Maryland Port Administration (MPA) Confined Aquatic Disposal (CAD) Program

Frequently Asked Questions (FAQs)

GENERAL DREDGED MATERIAL INFORMATION

What is dredged material?

Dredged material is sediment excavated - or dredged - from the bottom of waterways.

Why is dredging necessary?

Over time, sediment accumulates in shipping channels due to wind, tides, and runoff. Several factors may impact the sediment depth in the shipping channels, such as runoff that originates from land-based activity, weather events, or underwater sediment that shifts in the wake of commercial and industrial ship traffic. This sediment accumulation can limit channel navigability.

How often do channels need to be dredged?

Dredging is happening continually, with an average of 4.6 million cubic yards (mcy) of sediment removed from shipping channels in the Chesapeake Bay and 1.17 mcy removed from the Baltimore Harbor shipping channels annually. That's the equivalent of filling the Baltimore Ravens M&T Bank Stadium to the brim with sediment twice. The frequency of dredging in specific areas depends on the amount of sediment accumulated. The Maryland Port Administration (MPA) and the US Army Corps of Engineers (USACE) work together to conduct dredging and find placement sites and solutions for this dredged material, which is also referred to as "maintenance dredging."

What is in dredged material?

Dredged material in the Chesapeake Bay and Baltimore Harbor is mostly fine silts, clay, and sand accumulating in the shipping channels. The geologic formations in the region, as well as human activities, affect the character of the sediment in different locations. Human activities affecting sediment include industrial activity, agriculture, and urban development. However, dredged material from shipping channels generally does not contain pollutants at levels that could cause human or environmental harm and is not classified as hazardous.

DREDGED MATERIAL TESTING

How is dredged material tested for placement in a DMCF or CAD cell?

Sediment dredged from shipping channels is tested before dredging and, if it meets state and federal regulations, can then be placed in a containment facility, including a CAD cell. To evaluate dredged material from the federal navigation channels, EPA's Inland Testing Manual is used to screen channel material during USACE evaluations for maintenance channel dredging.

MPA mandates testing of dredged sediments for various physical and chemical traits to determine sediment suitability for placement at DMCFs. Sediments are tested for organic contaminants, such as polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides that bind strongly to sediments. Tests include grain size, specific gravity, metals, nutrients, pH, total organic carbon, oil, total petroleum hydrocarbon (TPH), ammonia, sulfides, cyanide, and tributyltin. A Toxicity Characteristic Leaching Procedure (TCLP) is also performed, a leaching procedure used to evaluate a sample to determine which contaminants are present in the leachate as well as their concentrations.

How is dredged material tested for innovative reuse?

If sediment will be re-used in innovative reuse, a discrete amount will be separated and dried after dredging has occurred, then tested again to be categorized as fill using Maryland Department of the Environment (MDE) guidelines. Samples are evaluated using MDE criteria based on EPA's Regional Screening Levels (RSLs), considering toxicity, exposure, and properties. These guidelines are in place to ensure that human health and the environment are safeguarded. Dredged material reuse follows MDE Guidance, with categories as follows:

- Category 1: Residential Unrestricted Use Soil and Fill Material - for offsite fill use.
- Category 2: Non-Residential Restricted Use Soil and Fill Material - non-residential fill.
- Category 3: Restricted Use Soil and Fill Material - for managed commercial innovative use.
- Category 4: Ineligible Soil and Fill Material - unfit for reuse, requiring containment.

How is dredged material tested for beneficial reuse?

Dredged material that meets specific criteria in state and federal regulations can be considered for "Beneficial Use." Beneficial use includes dredged material for the restoration of underwater grasses, island restoration, stabilization of eroding shorelines, the creation or restoration of wetlands, and the creation, restoration, or enhancement of fish or shellfish habitats. This is a mutually beneficial outcome as it helps MPA meet its dredged material management needs and provides the sediments needed to restore animal and plant habitats.

Beneficial use projects require monitoring and maintenance plans to prevent adverse effects and ensure proper function. A key consideration in determining sediment characterization requirements by MDE for beneficial uses is the source of the dredged material. Dredged material from inside the legally defined

Baltimore Harbor will generally require more rigorous sediment characterization, both physical and chemical, and associated monitoring to be deemed suitable for beneficial use.

CONFINED AQUATIC DISPOSAL (CAD) OVERVIEW

What is confined aquatic disposal?

