
Scope of Work

Cleveland Harbor, Ohio

Dredge Material Management Plan



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1. PROJECT DESCRIPTION

Cleveland Harbor is located within the central basin of Lake Erie on the south shore at the mouth of the Cuyahoga River in Cuyahoga County, Ohio (Figure 1). The harbor is 191 miles southwest of Buffalo, NY and 110 miles east of Toledo, OH.

Included in the project are the Outer Harbor and Cuyahoga River Channels (Figure 2). The harbor measures about 1,300 acres, is 5 miles long and varies in width between 1,600 to 2,400 feet. The harbor is protected by a breakwater system: an east breakwater (20,970 feet long), a west breakwater (6,048 feet long), and the east and west arrowhead breakwaters (each measuring 1,250 feet). Authorized depths in this area range from 25 to 28 feet. The East and West Arrowhead Breakwater protect the Lake Approach Channel with an authorized depth of 29 feet. The Entrance Channel varies in width from 750 to 220 feet and is maintained at an authorized depth of 28 feet to the mouth of the Cuyahoga River. The lower Cuyahoga River Channel, from the lakeward side of the piers to immediately above the Old River confluence, is maintained to an authorized depth of 27 feet. The upper Cuyahoga River and turning basin are maintained to an authorized depth of 23 feet and 18 feet respectively. A confined disposal facility (CDF) is also situated in the outer harbor.

The Cleveland Harbor Dredged Material Management Plan (DMMP) is a five-year project that will include management of existing disposal sites to extend their useful life and address specific measures necessary to manage the volume of material likely to be dredged over the next twenty years. The policy of the U.S. Army Corps of Engineers (USACE) is to accomplish the disposal of dredged material associated with the operation and maintenance dredging of Federal navigation projects in the least costly manner that is consistent with sound engineering practices and environmental standards.

2. AUTHORIZATION AND DEVELOPMENT HISTORY

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. The project 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. The role of the USACE, as established by law, is to provide safe, reliable, and efficient waterborne transportation systems for movement of commerce, national security, and recreation. Maintenance of Federal navigation improvements at harbors such as Cleveland, OH, is the responsibility of the USACE. Historically, the USACE has utilized a number of dredged disposal methods for sediments dredged from Federal harbors including unconfined open water disposal and disposal into a CDF. A CDF refers to a site where specific dredged materials are confined because of their potential for the release of contaminants into open water. The

existing CDF at Cleveland Harbor is located in the outer harbor and was completed in 1998. It is 58 acres and has a design capacity of approximately 2,900,000 cubic yards. WRDA 1986 (P.L. 99-662), Section 201, as amended by WRDA 1996, established the cost sharing provisions for harbors. The non-Federal sponsor for the confined disposal facility shall contribute 25% of the cost of construction during the period of construction and an additional 10%, plus interest, over a period not to exceed thirty years.

Figure 1. Cleveland Harbor location map.

