Short-Term Decision Document

Dredged Material Management Plan and Environmental Assessment

Cleveland Harbor
Cleveland, Ohio

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US Army Corps of Engineers®
Buffalo District

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Executive Summary

Cleveland Harbor, Cuyahoga County, Ohio, is located on the southern shore of Lake Erie at the mouth of the Cuyahoga River. The harbor is 191 miles southwest of Buffalo, NY and 110 miles east of Toledo, Ohio. The purpose of this decision document is to present the U.S. Army Corps of Engineers (USACE) short-term plan to provide one million cubic yards (cy) of new capacity for maintenance dredging and disposal of dredged sediment from the Cleveland Harbor, Ohio federal navigation project that must be placed in an area other than the open lake as determined by USACE in accordance with applicable laws, rules, regulations and policy. Together with existing CDF capacities and expected consolidation, a total of seven years (2014-2020) is used in the economic analysis. The basic problem at Cleveland Harbor is the lack of dredged material confinement capacity currently needed to continue the operation and economic viability of Cleveland as a commercial navigation port on the Great Lakes. This decision document recommends the alternative proposed by the Cleveland-Cuyahoga County Port Authority (the Port) for confining dredged sediment.

The District has worked very closely with the project's stakeholders, including but not limited to, the Port of Cleveland, City of Cleveland, and State and local regulatory agencies to identify cost-effective alternatives for dredged sediment management in lieu of building new confined disposal facilities (CDFs). Additional stakeholders include the Federal Aviation Administration, U.S. Environmental Protection Agency, Ohio Department of Natural Resources, Ohio Environmental Protection Agency, Ohio Department of Transportation, Cuyahoga County Planning Commission, and Department of Port Control at Burke Lakefront Airport.

Several measures were considered to develop a range of plans that were carried forward to detailed planning. The alternatives that were developed include some combination of CDF management, vertical expansion at existing CDFs, and beneficial use sites that had at least one year's worth of dredged material disposal capacity (i.e., 250,000 cy). The federal base plan and tentatively selected plan consisted of the vertical expansion of CDFs 9, 10B, and 12 to an elevation of +20 feet above low water datum (LWD) using mechanical placement. This plan was determined to be the least cost, environmentally acceptable, and technically feasible alternative.

The Port of Cleveland has advocated for a slightly different alternative for providing 1M cy of new capacity whereby the Port would incrementally implement vertical expansion of only CDF 12, with mechanical placement, to an elevation of +35 feet above LWD. The Port would recover much of its investment through a tipping fee to be paid by USACE for placement of dredged material into the CDF. All design, construction, and operational costs would be funded by the Port under terms of a future agreement that will be based on this decision document. The Port proposes to recoup costs by means of a fixed user fee of $11.50 per cubic yard ($15.10/cy including proposed unloading costs). Details of the Port's alternative were

first provided in January 2013, revised as of July 2013, and added later to this report as Alternative Plan 7 – Port's Plan – CDF 12 Vertical Expansion. The cost comparison of the Federal Base Plan to the Port's Plan for providing 1M cy of new capacity found the Port's Plan to be less costly.

The Port's plan would be executed through a Section 217 agreement, with the Port assuming all risks associated with costs and technical feasibility. The Port would assume those risks by fixing the tipping fee at a cost less than the estimated federal investment in the Base Plan for the first two years and capping it thereafter at the estimated federal investment in the Base Plan while agreeing to take all necessary actions to create the capacity to support dredging needs. Section 217 of WRDA 1996, as amended by Section 2005 of WRDA 2007 authorizes USACE to enter into an agreement with a non-Federal interest, a private entity or both for the acquisition, design, construction, management, or operation of a dredged material disposal facility using funds provided in whole or in part by the private entity. There is agreement in principle between both parties that such an arrangement is achievable.

It will not be necessary to evaluate the Port's plan at the same level of detail as the base plan due to the nature of the Section 217 proposal. A vertical team meeting was held on July 17, 2013, including the Port, USACE, Headquarters, Lakes and Rivers Division Office, and Buffalo District staff. At this meeting, it was acknowledged that integration of the Port's plan into the decision document would not be following typical USACE guidelines. Subsequently, revisions to the decision document incorporate technical and cost information provided by the Port, which were not prepared to the same level of detail as those of the federal alternatives.

Sediment quality within the Cleveland Harbor upper navigation channel is documented to have improved over time to a point where it has now been found by the USACE to meet federal guidelines for open lake placement. An evaluation completed in August 2013 found that approximately 80 percent of sediment dredged each year from the Cuyahoga River navigation channel meets federal guidelines for open lake placement. Assuming that environmental analyses find no significant unavoidable impacts associated with open lake placement, this plan could provide up to 20 years or more of disposal capacity. The potential for open lake placement will be considered under a separate USACE document in the near future.

1. Study Purpose

After spending years of planning and development of a 20-year Dredged Material Management Plan (DMMP) with stakeholders and the local sponsor, Buffalo District did not implement the selected plan to construct a new $300M confined disposal facility (CDF) due to a lack of non-Federal financial capability. Without a plan for disposal, the harbor faced a crisis because full dredging and hydraulic placement could not continue after 2014 without additional capacity. The Buffalo District took the lead in responding to this urgency and initiated an aggressive effort to engage stakeholders in searching for a solution. A dredging task force was assembled consisting of the City, the Port Authority, industry, state regulators, congressional representatives, and environmental groups; monthly meetings were held for nearly two years. During this time, support from the U.S. Army Corps of Engineers (USACE) Engineering Research and Development Center (ERDC) was enlisted to look in more detail at sediment quality and beneficial use opportunities for the short and long-term. The preferred approach was developing a short-term plan that would enable continued dredging while the necessary time was allowed to conduct a tiered evaluation of the suitability of sediments for open lake placement.

The Buffalo District proposed in 2011 to pursue an interim DMMP (IDMMP) because the option of waiting to prepare a 20-year plan until the open lake question was fully answered posed a significant risk that disposal capacity would not be available when needed in 2015. The four year timeframe (2015-2018) for providing new disposal capacity was chosen because Confined Disposal Facility (CDF) is almost depleted. By the year 2015, additional disposal capacity will need to be available or a new method of disposing or using the material will have to be in place in order to continue dredging Cleveland Harbor. It will also allow time to resolve what is a critical unknown concerning open-lake suitability. The tentatively selected plan (TSP) in the IDMMP involved expanding capacities within the footprints of the three existing CDFs through dewatering and geotextile improvements to account for the increased loading from stacking sediments higher.

The Port has expressed interest in taking over disposal operations under a Section 217 (tipping fee) agreement as an alternative to the TSP. The Port would like to begin negotiations to execute a Section 217 agreement with USACE to provide disposal services at a per cubic yard cost.

The purpose of this short-term decision document is to present the USACE, Buffalo District plan for maintenance dredging and disposal of dredged sediment from Cleveland Harbor, Ohio federal navigation project that must be placed in an area other than the open lake as determined by USACE in accordance with applicable laws, rules, regulations and policy. Inherent in the planning of this project is the requirement that this decision document provide a method of supplying one million cy of new dredged sediment disposal capacity. USACE is continually undergoing DMMP development and this decision document is an interim measure that will enable the agency to gain more time. This document is an actionable element that will likely become an integral component of the long-term solution that could include open-lake placement and may well provide 20 years of management. The Buffalo District has drafted a short-term

decision document and tentatively selected an alternative for gaining approximately one million cubic yards of new capacity. This decision document is a revision to the draft IDMMP dated March 2013 that was last submitted for HQUSACE review.

This Decision Document summarizes the results of a detailed multi-year investigation of various options and alternative plans for dredged material disposal and evaluates the engineering, economic, and environmental impacts of those alternatives. This report also summarizes the public coordination done to date on the planning of this document and accounts for the views of local interests (sponsors) who could be responsible for financially sharing construction costs of a new disposal area(s) or method(s) of disposal. It was agreed by USACE and the Port that the Port's plan will be incorporated in a revised decision document and the name of the new document will be “Cleveland Harbor Short-Term Decision Document”. This document could be the basis of a Section 217 agreement between the USACE and the non-Federal sponsor. Integration of the Port’s plan deviates from USACE guidelines. Subsequently, the decision document incorporates technical and cost information provided by the Port, which may not be prepared to the same level of detail as those of the federal alternatives. The District has identified technical and cost differences in the Port’s plan that would not be deemed policy compliant if formulated as a USACE alternative. These items will not require resolution since the Port will assume all technical and financial risk. It will not be necessary to evaluate the Port’s plan at the same level of detail as the base plan due to the nature of the Section 217 proposal.

Based on 2010 data of total tonnage handled, Cleveland Harbor is the 5th busiest port on the Great Lakes and 48th busiest port in the nation (USACE-IWR, 2010). Inherent in the operations and maintenance of any port is maintenance dredging and disposal of sediments. Sediments are dredged from within the Federal channel, as well as private areas by local port interests. Complicating the need for dredging and dredged material disposal at Cleveland is the fact that most, if not all sediments dredged, have historically had low levels of contaminants that were deemed unsuitable for open lake placement. Sediments must either be confined or otherwise handled in an environmentally acceptable manner.

Past and current practice for dredged sediment disposal in Cleveland has been to dispose of materials in stone dike enclosures called CDFs constructed along the Cleveland waterfront. A CDF refers to a site where dredged sediments are confined in an enclosed space to reduce the potential for release of contaminants into open water. CDFs can be upland or located adjacent to or as an island along the lakeshore. In practice, due to the relatively high costs for overland versus waterborne transportation, most CDFs are located along the lakeshore of the Great Lakes. Once filled, or in some instances nearly filled, the CDFs are transferred to the local sponsor for future disposition. In the interest of maximizing remaining CDF capacities, annual dredging quantities began to be limited in 2006. Maintenance of the federally-authorized channel since that time has been accomplished by dredging an average of less than 225,000 cy of sediment each year. Average annual non-Federal quantities are similarly kept below a target of 25,000 cy.

These volumes serve as the basis for interim projections of capacity needs but they do not address any backlog of sediments.

From 2006 to present, the capacity for hydraulic placement has been maximized using fill management plans (FMP) internal to the CDFs (e.g. perimeter grading and excavation within the original design footprint). Fill management ensured that hydraulic placement capacity will remain through 2014, based on a reduced annual dredging rate of 225,000 cy. By the year 2015, additional disposal capacity will need to be available or a new method of disposing or using the material will have to be in place in order to continue dredging Cleveland Harbor.

2. Existing Conditions

2.1. Project Name and Description

Cleveland Harbor, Cuyahoga County, Ohio, is located on the southern shore of Lake Erie at the mouth of the Cuyahoga River. The harbor is 191 miles southwest of Buffalo, NY and 110 miles east of Toledo, OH

The economy of Cleveland today has largely stabilized with a shift from heavy industry and manufacturing to financial services, insurance, and the healthcare industry. As of the 2010 census the city ranked 45th in the nation with a population of 396,815 while the Cleveland standard metropolitan statistical area (SMSA) ranks 28th in the nation with a population of over 2,077,240. Major redevelopment of portions of the waterfront and downtown has occurred in recent years.

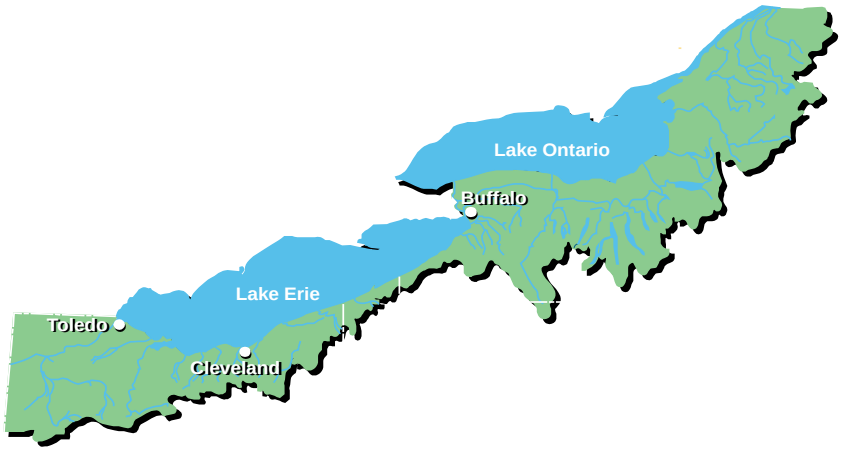


Figure 1 – Cleveland, Ohio Location Map

The Port of Cleveland is managed by the Cleveland-Cuyahoga County Port Authority which was established in 1968 by the City of Cleveland and Cuyahoga County. Port Authority facilities include nine berths and 6,500 linear feet of dock space. The port is a designated Foreign Trade Zone. Eight international cargo docks occupy 100 acres of land along Lake Erie and the Cuyahoga Bulk Terminal transshipment facility occupies 44 acres just west of the Cuyahoga River. Primary inbound cargo includes steel, heavy machinery, and bulk commodities such as limestone and grain. Outbound commodities include machinery and steel. Connecting transportation modes include three major interstates (71, 77, 90), and the Norfolk and Southern, and CSX railroads (Cleveland-Cuyahoga County Port Authority, 2006).

The majority of Cleveland harbors tonnages are bulk commodities such as iron ore, limestone, salt, sand, and gravel, and cement. Trade between U.S. ports accounts for 81 percent of all tonnages, with the remaining 19 percent being foreign (Europe and Canadian). Trade with European countries is mostly semi finished steel products. Canadian tonnages account for 86 percent of foreign traffic, and include movements of cement, limestone, sand, and gravel. U.S. domestic trade is dominated by receipts of iron ore from Great Lakes U.S. ports on Lake Superior. Salt is the major commodity shipped from Cleveland, with 81 percent destined for U.S. ports and 19 percent to Canadian ports.

2.2. Historical Dredging and Disposal at Cleveland

Cleveland Harbor is dredged every year, in the spring and fall. Sedimentation and shoaling within the federal channel is, and has historically been, the primary driver for the need to perform dredging. The Cuyahoga River is an event-driven sediment transport system and it can convey a large sediment load in response to storms. The enlarged prism of the federal channel creates a zone of sharply reduced flow velocity which acts as an efficient trap for those sediments. As sediments are deposited and shoals form, they tend to obstruct navigation in the channel, and require dredging to maintain authorized depths. In the interest of maximizing remaining CDF capacities, annual dredging quantities began to be limited in 2006. Maintenance of the federally-authorized channel since that time has been accomplished by dredging an average of less than 225,000 cy of sediment each year.

Historically, the USACE has employed a number of dredged material disposal methods for sediments dredged from the federal channels at Cleveland Harbor including unconfined open water placement and disposal into a CDF.

Since the late 1960's several CDFs have been constructed in-lake adjacent to shore at Cleveland Harbor (Figure 2):

- CDF 13 was operational from 1967 to 1968. The facility was constructed as a demonstration project. The City of Cleveland was the local sponsor.

- CDF 9 was operational from 1969-1974. The facility was constructed as a demonstration project; the approximate design capacity was 2.0 million cy. The City of Cleveland was the local sponsor. CDF 9 was transferred to the City of Cleveland.

- CDF 12 was operational from 1974 to 1979. The facility cost approximately $6.8 million; the approximate design capacity was 2.8 million cy. The Cleveland-Cuyahoga County Port Authority was the local sponsor. CDF 12 was transferred to the Port Authority in 1990.

- CDF 14 was operational from 1979 to 1998. The facility cost approximately $28.3 million; the approximate design capacity was 6.8 million cy. CDF 14 was transferred to the local sponsor, Cleveland-Cuyahoga County Port Authority in 2001. That same year, the City of Cleveland resolved to use the facility as a wildlife preserve, impeding the possibility of future filling.

- CDF 10B opened for operation in 1998 and continues to be used by the USACE. The facility cost approximately $21 million; the approximate design capacity was 2.9 million cubic yards. The City of Cleveland was the local sponsor. Use of 10B was continued by implementing fill management measures between 2006 and 2011.

Table 1 summarizes Federal and non-Federal disposal quantities at existing CDFs.

