APPENDIX J

DESIGN ANALYSIS

Cleveland Harbor
Draft DMMP/DEIS
Design Appendix

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1. INTRODUCTION

The Cleveland Harbor Confined Disposal Facility (CDF) proposed under the selected plan in this document is the newest in a series of CDFs that have been constructed at Cleveland Harbor, Ohio (reference Figure 2.2) to contain sediments dredged from the Federal navigation project that are unsuitable for open-lake disposal. The construction of a new facility will enable dredging of the project to continue well into the future as the facilities presented in the preferred plans are sized to contain sediments for 20 to 21 years of dredging (based on the base plan rate of annual dredging established in Chapter 2). The CDF and the Cleveland Harbor Dredged Material Management Plan (DMMP) are being developed under the Operations and Maintenance Authority for the Federal navigation project at Cleveland, Ohio.

2. PURPOSE AND SCOPE OF THIS APPENDIX

The purpose of this appendix is to describe the CDF alternatives proposed under the DMMP and to present the preliminary design for the construction of the selected plan. Approval of the DMMP and its appendices will provide the basis for the preconstruction engineering and design of the project. This report is the preliminary design level report. It includes the following information: the project authority; a description of the Federal navigation project at Cleveland Harbor; summaries of the field investigations and design work; the preliminary cost estimates for the preferred plans; a summary of the environmental investigations; and the preliminary project construction schedule. Information on the formulation and environmental impacts of this project can be found in the main document.

3. PROJECT AUTHORIZATION AND LOCAL COOPERATION

The existing Federal navigation project at Cleveland, Ohio was authorized by the River and Harbor Acts of 1875, 1886, 1888, 1899, 1902, 1907 and 1910. The 1937 River and Harbor Act made the maintenance of the channels of the Cuyahoga and Old Rivers to a depth of 21 feet below Low Water Datum (LWD) a Federal responsibility. All subsequent legislation has made maintenance of all channels included in the Federal project at Cleveland Harbor a Federal responsibility. The selected plan is to be constructed under the Operations and Maintenance Authority of the original project contained in the River and Harbor Acts of 1946, 1958, 1960, and 1962. The construction of a new CDF is required for the continued main entrance of the existing project which is consistent with the original project authorizing documents. The construction of the CDF is cost-shared in accordance with Section 201 of the Water Resources Development Act of 1996. The Cleveland Cuyahoga Port Authority and the City of Cleveland has indicated their intent to be the non-Federal sponsors and as such, will be required to provide the following:

a. 25% of the initial cost of the *base-plan* facility for Commercial Navigation projects where authorized depths range from greater than 20 feet to 45 feet.

b. 100% of the cost of all lands, easements, rights-of-way and relocations (LERR).

c. An additional 10% of the total project cost after construction over a maximum 30-year period. The non-Federal costs of lands, easements, rights-of-way and relocations (other than utility relocations) needed for the project are credited against this extra 10% non-Federal costs.

d. Maintenance of the facility after completion of its use for disposal purposes in a manner satisfactory to the Secretary of the Army.

4. PROJECT DESCRIPTION

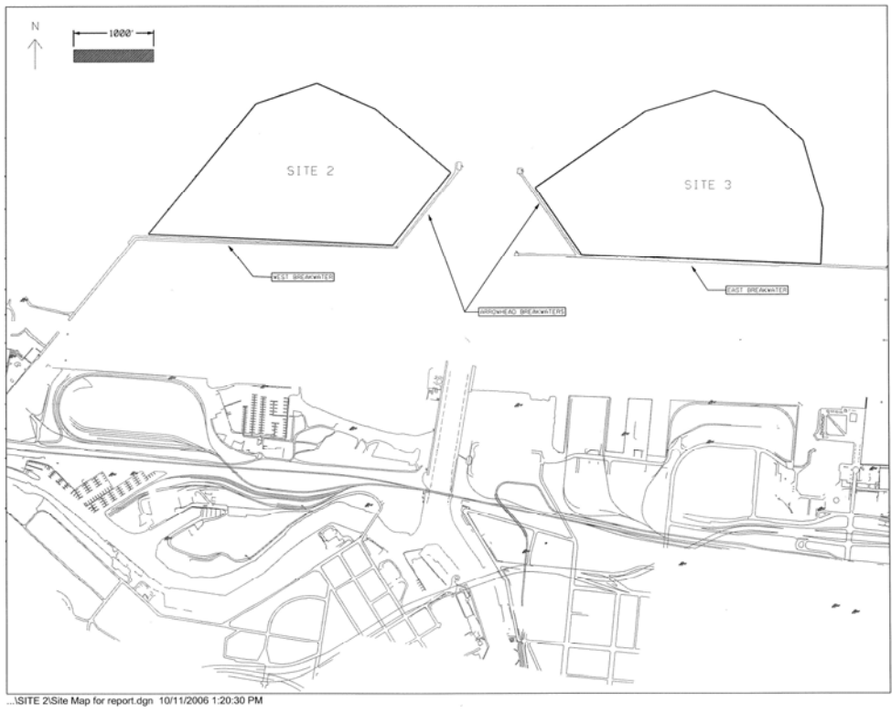
Preliminary CDF designs were developed to assess the feasibility of Sites 2, 2a, 3, 3a and East 55th Street as locations for a new CDF.

<u>CDF Sites 2 and 3</u>

CDFs at Sites 2 and 3 are both designed so that dredged fill can be placed up to +20' LWD. The CDF is esigned to contain sediments while allowing water to either evaporate or

flow out of the disposal facility through the dike itself or through the overflow weir. Additional information regarding the sites is presented in Table 1. The proposed CDF locations are illustrated on Figure 1 below.

FIGURE 1 – Locations of proposed sites 2 and 3



	SITE 2 CDF	SITE 3 CDF
AREA (ACRE)	108	117
EXISTING LAKEBED ELEVATION (FEET FROM LWD)	-20 to -30	-16 to -27
OPEN STORAGE VOLUME (CUBIC YARDS)	7.2×10^6	7.2×10^6

TABLE 1 – CDF information for Sites 2 and 3

A combination of steel sheet piling, geotextile filter, and granular filter are utilized within perimeter rubblemound structures to provide a barrier to contain dredged material. The rubblemound structures serve to support and protect the barrier materials. Stability berms are utilized at the toe of the rubblemound structures to ensure foundation stability. Typical rubblemound cross sections for Site 2 are illustrated on Figures 3 through 5. Typical rubblemound cross sections for Site 3 are illustrated on Figures 6 through 8. Table 2 includes a general description of the rubblemound materials illustrated on Figures 3 through 8.

MATERIAL	DESCRIPTION
A	5 to 10 ton stone
B	600 to 2000 lb. stone
C	0.5 to 12-inch stone, slag, or recycled concrete
D	1.5 to 4-inch stone, slag, or recycled concrete
E	3 to 12-inch stone or recycled concrete
F	0.1 to 0.75-inch stone/sand, slag, or recycled concrete
H	6 to 18-inch stone or recycled concrete

TABLE 2 – Rubblemound materials as illustrated on Figures 3 through 8

CDF Cells 1 and 2 of Alternative Plan 2a

Alternative Plan 2a involves constructing a in-harbor CDF cell (hereinafter "Cell 1") in addition and prior to construction of a CDF cell (hereinafter "Cell 2") in the outside the harbor at the location of Site 2. The intent of first constructing a cell inside the harbor is to provide

capacity sooner and at a lower cost per cubic foot than that which can be provided by the open-water CDFs.

Alternative Plan 2a would involve the construction of a two celled CDF as illustrated in Tab C, this appendix. Cell 1, to be constructed and available for disposal of dredged material in 2015, would be approximately 65 acres in size and would have a top of wall elevation of +10 LWD. Construction of cell 1 would include the existing wall of the West Breakwater as the northern perimeter. To the east and south, Cell 1 would be constructed of new perimeter walls, consisting of vertical steel sheet pile walls. Cell 1 would be subdivided as necessary to improve the operational aspects of dredged material disposal. Cell 1 would be designed to have a life of about eight years assuming the average annual disposal of about 338,220 CY (about 2,620,000 CY total). Cell 1 would be operational from 2015 through 2022. Upon filling Cell 1 the area would be transferred to the non-Federal sponsor.

Cell 2 of Alternative Plan 2a would be constructed within the bounds of Site 2 and would include the West Breakwater as the southerly wall and would be operational from 2023 through 2035. It would be designed to have an area of 65 acres, a top of wall elevation of +20 LWD and an estimated capacity of 4,490,000 CY for a life of thirteen years at 338,220 CY per year. The north and west walls of Cell 2 would have a preliminary design identical to that of the Site 2 CDF.

CDF Cells 1 and 2 of Alternative Plan 3a

Alternative Plan 3a involves constructing a in-harbor CDF cell (hereinafter "Cell 1") in addition and prior to construction of a CDF cell (hereinafter "Cell 2") in the outside the harbor at the location of Site 3. The intent of first constructing a cell inside the harbor is to provide capacity sooner and at a lower cost per cubic foot than that which can be provided by the open-water CDFs.

Alternative Plan 3a would involve the construction of a two celled CDF as illustrated in Tab X, this appendix. Cell 1, to be constructed and available for disposal of dredged material in 2015, would be approximately 50 acres in size and would have a top of wall elevation of +10 LWD. Construction of cell 1 would include the existing wall of the East Breakwater as the northern perimeter. To the east and south, Cell 1 would be constructed of new perimeter walls, consisting of vertical steel sheet pile walls. Cell 1 would be subdivided as necessary to improve the operational aspects of dredged material disposal. Cell 1 would be designed to have a life of about five and a half years assuming the average annual disposal of about 338,220 CY (about 1,800,000 CY total). Cell 1 would be operational from 2015 through 2020. Upon filling Cell 1 the area would be transferred to the non-Federal sponsor.

Cell 3 of Alternative Plan 3a would be constructed within the bounds of Site 3 and would include the West Breakwater as the southerly wall and would be operational from 2020 through 2034. It would be designed to have an area of 79 acres, a top of wall elevation of +20 LWD and an estimated capacity of 4,650,000 CY for a life of fourteen years at 338,220 CY per year. The north and west walls of Cell 2 would have a preliminary design identical to that of the Site 3 CDF.

CDF Alternative Plan East 55th Street Site

This plan would involve the construction of a single Confined Disposal Facility as illustrated in Figure 2 below. The CDF is approximately 157 acres in size. To the south, the East 55th Street site will be bounded by an improved State Park Marina breakwater, the natural shoreline near the terminus of East 55th Street, and a to-be-constructed perimeter wall/dike. A portion of the eastern boundary would be formed by the existing First Energy circulating water intake (necessary improvements will be made to the structure) and the remainder of the perimeter shown will be formed by still to be constructed walls. The perimeter walls will be comprised of both rubblemound dikes (similar in construction to that of existing Dike 10B) and back-to-back open cell wall design. Since this site may be converted into a commercial port by the local sponsor, the local sponsor requests a vertical surface along the northern, eastern, and a portion of the western outer walls for mooring vessels.

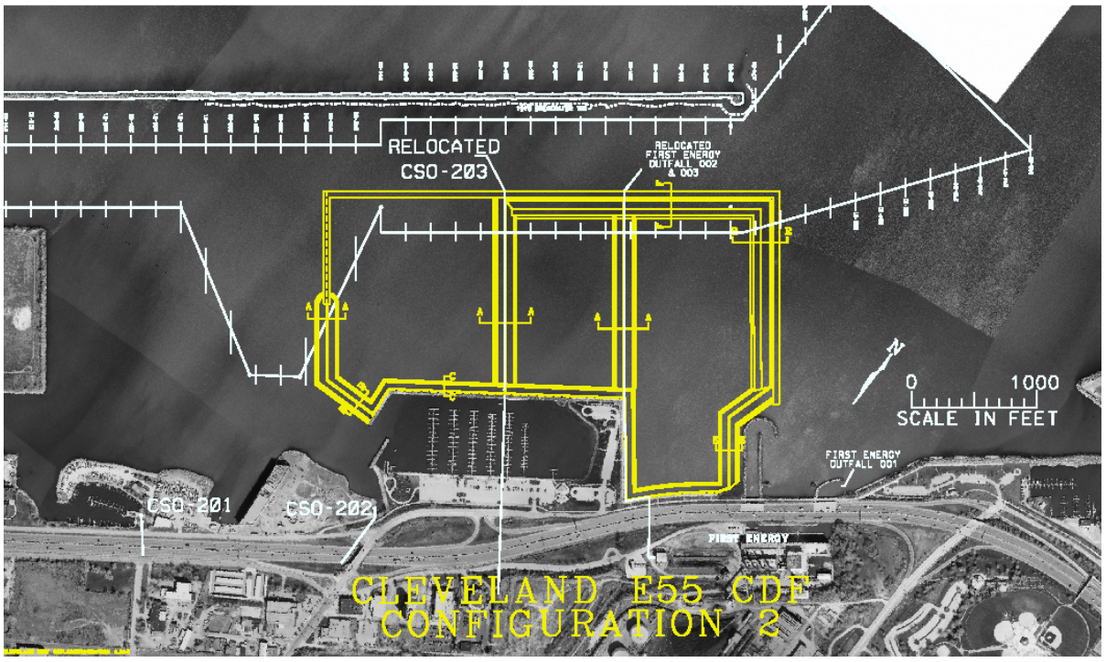


FIGURE 2 – East 55th Street CDF

The CDF would be constructed in optimally sized cells in order to spread out construction costs over time while balancing cost effectiveness. Cell size and sequencing has not yet been finalized, but the combined footprint will not exceed what is shown in the attached sketch. Anticipated volume is 6,850,000 cubic yards, which will provide approximately 20 years of capacity assuming an annual dredging volume of about 338,220 cubic yards per year. The first cell would be constructed from 2012 through 2014, allowing filling operations to begin in FY15. Additional cells would follow, with each subsequent cell becoming operational as the previous cell is filled.

