

PURPOSE AND NEED

I.1.0 CIDMMA EXPANSION

Craney Island Dredged Material Management Area (CIDMMA) (see Figure I-1) is a Federally-owned and U.S. Army Corps of Engineers (USACE)-operated dredged material placement area that is open for public and private dredged material from the Norfolk Harbor and adjacent waters as defined in House Document 563 of the 79th Congress. The CIDMMA has been in continuous use since 1957, serving the dredging needs of the Norfolk Harbor. Located approximately 140 miles southeast of Washington, D.C., the site is bordered by the Elizabeth River to the east; the James River to the north and west, and the City of Portsmouth, Virginia to the south. Originally designed for a life span of 20 years, with a capacity of 96 million cubic yards, CIDMMA has over 225 million cubic yards of dredged material deposits as of the end of Federal Fiscal Year (FY) 2004.

This Environmental Impact Statement (EIS) evaluates the potential environmental consequences of the USACE and the non-Federal sponsor, the Virginia Port Authority's (VPA's) proposed action to construct a 580-acre eastward expansion of the existing CIDMMA. The proposed project would accommodate additional dredged material placement capacity and, after the cell is filled, port development on top of the dredged material placement facility. This document presents the environmental consequences associated with the dredging of access channels, cell construction, and port development and operation on the constructed 580-acre cell.

This EIS was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations 1500-1508), and USACE procedures for implementing NEPA (ER 200-2-2).

Article I. Study Authority

This study is authorized by resolution of the U.S. House of Representatives Committee on Transportation and Infrastructure dated 24 September 1997, which reads:

“Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army is requested to review the report of the Chief of Engineers on the Norfolk Harbor and Channels (Deepening), contained in House Document 99-88, 99th Congress, 1st Session, and conduct a study of eastward expansion of the Federally owned Craney Island Dredged Material Management Area (CIDMMA). Such study shall be directly coordinated with the sponsor, the Commonwealth of Virginia, through the Secretary of Transportation represented by the Virginia Port Authority, and shall give specific attention to rapid filling to accommodate anticipated port expansion and to the operation of the existing facility while extending the useful life of CIDMMA, and shall take into account all relevant environmental issues and the subsequent transfer of the expanded area of CIDMMA to the Commonwealth of Virginia.”

Study Area

The Port of Hampton Roads is located in the southeastern region of the Commonwealth of Virginia at the southern end of Chesapeake Bay, midway on the Atlantic Seaboard (approximately 170 miles south of Baltimore, MD, and 220 miles north of Wilmington, N.C.). The harbor is a natural roadstead of 25 square miles formed by the confluence of the James, Nansemond, and Elizabeth Rivers. It is recognized as one of the largest and finest natural harbors in the world and is a primary stimulus to the economic well-being of the region, the Commonwealth, and the Nation. The land area surrounding the harbor encompasses about 1,500 square miles and includes the cities of Chesapeake, Norfolk, Portsmouth, Suffolk, and Virginia Beach, as well as Isle of Wight County on the southside and Hampton and Newport News on the northside. The 2004 population of this area was approximately 1.4 million people.

Hampton Roads is one of the largest and most active ports in the U.S. Foreign, national, regional, and local markets are conveniently accessible to the port through the numerous steamship services to worldwide ports and the strategic position that the port occupies with respect to national and regional transportation patterns. The geographic location of the port and an excellent rail and highway network make it economically and efficiently available to a significant portion of the Nation's population and manufacturing centers. The port is most strategically located with respect to the vast coal fields of Virginia, West Virginia, and Kentucky, and extensive amounts of steam and metallurgical coal resources are transported by rail from these areas to Norfolk and Newport News for both overseas shipment and domestic use. Other bulk commodities and breakbulk commodities also comprise a significant and important part of the waterborne shipments through the port. Container shipments have grown significantly in recent years and are projected to show substantial increases in the future. The port generates significant local, regional, and national economic impacts, providing employment, payroll, and tax revenues in Hampton Roads, the Commonwealth, and the Nation. The location and the study area are shown on Figure I-1.

