Attachment F

Dredge Material Management Plan, Mack Point www.haleyaldrich.com

DREDGED MATERIAL MANAGEMENT PLAN
PORT OF SEARSPORT
MACK POINT TERMINAL

by
Haley & Aldrich, Inc.
Portland, Maine

for
Maine Department of Transportation
Augusta, Maine

File No. 208555
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SUBJECT: Dredged Material Management Plan
Port of Searsport
Mack Point Terminal

Introduction and Background

Offshore wind (OSW) presents a generational economic and energy opportunity for Maine and is poised to grow significantly in the coming years. In March 2020, the State of Maine Department of Transportation (MaineDOT) initiated a study to assess the Port of Searsport as a potential location of a new OSW production facility and identify any potential construction and development needs to support Maine's OSW industry.

Searsport Harbor, in the Town of Searsport, Waldo County, is a large, deep draft commercial port north of Portland, Maine. Searsport is located in the northwest portion of Penobscot Bay. A commercial terminal at Searsport Harbor, hereafter referred to as Mack Point, includes two piers – a dry cargo pier leased by MaineDOT to Sprague Operating Resources LLC (Sprague), and a liquid pier owned and operated and used by Sprague and the Irving Oil Company. The federal navigation channel in Searsport Harbor at Mack Point was authorized by Congress in 1962 and construction was completed by the U.S. Army Corps of Engineers (USACE) in 1964. The channel is approximately 35 feet deep, 3,500 feet long, and 600 feet wide at its narrowest point. Land use adjacent to Searsport Harbor is primarily commercial, apart from the largely undeveloped Sears Island located to the east. Maintenance dredging in the federal navigation channel has not been performed in Searsport Harbor since the initial construction of the channel in 1964, and during the past five decades, shoaling has reduced the depth of the channel in some areas to 33 feet or less. Shallow water depths hinder navigational access, compromise vessel safety, and would currently preclude the use of Mack Point as an OSW facility.

The Maine Offshore Wind Roadmap, released in 2023, determined a port facility is a priority for unlocking Maine's opportunity in OSW, and identified Mack Point, and nearby Sears Island, as potential deep-water ports that could be utilized for an OSW production facility. However, as a result of shoaling and shallow water depths in the vicinity of Mack Point, dredging is likely necessary to establish sufficient water depth for the operation of an OSW production facility. Conceptual design estimates suggest that as much 418,000 cubic yards (cu yd) would need to be removed from the Mack Point location to construct a successful OSW facility.

This document discusses the composition of the targeted dredge materials in the vicinity of Mack Point, describes the most likely dredge and material handling alternatives, and reviews potential available dredged material disposal locations. Potential disposal locations are initially screened against several standard criteria, and remaining options are comparatively assessed to create a composite dredged material handling and disposal plan.

Material Characterization and Disposal Suitability

Maintenance dredging has not been performed in Searsport Harbor since the construction of the federal navigation channel in 1964 when 487,500 cu yd of material was mechanically removed and placed at the Belfast Bay Disposal Site (BDS), which is now closed. Since that time, sediment investigation related to the future performance of maintenance dredging and potential disposal sites has been completed. Investigations were performed by USACE in 2008, 2015, 2017, and 2021, with the collection of sediment samples from across Searsport Harbor to characterize sediment that would be removed during maintenance dredging and assess suitability for open-water disposal in Penobscot Bay, and/or for the construction of a Confined Aquatic Disposal (CAD) cell in Searsport Harbor to contain the maintenance dredge spoils.

The 2008 investigations resulted in an initial determination that the materials present in Searsport Harbor were suitable for open-water disposal based on 4 full-depth composite samples collected from across 10 locations (USACE, 2009). However, follow-up investigations were performed in 2015, including the collection of 10 discrete surface (0 to 1 foot below sediment surface) and 10 discrete subsurface (> 1 foot below sediment surface) from across 10 locations. The results of these follow-up investigations suggested that surface materials at four of the follow-up locations in the vicinity of Mack Point may not be suitable for open-water disposal based on elevated concentrations of select constituents including metals and polycyclic aromatic hydrocarbons (PAHs) (USACE, 2015).

Similar investigations were performed in 2017 and 2021 to further characterize potential dredge materials. The 2017 investigations resulted in full-depth composite samples collected at six locations, and 22 discrete samples collected in approximate 1-foot intervals from the first several feet at each of the six locations. The results of the 2017 investigations continue to suggest that surface materials have slightly elevated concentrations of select metals and PAHs that may make them unsuitable for open-water disposal. The 2021 investigations included eight discrete samples collected from four locations (one surface and one subsurface at each location). Sample analysis showed similarly slightly elevated concentrations of select metals and PAHs at all four locations (USACE, 2022).

In general, the deeper underlying material in the Searsport Harbor navigation channel and in the vicinity of Mack Point, and therefore also in the potential adjacent CAD cell area, consists of native material that has not been exposed to significant anthropogenic sources of contamination, with contaminant concentrations that are acceptable for CAD placement and is also acceptable for open-water placement. Further, the results of these investigations generally showed some low-level impacts to surface and deeper sediments, with noted elevated concentrations of individual metals and PAHs in select locations in the top 3 feet. (USACE, 2022)

Based on the available data, including investigation results from previous investigations, recent bulk sediment chemistry data, and subsequent water column modeling, material deeper than 3 feet below sediment surface from Searsport Harbor in the vicinity of Mack Point is considered suitable for unconfined open-water placement according to the testing and evaluation requirements set forth in Section 404 of the Clean Water Act (CWA) (USACE, 2022).

However, surface and deeper materials alike from the Searsport Harbor federal navigation channel can be effectively isolated according to 40 CFR §230.72 through disposal and containment in a CAD cell (USACE, 2022).

Dredging Project Description

Completion of the Mack Point dredging project (the Work) would include the removal of targeted materials via mechanical dredging, and the preparation of removed materials for disposal at a regulated upland facility or at a nearby ocean disposal site. Target dredge areas and associated removal volumes are illustrated on Figure 1. Targeted removal volumes from each of the three proposed dredge areas associated with completion of the Work are broken out into surface and subsurface volumes, as well as the native glacial till volume below the depositional materials. This section describes the performance of the Work, construction of a materials handling facility (MHF), and identifies potential disposal destinations for dredged materials.

DREDGING OPERATIONS AND MATERIALS HANDLING

Site Preparation and Improvements

Site preparation activities would include the mobilization of labor, equipment, and materials to Mack Point, which is assumed to have sufficient available space to support the Work. Implementing the Work would include the potential construction of a MHF where a variety of non-over-water activities would occur. The following Site preparation activities may be performed to facilitate the dredging:

- Improving Site access, including temporarily removing docks, placing security controls (i.e., fencing) to restrict public access as needed, and placing wildlife protections as needed;
- Protecting structures that remain in place (e.g., permanent piers, pilings, and seawalls that may require protective buffers to avoid damage during construction); and
- Constructing an MHF, including temporary utility connections and temporary lighting, temporary facilities, vehicular access routes, a processing pad, a water treatment facility, import storage space, a truck wheel wash and decontamination stations, and stormwater controls. If any of the items planned for construction at the MHF are already in place from prior projects, the items would be reviewed, and adjustments and new construction would be completed only as needed.

Temporary Dock Removals

As necessary, performance of the Work may include the temporary removal or relocation of docks, or other facilities, to provide access to sediments within the dredge footprint. Any temporary floating docks removed during construction would be temporarily relocated and maintained for eventual reinstallation.