5. SUBSUFACE AND GEOTECHNICAL INVESTIGATIONS

Geotechnical field investigations were not conducted in direct support of the preliminary design analysis. Soundings for used in preparation of the preliminary designs were taken from project condition surveys conducted in 2007 by survey personnel from the U.S. Army Corps of Engineers, Buffalo District and published National Oceanic and Atmospheric Administration nautical charts. A bathymetric survey was conducted within the footprint of the East 55th Street site in

Subsurface investigations in support of preconstruction engineering and design are planned for Fiscal Year 09. Design assumptions are based on historical data for marine construction in the harbor and engineering judgment. A summary of subsurface design criteria is discussed in Paragraph 8, this appendix.

6. DESIGN WAVE ANALYSIS

A design wave analysis at the proposed CDF sites was not completed, however past investigations have suggested an incident significant design wave along the East Breakwater of approximately 13 feet. Dike 10b within the interior of the harbor was designed based upon an incident significant design wave of 6 feet. Typical stone sizes, armor slopes, cross-section configurations and crest elevations were selected based upon East Breakwater repair experience, and past CDF designs which had crest elevations based upon limiting wave overtopping. A rigorous wave analysis will be required during the detailed design of the selected alternative.

7. DESIGN CROSS SECTION

Construction of a deep water facility presents many challenges. Perimeter walls must accommodate wave heights up to 13 feet. The three preferred alternative CDF designs are Site 2, located along and lakeward of the West Breakwater, Site 2a, located lakeward and landward of the West Breakwater, Site 3, located along and lakeward of the western end of the East Breakwater (Figures 2.7 through 2.9). The primary differences between CDFs 2 and 3 include

area, water depth, and capacity; CDF 2 is somewhat smaller in area (108 acres) than CDF 3 (129 acres). However, the water depth for CDF 2 is approximately four feet greater than for CDF 3.

Sites 2 and 3

A combination of steel sheet piling, geotextile filter, and granular filter are utilized within perimeter rubblemound structures to provide a barrier to contain dredged material. The rubblemound structures serve to support and protect the barrier materials. Stability berms are utilized at the toe of the rubblemound structures to ensure foundation stability. Typical rubblemound cross sections for Site 2 are illustrated on Figures 3 through 5. Typical rubblemound cross sections for Site 3 are illustrated on Figures 6 through 8. Table 2 includes a general description of the rubblemound materials illustrated on Figures 3 through 8.