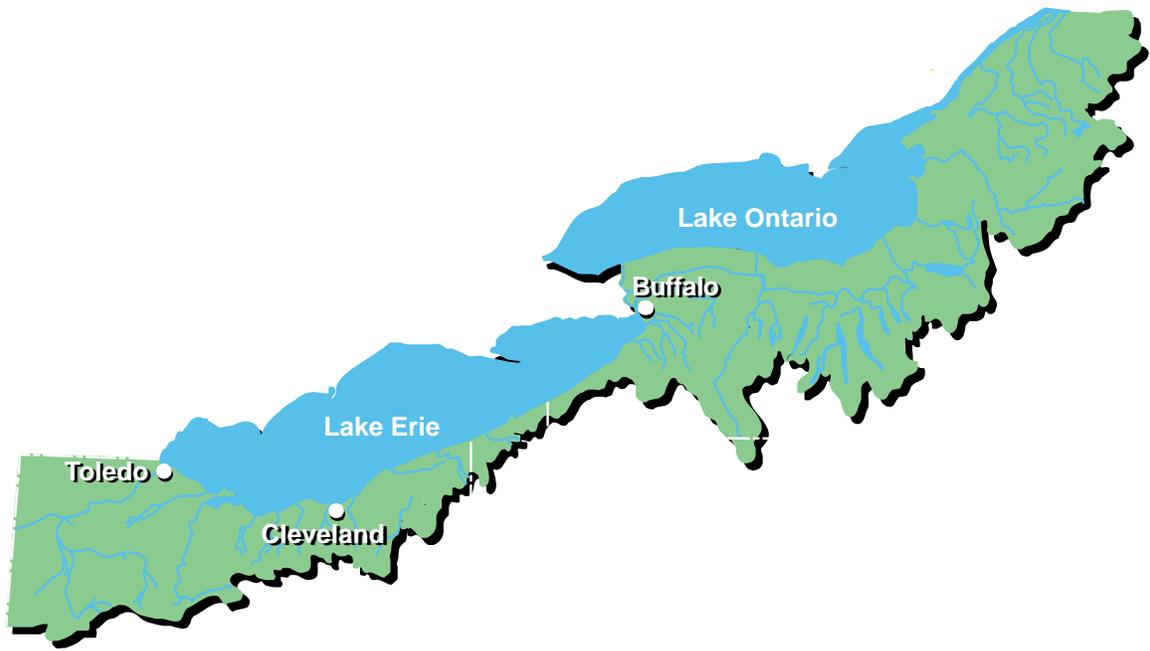


Figure 2. Cleveland Harbor, Project Limits



3. SPONSOR/STAKEHOLDER COORDINATION

Those interested in Cleveland Harbor include a myriad of public and private entities as well as the citizens of the Cleveland Metropolitan Area. The primary public entities are the Cleveland Port Authority and City of Cleveland who are likely to sponsor this effort. As the sponsor, they would be responsible for providing the non-federal funding, executing the Project Cooperation Agreement (PCA) and satisfying the sponsor's obligations outlined in the PCA. The Cuyahoga County Planning Commission is also highly interested in the results of this study along with several other Federal, State and local agencies/organizations involved in the development and regulation of Cleveland water resources. Shippers, private marina operators, environmental organizations, and the general public are the primary private entities interested in the Cleveland DMMP.

The goal of project coordination is to open and maintain channels of communication with interested parties. The objectives of project coordination are: 1) to provide information about proposed USACE activities; 2) to make interested parties' desires, needs, and concerns known to decision-makers; 3) to provide for consultation with interested parties before decisions are reached; and, 4) to consider the views of interested parties in reaching decisions. It should be noted, however, that the USACE cannot relinquish its legislated decision-making responsibility; the outcome of any planning study is subject to institutional constraints.

Project coordination activities will include newsletters, public workshops, and meetings with interested parties, pertinent agencies, and local officials. Coordination with the potential sponsor and stakeholders will begin at study initiation and will be maintained throughout the study process.

4. STUDY PROCESS

Dredged material management planning for all Federal harbor projects is conducted by the USACE to ensure that maintenance dredging activities are performed in an environmentally acceptable manner, use sound engineering techniques, are economically warranted, and that sufficient confined disposal facilities are available for at least the next twenty years. These plans address dredging needs, disposal capabilities, capacities of disposal areas, environmental compliance requirements, and potential for beneficial usage of dredged material and indicators of continued economic justification. The DMMP shall be updated periodically to identify any potential changed conditions. DMMPs are required under USACE Engineer Regulation, ER 1105-2-100, Planning Guidance Notebook, Chapter 3, Corps Civil Works Missions.

The DMMP will be prepared in accordance with the guidance contained in the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (1983) and ER 1105-2-100 (22 April 2000). As such, it will follow the six-step feasibility study planning process, which is:

- **Problem Identification**: Identify the water and related land resources problems and opportunities (relevant to the planning setting) associated with the Federal objective and specific State and local concerns.
- **Inventory and Forecast Conditions**: Identify, analyze, and forecast existing and future conditions without project water and related land resource conditions.
- **Preliminary Formulation and Screening of Alternatives**: Formulate alternative plans that address planning objectives.
- **Evaluation of Alternative Plans**: Evaluate alternative project plans for effectiveness, efficiency, completeness, and acceptability.
- **Compare Alternative Plans**: Compare plans by performing benefit-cost analysis to prioritize and rank alternatives.
- **Plan Selection**: Select a plan for recommendation after consideration of the various alternatives, their effects, and public comments.

5. STUDY PRODUCTS

The two major products that will be produced during the study will be:

5.1 Dredge Material Management Plan

The DMMP will document the study process, the coordination that occurred, and the technical analysis that resulted in the selected plan to address Cleveland Harbor's dredge disposal needs for at least the next twenty years. It will describe the problem, identification and formulation activities that were conducted, and the management alternatives that were considered. The DMMP will specifically document the following major activities along with any other supplementary studies that may be identified during the course of the study:

Engineering Studies: All engineering investigations that support the analysis of alternatives and provide the basis for the recommended plan will be documented. These will include surveying and mapping, hydrology and hydraulics studies, coastal/geotechnical investigations, cost estimating, etc.