Article II. Need For and Objective of Action

The purpose of the Feasibility Study was to determine the need for and Federal interest in an eastward expansion of CIDMMA. Three areas of potential Federal interest in the eastward expansion of CIDMMA were identified in the Reconnaissance Phase for further evaluation as follows:

1. Increased dredged material disposal capacity. The additional cell would extend the useful life of CIDMMA as a dredged material containment area. Studies to further evaluate alternatives to extend the useful life of CIDMMA as an economical dredged material placement area are in the Federal interest and would be consistent with Army policies.
2. Growth in commodity movements and waterborne transportation savings. Once filled, CIDMMA could provide additional acreage for the development of projected long-term berthing and landside port facilities adjacent to the Norfolk Harbor Channel. Expansion could provide National Economic Development (NED) benefits in terms of transportation savings by providing an area for development of a containerized cargo terminal.
3. National Defense. Expansion of CIDMMA could serve as a defense logistical and tactical area supporting deployment of national defense forces. The potential exists for using the future port terminal as a logistical shipping point for military cargo in times of wars.

NEPA and the USACE Principles and Guidelines (ER 1105-2-100) provide the basis for Federal Policy concerning multi-objectives planning. The Federal objective of water and related land resources project planning is to contribute to NED consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Water and related land resources project plans are formulated to alleviate problems and take advantage of opportunities in ways that contribute to this objective.

Article III. Need for Additional Dredged Material Storage Capacity

(a) CIDMMA Existing Conditions

Placement of dredged material at CIDMMA is limited to users within the geographical area of Norfolk Harbor and adjacent waters. In general, this includes the navigable waters of the ports of Norfolk, Portsmouth, Chesapeake, Hampton, and Newport News. Each project requesting use of CIDMMA is evaluated by the District on a case-by-case basis. The District determines if the project can legally use the facility, consistent with the project's authorizing documents.

In accordance with the authorization, CIDMMA is to be used for the benefit of the maintenance and development of navigation improvements serving Government and private interests. CIDMMA is authorized to handle all types of navigational dredged material, including material suitable and unsuitable for open ocean disposal. It cannot be limited to only unsuitable material without additional Congressional authorization.

If dredging is not related to navigation, i.e., road building, railroad crossings, interior lakes and ponds etc., then disposal at CIDMMA will be denied. Also, CIDMMA cannot be used for disposal of material excavated from upland areas or for disposal of construction debris, except for limited special cases, such as beneficial use of concrete for rip-rap to protect exterior dikes from erosion.

The current management strategy for operating CIDMMA is based on Section 148 of the Water Resources Development Act (WRDA) of 1976 (P.L. 94-587) that states the "Chief of Engineers, shall...extend the capacity and useful life of dredged material disposal areas such that the need for new dredged material disposal areas is kept to a minimum." The Engineer Research and Development Center (ERDC), formerly Waterways Experiment Station, published Technical Report EL-91-11, Development of a Management Plan for CIDMMA in December 1991.

ERDC recommended that Norfolk District sub-divide CIDMMA into three cells so that the dredged material could be placed in one cell while the other two cells dry out. The benefit of drying the dredged material is that significantly more volume is created for dredged material placement. The ERDC Management Plan also noted "...lift thicknesses in excess of 5 feet begin to significantly affect desiccation and consolidation behavior."

In addition to drying the material, another way of increasing storage capacity is by increasing the facility's dike height. The CIDMMA was built on top of clay layers that were naturally deposited within Hampton Roads. Soils investigations revealed that water was trapped in the marine clay under CIDMMA and was under pressure due to the weight of the facility and that this water limited the foundation's load bearing

capacity. In order to relieve the pressure, strip drains were installed to create water exit pathways that improved foundation strength. Strip drains were installed from 1995 through 2001.

With greater foundation strength, the dike elevations have been increased to heights greater than allowed without the installation of strip drains. Currently the dikes have been raised to elevations ranging from 36 to 40 feet above mean lower low water (MLLW). Under the current management program, the dikes are raised in anticipation of the next year's inflow.

(b) CIDMMA Future Conditions

Since its construction, CIDMMA has received an average of 4.8 million cubic yards of dredged material annually. These deposits include both new work and maintenance of Federal channels and anchorages, as well as permit dredging from other Federal, state, municipal, and private users. The total annual volume varies from year to year (see Table I-1). For example, in 1970, prior to the subdivision of the site into three cells, more than 16 million cubic yards of material were placed in CIDMMA. At the other extreme, less than 1 million cubic yards were deposited in 1990. Some of this annual variation is due to the 2- to 3-year dredging cycle of the CIDMMA Rehandling Basin, which receives material from vessels that do not have pump-out capabilities, such as bottom dumping scows.