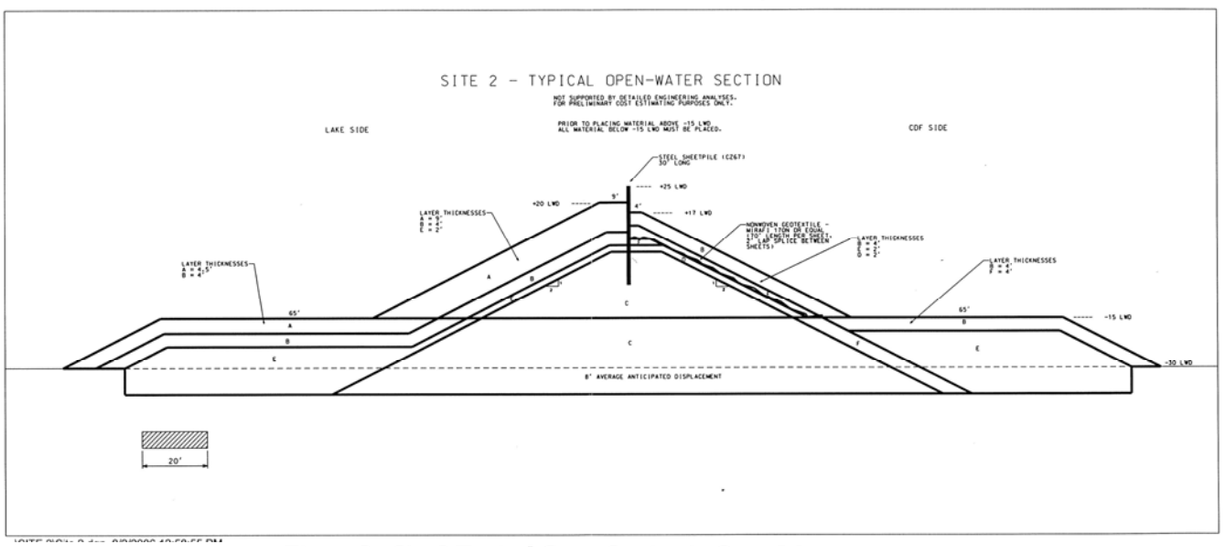


Figure 3 - Site 2 Typical Cross Section in Open Water

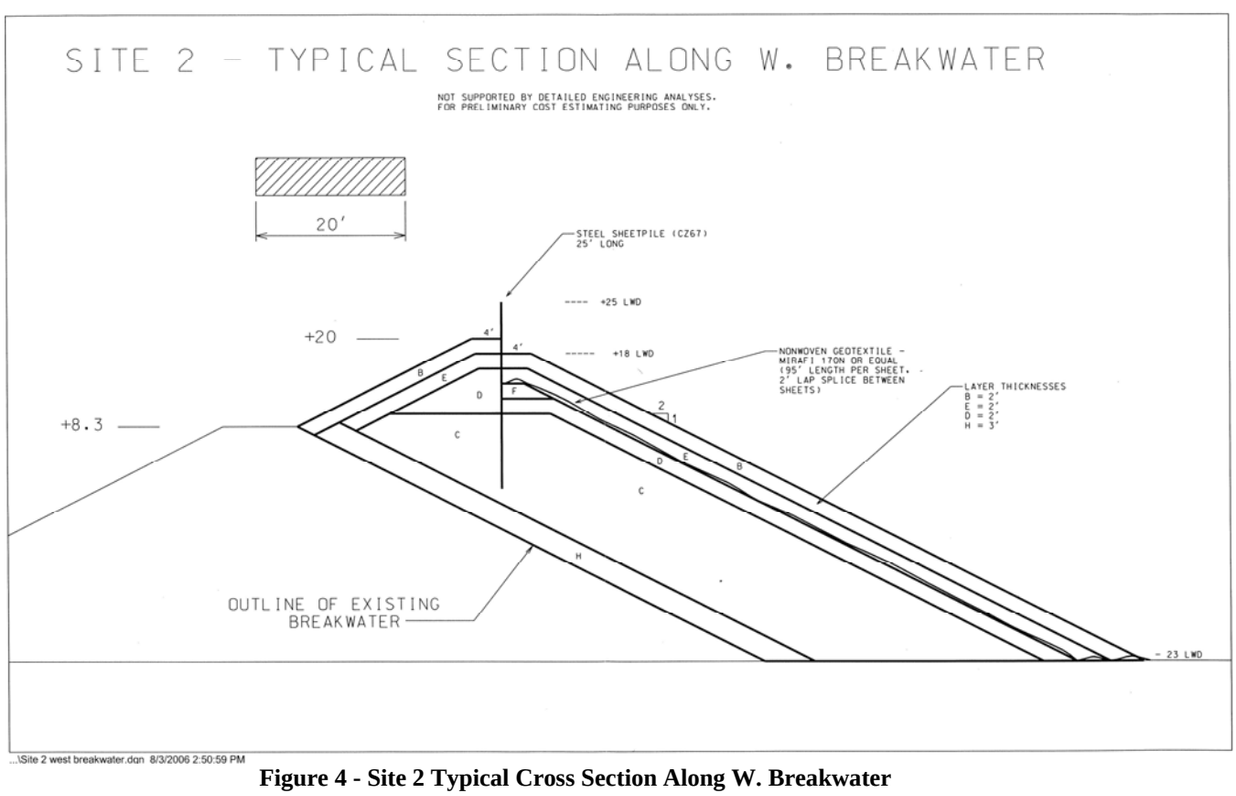


Figure 4 - Site 2 Typical Cross Section Along W. Breakwater

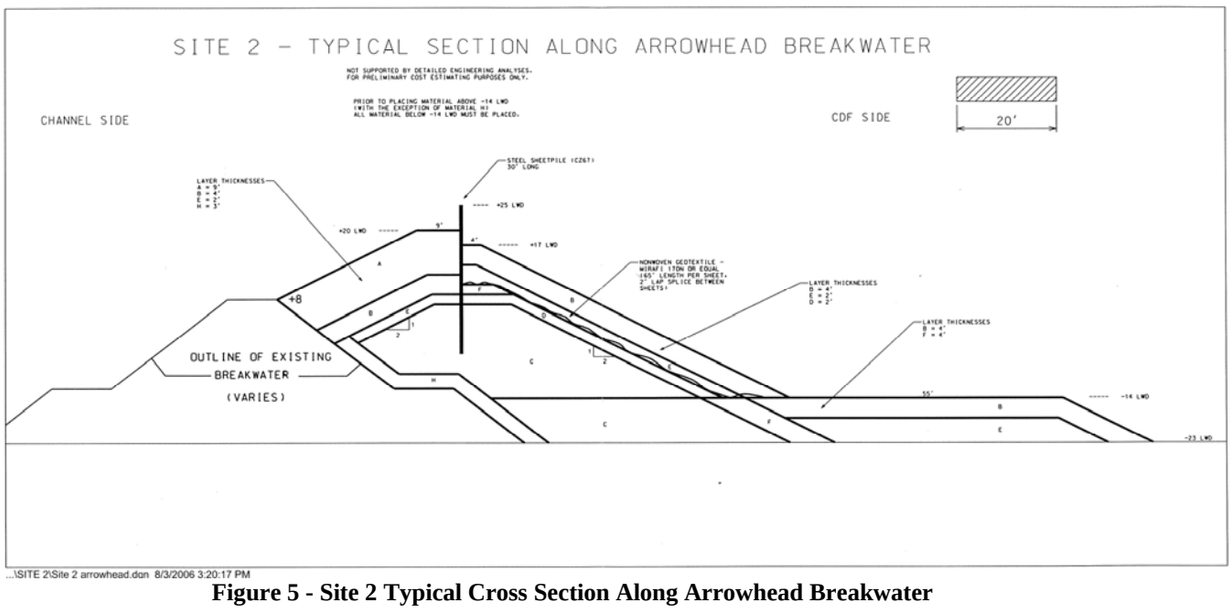


Figure 5 - Site 2 Typical Cross Section Along Arrowhead Breakwater

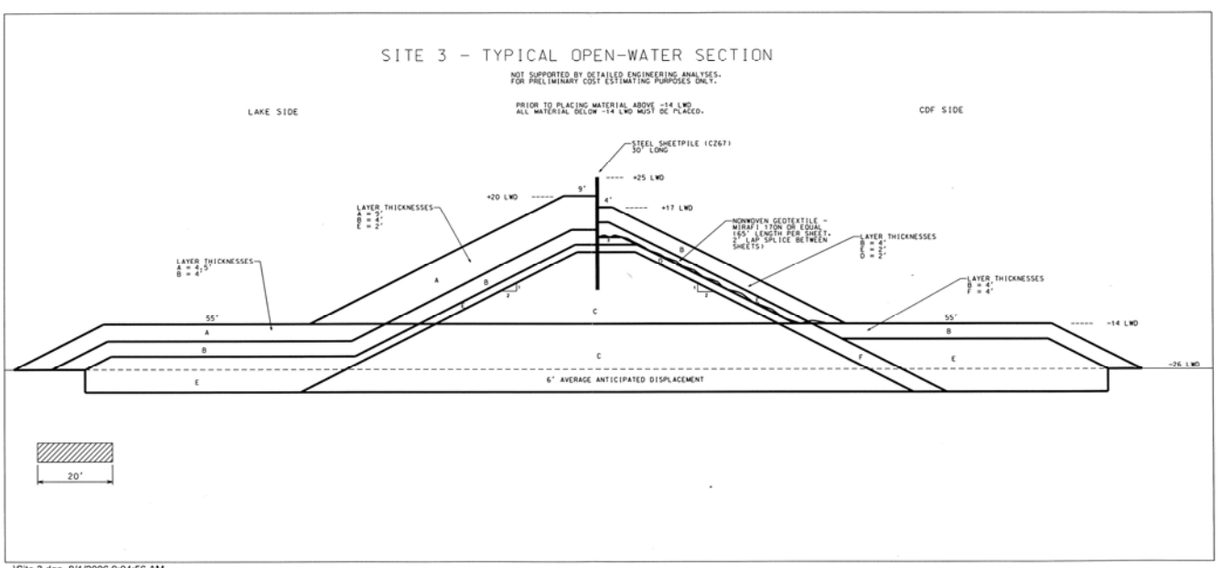


Figure 6 - Site 3 Typical Cross Section in Open Water

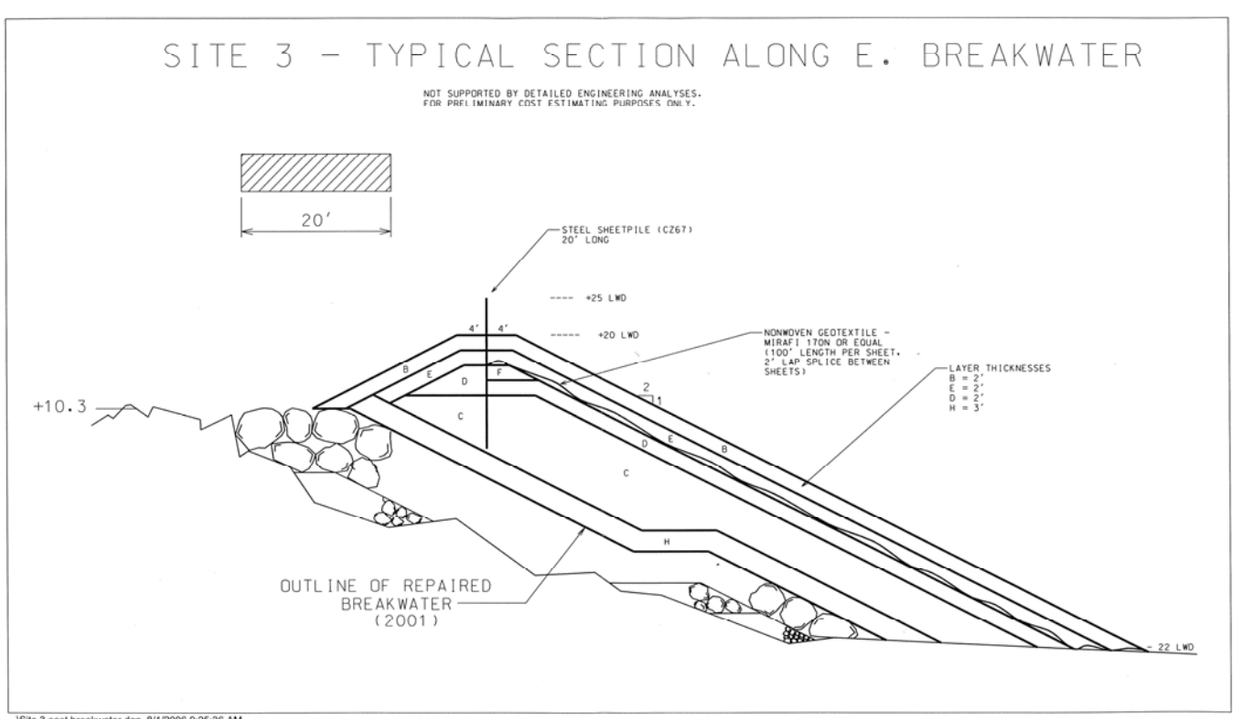


Figure 7 - Site 3 Typical Cross Section Along E. Breakwater

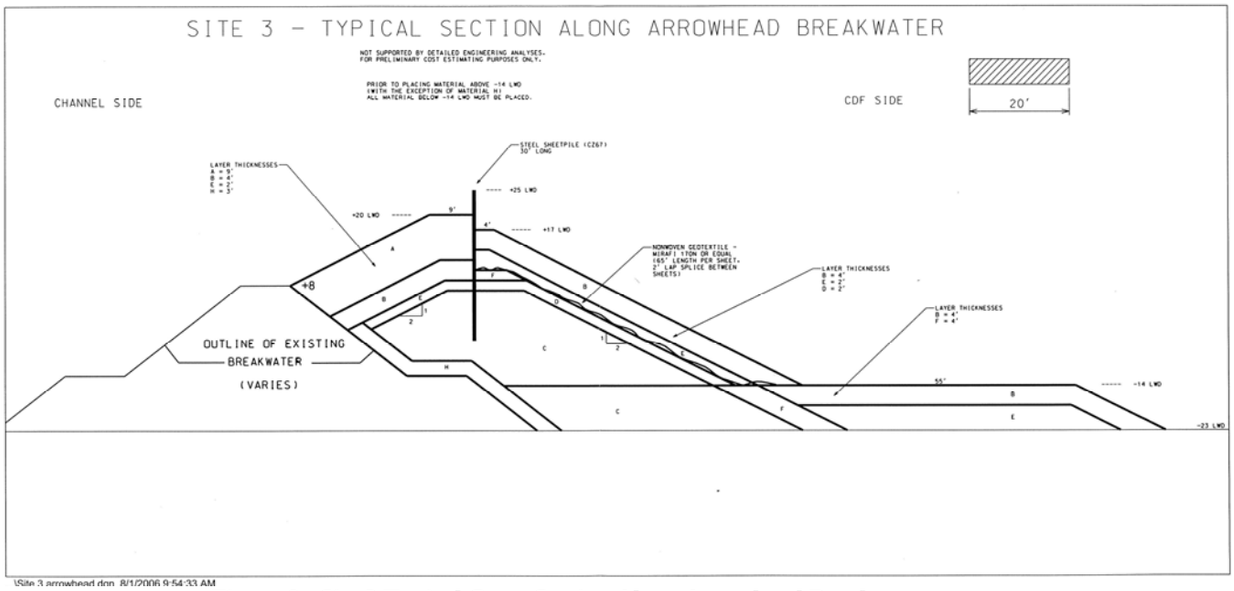


Figure 8 - Site 3 Typical Cross Section Along Arrowhead Breakwater

The cross section is made up primarily of bedding stone and a filter layer. The filter layer is designed to retain sediments while allowing water to pass through the dike. Water will typically flow out of the dike during and for sometime after annual dredging operations or during prolonged periods of precipitation. Water may also flow into the diked area when water levels fluctuate on Lake Erie. A geotextile fabric will be placed over the filter layer to keep the material in this layer from migrating through the underlayer and being washed out. The dike as designed is high enough to limit wave overtopping which could bring water into the containment area.

On the disposal area side of the dike the bedding and filter layers will be covered by two layers of underlayer stone which will be large enough to protect the dike slope from the limited wave activity that can be expected in the enclosure. The harbor side of the dike will also have the two layers of underlayer stone with an additional layer of armor stone to protect against the wave climate that can be expected in the harbor area. Geotechnical studies concluded that a wide berm at the base is required on either side of the dike to provide for structural stability. Note that there is considerable displacement of the existing very soft bottom materials with the bedding stone. It is estimated that between 7 to 9 feet of displacement in the bottom sediments will take place, with the bedding stone providing the foundation base for the dike.

Cell 1 of Alternatives 2a and 3a

The design cross-section for Cell 1 of Alternatives 2a and 3a is a vertical walled dike comprised of a sheet steel pile and combi-wall system as shown in Figure 9. The intent of the vertical walled cell is to reduce the footprint of the cell and its corresponding encroachment on the existing Federal channel. Inside the cell, the vertical walls maximize available disposal capacity in what is a relatively small disposal space. The vertical walls also leave open the possibility that the cell could be used as future port facilities, if the local sponsor so chooses. This design is only suitable for cells inside the protected harbor, as they are not able to withstand the wave and ice action of the open lake water.

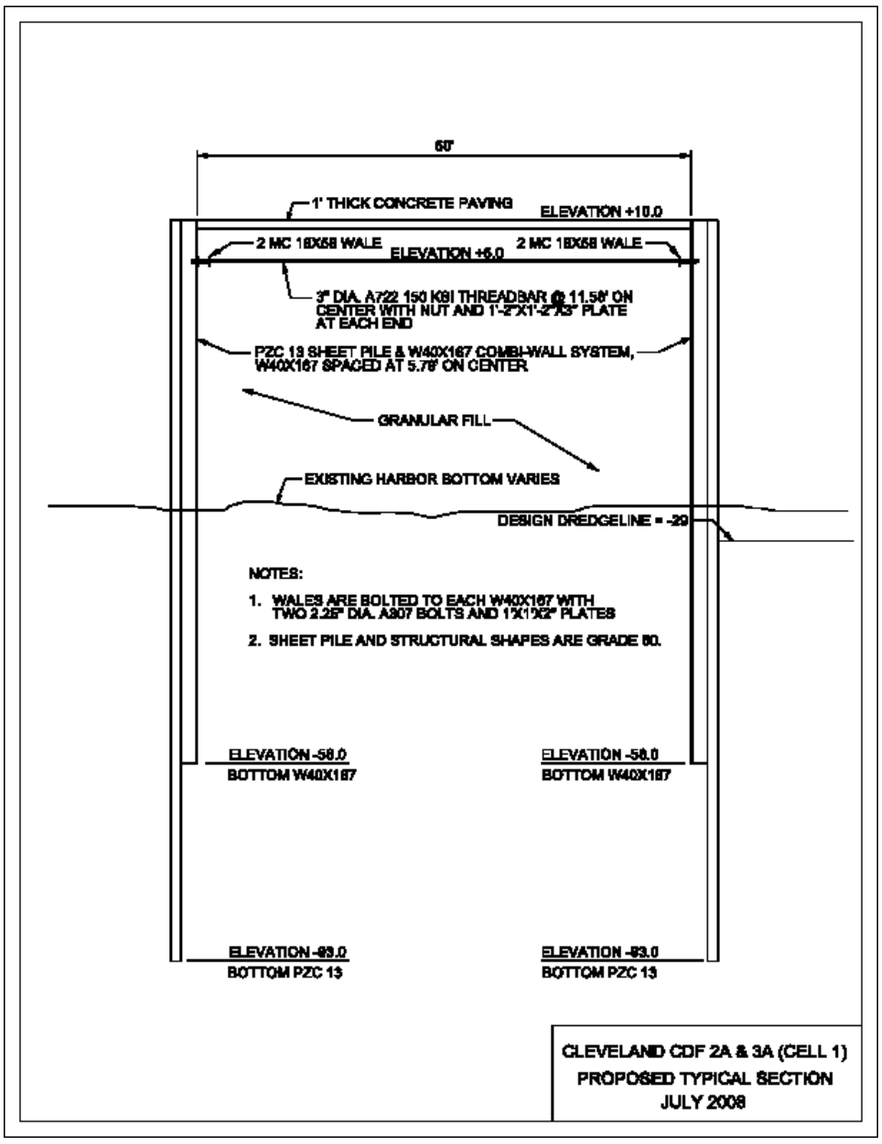


Figure 9: Cleveland CDF Alternative 2a and 3a Typical Section

Cell 2 of Alternatives 2a and 3a

Cell 2 of Alternative 2a is sited within the bounds of Site 2, but has a reduced footprint due to its reduction of capacity in an amount equal to the volume provided by Cell 1. As described in Paragraph 4 above, Cell 2 would provide the remaining 13 years of the 21 years of capacity Alternative 2a provides. Cross sections are similar to those presented for Site 2. Preliminary design information for Cell 2 Alternative 2a is shown in Tab C.

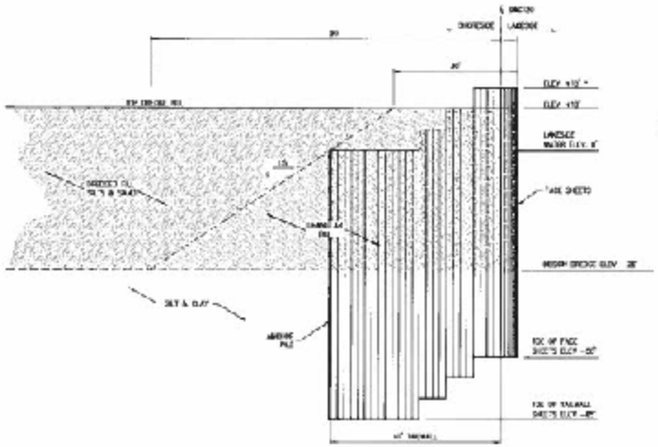
Cell 2 of Alternative 3a is sited within the bounds of Site 3, but has a reduced footprint due to its reduction of capacity in an amount equal to the volume provided by Cell 1. As described in Paragraph 4 above, Cell 2 would provide the remaining 14 years of the 20 years of capacity Alternative 3a provides. Cross sections are similar to those presented for Site 3. Preliminary design information for Cell 2 Alternative 3a is shown in Tab D.

East 55 Street Site Alternative

For the rubblemound portions of the East 55th Street site, typical stone cross-sections for the existing CDF at Dike 10b and the proposed Site 2 were assumed applicable to this site. It is assumed the phased construction would progress east to west. The plan and typical cross-sections are presented in Tab E of this appendix.

The design for vertical walled portions of the East 55th Street Alternative was developed by PND Associates, a consultant to steel supplier LB Foster, in cooperation with USACE. When USACE contacted LB Foster for cost quotes in support of cost estimating efforts, LB Foster stated that they had been in contact with other consultants involved in the potential port relocation project

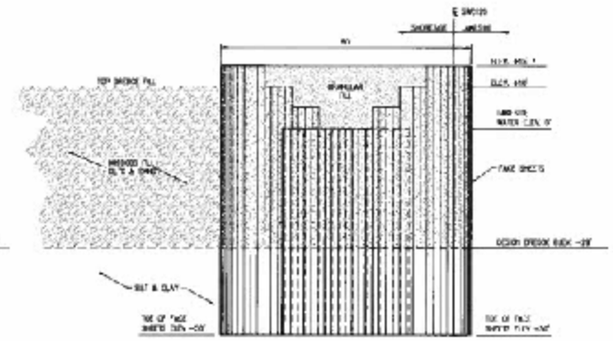
and that they had identified other designs that may be more cost effective. USACE originally designed a combi-wall system; LB Foster and PND Associates recommended a back-to-back open cell design. Further discussion and a review of the proposed design indicated that the design was acceptable for dredged material disposal and resulted in less steel tonnages and sheet pile members that are more readily available and easier to produce. The back-to-back open cell design is used in the cost estimate of the preliminary Federal Standard design for the site and is shown in Figure 10 below (the Federal standard means the dredged material disposal alternative or alternatives identified by the Corps which represent the least costly alternatives consistent with sound engineering practices and meeting the environmental standards). However, further analysis by the Port Authority and its consultant determined that the design is not suitable for the surcharges the relocated port facilities will add. Therefore, the combi-wall system, similar to what is used in the preliminary designs for Cell 1 of Alternatives 2a and 3a, is used as the locally preferred design for the East 55th Street site in Tab E of this appendix.