Additional Support Facilities

Construction offices and associated support facilities (e.g., secure storage and sanitation facilities) would be leased or mobilized at the MHF. Designated parking areas near the construction offices would be established for project personnel and visitors. These facility locations would be further evaluated in the design; however, it is assumed there is available space at Mack Point. Temporary utility connections may be required for the offices, including water, electrical power, sanitary facilities, climate control, and communications, including telephone and high-speed internet connections.

Materials Handling Facility

As discussed above, a portion of the materials targeted for removal will likely need to be disposed of at an appropriately regulated upland disposal facility. Activities at the selected MHF, which would be constructed primarily to process dredge spoils destined for upland disposal, would include:

- Offloading and handling of dredged material requiring upland disposal;
- Dredged material dewatering and stabilization (as needed);
- Segregating and processing debris;
- Characterizing waste per disposal facility requirements and stockpiling, loading, and transporting dewatered dredged material and debris to appropriate off-site disposal facilities;
- Collecting, treating, testing, and discharging decant water; and
- As necessary, stockpiling clean construction materials imported necessary for the performance of the Work.

Temporary improvements may include utility connections or modifications, along with installation of lighting, a truck wash area, and a decontamination area, unless such site improvements already exist in satisfactory condition at the MHF. Additional mooring locations may be added to accommodate dredged material barges. Temporary access roads may also be improved or constructed to facilitate transportation among the transload area, temporary stockpiles, and on-site and off-site locations. Designated vehicle routes would be established for transporting dewatered dredged sediment and debris for off-site disposal. A truck wheel wash and decontamination stations would be positioned near the construction entrance/exit within the MHF on the established on-site truck route. Prior to leaving the transload facilities, trucks would be decontaminated to remove visible dirt or mud. Security fencing with gates positioned at construction entrances/exits would be constructed around the upland MHF. Additional security measures or enclosures may be used to secure materials or equipment during non-working periods and to provide additional safety to personnel. Additional information on the main features of the MHF is presented below.

Transload Area

The transload area would be a reinforced area adjacent to the water for offloading dredged material from barges arriving from the in-water work area. The transload area would include upland space for equipment, such as a truck and excavator, and would be designed to allow for optimal traffic flow. The in-water portion of the transload area would include sufficient water depth for the anticipated barges and tugs and would be equipped with spill aprons and liners to mitigate the release of dredged material to the water surface.

Dredged Material Staging Area

Dredged material staging at the MHF would consist of segmented dewatering cells constructed of prefabricated concrete blocks and graded to a sump(s) where water can be collected and pumped for treatment prior to discharge. Dewatering cells would likely be sized to allow for five days of dredge material dewatering based on the anticipated dredge production rate. The cells would be lined with an impermeable geomembrane liner overlain by a non-woven cushion geotextile and compacted aggregate base and paved with hot-mix asphalt. Additional non-woven cushion geotextile may be used beneath the geomembrane liner, depending on the condition of the ground surface.

DREDGING OPERATIONS

In-water Construction Controls Installation

In-water work requires the installation of construction controls to demarcate and regulate access to work areas, protect public safety, and mitigate water quality issues resulting from discharges that may occur during dredging activities.

Work Area Demarcation and Marine Safety Controls

To demarcate and regulate access to work areas and protect public safety, private vessels would not be allowed to operate within active in-water work areas. Temporary aids to navigation (ATON) would be installed to delineate exclusion zones and communicate restrictions to vessel operation near the Work areas (e.g., no wake zones and restricted areas). The ATON would comply with the rules, regulations, and procedures pertaining to private ATON set forth in the United States Coast Guard (USCG) Code of Federal Regulations, Title 33, Chapter 1, Parts 62, 64, and 66. An ATON plan would be submitted to the USCG district commander prior to construction. The district commander would confirm the minimum marking requirements and issue and maintain a local notice to mariners for the duration of the in-water work.

Security fencing may be constructed as needed around docks/piers adjacent to active work area(s) each construction season to maintain separation between the public and the Work area, to demarcate the land-side perimeter of the in-water work areas, and to provide additional safety for personnel who may be working over the water surface.

Turbidity Curtains

Increased turbidity and sheens may occur during dredging or the placement of any potential backfill materials associated with the Work. A turbidity control system of best management practices (BMPs), consisting of turbidity curtains and absorbent booms, would be installed to minimize potential discharges from either the enclosed in-water work areas or as a result of material transfers between the dredging/capping equipment and material barges. Turbidity control systems would also be installed around material barges when offloading at the MHF and around active Work areas. Oil-absorbent booms would be installed inboard, and as necessary, outboard of the turbidity curtain(s) to address floating product. Silt curtain installation would consider prop wash, as well as wind and wave forces, to evaluate potential configurations and specifications for the turbidity control system. Potential construction components associated with turbidity curtain installation include, but are not limited to, anchor barges, submerged anchor points, and temporary steel piles.

Shoreline Zone Erosion Protection

Marine debris and remnants of historical piers may be present in portions of the site. Where applicable and feasible, marine debris (i.e., wood, concrete, and metal) would be removed before or during dredging operations. Debris would be loaded into a debris barge and transported to the MHF where it would be sorted and processed for disposal, reuse, or recycling.

Sediment Removal

Sediment removal would be performed using mechanical dredging in-the-wet. Depending on logistical needs, mechanical dredging would be performed in open-water areas and occur mostly from water-based equipment consisting of a barge-mounted crane or excavator that can be outfitted with a dredge bucket. For environmental dredging, environmental or closed buckets are used to minimize loss of sediment upon bucket retrieval, thus minimizing the loss of excavated materials to the water column. For non-environmental removal (i.e., non-impacted material), a conventional dredge bucket can be used which may allow for more rapid removal rates. Mechanical dredging equipment removes sediment near its in-situ condition; however, in so doing, some additional surface water can be entrained within the bucket, especially for shallow dredge cuts. Specific mechanical dredge configurations and bucket sizes vary and would depend on equipment availability and contractor selection. Sediment would be placed into barge scows, with water entrained, and transported to an open CAD cell, an open-water ocean disposal site, a restoration project site for beneficial reuse, or to the MHF for material handling, dewatering, and eventual disposal at an upland landfill.

For the purposes of this assessment, an average production rate of approximately 1,000 cu yd per day is anticipated. Because of the relatively deep material removal thicknesses and small removal areas, this is a somewhat conservative assumption, where in larger and less confined deeper areas without environmental restrictions, production rates may reach as high as 2,500 cu yd per day. However, given the nature of dredging and the need for caution in minimizing material losses during removal operations, with slower production expected in the top 3 feet of impacted materials, and quicker rates in the deeper cleaner material, an average production of 1,000 cu yd per day is a reasonable assumption for the Work. Without additional dredging operations (e.g., extra barge and extra dredge), which would be challenging to implement in this space, at this assumed average production rate, and the targeted removal volume of over 225,000 cu yd, the Work is anticipated to take more than 200 days of dredging activities. Because of the work-in-water restrictions limiting dredging activities to 8 November through 9 April, performance of the Work is anticipated to require two construction seasons; however, more rapid production, or the deployment of more than one dredging operation may be able to reduce the total construction time.

Dredged Materials Management Evaluation Criteria and Options

Based on information prepared by Moffatt & Nichol for the development of Mack Point to support OSW, approximately 225,000 cu yd of dredged material would be generated and require disposal. As discussed in Section 2, dredged materials have some limited environmental impacts that limit the potential disposal options. This section introduces the available disposal options and presents the criteria for the assessment and selection, culminating in the creation of a complete construction alternative, including disposal, from removal to disposition.

