FY26 Coastal Resilience Grant – Beach Nourishment Needs Assessment: Salisbury, Newburyport, Newbury

Task 2 Summary: Review of Existing Data and Data Collection

I. Management history

To better understand shoreline changes and jetty stabilization over time, a management history record was prepared. The jetty history, which spans 1881-2015 is well documented in both repairs and full construction updates. Nourishment and dredging information are sparser; Coastal Solutions has logged 20 events of inlet dredging spanning from 1937 to 2023. Much of this dredge was placed offshore, however it has recently been approved to move this sediment to Salisbury, Plum Island, and Reservation Terrace.

II. Shoreline surveys

a. Historical data

Historical shoreline data is needed for shoreline change calculations, both short-term and long-term. MassGIS provides shorelines measured through LIDAR. It was determined that the most reasonable shorelines applicable to the Upper North Shore were the 1952 and the 2005 high-water shorelines. Both shorelines were compared against the 2026 survey collected by Coastal Solutions.

b. Shoreline delineation (2026) and grain size sampling

A high-water line/berm crest shoreline delineation survey was performed on January 13, 2026. The survey covered the entire project area. Grain size sampling was also completed along the same shoreline. Two samples were taken approximately every 2000 feet. Sixteen sampling transects were identified, resulting in a total of 32 samples, where one sample was collected on the beach face and one sample was collected on the beach berm along each transect. Figure 1 below shows the shoreline and sediment survey locations.

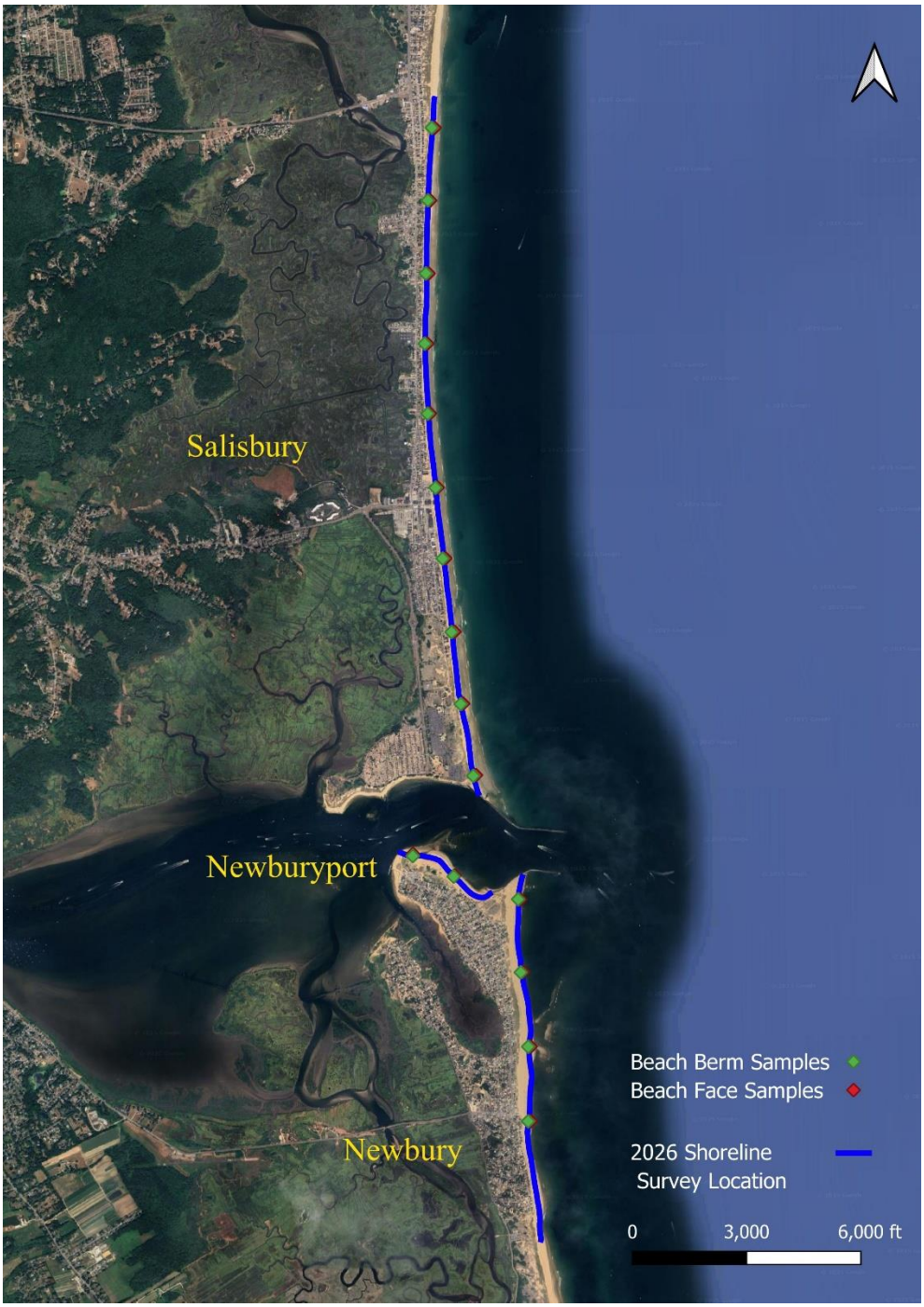

Figure 1. Massachusetts upper north shore sediment and shoreline survey locations.

III. Bathymetry

Bathymetric data was obtained from NOAA Coast to inform wave modeling. Two primary sources of data were used: NOAA NCEI CUDEM and the 2018 USACE Topobathy survey. The NOAA

NCEI CUDEM informed the offshore bathymetry, while the 2018 USACE survey provided detailed nearshore topobathy and was performed after the 2018 storm season.

IV. Wave processes

A thorough review of available wave and wind data was performed. The USACE Wave Information Study (WIS) hindcast database, at station 63045, was used to generate the offshore wave conditions. The WIS has a record that spans the 44-year period from January 1980 to December 2024. The entire record was reviewed to generate mean wave conditions where waves were sorted by mean wave direction into compass sectors and then further sorted by wave height to find bottom, middle, and top wave height conditions. For each compass sector, the bottom, middle, and top wave height conditions were derived such that each condition had an equal rate of occurrence. The mean wave height was calculated by taking the mean of all values in the (bottom, middle, or top) bin. The remaining mean wave and wind parameters were found by calculating a mean based on conditions that corresponded to the mean wave height.

V. Coastal infrastructure inventory

Public coastal infrastructure is logged within the *Massachusetts Coastal Infrastructure Inventory and Assessment Report,* which was last updated in 2015. This log not only takes stock of what is currently supporting the shoreline, but details the condition and approximate reconstruction, repair, and upgrade costs.

VI. Natural resource inventory

A natural resource inventory identified Priority Habitats and Estimated Habitats provided from the Massachusetts Division of Fisheries & Wildlife.

The shorelines are also designated as "Shellfish Suitability Areas" with the whole site serving as a habitat for Surf Clams, Sea Scallops, and Ocean Quahog (Salisbury).