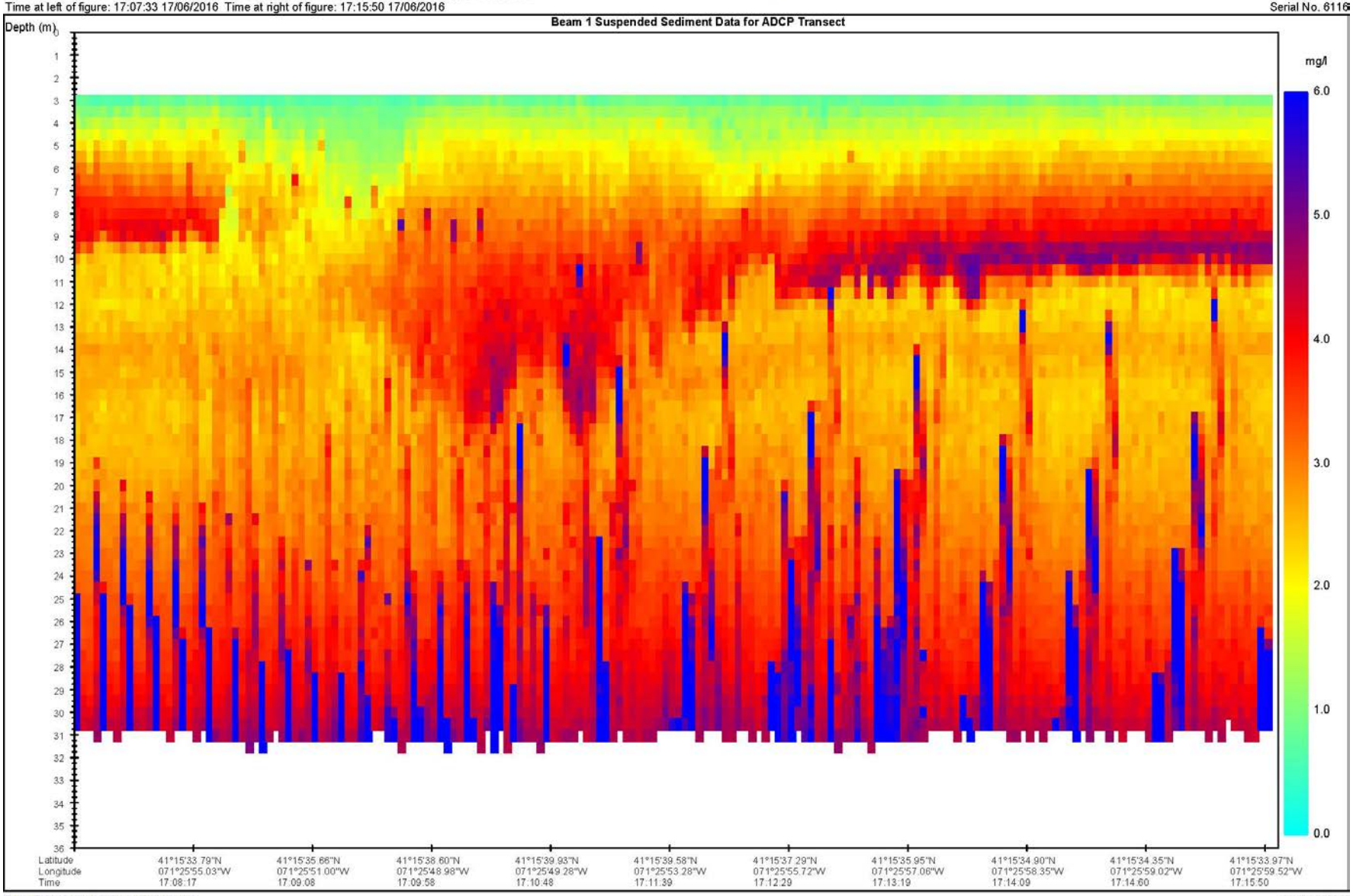
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 16

Figure B047

Transect Start: Lat: 41°15'31"N Long: 071°25'58"W Transect End: Lat: 41°15'33"N Long: 071°25'59"W
Time at left of figure: 17:07:33 17/06/2016 Time at right of figure: 17:15:50 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

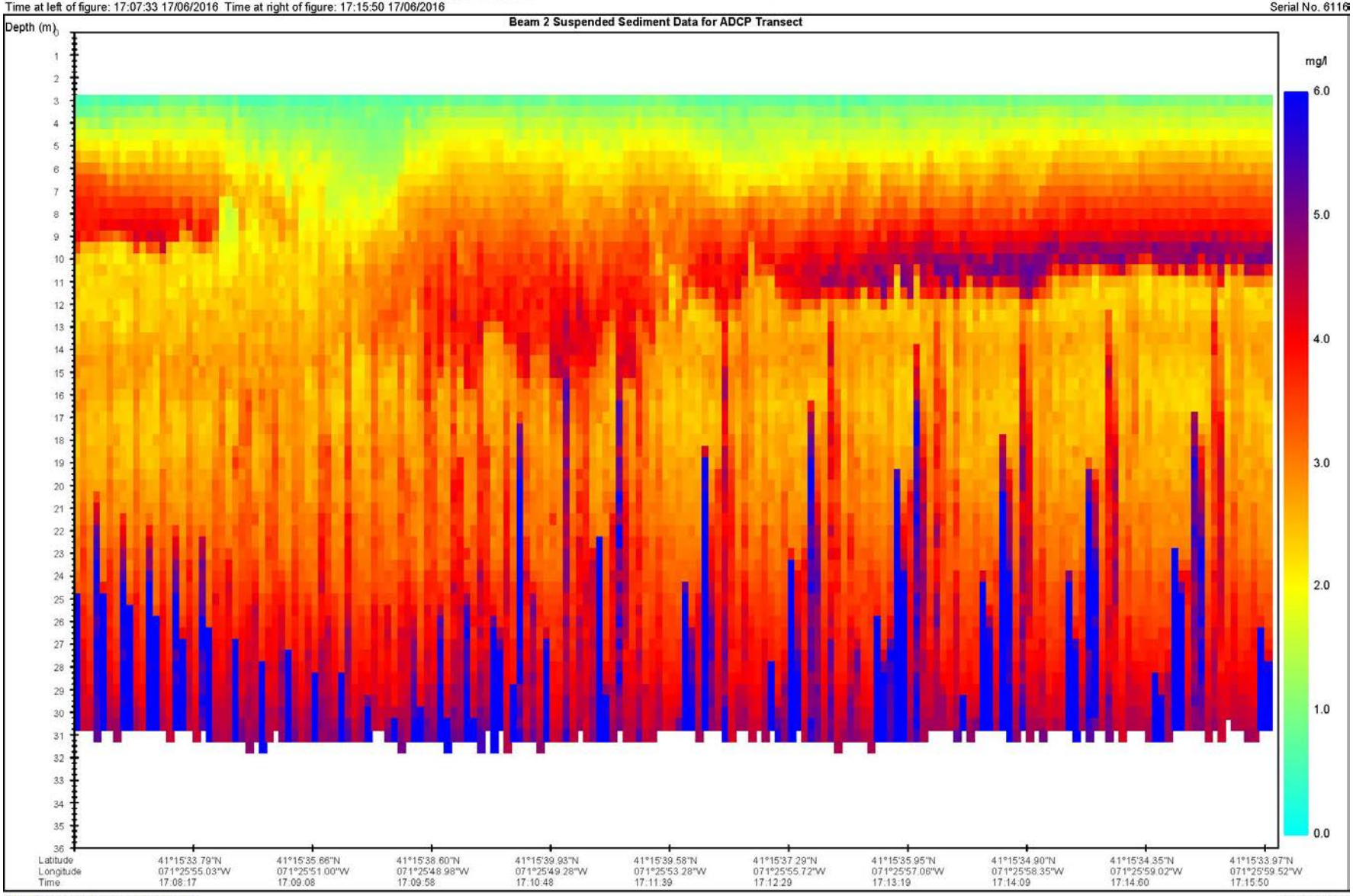
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 16

Figure B048

Transect Start: Lat: 41°15'31"N Long: 071°25'58"W Transect End: Lat: 41°15'33"N Long: 071°25'59"W
Time at left of figure: 17:07:33 17/06/2016 Time at right of figure: 17:15:50 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

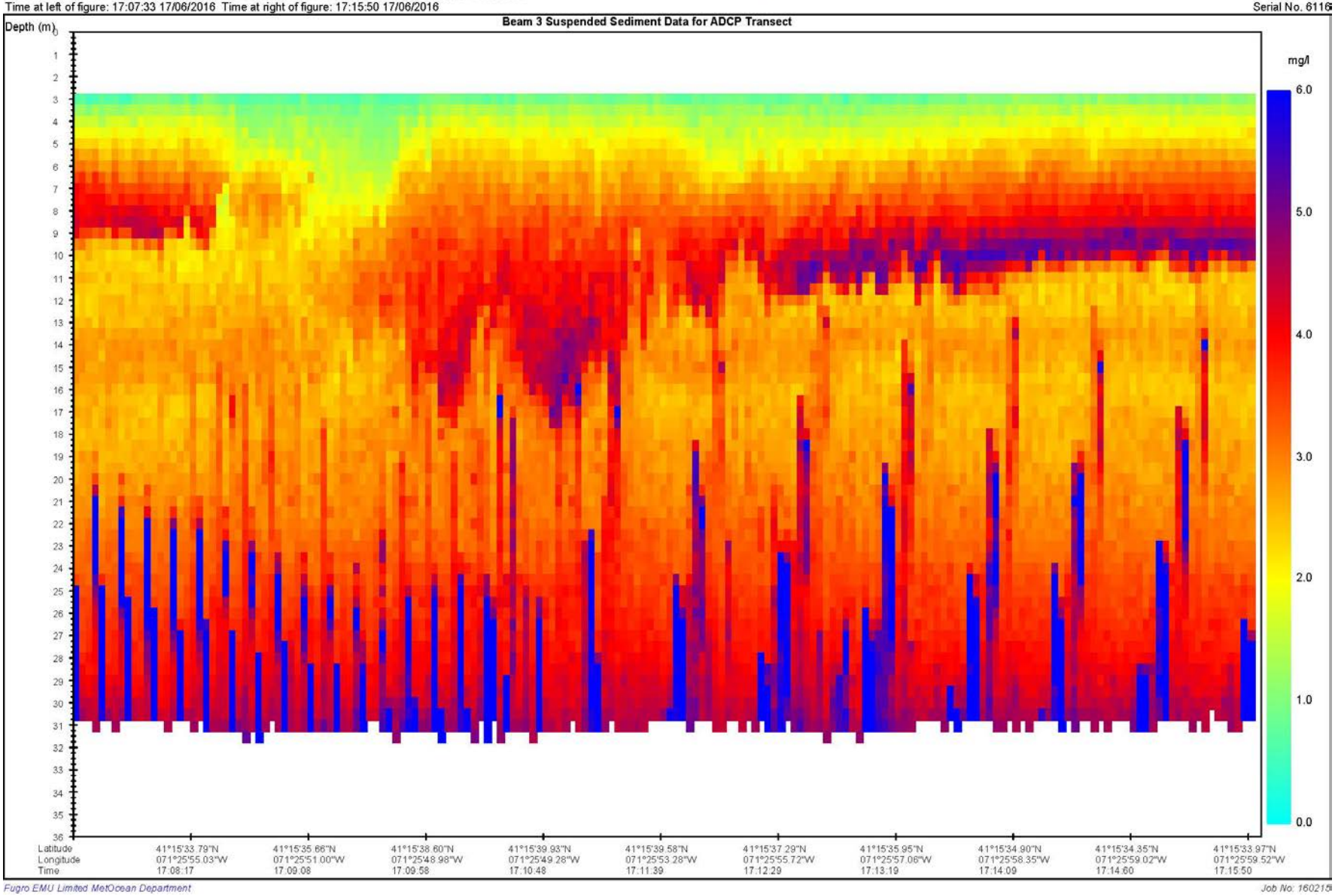
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 16

Figure B049

Transect Start: Lat: 41°15'31"N Long: 071°25'58"W Transect End: Lat: 41°15'33"N Long: 071°25'59"W
Time at left of figure: 17:07:33 17/06/2016 Time at right of figure: 17:15:50 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

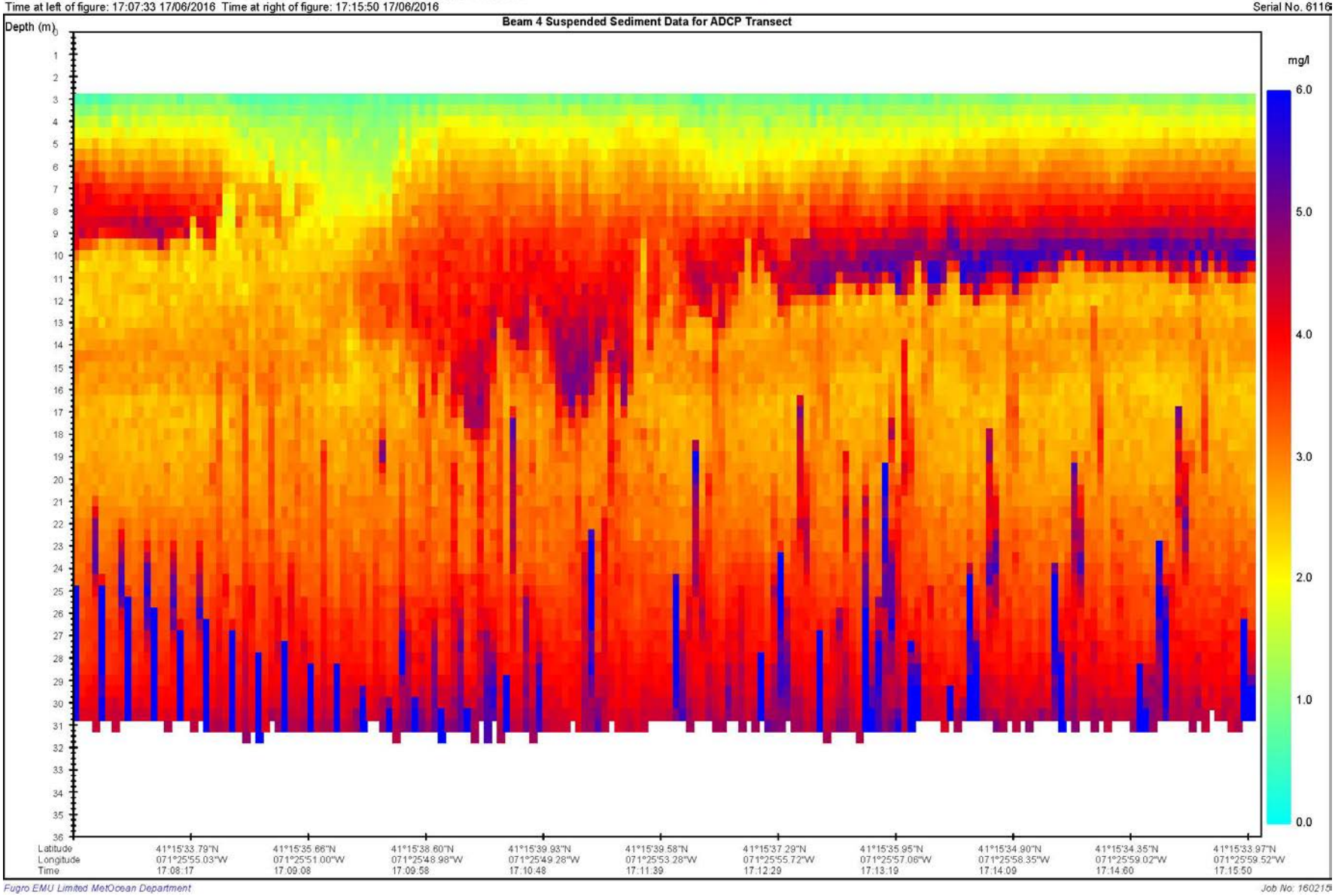
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 16

Figure B050

Transect Start: Lat: 41°15'31"N Long: 071°25'58"W Transect End: Lat: 41°15'33"N Long: 071°25'59"W
Time at left of figure: 17:07:33 17/06/2016 Time at right of figure: 17:15:50 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

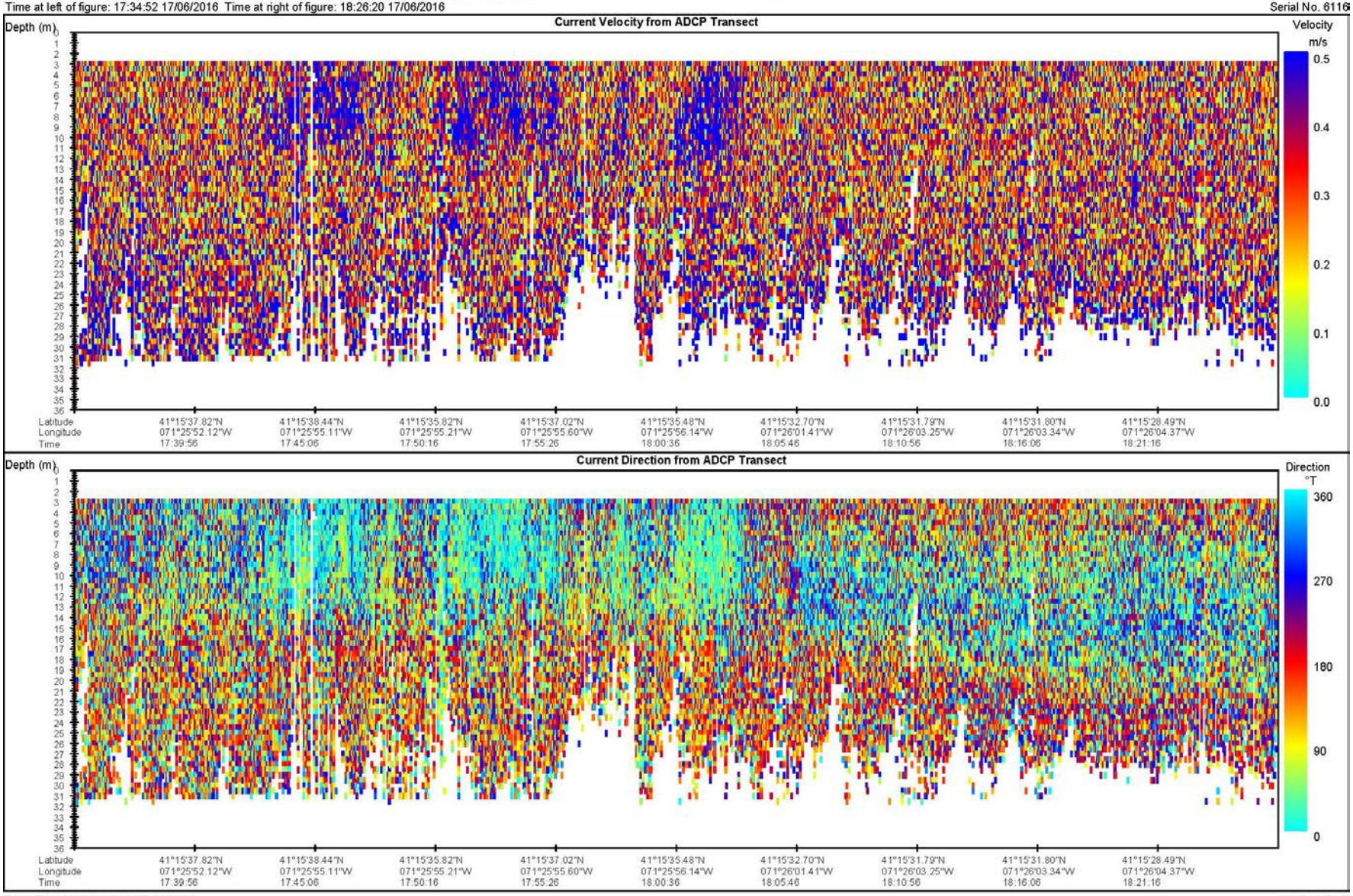
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 17

Figure B051

Transect Start: Lat: 41°15'28"N Long: 071°26'04"W Transect End: Lat: 41°15'27"N Long: 071°26'05"W
Time at left of figure: 17:34:52 17/06/2016 Time at right of figure: 18:26:20 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

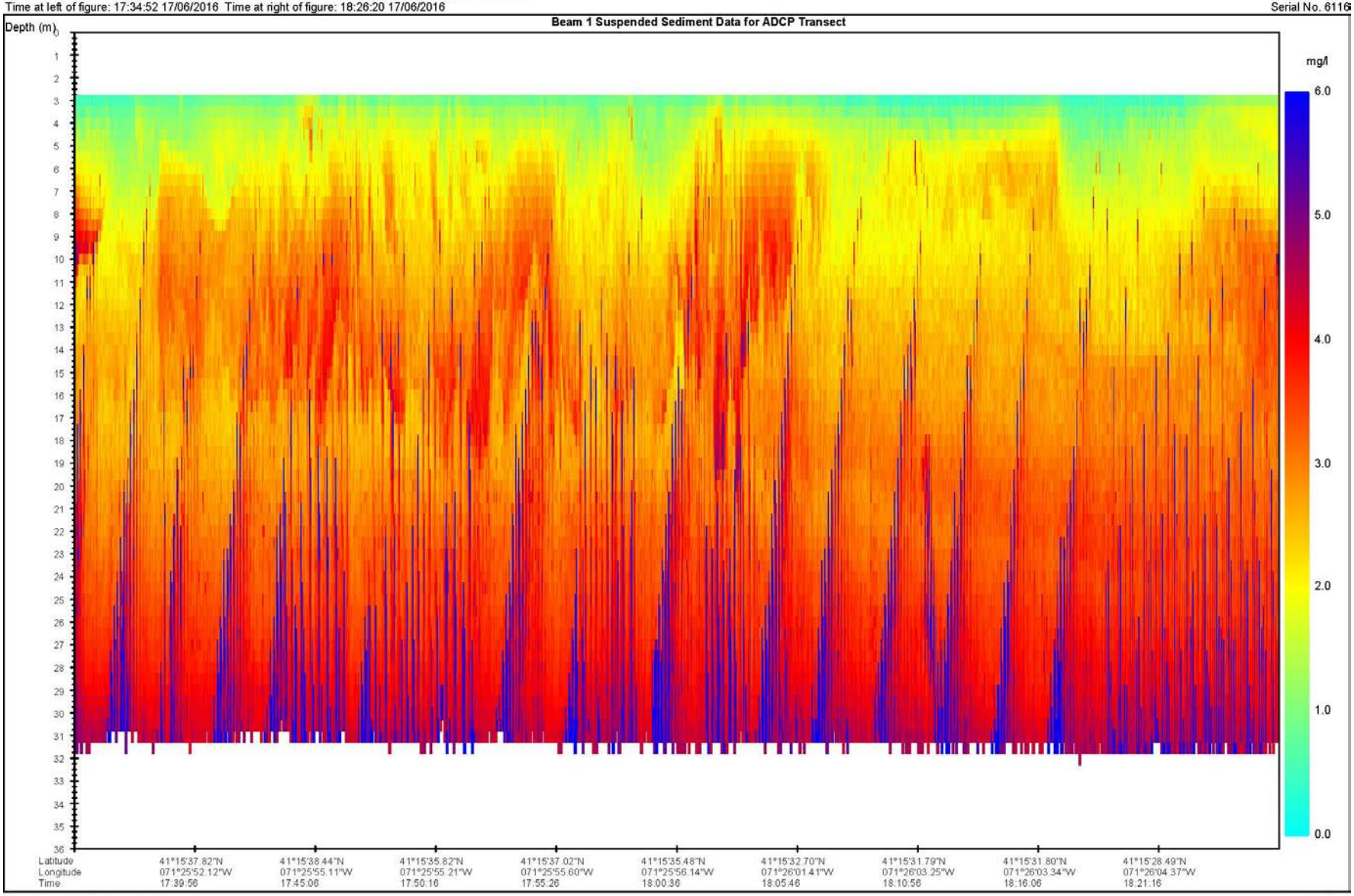
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 17

Figure B052

Transect Start: Lat: 41°15'28"N Long: 071°26'04"W Transect End: Lat: 41°15'27"N Long: 071°26'05"W
Time at left of figure: 17:34:52 17/06/2016 Time at right of figure: 18:26:20 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

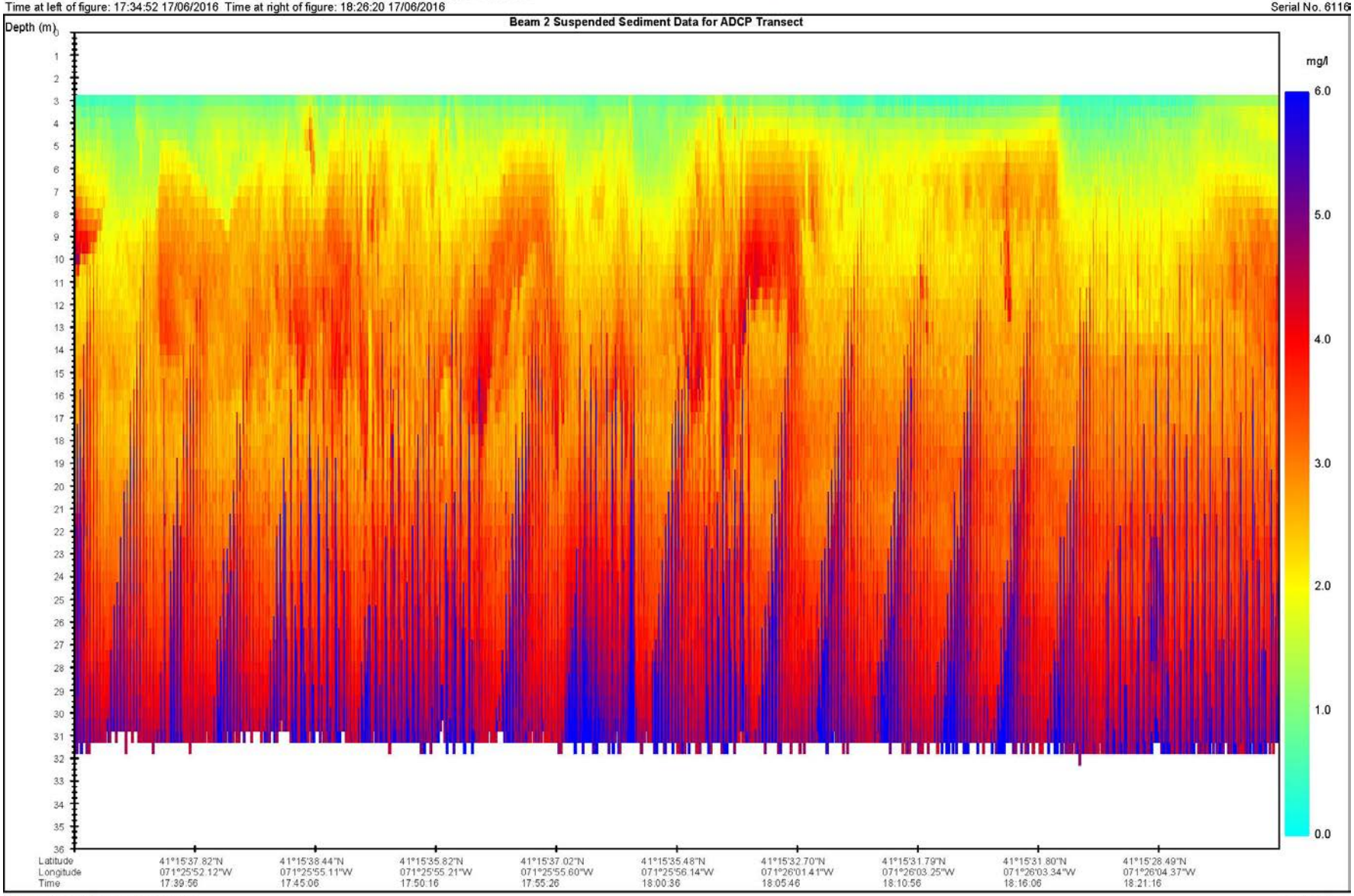
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 17