SECTION A-A
SINGLE OPEN CELL® WALL

1) * MAX. HEIGHT TO ALLOW FOR SETTLEMENT
2) CONCRETE CAP MAY BE USED AS FORMS
3) GRANULAR FILL REQUIRED SIMILAR TO CLAY THAN DOUBLE WALL SYSTEM.
4) MAXIMUM SHEET PILE LENGTH IS

INTERNAL QUANTITIES-SINGLE WALL SYSTEM			
PILE TYPE	PILE LENGTH	QUANTITY	TONNAGE
SANDY WYE PILE	60'	700	940
ANCHOR PILE	60'	700	940
PZ27.5 FLAT SHEET	60	8,549	14,304
TOTAL	----	----	20,375



SECTION B-B
BACK-TO-BACK OPEN CELL® WALL

1) * MAX. HEIGHT TO ALLOW FOR SETTLEMENT
2) CONCRETE CAP MAY BE USED AS FORMS
3) MAXIMUM WALL HEIGHT IS

INTERNAL QUANTITIES-DOUBLE WALL SYSTEM			
PILE TYPE	PILE LENGTH	QUANTITY	TONNAGE
SANDY WYE PILE	60'	350	1,300
ANCHOR PILE	60'	700	700
WYE-OF PILE	60'	4	7
PZ27.5 FLAT SHEET	60'	1,014	15,909
PZ27.5 FLAT SHEET	60'	1,392	2,220
PZ27.5 FLAT SHEET	60'	1,392	2,220
PZ27.5 FLAT SHEET	60'	4,174	6,674
TOTAL			28,830

E. HORNBLESS, INC.

CERTIFIED CELL® IS A REGISTERED TRADEMARK OF THE CONCRETE, INC. TYPE CELL SYSTEM IS PATENTED PATENT - US 6,705,804B2 DATE: 06 JAN 2004

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REV	DATE	DESCRIPTION

PROJECT: CLEVELAND FIRST ENERGY
E55 STREET CDF PROJECT

TITLE: TYPICAL SECTIONS

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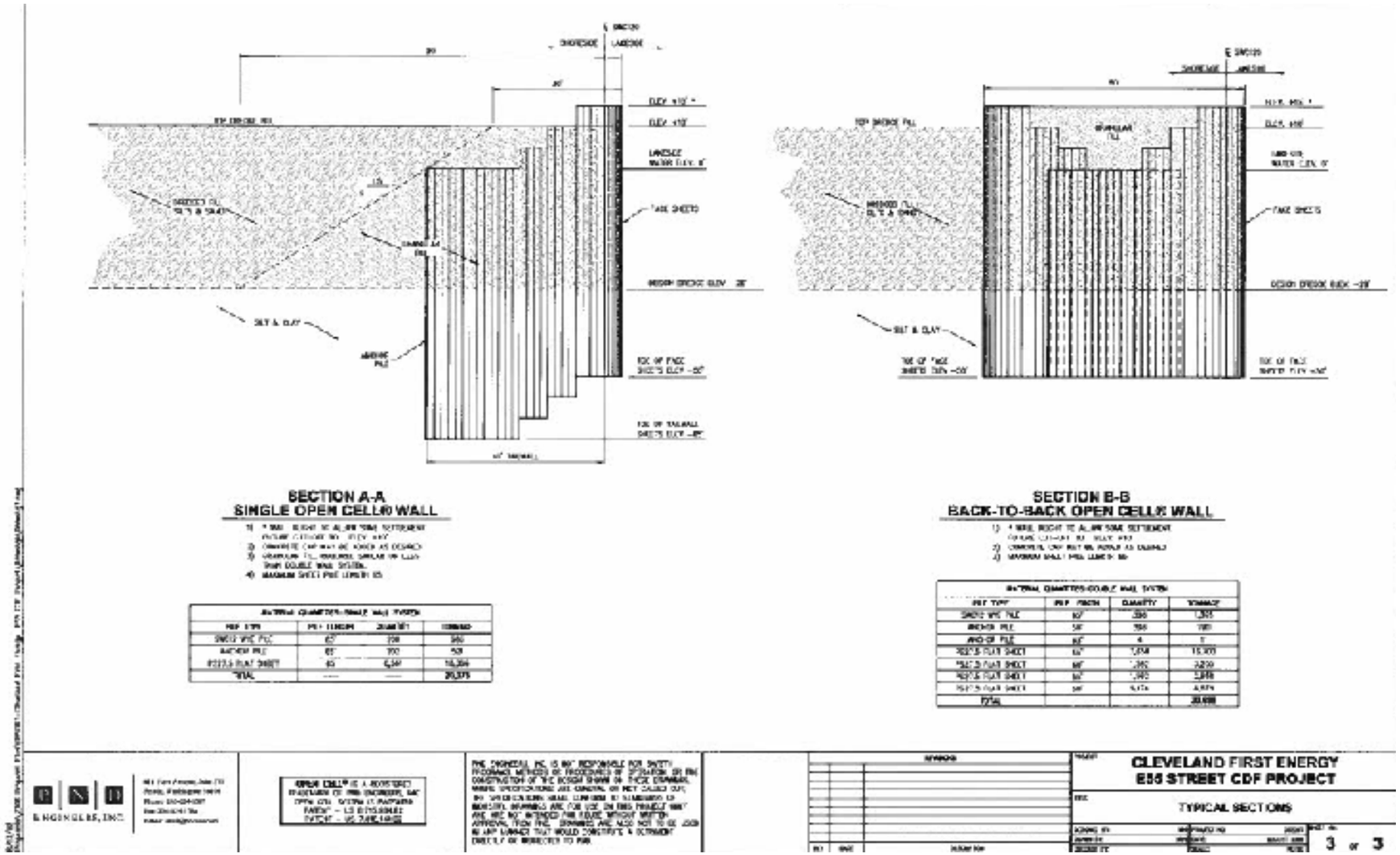

Figure 10 Back-to-Back Open Cell Design for East 55th Street Site (Federal Standard)

Alternate Dike Cross-Section Designs Considered

Due to the deep water, the size of the proposed open water CDFs, and the settle-ability of the lake bottom, the size of the cross section and thus, amount of stone required for construction is unprecedented along the lower Great Lakes. There is currently no single quarry on Lake Erie able to produce the size and quantity of stone required to construct the proposed Outer Harbor CDFs. Limitations on quantity and quality of stone required to construct CDFs in Cleveland Harbor are the primary cause of the high preliminary cost estimate. Available quarries would be required to increase production rates in order to meet construction demands by adding plant and personnel and opening new quarry space. Associated costs will be passed along to the Government through escalated unit costs. Thus, the engineering team pursued several alternative cross sections in an effort to reduce costs. These include:

Geosynthetic Containers - As an alternative to high cost stone revetments, geosynthetic containers are an innovative technique currently used to contain dredged material. Containers are prefabricated in a factory to form an elongated box with an open lid to meet the capacity needs of a given project and the configuration of the barge. The container is placed in the hopper of a split hopper barge. Dredged sediment is pumped into the container and once 75-80% full, the inlet of the container is sealed. The barge is towed to the disposal site, the container is released by opening the split hopper, and the container falls to the lakebed. For the purposes of this project, sediment dredged from the Federal channel could be placed directly into geosynthetic containers hydraulically as described above or could be mechanically filled with dredged material from existing CDFs and/or sediment directly pumped from the dredging operations. The containers would be transported and deposited in location where the perimeter dikes of the CDF would be constructed. Volume occupied by geosynthetic containers would reduce the volume of materials needed to construct the new CDF. Specifically, they could be used to supply the required volume and mass required in the stability berm or for interior berms to create sub-cells as necessary. Containers would be used as a base for construction of the perimeter footprint and interior berms to create sub cells as necessary.

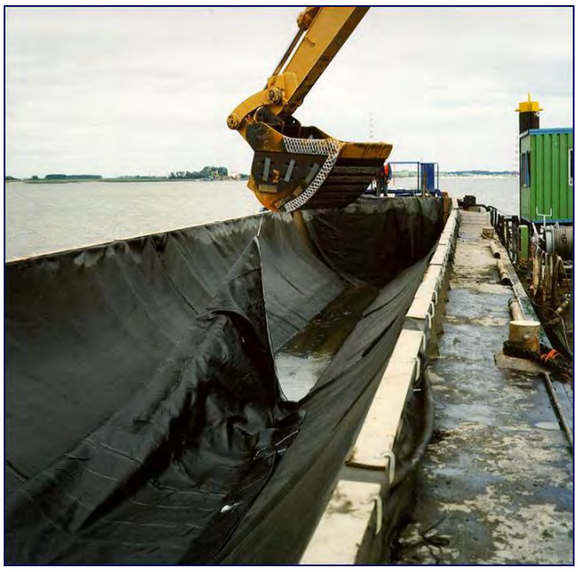

Figure 11 Geocontainer lining the barge.

Figure 12 Geocontainer filled with dredged sediment.

Figure 13 Closing filled Geocontainer.

Figure 14 Geocontainer sewn shut.

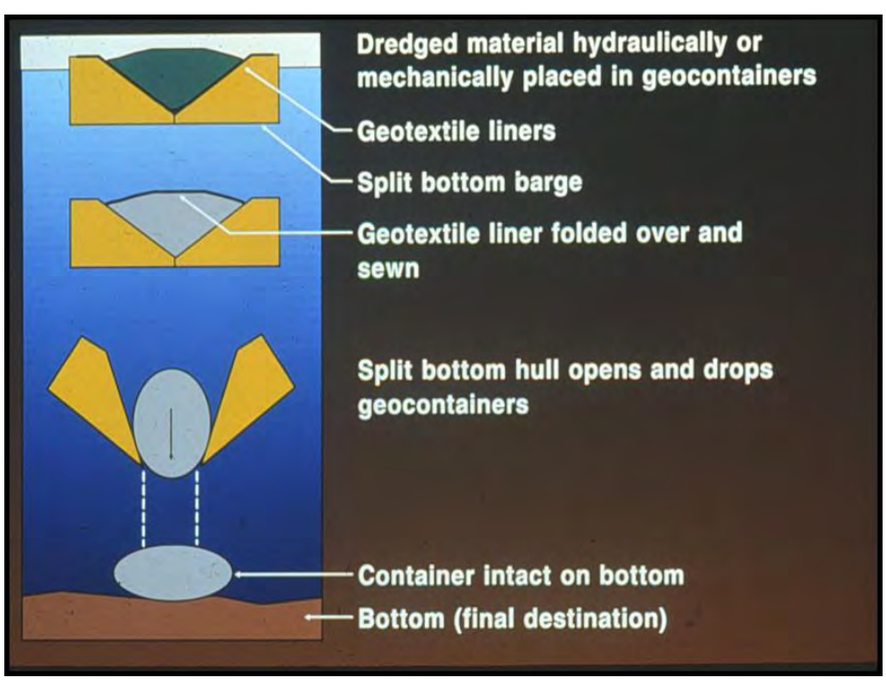

Figure 15 Geocontainer fill and disposal phases.

Using Site 2 as a case study, use of geocontainers in lieu of a portion of core stone (identified as stone type B, C, and E in the preliminary designs) reduces total stone quantities by 1,839,000 tons. Cost savings are estimated at approximately $20,000,000. However, due to the unproven and untested nature of the geocontainers as a core material in large, rubblemound dikes and potential regulatory concerns, further study is needed. Therefore, cost estimates for the purposes of plan formulation and analysis are based on virgin stone in all rubblemound dikes.

This value engineering alternative will be carried forward. Rubblemound dikes comprise at least a portion of the perimeter dikes of all CDF alternatives; should the alternative prove feasible and cost effective during detailed design, cost savings will be yielded no matter the alternative selected.

Prefabricated Caissons - Caissons are another innovative prefabricated construction alternative. Structures would be pre-fabricated and mobilized to the construction site and ballasted onto a previously prepared foundation. There are several types of caissons including open, box, and pneumatic. Open caissons are open at the top and bottom, box caissons are closed at the bottom, open at the top, and pneumatic caissons are airtight chambers to accommodate submerged workers. Of the three caisson alternatives, box caissons are typically used in underwater construction and as a foundation. The most likely alternative for CDF construction would be generally rectangular, pre-cast, modular, interlocking, buoyant concrete sections that are floated into position, ballasted with dredge material, steel slag, recycled concrete, or similar material, and post-tensioned. Box caissons can be rectangular or circular, and constructed to accommodate a range of sizes hundreds of feet in diameter (Encyclopedia Britannica, 2007).

Cost analysis was based on use of pre-cast concrete caissons as the core of the Site 2 CDF verses construction of a stone CDF by “traditional methods”. Costs are for constructing large concrete caissons on land, floating to the construction site, placing by filling with water and then dredge material; each caisson to be approximately 120 feet long by 30 feet wide by either 22 or 26 feet in height. For the 4925 lf of full cross-section rubblemound dike in the Site 2 CDF there would be 41 larger units sitting on 82 smaller units. These units would be constructed on the lake front where they could easily be floated. Construction of each unit consists of form work, reinforcing steel and concrete placement. A stone bed would be constructed 4 feet thick with the smaller caissons being placed side by side on the bedding stone and the larger units sitting on top of the smaller stacked in a pyramid shape. After the placement of each caisson the interior of each caisson would be filled with dredge material. On the lake side, bedding, underlayer and armor stone would be placed against the units to protect the caissons from wave action. On the “fill” side a sand/stone filter layer would be placed against the caissons.

By contrast, for typical of CDF construction, different layers of stone would be layered to build a containment cell for dredge material. Different layers include core, filter, underlayer and armor stone material of various thicknesses. Construction would consist of placing core stone most likely by a self unloading ship followed by placing of the other various layers of other material by crane and barge. Due to the potential size of this project, pricing was obtained for the various materials. Cost Engineering started by estimating the costs for building the caisson units. Placement costs were to be developed next. Due the large costs of construction of the units on land (not placement), cost engineering looked at the construction of a rubblemound CDF that would occupy the same volume of space as the caissons would. Cost Engineering determined the cost of the construction of the caissons alone to be approximately $30 million versus the cost of construction of a stone core that occupies same volume of stone at approximately $23 million. Cost Engineering did not continue any further development of placement costs for the caisson alternative as this would only increase the cost of this alternative.

