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 annually. That's the equivalent of filling the Baltimore Ravens M&T Bank Stadium to the brim with sediment twice every year. The frequency of dredging in specific areas depends on the amount of sediment accumulated, but on average, 1.17 mcy are dredged from the Baltimore Harbor shipping channels annually. 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.

CONFINED AQUATIC DISPOSAL (CAD) OVERVIEW

What is confined aquatic disposal?

Confined Aquatic Disposal, or CAD, is a technique in which 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 maintaining shipping channels and anchorages.

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

CAD is being investigated as a potential dredged material management solution used as part of the State of Maryland's Dredged Material Management Program (DMMP), which identifies options for dredged material placement for channels serving the Port of Baltimore. Identifying additional placement capacity for materials dredged from Baltimore Harbor channels, 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 developed. In addition to existing DMCFs, MPA is exploring alternative approaches to dredged material management, like CAD. In 2011, the Harbor Team, an advisory committee to the DMMP, recommended CAD as an alternative to the limited capacity available in DMCFs and as part of the statutory mandate for the DMMP to provide a continuous, long-term strategic plan for dredged material management. Another aspect of this project is that the MPA would like to beneficially use the material from the depression since it would be mostly sand and gravel to use in Port construction projects.

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 MPA is exploring if CAD is a viable option for placing dredged material in Baltimore Harbor. The Maryland Department of the Environment (MDE) and the USACE approved the Phase I CAD Pilot Project in the Baltimore Harbor, which was constructed in 2016 adjacent to the Masonville DMCF, and would also have to approve future CAD locations. CAD is a potential solution that MPA aims to continue to investigate, building on the successful implementation of the small-scale CAD pilot project adjacent to the Masonville DMCF.

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.

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

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 a 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 area during construction. The benthic community will be displaced during construction. However, 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. If an additional CAD pilot project is deemed feasible and an acceptable site is selected, MPA would work under the oversight of MDE in coordination with other State and Federal regulatory agencies to determine if CAD adequately confines dredged material and is safe for the surrounding environment and adjacent communities.

CAD PLACEMENT

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 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 water quality criteria exceedances.

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 and their concentrations.

How is sediment tested before placement in a CAD cell?

For the Phase I CAD Pilot Project, sediment from 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 involved 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 established in the USEPA and State of Maryland acute water quality criteria for the protection of aquatic life). 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 Pilot Project are available upon request. Please contact the CAD project manager, Rachael Gilde, at rgilde@marylandports.com. A similar testing regime is expected for future CAD projects.

How are the depth and size of CAD cells determined?

The sizing of a CAD cell is based on the amount of dredged material the DMMP needs to place at the time of construction. The DMMP considers various elements of dredged material capacity each year based on proposed dredging projects. The design of the CAD cell also incorporates additional space to allow for sediment expansion (bulking) and to prevent overfilling of the cell. The depth of the cell depends on several factors, including the depth to the sand layer, the total thickness of the sand layer, 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?

For the Phase I CAD Pilot Project, a three-dimensional hydrodynamic model was used to determine if the material deposited within the CAD cell remained in place. The model considered regular tides and storm impacts to assess sediment exposure, resuspension, and transport of sediment. Existing harbor deposition will cover the sediment placed within the CAD cell.

Based on the Phase I CAD Pilot Project findings, an additional model considered tides and storm impacts to assess sediment exposure, resuspension, and sediment transport and found that deeper sites reduce storm effects. Additional modeling incorporates site-specific currents, sediment data, CAD cell design, and depth and reveals that the extra space and deeper depth provided by a larger CAD cell can mitigate impacts from currents and waves. Natural sediment deposition over time will also aid in retaining sediment in the cell.

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

No. Any future 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).

ENGAGEMENT

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

Please visit the Innovative Solutions tab on the DMMP website (Marlyand-DMMP.com) for resources related to CAD and other Innovative Reuse and Beneficial Use (IRBU) of Baltimore Harbor dredged material. Community feedback will be incorporated and addressed throughout the vetting this alternative method of dredged material management. 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 in-person and virtual attendance options.

If you want more CAD information, please visit the Maryland-DMMP.com website and sign up to receive updates. MPA is also eager to provide presentations about the CAD program 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 Outreach Coordinator, at dfisher2@marylandports.com.