Figure B053

Transect Start: Lat: 41°15'28"N Long: 071°26'04"W Transect End: Lat: 41°15'27"N Long: 071°26'05"W
Time at left of figure: 17:34:52 17/06/2016 Time at right of figure: 18:26:20 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

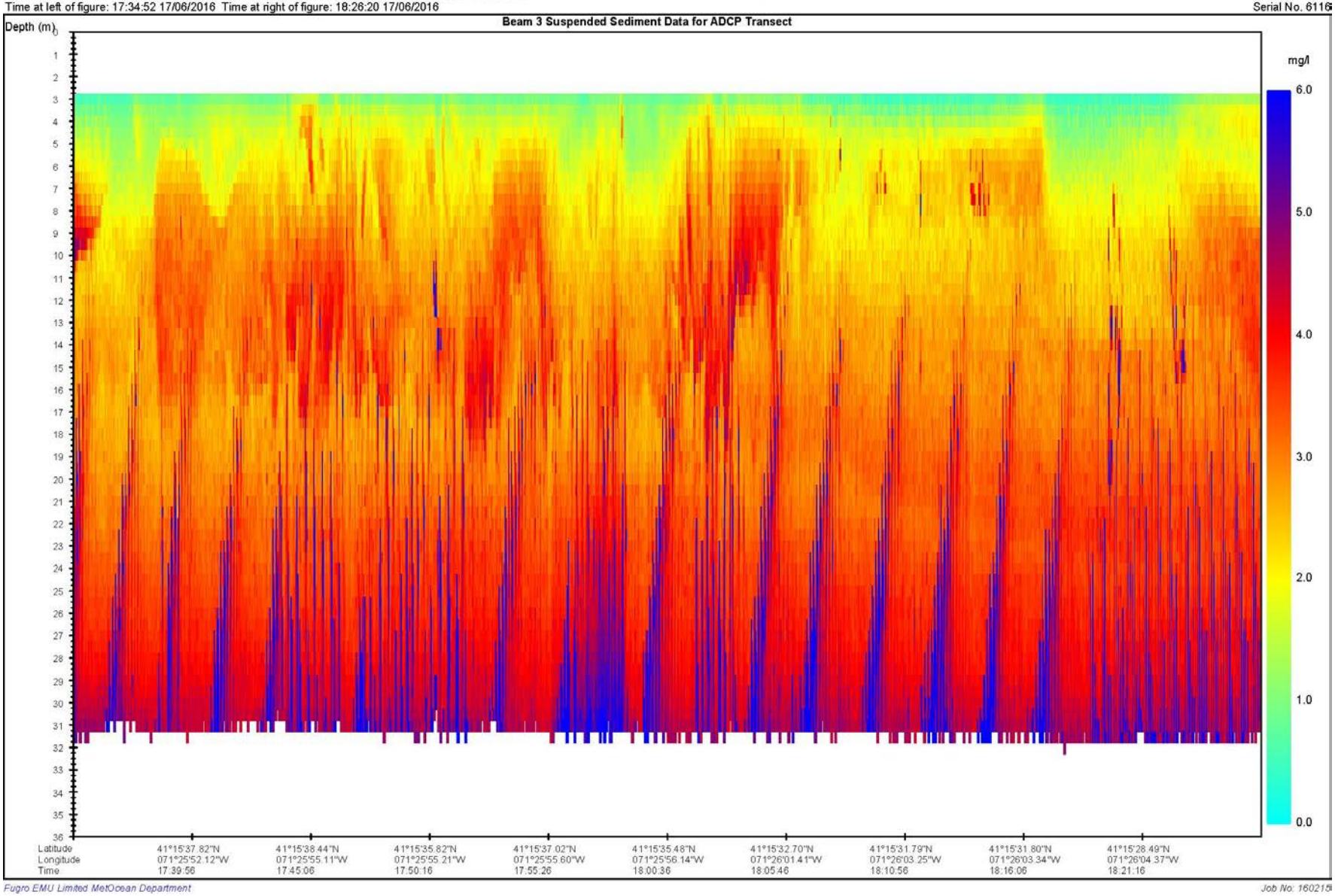
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 17

Figure B054

Transect Start: Lat: 41°15'28"N Long: 071°26'04"W Transect End: Lat: 41°15'27"N Long: 071°26'05"W
Time at left of figure: 17:34:52 17/06/2016 Time at right of figure: 18:26:20 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

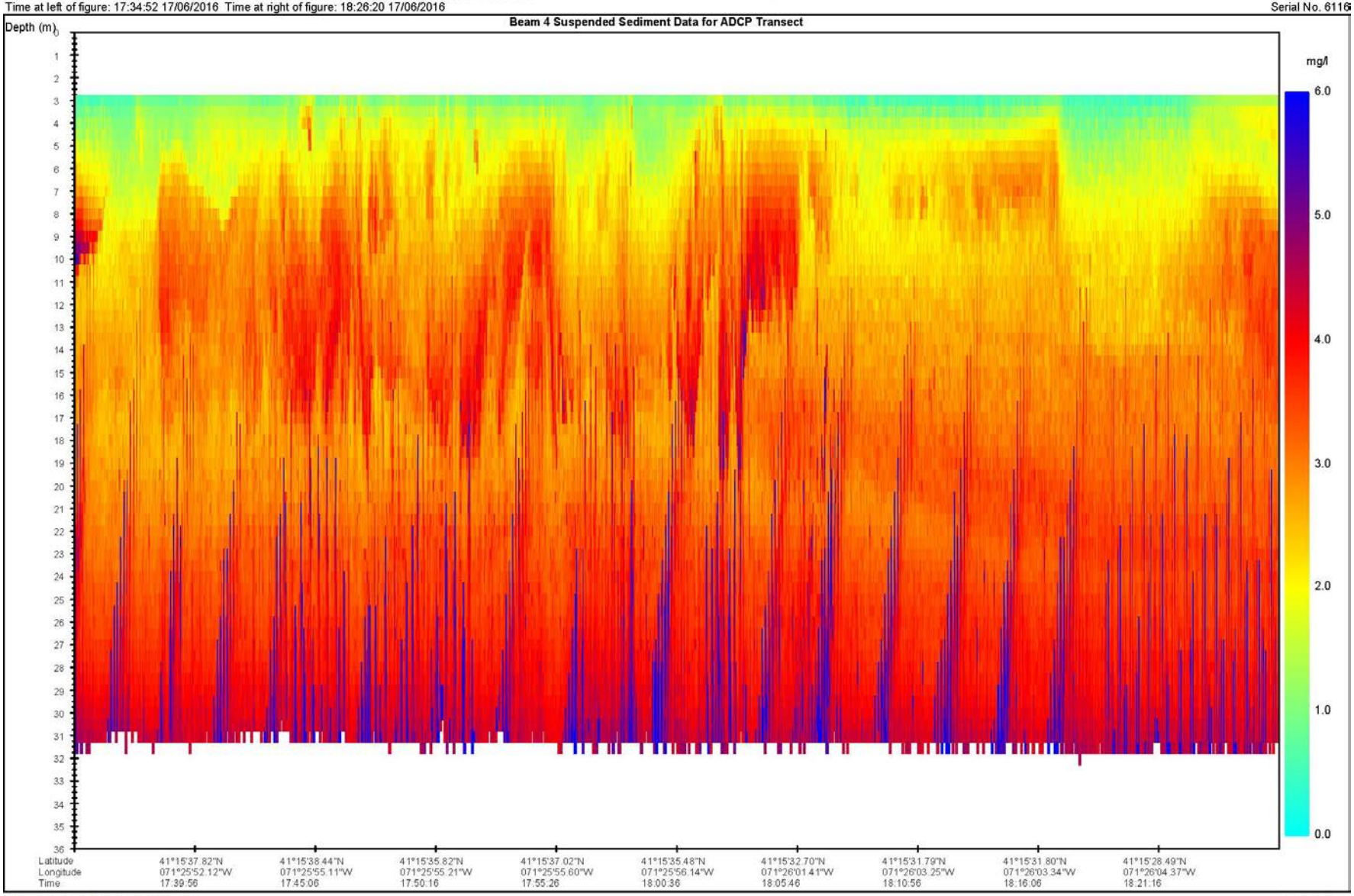
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 17

Figure B055

Transect Start: Lat: 41°15'28"N Long: 071°26'04"W Transect End: Lat: 41°15'27"N Long: 071°26'05"W
Time at left of figure: 17:34:52 17/06/2016 Time at right of figure: 18:26:20 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

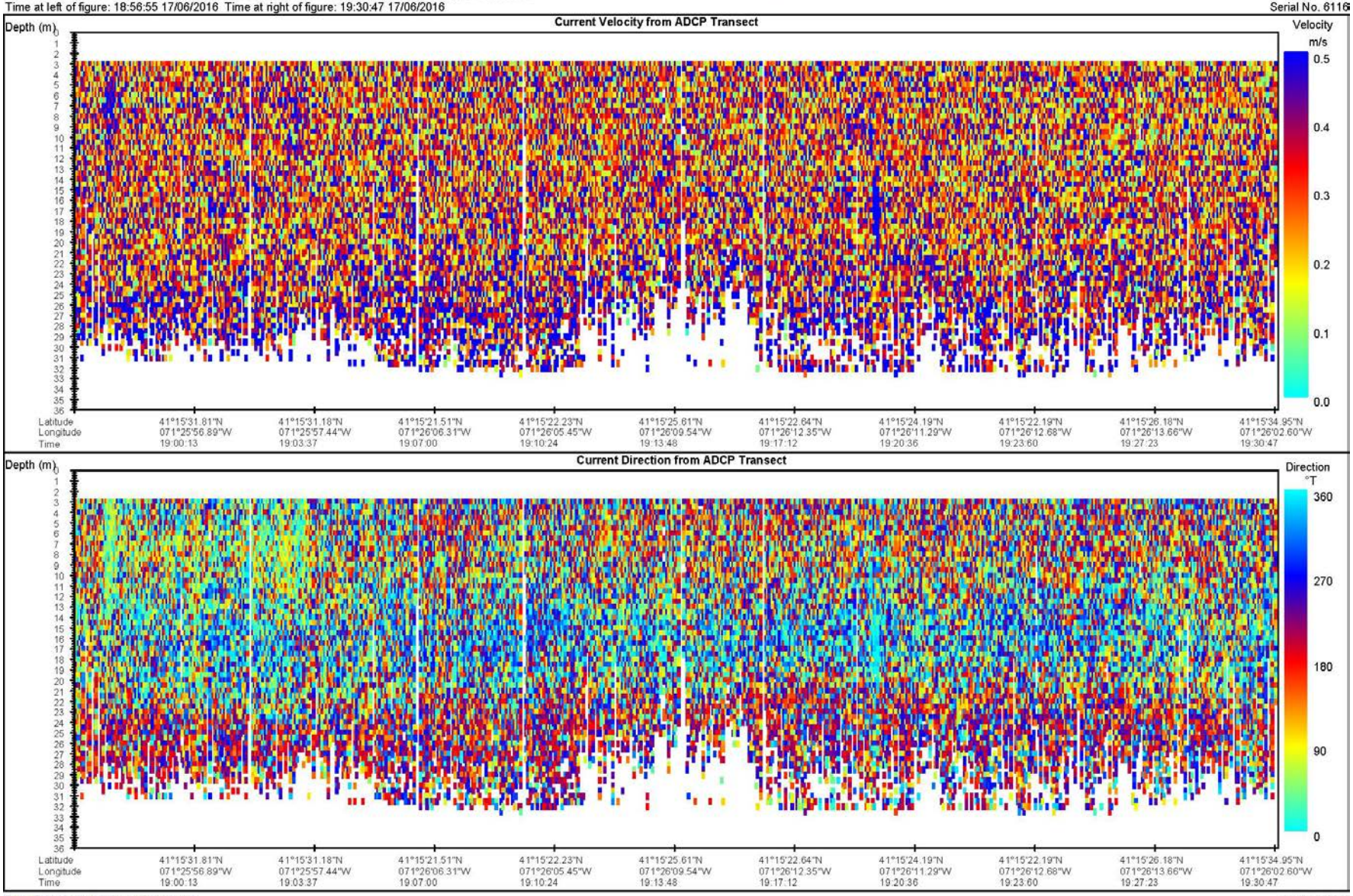
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 18

Figure B056

Transect Start: Lat: 41°15'35"N Long: 071°26'03"W Transect End: Lat: 41°15'35"N Long: 071°26'02"W
Time at left of figure: 18:56:55 17/06/2016 Time at right of figure: 19:30:47 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

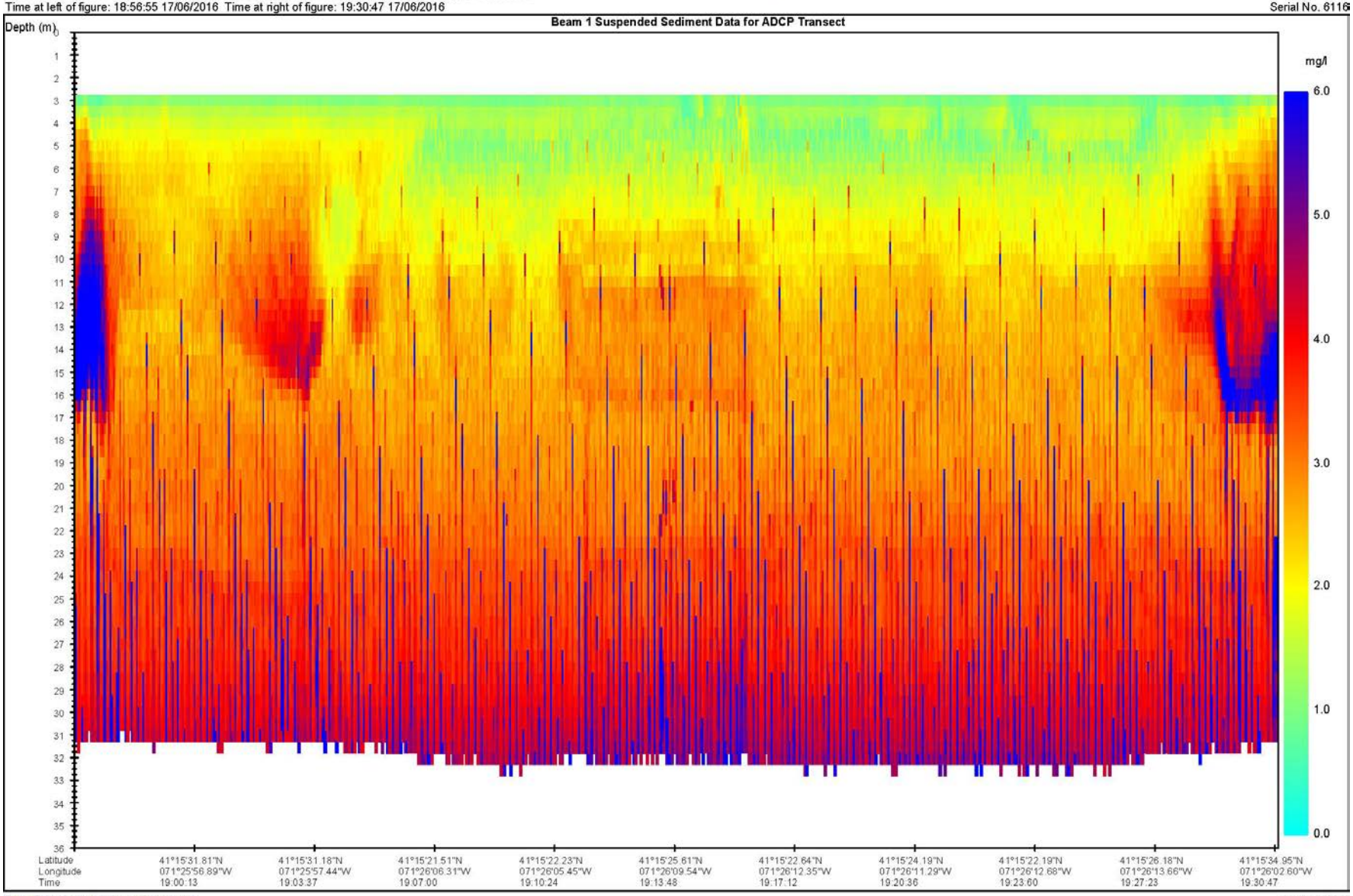
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 18

Figure B057

Transect Start: Lat: 41°15'35"N Long: 071°26'03"W Transect End: Lat: 41°15'35"N Long: 071°26'02"W
Time at left of figure: 18:56:55 17/06/2016 Time at right of figure: 19:30:47 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

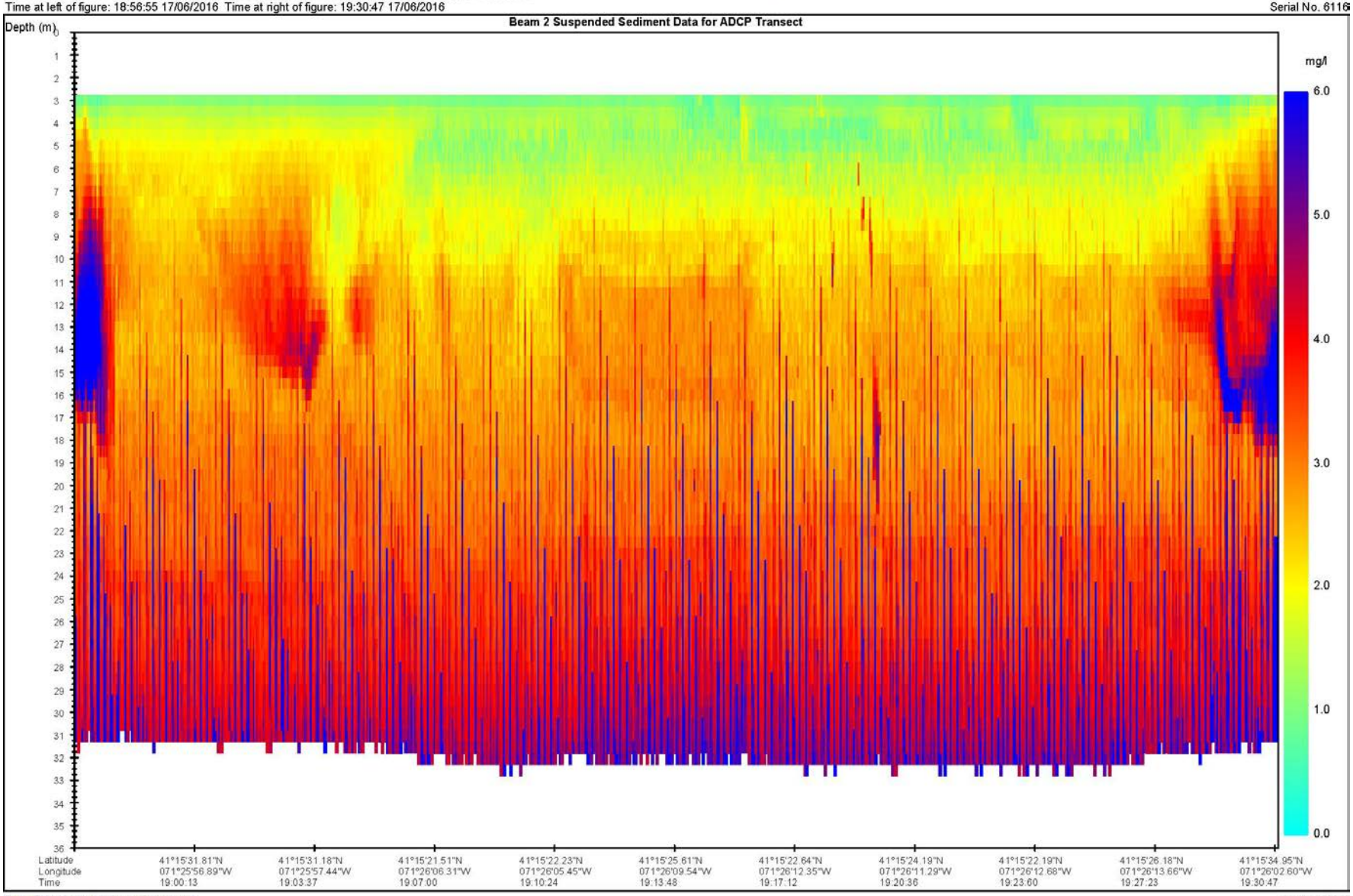
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 18

Figure B058

Transect Start: Lat: 41°15'35"N Long: 071°26'03"W Transect End: Lat: 41°15'35"N Long: 071°26'02"W
Time at left of figure: 18:56:55 17/06/2016 Time at right of figure: 19:30:47 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

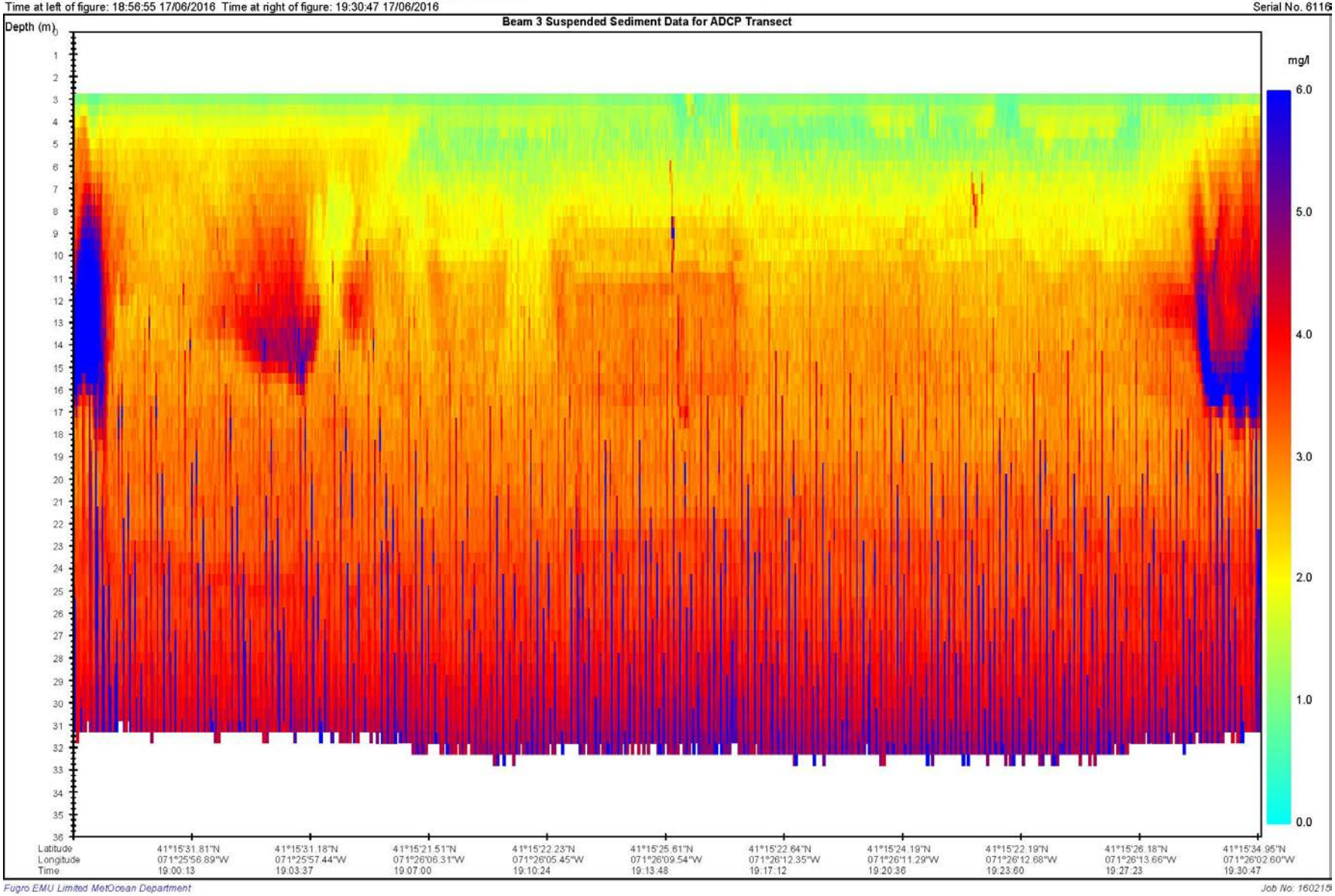
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 18

Figure B059

Transect Start: Lat: 41°15'35"N Long: 071°26'03"W Transect End: Lat: 41°15'35"N Long: 071°26'02"W
Time at left of figure: 18:56:55 17/06/2016 Time at right of figure: 19:30:47 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