Therefore, this alternative is not carried forward to detailed design.

Vertical walls – Despite multiple design iterations and several conceptual ideas, the team was unable to identify a feasible vertical containment structure such as concrete sea walls or sheet steel pile for the CDF alternatives outside the protective breakwater system. The primary constraint is water depth and wave action. Vertical structures for open-water will not be carried further in design.

Pre-cast concrete armoring units – In support of efforts to identify alternative materials to quarried stone in the design cross-section, the design team also considered pre-cast concrete

armoring for the rubble mound structures. However, research of prior bid prices and supplier quotes indicated unit prices higher than that of the virgin stone. However, given the previous discussion of the high cost of quarried armor stone and the inability of quarries to meet supply needs for this project, which increases cost, the precast concrete armor unit alternative will be revisited during detailed design and cost estimation to verify the economic validity of this alternative.

A comprehensive value engineering study will be conducted during detailed design and value engineering considerations will be at the forefront of all design efforts.

8. SUMMARY OF GEOTECHNICAL AND SUBSURFACE INFORMATION

The soil conditions at the project location are poor from a foundation design standpoint. The first approximately ten feet of bottom sediments is generally a very soft muck which is primarily silt with organic material. Beneath the muck is about 20 feet of medium to high plasticity soft to medium stiff clay and silty clay with silt lenses. Beneath these clays are stiffer materials which appear to be glacial till. The till deposits are semi-sorted and unstratified.

The objective of the dike stability analyses was to determine a dost-effective, stable dike configuration that would prevent shear failure of the underlying soil foundation. Analyses were performed for both the end of construction and long term conditions. In order to meet the required 1.3 factor of safety, it was determined that berm is required on both the containment and harbor sides of the dike. The factors of safety obtained are considered acceptable for this type of structure.

The objective of the dike settlement analyses was to determine if excessive foundation settlement would occur over time which could result in unacceptable loss of dike freeboard. The laboratory consolidation tests conducted on the soil samples indicate that these soils are pre-consolidated to some degree with overconsolidation ratios varying from 1.2 to 9.0. The analyses resulted in the conclusion that although settlement will occur, it will occur over a long period of time and the fill material will consolidate simultaneously, negating the need for any special construction procedures.

The long-term storage capacity of the containment area was determined by estimating the consolidation of the foundation soils and the sediments placed in the CDF. It was estimated that approximately 338,220 cubic yards of sediment will be removed annually at Cleveland Harbor. This quantity is based on historical annual dredge quantities and takes into account land use changes and other factors within the Cuyahoga River basin. The analyses conducted using the 338,220 cubic yards per year resulted in a storage capacity of between 20 to 21 years for the preferred CDF locations.

A summary geotechnical narrative for preliminary cellular wall design is in Tab G, this appendix.

9. STRUCTURAL DESIGN NARRATIVE

Preliminary structural design has been performed for the vertical wall system for the Cleveland Harbor Confined Disposal Facilitiy E55, 2A (Cell 1) and 3A (Cell 1) Sites by the Buffalo District Civil/Structural Design Team. The vertical wall system consists of parallel combi-walls (steel sheet pile and wide flange king piles) 60 feet apart anchored together near the top with double steel channel wales and threadbar tierods. The space between the vertical walls is filled with granular fill and capped with a temporary concrete slab as protection against loss of fill from wave overtopping. The vertical wall system initially functions as a containment structure as the CDF is being filled with dredged material. After the CDF is filled and turned over to the local sponsor, a new terminal port facility will be constructed at the CDF. The vertical walls would be used for the docking of cargo ships at the new terminal port facility. The structural design was performed in accordance with guidance found in engineering manual EM 1110-2-2504, Design of Sheet Pile Walls. Soil parameters for the design were provided for each site by the LRB Coastal/Geotechnical Team. Corps of Engineers computer program CWALSHT, Design/Analysis of Sheet Pile Walls By Classical Methods was used for the design. CWALSHT provided the required wall embedment, wall bending moments and anchor force which was then used to size all the vertical wall structural components. Bearing capacity

analyses perform by the LRB Coastal/Geotechnical Team determined that wall embedments provided by CWALSHT had to be increased in order to prevent bearing failure of the underlying soil. This required increasing the wall embedments 35 feet for the E55 site and 7 feet for the 2A and 3A sites. Figures of the vertical wall systems for E55, 2A and 3A sites are contained elsewhere in this report. The vertical wall systems shown in this report are preliminary and are subject to change when the detailed design is performed.

The preliminary design of the open cell wall alternatives were performed and drawings of these alternatives were provided by PND Engineers Inc., Consulting Engineers of Seattle, Washington.

10. WATER QUALITY DESIGN CONSIDERATIONS

The purpose of each of the proposed CDFs is to remove polluted sediments from the aquatic environment. In the past, these sediments had been open-lake dumped. However, with the passage of the Clean Water Act and associated legislation, polluted sediments have been restricted from open-lake discharge. The CDF is designed to contain the polluted sediments through the use of a geotextile membrane, a thick filter layer, and limestone dike material construction. Once the dredged sediments are placed in the CDF, a number of processes occur. Adsorption of pollutants to the sediments and the settling of sediments and associated pollutants out from the water column is generally recognized as the primary pollutant removal/containment process within a CDF. Pollutants associated with dredged materials are strongly attached (adsorbed) to the organic and clay fractions. As the particulates settle out, the pollutants adsorbed to the particulates are thereby removed from the water column and contained in the sediments. The CDF is therefore designed to contain sediments while allowing water to either evaporate or flow out of the disposal facility through the dike itself or through the overflow weir.

Sites 2 and 3 and rubblemound portions of East 55th Street site

A geotextile membrane is permeable and is used at the very top of the filter layer to protect the “C” and "D" stones from migrating through the larger "B" and “E” stones which will be placed on top. The zone it protects is that which is above the water surface (early in the dike filling process) and/or that zone potentially impacted by waves generated within the CDF or subject to fluctuating water levels. The filter layer has a component size range from the # 200 sieve up to five inches in diameter.

The effluent then filters through the remainder of the dike wall. As it passes through, three processes occur - settling, adsorption and bioabsorption/biodegradation. These processes all contribute to scrubbing the effluent. Buffalo District monitoring at Cleveland and other harbors has shown no significant impairment of water or sediment quality outside the dikes due to movement of pollutants through the dikes

The overflow weir is an integral part of the CDF which helps to increase filling efficiency by draining water from the interior, with proper provisions for maintaining environmental quality standards. This discharge will only occur after the dredged reach above lake level, and even during mid-life of the CDF the ponded water may be left to evaporate. Use of the weir discharge may also be used to avoid undesirable conditions (vegetation growth, waterfowl attraction, botulism conditions, etc.) in the CDF. The overflow weir is designed with removable boards to provide for adjustable weir top elevation. The weir is designed to limit suspended solids concentration in the effluent discharge to less than 100 miligrams per liter. Testing has shown that this limit reasonably achieves State water quality standards for the lake receiving waters. In the last years of CDF life suspended solids concentrations between 100 to 200 milligrams per liter may persist. To meet State water quality standards, methods such as adding a flocculent or the use of filter materials will be used to restrict particulate and associated pollutant level outflow from the weir along with proper management of the filling regimen.

Cell 1 Alternatives 2a and 3a and Vertical Wall Portion of East 55th Street Alternative

Cell 1 of Alternatives 2a and 3a and portions of the East 55th Street site are confined largely by sheet steel pile bulkheads. These bulkheads provide a relatively impermeable barrier. However, portions of Cell 1 of Alternatives 2a and 3a and the East 55th Street site are also

confined by rubblemound dikes. Therefore, it is expected that water quality design parameters will be met in the same manner as the pure rubblemound alternatives.

11. CONSTRUCTION PROCEDURE

It is anticipated that the construction of the proposed CDFs will utilize marine construction equipment for placement and grading of the rubblemound stone structure to produce the cross sections shown above and to drive the sheet steel pile cells as part of Cell 1, Alternatives 2A and 3A and the East 55th Street site CDF. Due to the East 55th Street site's connection to land, land based construction may be possible but would require significant material laydown and construction vehicle marshalling areas. Typical order of work will be established during preconstruction engineering and design and is dependent on the selected plan.

12. CONSTRUCTION MATERIALS

The results of a materials survey indicate that there are a sufficient number of sources within a 100-mile radius of the project. Sources have been identified that can produce the required stone construction materials in limited quantities. However, none of these sources has the ability to produce the amount of stone needed for the proposed CDFs in the timeframe required for construction without adding additional production capacity at the cost of the Government. Thus, prices shown in the cost estimates for the rubblemound structures, which are based on quotations from reliable quarries, result from significantly higher unit costs for stone caused to the quarries' needs to add additional labor and plant to meet the required production rates.

However, production of core stone should not be an issue, given the normal operations of large quarries such as standard LaFarge/Marblehead and Rogers City, MI, which routinely produce core stone and aggregates as their normal production.

13. CONSTRUCTION COST ESTIMATE

Feasibility-level preliminary construction cost estimates have been prepared for the CDFs included in the preferred plans. They are included in Tab F of this appendix. A summary is presented in Table 3 below.

Plan	Acres	Capacity (CY)	Cell 1	Cell 2	Cell 3	Total
Alternative 2	108	7,200,000	$241,754,000			**$241,448,088**
Alternative 3	117	7,200,000	$209,671,000			**$217,939,677**
Alternative 2a	130	7,370,000	$114,757,000	$142,160,000		**$265,711,456**
Alternative 3a	123	6,453,651	$132,200,000	$196,788,000		**$340,339,038**
East 55th Back to Back Open Cell	157	6,855,000	$113,300,000	$56,500,000	$76,300,000	**$237,928,589**
East 55th local preferred plan Combi Wall	157	6,855,000	$128,900,000	$60,700,000	$86,200,000	**$276,987,361**

Table 3: Summary of construction cost estimates of alternative plans

14. COST RISK ANALYSIS:

The cost estimates were subjected to a Cost Risk Analysis conducted by the USACE Cost DX in Walla Walla District in order to establish risk-based cost contingencies for each of the alternative plans. The cost risk analysis modeling developed the following cost contingencies at an 80% confidence level:

Plan 2: 26.06%
Plan 2a: 24.24%
Plan 3: 26.57%
Plan 3a: 24.41%
Plan 4: 24.09%
Plan 4a: 22.16%

These cost contingencies were applied to the cost estimates and are reflected in the estimates in Appendix D. The cost risk analysis effort is a continual process and will be revisited throughout the detailed design process in order to ensure reliable cost estimation.

15. ENVIRONMENTAL CONSIDERATIONS

Environmental impacts of the proposed plan are identified in Chapters 3 and 4 of this document. Chapters 2, 5, and 6 and the appendices provide addition information related to the Environmental Impact Statement.

16. PROJECT DESIGN AND CONSTRUCTION SCHEDULE

The conceptual schedule outlined below lists the key activities by fiscal year for the design and construction of the proposed CDF, as well the associated fill management plans.

FY	Task
FY09	Continue Preliminary Engineering of new CDF; conduct geotechnical investigations
	Design Phase 2 of Dike 12 FMP
	Construct Dike 9 FMP
	Dredge and fill at Dike 12
FY10	Begin Preconstruction Engineering and Design (PED) of new CDF
	Complete Design Document Report and Value Engineering Study
	Dredge and fill at Dikes 12 and 10B
FY11	Complete PED of new CDF
	Complete contract plans and specifications
	Dredge and fill at Dike 9
	Construct Phase 2 of Dike 12 FMP
FY12	Issue contract solicitation for initial construction
	Award contract
	Begin construction of new CDF (first cell)
	Dredge and fill at Dikes 12 and 9
FY13	Continue construction of new CDF (first cell)
	Dredge and fill at Dike 12
FY14	Complete construction of new CDF
	Dredge and fill at Dike 12
FY 15 – 29	Dredge and fill new CDF

17. RECOMMENDATION

It is recommended that the DMMP/EIS be approved and serve as the basis for preconstruction engineering and design for the recommended confined, diked disposal facility at Cleveland Harbor, Ohio.

Tab A
Preliminary Design Site 2

SITE 2 – PRELIMINARY DESIGN – AUGUST 2006

This preliminary design information will be used to develop cost estimates to assess the feasibility of Site 2 as a potential location for a new CDF. Detailed engineering analyses were not performed.

The proposed centerline location for a Site 2 containment dike is illustrated on Figure 1. Additional information regarding a Site 2 CDF is presented below.

Area =	108 acres
Existing lakebed elevation =	-20 to -30 feet LWD
Perimeter of new containment dike in open water =	4925 feet
Perimeter of new containment dike along W. breakwater =	3055 feet
Perimeter of new containment dike along arrowhead brkwtr. =	1155 feet
Final dredged fill elevation =	+20 feet LWD
Open volume available for dredged fill =	7.2×10^6 cubic yards

A typical containment dike section in open water is illustrated as Figure 2. Information regarding various material zones is presented in Table 1.

A typical containment dike section along the West Breakwater is illustrated as Figure 3. Information regarding various material zones is presented in Table 2.

A typical containment dike section along the Arrowhead Breakwater is illustrated as Figure 4. Information regarding various material zones is presented in Table 3.

A weir structure, similar to that used at existing Dike 10B, will be needed at Site 3.

Appendix A includes preliminary stability analyses and volume calculations.