Economic Studies: The economic investigations that will be documented will identify historical, existing, and future port conditions by looking at commerce moving via Cleveland Harbor and Cuyahoga River Channel; the types of vessels utilized; facilities that use the channel; and transportation costs as it relates to existing and future project conditions. Data will be collected, analyzed, and integrated from a variety of sources including the

Institute for Water Resources (IWR) and the Waterborne Commerce Statistics Center. The economic analysis that results in the determination of National Economic Development (NED) benefits including risk analysis attributable to the proposed project will also be included.

Environmental Studies: The environmental studies that are performed in accordance with the National Environmental Policy Act (NEPA) and applicable or relevant and appropriate regulations to identify specific measures necessary to manage the disposal of future maintenance dredged material and potential new material dredged from Cleveland Harbor will be contained in a NEPA document that will be prepared to accompany the DMMP. The study's NEPA document will identify and evaluate dredged material placement alternatives and mitigation measures if necessary. The NEPA documentation will address the following pertinent issues: environmental and cultural resources data, environmental impacts, mitigation plans, and environmental compliance. Additionally, the potential effects on the human and natural environment will also be determined. To identify and evaluate dredged material placement alternatives and mitigation efforts, the USACE will request that the U.S. Fish and Wildlife Service (USFWS), the U.S. Environmental Protection Agency (USEPA), and others actively participate in study workgroups and public meetings.

The NEPA documentation will be prepared in accordance with the President's Council on Environmental Quality Rules and Regulations. Documentation will be prepared as defined and amended in 40 Code of Federal Regulations (CFR) Parts 1500-1508.

- **Preliminary Project Cooperation Agreement (PCA) and Financing Plan:** As the recommended plan is finalized, the USACE and the non-Federal sponsor will begin reviewing HQUSACE-established model language for the PCA of a dredged material management project, making necessary revisions as they pertain to the proposed project. The non-Federal sponsor will prepare a letter of intent that acknowledges the requirements of local cooperation and expresses good faith intent to provide required items of local cooperation for the recommended project. Additionally, the non-Federal sponsor will develop a preliminary financing plan describing its plans for financing the local share of the cost of the project. The Buffalo District will prepare an assessment of the non-Federal sponsor's capability to implement the financing plan. Coordination of the draft PCA and preliminary financing plan will be completed concurrent with the draft DMMP. The preconstruction planning and design costs will be subject to cost sharing as part of the first year of construction costs under the terms of the PCA.

6. STUDY TASKS

The first task will be a literature search to identify completed DMMPs and innovative technologies or methodologies that may be applicable to Cleveland Harbor. The remaining tasks will follow the six step planning process, mentioned above. When appropriate, the specific engineering, economic and environmental study tasks will be broken out.

6.1 Problem Identification

Study area water resources-related problems and opportunities will be defined in terms of the Federal objective and specific study planning objectives. Problems and opportunities will encompass current as well as future conditions and will reflect the priorities and preferences of the Federal Government, the non-Federal sponsor and other groups participating in the study process. This problem identification step or 'scoping' will begin at study initiation.

NEPA regulations CFR, Parts 1500-1508, require all Federal agencies that conduct water resource-related planning studies to conduct a scoping process. The NEPA scoping process determines the scope of issues to be addressed and identifies the significant issues related to a proposed action. Although NEPA scoping has traditionally been associated with identifying the environmental concerns associated with proposed actions, it can be combined with the plan formulation scoping process (specifying problems and opportunities) identified in this section. Therefore, to thoroughly define the project and minimize any duplication of efforts, these activities will be conducted simultaneously using stakeholder meetings, correspondence, fact sheets, etc.

Once problems and opportunities are properly defined, study planning objectives and constraints will be determined. Planning objectives are statements that describe the desired results of the planning process. Planning objectives will be directly related to the problems and opportunities identified for the study and will be used for the formulation and evaluation of plans. Constraints are restrictions that limit the planning process. This study will consider resource, legal, and policy constraints. Resource constraints are those associated with limits on knowledge, expertise, experience, ability, data, information, money, and time. Legal and policy constraints are those defined by law, USACE policy, and guidance. Alternative plans will be formulated to meet study objectives and to avoid violating constraints.