Table 1 - Annual Disposal Quantities

Year	Federal Disposal Quantities In Place (cy)	Non-Federal Disposal Quantities In Place (cy)
1998	335,885	24,738
1999	281,709	25,067
2000	225,633	107,441
2001	401,799	23,703
2002	182,026	11,779
2003	333,850	27,575
2004	219,097	32,257
2005	153,552	21,591
2006	154,000	9,712
2007	216,251	18,163
2008	224,111	28,358
2009	129,074	38,206
2010	183,197	20,383
2011	222,700	23,006
2012	250,000	23,635
2013	225,000	26,523
Total	**3,737,884**	**462,137**

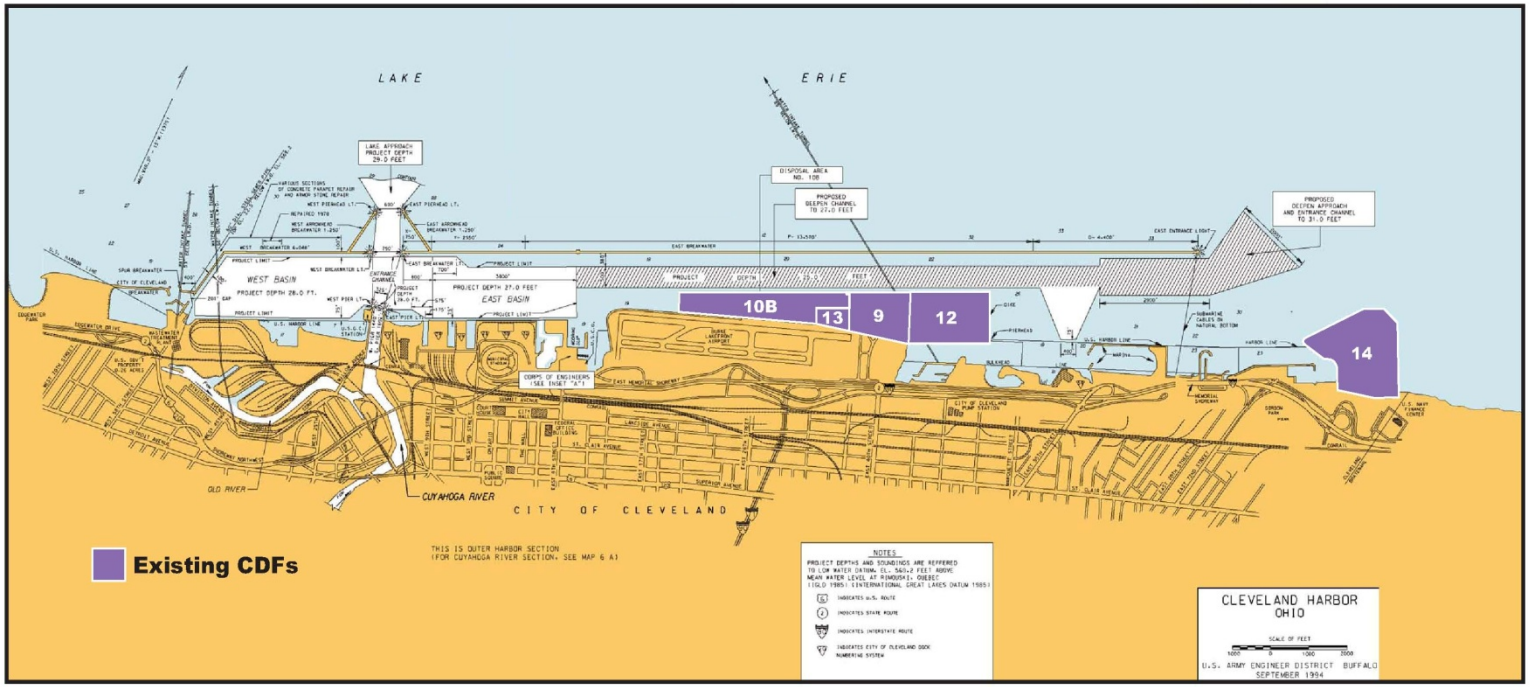


Figure 2 – Cleveland Harbor Confined Disposal Facilities

2.3. Authorization

Cleveland Harbor, Ohio, was initially authorized as a federal harbor by Congress in the River and Harbor Act of 1875. The 1875 authorization was modified in 1886, 1888, 1896, 1899, 1902, 1907, 1910, 1916, 1917, 1935, 1937, 1945, 1946, 1958, 1960, and 1962 River and Harbor Acts. Various modifications to the project were also authorized under the 1976 and 1986 Water Resource Development Acts (WRDA), the 1985 Supplemental Appropriations Act, and the 1988 Energy and Water Appropriations Act. In the event a Section 217 project is pursued, an agreement between USACE and the Port must address the project authority and the cost sharing responsibilities of the local sponsor pursuant to Section 101 of the WRDA of 1986.

Table 2 – Previously completed Project Reports

Report/Product	Document	Date
Diked Disposal Site No. 12	FEIS	1973-74
Operations and Maintenance	FEIS	April 1974
Diked Disposal Facility Site No. 14	FEIS	December 1975
Diked Disposal Facility Site No. 14	Statement of Findings	February 1976
Diked Disposal Facility Site No. 14	Supplemental Information Report	January 1980
Littoral Drift Nourishment at Bratenahl and Perkins Beach	EA/FONSI	February 1985
Modification to Dike 14 CDF	FEIS	September 1993
Modification to Dike 14 CDF	Record of Decision	December 1993
Confined Disposal Facility (Site 10B – 15-Year)	FEIS	March 1994
Confined Disposal Facility (Site 10B – 15-Year)	Record of Decision	August 1994
Operations and Maintenance Dredging and Discharge into Dike 10B	Section 401 Water Quality Certification	March 2003
Draft Dredge Material Management Plan and Environmental Impact Statement	DMMP/EIS	August 2009 (sponsor support withdrawn)
Draft Interim Dredged Material Management Plan and Environmental Assessment	IDMMP/EA	March 2013 (subject of this document revision)

2.4. Harbor Features

The harbor consists of a lakefront, breakwater-protected Outer Harbor and an Inner Harbor. The Inner Harbor includes the lower deep draft section of the Cuyahoga River, and the connecting Old River.

The Outer Harbor is a breakwater-protected area of about 1,300 acres. The Outer Harbor, five miles long and 1,600 to 2,400 feet wide, is protected by an east breakwater (20,970 feet long) and a shore connected west breakwater (6,048 feet long). There is a 201-foot gap in the west breakwater located about 662 feet from the shore end. The main entrance channel is formed by the east and west arrowhead breakwaters, both of which are 1,250 feet long. The arrowhead breakwaters are 600 feet apart.

There are two entrances to the Outer Harbor. The main entrance (Lake Approach Entrance Channel) is located between the east and west breakwater. The other entrance is at the east end of the east basin, between the east breakwater and the shore. Authorized channel depths in these entrance areas are 29 feet below Low Water Datum (LWD). LWD for Lake Erie is 569.2 feet above mean sea level as measured at Rimouski, Province of Quebec, Canada, and International Great Lakes Datum (IGLD) 1985. Authorized channel depths in the Outer Harbor are 28 feet below LWD in the west basin and 25 to 28 feet in the east basin.

The Inner Harbor includes the lower 5.8 miles of the Cuyahoga River and approximately one mile of the Old River. The Cuyahoga River is in line with the main entrance to the Outer Harbor from the lake. The Entrance Channel is protected by two parallel piers, 325 feet apart. The width of the Cuyahoga River varies from 130 to 325 feet. A turning basin is located approximately 4.8 miles upstream from the mouth of the Cuyahoga River. The Old River extends westward from a confluence point about 0.4 miles above the mouth of the Cuyahoga River. The Old River varies in width from 200 to 400 feet.

The project provides an authorized navigation channel depth of 27 feet in the lowermost part of the Cuyahoga River, from the lakeward end of the piers to a point immediately above the junction with the Old River. Authorized channel depths in the remaining portions of the Cuyahoga River are 23 feet. The Old River navigation channel is maintained to between 21 and 23 feet.

The Buffalo District maintains the breakwater and pier system in Cleveland Harbor including East and West Arrowheads, East Breakwater, West Breakwater, East Pierhead, West Pierhead, West Pier, and Buffalo District Ohio Area Office Finger Pier. These structures protect the harbor shoreline and its docks and businesses along the Cleveland lakefront and aids in navigation. Major local facilities protected include Burke Lakefront (BKL) Airport, Rock and Roll Hall of Fame, Voinovich Park, Cleveland Port, Cleveland Science Center, and Cleveland Browns Stadium. The breakwaters also protect existing CDFs 9, 10B, 12, and 13 from wave damages.

2.5. Economic Analysis

The purpose of the Cleveland Harbor IDMMP was to develop a range of alternatives that will allow dredging to continue through 2020, and to identify the least costly, environmentally acceptable plan. Focusing on this time frame allows near term dredging needs per year to be developed, identification of existing disposal capacity at existing CDFs, and determination of additional disposal needs to allow dredging to continue through 2020.

One of the criteria for selecting an alternative is a benefit to cost analysis. Benefits associated with any of the alternatives are defined as commercial navigation transportation cost increases avoided. These benefits are the difference in commercial navigation transportation costs under the Without Project Condition (WOP) and the With Project (WP) condition. The methodology used to generate benefits associated with these plans was to convert the transportation cost time streams under WOP and WP conditions to a present worth value over a seven year project evaluation period (2014-2020). These present worth values were then converted to average annual values using the fiscal year (FY) 14 discount rate of 3.5 percent, a seven year evaluation period, and a September 2013 price level. Table 3 provides a summary of the average annual values of the transportation cost time streams under WOP and WP conditions for the 13 commodities evaluated. Two shoaling rate scenarios were evaluated. The difference between WOP and WP condition average annual transportation costs are the benefits associated with the harbor. The harbors average annual benefits were placed at $10.71 million, the average of benefits associated with the two shoaling scenarios.

This average annual value of benefits can be directly compared to an average annual value associated with implementing various alternatives. This will allow benefit to cost ratios to be developed, as well as net benefits, which will help to identify the base plan. An Economics Analysis of the measures and plans carried to detailed planning are explained in more detail in Appendix C.

A detailed economic analysis on the Port's Plan will not be completed as was done with the federal alternatives that were carried to detailed planning in Appendix C. It has not been possible to complete an equitable comparison with the base plan because of technical and cost differences. It was agreed that the Port's willingness to accept technical and cost risks, would allow a comparison of the estimated federal investment in the base plan to a fixed tipping fee proposed by the Port. The Port will fix its tipping fee for two years as a sign of its confidence in the technical and cost components. The cost estimate for the Port's plan has not been prepared using Micro-Computer Aided Cost Estimating System (MCACES) or risk-based methodologies. However, a unit cost (i.e. $/cy) comparison between the Port's fixed tipping fee and the estimated federal cost of the base plan is intended to assess the lowest cost alternative available to the federal government.

Table 3 – Average Annual Harbor Benefits

		Harbor Benefits- .2, 1.0, 2.0 feet of Shoaling			Harbor Benefits- .4,2.0, 4.0 feet of Shoaling		
	Shoaling/Yr-OH,OR&Cuy,Upper Cuy: .2,1.0, 2.0 Ft.				Shoaling/Yr-OH,OR&Cuy,Upper Cuy: .4,2.0, 4.0 Ft.		
Commodity	2010 Tons	Average Annual Transportation Costs Without Project Condition	Average Annual Transportation Costs With Project Condition	Average Annual Benefits	Average Annual Transportation Costs Without Project Condition	Average Annual Transportation Costs With Project Condition	Average Annual Benefits
Salt	924,071	$ 9,625,400	$ 9,010,700	$ 614,700	$ 9,972,700	$ 9,010,700	$ 962,000
Slag	49,612	$ 610,000	$ 562,300	$ 47,700	$ 650,100	$ 562,300	$ 87,800
Iron Ore	5,458,397	$ 67,834,900	$ 63,111,900	$ 4,723,000	$ 68,905,000	$ 63,111,900	$ 5,793,100
Limestone	2,818,058	$ 23,558,500	$ 21,377,900	$ 2,180,600	$ 24,800,300	$ 21,377,900	$ 3,422,400
Sand	155,120	$ 1,928,900	$ 1,896,600	$ 32,300	$ 1,979,600	$ 1,896,600	$ 83,000
Gravel	150,284	$ 2,626,000	$ 2,387,800	$ 238,200	$ 2,799,500	$ 2,387,800	$ 411,700
Cement	587,470	$ 9,458,700	$ 8,488,900	$ 969,800	$ 10,185,200	$ 8,488,900	$ 1,696,300
Coke	51,262	$ 766,600	$ 765,900	$ 700	$ 767,200	$ 765,900	$ 1,300
Clays	7,099	$ 161,300	$ 161,300	$ -	$ 161,300	$ 161,300	$ -
Slar	15,379	$ 268,500	$ 209,100	$ 59,400	$ 312,000	$ 209,100	$ 102,900
	10,216,752	116,838,800	107,972,400	8,866,400	120,532,900	107,972,400	12,560,500
	Average Of Average Annual Benefits			$ 10,713,500			

3. Planning Process

3.1. Problems and Opportunities

A number of water resource problems and opportunities have been defined as part of this decision document. These problems and opportunities include the following:

3.1.1. Problems:

- Heavy annual shoaling in the Cuyahoga River Federal Channels is a continual problem from the perspective of dredging and disposal needs. Heavy sedimentation is expected to continue in the future as no significant sediment reduction on the river is foreseen.
- Existing CDFs have limited capacity to accept dredged sediment. CDFs 9, 10B, and 12 have capacity to confine dredged sediment through 2014 by current hydraulic placement methods.
- By the year 2015, new disposal capacity or method will have to be in place in order to continue dredging Cleveland Harbor.
- At this time, no formally approved decision document exists that would allow for any work related to dredged material management at Cleveland Harbor beyond the current operations and maintenance practices to continue beyond 2014. To implement short term measures from 2015 through 2020 would require detailed formulation and design of alternatives, a decision document, and at a minimum an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI).

3.1.2. Opportunities:

- The potential use of significant amounts of dredged material from Cleveland Harbor for productive purposes, defined as beneficial use of dredged material, rather than disposal in CDFs.
- USACE and others have for many years promoted and supported the use of dredged sediment for beneficial purposes. Beneficial use incorporated into the USACE Civil Works dredging programs and legislative authorities, as well as funding program, encourage beneficial use opportunities, including habitat restoration projects. Beneficial use alternatives for Cleveland Harbor are plans that incorporate landfill cover for final closure of a site or redevelopment of a site.
- Changing to mechanical placement of sediment at the CDFs to allow additional volume to be gained through vertical expansion, or mounding within existing footprints.
- An opportunity exists for implementation of the Port's plan as the best value to the federal government at a potentially reduced cost.
- Implementation of a potentially innovative approach to partnering via a Section 217 agreement.
- Open-lake placement due to improved sediment quality.

During the development of the initial IDMMP, numerous opportunities for beneficial use were identified. A significant effort was conducted by the USACE, Buffalo District and ERDC in 2010/2011 to assess beneficial use opportunities at Cleveland Harbor, including extensive sediment characterization and comparisons of alternatives. The USACE, ERDC report along with collaboration and many meetings with the Cleveland Harbor Task Force, Federal, State and local officials, and many other stakeholders, was instrumental in determining alternatives for the interim period of 2014 through 2020.

3.2. Objectives, Constraints and Assumptions

Planning objectives are statements that describe the desired results of the planning process by solving the problems and taking advantage of the opportunities identified. The planning objectives must be directly related to the problems and opportunities identified for the study and are used for the formulation and evaluation of plans. All study objectives are framed in terms of the federal objective and specific study planning objectives.

Constraints are restrictions that limit the planning process, which should not be violated and are unique to each study. Planning constraints are actions that should be avoided or situations that cannot be changed. This decision document will consider resource, legal, and policy constraints. Resource constraints are associated with limits on knowledge, expertise, experience, ability, data, information, money, and time. Legal and policy constraints are those defined by law, and USACE policy and guidance. Alternative plans are formulated to meet study objectives and avoid violating constraints.

Planning assumptions are presumed known and true in the absence of absolute certainty. Assumptions are factors that the team believes to be true, although these factors are not confirmed to be true. Assumptions are used to establish the project environment and also to provide a basis for planning and estimating.

3.2.1. Objectives:

- Maintain authorized navigation channels in the Outer Harbor, Cuyahoga River, and Old River at Cleveland Harbor for the period 2014 through 2020.
- Manage Cleveland Harbor dredged sediment in a cost-effective, technically feasible, environmentally acceptable, and if possible, beneficial manner.

3.2.2. Constraints:

- A suitability evaluation was completed in August 2013 which found that approximately 80 percent of sediment dredged each year from the Cuyahoga River meets federal guidelines for open lake placement, including compliance with applicable, numeric state water quality standards. However, obtaining the necessary 401 water quality certification and other coordination with State regulatory agencies to allow open lake placement could be a challenge.
- Planning actions and capital development projects will be subject to financial constraints and availability of funds, both federal and non-Federal.
- CDFs are attractive to wildlife and this can be a hazard at the Burke Lakefront Airport (BKL). Ideally, the complete elimination of standing water in the CDFs, should be the ultimate habitat management goal in the CDFs.
- Real estate rights to CDF 12, which has since been transferred to the local sponsor, may be required. However, if the Recommended Plan (Port's plan) is selected, this will no longer be a constraint since the Port has the Real Estate rights to CDF 12.
- A non-Federal cost share partner will be necessary for implementation of any plan brought forward.

3.2.3. Assumptions:

- Cleveland Harbor as a viable commercial navigation project – Cleveland Harbor is a major commercial port on Lake Erie requiring a significant annual expenditure of federal funds for dredging and disposal operations. Without a plan in place to manage dredged sediment, USACE would no longer dredge Cleveland Harbor and the Cuyahoga River channels. Eventually, commercial navigation channels would shoal in, particularly in the Cuyahoga River, and commercial navigation interests would incur major increases in waterborne transportation costs including cost of raw materials. In addition, maintenance of the extensive federal breakwater and pier structures at Cleveland would cease. Ultimately, Cleveland Harbor would no longer be a viable commercial navigation project or viable commercial harbor.
- Non-Federal disposal of dredged sediment – Historically non-Federal interests (local marinas, dock owners, Cleveland Cuyahoga County Port Authority, etc.) have dredged areas

in Cleveland Harbor and utilized capacity in the existing CDFs. This disposal has averaged around 25,000 cy per year. The assumption is that the non-Federal need to dredge and dispose sediment will continue in the future at about the same rate.