DREDGED MATERIALS MANAGEMENT OPTIONS

Based on the results associated with the performance of previous investigations presented in Section 2, there are a number of potential disposal options that may be used for portions, or the entire volume of sediment, removed from Mack Point. The following are the potential disposal options available:

- Upland Disposal
- Open-Water Ocean Disposal
- Construction of a CAD Cell
- Beneficial Reuse

The remainder of this section presents the criteria by which the disposal options would be evaluated and the results of the disposal option selection process.

DREDGED MATERIALS MANAGEMENT EVALUATION CRITERIA

The evaluation criteria used to evaluate material management/disposition options for this assessment include, but are not limited to:

- Effectiveness;
- Implementability;
- Cost; and
- Regulatory and community acceptance.

Collectively, these criteria present the feasibility of the proposed options and provide the basis for comparing the relative merits of the available disposal options and identifying their advantages and disadvantages. This approach is intended to provide enough information to compare the options and recommend an appropriate alternative(s) to establish a basis of cost for the project.

Effectiveness

Effectiveness is the ability of a management option to protect the environment and meet the project objectives. When effectiveness is evaluated, three primary factors are considered: 1) the ability to treat the estimated volume or area of disposal materials (in this case, sediment); 2) the ability of the option to protect the environment during placement; and 3) the reliability of the option to reduce the toxicity and mobility (movement) of contamination at the site and provide long-term protection. Material management options that were not deemed effective were screened out and not retained for further consideration.

Implementability

Implementability refers to technical and administrative feasibility. The evaluation of implementability includes such factors as the space needed for the completion of the Work, availability of services and materials required, and the ability to construct, maintain, and monitor the Work. Administrative feasibility is determined by the ability to obtain any approvals, rights-of-way, or permits for the Work from local, state, and federal governments. Evaluating implementability should also consider the availability of the specific and unique services and materials needed for all stages of construction, including equipment, storage capacity, off-site treatment capacity, materials, and qualified professionals. The material management options that cannot be implemented at the site were eliminated from further consideration. Additionally, in this instance, implementability includes an assessment of the time necessary to complete the siting and permitting process and the completion of the Work, as the state of Maine has a stated goal of achieving an operational OSW facility by 2030 (State of Maine, 2023).

Cost

The purpose of evaluating cost is to eliminate options with costs that greatly exceed other technologies that would provide similar outcomes. Therefore, relative costs for material management options are described as high, medium, or low, relative to the other management options.

The cost criterion is used to evaluate and compare the estimated capital and operations and maintenance costs of each management option, including direct capital costs (materials, equipment, and labor), and indirect capital costs (engineering, licenses/permits, and contingency allowances). Given the relatively low cost of post-construction monitoring/maintenance compared to the initial capital cost, no net-present-value correction of these future costs is presented. The relative cost-effectiveness of the options is also evaluated. Cost estimates developed for the purpose of evaluating the options have an approximate accuracy between plus 50 percent and minus 30 percent.

Regulatory and Community Acceptance

This criterion combines the acceptance of the selected option by the respective regulatory authorities and the public reception of the proposed disposal measures. Regulatory acceptance can include laws, ordinances, and associated regulations related to the implementation of the proposed option and is underpinned by the relative difficulty in receiving required permits and approvals. Community acceptance evaluates the general reception and public perception of the proposed option, how it may affect associated special interest groups (e.g., recreational users and fishermen), and the level of opposition that the proposed option is anticipated to receive (based on professional experience with similar projects in this area) during the related public comment periods.

DREDGED MATERIALS MANAGEMENT OPTIONS ASSESSMENT

Each of the disposal options and individual locations were evaluated against the criteria presented above. Full details related to that assessment can be found in Table 1. What follows is a summary of that assessment:

- Upland Disposal is an effective, implementable, and generally accepted means of disposing of dredge spoils. However, there are significant questions regarding the capacity of available landfills to accommodate the volume of anticipated materials. Further, because of the added cost in preparing dredge spoils for upland disposal, this is considered a high-cost option. Upland disposal at either the Juniper Ridge or Crossroads facilities was retained for further assessment.
- Open-Water Ocean Disposal is also an effective, implementable, and generally accepted means of disposing of dredge spoils that are free of impacts from human activity. Without the need for material preparation for disposal, ocean disposal is a cost-effective option. However, based on sediment investigation and chemical analysis discussed above, and as determined by USACE the surface materials are not likely acceptable for ocean disposal, and ocean disposal was retained for further assessment for materials more than 3 feet below the sediment surface (USACE, 2022). A summary of the assessment of potential open-water ocean disposal locations is provided below:
  - The Portland Harbor ocean disposal facility (PDS) was retained for further assessment as it, among other things, is commonly used and has sufficient capacity.
  - The Rockland ocean disposal facility (ROD) is routinely suggested as a potential open-water ocean disposal facility location for USACE or other public projects. However, it has not recently been approved for use, and is anticipated to meet, particularly from the lobster fishery and local environmental advocacy groups, stiff opposition if proposed for materials developed at Mack Point. Nonetheless, the Rockland facility has been retained for further assessment.
  - The Cape Arundel disposal facility is infrequently used and may be closed for further disposal activities. The Cape Arundel facility was not retained for further assessment.
- Construction of CAD cell can be an effective and generally accepted means of disposing of dredge spoils. Additional work would be necessary to confirm the implementability of this option, including but not limited to, locating available space that could accommodate all or portions of the Mack Point materials and the ability to permit such a facility. In any case, construction of a CAD cell is considered to be a high-cost option if a feasible site was identified. In addition, construction of a new CAD cell away from Mack Point, while other feasible options are available, is very likely to meet with stiff resistance from recreational and fisheries users. Nonetheless, construction of a CAD cell was retained for further assessment.
- Beneficial Reuse may be a potential option for a very small portion of the dredge materials anticipated from Mack Point. Notably, the native till materials are considered potentially available for beneficial reuse. However, because of the need for further characterization, and the difficulty in segregating what is less than 1 percent of the overall volume at the bottom of

the dredge area, this is considered a high-cost option, and is likely not implementable. Beneficial reuse was not retained for further assessment.

The results of this assessment suggest that upland disposal, construction of a CAD cell, and open-water ocean disposal at the PDS to be the only options retained.

Detailed and Comparative Analysis of Select Options

As presented above, upland disposal, construction of a CAD cell, and open-water ocean disposal were maintained for further consideration as feasible and implementable disposal options. This section will provide a comparative assessment of the retained options and discuss the potential for hybrid disposal alternatives based on capacity and material suitability.

POTENTIAL OPTIONS MAINTAINED FOR FURTHER ASSESSMENT

Upland Disposal

Upland disposal includes the construction of an MHF and the dewatering/drying and stabilization of dredged materials before off-site transport by truck to an appropriately regulated landfill. In particular, upland disposal has been retained in association with the top 3 feet of potential dredged materials which are assumed not to be appropriate for open-water ocean disposal. Local landfills at Juniper Ridge and Crossroads have both been retained for further assessment. However, neither landfill location currently has sufficient capacity to accommodate the anticipated dredged materials, nor do the facilities to manage the anticipated daily waste stream from the Work in addition to their normal public and required municipal and state sources. Although they may have the potential for expansion, that process is highly speculative and would be well outside the timeline for the completion of the Work and construction of the OSW facility. As a result, upland disposal must only be used as part of a hybrid disposal alternative.

