

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

Horizontal and Vertical Control Report

Type of Survey	<u>Hydrographic</u>
Project	<u>OPR-E352-KR-24</u>
Contract No	<u>1305M220DNCNJ0053</u>
Task Order No	<u>1305M224F0261</u>
Time Frame	<u>June 2024 - December 2024</u>

State	<u>Maryland and Virginia</u>
General Locality	<u>Tangier Sound</u>
	<u>2024</u>
	<u>CHIEF OF PARTY</u>
	<u>David R. Neff, C.H.</u>

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Date	<u></u>
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HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the office.

FIELD No

eTrac Inc.

State Maryland and Virginia

General Locality Tangier Sound

Project Name Tangier Sound, MD

Scale 1:20,000 Date of Survey June - December 2024

Instructions Dated July 3 2024 Project No. OPR-E352-KR-24

Vessel R/V Thunder, Current, Pulse

Chief of Party David Neff

Surveyed by eTrac, a Woolpert Company

Soundings by echo sounder R2 Sonic 2024, R2Sonic 2022

Graphic record scaled by N/A

Graphic record checked by N/A Automated Plot N/A

Verification by Atlantic Hydrographic Branch

Soundings in Meters at Mean Lower Low Water

REMARKS: NAD 83 (2011), UTM Zone 18N
Times are in UTC
The purpose of this contract is to provide NOAA with modern, accurate hydrographic
survey data with which to update the nautical charts of the assigned area.

SUBCONSULTANTS: _____

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A. Vertical Control

Per the project instructions, survey data for OPR-E352-KR-24 were vertically referenced to the ellipsoid. A time dependant, 7 parameter transformation from ITRF-2014 to NAD83(2011) was performed in QPS Qinsy. A vertical separation model was provided by NOAA to transform the ellipsoidally referenced data from NAD83(2011) to Mean Lower Low Water (MLLW). The transformation and the separation model were applied in QPS Qinsy on the vessels in real-time to shift the bathymetric data to the MLLW datum. Working on the MLLW datum in the field was efficient for operations as the NALL was identified in realtime. The separation model was carried through the processing pipeline maintaining the reference to the MLLW datum throughout all processing efforts.

All vessels received GNSS corrections over the G4+ carrier signal from the Marinestar Global Correction System maintained by Fugro or over the Trimble Real-Time CenterPoint RTX carrier signal. Both the Marinestar and Trimble systems are global real-time GNSS broadcast systems that deliver corrections from a network of base stations around the world via geo-stationary satellites. The Marinestar and Trimble Real-Time CenterPoint RTX corrections systems were utilized for both vertical and horizontal positioning. Accuracies in the 5 to 15cm range were observed throughout the project for Marinestar. Accuracies in the 3 to 8cm range were observed throughout the project for Applanix Real-Time CenterPoint RTX.

For OPR-E352-KR-24, Trimble Applanix POSPac MMS was utilized for all survey data to post-process real-time positioning data utilizing Trimble’s PP-RTX implementation of Trimble CenterPoint RTX. The Trimble CenterPoint RTX correction service is delivered via internet connection and integrated into Applanix POSPac MMS 9, to aid in post processed trajectories. Improved accuracies in the 2 to 6cm range were observed in the PP-RTX results. A Smoothed Best Estimate of Trajectory (SBET) was exported from POSPac MMS and applied to survey data in Qimera.

An additional assigned task for this project was to include interpolated grids in Mean Lower Low Water (MLLW) and North American Vertical Datum of 1988 (NAVD88) datum. To accomplish this task, MLLW XYZ data were exported from Qimera and loaded into Hypack. Using Hypack TIN, data were interpolated with a TIN Max Leg large enough to interpolate all desired gaps. Within Hypack, interpolated data were clipped to the outer and inner project boundaries of each H-cell sheet. The MLLW interpolated grids were then exported from Hypack and brought back into Qimera. In

order to reference soundings to NAVD88 Datum, a separation model was provided by NOAA and was applied to the gridded MLLW data within Qimera..

B. Horizontal Control

Survey data for OPR-E352-KR-24 were collected in NAD83(2011) UTM Zone 18N Projection.

Horizontal positioning was achieved using the same equipment and methods as described in the Vertical Control section of this document.

C. Approval Sheet

OPR-E352-KR-24

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Horizontal and Vertical Control Report

This report and the accompanying data are respectfully submitted.

Field operations contributing to the accomplishment of OPR-E352-KR-24 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and associated data have been closely reviewed and are considered complete and adequate as per the Statement of Work.

David R. Neff | eTrac, a Woolpert Company | Chief of Party | January, 2025

eTrac, a Woolpert Company
January 2025