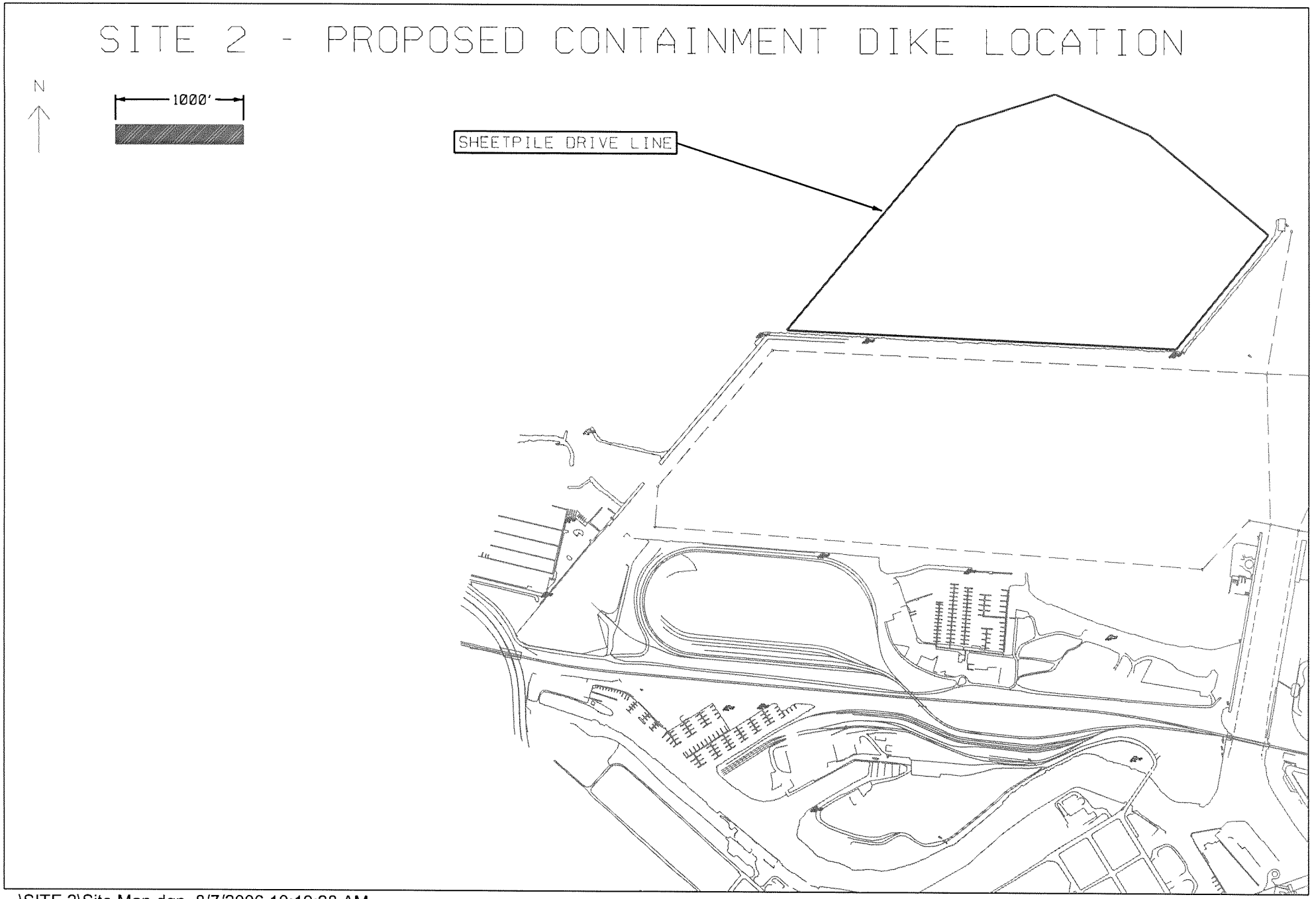

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Figure 1

SITE 2 - TYPICAL OPEN-WATER SECTION

NOT SUPPORTED BY DETAILED ENGINEERING ANALYSES.
FOR PRELIMINARY COST ESTIMATING PURPOSES ONLY.

PRIOR TO PLACING MATERIAL ABOVE -15 LWD
ALL MATERIAL BELOW -15 LWD MUST BE PLACED.

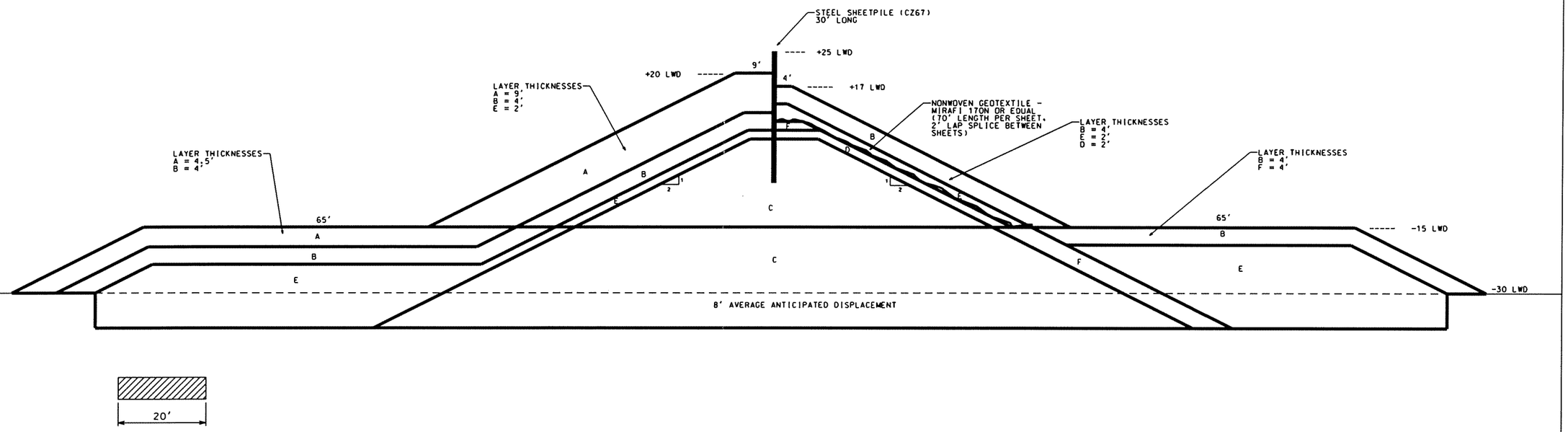

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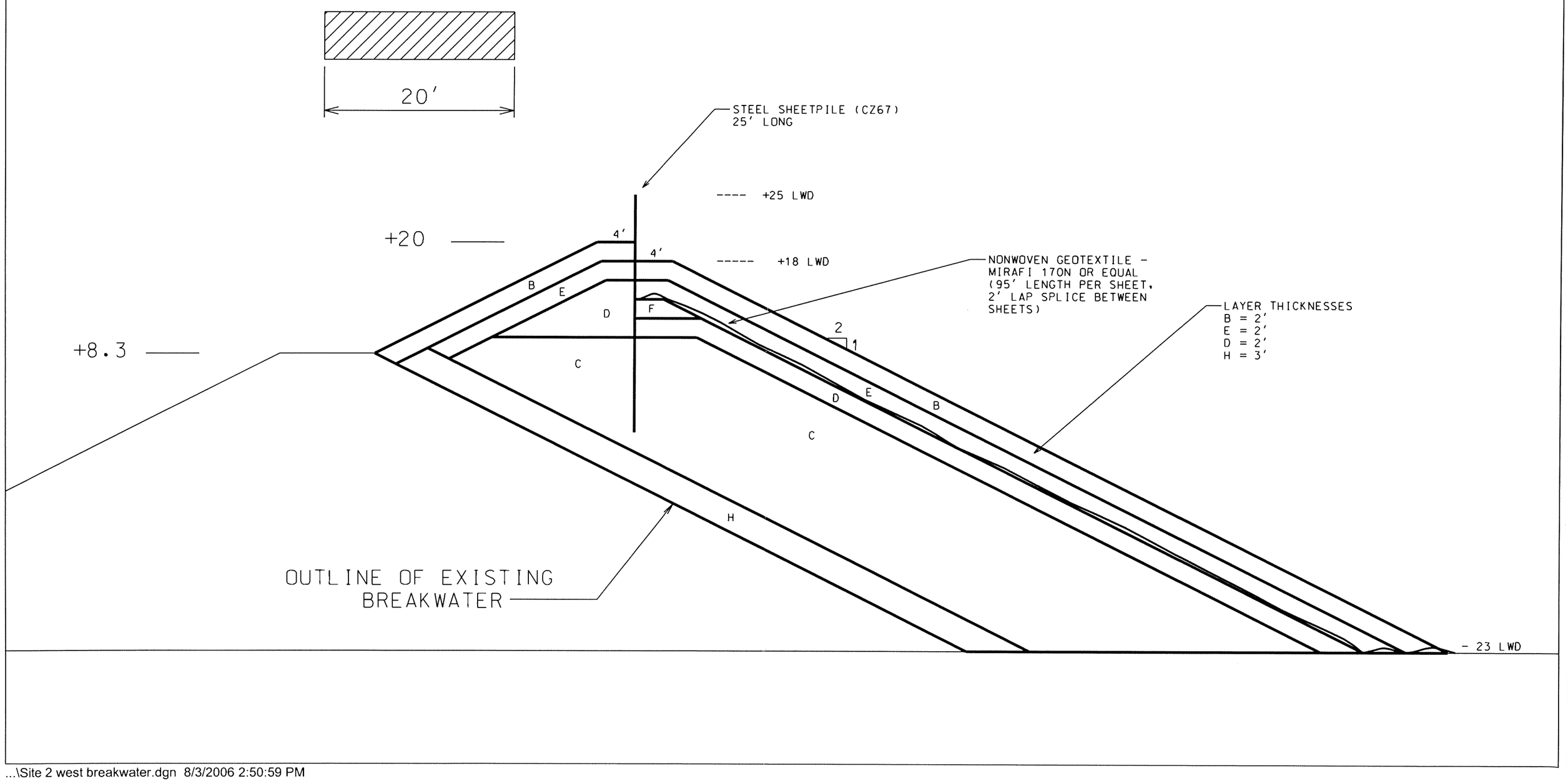
Figure 2

SITE 2 – TYPICAL SECTION ALONG W. BREAKWATER

NOT SUPPORTED BY DETAILED ENGINEERING ANALYSES.
FOR PRELIMINARY COST ESTIMATING PURPOSES ONLY.



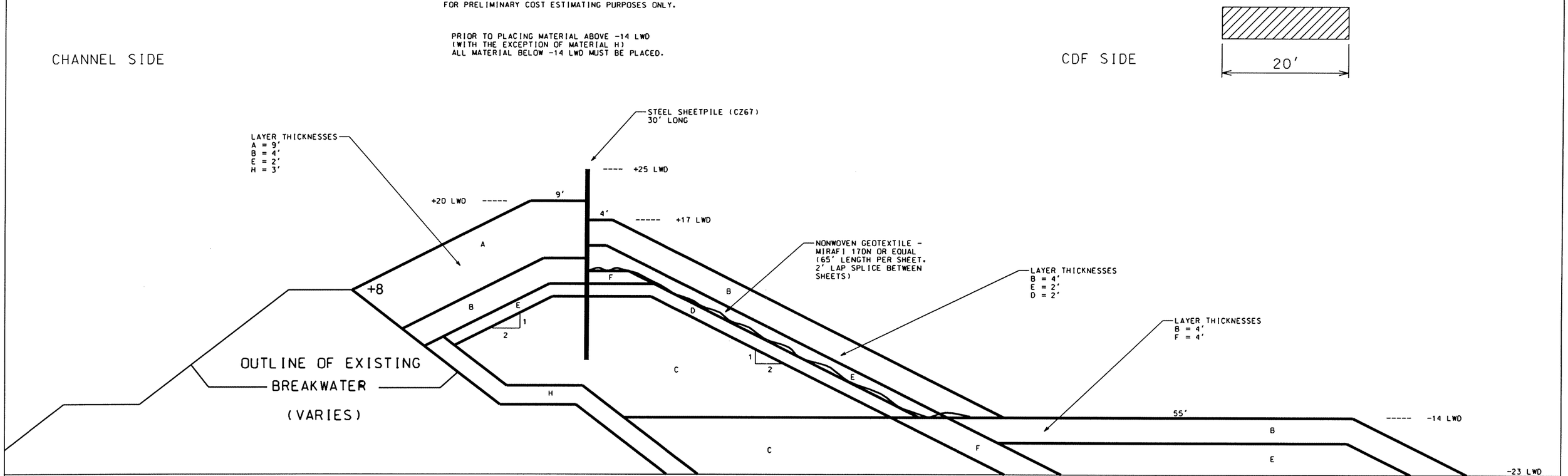
...\Site 2 west breakwater.dgn 8/3/2006 2:50:59 PM

Figure 3

SITE 2 - TYPICAL SECTION ALONG ARROWHEAD BREAKWATER

NOT SUPPORTED BY DETAILED ENGINEERING ANALYSES.
FOR PRELIMINARY COST ESTIMATING PURPOSES ONLY.

PRIOR TO PLACING MATERIAL ABOVE -14 LWD
(WITH THE EXCEPTION OF MATERIAL H)
ALL MATERIAL BELOW -14 LWD MUST BE PLACED.



