

## C. HORIZONTAL AND VERTICAL CONTROL

A complete description of the horizontal and vertical control for survey H12241 can be found under the OPR-E349-KR-10 *Horizontal and Vertical Control Report*, submitted under separate cover. A complete description of Global Positioning System (GPS) post-processing methodology for survey H12241 can be found in the OPR-E349-KR-10 DAPR, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

Real-time navigation logged during acquisition was overwritten with a post-processed navigation solution, created from Applanix POSPac MMS using the SmartBase option. A GPS base station with a dual frequency (L1/L2) receiver was established on Smith Island in Ewell, Maryland, and another in Airedele, Maryland, to enable post-processing using Single Base or SmartBase solutions. These two stations were augmented by GPS reference stations from the National Geodetic Survey (NGS) National and Cooperative Continually Operating Reference Stations (CORS) to form a GPS network for use in SmartBase processing. Table 7 lists the reference stations used in the network and their approximate distance from the survey area. North American Datum of 1983 (NAD83) coordinates of the base stations are included in the OPR-E349-KR-10 *Horizontal and Vertical Control Report*.

**Table 7. GPS Reference Stations Used During SmartBase Processing**

<b>Station</b>	<b>Data Provider</b>	<b>Approximate Distance to Survey Area</b>
AIRD	DEA	25km
EWELL	DEA	10km
MDSI	NGS	50km
HNPT	NGS	70km
VAWI	NGS	55km
VIMS	NGS	50km
VAGP	NGS	80km
CORB	NGS	115km
DEDS	NGS	100km

### C1. Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). Soundings were reduced to MLLW using post-processed GPS derived water levels. The VDatum derived separation model, *Potamac.bin*, was used to reduce NAD83 ellipsoid heights to MLLW as described in the OPR-E349-KR-10 DAPR. The separation model has been included in the digital deliverables. When the model file was used in the tide reduction process in CARIS HIPS it was inadvertently misspelled. A query of the GPS Tide Datum in HIPS will show the file *Potamic.bin*.

Traditional zoning from water level stations was not used for sounding reduction in this survey, though zoning provided by the Center for Operational Oceanographic Products and Services

(CO-OPS) and verified water level files for the survey have been included with the digital deliverables.

## **C2. Horizontal Control**

The horizontal datum for this project is NAD83. All of the real-time navigation data were collected in Differential GPS (DGPS) mode. DGPS corrections were received from the U.S. Coast Guard (USCG) beacon at Annapolis, Maryland (289 kHz) or from the secondary beacon at Driver, Virginia (301 kHz). During survey operations, some DGPS outages from the primary beacon occurred. The system was set up to automatically switch to the secondary beacon when the primary signal was lost. Real-time navigation data were overwritten by post-processed Smoothed Best Estimate Trajectory (SBET) data referenced to NAD83.