Confined Aquatic Disposal, or CAD, is a technique in which deposits of sand and gravel are removed from the river bottom to create a depression, or CAD cell. That depression is then filled with dredged material from projects such as maintaining shipping channels and anchorages. The sand and gravel excavated to create the CAD cell can be recovered and used for innovative reuse or beneficial use projects.

Why is MPA exploring the feasibility of CAD in Baltimore Harbor?

Identifying additional placement capacity for materials dredged from Baltimore Harbor, in addition to the Masonville and Cox Creek dredged material containment facilities (DMCFs), is challenging because property adjacent to the Port is densely populated and already developed. So, in addition to existing DMCFs, the MPA is exploring innovative alternative approaches to dredged material management, like CAD. In 2011, the Harbor Team, an advisory committee to the State of Maryland's Dredged Material Management Program (DMMP), recommended CAD as an alternative to the limited capacity available in dredged material containment facilities and as part of the statutory mandate for the DMMP to provide a continuous, long-term strategic plan for dredged material management.

Is CAD used in other Ports?

CAD is successfully used in other locations in the United States (e.g., Los Angeles, CA; Bremerton, WA; Providence, RI; Boston, MA; and other locations) and is a viable option for placing dredged material in Baltimore Harbor.

Why must the material be contained?

The material must be contained to comply with Maryland law (Environmental Article 5-1102(a)), which requires placement in contained areas with approval from MDE for all dredged material from Baltimore Harbor, which is defined as the tidal portions of the Patapsco River and its tributaries lying westward of a line extending from Rock Point in Anne Arundel County to North Point in Baltimore County. MDE and the USACE approved the use of CAD through the initial permitting process during the Phase I CAD Pilot Project in the Baltimore Harbor (see Figure 1 for location); MDE and USACE would have to approve future CAD locations.

Environment Article 5-1102.

(a) A person may not redeposit in an unconfined manner dredged material from Baltimore Harbor into or onto any portion of the water or bottomland of the Chesapeake Bay or the tidewater portions of any of the Chesapeake Bay's tributaries outside of Baltimore Harbor. However, the dredged material may be redeposited in areas approved by the Department [MDE].

What environmental impacts can be expected?

Any CAD project will be constructed and filled under federal and state environmental permits to protect water quality and the surrounding environment. Based on multiple in-depth environmental studies, the construction and filling of a CAD cell are anticipated to have temporary, minor impacts.

Water quality monitoring performed during the Phase I CAD Pilot Project showed only minor increases in turbidity, or the change in water's cloudiness, along the river bottom during placement that dissipated quickly; no exceedances of state water quality criteria were observed. Sediment and Nutrient Investigation reports are available upon request. Please contact the CAD project manager, Rachael Gilde, at rgilde@marylandports.com.

Work at the CAD site can only be conducted during specific times of the year, specified in the permits, to avoid fish spawning seasons and minimize any effect on larval populations. Fish are highly mobile and will likely avoid the construction area. The benthic community will be displaced during construction. Still, recolonization is expected within two years based on data seen from other dredging/placement projects within the Chesapeake Bay. Additional benthic studies may be planned to understand the existing habitat conditions.