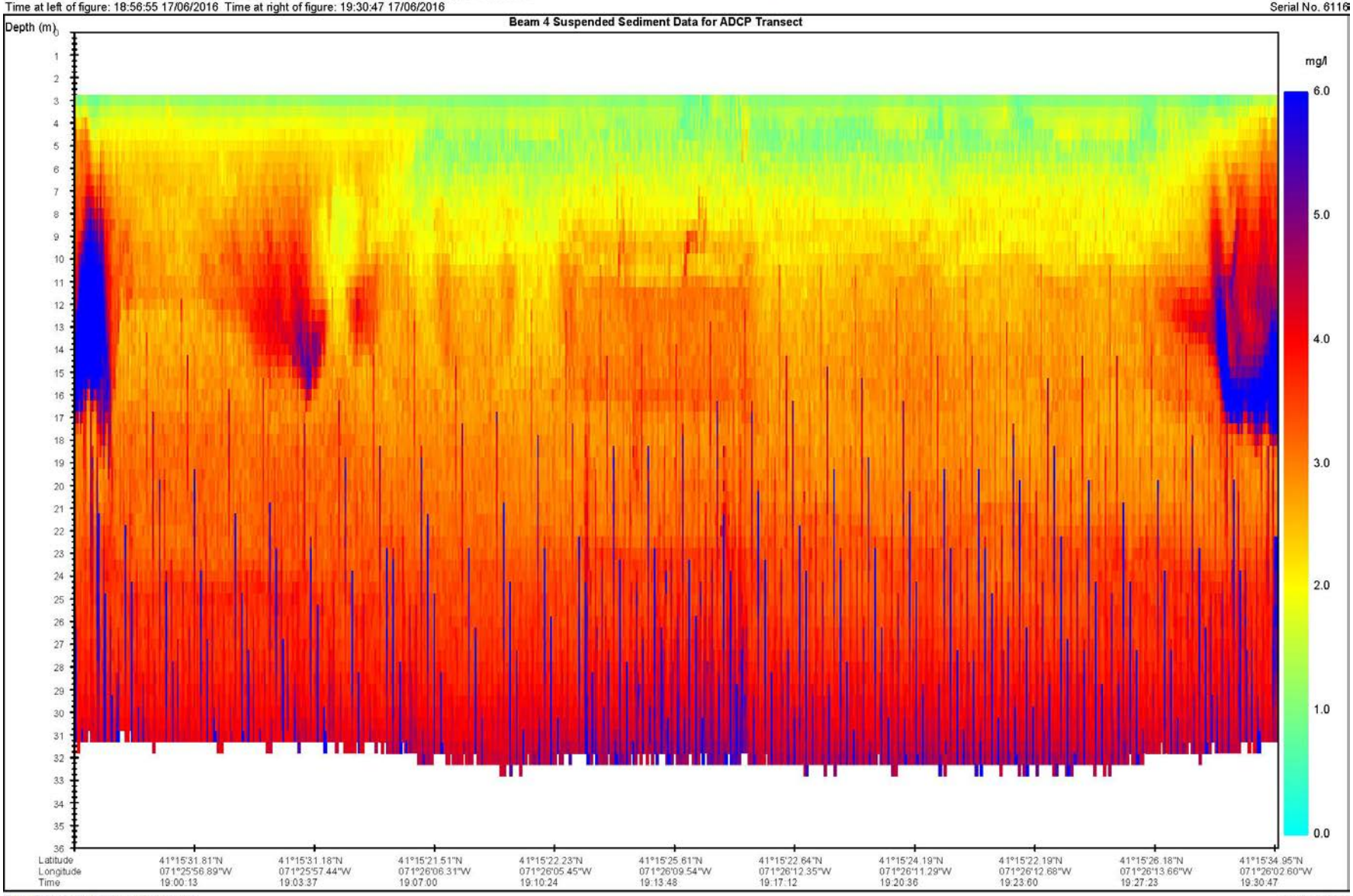
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 18

Figure B060

Transect Start: Lat: 41°15'35"N Long: 071°26'03"W Transect End: Lat: 41°15'35"N Long: 071°26'02"W
Time at left of figure: 18:56:55 17/06/2016 Time at right of figure: 19:30:47 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

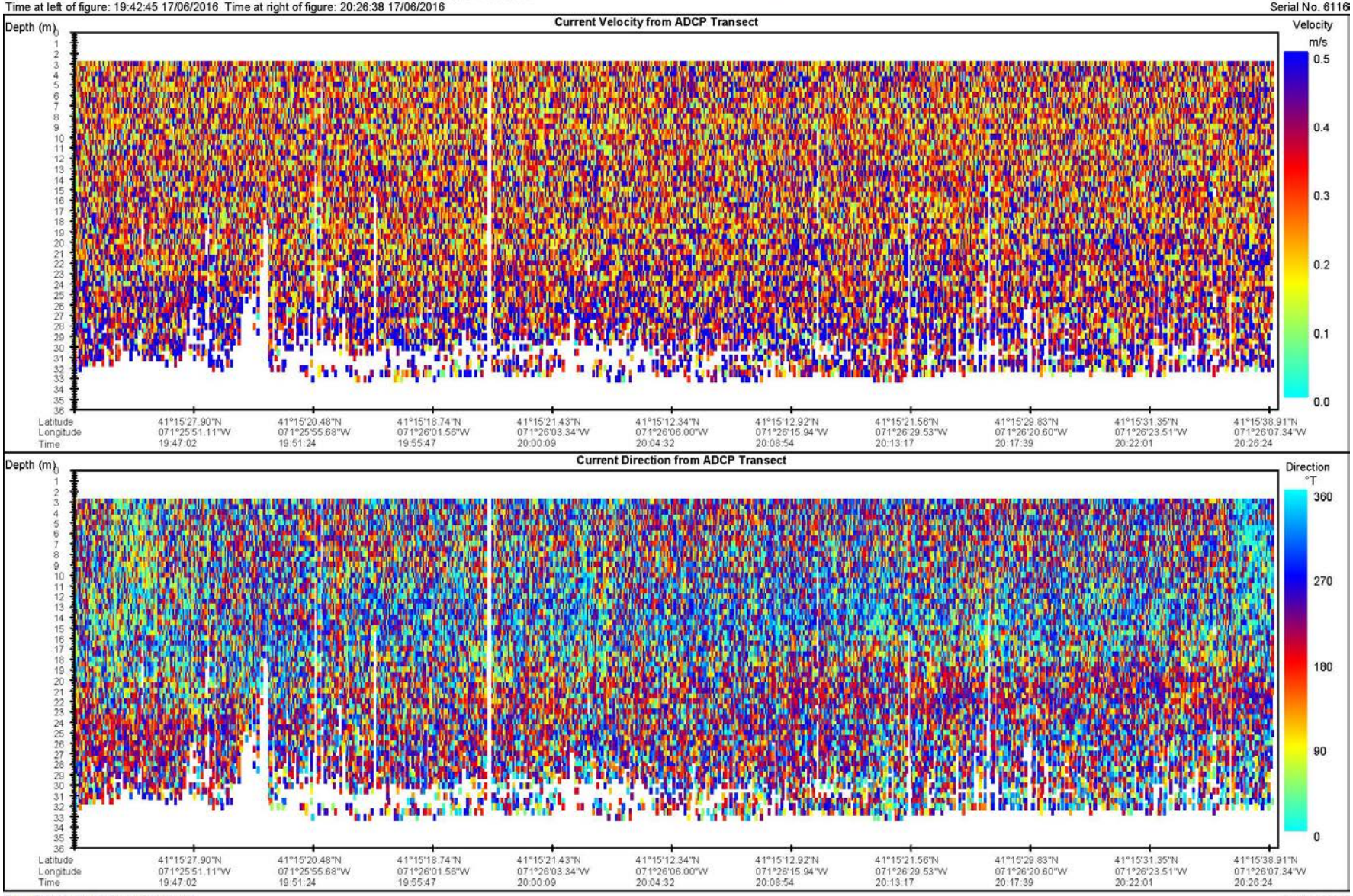
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 19

Figure B061

Transect Start: Lat: 41°15'39"N Long: 071°26'10"W Transect End: Lat: 41°15'39"N Long: 071°26'06"W
Time at left of figure: 19:42:45 17/06/2016 Time at right of figure: 20:26:38 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

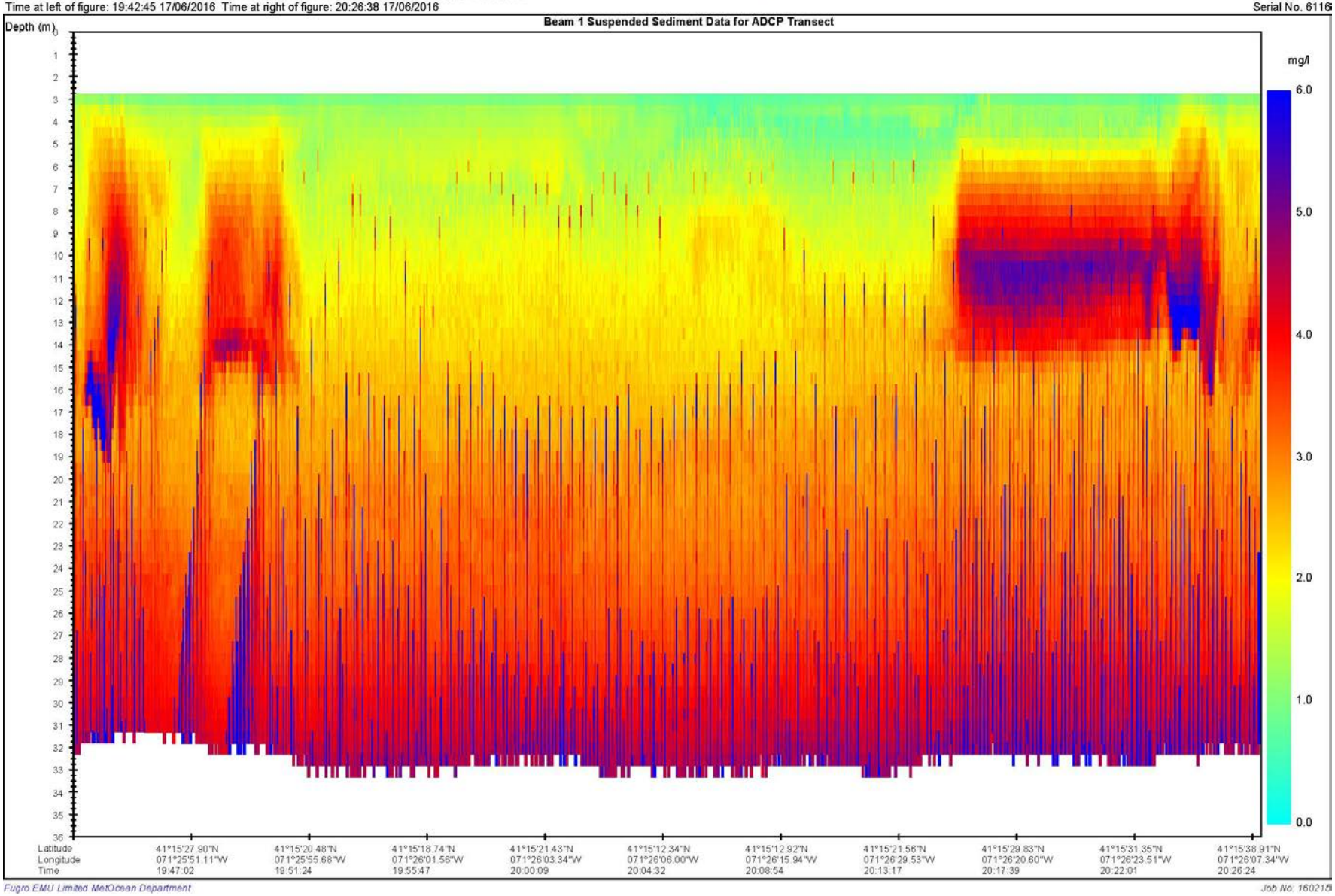
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 19

Figure B062

Transect Start: Lat: 41°15'39"N Long: 071°26'10"W Transect End: Lat: 41°15'39"N Long: 071°26'06"W
Time at left of figure: 19:42:45 17/06/2016 Time at right of figure: 20:26:38 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

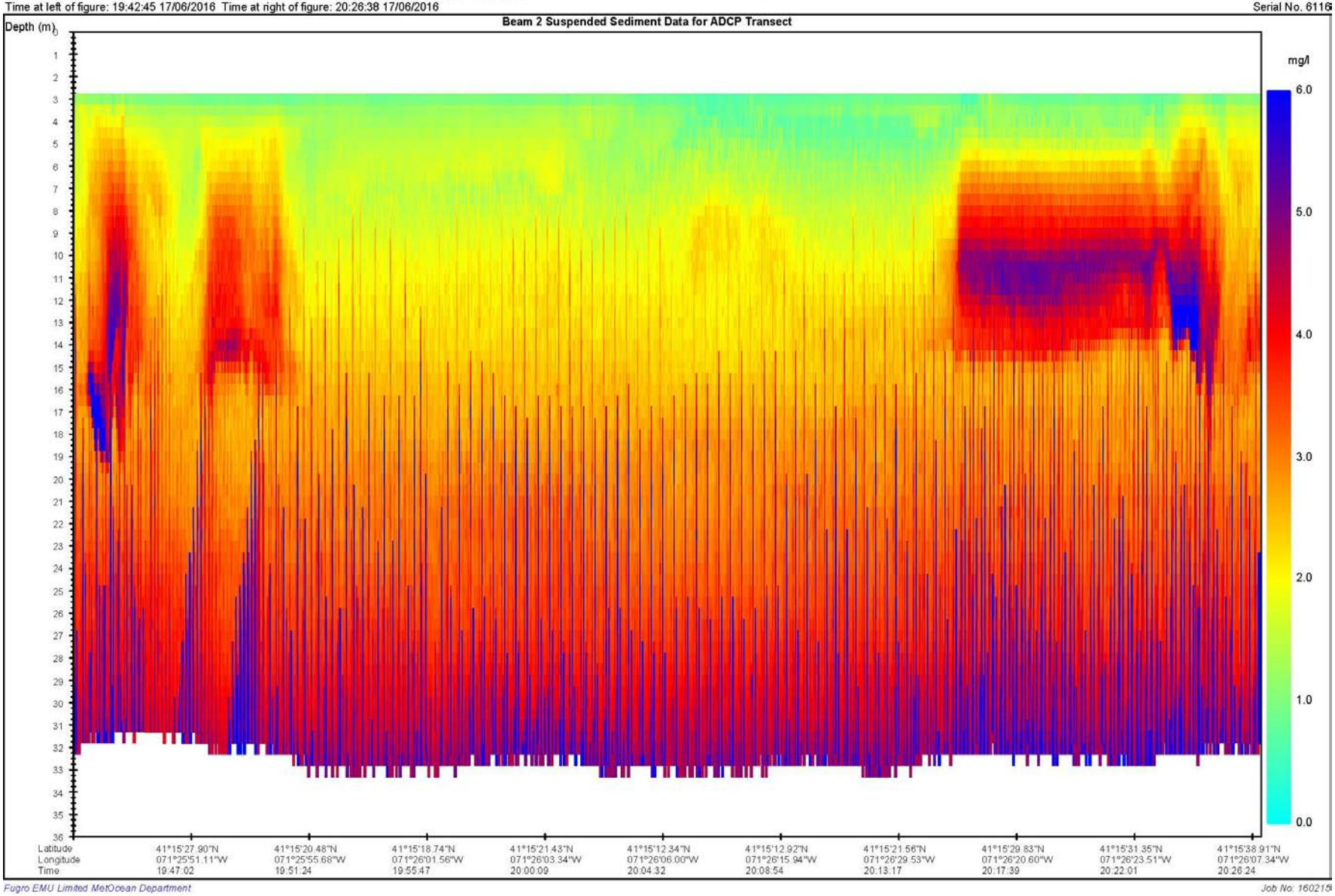
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 19

Figure B063

Transect Start: Lat: 41°15'39"N Long: 071°26'10"W Transect End: Lat: 41°15'39"N Long: 071°26'06"W
Time at left of figure: 19:42:45 17/06/2016 Time at right of figure: 20:26:38 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

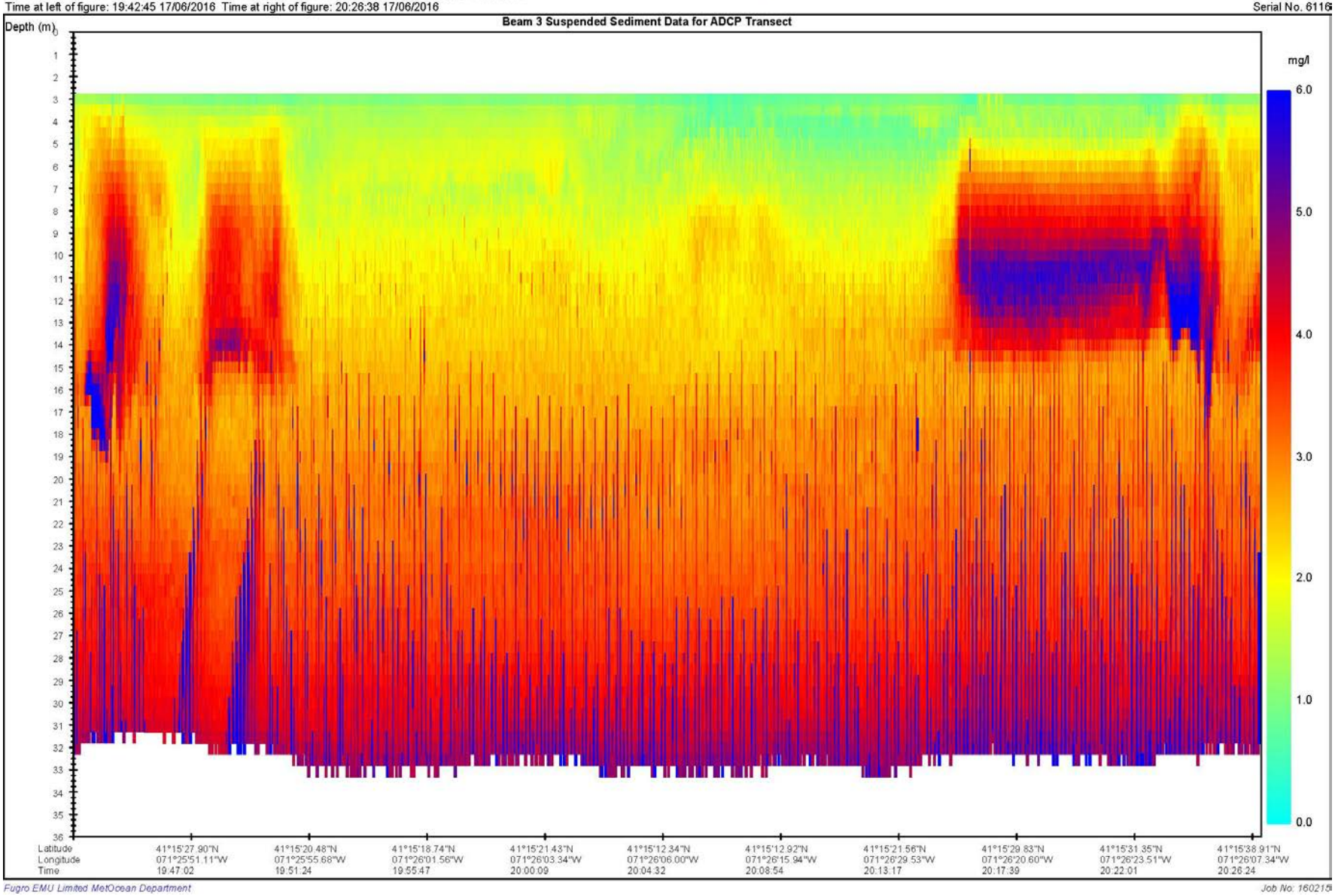
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 19

Figure B064

Transect Start: Lat: 41°15'39"N Long: 071°26'10"W Transect End: Lat: 41°15'39"N Long: 071°26'06"W
Time at left of figure: 19:42:45 17/06/2016 Time at right of figure: 20:26:38 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

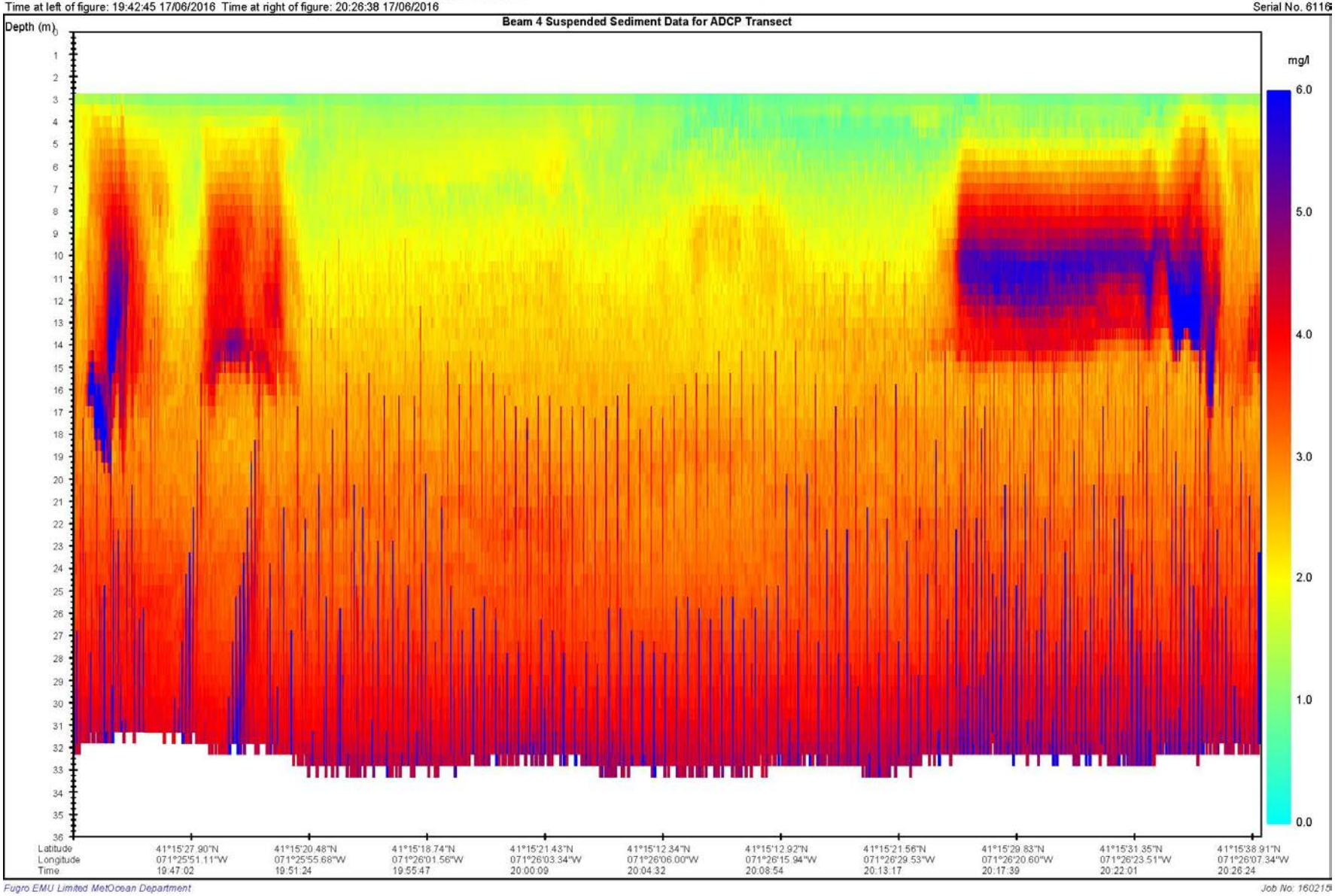
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 19

Figure B065

Transect Start: Lat: 41°15'39"N Long: 071°26'10"W Transect End: Lat: 41°15'39"N Long: 071°26'06"W
Time at left of figure: 19:42:45 17/06/2016 Time at right of figure: 20:26:38 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

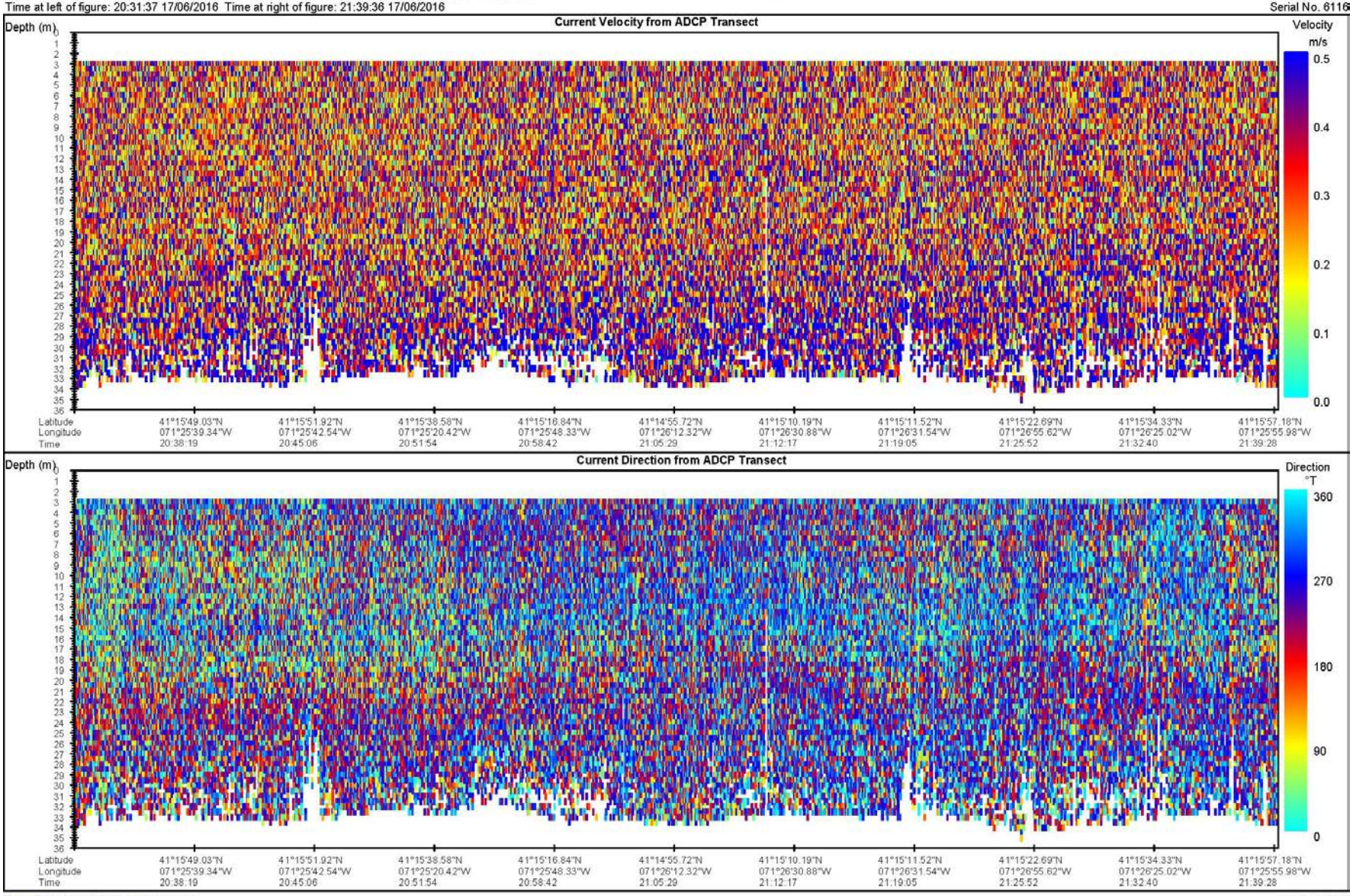
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 20

