

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via ERTDM	OPR-R385-KR-20_ERTDM_NAD83-MLLW_04162020.csar

Table 11: ERS method and SEP file

All soundings were reduced to MLLW using the ERTDM NAD83 to MLLW separation model grid file provided by NOAA using ERS methodology.

Tide gauges and ERTDM validation sites (GPS buoys) were installed as part of the overall project but were not used for reduction of soundings. Gauge data and validation results have been separately provided to NOAA CO-OPS. Reports (with accompanying data packages) that have been submitted directly to CO-OPS are itemized in Section E of this report.

Discrete tide zones were generated using project gauge data but were not used for sounding reduction. Zones were used for an ERZT comparison to the provided ERTDM grid, with the two methods having an overall agreement of 0.02 m with a standard deviation of 0.12 m. Zones are provided in the Water Levels directory. Additional detail is available with the project HVCR.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 3.

The following PPK methods were used for horizontal control:

- Smart Base
- RTX

Post-processing of all navigation data was done in Applanix POSPac MMS (v8.4) software. Initial processing was done in the field using Trimble PP-RTX methodology. Following completion of operations and availability of precise ephemeris data, navigation data was reprocessed in POSPac using Applanix SmartBase (ASB) methodology to achieve better overall results than the initial PP-RTX method, and applied to all survey data. ASB processing was possible because the project area was fully encompassed by a network formed by three or more CORS base stations. ASB processing was further facilitated by the presence of the nearby stations at St. Michael (AT01) and Unalakleet (AB17). ASB processing replaced all initial PP-RTX positions. Therefore, all final data is corrected with ASB. Exceptions, if any, were noted previously in this report. Note: The area is within UTM zone 4N, but 3N was used for projection instead. This was done to simplify operations by keeping all survey sheets under OPR-R385-KR-20, which laid mostly in 3N, in a common UTM zone.

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
StMichael AK2018	AT01
Bethel WAAS	BET1
BaldHead Ak2006	AC31
Buckland AK2007	AC07
Unalakleet AK2008	AB17
Razorback AK2007	AB09
Mekoryuk AK2008	AB04
Savoonga AK2007	AB04

Table 12: CORS Base Stations

WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition. All real-time positions were replaced in final processing with post-processed kinematic (PPK) positions generated in Applanix POSPac software, as described previously.