These tasks will be undertaken with the basic understanding that the problem at Cleveland is that the CDF is reaching capacity. Without a new disposal site or the identification of other means of extending the life of the CDF, the impact on the local and regional economy will be significant. Many industries depend on the harbor for the receipt of materials to support their operations.

6.2 Inventory and Forecast Conditions

The second step of the planning process is to develop an inventory and forecast of critical resources (e.g., physical, demographic, economic, social, etc.) relevant to the problems and opportunities under consideration in the planning area. This information will be used to further define and characterize the identified problems and opportunities. A quantitative and qualitative description of these resources will be made for both current and future conditions and will be used to define existing and future without-project conditions. Existing conditions are those at the time the study is conducted. The forecast of the future without project condition reflects the conditions expected during the twenty-year project life. The future without project condition provides the basis from which alternative plans are formulated and impacts are assessed. Since impact assessment is the basis for plan evaluation, comparison and selection, clear definition and full documentation of the without-project condition are essential. Forecasts will be made for selected years over the twenty-year period of analysis to indicate how changes in economic and other conditions are likely to have an impact on problems and opportunities. The various study tasks that will be conducted during this phase of the planning process are identified below.

Engineering Tasks

6.2.1 Surveys and Mapping

Aerial Photography

Existing files will be researched for information that might be available. New aerial photography will be acquired as necessary during the three year DMMP study.

Topographic Surveys

Topographic data may be required to establish the limits of a potential upland disposal site, as well as the boundaries of locations on or near shore. The necessity of these surveys will be determined during the study.

6.2.2 Civil Structural Studies - Inventory Existing Conditions

This task includes gathering, inventorying, and reviewing various data, including historical surveys, previous USACE reports, existing physical conditions, etc. that could potentially impact recommended alternatives.

6.2.3 Civil Structural/General Design Studies - Inventory Existing Conditions

This task includes gathering, inventorying and reviewing various data, including: historical surveys; previous USACE reports; existing physical conditions such as soil characteristics, waves, winds, etc. and all pipeline and cable permits which could potentially impact recommended alternatives. This review will determine any data gaps where additional information will be required and identify any additional investigations that will be conducted.

Economic Tasks

6.2.4 Types and Volumes of Commodity Flow

An analysis of existing, as well as potential, commodity flows into and out of the study area will be conducted over the twenty-year project life. This analysis will result in a determination of the following:

- Origins and destinations of import, export, commodity shipments;
- Commodity trade routes;
- The transportation mode or modes by which commodities are carried to or from the port;
- The sizes and types of vessels used for transportation; and
- A description of the economic study area in terms of:
 - Commodities, current and prospective;
 - Existing port development, including port infrastructure;
 - Local municipalities;
 - The local economy; and
 - Competing ports.

Data sources will include Waterborne Commerce of the United States and interviews with harbor and facility representatives as well as any other relevant publications or knowledgeable industry personnel.

6.2.5 Project Waterborne Commerce

Commerce projections that reflect the potential use of the waterway over the twenty-year project life will be developed. The volume of harbor commerce will be projected on a commodity-by-commodity and trade route-by-trade route basis. Commerce projections will be based upon, but not limited to, any or a combination of the following methods: relating the traffic base to an index over time (e.g., general indices on an industry basis); independent hinterland and resource availability studies supplemented by interviews of relevant shippers, carriers, port officials, commodity consultants and experts; and/or statistical analysis of historical flow patterns.

6.2.6 Vessel Fleet Composition and Cost

Vessel Fleet Composition

Historical, present and future vessel/fleet size and composition will be established, comparison of which will result in determination of anticipated fleet changes over the period of analysis. Fleet composition will be considered according to trade route, type of commodity, and volume of traffic, capacity utilization, and any port or canal restrictions.

Vessel Operating Costs

Waterborne commerce transportation costs will be based on vessel operating costs obtained from discussions with Great Lakes' fleet operators.

6.2.7 Current Cost of Commodity Movement

The total origin-to-destination transportation costs for commodity movement will be estimated for the without and with project conditions. Estimated costs will include necessary handling, transfer, and storage, as well as any other accessory charges.

6.2.8 Current Cost of Alternative Movement

The economic concept of substitution applies to production as well as to consumption. The essence of this task is to identify and evaluate substitutes for this project. Such options may include alternative harbors, traffic management, or use of other modes of transportation. Information will be obtained through a search of appropriate literature and interviews with harbor users.