Figure B066

Transect Start: Lat: 41°15'56"N Long: 071°25'54"W Transect End: Lat: 41°15'57"N Long: 071°25'55"W
Time at left of figure: 20:31:37 17/06/2016 Time at right of figure: 21:39:36 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

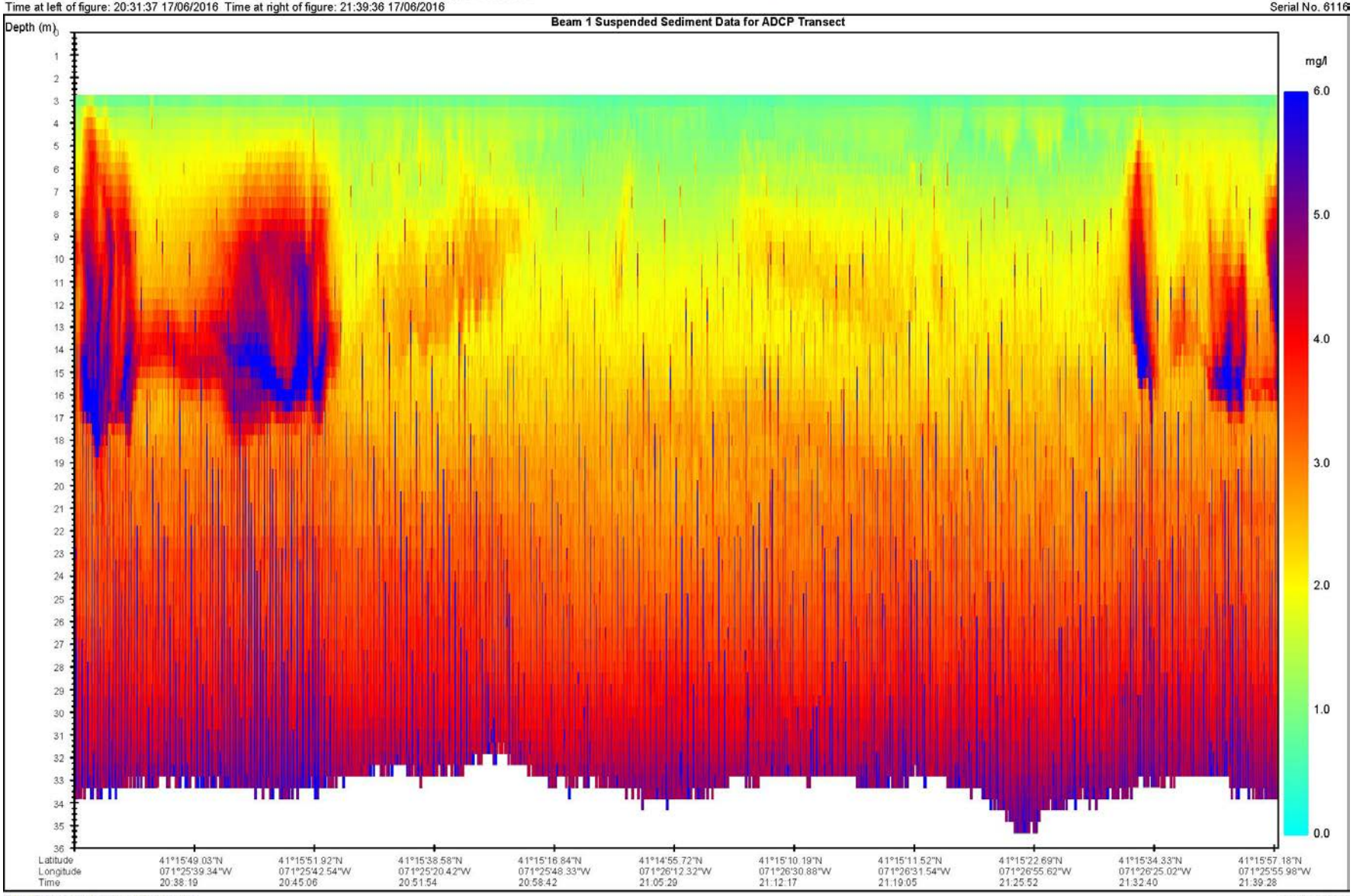
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 20

Figure B067

Transect Start: Lat: 41°15'56"N Long: 071°25'54"W Transect End: Lat: 41°15'57"N Long: 071°25'55"W
Time at left of figure: 20:31:37 17/06/2016 Time at right of figure: 21:39:36 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

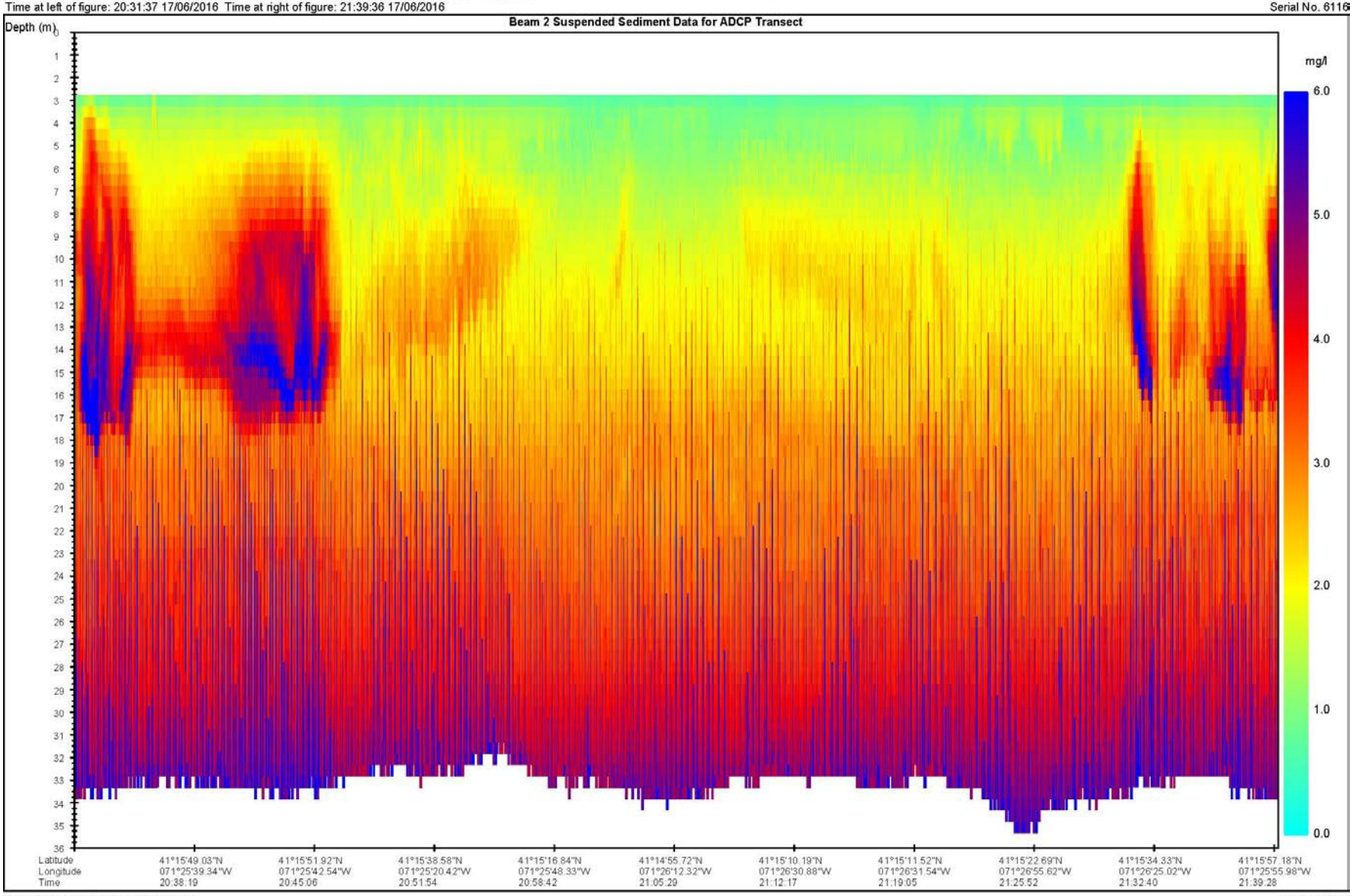
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 20

Figure B068

Transect Start: Lat: 41°15'56"N Long: 071°25'54"W Transect End: Lat: 41°15'57"N Long: 071°25'55"W
Time at left of figure: 20:31:37 17/06/2016 Time at right of figure: 21:39:36 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

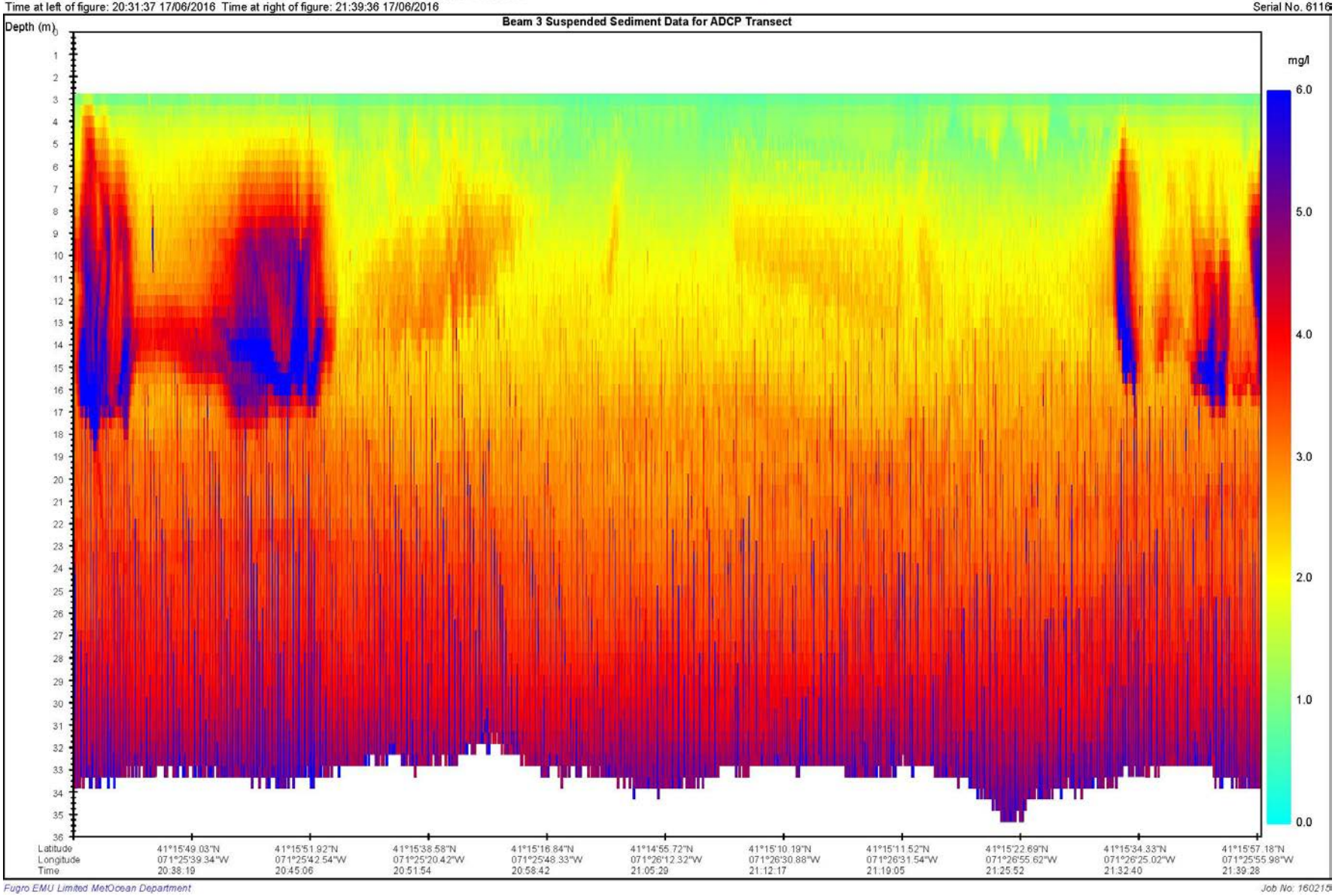
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 20

Figure B069

Transect Start: Lat: 41°15'56"N Long: 071°25'54"W Transect End: Lat: 41°15'57"N Long: 071°25'55"W
Time at left of figure: 20:31:37 17/06/2016 Time at right of figure: 21:39:36 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

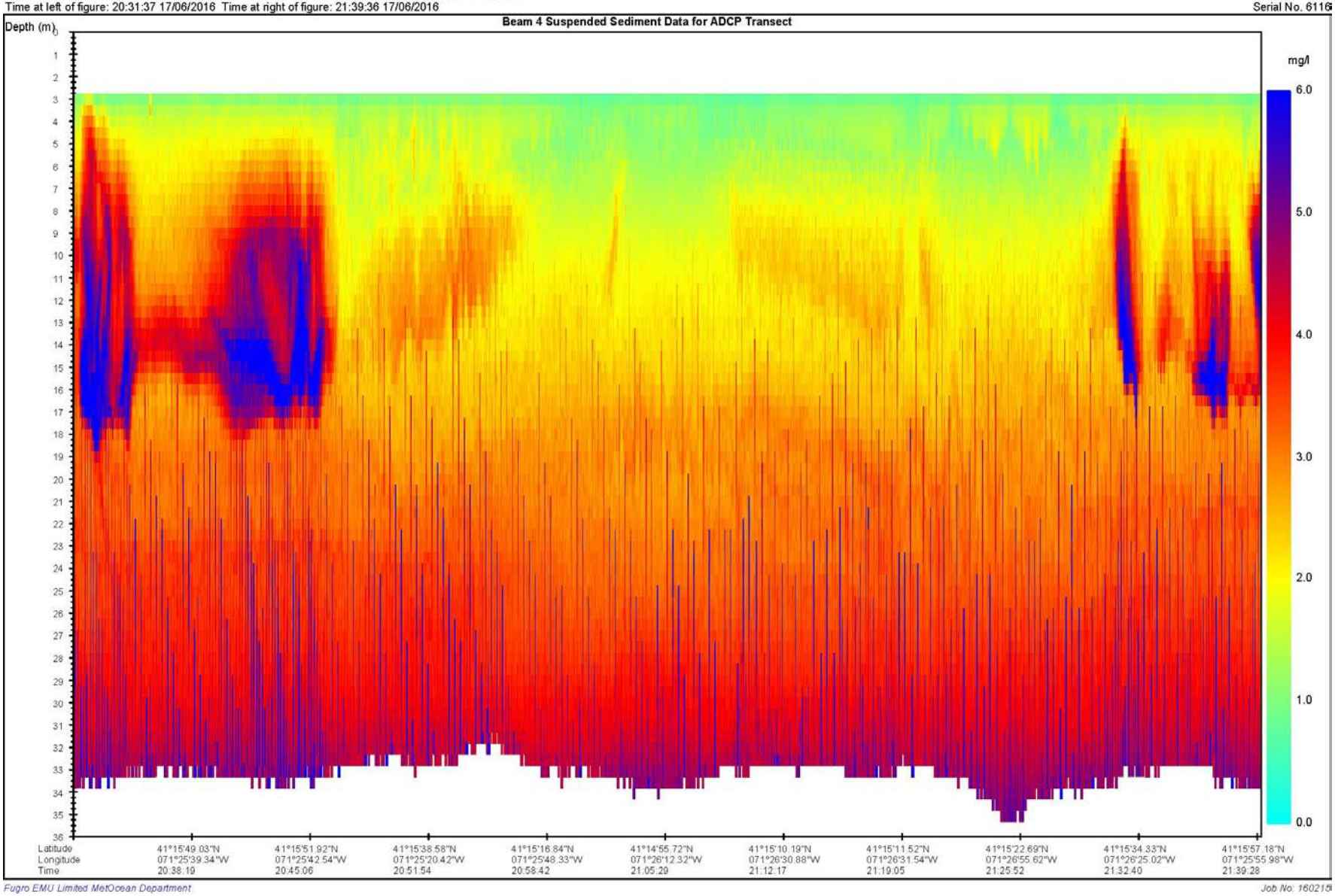
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 20

Figure B070

Transect Start: Lat: 41°15'56"N Long: 071°25'54"W Transect End: Lat: 41°15'57"N Long: 071°25'55"W
Time at left of figure: 20:31:37 17/06/2016 Time at right of figure: 21:39:36 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

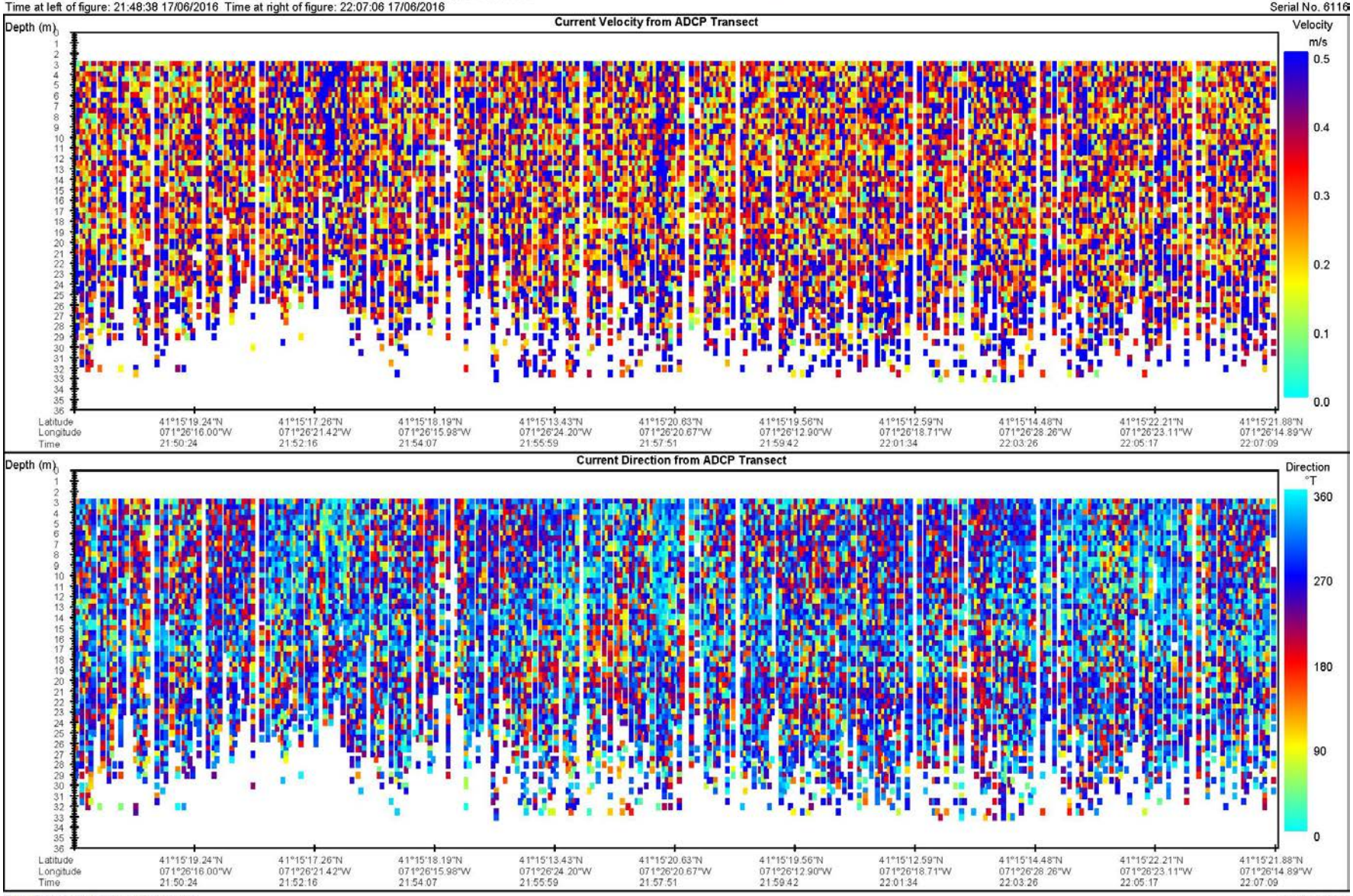
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 21

Figure B071

Transect Start: Lat: 41°15'27"N Long: 071°26'10"W Transect End: Lat: 41°15'21"N Long: 071°26'14"W
Time at left of figure: 21:48:38 17/06/2016 Time at right of figure: 22:07:06 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

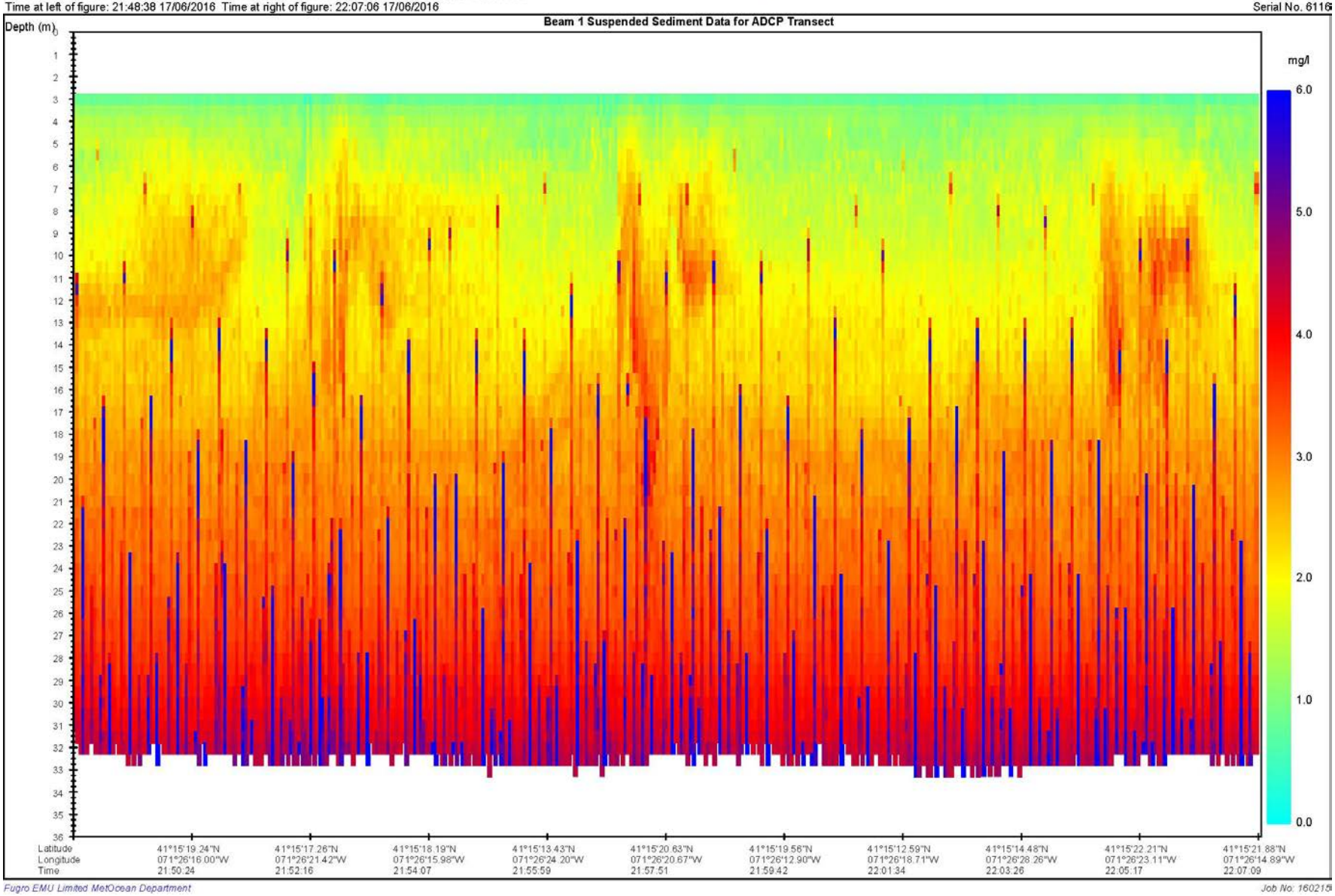
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 21

Figure B072

Transect Start: Lat: 41°15'27"N Long: 071°26'10"W Transect End: Lat: 41°15'21"N Long: 071°26'14"W
Time at left of figure: 21:48:38 17/06/2016 Time at right of figure: 22:07:06 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

