C. VERTICAL AND HORIZONTAL CONTROL

For complete review of horizontal and vertical controls for all survey operations see HVCR.

C.1 VERTICAL CONTROL

The survey was ellipsoidally referenced, mitigating the requirement for squat and settlement models for the newly mobilized R/V Gulf Surveyor. Vertical control was provided using RTK GNSS techniques, with corrections provided by a base station located atop the Seacoast Science Centre in Fort Point, New Hampshire. A MLLW referenced surface was creating using a NAD83 to MLLW transformation grid from VDATUM 4.0. The grid was brought into CARIS using Pydro and some layer math. The VDATUM offset was ~28.38 m with a vertical uncertainty of 0.1305450 m (Table 11).

Table 11. VDatum Components

To	From	meters	uncertainty
WGS84	NAD83 NAD83 (2011)	1.191	0.028
NAD83 (NAD83)	NAD83 NAVD88	26.800	0.073
NAD83 NAVD88	NAD83 MLLW	1.58	0.117
Sum			
WGS84 to NAD83 MLLW components		29.571	0.131
NAD83 to NAD83 MLLW		**28.38**	**0.131**

C.2 HORIZONTAL CONTROL

The horizontal datum for all surfaces of Summer Hydrography 2016 was NAD83 (2011), with coordinates for final products projected using UTM 19N. Positions are acquired using identical techniques as for Vertical Control. For further details, see the Horizontal and Vertical Control Report (HVCR).