6.2.9 Future Cost of Commodity Movements

This task will result in an estimate of the relevant shipping costs during the period of analysis and future changes in fleet composition, port delays, and port capacity.

6.2.10 Use of Harbor With and Without a Project

The purpose of this task is to estimate harbor use over time, both without and with the project. Applicable data obtained for the establishment of existing conditions will be used as the foundation for this analysis. Data requirements include determination of the use of the harbor in terms of fleet composition, commodity flows, and transportation costs for without and with project conditions.

6.2.11 National Economic Development Benefits

NED benefits will be developed for with- and without-project alternatives.

Environmental Tasks

6.2.12 Sediment Quality Data

Available sediment quality data will be evaluated to determine the suitability of the sediments dredged from the Federal harbor for unconfined open-lake discharge as well as their suitability for beneficial use. Trends in sediment contamination levels at Cleveland Harbor will be assessed to forecast future management needs.

6.2.13 Historical Data – Fish and Wildlife Resources

Existing information from previous Cleveland Harbor studies will be researched for historical data concerning benthic, wetlands, and fishery communities within the study area.

6.2.14 Wetland Trend Analysis

Wetland trends within the study area will be analyzed. Wetlands within the project area will be identified and delineated in accordance with the Corps of Engineers Wetland Delineation Manual (January 1987).

6.2.15 Cultural Resources

In accordance with Section 106 of the National Historic Preservation Act, consultation will be initiated with the National Park Service, Ohio State Historic Preservation Office (SHPO), Indian tribes, and local historic preservation organizations to identify known archaeological sites and historic properties within the area(s) of potential effect (APE). An evaluation of the nature and extent of the proposed project and degree of ground disturbance resulting from the previous and current use of the APE will be used to determine the need for and scale of Phase I and Phase II cultural resource surveys. The significance of any sites/properties identified during this process will be evaluated to determine their eligibility for listing in the National Register of Historic Places. As needed, adverse effects on these properties would be resolved through continued consultation with the SHPO and other consulting parties.

6.2.16 Socioeconomic Data

Current demographic data will be reviewed to identify minority and low-income communities in the vicinity of potential disposal/beneficial use sites in order to ensure their involvement in the project's public participation program; achieve the goal of environmental justice; and avoid, minimize and/or mitigate any disproportionate adverse environmental effects on these communities.

6.3 PRELIMINARY FORMULATION AND SCREENING OF ALTERNATIVES

In the third step in the planning process, non-structural and structural management measures to include beneficial reuse will be identified that meet one or more planning objectives. A range of alternative plans based on (combinations of) screened management measures will be identified in partnership with the potential sponsor and stakeholders. These will be refined and scaled in subsequent iterations throughout the planning process. It should be noted that additional alternative plans (new plans) could be included for evaluation at any time during the process.

Some of the potential measures for the Cleveland DMMP and the preliminary screening criteria are listed in the Preliminary Screening of Measures Table on the next two pages.



PRELIMINARY SCREENING OF MEASURES

Category	Measure	General Performance	General Engineering Feasibility	Relative Cost	Relative Environmental Impacts	Relative Socio-Economic Impacts	Potential for Combining with Other Measures	Status
No-Action	No-action							
Confined Disposal Facilities	Vertical Expansion of Existing CDF							
	CDF Management (Dewatering)							
	Recycling CDF						Can be combined with other measures.	Retain alt. Combine with...
	Nearshore Disposal							
	Construct New CDF							
	Open Lake Disposal							
Beneficial Uses	Manufactured Soils							
	Environmental Restoration & Protection							
	Shallow Water Habitat							
	Recreational							

Category	Measure	General Performance	General Engineering Feasibility	Relative Cost	Relative Environmental Impacts	Relative Socio-Economic Impacts	Potential for Combining with Other Measures	Status
	Hill/Industrial Buffer							
Contaminant Reduction	Nutrient Management							
	Animal Waste Management							
	Pest Management							
Sediment Load Reduction	Crop Residue Management							
	Conservation Cropping Sequence							
	Alternative Crops							
	Grassed Waterways							
	Wetland Sediment Ponds							
	Agricultural Runoff Retention Reservoirs							
	Filter Strips							

Category	Measure	General Performance	General Engineering Feasibility	Relative Cost	Relative Environmental Impacts	Relative Socio-Economic Impacts	Potential for Combining with Other Measures	Status
Sediment Reduction Load Cont.	Stream Bank Erosion							
	Developing Market for Canola Crop							
	Sediment Reduction Strips							

Formulated plans will be in compliance with existing statutes, administrative regulations, and common law or include proposals for changes, as appropriate. Section 904 of WRDA 1986 requires the USACE to address the following matters in the formulation and evaluation of alternative plans:

- Enhancing National Economic Development;
- Protecting and restoring the quality of the total environment;
- The well-being of the people of the United States;
- The prevention of loss of life; and
- The preservation of cultural and historical values.