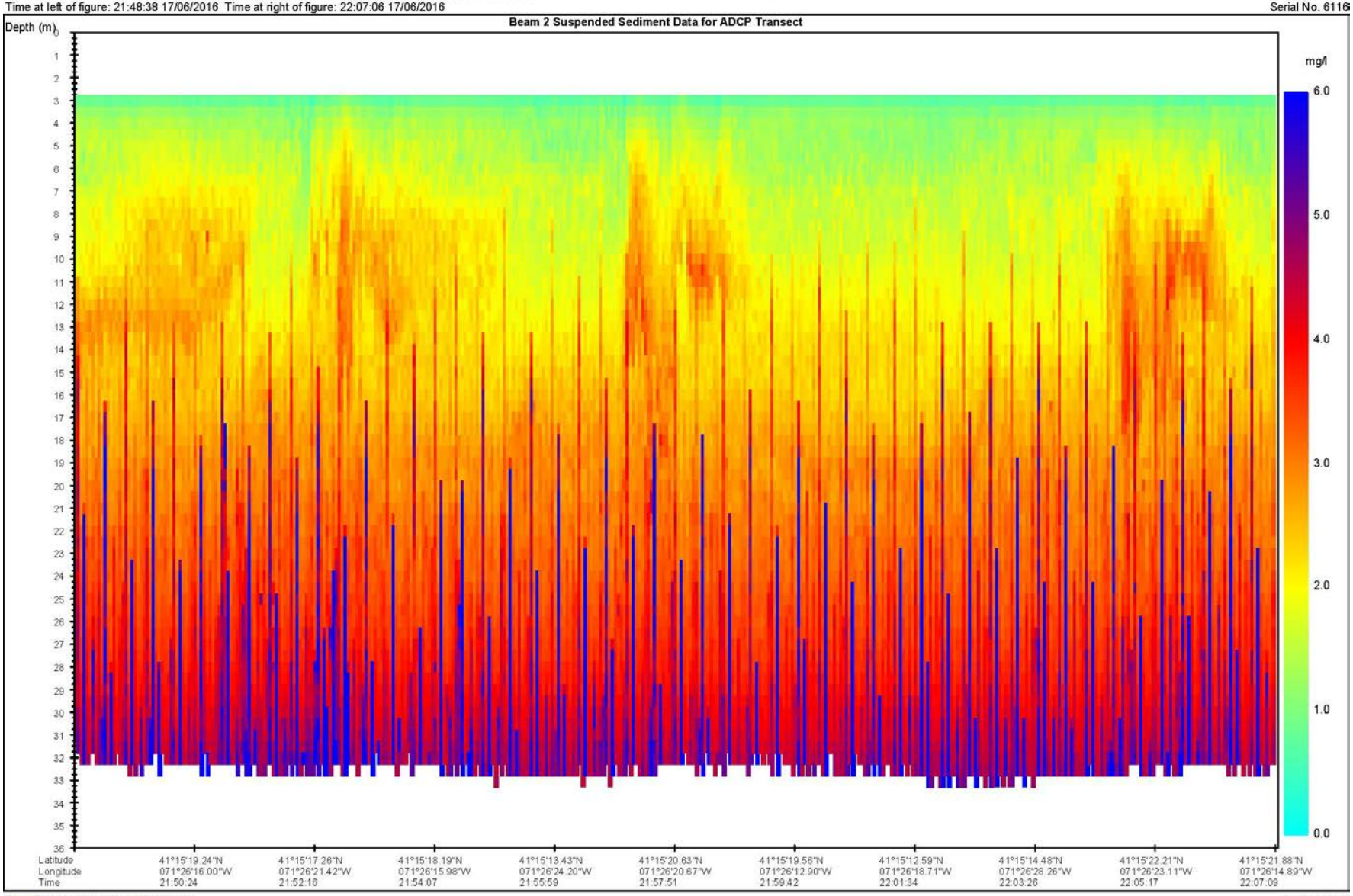
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 21

Figure B073

Transect Start: Lat: 41°15'27"N Long: 071°26'10"W Transect End: Lat: 41°15'21"N Long: 071°26'14"W
Time at left of figure: 21:48:38 17/06/2016 Time at right of figure: 22:07:06 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

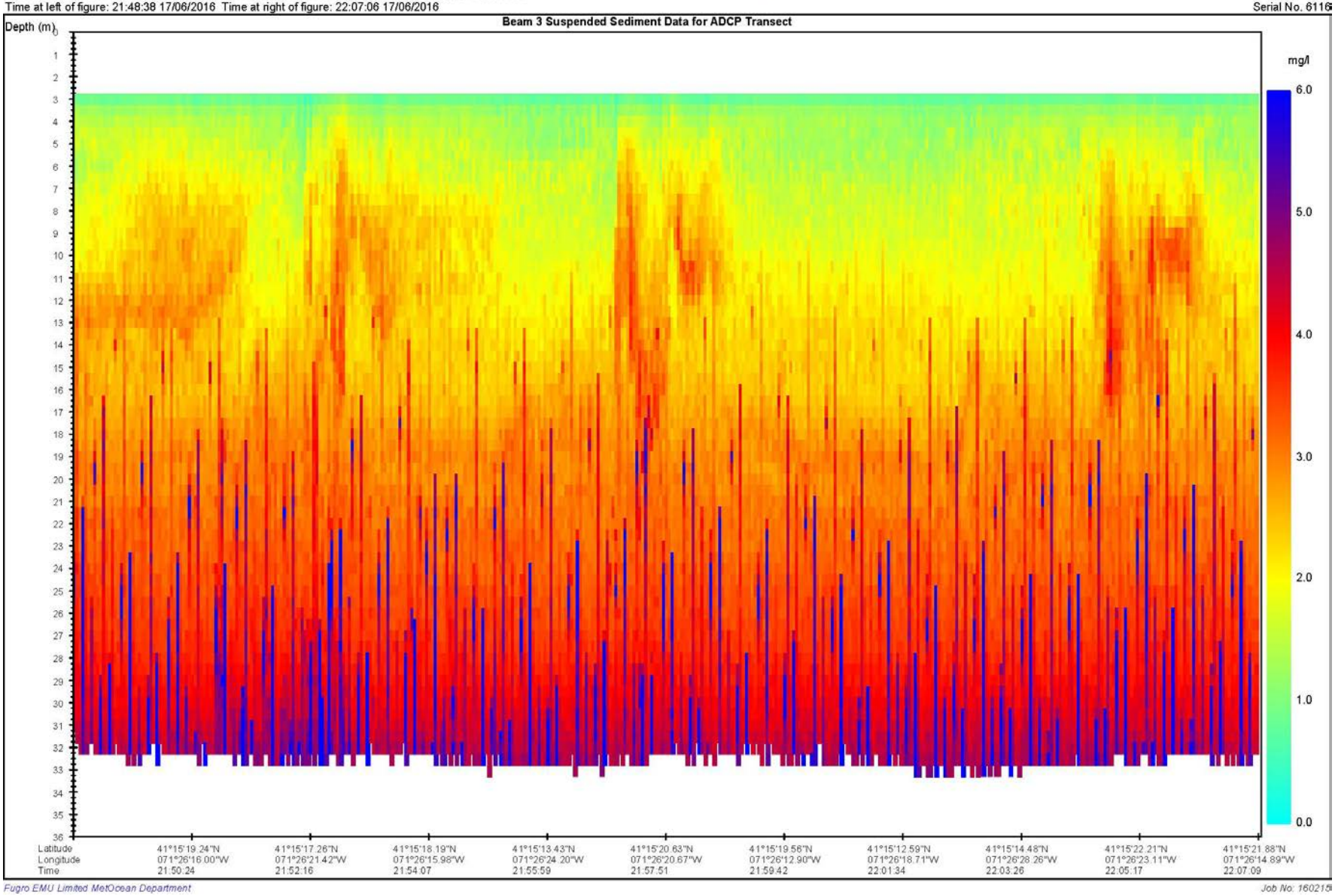
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 21

Figure B074

Transect Start: Lat: 41°15'27"N Long: 071°26'10"W Transect End: Lat: 41°15'21"N Long: 071°26'14"W
Time at left of figure: 21:48:38 17/06/2016 Time at right of figure: 22:07:06 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

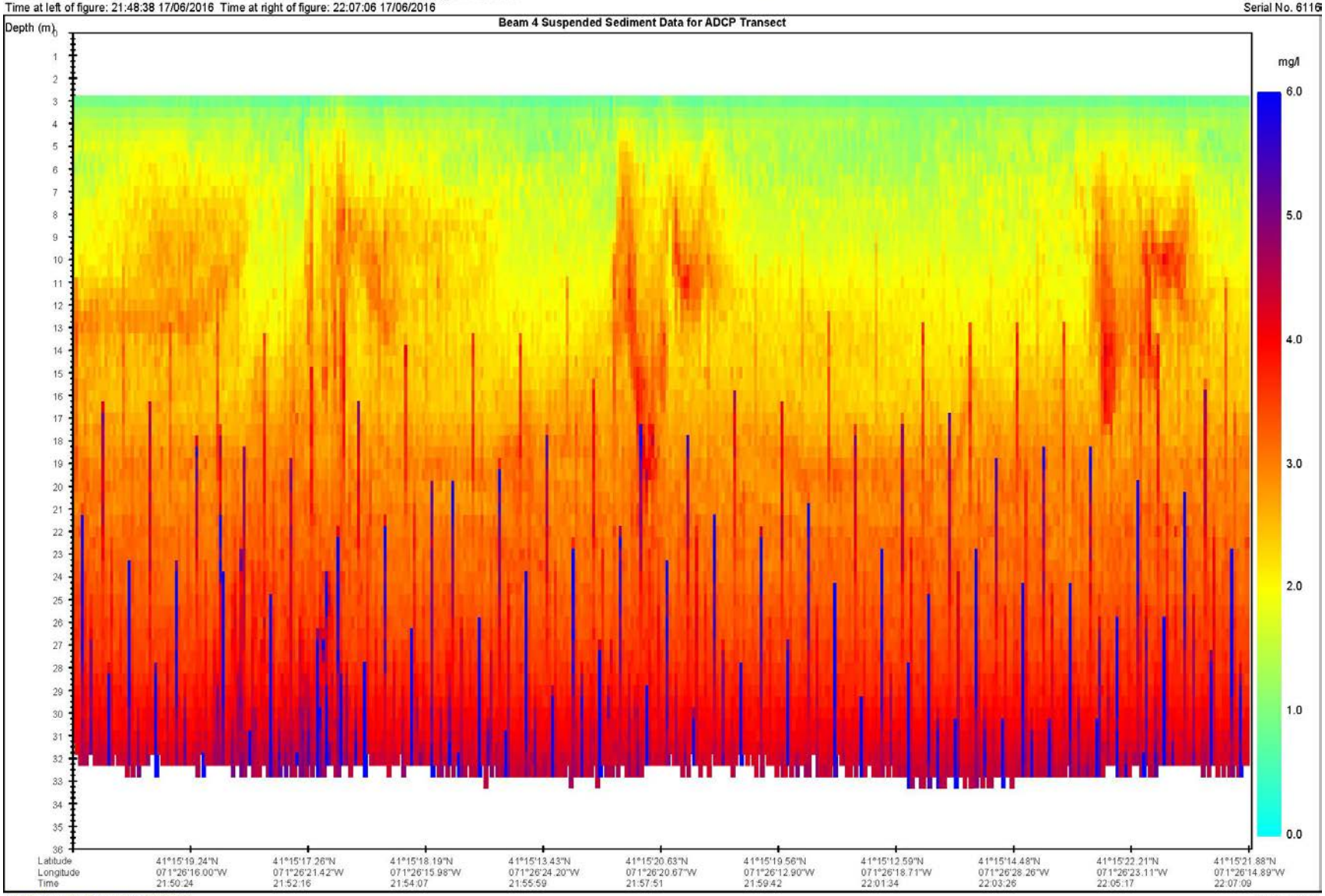
HDR Environmental, Operations and Construction, Inc.

Colour Contour Plots of Current Speed and Direction
Block Island Sediment Plume Monitoring, Jet Plow 21

Figure B075

Transect Start: Lat: 41°15'27"N Long: 071°26'10"W Transect End: Lat: 41°15'21"N Long: 071°26'14"W
Time at left of figure: 21:48:38 17/06/2016 Time at right of figure: 22:07:06 17/06/2016

RDI ADCP
Serial No. 6116



Fugro EMU Limited MetOcean Department

Job No: 160215

Appendix 8. Idronaut Turbility Profiles

Data from the Background and Jet Plow Idronaut turbidity and CTD profiles are presented below.

Figure/Table **(see following pages)**	**Location/Source**	**Presentation Type**	**Parameters**
Figure C001-C006	Background (Day One) – Profile 1-6	Water Column Profile	Turbidity (Counts), Temperature (°C), Salinity (ppt), Density (kgm^{-3})
Figure C007-C008	Background (Day Two) – Profile 7-8	Water Column Profile	Turbidity (Counts), Temperature (°C), Salinity (ppt), Density (kgm^{-3})
Figure C009-C024	Jet Plow – Profile 1-16	Water Column Profile	Turbidity (Counts), Temperature (°C), Salinity (ppt), Density (kgm^{-3})

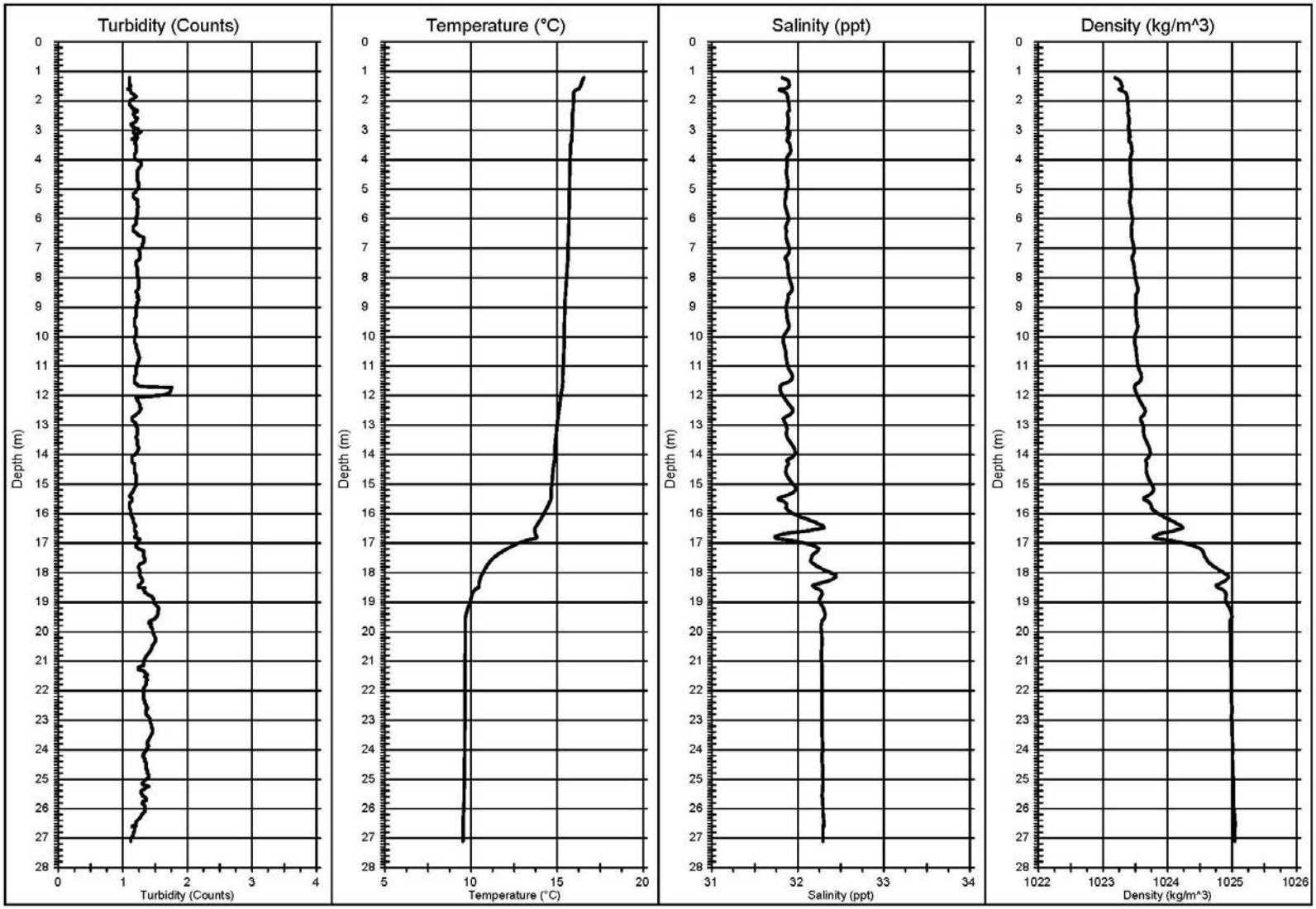
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°17'14"N Longitude: 071°24'49"W Site Depth: 27.2m
Deployed: 16/06/2016 19:20:46 Recovered: 16/06/2016 19:22:10

Water Column Profiles
Block Island Sediment Plume Monitoring, Background, 1

Figure C001

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

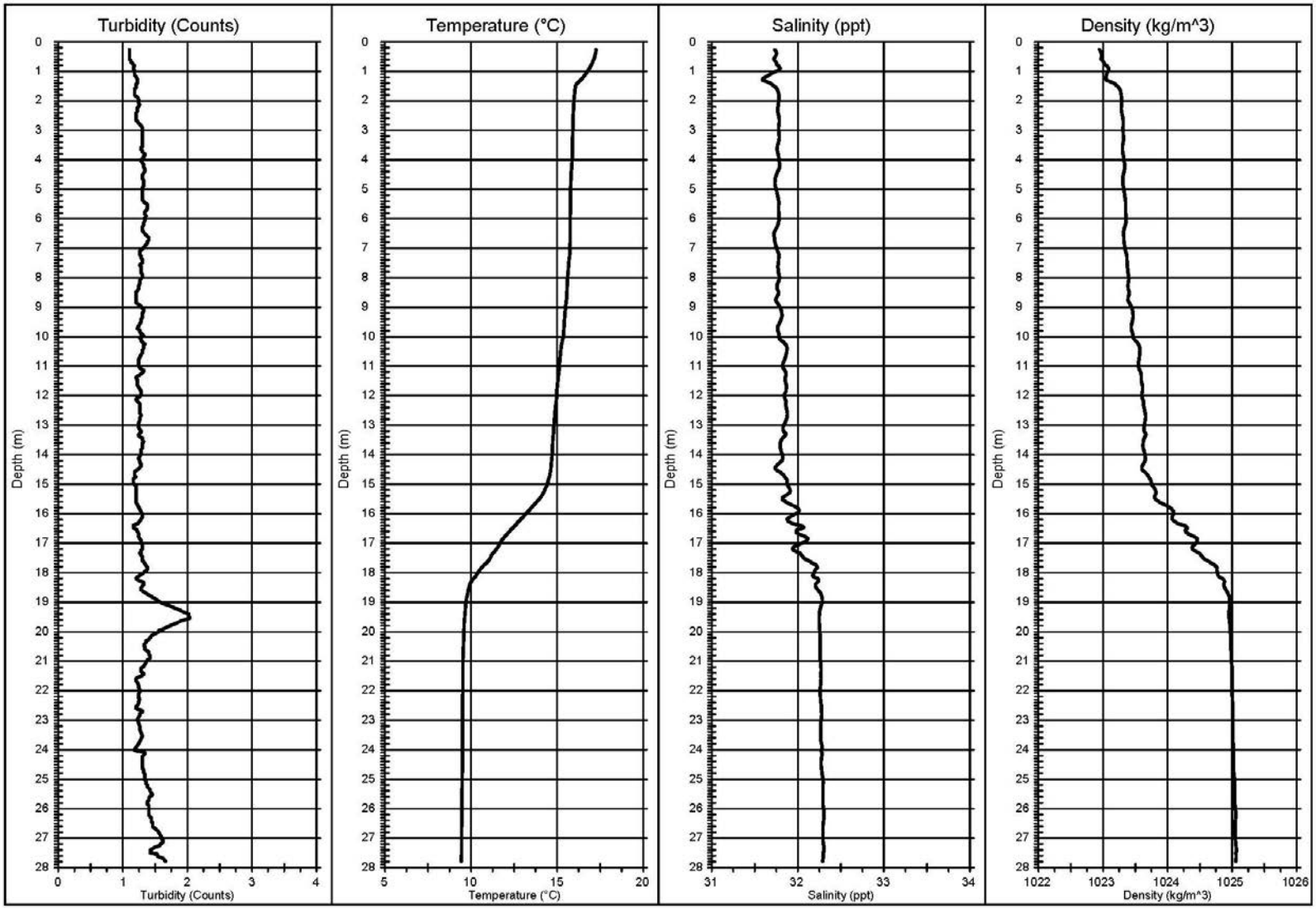
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°17'55"N Longitude: 071°24'46"W Site Depth: 27.8m
Deployed: 16/06/2016 19:45:50 Recovered: 16/06/2016 19:47:04

Water Column Profiles
Block Island Sediment Plume Monitoring, Background, 2

Figure C002

Environmental Sensors / Idronaut
Serial No.: 60815



Fugro EMU Limited MetOcean Department

Job No: 160215

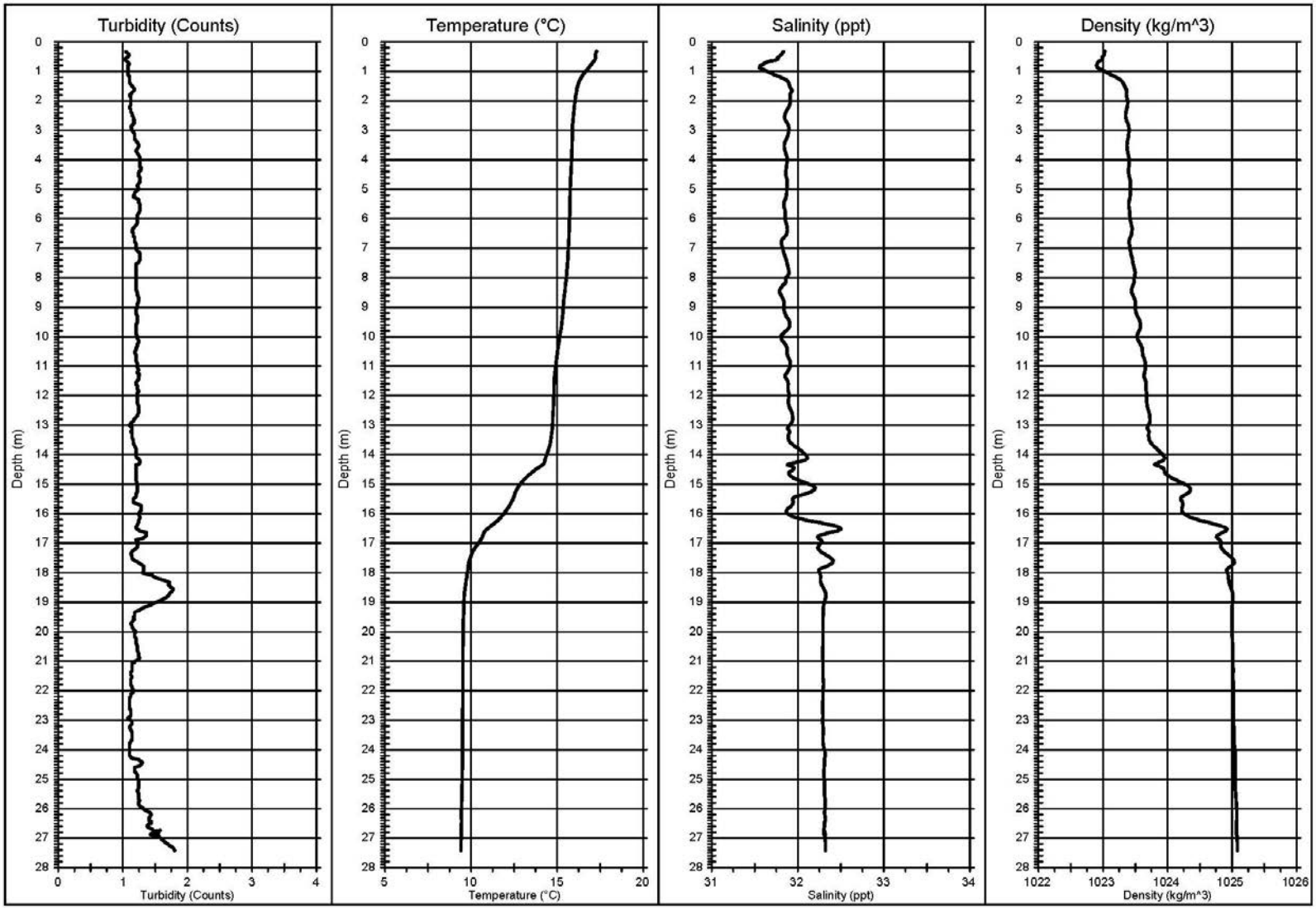
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°17'56"N Longitude: 071°24'45"W Site Depth: 27.5m
Deployed: 16/06/2016 19:53:15 Recovered: 16/06/2016 19:54:28

Water Column Profiles
Block Island Sediment Plume Monitoring, Background, 3

Figure C003

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

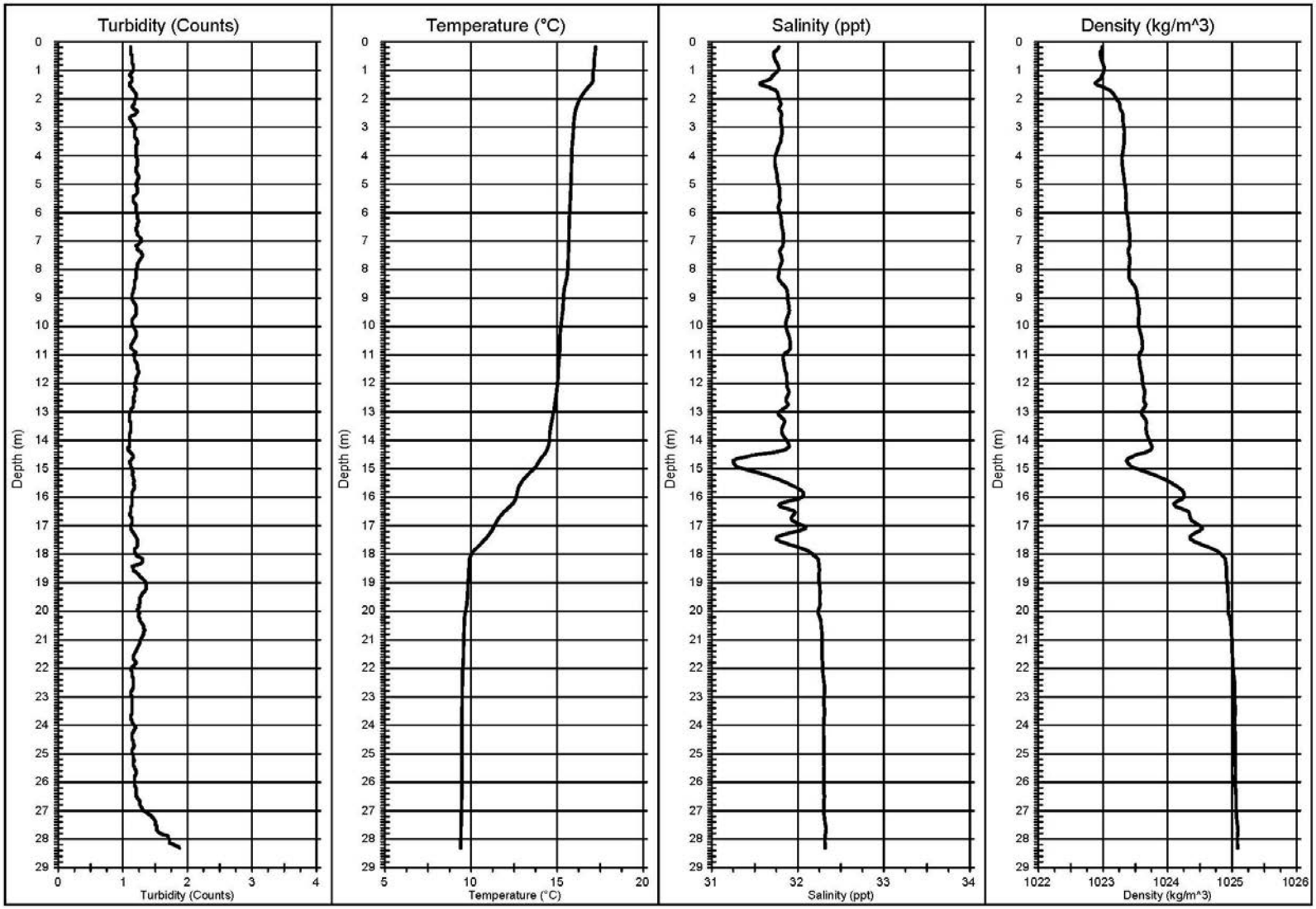
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°18'26"N Longitude: 071°24'49"W Site Depth: 28.4m
Deployed: 16/06/2016 20:19:34 Recovered: 16/06/2016 20:20:41