...\SITE 2\Site 2 arrowhead.dgn 8/3/2006 3:20:17 PM

Figure 4

Material	Size Specification	Physical Properties Specification	In-place volume per lineal foot (CF)	Maximum volume (in-place) to weight (shipping) conversion factor (PCF)	Minimum volume (in-place) to weight (shipping) conversion factor (PCF)
F	ODOT 703.01 Size No. 68	ODOT 703.16C	223	135 (stone with $G_s = 2.72$, n = 26%, w = 7%)	70 (dry slag)
E	ODOT 703.19B Type D	ODOT 703.19B	2539	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
D	ODOT 703.19A Crushed Aggregate	ODOT 703.19A	115	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
C	ODOT 703.19B Type D Or ODOT 703.01 Sizes No. 1 through 5 inclusive	ODOT 703.19B Or ODOT 703.19A	4368	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
A	5 to 10 ton	Similar to past USACE specifications	1174	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)
B	600 lb. to 2000 lb.	Similar to past USACE specifications	1350	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)

G_s = Specific gravity
n = Porosity of in-place material
w = Moisture content of material as shipped
RPCC = Recycled Portland Cement Concrete

Table 1 – Site 2 Containment Dike Materials Typical Open-Water Section

Material	Size Specification	Physical Properties Specification	In-place volume per lineal foot (CF)	Maximum volume (in-place) to weight (shipping) conversion factor (PCF)	Minimum volume (in-place) to weight (shipping) conversion factor (PCF)
H	ODOT 703.19B Type C	ODOT 703.19B	208	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
F	ODOT 703.01 Size No. 68	ODOT 703.16C	10	135 (stone with $G_s = 2.72$, n = 26%, w = 7%)	70 (dry slag)
E	ODOT 703.19B Type D	ODOT 703.19B	223	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
D	ODOT 703.19A Crushed Aggregate	ODOT 703.19A	220	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
C	ODOT 703.19B Type D Or ODOT 703.01 Sizes No. 1 through 5 inclusive	ODOT 703.19B Or ODOT 703.19A	1002	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
A	5 to 10 ton	Similar to past USACE specifications	0	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)
B	600 lb. to 2000 lb.	Similar to past USACE specifications	244	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)

G_s = Specific gravity
n = Porosity of in-place material
w = Moisture content of material as shipped
RPCC = Recycled Portland Cement Concrete

Table 2 – Site 2 Containment Dike Materials, Typical W. Breakwater Section

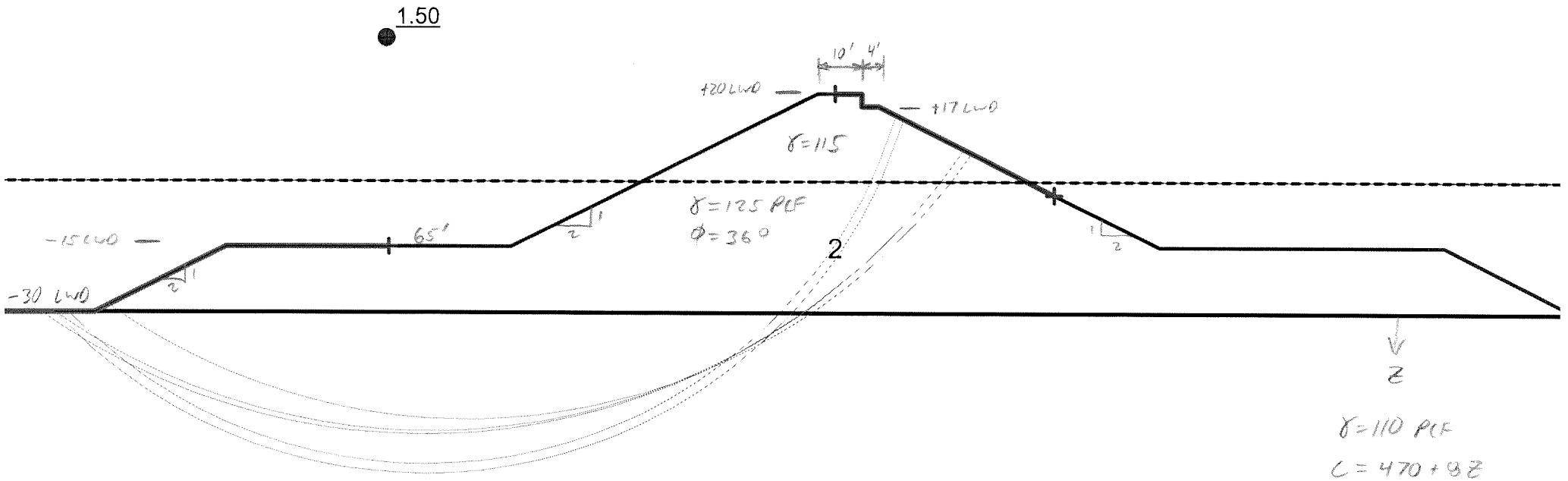
Material	Size Specification	Physical Properties Specification	In-place volume per lineal foot (CF)	Maximum volume (in-place) to weight (shipping) conversion factor (PCF)	Minimum volume (in-place) to weight (shipping) conversion factor (PCF)
H	ODOT 703.19B Type C	ODOT 703.19B	139	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
F	ODOT 703.01 Size No. 68	ODOT 703.16C	97	135 (stone with $G_s = 2.72$, n = 26%, w = 7%)	70 (dry slag)
E	ODOT 703.19B Type D	ODOT 703.19B	453	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
D	ODOT 703.19A Crushed Aggregate	ODOT 703.19A	110	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
C	ODOT 703.19B Type D Or ODOT 703.01 Sizes No. 1 through 5 inclusive	ODOT 703.19B Or ODOT 703.19A	1154	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
A	5 to 10 ton	Similar to past USACE specifications	324	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)
B	600 lb. to 2000 lb.	Similar to past USACE specifications	693	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)

G_s = Specific gravity
n = Porosity of in-place material
w = Moisture content of material as shipped
RPCC = Recycled Portland Cement Concrete

Table 3 – Site 2 Containment Dike Materials, Typical Arwhd. Brkwtr. Section

APPENDIX A

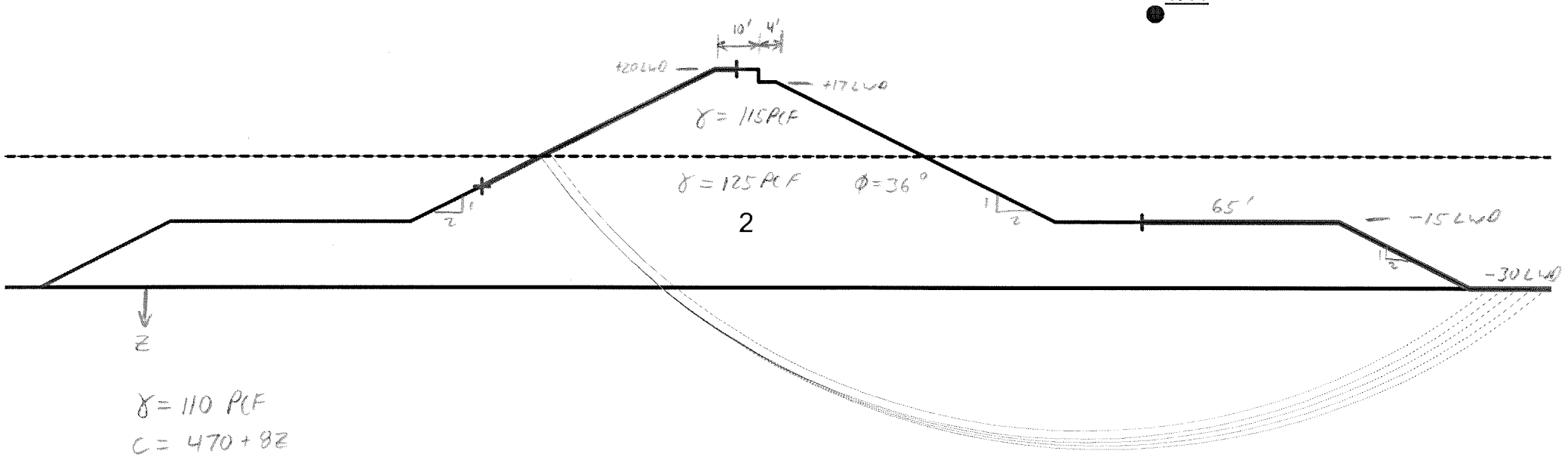
File : Site 2


1.50
10'
4'
+20 LWD
+17 LWD
γ=115
γ=125 PCF
Φ=36°
2
-15 LWD
65'
-30 LWD
2
1
2
1
2
1
z
γ=110 PCF
C=470+9z

1

File: Site 2 Revise

1.41



1

Originator: _____ Page _____ of _____

Date: _____

Project: _____

Subject: Site 2 open volume calcs

Depth (ft)	Avg. elev.	Offset from sheetpile: open	w. brk.	Arrowhead	Area (ft^2)	Height (ft)
-26 to -15	-20.5	144'	81'	135'	3.674×10^6	11'
-15 to -14	-14.5	67'	69'	121'	4.065×10^6	1'
-14 to +17	+1.5	35'	37'	35'	4.401×10^6	31'
+17 to +18	+17.5	0'	5'	0'	4.706×10^6	1'
+18 to +20	+19	0'	0'	0'	4.721×10^6	2'

$$\text{Volume} = 3.67 \times 10^6\ ft^2 \times 11' + 4.06 \times 10^6\ ft^2 \times 1' + 4.40 \times 10^6\ ft^2 \times 31' + 4.71 \times 10^6\ ft^2 \times 1' + 4.72 \times 10^6\ ft^2 \times 2'$$

$$= 7.2 \times 10^6\ CY$$

Checked By:

Tab B
Preliminary Design Site 3

SITE 3 – PRELIMINARY DESIGN – AUGUST 2006

This preliminary design information will be used to develop cost estimates to assess the feasibility of Site 3 as a potential location for a new CDF. Detailed engineering analyses were not performed.

The proposed centerline location for a Site 3 containment dike is illustrated on Figure 1. Additional information regarding a Site 3 CDF is presented below.

Area =	129 acres
Existing lakebed elevation =	-16 to -27 feet LWD
Perimeter of new containment dike in open water =	5430 feet
Perimeter of new containment dike along E. breakwater =	2990 feet
Perimeter of new containment dike along arrowhead brkwtr. =	1010 feet
Final dredged fill elevation =	+20 feet LWD
Open volume available for dredged fill =	8.0×10^6 cubic yards

A typical containment dike section in open water is illustrated as Figure 2. Information regarding various material zones is presented in Table 1.

A typical containment dike section along the East Breakwater is illustrated as Figure 3. Information regarding various material zones is presented in Table 2.

A typical containment dike section along the Arrowhead Breakwater is illustrated as Figure 4. Information regarding various material zones is presented in Table 3.

A weir structure, similar to that used at existing Dike 10B, will be needed at Site 3.

Appendix A includes preliminary stability analyses and volume calculations.