Engineering Tasks

6.3.1 Technical Coordination for Evaluation of Alternative Plans

The design of dredged material disposal alternatives will include the development of preliminary costs and plans for each management alternative.

6.3.2 Limited Field Data Collection

Limited field studies are intended to provide basic information required for the initial assessment. If initial evaluations determine that an alternative warrants further evaluation, more extensive data collection efforts may be required which may result in the development of scopes of work for additional studies needed for alternative evaluation and selection.

Environmental Tasks

6.3.3 Environmental Resource Inventory

An Environmental Resource Inventory will be prepared from a review of relevant literature. This report will document existing environmental resources occurring in or surrounding the study area. The supplemental environmental inventory will include information regarding the navigation project, recreational and natural resources impacts, aerial data, historical data, GIS capabilities, and the selection of the recommended plan. Tasks will include coordination in accordance with the Endangered Species Act, Fish and Wildlife Coordination Act, and Coastal Zone Management Act.

6.3.4 Determine Sediment Suitability:

The suitability of dredged sediments for placement in the selected alternative disposal site(s) will be analyzed. The compatibility of the dredged material to sediments present within the discharge site will be addressed. If applicable, the detrimental effects of contaminants in the dredged material will also be addressed. This analysis will also be utilized in preparing the 404(b)(1) Evaluation.

Interdisciplinary Study Team Tasks

6.3.5 Development of Weighting Factors

If appropriate, weighting factors will be developed to assist in the evaluation of alternative plans. Both the USACE study team and appropriate stakeholders will participate in their identification.

6.3.6 Locate Suitable Beneficial Use/Disposal Sites

Beneficial uses of dredged material, in combination with other project measures, will be investigated for the placement of material dredged from Cleveland Harbor. Beneficial use disposal sites will be identified through the efforts of the USACE study team in association with appropriate stakeholders and various Federal and State agencies. All potential measures will be identified and analyzed for potential placement suitability.

6.3.7 Independent Technical Review - In-Progress Review

The dredged material management study's review process is intended to identify and resolve concerns that might otherwise delay or preclude HQUSACE approval of the draft report. In-progress reviews can be held at any point in time during the study process to provide an update of study findings and progress, identify potential problems (technical/policy), and document decisions. Early identification and resolution of technical/policy concerns at, or subsequent to the in-progress review, will allow the Buffalo District to make necessary project adjustments prior to submitting a draft report.

The entire study team and the non-Federal sponsor will participate in the in-progress review. This meeting will be a key decision point in determining whether alternatives meet Federal and non-Federal policies and budgetary criteria and should be recommended for project implementation.

This study task includes the Project Delivery Team (PDT) internal review to include functional chiefs and an Independent Technical Review (ITR). The ITR will be performed by persons not involved in the development of the DMMP and led by a Regional Technical Specialist outside the District.

Real Estate Tasks

6.3.8 Real Estate and Alternative Plans

Real Estate will provide advice and monitor real estate activities and issues for various alternative plans. Real estate studies, at this point, will be preliminary in nature and identify issues and provide information to be considered in determining the selection of the recommended plan.

6.4 EVALUATION OF ALTERNATIVE PLANS

The fourth step in the planning process is the evaluation of alternative plans. The evaluation of project effects is a comparison of the with-project and without-project conditions for each alternative.

Evaluation consists of four general tasks:

The first task is to forecast the most likely with-project condition expected under each alternative plan. Each with-project condition will describe the same critical variables included in the without-project condition. Criteria to evaluate the alternative plans include all significant resources, outputs and plan effects. They also include contributions to the Federal objective, the study planning objectives, compliance with environmental protection requirements, the four evaluation criteria (completeness, effectiveness, efficiency and acceptability) and other criteria deemed significant by participating stakeholders. The definitions of completeness, effectiveness, efficiency and acceptability are:

Completeness is a determination of whether or not the plan includes all elements necessary to achieve the objectives of the plan. It is an indication of the degree that the outputs of the plan are dependent upon the actions of others.