In developing future deposition rate estimates for CIDMMA, the District queried Norfolk Harbor users that have historically placed large volumes of material into the CIDMMA, such as the USACE Norfolk District Operations Division, Navy, and the VPA. In addition, known future users, such as Maersk, that will require dredged material volume capacity in the future were also queried. All of the queried users provided the approximate location of dredging, estimates of future dredged material inflow quantities, and the anticipated timing of the inflows. The inflow schedules were reviewed to ensure the scheduled deposits would not exceed the capabilities of the facility. In addition, the dredged material inflow estimates were periodically updated during the course of the Feasibility Study.

Future inflow estimates are also based on the assumption that CIDMMA would accept all material that was eligible for disposal, as is the actual practice. Furthermore, it is assumed that the District will continue to use dredged material beneficially whenever possible; however, based on the experience of recent years, it is assumed that little of the material placed into the existing site will be suitable for beneficial use.

Individual year-by-year inflow projections were developed for 2005-2022. For years beyond 2022, this analysis assumes that the historic average of 4.8 million cubic yards per year will continue to be a reasonable estimate of the future deposition rate into CIDMMA, inclusive of maintenance and identified new work dredging. This estimate is consistent with the Norfolk Harbor and Channels, Virginia, Long-Term Disposal (Inner Harbor) draft information report, dated June 1990, which projected the deposits into CIDMMA to be 4 million cubic yards annually without accounting for new dredging projects that have been initiated since 1990, such as the 50-foot inbound element and the new Maersk container handling facility. In addition, sensitivity analyses were conducted on the in-flow estimate for the years beyond 2022, and it was found that in-flow during these later years has only a small impact on the projected useful life of the facility.

Table I-1. Historical and total CIDMMA inflow (1957 – 2004)

<u>Fiscal year</u>	<u>Volume (cubic yd)</u>	<u>Fiscal year</u>	<u>Volume (cubic yd)</u>
1957	3,700,000	1982	6,170,000
1958	6,550,000	1983	2,690,000
1959	8,060,000	1984	10,070,000
1960	7,020,000	1985	1,890,000
1961	4,120,000	1986	3,710,000
1962	4,680,000	1987	2,830,000
1963	1,440,000	1988	12,800,000
1964	3,730,000	1989	3,100,000
1965	5,730,000	1990	930,000
1966	6,320,000	1991	3,910,000
1967	11,560,000	1992	1,530,000
1968	4,890,000	1993	3,960,000
1969	5,060,000	1994	1,440,000
1970	16,460,000	1995	2,630,000
1971	8,910,000	1996	5,370,000
1972	4,030,000	1997	1,060,000
1973	3,170,000	1998	2,000,000
1974	5,290,000	1999	2,940,000
1975	3,540,000	2000	1,990,000
1976	5,890,000	2001	3,110,000
1977	2,000,000	2002	3,030,000
1978	7,030,000	2003	3,610,000
1979	2,880,000	2004	<u>3,000,000</u>
1980	6,340,000		
1981	3,170,000	Total	225,630,000

(c) Without Project Conditions: Dredged Material Disposal Capacity Shortfall

Table I-2 presents the CIDMMA dredged material inflow forecast. The CIDMMA inflow forecast is based on the user survey and historical inflows discussed in the “Existing Conditions” section. The inflow forecast includes only those future inflows that have the highest level of certainty. Other potential inflows, such as material that would result from deepening the main channel to its authorized depth of 55 feet, or material that would result from berth deepening beyond existing conditions, have not been included in the forecast.

User surveys and other information were forwarded to ERDC for analysis and development of with and without project capacity projections for CIDMMA. ERDC used the Primary Consolidation, Secondary Compression and Desiccation of Dredged Fill computer model to estimate the lifespan of the CIDMMA.

PURPOSE AND NEED I

The model was calibrated using past surveys of CIDMMA and past inflows. Based on ERDC simulations, CIDMMA will reach its maximum capacity in 2025 under without project conditions.