Water Column Profiles
Block Island Sediment Plume Monitoring, Background, 4

Figure C004

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

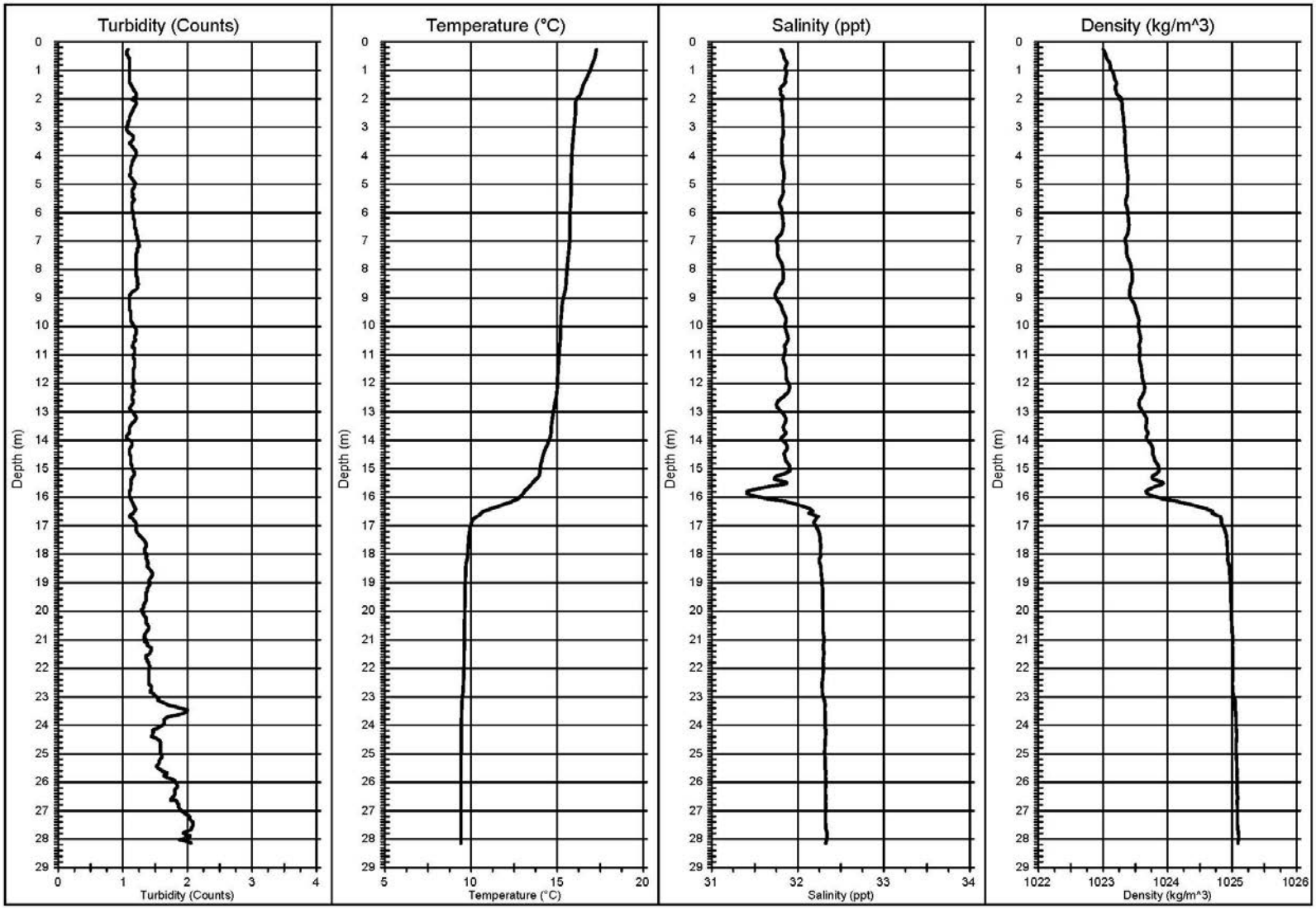
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°18'59"N Longitude: 071°24'57"W Site Depth: 28.2m
Deployed: 16/06/2016 20:40:08 Recovered: 16/06/2016 20:41:18

Water Column Profiles
Block Island Sediment Plume Monitoring, Background, 5

Figure C005

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

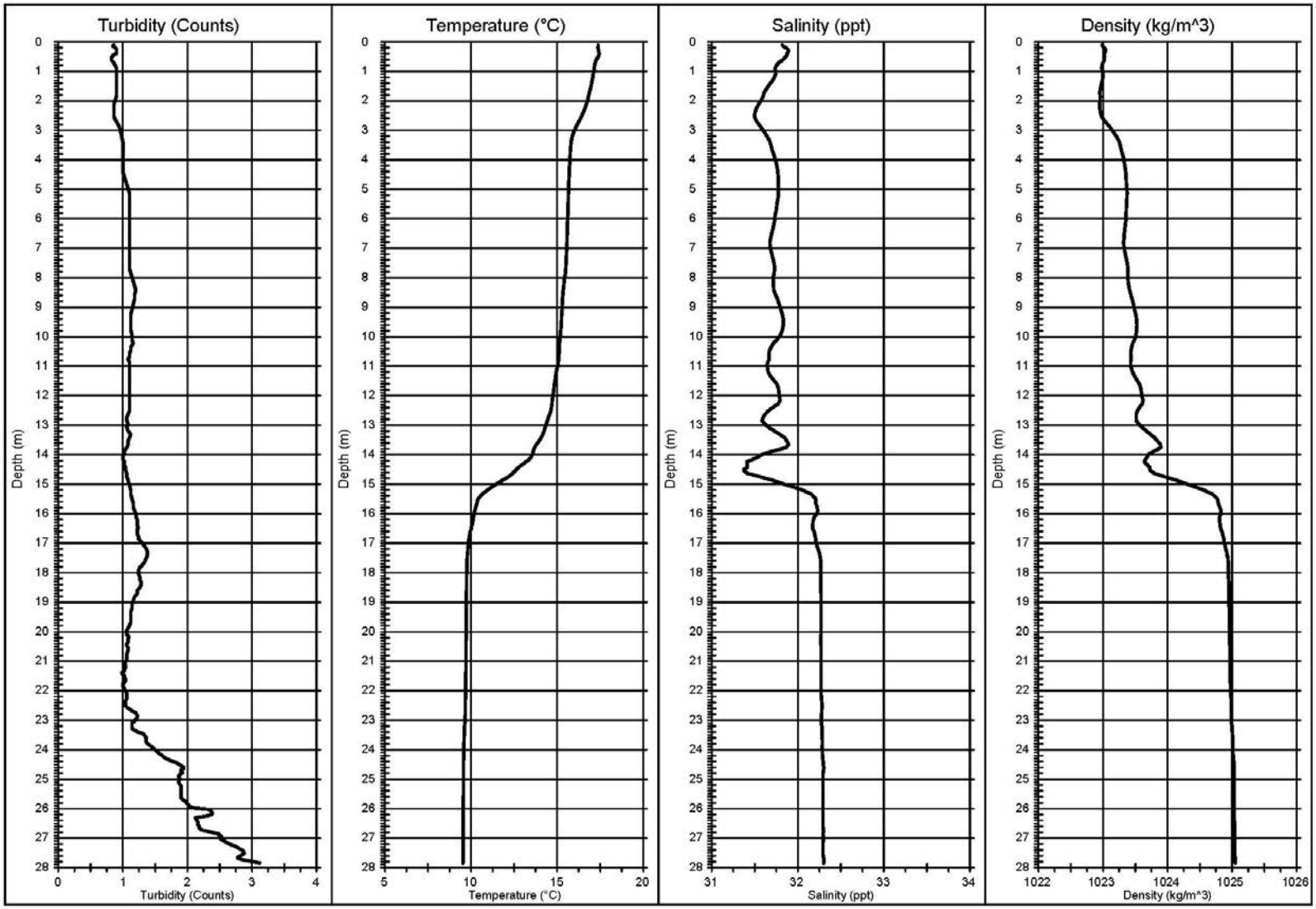
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°20'35"N Longitude: 071°25'23"W Site Depth: 27.9m
Deployed: 16/06/2016 21:21:43 Recovered: 16/06/2016 21:22:29

Water Column Profiles
Block Island Sediment Plume Monitoring, Background, 6

Figure C006

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

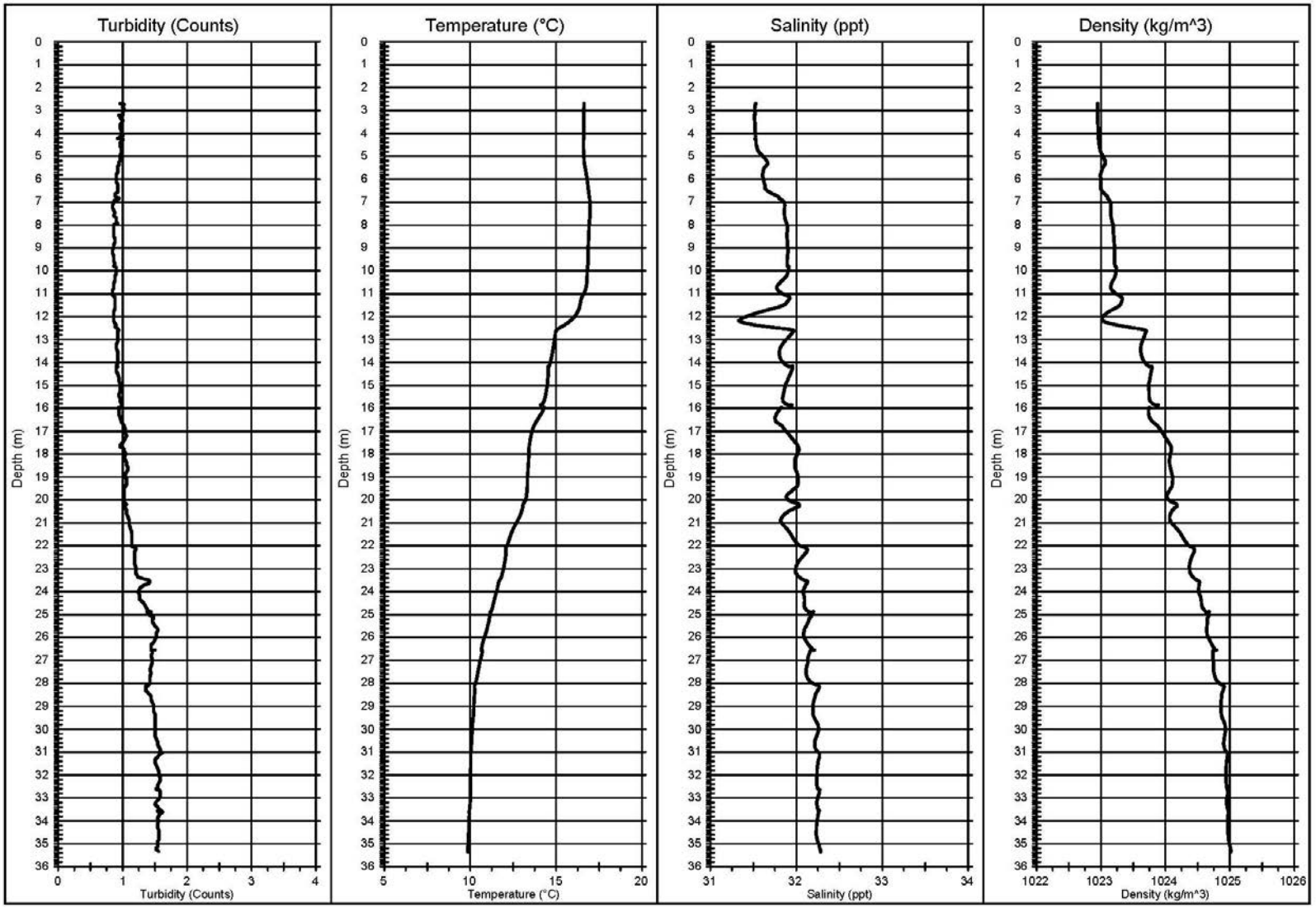
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'56"N Longitude: 071°27'32"W Site Depth: 35.5m
Deployed: 19/06/2016 14:03:33 Recovered: 19/06/2016 14:04:47

Water Column Profiles
Block Island Sediment Plume Monitoring, Background, 7

Figure C007

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

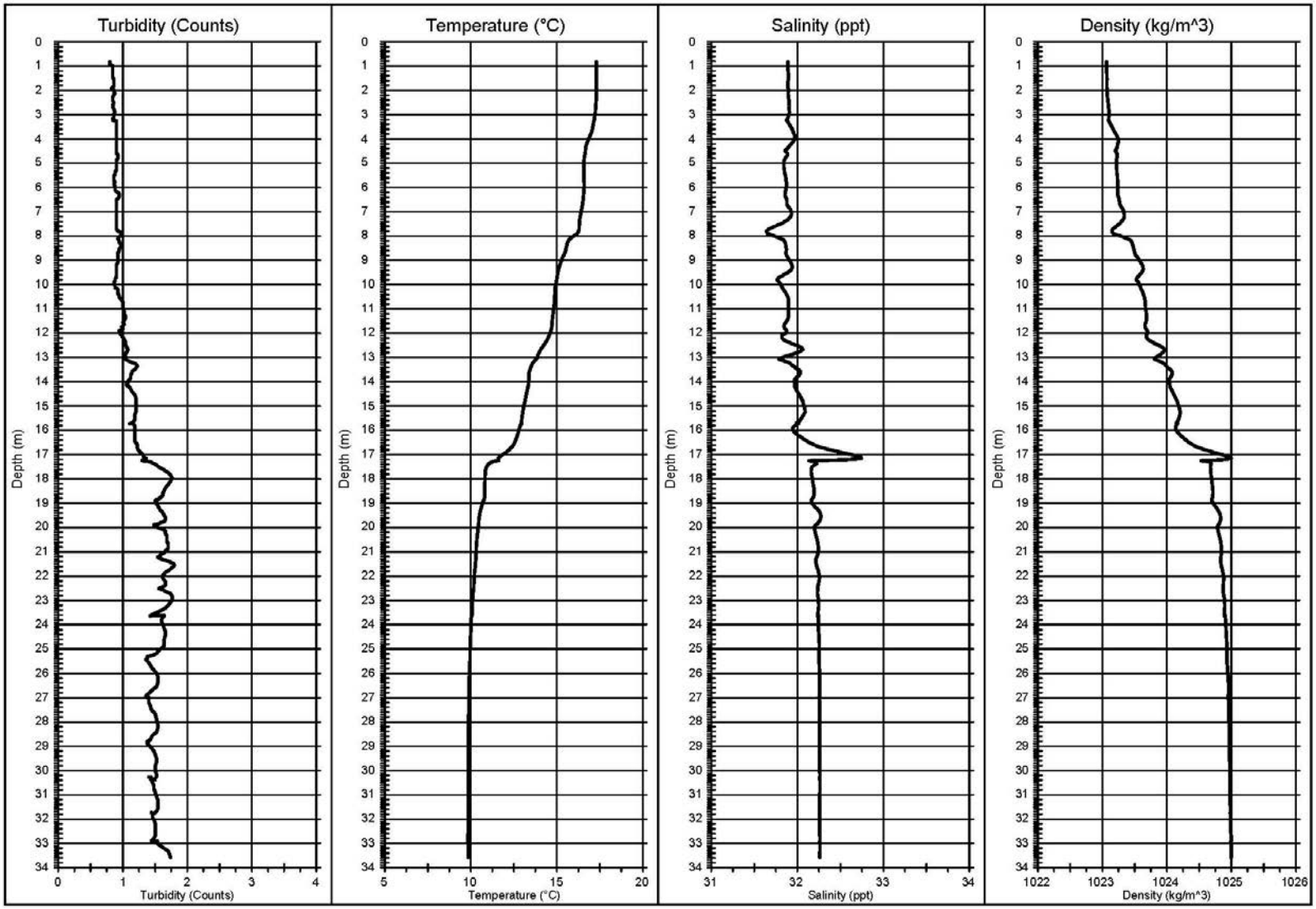
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°14'57"N Longitude: 071°26'46"W Site Depth: 33.9m
Deployed: 19/06/2016 15:22:43 Recovered: 19/06/2016 15:23:52

Water Column Profiles
Block Island Sediment Plume Monitoring, Background, 8

Figure C008

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

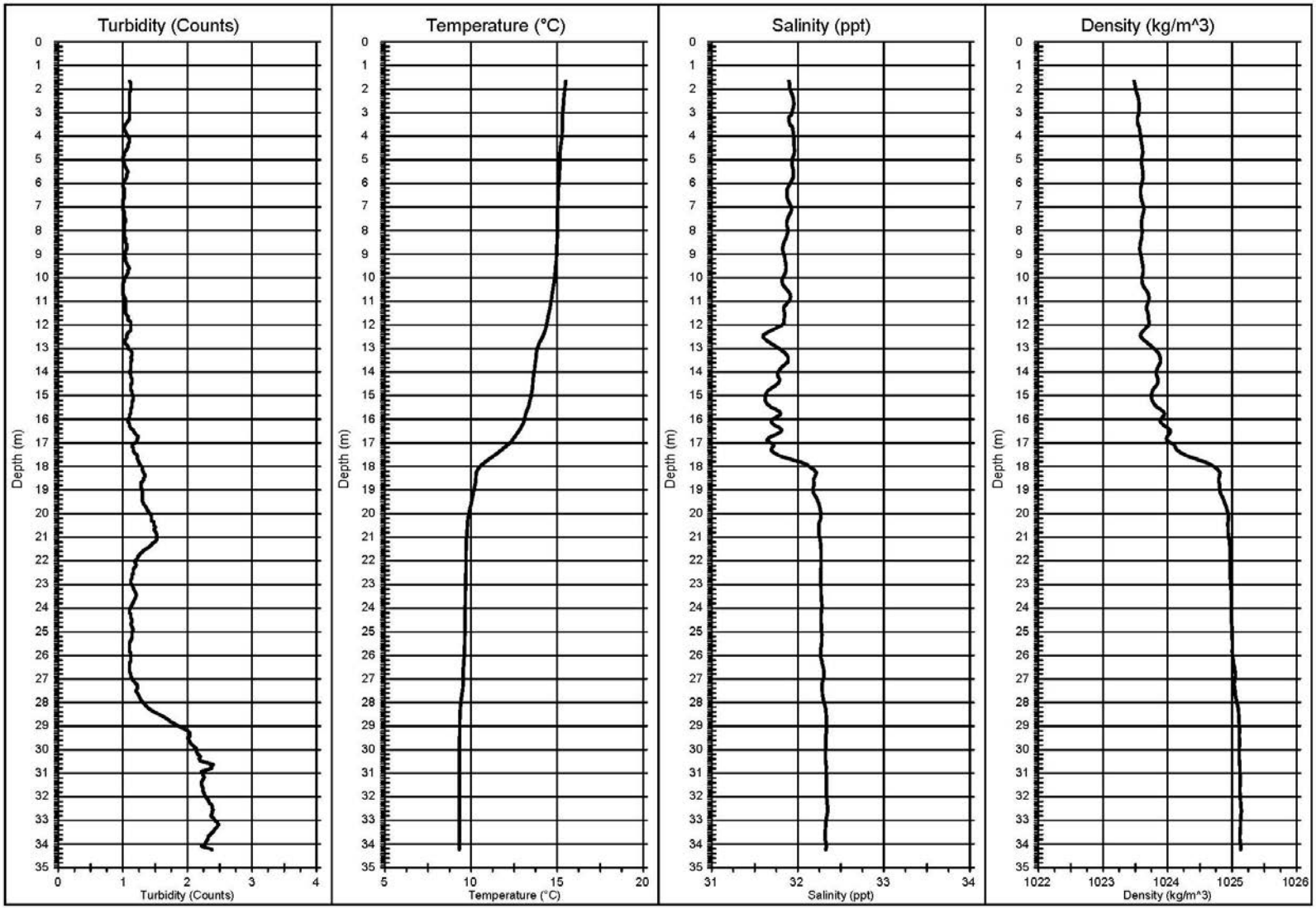
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'56"N Longitude: 071°25'44"W Site Depth: 34.4m
Deployed: 17/06/2016 13:39:01 Recovered: 17/06/2016 13:39:54

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 1

Figure C009

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

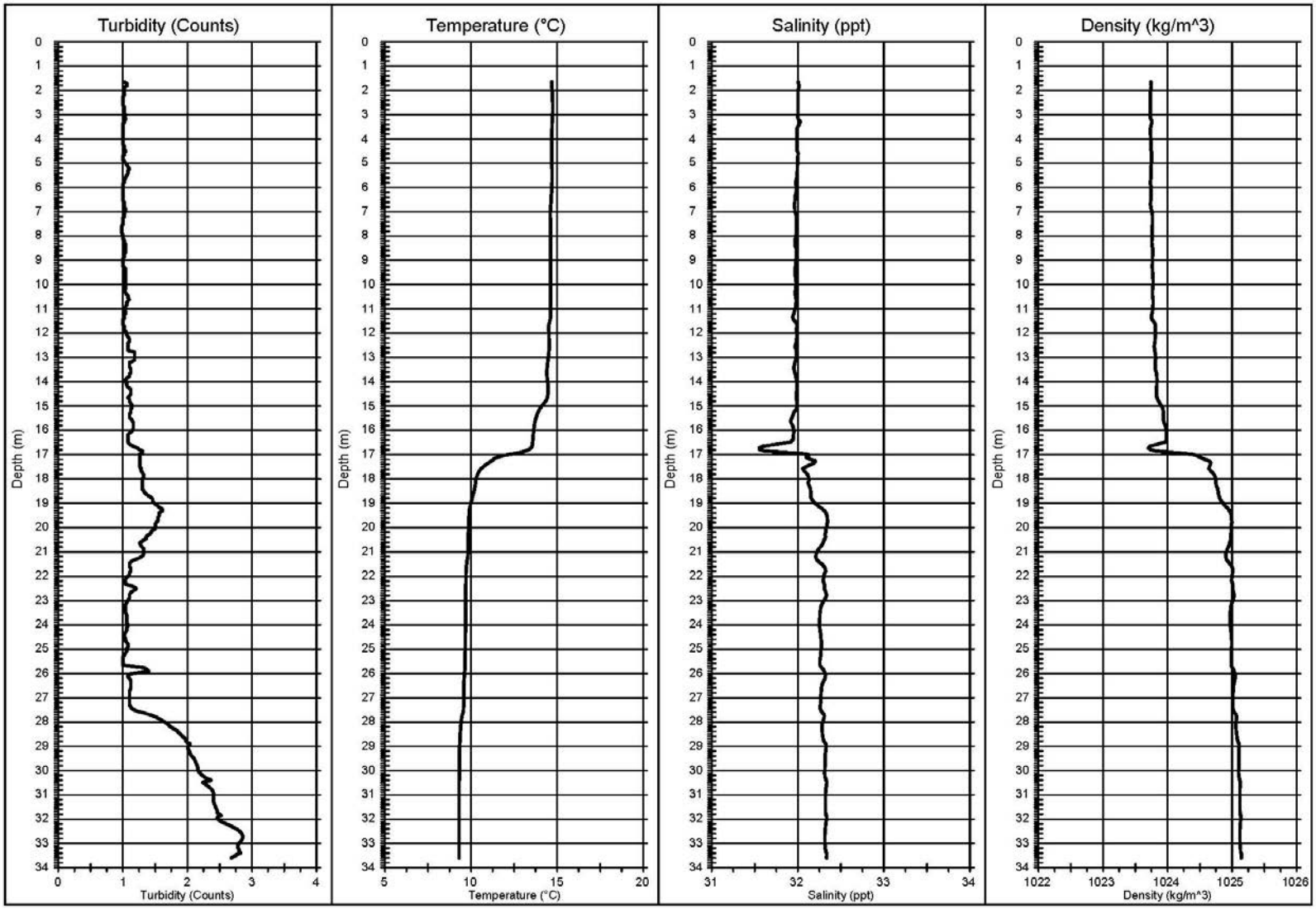
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'52"N Longitude: 071°25'34"W Site Depth: 33.7m
Deployed: 17/06/2016 13:50:42 Recovered: 17/06/2016 13:51:47