Effectiveness is defined as a measure of the extent to which a plan achieves its objectives. All of the plans in the final array provide some contribution to the planning objectives.

Efficiency is a measure of the cost effectiveness of the plan expressed in net benefits. All of the plans in the final array provide net benefits.

Acceptability is defined as acceptance of the plan to the local sponsor and the concerned public. All of the plans in the final array must be in accordance with Federal law and policy. *The plans are either more or less acceptable than other plans. Since all plans meet Federal criteria, they are considered minimally acceptable (plans that do not meet this criteria should have been screened at the preliminary plan stage.)*

The second task is to compare each with-project condition to the without-project condition and document the differences between the two. The third task is to characterize the beneficial and adverse effects by magnitude, location, timing and duration. The fourth task is to identify the plan(s) that will be further considered in the planning process, based on a comparison of the adverse and beneficial effects and the evaluation criteria.

Engineering Tasks

6.4.1 Coastal/Geotechnical Evaluation

Information obtained previously in the study effort task will be reviewed to provide an initial coastal/geotechnical assessment of the suitability of foundation conditions for alternative plans. This assessment will coincide with the *Compare Alternative Plans* task in order to coordinate ranking of plans based on engineering feasibility and environmental suitability. The *Project Cost Estimates* task will then begin, and include only those alternatives that best meet these criteria.

6.4.2 Rough Order of Magnitude (ROM) Estimates

Initial construction cost estimates will be prepared for each dredged material management alternative. Alternative estimates will be reviewed for appropriate equipment, productivity, and operational factors. For non-dredging work, ROM estimates will be prepared using spreadsheets. These spreadsheet estimates will be based on the escalated historical cost of similar projects.

Economic Tasks

6.4.3 Average Annual Costs

Average annual equivalent construction costs, including interest during construction and operation and maintenance costs will be calculated for project level cost estimates of each project alternative. The discount rate used for this analysis will be the discount rate established annually for the formulation and evaluation of plans for water and related land resources.

Environmental Tasks

6.4.4 Socioeconomic Analysis

Non-monetary social and economic impacts will be evaluated on the region, community, and groups within the zone of influence of the project. Impacts to be considered under the other social effects account will include the following: income distribution; employment distribution; population distribution and composition; the fiscal condition of the state and local governments; the quality of community life; life, health, and safety factors; displacement; and long-term productivity. Impacts to minorities and low-income groups will also be evaluated and incorporated into the environmental justice analysis in the NEPA document.

6.4.5 Mitigation Analysis Report

A detailed evaluation addressing possible actions that would offset any unavoidable impacts associated with the study's alternatives will be conducted. All efforts will be

made to reduce any potential environmental impacts associated with the proposed DMMP; however, if adverse environmental impacts are unavoidable, then a mitigation plan will be developed.

6.4.6 Evaluate Proposed Alternatives

During this study task, proposed alternatives that were derived during the modeling studies and stakeholder meetings will be evaluated to determine environmental benefits that could possibly occur by implementing each proposed alternative. The no action alternative will be included as part of this assessment. Each alternative will be evaluated from an environmental perspective for impacts that may occur to air and water quality, vegetation, fish and wildlife habitat, etc. Environmental and socioeconomic impacts will be assessed for each proposed alternative.

6.5 COMPARE ALTERNATIVE PLANS

In the fifth step of the planning process alternatives (including the no action plan) are compared against each other, with emphasis on the outputs and effects that will have the most influence in the decision making process. Beneficial and adverse effects of each plan will be compared; these effects include both monetary and non-monetary benefits and costs. Identification of tradeoffs will also be documented to support the team's final recommendation. This comparison step is a reiteration of the evaluation step; with the exception that in this step each plan (including the no action plan) is compared against each other and not against the without-project condition. The output of the comparison step will be a ranking of plans.

Trade-off Analysis

The first trade-offs to be considered in evaluating the final alternative plans is to distinguish between the No Action Alternative and the other action alternatives. This is followed by the trade-off between the action alternatives.

(1) Action versus No Action

The no action alternative ranks lower than the action alternatives in that it is not effective in meeting any of the planning objectives. It has no positive benefits or impacts, since it is the basis from which the impacts and benefits are measured. It does not, however, involve incurring the implementation cost or adverse impacts of the action alternatives.

(2) Trade-Offs between Action Alternatives

The second level of trade-offs to consider is those between the action alternatives. Of the action alternatives considered, there is an obvious trade-off between *describe trade-offs*.

Compare responses to the formulation criteria – efficiency versus effectiveness, efficiency versus acceptability.