CAD SITE SELECTION & PLACEMENT

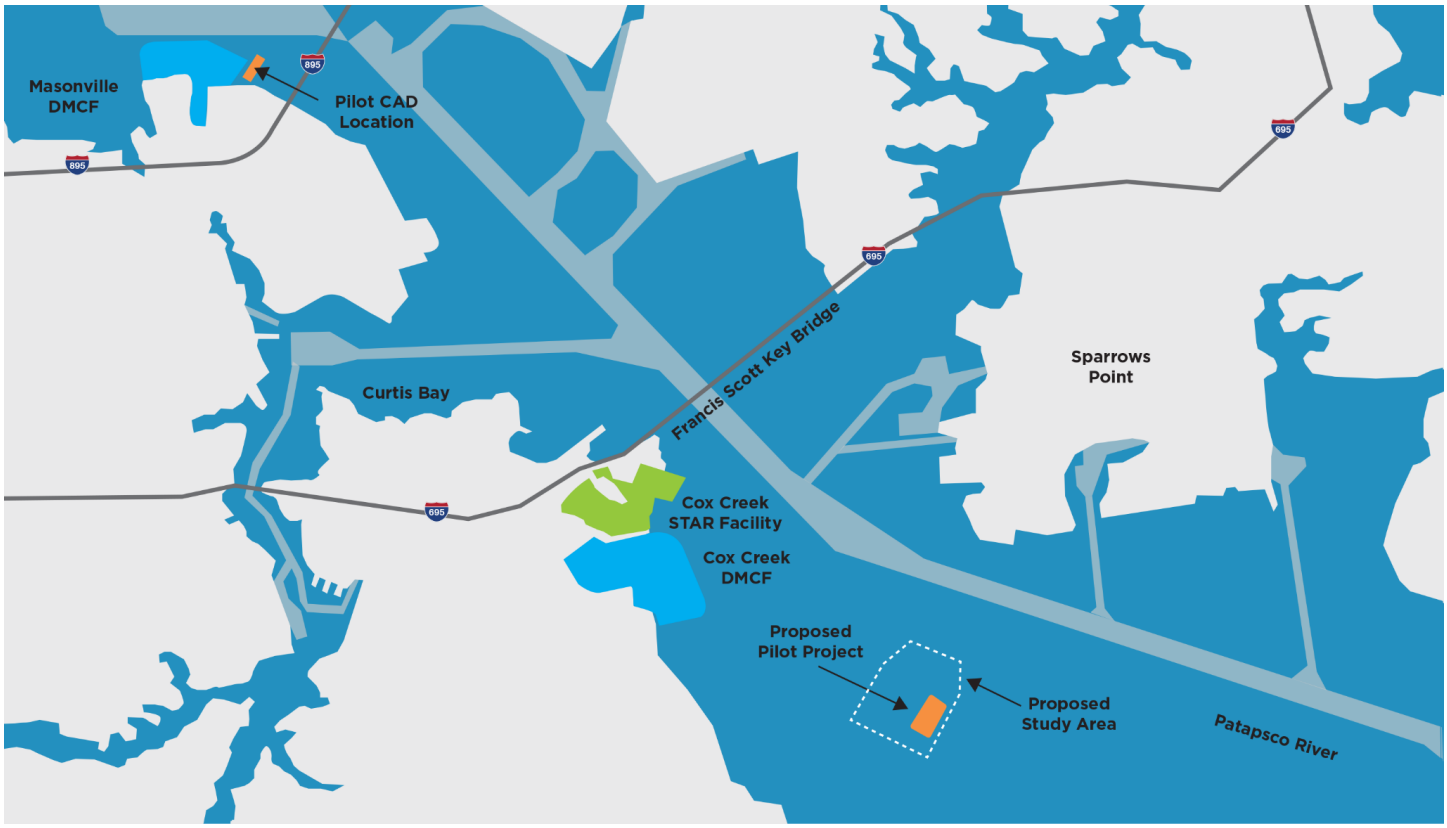

Figure 1. CAD Location Map

How was the current Phase II CAD Pilot Project location selected?

The Phase II CAD Pilot Project site was chosen after extensive studies. Initial assessments excluded areas within Baltimore Harbor with existing infrastructure, potentially contaminated sediments, shallow waters, heavy ship traffic zones, and complex permitting requirements. Natural resource sites, such as habitat restorations, were also avoided. Additional studies included an environmental assessment that evaluated impacts: air quality, biological resources, cultural resources, geology and soils, wind and wave, hydrology, water quality, navigation, infrastructure and utility crossings, and socioeconomic factors. This assessment was used to narrow down further possible locations feasible for constructing a second CAD pilot project.

How will dredged material be placed in a constructed CAD cell?

Dredged material can be placed within a CAD cell using several types of equipment and methods depending on how the material is initially dredged, how far the material must be transported, and available water depths. Expected operations for the proposed Phase II CAD Pilot Project include split hull barges capable of opening at the bottom to release material within the cell limits. This method was utilized in the Phase I CAD Pilot Project, resulting in precise placement with no state water quality criteria exceedances.

How is sediment tested before placement in the CAD cell?