- ArcelorMittal steel plant remains in Cleveland - Since the early 1900s, significant steel making operations have taken place along the Cuyahoga River. Today, ArcelorMittal steel is operating a modern, profitable facility on the Cuyahoga River located at the upper most reach of the federal navigation channel. It is assumed that steel making operations will continue on the Cuyahoga River during this period of analysis and beyond. The steel plant would be serviced by water and overland transportation networks to receive raw material and bulk commodity inputs.
- Burke Lakefront Airport remains in operation - BKL Airport has been in operation for many years on the Cleveland waterfront. No current plans call for closing or otherwise modifying the operations of BKL as a secondary airport for Cleveland. Therefore, it is assumed that BKL will remain in operation for this period of analysis.
- Recent sediment sampling analysis indicates approximately 80 percent of sediment dredged from the upper reach of the Cuyahoga River channel meets federal guidelines for open lake placement. Any agreements related to a potential Section 217 project would identify that USACE may never utilize the full placement capacity at a non-Federal facility.
- Components of the Port's plan are developed at a different level of technical and cost detail as the federal alternatives. Therefore, USACE cannot complete an equitable comparison with the base plan.
- Detailed technical and cost analyses of the Port's plan will not be accomplished.
- The Port's plan will not be subject to a detailed planning analysis.
- The Port will assume all technical and cost risks associated with its plan.
- A Section 217 Agreement will state that the Port assumes all risks and responsibilities associated with the rates at which dredged sediment will be accepted into the Port-managed disposal facility, and that the Port will be responsible for any and all costs associated with delays to USACE dredging contractor(s) due to operation of the facility.
- The Port will continue to embrace an adaptive management approach to its plan, rather than design to the same level of technical completeness as USACE alternatives.
- The framework for negotiation of the tipping fee will not be based on a detailed cost analysis of the Port's Plan or comparison with the Base Plan, but rather a fixed tipping fee proposed by the Port and not to exceed the federal investment in the base plan.
- The Port will receive no credit for Lands, Easements, Rights of Way, Relocations, and Disposal (LERRD);
- The Port's proposal to fix the tipping fee will be accepted;
- Use of the federal discount rate (currently 3.5 percent) as a reasonable rate of return on Port investment. After two years, the tipping fee will be renegotiated based on actual costs incurred by the Port. Lower actual costs would benefit the government, as it would result in a lower tipping fee reached during renegotiation. Incentivizing cost-savings would ultimately result in savings to the Federal government; and

- The Port's classification of construction, and operations and maintenance components in their plan will be accepted.

3.3. Previous Reports and Studies

The August 2009 Draft DMMP and Environmental Impact Statement for Cleveland Harbor tentatively selected construction of a new waterfront CDF. Ultimately, the facility could not be constructed for financial reasons. Contained within the 2009 DMMP/EIS was also a review of potential beneficial uses of dredged material that included mine land reclamation, littoral nourishment, soil manufacture, wetlands/habitat creation, and landfill cover. However, none of these alternatives were considered feasible at that time nor carried forward for detailed analysis due to a lack of information and inability to refine the management concepts.

In 2011, the USACE, ERDC issued a report titled *Evaluation of Beneficial Use Suitability for Cleveland Harbor Dredged Material: Interim Capacity Management and Long-Term Planning*. This report provided a review of the logistical and technical feasibility of beneficial use alternatives, including an analysis of the engineering and ecological suitability, environmental and regulatory acceptability, site specific logistical considerations, and preliminary cost estimates for implementing each of the beneficial use management options deemed feasible.

A Value Engineering Study on the Cleveland Harbor Interim Dredged Material Management Plan (IDMMP), Cleveland, Ohio, was completed in October 2012. Four (4) proposals were recommended to be accepted. The first three proposals corresponded to short-term alternatives recommended by ERDC in the 2011 beneficial use study report, and these were the focus of analyses in the IDMMP (i.e., vertical expansion of CDFs, investigation of beneficial use sites). The fourth proposal corresponded to an initiative which is more of a long-term alternative, but was recommended for consideration due to potential future viability (pursue potential open-lake placement).

3.4. Partners and Stakeholders

The USACE, Buffalo District has worked very closely with the project's stakeholders, including but not limited to, the Cleveland-Cuyahoga County Port Authority, City of Cleveland, and State regulatory agencies to identify sustainable alternatives for dredged material management in lieu of building new CDFs. During 2010, numerous beneficial use alternatives were brought to the attention of the Cleveland Harbor Dredging Task Force and screened by the USACE, Buffalo District. The previous Interim DMMP/EA made use of that initial screening and the subsequent detailed analysis by ERDC that included recommendations.

3.5. Partner Requirements and Letter of Intent

The non-Federal partner's expectation is to have the USACE, Buffalo District continue to dredge the Cleveland Harbor and Cuyahoga River Channels which will require management of dredged sediment in an environmentally acceptable manner. Dredging in Cleveland Harbor is typically performed twice per year due to the significant shoaling that occurs within the channels. In order

for USACE to continue with further design and evaluation of the selected alternative, a signed Letter of Intent (LOI) from a non-Federal entity was required. The Cleveland Cuyahoga County Port Authority provided a LOI dated August 14, 2012 stating that the LOI was limited to the IDMMP and the Port Authority's goal continues to assume responsibility for dredged material management under the Section 217 authority of WRDA 96. The local sponsor is aware of their financial responsibility to share the cost for vertical expansion associated with the recommended plan. All obligations will be incorporated in a Section 217 Agreement between the Buffalo District and the non-Federal sponsor.

Under standard agreements, the costs for the construction of dredged material disposal areas for existing projects are shared in accordance with navigation operation and maintenance cost sharing provisions applicable to the authorized navigation project. All costs associated with dredging, transportation, and placement of sediment are 100 percent Federal. In accordance with section 101(a) of WRDA 86 (33 U.S.C. 2211), the non-Federal sponsor must pay, during construction, 25 percent of the cost of construction of general navigation features, provide the lands, easements, rights-of-way and relocations (LERR) necessary for construction, and pay an additional 10 percent of the cost of the general navigation feature over a period not to exceed 30 years. The value of LERR is credited against this additional 10 percent payment. However, LERR credit may not be given for CDF 12 because it was provided as credit to the Port for initial construction of the CDF in 1973. Costs presented in this decision document are for plan evaluation purposes. They will be subject to escalation and will be outlined in a project partnership agreement if USACE and a non-Federal sponsor were to proceed with construction of the improvements identified in the base plan.

The Port has advocated for an alternative approach, whereby the Port would construct and operate modifications to the existing CDF 12 for management of dredged material which would provide 1 million cy of new capacity. The Port would recover much of its investment through a tipping fee to be paid by USACE. The Buffalo District has reviewed the Port's proposed work items categorization as construction or operations and maintenance, and associated cost estimates, and considers it a reasonable basis for a fixed tipping fee.

The Port's plan would be executed through a Section 217 agreement, with the Port assuming all risks associated with costs and technical feasibility. Section 217 of WRDA 1996, as amended by WRDA 2007 authorizes USACE to enter into an agreement with a non-Federal interest, a private entity or both for the acquisition, design, construction, management, or operation of a dredged material disposal facility using funds provided in whole or in part by the private entity. There is agreement in principle between both parties that such an arrangement is achievable.

3.6. Six Step Planning Process

The analysis completed to select the base plan in the Interim DMMP/EA was consistent with guidance provided in USACE Engineer Regulation (ER) 1105-2-100, the Planning Guidance Notebook (USACE, 2000). In brief, the guidance requires a six step planning process as outlined below:

Step 1 – Identifying problems and opportunities
Step 2 – Inventorying and forecasting conditions
Step 3 – Formulating alternative plans
Step 4 – Evaluating alternative plans
Step 5 – Comparing alternative plans
Step 6 – Selecting a plan

The planning process is iterative as a study progresses. This study has progressed to the stage where a recommended plan has been identified. The remainder of this chapter will focus on explaining the planning process used to document the decision process leading to the recommended plan. Implementation of the currently identified recommended plan is subject to reviews by local, State, and Federal agencies, and the public. In addition, the decision process will involve several levels of reviews and approvals through the USACE.

The first step in the plan formulation process is to identify management measures that could be implemented to meet some or all of the study objectives. Management measures can be structural and non-structural, and combined in various fashions to formulate alternative plans. The management measures developed for this study are briefly described below. Based on the objectives, constraints, and practicable management measures defined for this study, alternative plans have been developed and are described in later paragraphs.

4. Management Measures

Eight management measures were developed, including the No Action alternative, which were evaluated for inclusion in detailed planning. Table 4 lists the management measures that the team identified.

Table 4 - Initial Measures Identified

MEASURES
Measure 1 – No Action
Measure 2 – Brook Park Landfill
Measure 3 – Silver Oak Landfill
Measure 4 – Existing CDF Management
Measure 5 – Adding Capacity at Existing CDFs
Measure 6 – CVIC Site
Measure 7 – Cleveland Lakefront Nature Preserve
Measure 8 – ODOT Transportation Projects

4.1. Measure 1: No Action

Under this alternative, the Federal Government would do nothing to address the need for interim placement of dredged material. Remaining hydraulic capacity in the CDFs would be effectively depleted by 2015 causing a decrease in the amount of material that would be dredged from the navigation channel. With a decrease in dredging or without any dredging, the navigation channel

would shoal in and impede commercial navigation. Reduced channel depths would result in light loading commercial navigation vessels. Consistent with USACE guidance ER 1105-2-100, ER 200-2-2 (Procedures for Implementing NEPA) and 40 CFR 1500-1508 (Regulations for Implementing the Procedural Provisions of the NEPA of 1969), this measure will be carried forward into detailed planning and fully evaluated in the array of final plans.

4.2. Measure 2: Brook Park Landfill

Brook Park is a 28-acre landfill located south of Hopkins Airport that is owned by the City of Cleveland. The City is currently developing plans for capping and filling the former landfill in order to accommodate industrial development of the site, including potential use as a solar collection farm. The site is easily accessible for truck transportation and has a capacity for accepting 350,000 to 500,000 cy of dredged sediment depending on the final site development plans. Development of the site will require geotechnical survey and engineering analysis of site stability, storm water control, and protection of the adjacent Abrams Creek. The City is in the process of completing environmental and geotechnical assessments to confirm the feasibility of developing the site. The site is anticipated to be ready to receive dredged sediment as early as 2014.

4.3. Measure 3: Silver Oak Landfill

Silver Oak is a 27-acre inactive construction and demolition landfill located on a 49-acre site at 26101 Solon Rd, Oakwood Village, Ohio. Negotiations for closure of the landfill under Ohio Environmental Protection Agency (OEPA) rules are currently underway between representatives of the landfill owner and the Cuyahoga County Board of Health. Closure of the landfill will require contouring the landfill and construction of a compacted cap requiring a minimum of 100,000 cy of fill or dredged sediment. Due to the current configuration of the landfill, construction of the final cap and vegetative cover may require a modification to the original landfill design and permit. The site is located adjacent to the Cleveland MetroPark Bedford Reserve which is adjacent to Tinkers Creek. This is a high quality recreation area that includes picnic areas, hiking trails, and horseback riding trails. Upstream of the landfill, Tinkers Creek drops 220 feet over a two mile reach where a steep, walled gorge is the dominant landform surrounding the creek. The gorge, declared a National Natural Landmark, is a unique area with numerous tree, shrub, and floral species. Additional dredged sediment could be used for contouring and landscaping the site for use as an upland nature preserve, creating the opportunity to use an additional 200,000 cy of dredged sediment.

4.4. Measure 4: Existing CDF Management

The amount of remaining sediment storage space was estimated for CDFs 10B and 9. These two CDFs are currently hydraulically connected. USACE would have to obtain the right to use CDF 9 after 2015. The evaluation of remaining sediment storage space revealed that the two CDFs, working as a unit, could provide approximately 500,000 cubic yards of storage starting in 2014. This would essentially accommodate two years of dredging, based upon the assumption that each year's dredging quantity would be 250,000 cy (225,000 cy federal, 25,000 cy non federal).

4.5. Measure 5: Adding Capacity at Existing CDFs

USACE developed a series of evaluations that allow mounding dredged sediment in CDFs 10B, 9, and 12. The dredged sediment would be mechanically placed in the CDFs and graded to meet structural and slope stability requirements. Due to the proximity to Burke Lakefront Airport, the project must comply with Federal Aviation Administration requirements. The height and slope of the mounded sediment would be determined during further alternative development based largely on results of geotechnical analysis of the CDFs. Locations and methods of mechanical offloading of dredged sediment would also be analyzed.

4.6. Measure 6: CVIC Site

The Cuyahoga Valley Industrial Center (CVIC) is a 58-acre brownfield development located at 3183 Independence Road controlled by a public-private partnership dedicated to attracting development to the city. The need for significant quantities of construction fill to bring the site to finished grade makes it an attractive prospect for the beneficial use of dredged sediment. This site previously obtained OEPA approval for receipt of dredged sediment in 2010. The estimated remaining capacity at the site is 300,000 cy.

The buildable site is currently for sale and there is no assurance that the presently available capacity can be retained. However, in the event capacity at the site is preserved, a project could consist of two options: 1) removal of sediment from the adjacent upper Cuyahoga River during dredging operations with direct truck transport to the nearby site, or 2) excavation of sediment from the existing CDFs with truck transport to the site.

4.7. Measure 7: Cleveland Lakefront Nature Preserve

The Cleveland Lakefront Nature Preserve is an 88-acre CDF, formerly CDF 14, on Cleveland's east side along Lake Erie. Approximately 6 million cy of sediment from Cleveland Harbor was placed into CDF 14 from 1979 to 1999. In 1999, the site was transferred to the non-Federal sponsor, Cleveland-Cuyahoga County Port Authority, and is currently managed as a nature preserve. In 2007, a study conducted by OEPA indicated that the site can be used safely as a nature preserve and recreation site for hiking and bird watching. OEPA has indicated that a five acre section of the facility contains pollutants with measured levels above residential land use standards established by OEPA. The contaminants of concern include polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and lead. The remediation plan placed a 4-foot cap of soil or dredged sediment on top of the area that has elevated concentrations of contaminants. Approximately 404,000 cy of material was needed to cover the five acre area and reduce potential future exposure to people and wildlife.

In the evaluation process, the Port Authority did convey that they were interested in not only providing coverage for the five acre section at the nature preserve, but also creating a world-class habitat area. This measure would entail placing material to overcome invasive species which dominate the site, and to provide material to create a terrain-rich suite of carefully designed and restored habitat areas.

4.8. Measure 8: ODOT Transportation Projects

The Ohio Department of Transportation (ODOT) is planning roadway construction projects in the Cleveland area. It is anticipated that these projects could require significant quantities of top soil/fill if the projects proceed to construction. ODOT is in the process of reviewing the schedules for the projects and the State of Ohio is evaluating funding priorities.

5. Measures Carried Into Detailed Planning

The measures carried into detailed planning need to be implementable in the years 2014 through 2020 (with the exception of Plan 1 – No Action). These measures included: development of beneficial use sites, CDF management, and vertical expansion at existing CDFs, and other projects.

Measures 1 through 6 were carried into detailed planning. Measures 7 and 8 were not carried into detailed planning since they were not implementable in the near future. The Buffalo District received a letter from former Mayor Jane Campbell, dated February 6, 2004, stating that "considering CDF 14 for an interim or long-term disposal facility does not comport with the vision for Dike 14 expressed by the community and articulated in the City's Lakefront Plan". The Dike 14 Nature Preserve committee has also expressed opposition. This measure could be investigated in more detail for the long-term management plan.

Measure 8 (ODOT Transportation Projects) was eliminated from further evaluation because the USACE, Buffalo District confirmed that ODOT was in the process of reviewing and changing the schedule for these projects and the State of Ohio is evaluating its funding priorities. It is very unlikely that these projects will be built in the near term.

Table 5 below shows the measures that were carried forth into detailed planning, along with the two plans that were not carried forth.

Table 5 – Initial Measures Identified As Potential Components of Plans

MEASURES	IMPLEMENTABLE	IN DETAILED PLANNING
Measure 1 – No Action	Yes	Yes
Measure 2 – Brook Park Landfill	Yes	Yes
Measure 3 – Silver Oak Landfill	Yes	Yes
Measure 4 – Existing CDF Management	Yes	Yes
Measure 5 – Adding Capacity at Existing CDFs	Yes	Yes
Measure 6 – CVIC Site	Yes	Yes
Measure 7 – Cleveland Lakefront Nature Preserve	No	No
Measure 8 – ODOT Transportation Projects	No	No

The concept of mechanical placement and vertical expansion at CDFs 10B, 9, and 12 was developed in more detail. A brief summary of the vertical expansion evaluations performed for CDFs 10B, 9, and 12 follows.