Construction of a CAD Cell

Construction of a CAD cell requires the removal of native or resident sediment from a nearby location to create storage space for targeted sediments removed from another location. Similar to materials at the Mack Point facility, because of their proximity to the Mack Point facility, and select investigations summarized above, the top 3 feet of material removed for the construction of a nearby CAD cell are assumed to require disposal at an appropriately regulated landfill, while the remaining volume would be taken to the PDS location. Materials placed in the CAD cell would be covered with clean materials imported to the Site.

Open-Water Ocean Disposal

Open-water disposal includes the transport of dredged materials in an open scow to a deep-water open disposal location. As discussed in Section 4, after this assessment, both the PDS and RDS locations have been maintained for further assessment, and sub-surface materials from both the Mack Point facility and construction of the CAD cell are permitted at the PDS and RDS locations.

DETAILED ANALYSIS OF AVAILABLE OPTIONS

This section provides a brief comparative analysis of the retained options with respect to the four performance categories discussed in Section 4. The results of this comparison will be used to select a preferred disposal option, or, if necessary, to create a hybrid alternative.

Comparative Analysis

- Effectiveness – All three options are widely used, effective means of disposing of dredged materials. Upland disposal and construction of a CAD cell are the only option anticipated to be considered effective in managing the top three feet of dredged materials from either the Mack Point facility or construction of the CAD cell. Although upland landfill disposal may offer more permanence in the control of impacted materials following disposal, neither alternative has a clear advantage in the protection of the environment or the reduction in toxicity/mobility of placed materials.
- Implementability – All three options retained are commonly selected and implemented options for the disposal of dredged materials. There are some added implementation challenges associated with upland landfill disposal, as the dredged material needs additional handling to be dewatered and stabilized before it can be transported off site. Upland disposal could, if total capacity were expanded, accommodate the total dredge volume; however, even if the local upland disposal facilities ceased accepting material from any other source, they currently only offer up to 150,000 cu yd of available capacity and do not currently and will not soon have the capacity to accept the entire anticipated volume of dredged materials. Further, given their current and forecasted waste streams (some of which they are obligated to manage), both facilities would likely need to expand their operations (i.e., labor and equipment) to be able to accommodate the daily waste stream associated with the Work. Given these limitations, upland disposal is not currently implementable as the sole option. Construction of a CAD cell would increase the volume of dredged materials requiring management and would very likely extend the construction schedule by a minimum of one additional construction season, making it very unlikely to be completed before the anticipated opening of the OSW facility. Additionally, there is not currently an identified location for a CAD cell; therefore, the feasibility and implementability are difficult to qualify. However, permitting and regulatory acceptance is also a component of implementability, and as discussed in Section 2, because of low-level detections of certain constituents, the top 3 feet of the anticipated dredge materials are more than likely not acceptable for placement at either ocean disposal facility. Based on the poor implementability of any of the retained options as the sole source of material disposal, it is apparent that a hybrid alternative will be necessary.
- Cost – Comparative costs for the disposal of dredged materials obtained from local vendors and general industry standards suggest that open-water ocean disposal is approximately one-quarter the cost of upland disposal options before considering additional costs associated with material handling and stabilization. Creation of a CAD cell for the entire anticipated sediment volume would obviate an increase in the volume of dredged materials, would be challenging to implement, extends the construction schedule, and significantly increases the mass of materials that must be managed if it were the sole disposal option for the completion of the Work. As a result, as the only disposal option, construction of a CAD cell is considered a very high-cost

option. However, inclusion of a CAD cell as part of a hybrid alternative reduces the mass of material requiring upland disposal, and as a result, may diminish the overall cost of the Work.

- Regulatory and Community Acceptance – All three options are common disposal options. Selection of either ocean disposal facility as a disposal location for the top 3 feet of dredged material is not likely to meet with regulatory acceptance or permitting. Use of the PDS or RDS may meet some resistance from environmental advocates and/or recreational users who would oppose the disruption of normal activities in Portland Harbor or West Penobscot Bay. Similarly, construction of a CAD cell may also meet public resistance as it relates not just to the disruption of normal activities, but also to the destruction of native or resident habitat. Selection of upland landfill disposal may also meet some opposition related to increased truck traffic and the exposure of dredged materials to the general public. Nonetheless, in either case, given that both options are commonly employed, community acceptance is not likely to be a major obstacle.

Summary of Disposal Alternatives Comparison

Based on the discussion above, it is apparent that all the retained options are generally acceptable, effective, and implementable means of managing dredged materials associated with development of an OSW facility at Mack Point. However, there are certain limitations related to each option that preclude them from being used as the sole alternative for the disposal of dredged materials associated with Mack Point. In this instance, two hybrid alternatives, relying on two or more of the retained disposal options, have been developed which offer a balance of effectiveness and implementability in managing the Mack Point dredge materials. A summary of the two hybrid alternatives is provided below:

- Alternative 1 – the top 3 feet of materials in the dredge area adjacent to Mack Point are dewatered and stabilized for disposal at an upland disposal facility. The remainder of the dredge volume is sent to either the PDS or RDS for ocean disposal.
- Alternative 2 – a nearby CAD cell is constructed with the top 3 feet of the CAD cell area dewatered and stabilized for disposal at an upland disposal facility. The top 3 feet of materials in the dredge area adjacent to Mack Point are placed in the CAD cell. The remainder of the materials from construction of the CAD cell and completion of the Work in the dredge area adjacent to Mack Point are sent to either the PDS or RDS for ocean disposal.

The table below summarizes each alternative and lists the estimated dredged sediment volumes for each disposal option and provides the total cost for the performance of the Work. Cost estimates and details related to these hybrid dredged material management alternatives, including performance of the aspects of the Work, are included on Tables 2 and 3.

	Dredged Material Disposal Option			
	Upland Disposal	**CAD Cell**	**Ocean Disposal**	**Total Cost[1]**
Alternative 1	92,000 cu yd	--	133,000 cu yd	$ 51.5MM – 54.7MM
Alternative 2	33,700 cu yd	92,000 cu yd	225,000 cu yd	$ 36.9MM – $42.4MM

[1] The total cost presented here represents a range of costs related to open-water ocean disposal at either the Rockland or the Portland open-water ocean disposal facility sites. Because of the difference in travel times associated with the respective ocean, the costs presented represent the total cost differential for each alternative.

Enclosures:

References
Table 1 – Disposal Option Screening Evaluation
Table 2 – Cost Estimate for Alternative 1
Table 3 – Cost Estimate for Alternative 2
Figure 1 – Mack Point Dredge Extents

References

State of Maine, 2023. “An Act Regarding the Procurement of Energy from Offshore Wind Resources,” Legislative Document (L.D.) 1895. Approved 27 July 2023. Access date: 19 June 2024.

USACE, 2009. Suitability Determination for Searsport Harbor Federal Navigation Maintenance and Improvement Project, Penobscot Bay, Searsport, Maine. U.S. Army Corps of Engineers, New England District, Concord, MA.

USACE, 2015. Supplementary Suitability Determination for Searsport Harbor Federal Navigation Maintenance and Improvement Project, Penobscot Bay, Searsport, Maine. U.S. Army Corps of Engineers, New England District, Concord, MA.

USACE, 2022. Final Supplemental Suitability Determination for Maintenance Dredging of the Searsport Harbor Federal Navigation Project and Construction of a Confined Aquatic Disposal Cell, Searsport, Maine. U.S. Army Corps of Engineers, New England District, Concord, MA.