For the Phase I CAD Pilot Project, sediment from federal navigation channels and the proposed CAD cell underwent tests for grain size, solids, organic carbon, nutrients (nitrogen, phosphorus), metals, PAHs, total PCBs, and chlorinated pesticides. Elutriate samples (sediment samples mixed vigorously with water) were collected from channel sediment to assess potential contaminant release into the water during material placement in the CAD cell. This involves placing sediment in a chamber with site water, analyzing the resulting water quality, and comparing it against the original site water (evaluated against screening levels set out in the MDE Innovative Reuse and Beneficial Use of Dredged Material Guidance Document). Elutriate samples were tested for nutrients, metals, PAHs, total PCBs, and chlorinated pesticides. Water quality monitoring during material placement was consistent with elutriate results, existing data, modeling, and baseline studies. Monitoring occurred at specific depths and locations within the CAD cell. The results of the Sediment and Nutrient Investigation report from the Phase I CAD Pilot Project are available upon request. Please contact the CAD project manager, Rachael Gilde, at rgilde@marylandports.com.

How are the depth and size of CAD cells determined?

Sizing is based on target capacity considerations for the amount of dredged material the CAD needs. The DMMP considers various elements of dredged material capacity each year based on proposed dredging projects. The design of the CAD cell incorporates additional space capacity to allow for sediment expansion and prevent overfilling of the cell. The Phase II CAD Pilot Project is targeting an increased size compared to the Phase I CAD Pilot Project to continue to test and demonstrate the success of this dredged material management technique.

The depth of the cell depends on several factors, including the depth to the sand layer, the total thickness of the sand, material density at depth (e.g., how hard the material is to dredge), depth of the confining clay layer, the capability of the dredging equipment, and the amount of space needed for the material being placed in the CAD cell.

How do you determine if the material deposited within the CAD cell will remain in place?

A three-dimensional hydrodynamic model was used for the initial site screening and design of the Phase II CAD Pilot Project. The model considered regular tides and storm impacts to assess sediment exposure, resuspension, and transport. Despite higher exposure than the Phase I CAD Pilot Project, the proposed location's depth reduces storm effects. Later modeling incorporated site-specific currents, sediment data, CAD cell design, and depth. This modeling revealed that the cell's extra space and depth mitigate impacts from currents and waves, aided by sediment deposition over time, where the sediment within the cell would be retained. Existing harbor deposition would cover placed sediment within the CAD cell.

Is there a risk of placed material contaminating the underlying aquifer?

No. The proposed CAD cell would be located above an existing clay layer that serves as a confining layer separating any potential exchange with aquifers in the area. This was confirmed during the groundwater studies performed before the Phase I CAD Pilot Project. Additionally, analytical testing performed on the maintenance dredged material demonstrates that the leaching of potential contaminants into the surrounding water column is unlikely (see Confined Aquatic Disposal Pilot Project Sediment Investigation Report).

PROJECT IMPACTS & ENGAGEMENT

What will the light and noise impacts be from the construction of the CAD cell?

The proposed CAD cell is located approximately three-quarters of a mile from the nearest shoreline, about halfway to the existing federal navigation channel. Noise and light impacts are not anticipated to occur in the neighboring communities and would be similar to existing routine dredging activities for the channel.

To aid in demonstrating the low risk of impact, MPA studied USACE maintenance dredging operations in the summer of 2023, which included collecting noise data and drone imagery to provide reference to the local communities. Additional information from this study will be shared in future outreach efforts.

How can I get additional information on the MPA CAD Program, including how to get involved?

Please visit the Future Solutions tab on the DMMP website (Marlyand-DMMP.com) for resources related to the CAD Program and other Innovative Reuse and Beneficial Use (IRBU) of Baltimore Harbor dredged material.

The Citizens Advisory Committee represents the public and advises the Maryland Port Administration and its DMMP partners on various dredging-related topics and issues, including CAD. The committee's quarterly meetings are open to the public and often have both an in-person and virtual attendance option. Due to the proximity of the proposed CAD pilot location to the Cox Creek DMCF, the Cox Creek Citizens Oversight Committee (COC) is frequently updated at the quarterly Cox Creek COC meetings. Community members are welcome to attend any of these meetings to receive up-to-date information about DMMP projects. For information about the DMMP's committees, please visit maryland-dmmp.com/committees/.

MPA maintains a distribution list for community members and stakeholders interested in the CAD program. MPA is also eager to provide presentations about the CAD and IRBU programs by request. Community members and stakeholders interested in being included on the CAD program distribution list or arranging a presentation for a group should contact Danielle Fisher, MPA Harbor Development outreach coordinator, at dfisher2@marylandports.com.