5.1. Vertical Expansion Evaluation CDF 10B

The concept of vertically expanding CDF 10B was evaluated for a range of potential final elevations above low water datum (LWD). The elevation at which CDF 10B reaches its current design capacity elevation is approximately + 12 feet LWD. This includes two feet of freeboard below the existing perimeter berms at +14 feet LWD elevation. The storage space currently remaining in CDF 10B, before it reaches its design elevation, would be used to accommodate dredging in 2014. The amount of new storage space that would be available at CDF 10B was determined for a range of final CDF elevations. Four elevations were evaluated: +20, +24, +28, and +44 feet LWD. These target elevations all yielded different storage capacities. The final storage capacities took into consideration restrictions on CDF 10B's fill heights in order to meet FAA aircraft safety requirements associated with using the runways at Burke Lakefront Airport. The FAA has restrictions on the ground elevation within a specific buffer distance from the runway center. The available resulting storage capacities at CDF 10B for final fill elevations for +20, +24, +28, and + 44 feet are: 506,000, 594,000, 653,000, and 925,000 cy respectively.

In order to support these design elevations, a slope stability analysis was performed to assess the effect of the stacked fill on the stability of the existing CDF rubble mound containment dikes (global stability). Slope stability modeling indicated that these fill heights require improvements in order to maintain a minimum factor of safety. In order to reach these fill heights, geotextile reinforcement would be needed, and in higher cases in combination with foundation wick drains. As design heights increased, the number of layers needed and the linear extent of the fabric, increased. Installation of multiple layers of geotextile fabric would necessitate a minimum of two feet of sediment cover over an existing geotextile layer, before a second geotextile layer could be installed. This minimal two feet of cover would provide enough compaction to the sediment to allow construction equipment to pass over the first layer of geotextile fabric and not compromise its integrity.

5.2. Vertical Expansion Evaluation CDF 9

An evaluation similar to that performed for 10B was performed for CDF 9. The elevation at which CDF 9 reaches its current design capacity elevation is approximately + 13.5 feet LWD. This includes two feet of freeboard below the existing perimeter berms at +15.5 feet LWD elevations. The storage space currently remaining in CDF 9, before it reaches its design elevation, would be used to accommodate some of the dredging needs in 2014. The amount of new storage space that would be available at CDF 9 was determined for a range of final CDF elevations. Two elevations were evaluated: +20 and +24 feet LWD. Slope stability modeling indicated that these fill heights require improvements in order to maintain a minimum factor of safety. A minimum of two feet of cover over any geotextile layer would be needed before

another layer of geotextile reinforcement could be placed. This would insure the structural integrity of the lower geotextile fabric layer.

5.3. Vertical Expansion Evaluation CDF 12

An evaluation similar to that performed for 10B was performed for CDF 12. The elevation at which CDF 12 reaches its current design capacity elevation is approximately +16.5 feet LWD. This includes two feet of freeboard below the existing perimeter berms at +18.5 feet LWD. The amount of new storage space that would be available at CDF 12 was determined for one elevation: +20 feet LWD. Slope stability modeling indicated that this fill height requires improvements in order to maintain a minimum factor of safety. A minimum of two feet of cover over any geotextile layer would be needed before another layer of geotextile reinforcement could be placed. This would insure the structural integrity of the lower geotextile fabric layer. In order to reach any of the target design elevations at CDF 12, wick drains would have to be installed in the southeast corner. The southeast corner of the CDF would require a 150 by 300 foot long wick drain field located outside the CDF berms. These wick drains would be needed to insure both local (internal) and global stability of the existing CDF rubble mound dike. These wick drains would reduce excess pore water pressures that have built up in the fine-grained dredged fill and pre-existing lake bottom sediments. These excess pore water pressures have weakened the foundation shear strength which is the cause of stability problems.

6. Alternative Plans

During the original evaluation process, six alternative plans were developed, including the No Action alternative. The six alternative plans were evaluated with respect to completeness, effectiveness, efficiency, and acceptability as discussed in Principals and Guidelines. Five plans outlined how dredging needs at Cleveland Harbor would be accomplished from the period 2014 through 2020, the evaluation period. For project evaluation purposes, it is assumed that 250,000 cy of sediment will be dredged and require disposal, each year from 2014 through 2020. Federal annual dredging quantities are estimated at 225,000 cy and non-Federal annual dredging quantities are placed at 25,000 cy. Sediment storage space for dredging from 2014 through 2020 would be provided by the usage of remaining storage space at existing CDF's, providing 1m cubic yards of new storage space and gains from sediment consolidation that is projected to occur at all of these sites.

The Port advocated for a seventh alternative, whereby they would design and construct modifications to the existing CDF 12 in Cleveland Harbor for management of dredged material. This alternative was added later to this report and is called Alternative Plan 7 – Port's Plan – CDF 12 Vertical Expansion. The Port would recover much of its investment through a tipping fee to be paid by USACE and other users. The Port's plan may be pursued through a Section 217 agreement, with the Port assuming risks associated with costs and technical feasibility. Section 217 of WRDA 1996, as amended by Section 2005 of WRDA 2007 authorizes USACE to enter into an agreement with a non-Federal interest, a private entity or both for the acquisition, design,

construction, management, or operation of a dredged material disposal facility using funds provided in whole or in part by the private entity There is agreement in principle between both parties that such an arrangement is achievable.

6.1. Plan Descriptions

Six measures were used to develop a range of plans that were carried forward to detailed planning. To be consistent with USACE guidance, Alternative Plan 1 (No Action) was carried forward. Under this alternative, the Federal Government would do nothing to address the need for interim placement of dredged material. Without dredging, the navigation channel would shoal in and impede commercial navigation. Reduced channel depths would result in light loading commercial navigation vessels. Alternative Plans 2 through 7 will provide one million cy of new capacity. The alternative plans are:

- Alternative Plan 1 – No Action
- Alternative Plan 2 – CDF Vertical Expansion- 10B, 9 and 12 (+20 ft LWD)
- Alternative Plan 3 – CDF Vertical Expansion- 10B, 9 (+24 ft LWD)
- Alternative Plan 4 – CDF Vertical Expansion 10B (+28 ft LWD), Beneficial Use Site
- Alternative Plan 5 - CDF Vertical Expansion- 10B (+44 ft LWD)
- Alternative Plan 6 – Beneficial Use Sites- CVIC, Brook Park, Silver Oaks
- Alternative Plan 7 – Port of Cleveland Plan – CDF 12 Vertical Expansion

The alternative plans developed included some combination of CDF management, vertical expansion at existing CDFs and use of beneficial use sites that had at least one year's worth of dredging capacity (250,000 cy). Table 6 provides the major components of the six plans.

Table 6 - Plan Components

Alternative Plans	Management Measures					
	(1) No Action	(2) Brook Park Landfill	(3) Silver Oak Landfill	(4) Existing CDF Management	(5) Adding Capacity at Existing CDFs	(6) CVIC Site
Alternative Plan 1 No Action	X					
Alternative Plan 2 VE 10B,9, 12				X	X	
Alternative Plan 3 VE 10B, 9				X	X	
Alternative Plan 4 VE 10B, BU				X	X	X
Alternative Plan 5 VE 10B				X	X	
Alternative Plan 6 Beneficial Use- CVIC, Brook Park, Silver Oaks		X	X	X		X
Alternative Plan 7 Port of Cleveland VE 12				X	X	

Plans 2 through 7, together with existing CDF capacities and expected consolidation, provide a potential storage capacity of seven years. Plans 2 through 7 assume that the contractor will mechanically dredge material from the Cuyahoga River into scows. The scows will be transported by tug to the CDF complex where they would be mechanically offloaded after 2014 using a land-based crane.

The plans developed include vertical expansion at the current CDFs, a combination of vertical expansion at current CDFs and beneficial use of upland storage facilities, and beneficial use at upland storage facilities exclusively. Geotechnical analysis of Plans 2 through 5 has indicated that vertical expansion at the CDFs would require the usage of geotextile reinforcement, installation of wick drains, and/or usage of additives to the sediments to achieve slope stability needs.

Figure 3 provides a conceptual drawing of the lifts required for vertical expansion and locations where geotextile reinforcement and wick drains might be installed at each of the CDFs to accommodate these lifts. A brief description of each alternative evaluated follows.

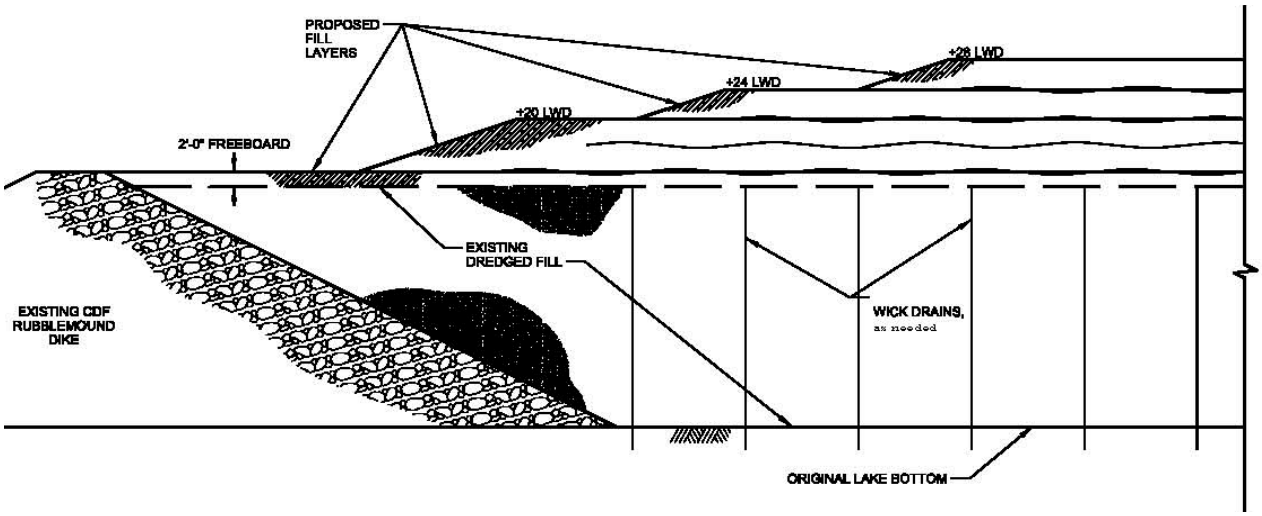


Figure 3 – Conceptual drawing of Vertical Expansion

6.2. Alternative 1: No Action/Without Project Future Conditions

Under this alternative, the Federal Government would do nothing to address the need for interim placement of dredged material. Remaining hydraulic capacity in the CDFs would be effectively depleted by 2015 causing, at a minimum depending on the availability of open lake placement, a decrease in the amount of material that would be dredged from the navigation channel. With a decrease in dredging or without any dredging, the navigation channel would shoal in and impede commercial navigation. Reduced channel depths would result in light loading commercial navigation vessels.

6.3. Alternative 2: Vertical Expansion (Mechanical Placement) CDFs 9, 10B, 12 (+20 ft)

Using all three CDFs (9, 10B, and 12), each would be filled to approximately +20 ft LWD (up to six feet above existing perimeter berm heights). The geotechnical analysis indicates the need for geotextile reinforcement in each CDF, wick drains at CDF 12, and associated sediment placement activities. Current estimates at exactly +20 ft LWD put the available quantity for this option at 926,000 cy, and the additional 74,000 cy can be gained during detailed design through slight modification to final grades. Table 7 below describes a possible sequence of events that

would occur under this alternative. Figure 4 provides a schematic of the locations where geotextile reinforcement and wick drains would need to be installed at each of the CDFs to accommodate vertical expansion up to +20 ft LWD. Figure 5 provides a cross sectional view of vertical expansion components at the three CDFs.

Table 7 - Alternative 2: Sequence of Events

Assumed Construction Sequence for Planning		
	Dredging	CDF Improvements
FY14	Hydraulic Placement - CDFs 10B and 9	
FY15	Mechanical Placement - CDF 12	CDF 10B - Excavate FAA exclusion zone, geotextile (1st layer) CDF 12 - Wick Drains / Excavate, geotextile (1st layer, Northeast corner)
FY16	Mechanical Placement - CDF 10B (FAA Exclusion Zone)	CDF 9 - geotextile (1st layer) CDF 12 - geotextile (2nd layer)
FY17	Mechanical Placement - CDF 12 and 9 (After 2nd layer geotextile)	CDF 9 - geotextile (2nd layer) CDF 10B - geotextile (2nd layer)
FY18	Mechanical Placement - CDF 10B	Incidental earthwork
FY 19-20	Mechanical Placement using residual capacities (all three CDFs) and gains from consolidation	None

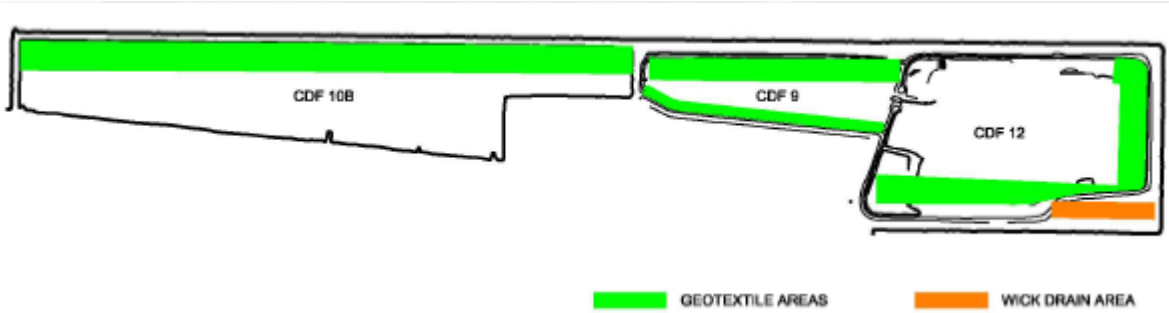
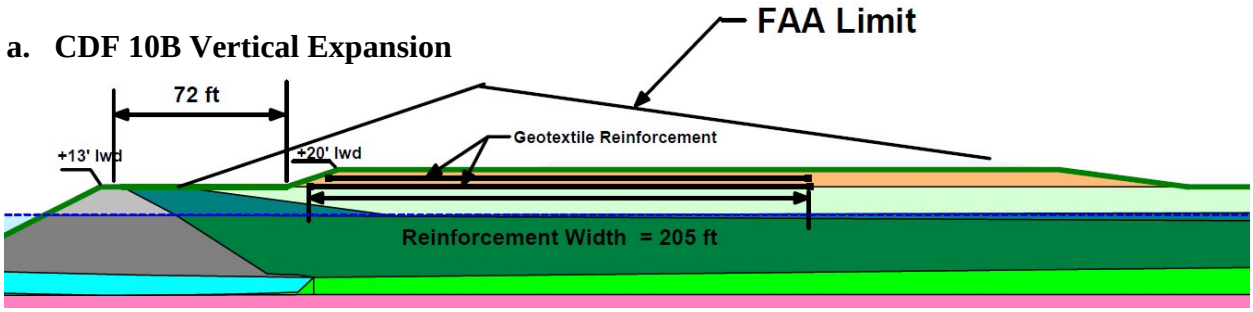
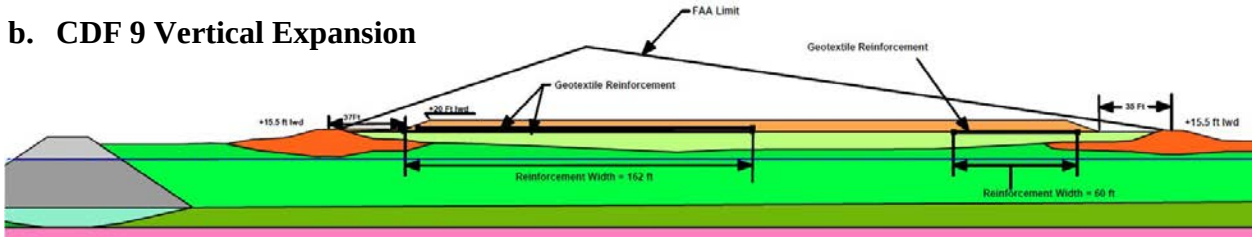


Figure 4 – Location of Geotextile Reinforcement and Wick Drains at CDFs 10B, 9, 12