TABLES

TABLE 1
DISPOSAL ALTERNATIVE SCREENING EVALUATION
MACK POINT OFFSHORE WIND PRODUCTION FACILITY
SEARSPORT, MAINE

Disposal Type	Disposal Option	Description	Applicability	Effectiveness	Implementability	Relative Cost	Acceptance	Retained?
Upland Landfill	Juniper Ridge Landfill	State of Maine solid waste landfill operated in Alton, Maine, approximately 45 miles by road from the Mack Point dredging site.	Yes, this alternative is applicable to the Site.	Effective off-site disposal options for non-hazardous wastes.	This alternative is considered implementable. Non-hazardous solid waste landfills are proximate to Mack Point. Would require dewatering and likely addition of amendment to make dredged materials suitable for transport. Transport would likely be by truck. Waste characterization required to determine suitability. Existing landfills would not have sufficient capacity for the entire anticipated dredged volume; however, with coordination and a well-managed delivery schedule, it is likely that the two identified landfills could accommodate the top 3 feet of impacted materials.	High. Transportation and disposal fees are high on a per ton basis on their own without considering additional costs related to material dewatering and stabilization.	The identified landfills are already permitted and appropriately regulated. There may be some public resistance related to associated truck travel, but is not expected to be greater than any other resistance to the overall Mack Point project.	Yes. This option is retained related to effectiveness and implementability. However, as there is not sufficient available capacity for the entire volume of dredge material it must only be used as part of a hybrid alternative.
	Crossroads Landfill	Waste Management Inc. solid waste landfill operated in Norridgewock, Maine, approximately 60 miles by road from the Mack Point dredging site.						
Open-Water Ocean Disposal	Portland Harbor	The Portland Disposal Site is an open-water ocean disposal site administered and operated by the U.S. Army Corps of Engineers approximately 100 miles over the water from Mack Point.	Yes, this alternative is applicable to the Site.	Effective disposal option for dredge spoils generated during dredging activities, pending waste characterization and regulatory approval.	This alternative is considered implementable. Would not require additional upland staging areas or material handling/stabilization or water treatment, but could be direct-loaded to bottom dump scows and barged to to the open-water disposal facility. Waste characterization required to determine suitability.	Low. Additional cost may be necessary related to greater travel distance from Mack Point to Portland Harbor. Selection of this alternative would not incur additional costs related to material dewatering and stabilization.	The Portland Harbor open-water ocean disposal facility is a permitted and regulated active facility. Although there may be some public resistance to the facility in general, recreational and fisheries users, which are not prominent in this area, are not anticipated to be greatly affected by disposal of Mack Point dredge spoils at this facility.	Yes. This option is retained related to effectiveness and implementability. However, because the top 3 feet of material in the dredge area adjacent to Mack Point are not likely acceptable for open-water ocean disposal, it must only be used as part of a hybrid alternative.

Disposal Type	Disposal Option	Description	Applicability	Effectiveness	Implementability	Relative Cost	Acceptance	Retained?
Open-Water Ocean Disposal	Cape Arundel	Cape Arundel is a former or infrequently used U.S. Army Corps of Engineers open-water disposal site approximately 130 miles by water from Mack Point.	Yes, this alternative is applicable to the Site.	Effective disposal option for dredge spoils generated during dredging activities, pending waste characterization and regulatory approval.	This alternative is considered implementable. Would not require additional upland staging areas or material handling/stabilization or water treatment, but could be direct-loaded to bottom dump scows and barged to to the open-water disposal facility. Waste characterization required to determine suitability.	Unknown. Costs associated with reopening Cape Arundel, and progressing through the permitting process are not known, and may make use of this location infeasible. Additional costs may be necessary related to greater travel distance from Mack Point. Selection of this option would not incur additional costs related to material dewatering and stabilization.	Cape Arundel may have been previously permitted and regulated; however its status as an active facility is unclear, and it appears to not be currently accepting materials for disposal. Reopening of this facility would likely meet greater resistance than Portland Harbor, and may be difficult to receive approval for use.	No. Because of the uncertainty in the status of Cape Arundel, and the potential time and permitting necessary for it to be reopened, this location was not retained for open-water ocean disposal.
Open-Water Ocean Disposal	Rockland	The Rockland Disposal Site is an open-water ocean disposal site administered and operated by the U.S. Army Corps of Engineers approximately 30 miles over the water from Mack Point.	Yes, this alternative is applicable to the Site.	Effective disposal option for dredge spoils generated during dredging activities, pending waste characterization and regulatory approval.	This alternative is considered implementable. Would not require additional upland staging areas or material handling/stabilization or water treatment, but could be direct-loaded to bottom dump scows and barged to to the open-water disposal facility. Waste characterization required to determine suitability.	Low. The Rockland location is closest to the site, and as a result, is considered the lowest cost option of the three locations assessed for open-water ocean disposal. Selection of this alternative would not incur additional costs related to material dewatering and stabilization.	The Rockland open-water ocean disposal facility is a permitted and regulated active facility. Recreational and fisheries users are anticipated to provide stiff resistance to the use of the Rockland facility for Mack Point dredge spoils. In particular, the lobster fishery in this area is a prominent advocacy group for the protection and growth of the lobster, and is anticipated to oppose the use of the Rockland facility for waste disposal.	Yes. This option is retained related to effectiveness and implementability. However, because the top 3 feet of material in the dredge area adjacent to Mack Point are not likely acceptable for open-water ocean disposal, it must only be used as part of a hybrid alternative. However, based on anticipated community resistance, this location may be difficult to achieve public acceptance and gain access to for open-water ocean disposal.

TABLE 1
DISPOSAL ALTERNATIVE SCREENING EVALUATION
MACK POINT OFFSHORE WIND PRODUCTION FACILITY
SEARSPORT, MAINE

Disposal Type	Disposal Option	Description	Applicability	Effectiveness	Implementability	Relative Cost	Acceptance	Retained?
Confined Aquatic Disposal	TBA	Design and install a sub-aqueous disposal facility for non-hazardous sediment. Dredged materials would be contained within a newly constructed containment unit and recovered with an upper layer of native, clean (ambient) sediments appropriate to prevent migration of impacts.	Yes, this alternative is applicable to the Site.	Would provide physical isolation of impacted sediment from benthic organisms and other receptors. Less effective in areas with structures, high-energy, high-vessel traffic and large amounts of debris. Would require periodic monitoring and potential maintenance to verify and maintain the cap effectiveness over the long term. More maintenance may be needed in high-traffic and high-energy areas without an armor cap component. Construction of the containment cell would cause significant disturbance to existing conditions and habitat in and around the vicinity of construction.	Implementable for most areas. Equipment and materials necessary to construct are readily available. Implementability in some areas would be limited due to restricted accessibility (e.g., beneath seawall/shoreline structure, piers/wharves, around piles/other structures, above rock dike), or in unique and protected areas. Would require existing sediment removal prior to cap placement to satisfy permitting requirements (e.g., no net fill) and removal of debris and other subsurface obstructions. Selection of the CAD Cell alternative is anticipated to extend the construction season a minimum of one additional season. Cap material (e.g., sand) will impact ability to manage turbidity during remedy implementation. Sufficient space/capacity is very likely to be difficult to achieve provided the full volume of anticipated dredge spoils.	High. Actual construction costs are difficult to estimate given the lack of an identified feasible construction site. Construction of the CAD Cell would require an equal volume of sediment removal, and associated disposal scenarios, as that performed at the Mack Point facility. Notably, like the materials at the Mack Point, the top 3 feet of material associated with construction of any nearby CAD Cell would also need to be disposed of at a regulated upland solid waste landfill.	Construction of a CAD cell in the vicinity of Mack Point is likely to meet with significant resistance from recreational and fisheries users, similar to the use of the Rockland open-water disposal facility. Construction of a CAD cell is likely to require an additional construction season that would delay completion of the project and extend the disruption of typical water-based activities. Construction of a CAD cell would necessitate additional habitat disruption adding to resistance from interested stakeholders.	Yes. Based on effectiveness and applicability the construction of a nearby CAD Cell has been retained. However, the use of a CAD Cell as the sole option for dredged material disposal extends the project construction schedule and would be difficult to implement given the necessary space required. As a result, construction of a CAD Cell is retained for use as part of a hybrid alternative.
Beneficial Reuse	TBA	Load and barge excavated unimpacted glacial till at the bottom of the targeted dredge thicknesses for use as beneficial reuse materials at active construction sites. If destined for upland use, this would require similar material handling and stabilization as described for upland disposal described above.	Yes, this technology is applicable to the project.	Effective alternative for waste disposal, pending waste characterization for suitability.	Readily implementable using conventional equipment associated with material handling and stabilization alternatives described above. Permitted facilities and demand are limited, making early identification and coordination key to implementability. The volume of dredged materials that may be suitable for beneficial reuse is insignificant relative to the overall project volume, and related dredge thicknesses of less than 1 foot may be so short that segregation during dredging activities would be highly difficult to achieve and unlikely to be performed successfully.	Medium. Disposal tipping fees would likely be negated under this alternative; however, material handling and stabilization would require additional costs and time as compared to open-water disposal.	Existing construction sites that are in the market for beneficial reuse materials have yet to be, and may not ever, be identified. The difficulty in performance makes the advantages of beneficial reuse unlikely to be great enough to consider the segregation and special handling needed.	No. Because of the small relative volume and the related difficulty in achieving separation of the clean till from depositional materials above, beneficial reuse was not retained.