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 2

Figure C01C

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

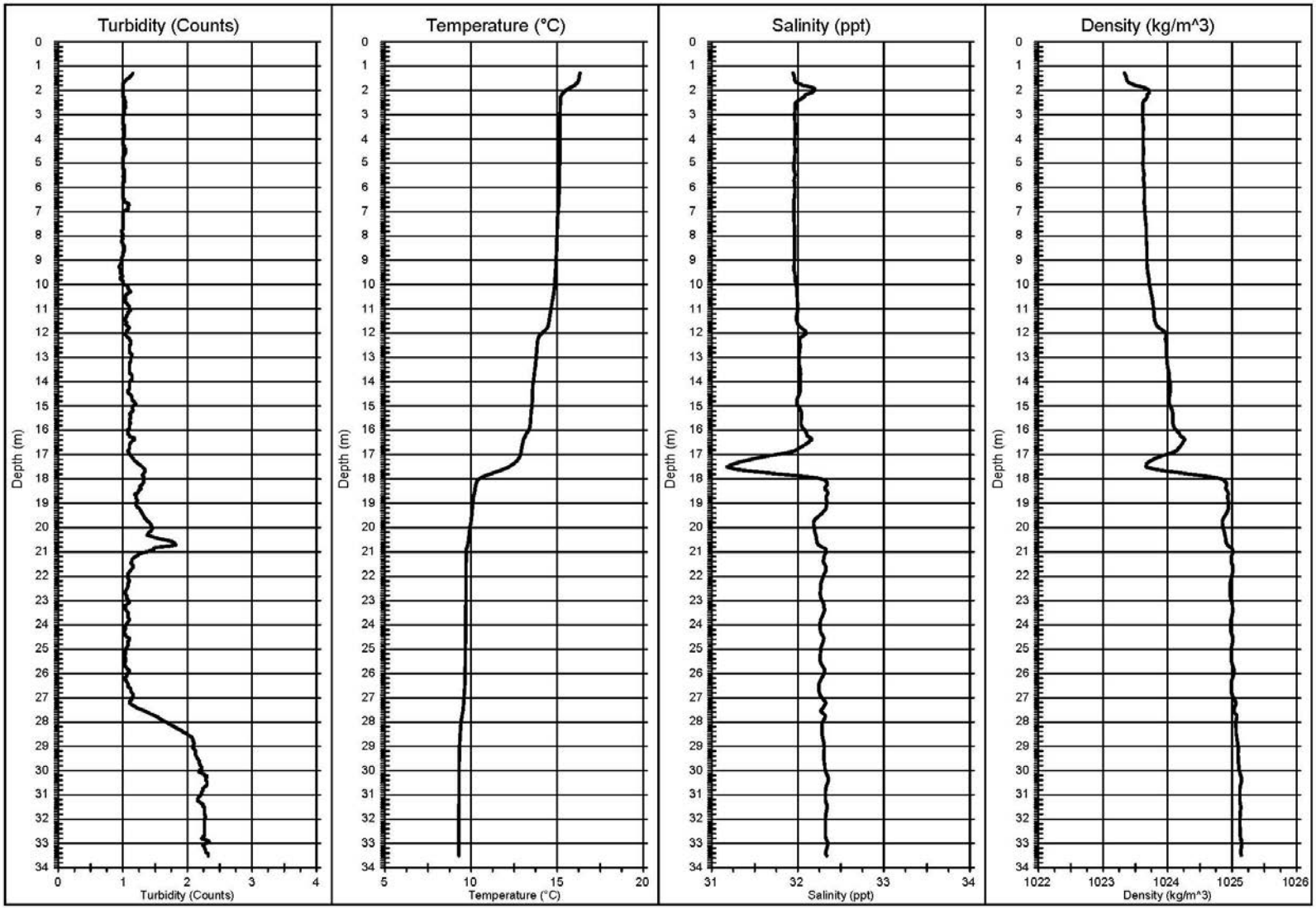
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'45"N Longitude: 071°25'27"W Site Depth: 33.6m
Deployed: 17/06/2016 14:00:07 Recovered: 17/06/2016 14:01:23

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 3

Figure C011

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

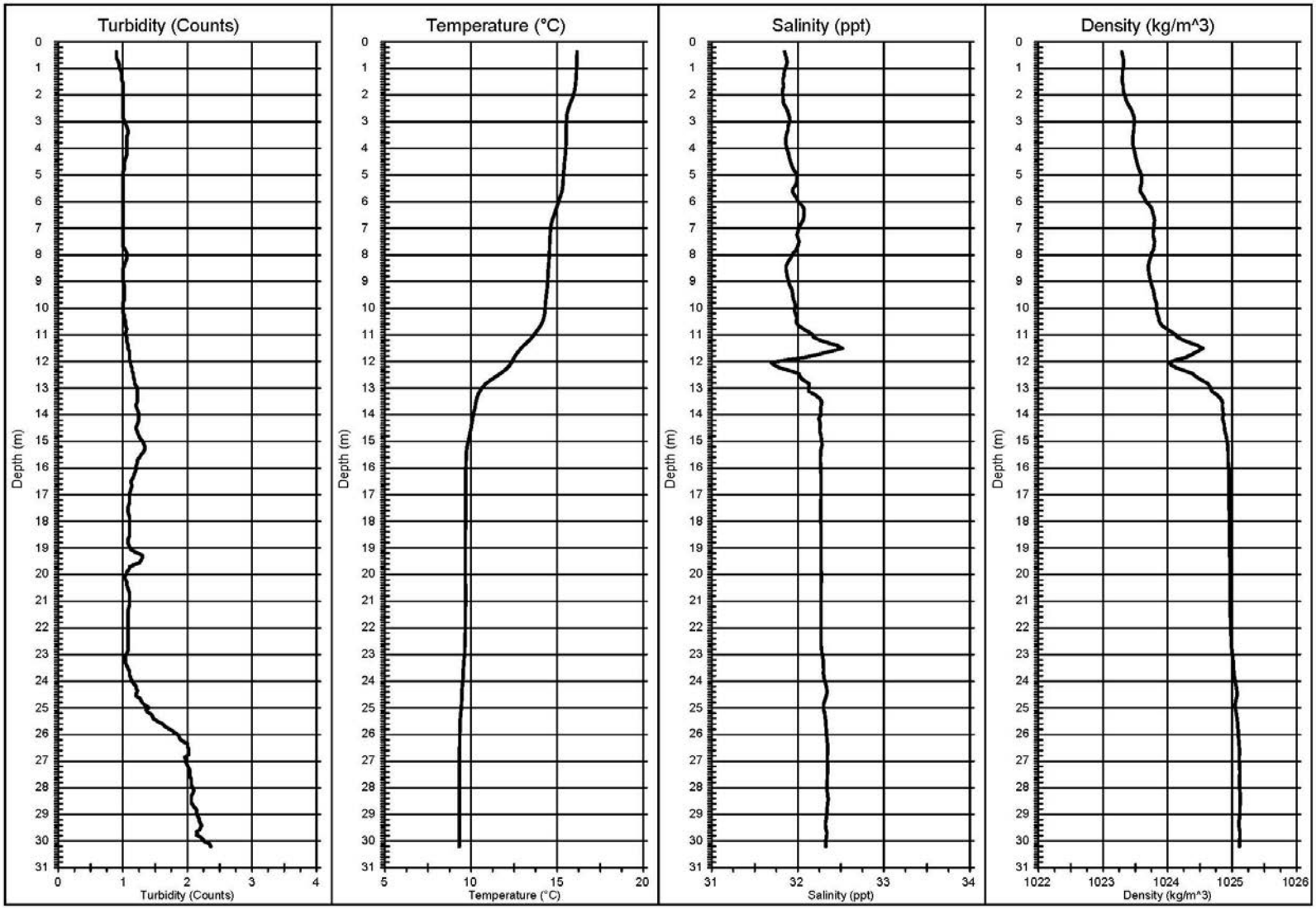
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'45"N Longitude: 071°25'48"W Site Depth: 30.6m
Deployed: 17/06/2016 14:46:17 Recovered: 17/06/2016 14:46:57

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 4

Figure C012

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

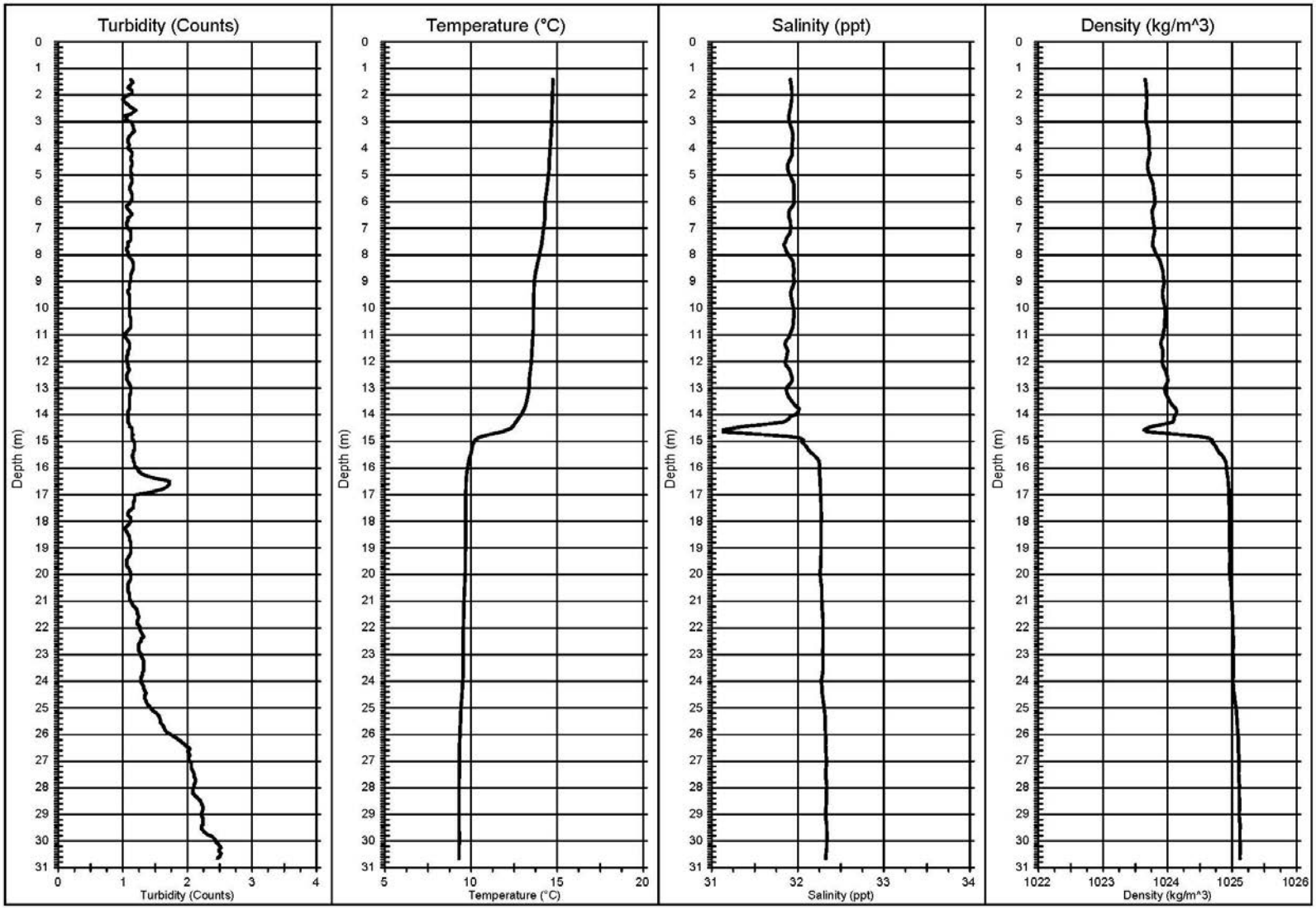
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'40"N Longitude: 071°25'42"W Site Depth: 30.9m
Deployed: 17/06/2016 15:11:17 Recovered: 17/06/2016 15:12:08

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 5

Figure C013

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

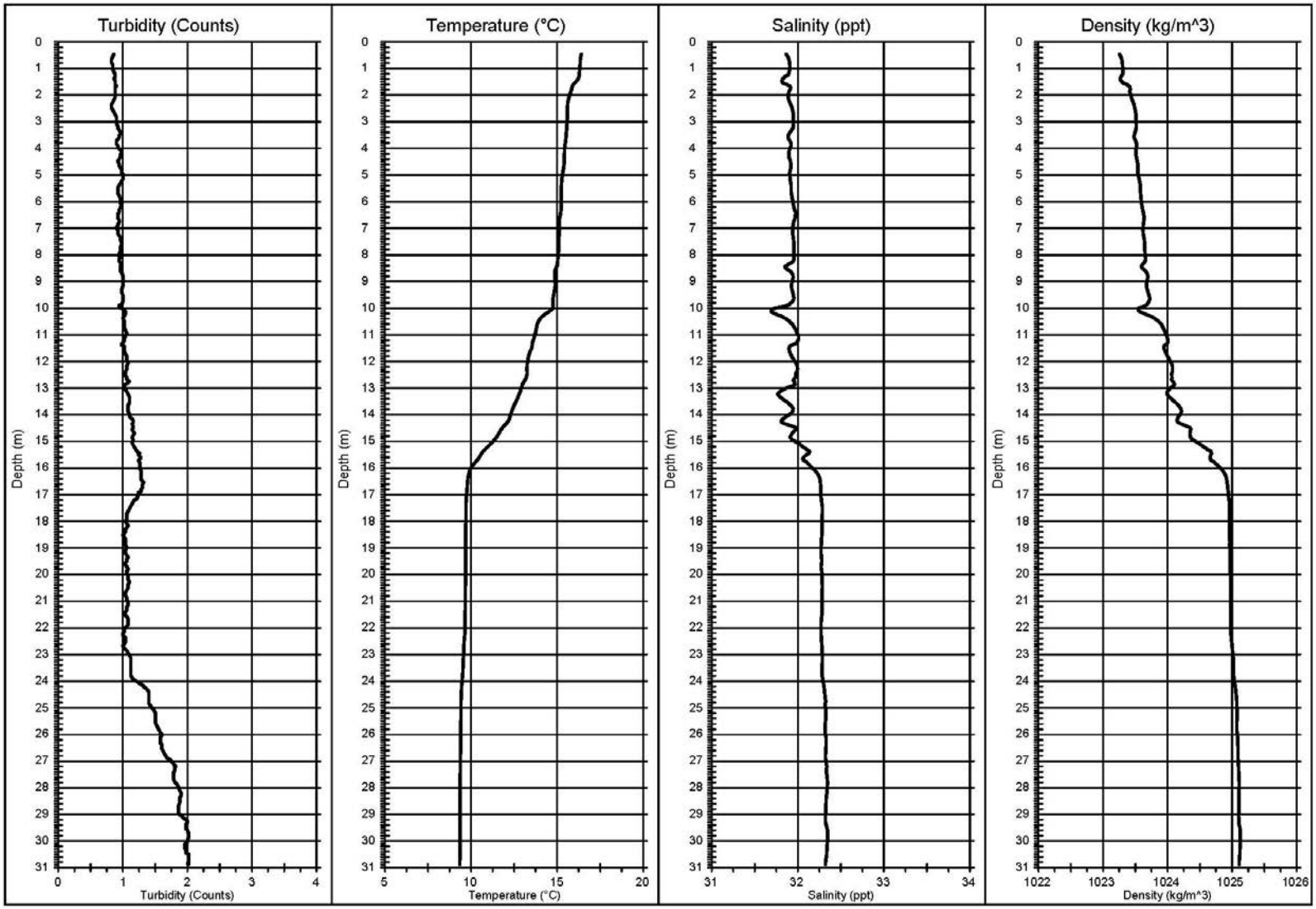
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'46"N Longitude: 071°25'42"W Site Depth: 31.1m
Deployed: 17/06/2016 15:45:22 Recovered: 17/06/2016 15:46:23

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 6

Figure C014

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

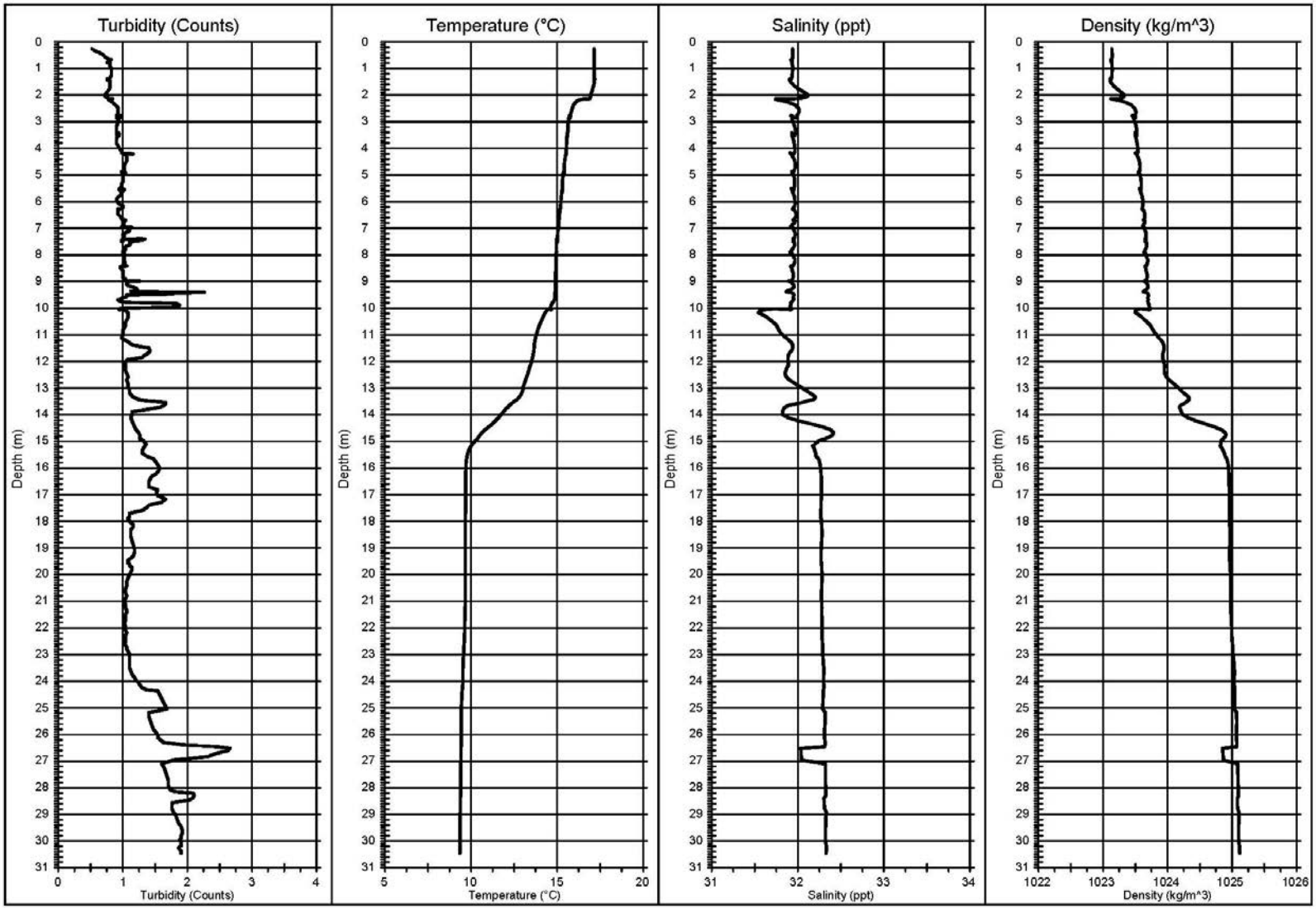
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'45"N Longitude: 071°25'52"W Site Depth: 30.6m
Deployed: 17/06/2016 16:22:13 Recovered: 17/06/2016 16:23:35

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 7

Figure C015

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

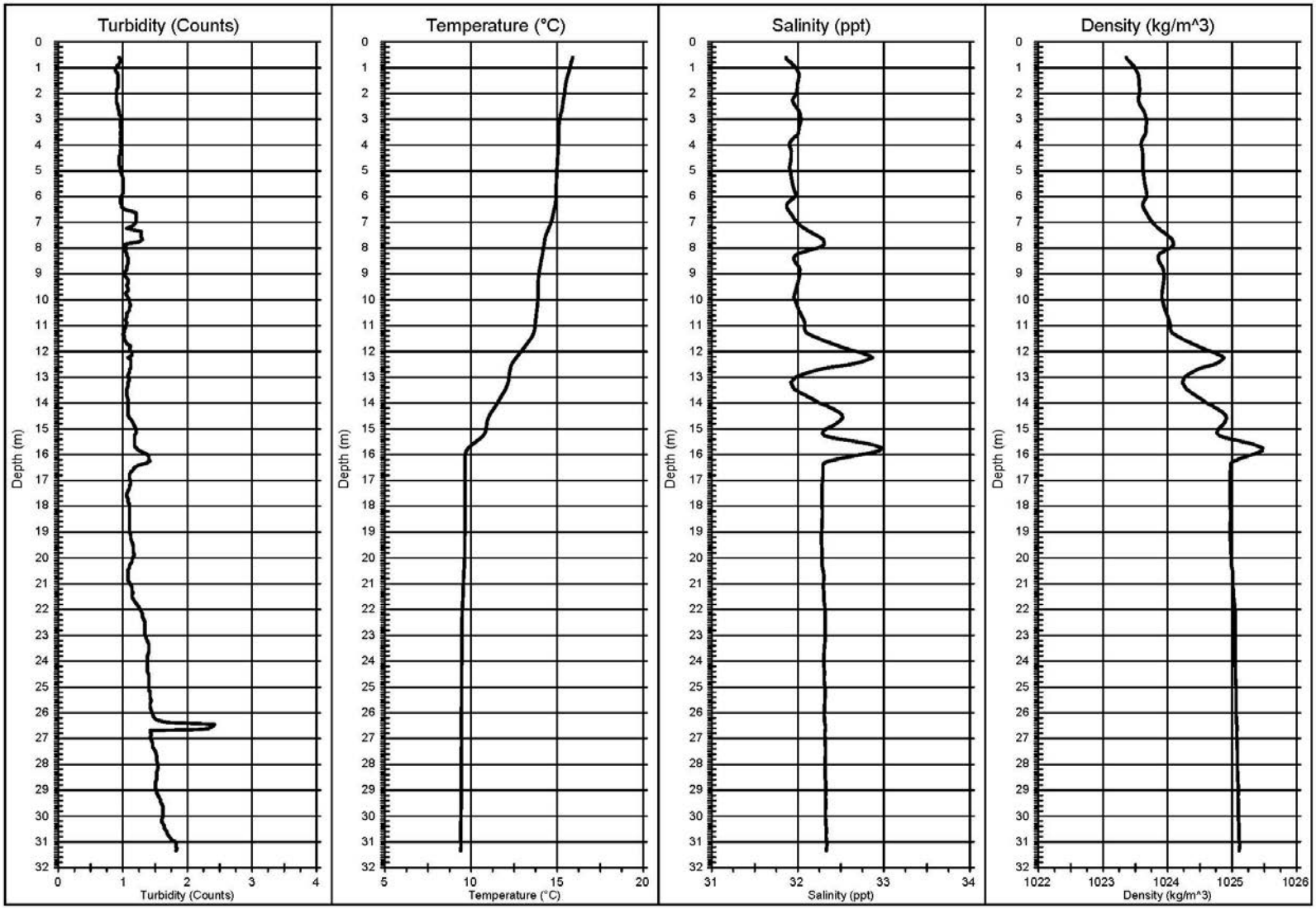
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'38"N Longitude: 071°25'53"W Site Depth: 31.5m
Deployed: 17/06/2016 17:40:22 Recovered: 17/06/2016 17:41:09

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 8

Figure C016

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

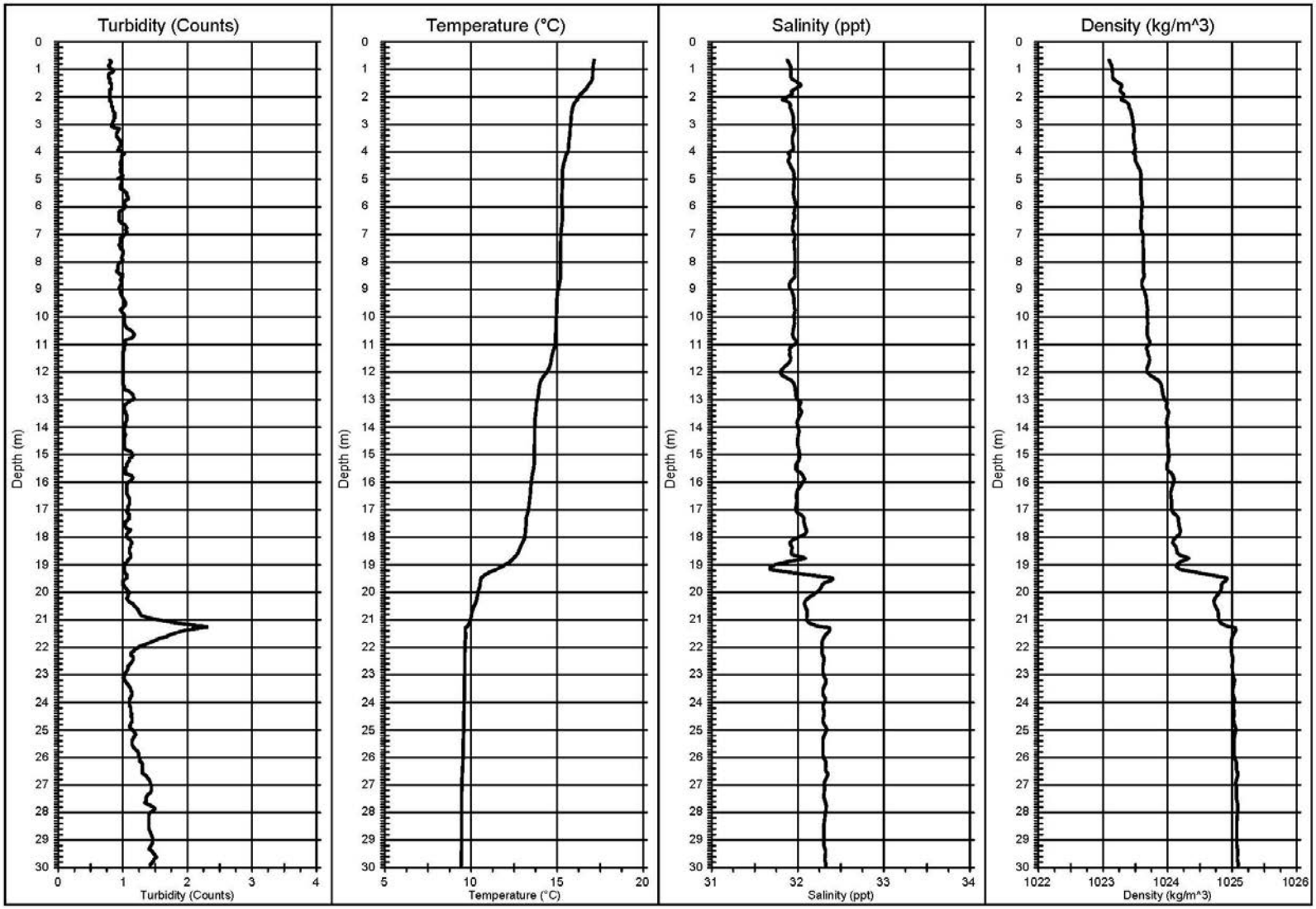
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'32"N Longitude: 071°26'03"W Site Depth: 30.0m
Deployed: 17/06/2016 18:09:15 Recovered: 17/06/2016 18:10:31