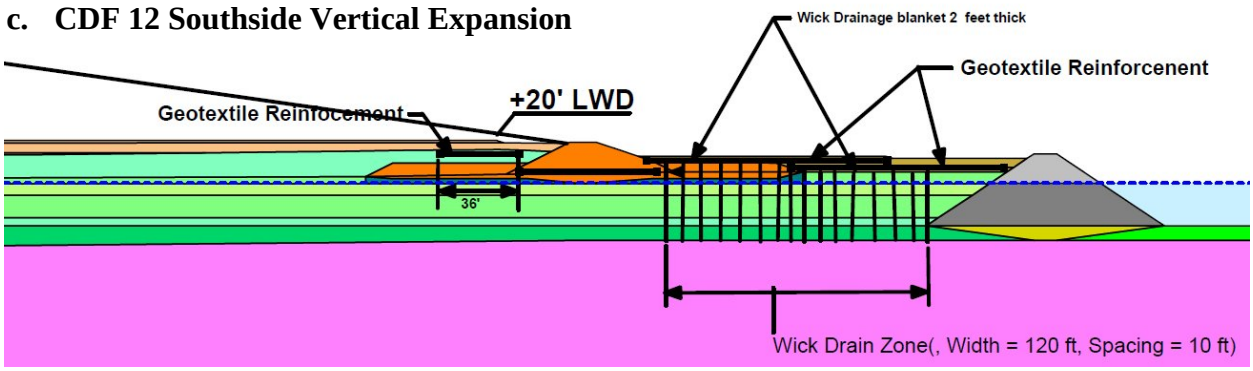
a. CDF 10B Vertical Expansion



b. CDF 9 Vertical Expansion



c. CDF 12 Southside Vertical Expansion



d. CDF 12 Northside Vertical Expansion

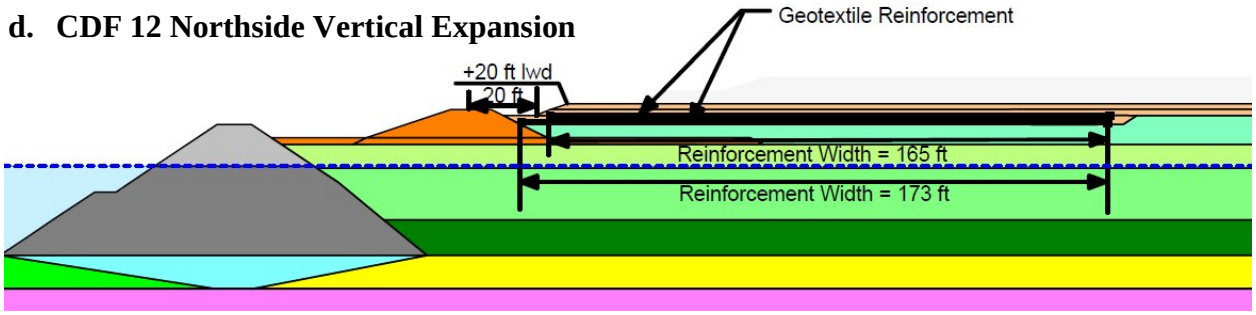
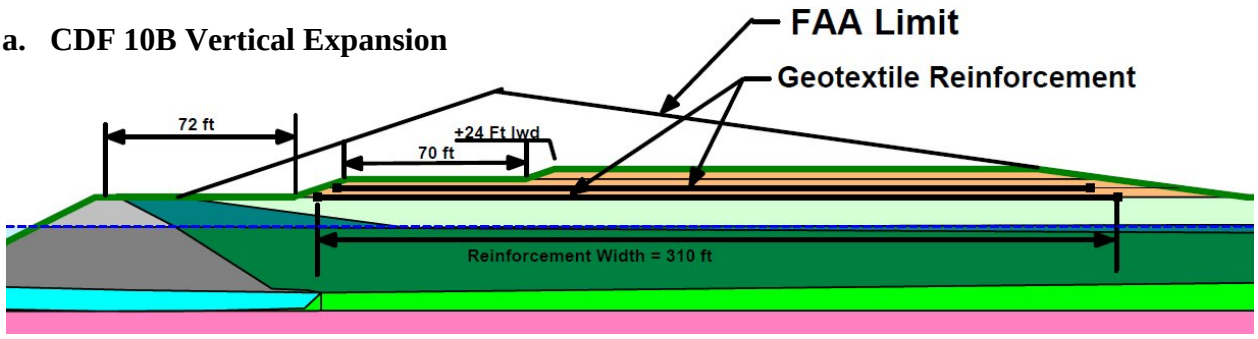


Figure 5 (a through d)– Alternative 2 – Vertical Expansion Components at CDFs 10B, 9, 12

6.4. Alternative 3: Vertical Expansion (Mechanical Placement) CDFs 9, 10B (+24 ft)

Filling only CDFs 9 and 10B to approximately +24 ft LWD, the geotechnical analysis indicates the need for geotextile reinforcement and associated activities. The capacity is approximately 837,000 cy and the volumetric balance can be gained during detailed design through slight modification to final grades. Figure 6 provides a cross sectional view of vertical expansion components at CDF 10B.

a. CDF 10B Vertical Expansion



b. CDF 9 Vertical Expansion

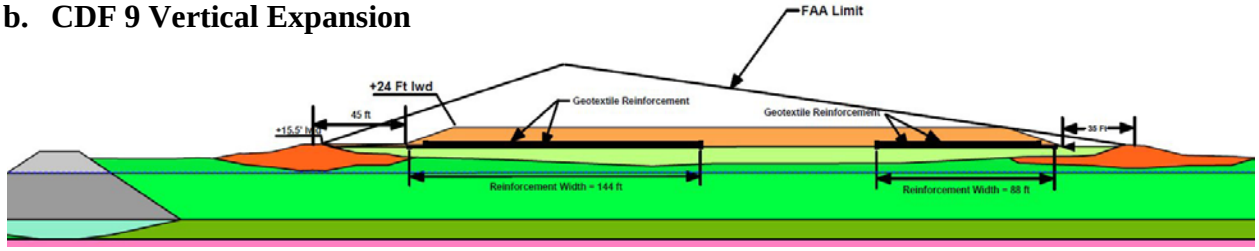


Figure 6 (a & b) – Alternative 3 – Vertical Expansion Components at CDFs 10B, 9

6.5. Alternative 4: Vertical Expansion (Mechanical Placement) CDF 10B (+28 ft) and a Beneficial Use (BU) site

Filling only CDF 10B to approximately +28 ft LWD, the geotechnical analysis indicates the need for geotextile reinforcement and associated activities. The CDF 10B capacity is approximately 653,000 cy and the volumetric balance will need to be supplemented with capacity at an upland disposal site. This upland site was assumed to be the CVIC brownfield redevelopment site. Figure 7 provides a cross sectional view of vertical expansion components at CDF 10B.

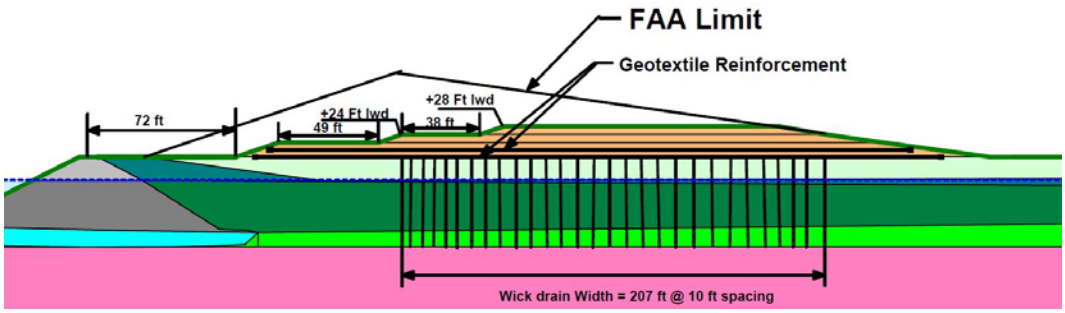


Figure 7 – Alternative 4 – Vertical Expansion Components at CDF 10B

6.6. Alternative 5: Vertical Expansion (Mechanical Placement) at CDF 10B (+44 ft)

Filling CDF 10B only to approximately +44 ft LWD, the geotechnical analysis indicates the need for geotextile reinforcement, wick drains, soil admixtures to dry the sediments so they are suitable for stacking in the CDF, and associated activities**.** The CDF 10B capacity is approximately 925,000 cy and the volumetric balance can be gained during design through slight modification to final grades. Figure 8 provides a cross sectional view of vertical expansion components at CDF 10B.

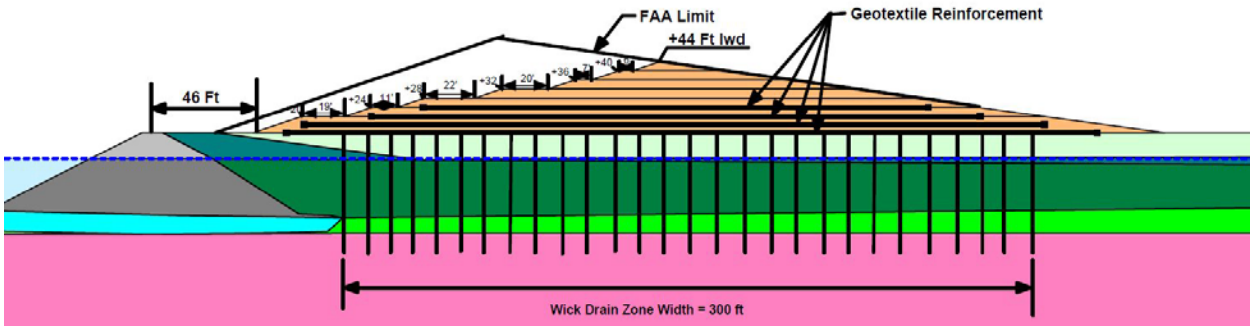


Figure 8 – Alternative 5 – Vertical Expansion Components at CDF 10B

6.7. Alternative 6: Utilize BU site(s) CVIC, Brook Park, Silver Oak

The ERDC Report from August 2011 recommended three short term beneficial use sites. The evaluation of beneficial uses was conducted by identifying opportunities for beneficial use, evaluating the suitability of the sediment for the proposed uses, assessing each project's unique characteristics for execution including volume and schedule requirements, and estimated costs. The three BU sites that were found to be the most feasible and lowest cost short term options are the CVIC, the Brook Park Landfill, and the Silver Oak Landfill. Figure 9 shows the locations of the three beneficial use sites.

- The CVIC is a 58-acre brownfield development. The estimated capacity at the site is 300,000 cy. Brook Park Landfill (also known as Kolthoff Landfill) is a 28-acre landfill.
- The site has a capacity for accepting 350,000 to 500,000 cy of dredged sediment depending on the final site development plans.
- Silver Oak Landfill is a 27-acre inactive construction and demolition landfill located on a 49-acre site. The site has an estimated capacity for accepting 100,000 to 300,000 cy of dredged sediment.

This alternative would require the development of an upriver dredged material re-handling operation. The re-handling site would be located upstream of the turning basin located at the Interstate 490 overpass. Under this concept, at least five years of dredging would be taken to this site, mechanically offloaded and stockpiled. The sediment would then be further dewatered, and placed into trucks that would transport the sediment to the beneficial use sites. Final sediment grading would take place at the beneficial use site.

Thus, two activities will be taking place at the upriver re-handling site, stockpiling of dredged sediment, and transporting dry sediment for beneficial use. In order for this plan to work, this stockpiling/transporting cycle will have to involve at least 250,000 cy of sediment every year. The facility needs to be able to process at least 250,000 cy annually, since annual sediment storage needs are assumed to be 250,000 cy annually between 2015 and 2020.

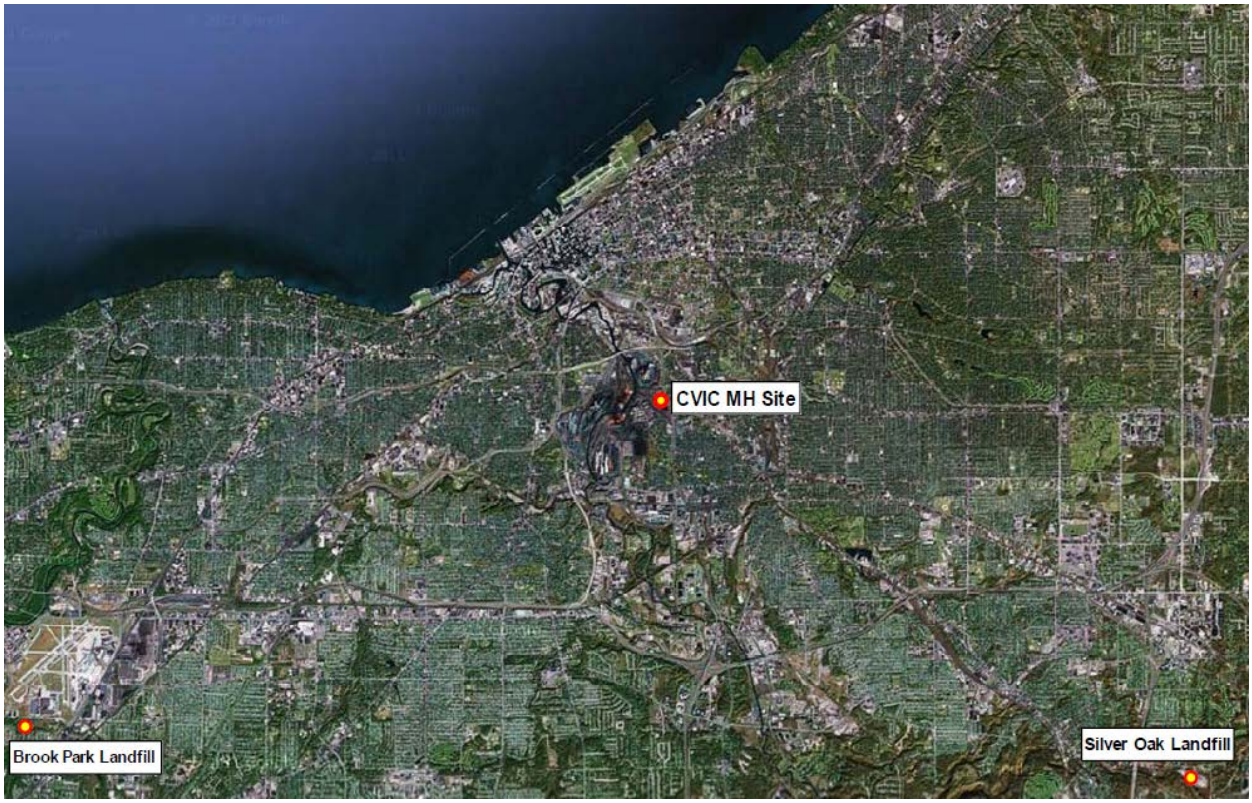


Figure 9 – Alternative 6 – Beneficial Use Site Locations

6.8. Alternative 7: Port of Cleveland Vertical Expansion CDF 12 (Mechanical Placement)

The Port contracted for engineering services from a joint venture of Moffatt & Nichol and Hull & Associates, Inc. Services included a design for optimizing capacity at the existing CDFs as part of a sustainable sediment management report (SSMR). The Port's sustainable sediment management plan consists of three general elements: 1) CDF capacity optimization (adaptive management plan); 2) identification of beneficial alternatives, and; 3) additional sediment characterization to facilitate alternative sediment management options (including possible open lake placement). The adaptive management plan was developed to provide an expanded capacity for dredged material within the footprint of CDF 12, one of the three existing lakefront CDFs (Figure 10). The Port's longer term plans make reference to possible use of all three CDFs. The major intent of the adaptive management plan associated with the SSMR is that a combination of different options is likely a better solution than a single-option scenario. A combination of options allows for more flexibility with respect to logistics (e.g., final placement site relative to specific dredging location in a given year or season), which benefits the feasibility, practicality, and costs. A combination option also allows for opportunities to balance the environmental, ecological, human, and economic impacts with the benefits.

Although the Port's consultant identified an achievable potential capacity of up to eight years at the CDFs by implementing an adaptive management plan to address CDF stability and consolidation through enhanced dewatering techniques, the Port also created a more modest plan with a lower capacity to correlate with the USACE's IDMMP format and content topics. The Port's plan provides approximately one million cubic yards of airspace capacity. This Port Plan incorporates the assumption that airspace capacity of the CDF is the same as the bathymetric dredged volume of the channel, which does not consider direct consolidation due to dewatering and the loss of buoyant forces. Additionally, the Port's plan does not rely on the potential for less capacity required as a result of alternative placement options (e.g., open-lake placement). Rather, the Port's plan focuses on what can be done in the near-term to provide an adequate capacity in the existing CDFs for the short-term management of Cleveland Harbor sediment. Therefore, for purposes of this short-term decision document, one million cubic yards has been referred to as the initial expansion (Phase I and II) and the corresponding expansion height is estimated to be +35.0 LWD (Figure 10).

The Port's plan relies on mechanical unloading and placement of dredged material instead of the current hydraulic methods. This reduces the amount of water to be managed and allows for faster consolidation, although it is acknowledged that mechanical offloading is less efficient than current hydraulic unloading methods in terms of the rate of unloading. The Port's plan also proposes potential active dewatering operations to remove excess water and allow the dredged material to undergo evaporative drying, or desiccation. The first step to preparing CDF 12 would be to construct a perimeter trench around the site. The construction of the trench would be coordinated with construction of a vertical expansion (berm raising) beginning at an approximate distance between 30 feet and 80 feet inward from the top of the existing original rock containment dike. The perimeter dike around CDF 12 would allow water to flow to a basin

on the west side from which it would be discharged to the lake through the existing CDF 12 weir. Since the site cannot be dewatered using gravity alone under existing conditions, pumping will be necessary to accelerate consolidation of the CDF; impacts to total suspended solids (TSS) concentrations will need to be assessed during design of the pumping systems. In addition to increasing available capacity within the CDFs, the dewatering operation would also serve to strengthen underlying soil around the CDF perimeter as the pore pressure is relieved and the weight of the drained soil would progressively consolidate the soil below it. Typical reductions in volume were projected by the Port's engineers to be on the order of 20 to 60 percent relative to pre-dredged (cut/in-stream) volumes depending on dewatering efforts made during placement of the material within the CDF.