Table I-2. Forecasted and total CIDMMA inflow (2005 – 2025)

Fiscal year	Volume (cubic yd)	Fiscal year	Volume (cubic yd)
2005	10,600,000	2016	4,600,000
2006	8,500,000	2017	4,700,000
2007	3,900,000	2018	2,500,000
2008	5,150,000	2019	2,650,000
2009	7,400,000	2020	4,100,000
2010	3,720,000	2021	2,500,000
2011	4,300,000	2022	2,650,000
2012	4,020,000	2023	4,800,000
2013	3,900,000	2024	4,800,000
2014	4,620,000	2025	4,800,000
2015	3,950,000		
	Forecast total (2005-2025)		98,160,000
	CIDMMA useful life total		323,790,000

Section 3.02

The CIDMMA capacity forecast is based on continuation of the management practices identified in the “Existing Conditions” section, such as use of drying cells, optimization of layer thickness, dike raising, strip drains, and implementing alternative beneficial uses of dredged material. CIDMMA capacity is regularly increased to meet short-term inflow projections by raising the interior height of the dikes. Interior dike heights currently range from 33 to 36 feet above MLW. Under without project conditions, the dikes are capable of being raised to an interior height of 47 feet, which is projected to accommodate forecasted inflow volumes until 2025. After 2025, with the dikes at an interior height of 47 feet, the CIDMMA foundation will have reached its bearing capacity, and additional inflows will no longer be accommodated.

I.2.0 TERMINAL CONSTRUCTION

Purpose of New VPA Container Terminal

The purpose of the proposed container terminal at CIDMMA will be to provide the Commonwealth of Virginia with sufficient capacity to meet the containerized cargo forecast for Hampton Roads and

continuing long-term cargo growth anticipated during the 2050 planning horizon. In recent years, The Port of Virginia has experienced average annual growth rates in containerized cargo of over 6 percent. These growth rates have resulted in significant annual cargo throughput, peak-operating conditions, and associated congestion that challenges the existing port infrastructure and equipment. Current market analysis indicates that the Commonwealth, represented by the VPA, must continue to accommodate steady growth well into the future.

The VPA 2040 Master Plan was based on a 1999 forecast for containerized cargo at The Port of Virginia with a growth rate between 3.5 and 4.7 percent, or an average rate of 4.1 percent per year (see Figure I-2). This growth rate is lower than the recent historical rate and, therefore, is considered conservative and sustainable. In fact, recent forecasts (2004) used to develop the economic benefits project a growth rate of 4.6 percent. It is the recent experience of most U.S. ports that actual growth has outpaced forecasted growth. Therefore, positive cargo growth is realistic for the Port of Virginia, which has the natural advantages of deep water and geographic location to accommodate a significant portion of the projected growth in East Coast cargo for the next 20 to 50 years.

Improvements to Existing VPA Facilities to Meet Short-Term Needs

Portions of VPA's current facilities were constructed prior to 1920. Due to age, these facilities are both functionally obsolete and deteriorated to a point where repair and maintenance yields diminished returns. Additionally, much of the port's container handling equipment is at the end of its useful life and will soon require replacement.

In order to improve existing facilities and protect capital, the VPA has chosen to maximize the capacity at its existing cargo handling terminals prior to investing in new terminal development. This approach has resulted in development of a capital investment program for the VPA's three existing maritime terminals. The capital improvement projects for existing VPA facilities through the year 2040 planning horizon include:

- Norfolk International Terminals (NIT) \$735 million
- Portsmouth Marine Terminal (PMT) \$187 million
- Newport News Marine Terminal (NNMT) \$ 26 million

The recommendations of the VPA 2040 Master Plan include specific projects for each of the VPA facilities. The recommendations for all VPA maritime facilities are summarized as:

- Reconstruction of some container wharfage for anticipated larger (Suez Class) vessels
- Acquisition of 100-foot gage (Suez Class) container cranes
- Dredging along berthing areas varies by terminal and ranges from -45 feet to -55 feet
- Rehabilitation of container yard to replace aging pavement
- Intermodal yard renovation
- Increase gate capacity and other civil/utility improvements
- Straddle carrier and other equipment acquisitions
- Demolition of aged warehouses and replacement with container storage yard

PURPOSE AND NEED I

Most of these improvements are planned to be in place by 2020. In fact, the NIT South Renovations are well underway. The wharf reconstruction (Phase I) is complete, and 8 new 100-foot gage cranes are in use. The container yard repaving is Phase II, and the first 48 of 108 is complete. Dredging of the berths and access channels at NIT to -50 feet MLW is expected to be completed in 2006.