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 9

Figure C017

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

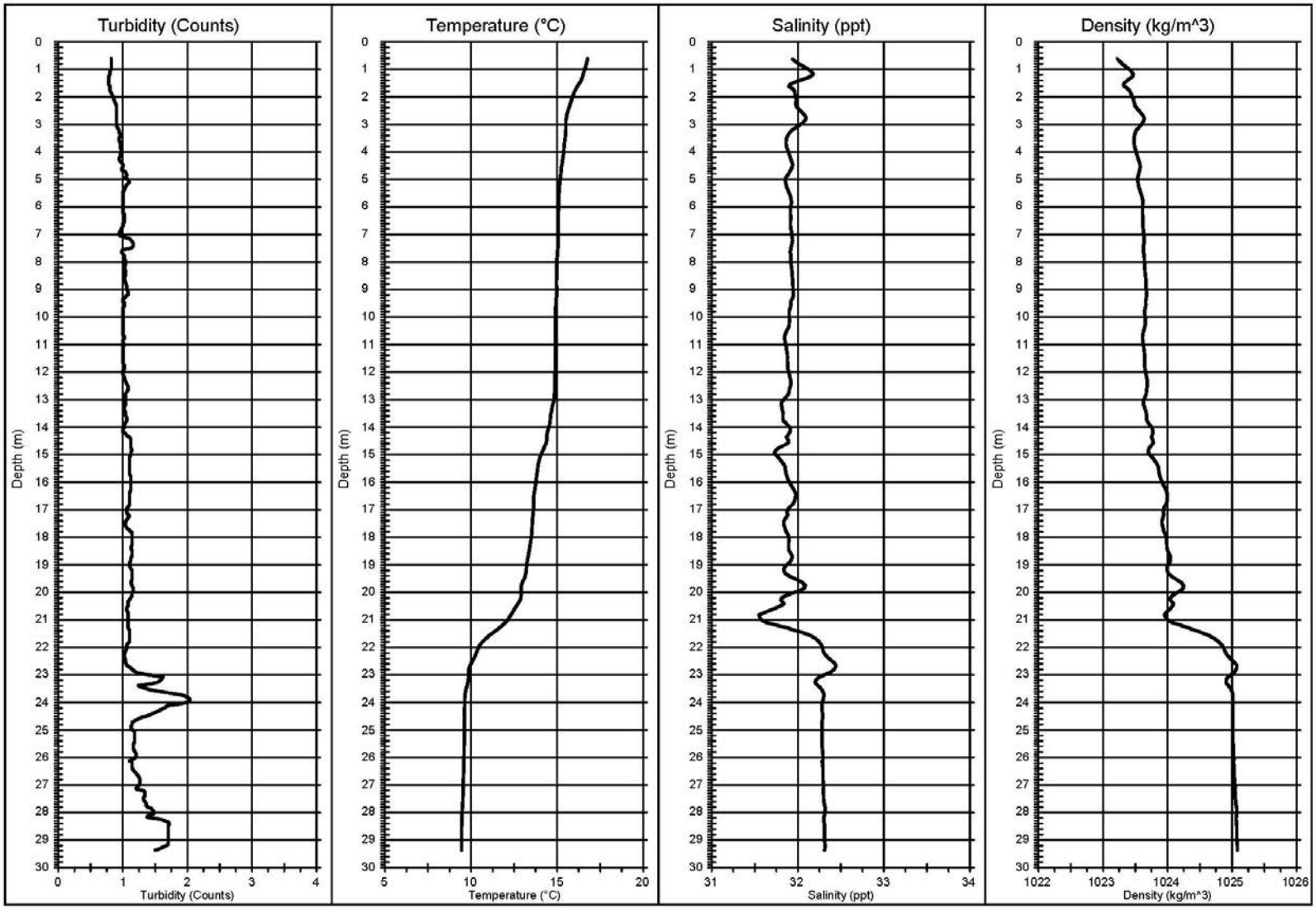
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'25"N Longitude: 071°26'04"W Site Depth: 29.5m
Deployed: 17/06/2016 18:19:58 Recovered: 17/06/2016 18:20:52

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 10

Figure C01B

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

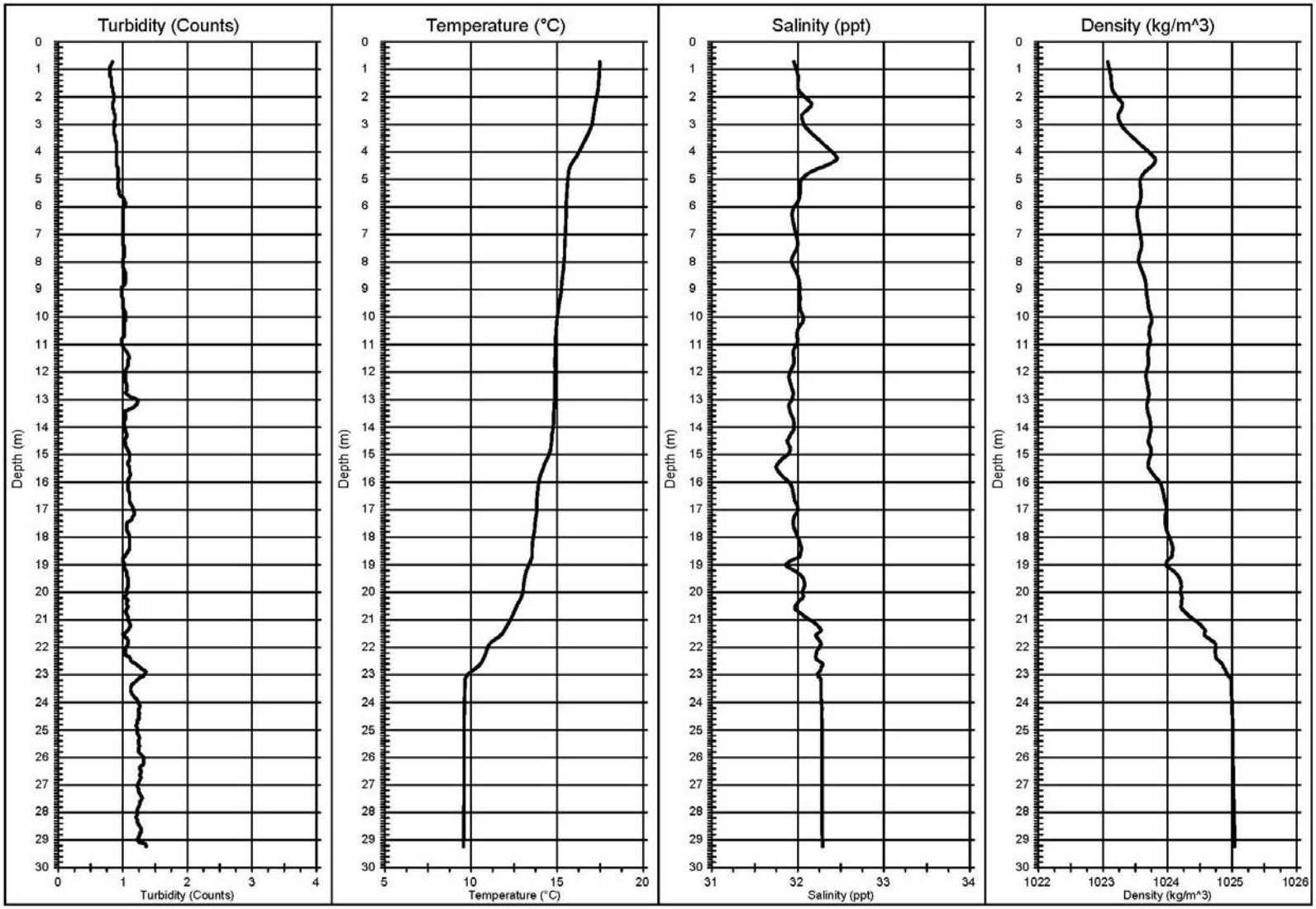
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'25"N Longitude: 071°26'10"W Site Depth: 29.4m
Deployed: 17/06/2016 19:19:24 Recovered: 17/06/2016 19:20:14

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 11

Figure C019

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

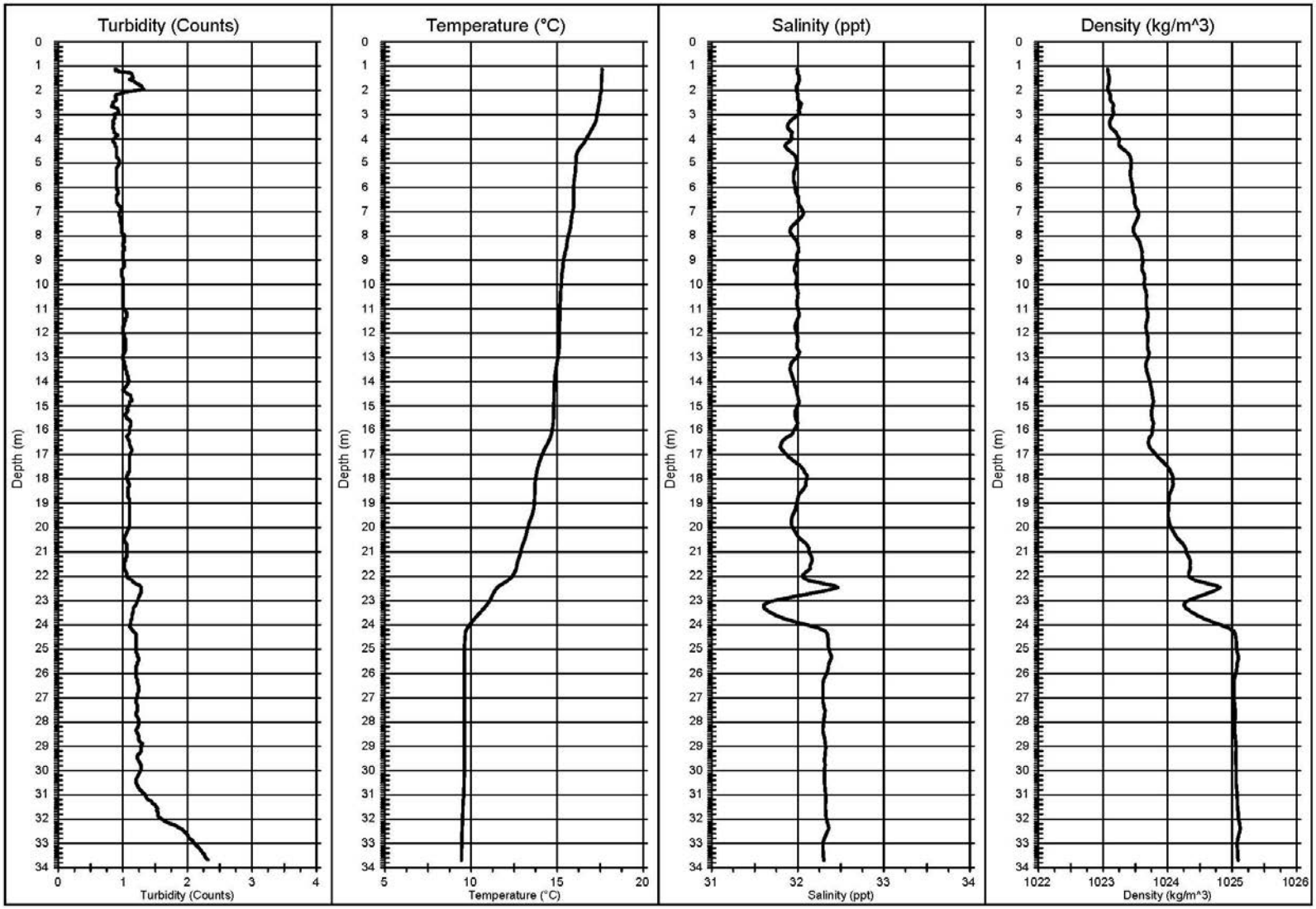
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'23"N Longitude: 071°26'12"W Site Depth: 33.7m
Deployed: 17/06/2016 19:52:56 Recovered: 17/06/2016 19:54:00

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 12

Figure C020

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

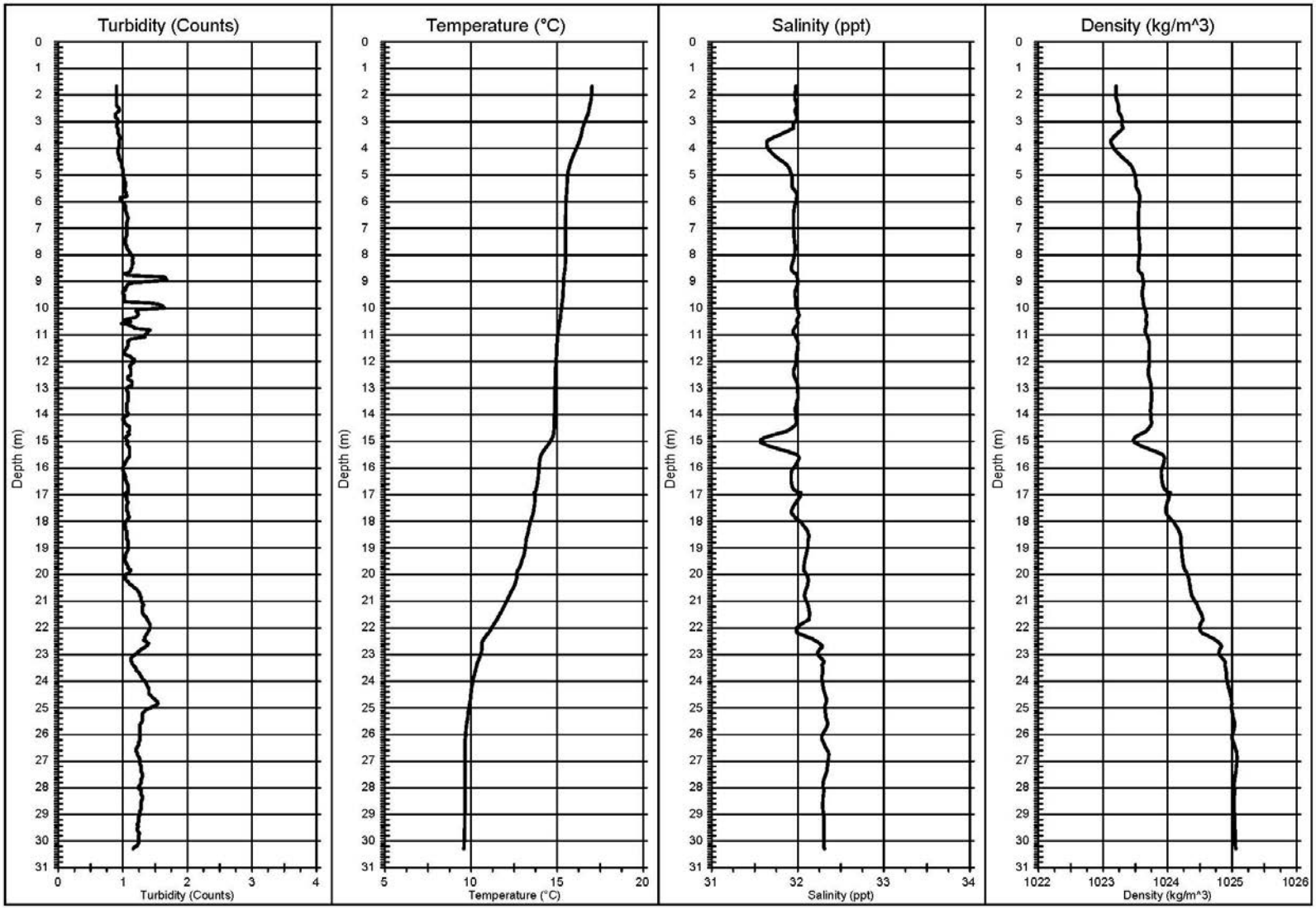
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'30"N Longitude: 071°26'21"W Site Depth: 30.4m
Deployed: 17/06/2016 20:15:55 Recovered: 17/06/2016 20:17:00

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 13

Figure C021

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

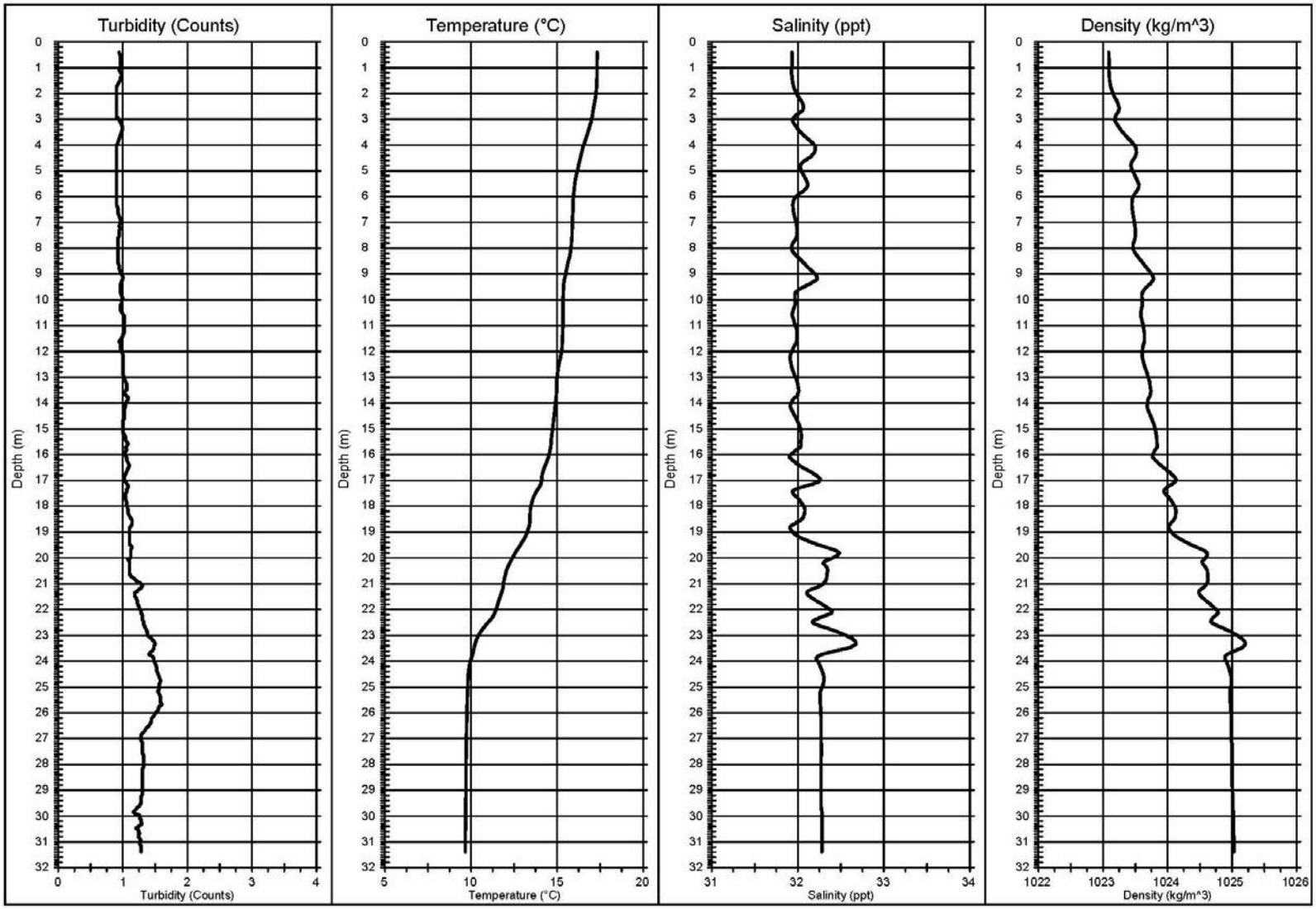
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'50"N Longitude: 071°26'40"W Site Depth: 31.6m
Deployed: 17/06/2016 20:37:43 Recovered: 17/06/2016 20:38:34

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 14

Figure C022

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

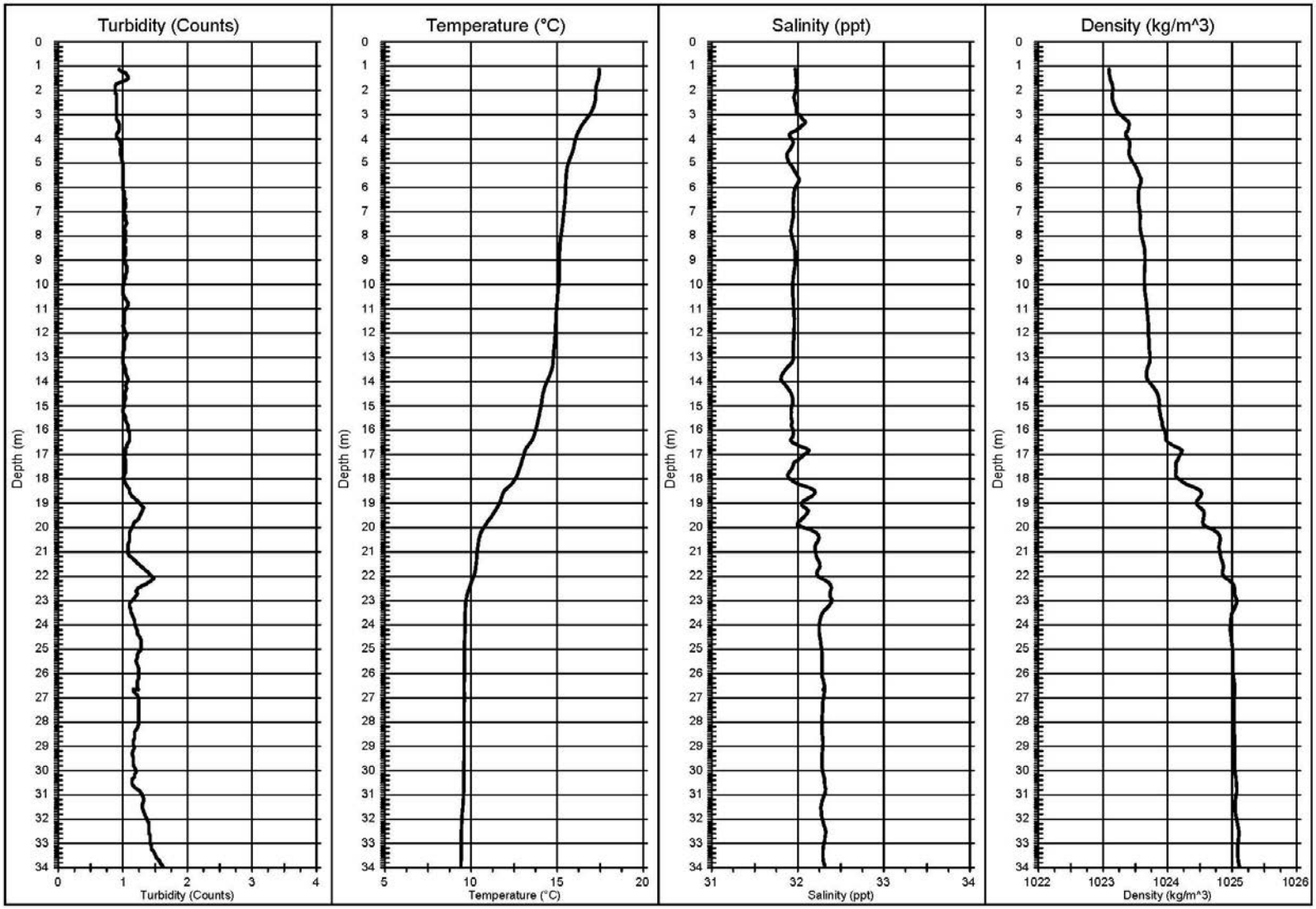
HDR Environmental, Operations and Construction, Inc.

Latitude: 41°15'11"N Longitude: 071°26'32"W Site Depth: 34.0m
Deployed: 17/06/2016 21:10:08 Recovered: 17/06/2016 21:11:00

Water Column Profiles
Block Island Sediment Plume Monitoring, Jet Plow, 15

Figure C023

Environmental Sensors / Idronaut
Serial No.: 608157



Fugro EMU Limited MetOcean Department

Job No: 160215

Appendix 9. University of Rhode Island TSS Analysis Results

Data from the water samples obtained on site and analyzed by the University of Rhode Island.

Sample Name	Sample Taken	Date Filtered	Concentration (mgl^{-1})
B1	16/06/2016	22/06/2016	218
M1	16/06/2016	22/06/2016	84
S1	16/06/2016	22/06/2016	91
B2	16/06/2016	22/06/2016	71
M2	16/06/2016	22/06/2016	92
S2	16/06/2016	22/06/2016	62
B3	16/06/2016	22/06/2016	68
M3	16/06/2016	22/06/2016	69
S3	16/06/2016	21/06/2016	89
B4	16/06/2016	21/06/2016	119
M4	16/06/2016	22/06/2016	46
S4	16/06/2016	22/06/2016	110
B5	16/06/2016	22/06/2016	61
M5	16/06/2016	22/06/2016	342
S5	16/06/2016	22/06/2016	100
B1	17/06/2016	24/06/2016	113
M1	17/06/2016	24/06/2016	89
S1	17/06/2016	24/06/2016	107
B2	17/06/2016	24/06/2016	71
M2	17/06/2016	24/06/2016	86
S2	17/06/2016	24/06/2016	90
B3	17/06/2016	24/06/2016	114
M3	17/06/2016	24/06/2016	105
S3	17/06/2016	24/06/2016	84
B4	17/06/2016	24/06/2016	94
M4	17/06/2016	24/06/2016	99
S4	17/06/2016	24/06/2016	76
B5	17/06/2016	24/06/2016	90
M5	17/06/2016	24/06/2016	103
S5	17/06/2016	24/06/2016	66
B6	17/06/2016	24/06/2016	94
M6	17/06/2016	23/06/2016	98
S6	17/06/2016	23/06/2016	101
B7	17/06/2016	24/06/2016	74
M7	17/06/2016	24/06/2016	95
S7	17/06/2016	24/06/2016	85
B8	17/06/2016	23/06/2016	119

Sample Name	Sample Taken	Date Filtered	Concentration (mgl^{-1})
M8	17/06/2016	21/06/2016	123
S8	17/06/2016	23/06/2016	112
B9	17/06/2016	21/06/2016	70
M9	17/06/2016	23/06/2016	103
S9	17/06/2016	23/06/2016	84
B10	17/06/2016	24/06/2016	96
M10	17/06/2016	23/06/2016	114
S10	17/06/2016	23/06/2016	100
B11	17/06/2016	23/06/2016	113
M11	17/06/2016	23/06/2016	124
S11	17/06/2016	23/06/2016	122
B12	17/06/2016	23/06/2016	120
M12	17/06/2016	23/06/2016	105
S12	17/06/2016	23/06/2016	88
B13	17/06/2016	23/06/2016	81
M13	17/06/2016	23/06/2016	89
S13	17/06/2016	21/06/2016	114
B1	19/06/2016	21/06/2016	76
M1	19/06/2016	21/06/2016	78
S1	19/06/2016	22/06/2016	117
B2	19/06/2016	21/06/2016	114
M2	19/06/2016	22/06/2016	96
S2	19/06/2016	21/06/2016	79

Note: B, M and S indicates Bottom, Middle and Surface water samples

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under US administration.

BOEM
Bureau of Ocean Energy Management

The Bureau of Ocean Energy Management

As a bureau of the Department of the Interior, the Bureau of Ocean Energy (BOEM) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS) in an environmentally sound and safe manner.

The BOEM Environmental Studies Program

The mission of the Environmental Studies Program (ESP) is to provide the information needed to predict, assess, and manage impacts from offshore energy and marine mineral exploration, development, and production activities on human, marine, and coastal environments.