
To:	Eric Ham and Kristen Chamberlain Maine Department of Transportation	From:	Matt Arsenault Topsham, Maine Office
File:	195602718	Date:	April 3, 2024

Reference: Proposed Sears Island Offshore Wind Terminal Sand Dune Characterization Memo

The Maine Department of Transportation is evaluating a project site (site) on the western shoreline of Sears Island to construct an offshore wind terminal that would support offshore wind development in Maine. This Project is proposed to serve as an Offshore Wind Port and Wind Turbine Launch Site. Coastal sand dune geology data available from the Maine Geological Survey (MGS) identified a portion of the site adjacent to an existing jetty as coastal sand dune, containing both frontal and back dune areas (Figure 1). On December 22, 2023, Stantec Consulting Services Inc. (Stantec) conducted a field survey to characterize the existing conditions of the MGS-mapped dune area. This memo summarizes these efforts.

METHODOLOGY

Coastal sand dunes are regulated under the Maine Natural Resources Protection Act (NRPA; 38 M.R.S.A. §§ 480-A – 480-JJ) and are further defined by Maine Department of Environmental Protection rules adopted under the NRPA (06-096 CMR 355). Stantec's December 2023 field survey reviewed the physical features of the MGS-mapped dune areas and compared their characteristics to the definitions under the NRPA and Chapter 355. A GPS receiver capable of achieving sub-meter level of horizontal accuracy was used to delineate the observed sand dune components (frontal dune, berm, back dune, etc.). Data were collected on general topography, characteristic vegetation, evidence of dynamic wave action, and surficial material. Representative photographs were taken to document the conditions.

RESULTS

The site includes a small coastal sand dune system on the south side of an existing jetty. The site includes a sloping sand and gravel beach beginning at the approximate mean low water elevation and extending landward to the approximate high tide limit, which was identified by field characteristics including a prominent wrack line (Photos 1 and 2). Landward of the high tide limit, a narrow dune berm (approximately 20 to 25 feet wide) consisting predominantly of medium- to fine-grained sand (based on ocular estimation) slopes gently upward to a low frontal dune ridge (Photos 3 and 4). The dune berm is subject to occasional tidal inundation during extreme high tide and storm events as evidence by a scattering of wrack material (primarily seaweed) along the berm (Photo 4). The frontal dune consists of a very narrow (approximately 15 feet wide) and sparsely vegetated coarse sand and gravel ridge (Photo 4). The top of the ridge has large accumulations of coarse woody debris and wrack that has accumulated during extreme high tide and storm events. The dominant vegetation on the frontal dune ridge includes common wormwood (*Artemisia vulgaris*) with scattered beach rose (*Rosa rugosa*) shrubs on its landward side (Photos 5 and 6). Differentiation of the dune berm and frontal dune transition was subtle due to the consistency of the slope and surficial material. In general, a slight slope inflection and subtle shift in sand grain size was observed at the transition between the berm and the frontal dune ridge determined during the survey (Figure 2).

An approximately 0.25-acre shrub-dominated back dune trough is present behind the frontal dune ridge. This basin-like feature is dominated by beach rose and is periodically inundated during extreme high tide/storm events based on field observations of scattered coarse debris and driftwood material (Photo 5). The soil consists of compacted fine- to medium-grained sand based on ocular estimation. When flooded, the basin drains through a swale along the northern edge of the sand dune system along the base of the existing jetty.

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Sand accumulations in this area appears to be driven primarily by deposition from floodwaters during extreme high tide/storm events.

Based on the field observations, the sand dune system observed at the Sears Island site meets the NRPA definition of a coastal sand dune. This sand dune system has been created by placement of the jetty at the site and accumulation of sand south of the jetty.

A site visit was conducted on April 2, 2024, to verify winter storms had not modified the dune. The survey found little had changed since the December 2023 survey, with the exception of some additional debris accumulation (Photos 7 and 8).

Stantec Consulting Services Inc.



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Attachment: Figure 1. Coastal Sand Dune Geology Map
Figure 2. Coastal Sand Dune Map
Representative Photos

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ATTACHMENT 1. COASTAL SAND DUNE GEOLOGY MAP

Coastal Sand Dune Geology Map

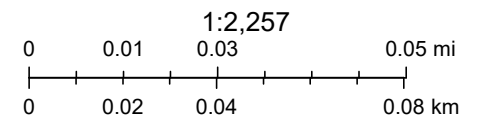


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 Sand Dune Erosion Hazard Areas  D2

Sand Dune Boundaries  Coastal Sand Dune Geology Maps Extents

 D1



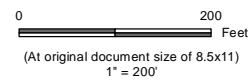
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Coastal Sand Dune Features

- Back Dune Trough
- Dune Ridge
- Frontal Dune Berm
- Beach



Project Location
Searsport, Maine

Prepared by PWB on 2024-03-06
TR Review by KWH on 2024-03-06
IR Review by MA on 2024-03-06

Client/Project
Maine Department of Transportation

195602718

Figure No.
2

Title
Coastal Sand Dune Map

- Notes**
1. Coordinate System: NAD 1983 StatePlane Maine East FIPS 1801 Feet
 2. Data Sources: MEDOT, Stantec
 3. Background: Maine Orthoimagery Regional, 2015

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

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ATTACHMENT 2. REPRESENTATIVE PHOTOGRAPHS

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Photo 1. Coastal sand dune system, including beach and berm, view to the south from jetty. Stantec. December 22, 2023.



Photo 2. Low beach area, view to the north. Stantec. December 22, 2023.

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Photo 3. Dune berm and frontal dune ridge, view to the north. Stantec. December 22, 2023.



Photo 4. Frontal dune ridge with accumulation of wrack debris, view to the southeast. Stantec. December 22, 2023.

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Photo 5. Back dune trough area dominated by beach rose, view to the north. Stantec. December 22, 2023.



Photo 6. Back dune trough area dominated by beach rose, view to the west. Stantec. December 22, 2023.

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Photo 7. Additional debris present on sand dune due to winter storms. Stantec. April 2, 2024.



Photo 8. Additional debris present on sand dune due to winter storms. Stantec. April 2, 2024.