After completion of the perimeter trenching, interior longitudinal trenches would be excavated to facilitate additional drainage of trapped water, followed by further evaporation and formation of desiccation cracks (Figure 11). Progressive trenching is proposed to deepen the trenches as the water elevation is lowered and the surficial crust becomes thicker. Material from the trench deepening would be used continuously to construct and raise the dike elevations. Additional measures proposed as contingencies would be used, as needed, to increase dewatering and settlements within CDF12 which will include installing drain tile or underdrains in the trenches, that would be connected to piping systems and a deeper caisson/well(s) that can be periodically pumped to remove water and increase settlement of the material. Installation of vertical wick drains may also prove beneficial for dewatering. Further evaluation of the efficacy of these features would be performed after the initial trenching and dewatering activities. It is noted that since mechanically placed dredged material has generally been observed to be self-leveling, investigation of specific techniques to keep trenches open to allow for efficient and effective trenching operations will likely be required as part of the referenced further evaluation. This should be less of an issue with future mechanically offloaded material.

Mechanical unloading of dredged material and placement into the CDFs would allow for more efficient dewatering and subsequently increased capacity in the CDF (which was not considered in the Port's plan volume). Initially, offloading is contemplated to be supported by a barge mounted hydraulic excavator or crane/clamshell. A practical and versatile long-term improvement may be to construct a pier along the CDF, where hydraulic excavators or crane/clamshell equipment could efficiently unload the scows into trucks for placement within the CDF. The Port has not finalized the unloading platform, but the cost analysis is based on a barge mounted hydraulic excavator or crane/clamshell. Trucks would be used to haul material within the site, dozers would be used to spread material excavated from the trenching operations, disking of the material would facilitate drying, and the fill would be compacted with a roller. The Port plan is presented in its entirety in Appendix F.

The Port's adaptive management approach by its nature does not facilitate a direct comparison with other USACE alternatives. However, the Port and its engineers report that the plan was developed using a standard of practice common in private-sector engineering design/consulting, and that applicable analyses and evaluations were completed to a sufficient level of detail and rigor. The contingency approach used in the Port's Plan was typical (standard) in terms of what

the private-sector uses. While the plan addresses pertinent technical aspects such as logistics and costs it does not conform to USACE guidelines or requirements.

The initial plan (SSMR) information that the Port provided in January 2013 was not at the same level of technical detail as the federal alternatives. The USACE completed the initial review of the Port's sustainable plan (as discussed earlier), as well as subsequent review of multiple iterations of the Port's plan (as requested by the USACE), which ultimately led to the Port's Report dated July 2013. During the July 17, 2013 vertical team meeting, options were discussed for how to incorporate the Port's plan in a revised decision document. It was discussed that since the Port accepts all technical and cost risks, and proposes a fixed tipping fee, the technical and cost risks to the government may be sufficiently controlled.

It was acknowledged that there will be key technical and cost items that will remain unresolved, including the following:

- Dewatering Feasibility – The Port's plan does not include supporting calculations or preliminary design analyses to determine feasibility or address technical uncertainties with the proposed dewatering plan. Instead, the Port's plan proposes more reliance on field studies to demonstrate relative effectiveness and has included budget amounts for multiple dewatering activities based on experience.
- Geotechnical Stability – The Port's preliminary plan (SSMR) includes a supplemental slope stability analysis to support a vertical expansion for Phase I through Phase IV (providing additional airspace beyond the one million cubic yards), with which USACE has identified technical uncertainties and stability concerns with the geotechnical modeling. Results from a stability analysis performed by the Port's consultant (Hull & Associates, Inc.) indicate acceptable factors of safety of 1.3 (Phase 1, 80 ft setback raised dike to +24.4 ft lwd) for static conditions. However, a corresponding stability analysis performed by the Buffalo District using the same geometry and material properties used in Hull's analysis resulted in an unacceptable factor of safety of 1.108 for the Phase I improvements. Although minimum factors of safety depend upon the consequence of failure, a typical minimum factor of safety for the CDF improvements in question is 1.3. Because the analysis of the Phase I conditions resulted in an unacceptable factor of safety for the Buffalo District, exacerbation of the situation would be expected for the Phase II conditions (needed to achieve the 1 million cy capacity) if the raised dike setbacks are not revised or the underlying soils are not modified (e.g. strengths increased). The Buffalo District's stability analysis indicates a translational type failure mechanism, rather than a circular arc failure mechanism as assumed in Hull's analysis. Due to the variation in material types and strengths, the Buffalo District maintains that a translational type of failure is more realistic and applicable to the conditions of the CDF. In addition, Hull's analysis used a nominally higher strength of the weak recent lacustrine deposits (muck) which underlies the CDF. Hull assigned a strength of 585 pounds per square foot (psf) to this stratum based on experience, research of geotechnical explorations in relatively close proximity to the CDF, and assuming that improvements will be made to the stratum

through dewatering/stabilization activities, which could result in a strength above 150 psf as determined by limited laboratory testing on sensitive samples (that can produce lower shear strength values in the laboratory once the samples are extracted, trimmed/prepared, and handled during the testing procedures). However, piezometer data (observed excess pore water pressure/effective stress) corroborates the 150 psf lab strength value. USACE questions the feasibility of achieving the higher 585 psf strength value used in Hull's analysis employing the above referenced dewatering/stabilization activities needed to achieve this strength prior to placing dredged material. The factor of safety reduces to 0.495 when the strength is reduced to 150 psf, raising further concerns regarding the overall geotechnical stability of the Port's plan. The Port's plan includes subsequent geotechnical explorations and field investigations to confirm strength values for the lacustrine layer and modification of the raised dike locations, where required, to achieve an acceptable factor of safety. It is noted that the geotechnical and field investigations have yet to be performed.

- Cost Estimates - The Port's plan does not include a Cost Appendix document conforming to USACE regulations and policies of the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (MCX), the office responsible for certifying project costs that are put forward for approval. Specific items that are not incorporated in the Port's plan include a cost estimate in MCACES format, formal/documented risk-based contingency development, estimated construction schedule, and a total project cost summary (TPCS) form. Instead, the Port's plan includes a Cost Appendix estimation standards and typical documents that are common to the private sector, which includes projected annual cost estimates, cost narrative and construction activity descriptions related to feasibility, and additional cost items to address potential contingencies.

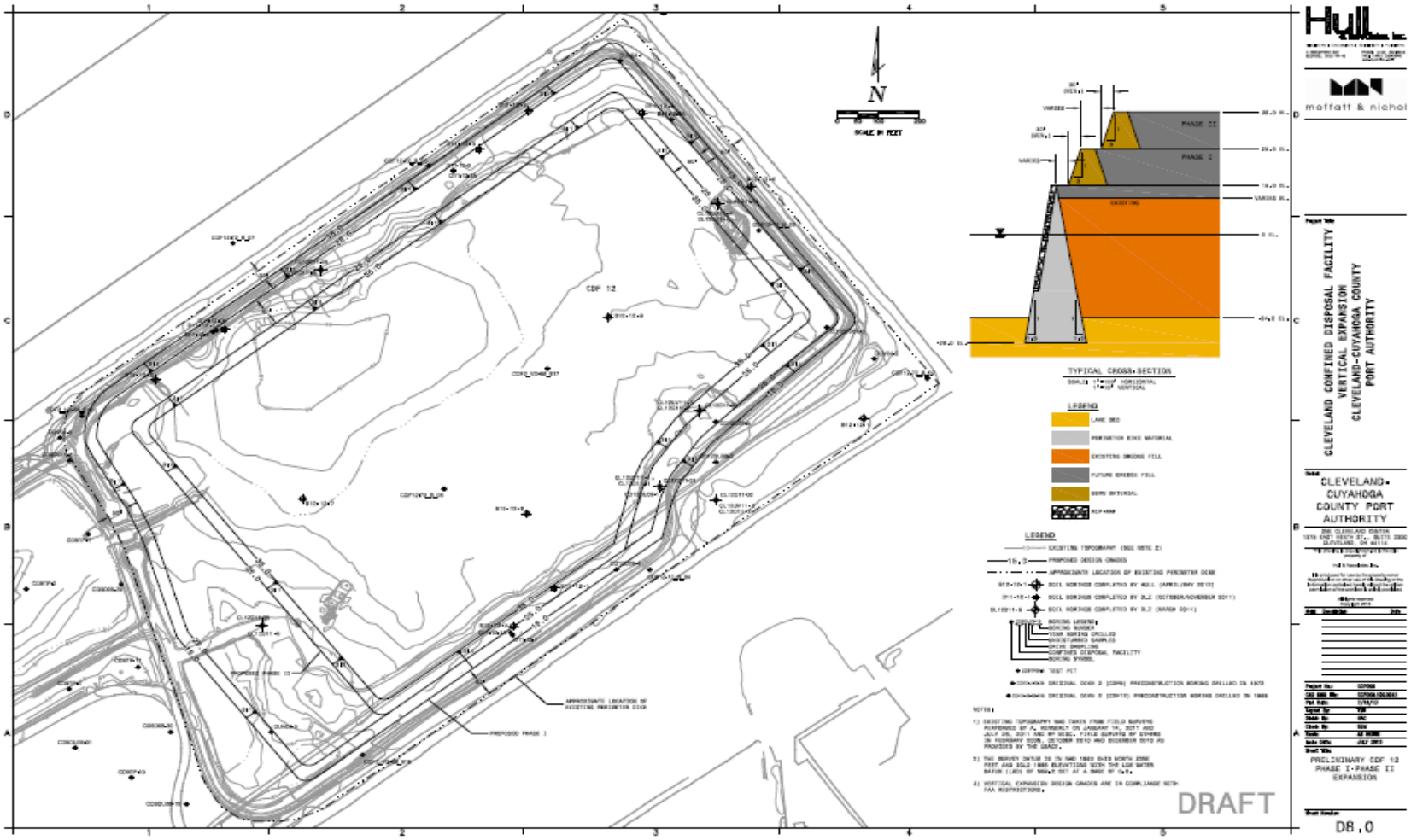


Figure 10 - Port Authority - Near Term Plan Adaptive Management Preliminary Concept Plan and Section of CDF 12 Vertical Expansion

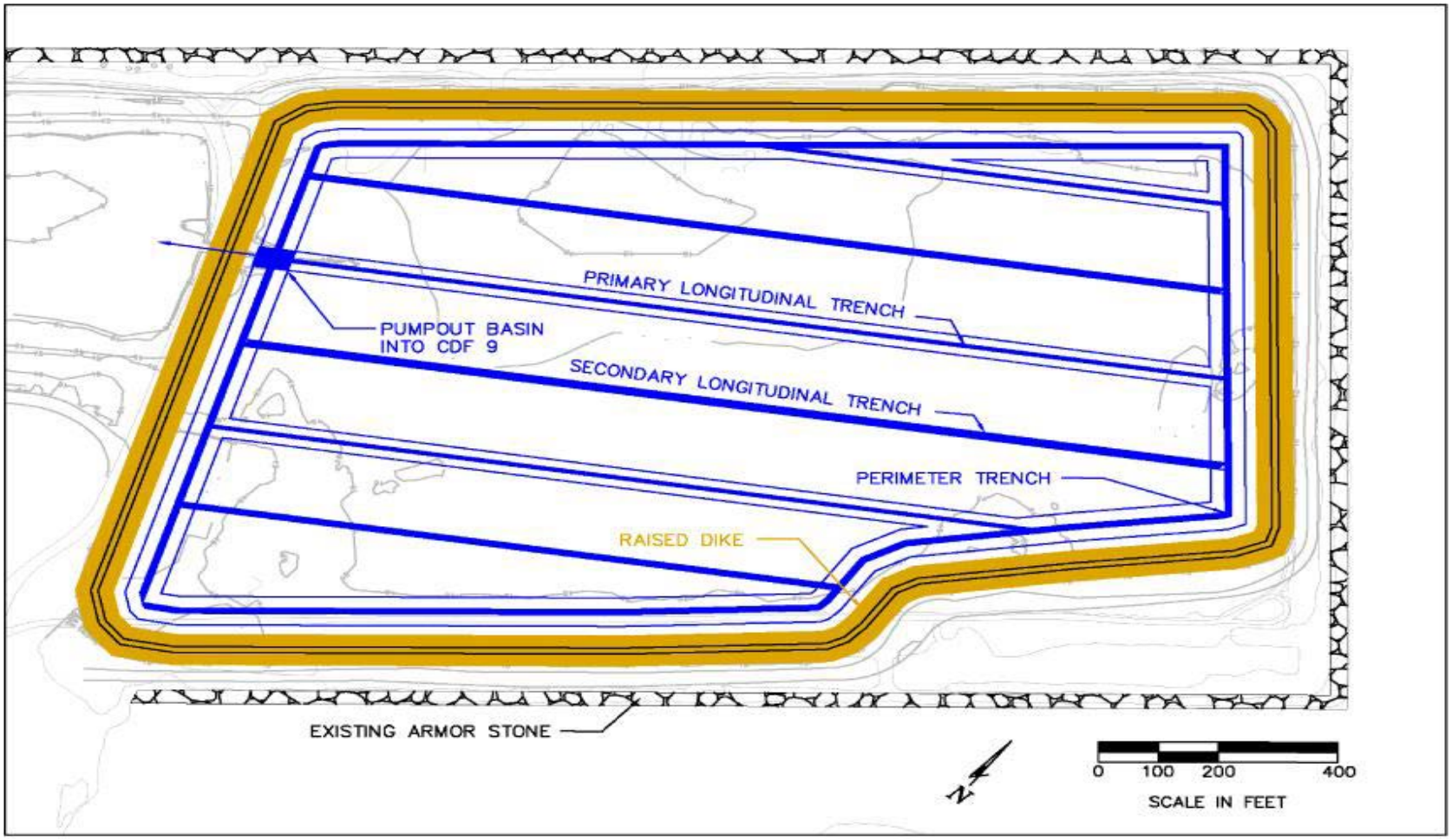


Figure 11– Port Authority Plan Showing Conceptual Excavation of Additional Longitudinal Trenches

7. Evaluation of Alternative Plans

The evaluation of alternative plans has followed a somewhat unconventional approach due to the late addition of the Port's plan. First, the six federally-formulated alternatives were evaluated and compared to each other to arrive at the base plan (Alternative 2). Table 8 summarizes the technical feasibility of these six alternatives as measured against the study objectives and costs. Once the Port plan was proposed, it was evaluated and compared to the base plan, although not to the same level of detail as that employed during evaluation of the federal alternatives.

The six federally-formulated plans were evaluated with respect to the criteria discussed in ER 1105-2-100, Planning Guidance Notebook. Alternative plans are evaluated according to their completeness, effectiveness, efficiency and acceptability. Completeness is how well a plan accounts for all actions necessary to realize the expected benefits. Effectiveness is the extent to which the plan addresses the identified planning objectives. Efficiency is the cost-effectiveness of the plan. Acceptability is the viability of the plan with respect to acceptance by state and local agencies and the public.

Plan 1, the No Action Plan, is complete, but does not meet any of the other three criteria. Plan 5 met all the criteria, except that of efficiency (i.e., the benefit cost ratio was under one). The other four plans (2, 3, 4, and 6) possessed varying levels of completeness, effectiveness, efficiency and acceptability. Given such considerations as cubic capacity provided, impact on commercial navigation, costs, ability to phase construction, ability to manage sediment placement, local sponsor preferences, environmental impacts, and costs, Plan 2 was identified as the most complete, effective, efficient and acceptable. In addition, Plan 2 was identified as the Base Plan - the least costly plan. It was also the NED plan (the plan with the highest net benefits).