ALTERNATIVE COMPARISON

ALTERNATIVE	COMPLETENESS	EFFECTIVENESS	EFFICIENCY	ACCEPTABILITY
NO ACTION				
ALT. 1				
ALT. 2				
ETC.				

6.6 PLAN SELECTION

In the sixth and final step in the planning process a single alternative plan will be selected. The recommended plan will be shown to be preferable to taking no action or implementing any of the other alternatives considered during the planning process.

PLAN SELECTION

The following designations will be made in the selection process:

- a. National Economic Development (NED) Plan. This is the plan that maximizes net national economic benefits.
- b. National Ecosystem Restoration (NER) Plan. This is the plan that reasonably maximizes net ecosystem restoration benefits by having the maximum excess of beneficial ecosystem effects for the costs.
- c. Optimum Trade-off Plan. This is the plan that provides the best mix of contributions to net national economic development and ecosystem restoration. It attempts to maximize the sum net of net economic and ecosystem effects.
- d. Locally Preferred Plan. This is the plan that, in the opinion of the sponsor, best meets the needs of the local community.
- e. Selected Plan.

Engineering Tasks

6.6.1 Project Cost Estimates

Project cost estimates will be developed for the recommended plan through the plans and specifications study phase.

6.6.2 Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) Cost Estimates

OMRR&R estimates will be prepared in support of the recommended plan.

6.6.3 Non-Federal Estimates

Non-Federal dredged material cost estimates will be developed for the recommended plan through the plans and specifications study phase.

6.6.4 Baseline Fully Funded Cost Estimate

As part of this study task, a Construction Execution Plan will be developed; consideration will be given to the size of the construction contract, phasing within each contract, and the sequencing of contracts. A Microcomputer Aided Cost Engineering System fully funded cost estimate will be prepared taking into consideration the Construction Execution Plan.

Environmental Tasks

6.6.5 NEPA Document

A NEPA document will be prepared to evaluate the environmental impacts associated with the management of material dredged from Cleveland Harbor. Information from fish and wildlife, cultural resources, and other resource-specific studies will be incorporated into the NEPA document.

6.6.6 Cultural Resources

As appropriate, Phase I and Phase II Cultural Resource Surveys will be completed.

6.6.7 Section 404(b)(1) Evaluation

In compliance with the Clean Water Act, a 404(b)(1) Evaluation will be prepared to analyze any potential water quality impacts associated with the placement of fill materials dredged from the study area and discharged into the waters of the United States.

6.6.8 Section 7, Endangered Species Act

The USFWS and ODNR will be requested to furnish information as to whether any listed threatened or endangered species or designed critical habitat, are within the proposed project area. If so, the USACE will prepare a Biological Assessment (BA) to determine if the proposed project may effect the study area, a BA will not likely be required.

6.6.9 Section 401 State Water Quality Certification (WQC)

Where applicable, WQC will be obtained from the State of Ohio stating that the proposed management alternative would not be in violation of the State's water quality standards.

6.6.10 Ohio Coastal Zone Management Program Federal Consistency Determination:

An Ohio Coastal Zone Management Program Federal Consistency Determination will be prepared to document compliance with the management policies of the program.

6.6.11 All Other Environmental Documents

This study task includes determination of compliance with other applicable environmental laws and regulations not specifically mentioned above [e.g., Air Conformity Determination (Clean Air Act) and compliance with appropriate Executive Orders].

6.6.12 Record of Decision

If applicable, upon completion of the NEPA document, a comprehensive summary will be prepared to report compliance with all environmental requirements.

Real Estate Tasks

Real Estate will advise and monitor real estate activities associated with the Recommended Plan by: providing a Real Estate Plan, preliminary attorney opinion(s) of compensability, and fair market appraisals; attending and participating in real estate public meetings and hearings, contributing to real estate drawings, providing detailed acquisition information to assure acquisitions are conducted in compliance with Federal Law, and attending project team meetings; and providing input into and reviewing the draft and final report and participating in the ITR.

7. SUMMARY

The DMMP will document the study analyses, conclusions, and recommendations. It will be the result of an iterative process that will include draft versions of the document and ITR

The DMMP will be prepared in accordance with guidance contained in ER 1105-2-100 and it will consist of:

- A main report summarizing the study's technical findings, conclusions and recommendations;
- Technical appendices, as necessary, presenting the detailed evaluations and results of individual work tasks; and
- Draft NEPA document(s).