TABLE 2
ALTERNATIVE 1
MACK POINT OFFSHORE WIND PRODUCTION FACILITY
SEARSPORT, MAINE

ALTERNATIVE 1
Cost Estimate for Removal of Targeted Sediment for Production Facility Construction
With Upland and Ocean Disposal Only

ITEM NO.	DESCRIPTION	UNIT	NO. OF UNITS	UNIT COST	ESTIMATED COST (Rockland)	ESTIMATED COST (Portland)
1	Mobilization/Demobilization	LS	1	$780,000	$780,000	$780,000
2	Access and Staging Area Development	AC	1	$120,000	$120,000	$120,000
3	Pre-Design Investigation	LS	1	$250,000	$250,000	$250,000
4	Survey Control	MO	11	$35,000	$385,000	$385,000
5	Silt Curtain System Materials/Installation/Removal/ Additional Silt Curtain Setup	SF	315,000	$3	$950,000	$950,000
6	Oil Booms Installation/Removal/Disposal	LF*Month	77,000	$3	$230,000	$230,000
7	Mechanical Dredging	CY	225,000	$30	$6,750,000	$6,750,000
8	Upland Disposal					
	- Dewatering/Stabilization	CY	92,000	$20	$1,840,000	$1,840,000
	- Water Treatment	Gal	3,000,000	$0.40	$1,200,000	$1,200,000
	- Disposal Pre-characterization	1/250T	552	$1,100	$610,000	$610,000
	- Transportation and Upland Disposal of Sediments	Ton	138,000	$200	$27,600,000	$27,600,000
9	Transportation and Ocean Disposal of Sediments					
	- Rockland Ocean Disposal Site	CY	133,000	$5	$670,000	
	- Portland Ocean Disposal Site			$25		$3,330,000
10	Miscellaneous Disposal	LS	1	$100,000	$100,000	$100,000
11	Construction Oversight	MO	11	$30,000	$330,000	$330,000
				Subtotal	$41,815,000	$44,475,000
				Engineering and Administration (3%)	$1,260,000	$1,340,000
				Contingency (20%)	$8,370,000	$8,900,000
				Total	$51,445,000	$54,715,000

TABLE 2
ALTERNATIVE 1
MACK POINT OFFSHORE WIND PRODUCTION FACILITY
SEARSPORT, MAINE

General Comments:

- This cost estimate has been developed at a detailed analysis of alternatives feasibility study level at an accuracy of -30 to +50%, in accordance with general industry standards.
- Unit cost ranges account for the possibility of cost variations due to design modifications resulting from additional site-specific data gathered during pre-design investigations.
- All costs have been provided in 2024 dollars and include material and labor unless otherwise noted.
- Costs do not include property costs (where applicable), access costs, permitting costs, legal fees, Agency oversight, or public relations efforts.
- These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to changes in general economic and business conditions, site conditions that were unknown at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Haley & Aldrich is not licensed as accountants or securities attorneys; therefore, we make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

Assumptions:

1 Includes mobilization and demobilization of labor, equipment, and materials necessary to implement the work. The mobilization/ demobilization cost has been estimated at 5% of the total construction cost, without consideration of transportation and disposal.

2 Staging area development/restoration includes preparation of the area for use during construction activities, and provision of a contractor office. At least a portion of this area will be covered with an HDPE liner to be used as a contaminated sediment holding and management area. Additional space will be included for the construction and operation of a temporary water treatment system. Restoration will include removal and disposal of gravel and fill where necessary, followed by topsoil and vegetation as appropriate.

3 Costs assume the performance of pre-design investigations to confirm the results of previous remedial investigation activities. Primary pre-design activities assumed for performance include side-scan sonar and sub-bottom profiling to identify any potential debris fields, core collection for geotechnical properties related to slope stability, and potential material stabilization and solidification agent needs.

4 Performance of the work will include routine checks on the progress of the work and changes to the local bathymetry. Costs include a routine bathymetric survey performed from the water over the entire work area, and reduction of bathymetric data for comparable bathymetric survey figures. Costs assume the performance of bathymetric surveys on a weekly basis; however, as the work progresses, the frequency of bathymetry work may be adjusted.

5 Dredging and sediment removal work will require a full-depth, single-tier silt curtain to be installed during the performance of work. The unit price includes the purchase of material, anchors, and suspension infrastructure, as necessary, and cost to install/remove each setup in each season.

6 While dredging is being performed oil booms will be installed around the perimeter of the work site in parallel with the silt curtain. The cost presented for oil booms includes all materials and labor required for the installation and removal of the oil boom system on a monthly basis, as necessary, dependent upon sheen generation and adsorption. Disposal of spent oil booms is included in Item 10 - Miscellaneous Disposal.

7 This cost estimate assumes that sediments will be removed via barge-mounted mechanical clam-shell dredge targeting sediments in accordance with the area, depth, and volumes suggested by previous remedial investigations and conceptual design work. A removal rate of 1,000 cy/day is assumed. Removed sediments will be placed in open scows and transported to shore for stabilization, or to the selected ocean disposal location. Based on the results of previous investigations, it is assumed that the top 3 feet of dredge material will need upland handling and management in preparation for transportation and disposal to a regulated waste facility. Remaining materials below the initial 3 feet will be direct loaded to bottom-dump scows for ensuing ocean disposal.

8 A portion of the excavated sediment from the Mack Point location will be prepared for and disposed of at a regulated upland disposal facility. Costs and activities associated with this task are included in this cost item as follows:

- Removed sediments designated for upland landfill disposal will initially be allowed to gravity dewater. As needed, mechanical means of drying (e.g., mixing and compaction) may be used to expedite material dewatering. If necessary, drying or stabilization agents may be added during the mixing process. Costs include the mechanical manipulation of dried materials, and the addition of a stabilization agent (e.g., Portland cement and/or fly-ash) as needed in preparation for off-site transport.