Table 8 – Comparison of Alternative Plans to Study Objectives

Study Objectives	Alternative Plans					
	1 No Action	**2 Vertical Expansion (Mechanical Placement) [CDFs 9, 10B, 12] (+20 ft)**	**3 Vertical Expansion (Mechanical Placement) [CDFs 9 and 10B] (+24 ft)**	**4 Vertical Expansion (Mechanical Placement) [CDF 10B and a BU site] (+28 ft)**	**5 Vertical Expansion (Mechanical Placement) at CDF 10B (+44)**	**6 Utilize BU site(s) Brook Park, Silver Oaks, CVIC**
To develop and evaluate alternative plans to maintain authorized navigation channels in the Outer Harbor, Cuyahoga River, and Old River at Cleveland Harbor for the period 2014 through 2020.	Not a Viable Plan for non-Federal sponsor. Dredging of channel could cease and channel would shoal in.	Viable plan to provide capacity needed to maintain the Federal channel.	Viable plan to provide capacity needed to maintain the Federal channel.	Viable plan to provide capacity needed to maintain the Federal channel. May require multiple sponsors and coordination could be complex. Plan hinges on specific timing of site availability. (i.e. the CVIC site is currently for sale) USACE policies/liability concerns present a challenge.	Viable plan to provide capacity needed to maintain the Federal channel.	Viable plan to provide capacity needed to maintain the Federal channel. May require multiple sponsors and coordination could be complex. Plan hinges on specific timing of site availability. (i.e. the CVIC site is currently for sale) USACE policies/liability concerns present a challenge.
To develop and evaluate alternative measures and plans for managing Cleveland Harbor dredged sediment in a cost-effective, technically feasible, environmentally acceptable and, if possible, beneficial manner.	Commercial navigation users would deliver less tons per trip. Cost of commodities delivery on the Cuyahoga River would increase.	Mechanical placement in CDFs is required, resulting in slower production rates and higher costs. Conforms to FAA standards and requirements at BKL.	Mechanical placement in CDFs is required, resulting in slower production rates and higher costs. Smaller construction area will increase complexity and costs. Conforms to FAA standards and requirements at BKL.	Mechanical placement in CDFs is required, resulting in slower production rates and higher costs. Smaller construction area will increase complexity and costs. Conforms to FAA standards and requirements at BKL Site preparation would be required at BU site. Transportation of sediment by truck could have impacts. Uses sediment in a beneficial manner.	Mechanical placement in CDFs is required, resulting in slower production rates and higher costs. Smaller construction area will increase complexity and costs. Conforms to FAA standards and requirements at BKL. Public and agency support for the final height could present challenges.	Site preparation would be required at BU sites. Needs upriver sediment transfer facility. Transportation of sediment by truck could have impacts. Uses sediment in a beneficial manner.
Cost[1]	NA	$53,276,700	$62,186,700	$70,931,7000	$134,961,700	$67,636,700
Ranking	6th	1st	2nd	4th	5th	3rd

*NOTES:
[1] Costs include dredging costs, construction costs and related PED and SA and costs in current dollars. The costs also include 2014 dredging, O&M, PM, and CM costs that are not reflected in the Cost Appendix.

7.1. Trade-Off Analysis

In planning for multipurpose or multiobjective projects, a balance must be reached between financial resources and the benefits that can be produced by the project. In this evaluation a trade-off analysis was completed comparing benefits (such as use of dredge material in a beneficial manner) to the inherent risks and increased costs. This analysis showed that Alternative 2: Vertical Expansion on CDFs 9, 10B, and 12 was the least costly alternative with the lowest risk.

7.1.1 Alternative 1: No Action

Advantages

- No federal dollars are expended

Disadvantages

- None of the project objectives are met
- Dredging of the channel could cease
- Channel would shoal in
- Commercial navigation users would deliver less tons per trip
- Costs of delivering commodities on the Cuyahoga River would increase

7.1.2 Alternative 2: Vertical Expansion CDFs 9, 10B, 12 (+20 ft)

Advantages

- Provides the largest footprint for construction and vertical expansion resulting in a lower final elevation.
- Utilizes existing confined disposal facilities
- Least Costly Alternative
- Project objectives are met

Disadvantages

- Requires compliance with FAA safety restrictions

7.1.3 Alternative 3: Vertical Expansion CDFs 9, 10B (+24 ft)

Advantages

- Utilizes existing confined disposal facilities
- Project objectives are met

Disadvantages

- Decreased space for construction and vertical expansion resulting in increased complexity of construction and higher final elevation.
- Final elevation could impact aesthetic view and public acceptance
- Requires compliance with FAA safety restrictions
- More costly than Alternative 2

7.1.4 Alternative 4: Vertical Expansion CDF 10B (+28 ft) and Beneficial Use

Advantages

- Utilizes existing confined disposal facilities
- Reclaim brownfield for future commercial/industrial use
- Project objectives are met

Disadvantages

- Decreased space for construction and vertical expansion resulting in increased complexity of construction and higher final elevation
- Final elevation could impact aesthetic view and public acceptance
- Requires compliance with FAA safety restrictions
- More costly than Alternative 2
- Subject to beneficial use site being available when needed
- Trucks would be required to transport material over public roads to beneficial use site

7.1.5 Alternative 5: Vertical Expansion CDF 10B (+44 ft)

Advantages

- Utilizes existing confined disposal facilities
- Project objectives are met

Disadvantages

- Least amount of space for construction and vertical expansion resulting in increased complexity of construction and highest final elevation
- Final elevation could impact aesthetic view and public acceptance
- Requires compliance with FAA safety restrictions
- More costly than Alternative 2

7.1.6 Alternative 6: Beneficial Use sites CVIC, Brook Park, and Silver Oak

Advantages

- Reclaim brownfields and former landfills for future use
- Project objectives are met

Disadvantages

- More costly than Alternative 2
- Subject to beneficial use sites being available when needed
- Each beneficial use site is owned by a different entity requiring coordination with multiple partners
- Trucks would be required to transport material over public roads to beneficial use sites

7.1.7 Port of Cleveland Vertical Expansion CDF 12

Advantages

- Utilizes existing confined disposal facilities
- Project objectives are met
- Potential for cost-savings associated with implementation of a Section 217 agreement

- Technical and cost risks are borne by the Port
- Only pay for capacity used
- No capital costs for Federal Government
- Supported by Sponsor.
- Fixed tipping fee for two years.

Disadvantages

- Requires compliance with FAA safety restrictions.
- Adaptive management approach – uncertainties/risks
- Potential policy compliance issues

7.2. Alternative Plan Costs

This section details the costs associated with alternatives 2 through 6 that were developed for project years 2014 through 2020. Costs included in Table 9 include all costs associated with dredging, CDF improvement, and beneficial use costs. Dredging costs included removal of sediment from the river, transport by scow to the off loading site, removal of sediment from the scows and placement into a sediment storage area. Dredging costs also included mobilization and demobilization costs, Engineering and Design, and Supervision and Administration costs. Appendix B contains the Cost Engineering Report.

CDF improvement costs included installation of geotextile fabric, wick drains, and other costs associated with activities incidental to the CDF improvements, such as grading within the CDF. These costs included contingencies as well as Engineering and Design, and Supervision and Administration costs. All plan costs represent September 2013 prices.

Beneficial use costs include preparation of the offloading area, dewatering staging area, dock fees, loading of trucks, hauling material to placement site, site preparation of beneficial use site, and final grading. These costs included contingencies as well as Engineering and Design, and Supervision and Administration costs.

These costs were identified by year from 2014 through 2020. This time stream of costs was then converted to present worth costs and summed. This present worth cost was then converted to an average annual value using a 3.5 percent annual interest rate and a seven year project evaluation period. Average annual values range from $7,678,200 for Plan 2 to $19,377,100 for plan 5. Table 9 summarizes the calculations used to develop the average annual cost values for each of the six original alternatives.

Table 9 – Costs by Plan (2014-2020) (Plans 2 – 6)

Alternative Plans (2014-2020)	Dredging and O&M Costs (2014 [1a]	Dredging and O&M Costs (2015-2018) [1b]	Dredging and O&M Costs (2019-2020) [1b]	Capital Improvement Costs [2]	Total Plan Costs	Present Worth Fed Dredging Costs	Present Worth CDF Improvement Costs	Present Worth Total Plan Costs	Average Annual Costs
Plan 2 – Vertical Expansion at CDF Sites 10B, 9, 12	$3,106,700	$20,560,000	$10,280,000	$19,330,000	$53,276,700	$29,464,100	$17,484,600	$46,948,700	$7,678,200
Plan 3 – Vertical Expansion at CDF Sites 10B, 9	$3,106,700	$20,620,000	$10,310,000	$28,150,000	$62,186,700	$29,541,400	$25,272,800	$54,814,200	$8,964,600
Plan 4 – Vertical Expansion at CDF 10B and BU sites	$3,106,700	$20,690,000	$10,345,000	$36,790,000	$70,931,700	$29,631,400	$33,577,300	$63,168,700	$10,330,900
Plan 5 – Vertical Expansion at CDF 10B	$3,106,700	$37,610,000	$18,805,000	$75,440,000	$134,961,700	$51,409,000	$67,073,400	$118,482,400	$19,377,100
Plan 6 – BU Sites	$3,106,700	$17,540,000	$8,770,000	$38,220,000	$67,636,700	$25,577,200	$33,766,900	$59,344,100	$9,705,400

[1a] Costs are inclusive of dredging, transport to CDF, and hydraulically offloading scows into CDF, along with estimated annual routine O&M and Fish and Wildlife Management costs. Dredging Contract costs were taken as $2,078,000 per year, and O&M Contract costs taken as $302,400 per year. Total costs include 12.5% contingency + 6% Preconstruction Engineering and Design (PED) costs + 10% Construction Management (CM) costs, plus associated contingency on PED and CM.

[1b] For Plans 1-6, costs are inclusive of dredging, transport to CDF, and offloading scows into CDF, along with estimated annual routine O&M and Fish and Wildlife Management costs. Contract costs from Abbreviated Risk Analysis summary (incorporating contingency) in Cost Appendix + 6% Preconstruction Engineering & Design (PED) costs + 10% Construction Management (CM) costs, plus associated contingency on PED and CM.

[2] For Plans 1-6, costs are inclusive of incidental earthwork and CDF improvement contract costs from Abbreviated Risk Analysis summary (incorporating contingency) in Cost Appendix + 6% Preconstruction Engineering and Design (PED) costs + 10% Construction Management (CM) costs, plus associated contingency on PED and CM.

7.3. Base Plan Alternative

In accordance with ER 1105-2-100, it is USACE policy to accomplish the disposal of dredged material associated with the construction or maintenance dredging of navigation projects in the least costly manner. Disposal is to be consistent with sound engineering practice and meet all federal environmental standards including the environmental standards established by Section 404 of the CWA of 1972, as amended. This constitutes the base disposal plan for the navigation purpose. The base plan may or may not be ultimately selected for implementation but is important in terms of helping to define projects and cost sharing requirements. Several measures were used to develop a range of plans that were carried forward to detailed planning. The alternatives that were developed included some combination of CDF management, vertical expansion at existing CDFs, and beneficial use sites that had at least one year's worth of dredging capacity (250,000 cy). The Buffalo District analyzed the available alternatives and identified a base plan. This plan was initially Alternative 2, which proposed vertical expansion using mechanical placement on CDFs 9, 10B, and 12 (+20 ft).

7.4. System of Accounts

Table 9 provides a comparison of Plans 2 through 6. The plans were compared to each other based on such NED accounts as Total Plan Cost, Present Worth Cost and Average Annual Cost.

7.5. Economic Rank Justification

Table 10 provides the economic rank of the alternatives evaluated. The economic rank was determined by the highest benefit to cost ratio and the least expensive current value of the project cost. The current value of the project cost reflects the total project implementation cost (dredging and sediment storage development costs). Plan 2 had the highest economic rank. It is also the base plan (least costly) as well as the NED plan (plan with highest net benefits).

Table 10 - Economic Evaluation of Alternative Plans

	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6
				CDF 10B	CDF 10B	Three
		3 CDF's	2 CDF's	Beneficial		Beneficial
	No Action	10B, 9, 12	10B, 9	Usage		Usage
Cost (Current Prices)		$ 53,276,700	$ 62,186,700	$ 70,931,700	$ 134,961,700	$ 67,636,700
Cost (Present Worth)		$ 46,948,700	$ 54,814,200	$ 63,168,700	$ 118,482,400	$ 59,344,100
Cost (Average Annual)		$ 7,678,200	$ 8,964,600	$ 10,330,900	$ 19,377,100	$ 9,705,400
Benefit (Average Annual)		$ 10,713,500	$ 10,713,500	$ 10,713,500	$ 10,713,500	$ 10,713,500
BenefitTo Cost Ratio		1.40	1.20	1.04	0.55	1.10
Net Benefits		$ 3,035,300	$ 1,748,900	$ 382,600	$ (8,663,600)	$ 1,008,100
Rank		1 st	2nd	4th	5th	3rd
Partial Payment Factor- 7 years-3.5%		0.16354	0.16354	0.16354	0.16354	0.16354

7.6. The Port's Plan

The Port's plan is very similar to the base plan in that it gains new capacity by mounding sediment higher. The Port's plan involves only one CDF, which is CDF 12 and mounds the sediment higher than the base plan. It has not been possible to complete an equitable comparison with the base plan because the level of technical and cost detail associated with the Port's plan is not commensurate with that of the base plan. It was agreed that the Port's willingness to accept technical and cost risks would allow a comparison of the estimated federal investment in the base plan to a fixed tipping fee proposed by the Port. The Port will cap its tipping fee for two years as a sign of its confidence in the technical and cost components. The cost estimate for the Port's plan has not been prepared using MCACES or risk-based methodologies. However, a unit cost (i.e. $/cy) comparison between the Port's fixed tipping fee and the estimated federal investment in the base plan is intended to assess the lowest cost alternative available to the federal government.

Presented in Table 11 is a summary of costs for the Port's plan. These costs reflect expenditures between 2015 and 2018. Appendix F contains detailed costs.

Table 11 – Summary of Costs for Port's Plan (2015-2018)

Major Feature of Work	Cost
CDF Expansion (1)	$2,571,100
Site Operations (1)	$3,575,000
Site Management (1)	$6,246,785
Unloading (1)	$3,600,000
Dredging (2)	$15,353,000
Total Project Costs	**$31,345,885**

(1) From Port Plan Table E-6 (July 2013).

(2) Dredging costs based on USACE unit costs for dredging, transport to CDF, contract contingency + 6percent PED costs + 10percent CM costs, plus associated contingency on PED and CM. Excludes costs with offloading into CDF

The Port proposes that a fixed tipping fee be specified in a Section 217 agreement based on the Port's estimate. The tipping fee would be fixed at $11.50 per cy ($15.10/cy including proposed unloading costs) for the first two years and would be renegotiated based on actual costs. Under the Port's proposal, any increase in the tipping fee would be capped to assure that the tipping fee remains below the federal investment in the Base Plan cost of providing dredging capacity. The tipping fee adjustment could also result in a decreased tipping fee. This approach substantially reduces the concerns about the adequacy of the Port's contingency calculation or the use of different design standards, since in both the initial two-year period, and following renegotiation, USACE is shielded against any risk that the actual costs to USACE will exceed the costs incurred for implementation of the Base Plan. The approach benefits the Port in allowing them to

realize a return on any efficiencies and cost controls during construction and operation and maintenance.

The Port calculated the proposed tipping fee by using such variables as capital investment ($2,571,100) total site O&M costs ($9,659,385), return on investment of 3.5%, assumed placement of 250,000 cubic yards of material annually, appropriate cost-sharing percentages, and a capacity of 1,000,000 cubic yards to be filled over four years. The tipping fee is essentially a unitized and amortized schedule for repayment of costs incurred, reflective of cost-sharing. The Port also provided a spreadsheet which itemizes all capital investment (i.e. construction) and site O&M costs. Open lake placement in the near future would extend the amortization period, but any resulting increase in the tipping fee would not exceed the federal investment associated with the Base Plan.

In order to verify the Port's calculation, Buffalo District utilized a tipping fee calculator provided by Baltimore District for determination of an appropriate tipping fee for the Cox Creek CDF. This tipping fee calculator is available upon request. Buffalo District found that the tipping fee in Cleveland would be $11.48 per cubic yard, comparing well to the Port's proposed fee of $11.50 per cubic yard. This small discrepancy is presumed to be the result of liberal rounding.

7.7. Cost Comparison Between Plans

Comparing the Port alternative to the Base Plan (previously selected) is the focus of this decision document. While the Port's alternative was added after selecting Alternative 2 as the Base Plan, it afforded the cost comparison of the two plans that serves as the basis of selection in this document. While the period of evaluation for assessing alternatives developed by the Corps was from 2014-2020, the Corps Base Plan and the Port's Plan were compared to each other on the basis of costs that would be incurred between 2015 and 2018. All cost that accrued during this timeframe (dredging and construction costs) were accounted for. The evaluation assumed each plan provided 1M cy of storage space. As shown in Table 12, the Port's plan has a lower total project cost than the Base Plan and the $11.50/cy (not including their unloading costs) as a fixed tipping fee proposed by the Port is lower than the $14.16 /cy estimated to be the federal investment in the Base Plan.

Table 12 compares the costs of the Port's Plan with the Base Plan. The costs for the Port's plan are lower than the Base Plan on a total project cost basis ($31.35 million versus $39.89 million), total federal costs basis ($30.45 million versus $33.12 million) and a federal cost per cubic yard of capacity gained ($11.50 versus $14.16) per cubic yard. On these bases, the recommended plan is Alternative 7 – the Port's Plan. All costs presented in Table 12 are $ per cy.

The proposed fixed tipping fee places the risks for technical feasibility and cost on the Port. The Port accepts these significant risks of a fixed tipping fee, but in return, they expect to benefit from any differences if actual costs are lower than estimated. Incentivizing the Port with greater rate of return on investment through efficiencies and cost controls could result in savings to the federal government as well. If after two years, the actual costs incurred are lower than predicted,

the renegotiated tipping fee will be reduced. Conversely, if the actual costs incurred are higher than predicted, the renegotiated tipping fee will be increased. However in no case will the tipping fee exceed the estimated unit cost associated with the Corps Base Plan as described in the decision document. The Port's $15.10/cy fixed tipping fee includes $3.60/cy for unloading and placement in the CDF. However, the USACE is responsible for dredging, transportation and placement in a CDF, so these costs have been segregated. At this feasibility stage, it is unnecessary to commit unloading costs as an element of the tipping fee. The USACE might elect to include unloading and placement in its dredging contracts, instead of paying the Port for such activities.