In addition, in an effort to maximize capacity of the VPA's existing terminals, a Master Plan for optimizing land use was developed. This Plan includes maximizing land use to accommodate the expected increase in containerized cargo volume until an additional terminal facility can be constructed. Site plan maps are included in the appendices that depict the current land use of the VPA marine terminals and the future land use after the implementation of the VPA 2040 Master Plan. To maximize the VPA container handling area, the VPA also minimized non-revenue or low-revenue generating areas. This optimization program will make use of all developable VPA lands, as summarized in Table I-3 and Figures I-3 and I-4. Much of what remains in the "undeveloped area" category is not suitable for cargo handling use (e.g., lands designated for required environmental mitigation).

Table I-3: UNDEVELOPED AREA AT VPA FACILITIES

VPA Facility	Current Undeveloped Area (acres)	2040 Plan Undeveloped Area (acres)
NIT	89.0	19.0
PMT	34.7	0.0
NNMT	5.8	5.8

Even with the extensive plans for expanding the capacity of its existing facilities, the VPA's terminals will run out of capacity in 2007. Figure I-5 shows the unmet demand curve as projected by the conservative growth rate in the VPA 2040 Master Plan.

Effect of Maersk Property to Help Meet Short Term Needs

In April 2004, Maersk Sealand, a division of the A.P. Moller Group, announced the development of a 500-acre waterfront site in Portsmouth, VA. The planned 280-acre container terminal will significantly enhance the Port of Virginia's capability to handle containerized cargo between its opening in 2007 and the opening of the (proposed) Craney Island Marine Terminal in 2017. This terminal will not eliminate the need for the VPA to improve its existing facilities or the need to develop a port facility at CIDMMA in order to meet long-term forecasted cargo growth. Instead, development of the Maersk Property will extend the date by which the (proposed) Craney Island Marine Terminal would need to be operating by about 8 years (i.e., year 2015 opening date versus about 2007 without development of Maersk Property). See Figure I-6 for the increased regional capacity as a result of the Maersk Terminal.

Additional Land Area Required to Meet Long Term Port Needs

The substantial on-going efforts to increase the capacity of the VPA's existing marine terminals and to develop the Maersk property will help meet cargo demand in short-term. However, despite these efforts, a new container terminal will be needed to provide the VPA with sufficient capacity to meet the long-term containerized cargo forecast. Planning, design, and construction of a new terminal will require 10 to 15 years. Therefore, in order to meet future needs, it is necessary to plan for port expansion now.

An analysis was conducted to project additional required port land area for the long-term. As an initial step, the Hampton Roads container cargo forecast was extended to the year 2050 based on the VPA 2040 Master Plan. The baseline forecast of 4.1 percent was used for the land analysis. Refer back to Figure I-2 to see this curve.

Using the 2050 containerized cargo forecast, corresponding container yard acreage requirements were projected as shown in Figure I-7. Over 1,800 acres are needed to accommodate the projected increases in containerized cargo volume. Note the operating efficiency of the terminals is assumed to increase at 2 percent per year and is capped at a maximum practical capacity of 5,000 twenty-foot equivalent units (TEU's) per acre per year.

An estimated 664 acres of total container cargo area will be available after maximizing land use at VPA's existing terminals (i.e., NIT, PMT, and NNMT). This is 1,200 acres short of the over-1,800 acres projected to be needed in 2050 (from Figure I-7). Even factoring in the new Maersk port facility in Portsmouth, more than 850 acres of container cargo area would still be needed by 2050. The proposed site of the east expansion of CIDMMA would provide 580 acres of new marine terminal space and will help meet minimum cargo capacity demands through 2035. An additional 270 acres will still be needed to meet the 2050 forecasted capacity demand. The "Evaluation of Potential Locations" section of this document will discuss the other locations that were considered.