- Water collected as removed materials are dried will be treated prior to discharge back to the water body. Water treatment is assumed to consist of particulate and carbon filters, and assumes PAHs are the only constituent of concern. Water volumes requiring treatment are estimated at 40 gal/cy of removed material. Estimated costs include the construction and operation of the temporary water treatment plant for the duration of material handling activities.

- Materials destined for upland disposal will require ex-situ characterization prior to off-site transportation. Costs assume the rapid analysis of stabilized materials for the full RCRA suite, PAH 34, and pesticides/herbicides. Sample collection and related analyses will be performed at a frequency of 1 sample per 250 tons.

- Upland disposal costs assume 1.5 tons/cy, including material bulking, any necessary stabilization agent, and the transport to and disposal of stabilized materials at an approved, regulated landfill in Maine.

9 Ocean disposal costs assume there are no additives necessary, and all removed materials have been prequalified for ocean disposal. Such materials will be transported in an open-hull dump scow for disposition at the selected ocean disposal site. Because there are two potential ocean disposal locations, a range of costs is presented.

10 This cost estimate includes provisions for the disposal of miscellaneous materials (e.g., used silt curtain and oil booms, personal protective equipment, and disposable equipment) at a facility permitted to accept such waste.

11 Construction monitoring/oversight are estimated at $1,000/day, and include costs for lodging and extras for non-working days. Construction oversight costs include daily monitoring of contractor activities and progress, and the review of interim construction, specifications, and design modification submittals.

12 Engineering and administration costs are estimated as 3% of the total project capital costs. Such costs include the review of all pre-, during-, and post-construction submittals, review of construction progress bathymetric mapping, and any design modifications that may arise over the course of the project related to unanticipated conditions or contractor approved alternative requests.

13 A 20% contingency allowance has been included to account for unforeseen circumstances or variability in the volumes, labor, or material costs.

TABLE 3
ALTERNATIVE 2
MACK POINT OFFSHORE WIND PRODUCTION FACILITY
SEARSPORT, MAINE

ALTERNATIVE 2
Cost Estimate for Removal of Targeted Sediment for Production Facility Construction
With Upland Disposal and CAD Cell Construction and Ocean Disposal

ITEM NO.	DESCRIPTION	UNIT	NO. OF UNITS	UNIT COST	ESTIMATED COST (Rockland)	ESTIMATED COST (Portland)
1	Mobilization/Demobilization	LS	1	$720,000	$720,000	$720,000
2	Access and Staging Area Development	AC	1	$120,000	$120,000	$120,000
3	Pre-Design Investigation	LS	1	$400,000	$400,000	$400,000
4	Survey Control	MO	18	$35,000	$630,000	$630,000
5	Silt Curtain System Materials/Installation/Removal/ Additional Silt Curtain Setup	SF	441,000	$3	$1,330,000	$1,330,000
6	Oil Booms Installation/Removal/Disposal	LF*Month	176,400	$3	$530,000	$530,000
7	Mechanical Dredging					
	- Mack Point Facility	CY	225,000	$30	$6,750,000	$6,750,000
	- CAD Cell Construction	CY	125,700	$30	$3,780,000	$3,780,000
8	Upland Disposal of CAD Cell Surface Materials					
	- Dewatering/Stabilization	CY	33,700	$20	$680,000	$680,000
	- Water Treatment	Gal	1,348,000	$0.40	$540,000	$540,000
	- Disposal Pre-characterization	1/250T	202	$1,100	$230,000	$230,000
	- Transportation and Upland Disposal of Sediments	Ton	50,550	$200	$10,110,000	$10,110,000
9	Transportation and Ocean Disposal of Sediments					
	- Rockland Ocean Disposal Site	CY	225,000	$5	$1,130,000	
	- Portland Ocean Disposal Site			$25		$5,630,000
10	CAD Cell Disposal of Mack Point Surface Dredged Materials	CY	92,000	$15	$1,380,000	$1,380,000
11	CAD Cell Cap Placement	CY	33,700	$30	$1,020,000	$1,020,000
12	Miscellaneous Disposal	LS	1	$100,000	$100,000	$100,000
13	Construction Oversight	MO	18	$30,000	$540,000	$540,000
				Subtotal	$29,990,000	$34,490,000
				Engineering and Administration (3%)	$900,000	$1,040,000
				Contingency (20%)	$6,000,000	$6,900,000
				Total	$36,890,000	$42,430,000

General Comments:

- This cost estimate has been developed at a detailed analysis of alternatives feasibility study level at an accuracy of -30 to +50%, in accordance with general industry standards.
- Unit cost ranges account for the possibility of cost variations due to design modifications resulting from additional site-specific data gathered during pre-design investigations.
- All costs have been provided in 2024 dollars and include material and labor, unless otherwise noted.
- Costs do not include property costs (where applicable), access costs, permitting costs, legal fees, Agency oversight, or public relations efforts.
- These estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs may be affected by known and unknown risks including, but not limited to changes in general economic and business conditions, site conditions that were unknown at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Haley & Aldrich is not licensed as accountants or securities attorneys; therefore, we make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

Assumptions:

1 Includes mobilization and demobilization of labor, equipment, and materials necessary to implement the work. The mobilization/demobilization cost has been estimated at 5% of the total construction cost, without consideration of transportation and disposal.

2 Staging area development/restoration includes preparation of the area for use during construction activities and provision of a contractor office. At least a portion of this area will be covered with an HDPE liner to be used as a contaminated sediment holding and management area. Additional space will be included for the construction and operation of a temporary water treatment system. Restoration will include removal and disposal of gravel and fill where necessary, followed by topsoil and vegetation as appropriate.

3 Costs assume the performance of pre-design investigations to confirm the results of previous investigation activities. Primary pre-design activities assumed for performance include side-scan sonar and sub-bottom profiling to identify any potential debris fields, core collection for geotechnical properties related to slope stability, and potential material stabilization and solidification agent needs.

4 Performance of the work will include routine checks on the progress of the work and changes to the local bathymetry. Costs include a routine bathymetric survey performed from the water over the entire work area, and reduction of bathymetric data for comparable bathymetric survey figures. Costs assume the performance of bathymetric surveys on a weekly basis; however, as the work progresses, the frequency of bathymetry work may be adjusted.

5 Dredging and sediment removal work will require a full-depth, single-tier silt curtain to be installed around each work area during the performance of work. The unit price includes purchase of material, anchors, and suspension infrastructure, as necessary, and cost to install/remove each setup in each season.

6 While dredging is being performed, oil booms will be installed around the perimeter of each work area in parallel with the silt curtain. The cost presented for oil booms includes all materials and labor required for the installation and removal of the oil boom system on a monthly basis, as necessary dependent upon sheen generation and adsorption. Disposal of spent oil booms is included in Item 12 - Miscellaneous Disposal.

7 This cost estimate assumes that sediments from both the Mack Point facility and the construction of the CAD Cell will be removed via a barge-mounted mechanical clam-shell dredge, targeting sediments in accordance with the area, depth, and volumes suggested by previous remedial investigations and conceptual design work. Conceptual design of the of the CAD Cell includes an approximate 7-acre area excavated to approximately 15 feet below the existing surface. A removal rate of 1,000 cy/day is assumed. Removed sediments will be placed in open scows and transported to their designated destinations.