Table 13 below provides total costs for the Corps Base Plan (Table 12) and the Port's Plan (Table 11). The total cost for the Corps Base Plan came to $39,890,000 and the total cost for the Port's Plan came to $31,350,000. These costs are broken out by Dredging, Unloading, Construction and Site O&M in Table 13. This table provides the split of costs between Federal and non-Federal for the Port's Plan and the Corps Base Plan. The total cost of the Port's Plan is less than the total cost of the Corps Base Plan.

The majority of federal cost share in both cases is attributable to dredging and disposal. And while site O&M costs for the Port plan are significantly higher than the Base Plan, the resulting tipping fee proposed by the Port is still lower than the estimated federal investment in the Base Plan. It is also noted that there would be no upfront capital costs by the Government for the Port plan and payment would only be made for the capacity used. This is advantageous in light of the uncertainty that exists with the volumes that will require confinement in the future. Open lake placement is a good possibility for most if not all of the sediment dredged in the near future.

The two approaches are similar in that they both gain new capacity within existing CDF footprints by mounding sediment higher. However, the Port plan uses only one of the CDFs and mounds to a higher estimated elevation. Because the Base Plan uses the larger footprint of all three CDFs, it required a more modest increase in the mounding height. The Base plan emphasizes significant geotextile and related improvements considered to be construction activities, while the Port plan relies more on operations and maintenance activities such as trenching and dewatering. The Base Plan costs incorporate a higher contingency amount, which was developed using a risk-based analysis. The Port is aware that the USACE technical experts did not concur on the stability of their plan. The Port has chosen to assume the associated risks.

Table 12 - Cost Per Unit Comparison Between Port's Plan and Base Plan [1]

Plan	Dredging [2]	Unloading [3]	Construction	Site O&M	Total Cost	Total Federal Cost	Total Non-Federal Cost	Total Federal Cost for Capacity Gain [7]
Port's Plan	$15.35	$3.60	$2.57 ($1.67 Fed/$0.90 non-Fed) [4]	$9.83 [4]	$31.35	$30.45 [4]	$0.90 [4]	$11.50
Base Plan	$15.35	$3.61	$19.33 ($12.56 Fed/$6.77 non-Fed) [5]	$1.60 [6]	$39.89	$33.12	$6.77	$14.16

(1) Both Plans assume dredging and placement of 1 million cubic yards of material. All costs reflect 2015-2018 timeframe.

(2) Dredging production was anticipated to be approximately 3,900 cy/day (3 scows per day). Costs were derived from USACE estimate, minus cost of unloading material, and incorporates contract costs, contract contingency, PED and CM, along with associated contingency on PED and CM.

(3) Unloading production rate under the Port's Plan is assumed to be at least as high as the Base Plan. Base Plan unloading costs derived from USACE estimate, and incorporates contract costs, contract contingency, PED and CM, along with associated contingency on PED and CM.

(4) Fed/non-Fed breakdown based on Port's proposed allocation.

(5) Fed/non-Fed breakdown assumes 65percent Federal + 35percent non-Federal share of contract costs for incidental earthwork and CDF improvement contract costs from Abbreviated Risk Analysis summary (incorporating contingency) in Cost Appendix +6 percent Preconstruction Engineering and Design (PED) costs +10 percent Construction Management (CM) costs, plus associated contingency on PED and CM.

(6) Includes USACE costs for routine CDF and Fish and Wildlife maintenance, contract contingency, PED and CM, along with associated contingency on PED and CM.

(7) Costs attributable to capacity gain are Construction and Site O&M costs.

Table 13 – Cost Sharing on Total Project Costs for The Port's Plan and Base Plan (1)

Plan	Dredging (2)	Unloading (3)	Construction(4)	Site O&M(5)	Total Cost	Total Federal Cost	Total Non-Federal Cost
Port's Plan							
Fed Cost	$15,350,000	$3,600,000	$1,670,000	$9,830,000	$30,450,000		
Non Fed	----------	----------	$900,000	----------	$900,000	$30,450,000	$900,000
---			----------		----------		
Total	$15,350,000	$3,600,000	2,570,000 (4)	$9,830,000	$31,350,000		
Base Plan							
Fed Cost	$15,350,000	$3,610,000	$12,560,000	$1,600,000	$33,120,000		
Non Fed	----------	----------	$6,770,000	----------	$6,770,000	$33,120,000	$6,770,000
---			----------		----------		
Total	$15,350,000	$3,610,000	$19,330,000	$1,600,000	$39,890,000		

1. Both Plans assume dredging and placement of 1 million cubic yards of material.
2. Dredging costs are 100% Federal.
3. Unloading costs are 100% Federal.
4. Construction cost are split 65% Federal, 35% non Federal.
5. O&M Costs are 100% Federal.

8. Real Estate

The Real Estate Plan (REP), Appendix D, addresses the USACE plan to meet the interim dredging needs for the Cleveland Harbor Federal Commercial Navigation Project.

The LERRD required to support the recommended plan will be a Submerged Land Lease from the State of Ohio which is already in place and has been previously provided for the construction of CDF 12 which was a Federal project.

It is the Port's position that the value of CDF 12 be included in the tipping fee calculation and offset all or part of the additional 10 percent non-Federal cost share. The Port proposes that the value of the land be specified in the tipping fee agreement based on an appraisal by the USACE. The Port believes the land value credit is consistent with the applicable cost sharing. The Port's proposal will dedicate the land at CDF 12 to dredged material placement purpose and preclude other potential uses of the property that would be available to the Port and the City.

The USACE position is that the Port should not receive LERRD credit for CDF 12. The Port is not entitled to LERRD credit in the amount of the fair market value of the 60 acre CDF. The land on which CDF 12 was constructed was provided for in a previous Federal project. The land previously provided was a lakebed site on which the CDF was constructed. The Government's construction of CDF 12 created a value for the land, which did not previously exist when it was solely a lakebed. The Port should not be allowed to benefit from the value created by the Government.

The Detroit District Real Estate Division will coordinate, monitor and assist with all real estate activities undertaken by the sponsor. If any acquisition activities are required, the Real Estate Division will assure that the acquisition process is conducted in compliance with Federal and State Laws; specifically the requirements under the Federal Uniform Relocation and Acquisition Act (P.L. 91-646).

9. Recommended Plan

A Base Plan was initially determined for the period 2014 through 2020. The Base Plan is Alternative Plan 2. The plan assumes that 250,000 cy of dredged material (225,000 Federal and 25,000 non-Federal) will be placed on an annual basis. Alternative 2 was determined to be the least cost, environmentally acceptable and technically feasible Federal Alternative.

Alternative 7, the Port's Plan (i.e. Port of Cleveland Vertical Expansion CDF 12 (Mechanical Placement), contains elements of technical and financial risk that would be deemed non-policy compliant if reviewed as a plan formulated by USACE. For these reasons, the Federal Alternative 2 has been retained as the Base Plan despite the fact that it is more costly than the Port's Plan. This decision document identifies the Port's Plan as the Recommended Plan for two key reasons. First, the Port is willing to accept all financial and technical risk for its plan,

allowing for some deviation from a traditional USACE-generated alternative. Secondly, a cost comparison was completed between the Port's Plan and the Base Plan, and the Port's Plan was determined to have a lower total cost and a lower Federal investment. Plan 7 is the least costly and the Recommended Plan.

9.1 Items of Local Cooperation

In order to implement the Recommended Plan, the Port will need to provide the following:

- In accordance with section 101(a) of WRDA 86 (33 U.S.C. 2211), the Port will be responsible for 35 percent of the cost of construction of the general navigation feature (represents the 25 percent of the cost at construction and an additional 10 percent of the cost of the general navigation feature over a period not to exceed 30 years);
- Provide the lands, easements, rights-of-way and relocations (LERR) necessary for construction; and
- Design, construct, manage and operate the dredged material disposal facility at their initial expense with costs to be recouped through a tipping fee paid by users.

9.2 Cost Risks

To address the cost risk to the government related to the construction of the facility by the Port, they have proposed the setting of a fixed tipping fee for two years, regardless of what actual costs they may need to incur, with any increase in the tipping fee capped to assure that the tipping fee remains below the Corp's estimated cost of providing dredging capacity. The tipping fee adjustment could also result in a decreased tipping fee. This approach substantially reduces the concerns about the adequacy of the Port's contingency calculation or the use of different design standards since in the initial two-year period the Corps is shielded against any risk that the actual costs to the Corps will substantially exceed the tipping fee. In the next two-year period the Corps risk of a rising tipping fee are capped.

Construction will occur over several years as the surfaces of the CDFs are raised to accommodate more sediment. As construction proceeds, the USACE will remain actively involved reviewing contract documents and monitoring fiscal and physical progress.

10. Environmental Compliance

The USACE completed an Environmental Assessment (EA) and draft Finding of No Significant Impact (FONSI) for the recommended plan (Appendix E). In accordance with the Council on Environmental Quality's "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) of 1969" (40 CFR 1500-1508) and Engineer Regulation 200-2-2 (Procedures for Implementing NEPA), the USACE assessed the potential environmental impacts of the proposed project in an EA, including the No Action alternative.

Implementation of NEPA requires that Federal agencies initiate "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action." In February 2012, a Public Scoping Information Packet was used to disseminate information regarding the Cleveland Harbor IDMMP to elicit any concerns of potential affected parties. Comments that were received were incorporated into the planning process and this decision document.

The operation and maintenance of the Cleveland Harbor federal channel is a federally funded and USACE-managed project. As the lead federal agency, the USACE must ensure activities associated with maintenance of the federal channel comply with several environmental protection regulations, executive orders, and policies.

The Port of Cleveland has advocated for Alternative 7 [i.e., Port of Cleveland Vertical Expansion CDF 12 (Mechanical Placement)] whereby the Port would recover much of its investment through a tipping fee to be paid by USACE for placement of dredged material into the CDF. Section 217 of WRDA 1996, as amended by WRDA 2007, authorizes the USACE to enter into an agreement to use a dredged material disposal facility designed, constructed, managed, owned, or operated by a non-Federal interest, a private entity, or both.

The environmental effects of the Port's plan, which only involves CDF 12, are expected to be mostly similar to those anticipated from the federal base plan (except for aesthetics) which involves three CDFs (Appendix E). Generally, the anticipated positive impacts from either plan involve the ability to continue maintenance dredging of the commercial navigation channel and its associated benefits to the regional economy (e.g., employment, business operations). Anticipated short-term adverse impacts may include elevated noise levels, disruption to navigation, and water quality (e.g., localized turbidity). The Port's Plan may result in a greater adverse impact to aesthetics than Alternative 2 due to their proposed higher mounding elevations. Obtaining and complying with any and all local, state, or federal environmental compliance requirements associated with Alternative 7 would be the responsibility of the Port of Cleveland (e.g., Coastal Zone Management Act, Clean Water Act).

The EA evaluates the project alternatives with respect to several social, economic, and environmental categories, including:

- Biological Resources
- Recreation
- Cultural Resources
- Socioeconomics
- Transportation
- Geology and Soils
- Water Resources
- Solid Waste Management
- Contaminated Materials

- Air Quality
- Noise
- Aesthetics
- Health and Safety
- Environmental Justice

The EA/FONSI will be circulated for a 30-day public review. Full NEPA compliance will be attained once the public review period has been concluded, no significant adverse impacts are identified, and the FONSI is signed.

11. Conclusion

Cleveland Harbor has been shown to be economically viable and the costs associated with implementation of the recommended plan are justified. This Short-Term Decision Document recommends implementing Alternative 7: Port of Cleveland Vertical Expansion CDF 12, provided an agreement can be reached on terms and conditions.

USACE is continually undergoing Dredged Material Management Plan (DMMP) development and this decision document is an interim measure that will enable us to gain more time. This document is an actionable element that will likely become an integral component of the long-term solution that could include open-lake placement and may well provide 20 years of management. An EA/FONSI has been drafted to assess the potential environmental impacts of the recommended plan and its Alternatives.

This decision document recommends the alternative proposed by the Port for confining dredged sediment for a minimum of four years. The selected plan involves progressive improvements to one of the existing lakefront CDFs as necessary to expand the volumetric capacity by approximately one million cubic yards. All design, construction and operational costs are to be funded by the Port under terms of a future agreement that will be based on this decision document. Port costs will be recouped by means of a fixed user fee of $11.50 per cubic yard ($15.10/cy including proposed unloading costs of $3.60). This cost for disposal capacity is not only the best value to the federal government but is also considerably less than the unit costs for constructing a new in-water facility.

Several other alternatives were identified and evaluated and these alternatives were assessed with respect to completeness, effectiveness, efficiency and acceptability, as discussed in Principles and Guidelines. The Port of Cleveland has advocated for Alternative 7 (i.e., Port of Cleveland Vertical Expansion CDF 12 (Mechanical Placement)] whereby the Port would recover much of its investment through a tipping fee to be paid by USACE for placement of dredged material into the CDF. Section 217 of WRDA 1996, as amended by WRDA 2007, authorizes the USACE to enter into an agreement to use a dredged material disposal facility designed, constructed, managed, owned, or operated by a non-Federal interest, a private entity, or both. Pending ASA(CW) approval, the Port's plan may be pursued through a Section 217 agreement with the Port of Cleveland, who would assume any risks associated

with costs and technical feasibility. There is agreement in principle between both parties that such an arrangement is achievable.

12. Recommendation

I recommend the approval of this decision document by LRD, HQUSACE, and the ASA (CW) contingent upon completion of the EA/FONSI. The Base Plan assumes that 250,000 cy of dredged material (225,000 Federal and 25,000 non-Federal) will be disposed of on an annual basis. Sediment storage needs from 2015 through 2018 will be accommodated at CDF 12 by vertical expansion of these facilities above their design elevations.

The recommended plan is Alternative 7, the Port's Plan (i.e. Port of Cleveland Vertical Expansion CDF 12 (Mechanical Placement), whereby the Port would recover much of its investment through a tipping fee to be paid by USACE for placement of dredged material into the CDF. Section 217 of WRDA 1996, as amended by WRDA 2007, authorizes the USACE to enter into an agreement to use a dredged material disposal facility designed, constructed, managed, owned, or operated by a non-Federal interest, a private entity, or both. Pending ASA(CW) approval, the Port's plan may be pursued through a Section 217 agreement with the Port of Cleveland, who would assume any risks associated with costs and technical feasibility. There is agreement in principle between both parties that such an arrangement is achievable.

Based on these factors, it is recommended that Alternative Plan 7 be implemented to provide sufficient sediment disposal capacity for Cleveland Harbor dredging from 2015 through 2018.

Karl D. Jansen
Lieutenant Colonel, U.S. Army
District Engineer

Acronyms

Term	Definition	Term	Definition
AFB	Alternative Formulation Briefing	**IRC**	Issue Resolution Conference
ASA(CW)	Assistant Secretary of the Army for Civil Works	**LERRD**	Lands, easements, rights-of-way, relocations and disposal
ATR	Agency Technical Review	**LOI**	Letter of Intent
CDF	Confined Disposal Facility	**LRB**	Great Lakes and River Division – Buffalo District
CLNP	Cleveland Lakefront Nature Preserve	**LRD**	Great Lakes and River Division
CM	Construction Management	**LRR**	Limited Reevaluation Report
CSDR	Coastal Storm Damage Reduction	**LWD**	Low Water Datum
CVIC	Cuyahoga Valley Industrial Center	**MSC**	Major Subordinate Command
cy	Cubic yard		
DPR	Detailed Project Report	**NED**	National Economic Development
DQC	District Quality Control/Quality Assurance	**NER**	National Ecosystem Restoration
EA	Environmental Assessment	**NEPA**	National Environmental Policy Act
EC	Engineer Circular	**O&M**	Operation and maintenance
EIS	Environmental Impact Statement	**OMB**	Office and Management and Budget
EO	Executive Order	**OMRR&R**	Operation, Maintenance, Repair, Replacement and Rehabilitation
ER	Ecosystem Restoration	**OEO**	Outside Eligible Organization
ERDC	Engineer Research and Development Center	**ODOT**	Ohio Department of Transportation
FAA	Federal Aviation Administration	**PDT**	Project Delivery Team
FDR	Flood Damage Reduction	**PAC**	Post Authorization Change
FEMA	Federal Emergency Management Agency	**PED**	Planning, Engineering & Design
FONSI	Finding of No Significant Impact	**PMP**	Project Management Plan
FRM	Flood Risk Management	**PL**	Public Law
FSM	Feasibility Scoping Meeting	**PPA**	Project Partnership Agreement
		QC	Quality Control
GRR	General Reevaluation Report	**RED**	Regional Economic Development
		RMC	Risk Management Center
Home District/MSC	The District or MSC responsible for the preparation of the decision document	**RMO**	Review Management Organization
HQUSACE	Headquarters, U.S. Army Corps of Engineers	**RTS**	Regional Technical Specialist
IDMMP	Interim Dredged Material Management Plan	**SAR**	Safety Assurance Review
IEPR	Independent External Peer Review	**SMSA**	Standard metropolitan statistical area
		USACE	U.S. Army Corps of Engineers
IGLD	International Great Lakes Datum		
IPR	In Progress Review	**WRDA**	Water Resources Development Act

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