8 The top 3 feet of excavated sediment from both the Mack Point facility and the CAD Cell location will be prepared for and disposed of at a regulated upland disposal facility. Costs and activities associated with this task are included in this cost item as follows:

- Removed sediments designated for upland landfill disposal from both the Mack Point facility and the construction of the CAD Cell will initially be allowed to gravity dewater. As needed, mechanical means of drying (e.g., mixing and compaction) may be used to expedite material dewatering. If necessary, drying or stabilization agents may be added during the mixing process. Costs include the mechanical manipulation of dried materials and the addition of a stabilization agent (e.g., Portland cement and/or fly-ash), as needed, in preparation for off-site transport.

- Water collected as removed materials are dried will be treated prior to discharge back to the water body. Water treatment is assumed to consist of particulate and carbon filters, and assumes PAHs are the only constituent of concern. Water volumes requiring treatment are estimated at 40 gal/cy of removed material. Estimated costs include the construction and operation of the temporary water treatment plant for the duration of material handling activities.

- Materials destined for upland disposal will require ex-situ characterization prior to off-site transportation. Costs assume the rapid analysis of stabilized materials for the full RCRA suite, PAH 34, and pesticides/herbicides. Sample collection and related analyses will be performed at a frequency of one sample per 250 tons.

- Upland disposal costs assume 1.5 tons/cy, including material bulking, any necessary stabilization agent, and the transport to and disposal of stabilized materials at an approved, regulated landfill in Maine.

9 Ocean disposal costs assume there are no additives necessary, and all removed materials have been prequalified for ocean disposal. Such materials will be transported in an open-hull dump scow for disposition at the selected ocean disposal site. Because there are two potential ocean disposal locations, a range of costs is presented.

10 Costs associated with placement of the dredge material from the Mack Point facility in the newly constructed CAD Cell assume that there are no preparations or additives necessary prior to placement in scows, and all removed materials have been prequalified for open-water disposal in the CAD Cell. Such materials will be transported in an open-hull dump scow for disposition at the newly constructed CAD Cell.

11 Ocean disposal costs associated with the remaining dredged materials from the construction of the CAD Cell assume there are no additives necessary, and all removed materials have been prequalified for ocean disposal. Such materials will be transported in an open-hull dump scow for disposition at the selected ocean disposal site.

12 This cost estimate includes provisions for the disposal of miscellaneous materials (e.g., used silt curtain and oil booms, personal protective equipment, and disposable equipment) at a facility permitted to accept such waste.

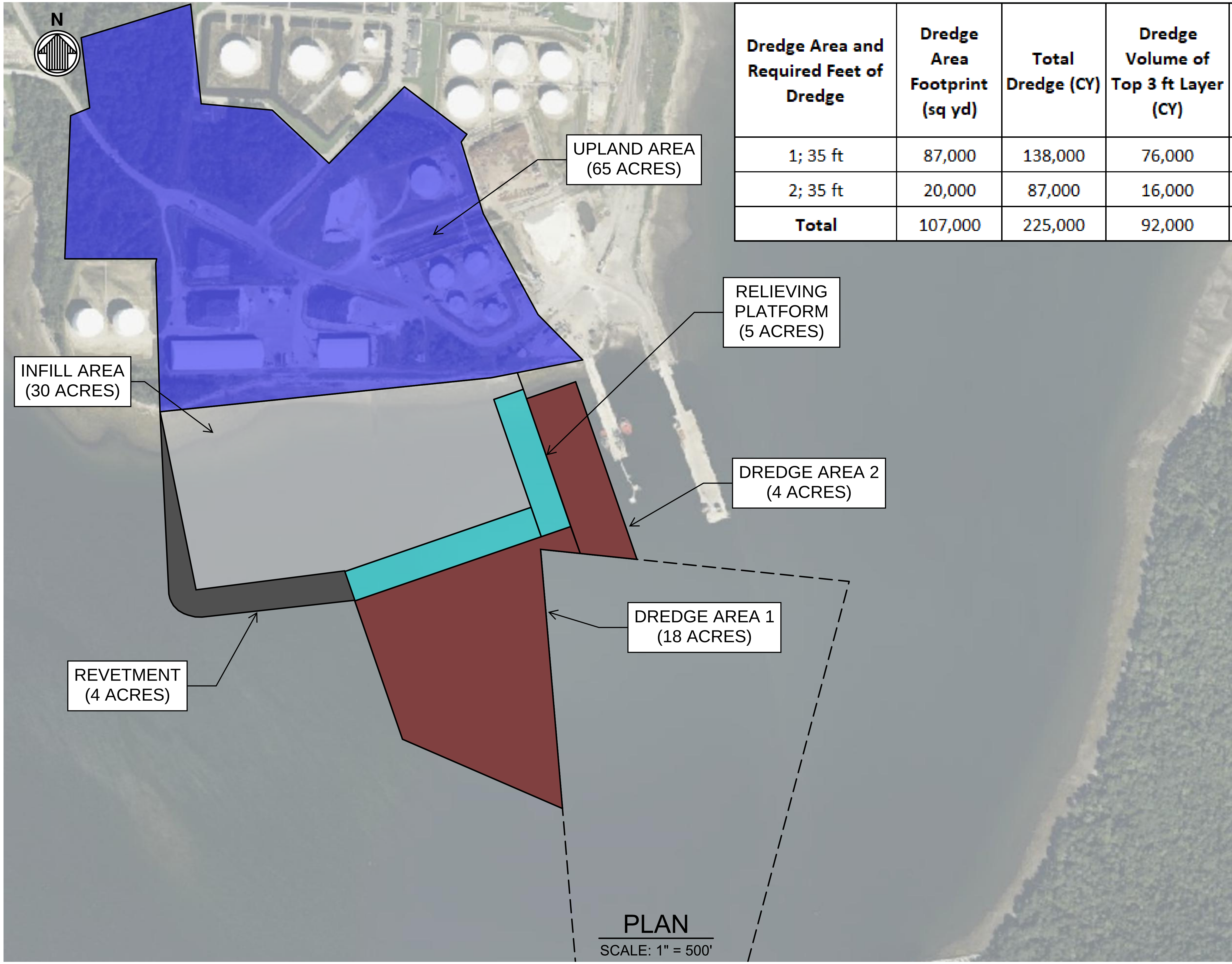
13 Construction monitoring/oversight are estimated at $1,000/day, and include costs for lodging and extras for non-working days. Construction oversight costs include daily monitoring of contractor activities and progress, and the review of interim construction, specifications, and design modification submittals.

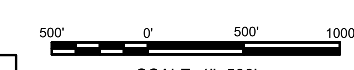
14 Engineering and administration costs are estimated as 3% of the total project capital costs. Such costs include the review of all pre-, during-, and post-construction submittals, review of construction progress bathymetric mapping, and any design modifications that may arise over the course of the project related to unanticipated conditions or contractor approved alternative requests.

15 A 20% contingency allowance has been included to account for unforeseen circumstances or variability in the volumes, labor, or material costs.

FIGURE

Dredge Area and Required Feet of Dredge	Dredge Area Footprint (sq yd)	Total Dredge (CY)	Dredge Volume of Top 3 ft Layer (CY)	Dredge Volume Below 3 ft Depth up to Glacial Till (CY)	Glacial Till Dredge Volume (CY)	Soft Material (Mud/Muck) (CY)
1; 35 ft	87,000	138,000	76,000	61,200	800	137,200
2; 35 ft	20,000	87,000	16,000	68,000	3,000	84,000
Total	107,000	225,000	92,000	129,200	3,800	221,200





MAINE FLOATING OFFSHORE WIND PORT ALTERNATIVES ANALYSIS

moffatt & nichol

2024.09.11

Mack Point Wind Port Alternative Dredge Extents

CONCEPTUAL DRAWING
NOT TO BE USED FOR CONSTRUCTION