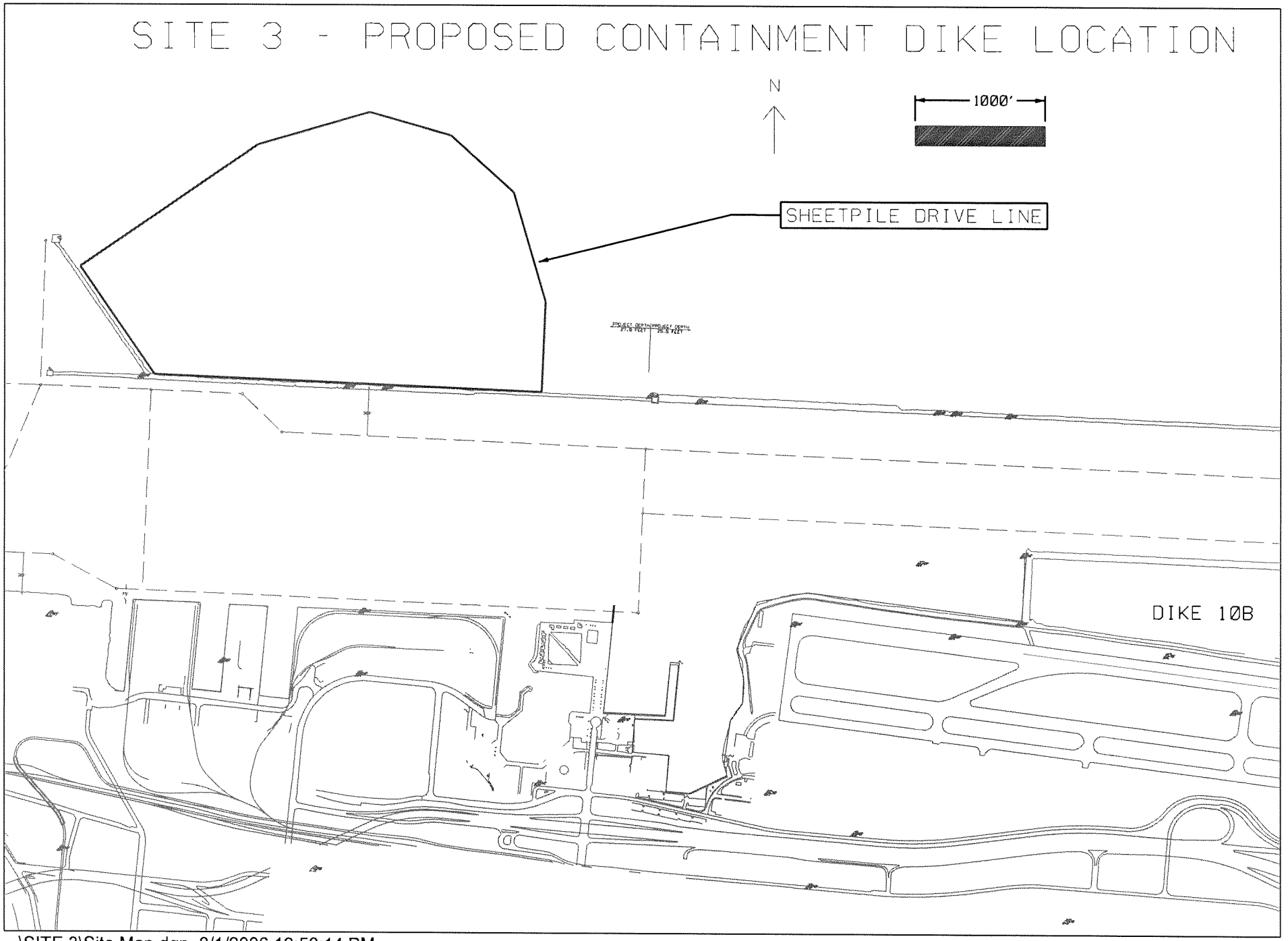


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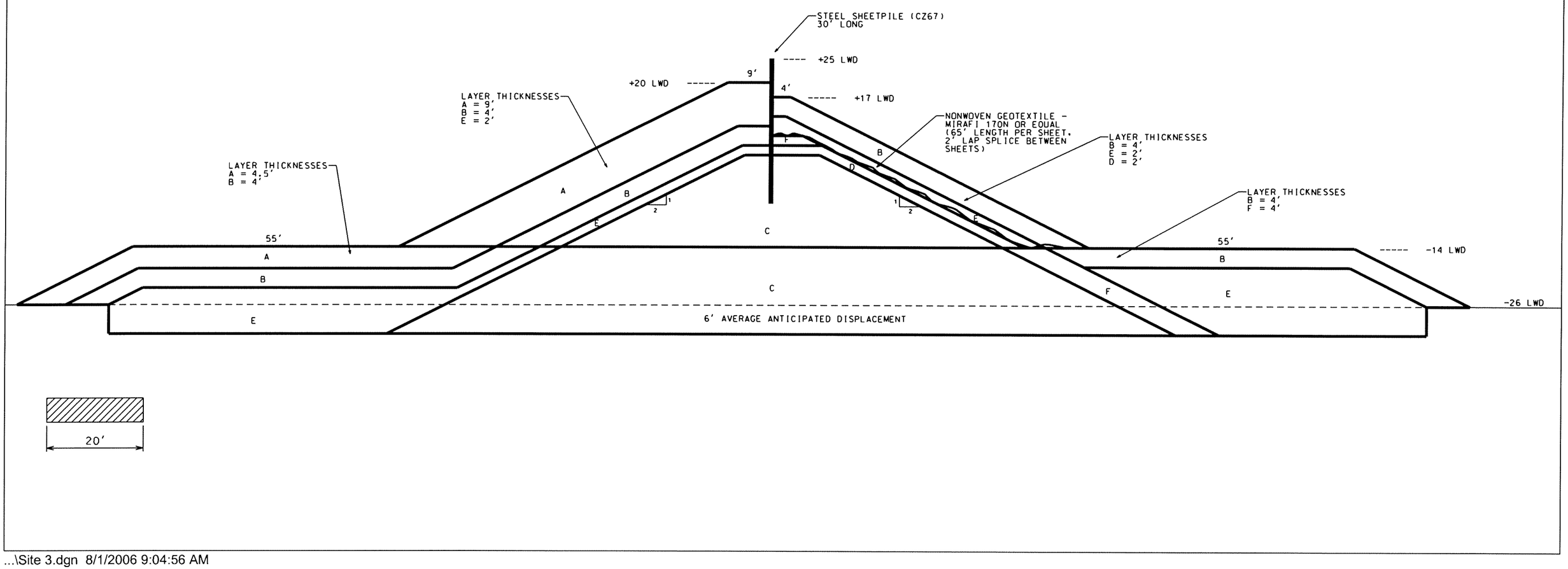
Figure 1

SITE 3 - TYPICAL OPEN-WATER SECTION

NOT SUPPORTED BY DETAILED ENGINEERING ANALYSES.
FOR PRELIMINARY COST ESTIMATING PURPOSES ONLY.

PRIOR TO PLACING MATERIAL ABOVE -14 LWD
ALL MATERIAL BELOW -14 LWD MUST BE PLACED.

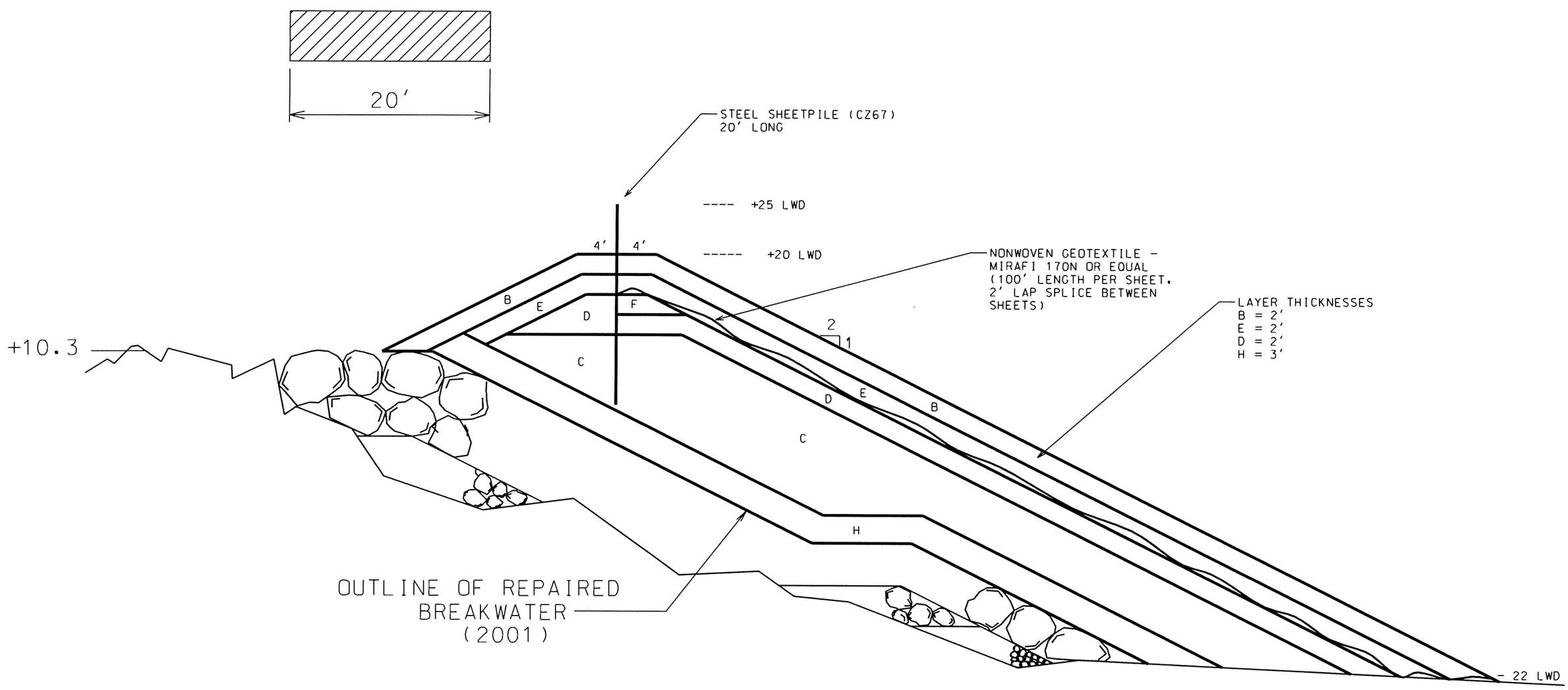


...\Site 3.dgn 8/1/2006 9:04:56 AM

Figure 2

SITE 3 – TYPICAL SECTION ALONG E. BREAKWATER

NOT SUPPORTED BY DETAILED ENGINEERING ANALYSES.
FOR PRELIMINARY COST ESTIMATING PURPOSES ONLY.



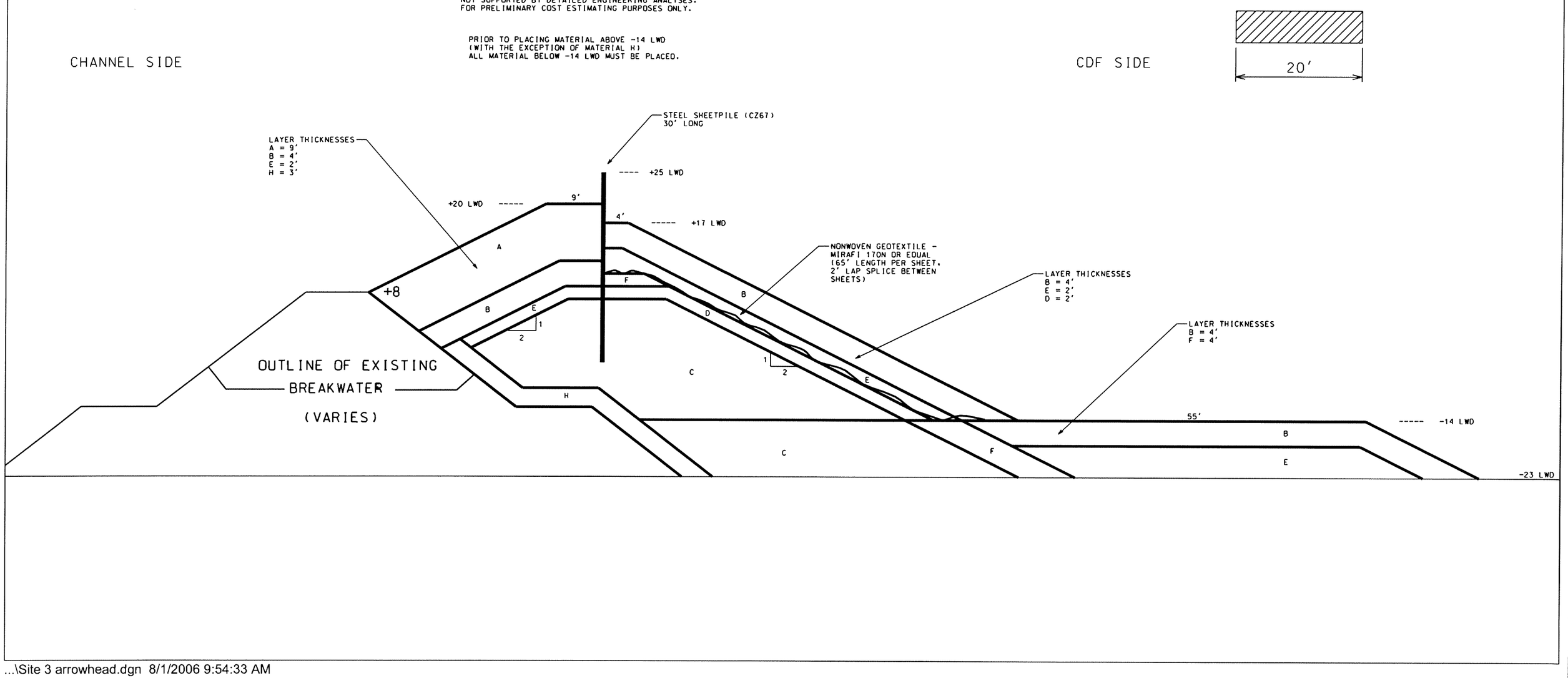
...\Site 3 east breakwater.dgn 8/1/2006 9:25:36 AM

Figure 3

SITE 3 - TYPICAL SECTION ALONG ARROWHEAD BREAKWATER

NOT SUPPORTED BY DETAILED ENGINEERING ANALYSES.
FOR PRELIMINARY COST ESTIMATING PURPOSES ONLY.

PRIOR TO PLACING MATERIAL ABOVE -14 LWD
(WITH THE EXCEPTION OF MATERIAL H)
ALL MATERIAL BELOW -14 LWD MUST BE PLACED.



...\Site 3 arrowhead.dgn 8/1/2006 9:54:33 AM

Figure 4

Material	Size Specification	Physical Properties Specification	In-place volume per lineal foot (CF)	Maximum volume (in-place) to weight (shipping) conversion factor (PCF)	Minimum volume (in-place) to weight (shipping) conversion factor (PCF)
F	ODOT 703.01 Size No. 68	ODOT 703.16C	178	135 (stone with $G_s = 2.72$, n = 26%, w = 7%)	70 (dry slag)
E	ODOT 703.19B Type D	ODOT 703.19B	1629	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
D	ODOT 703.19A Crushed Aggregate	ODOT 703.19A	110	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
C	ODOT 703.19B Type D Or ODOT 703.01 Sizes No. 1 through 5 inclusive	ODOT 703.19B Or ODOT 703.19A	3314	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
A	5 to 10 ton	Similar to past USACE specifications	1079	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)
B	600 lb. to 2000 lb.	Similar to past USACE specifications	1199	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)

G_s = Specific gravity
n = Porosity of in-place material
w = Moisture content of material as shipped
RPCC = Recycled Portland Cement Concrete

Table 1 – Site 3 Containment Dike Materials Typical Open-Water Section

Material	Size Specification	Physical Properties Specification	In-place volume per lineal foot (CF)	Maximum volume (in-place) to weight (shipping) conversion factor (PCF)	Minimum volume (in-place) to weight (shipping) conversion factor (PCF)
H	ODOT 703.19B Type C	ODOT 703.19B	258	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
F	ODOT 703.01 Size No. 68	ODOT 703.16C	10	135 (stone with $G_s = 2.72$, n = 26%, w = 7%)	70 (dry slag)
E	ODOT 703.19B Type D	ODOT 703.19B	212	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
D	ODOT 703.19A Crushed Aggregate	ODOT 703.19A	169	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
C	ODOT 703.19B Type D Or ODOT 703.01 Sizes No. 1 through 5 inclusive	ODOT 703.19B Or ODOT 703.19A	566	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
A	5 to 10 ton	Similar to past USACE specifications	0	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)
B	600 lb. to 2000 lb.	Similar to past USACE specifications	245	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)

G_s = Specific gravity
n = Porosity of in-place material
w = Moisture content of material as shipped
RPCC = Recycled Portland Cement Concrete

Table 2 – Site 3 Containment Dike Materials, Typical E. Breakwater Section

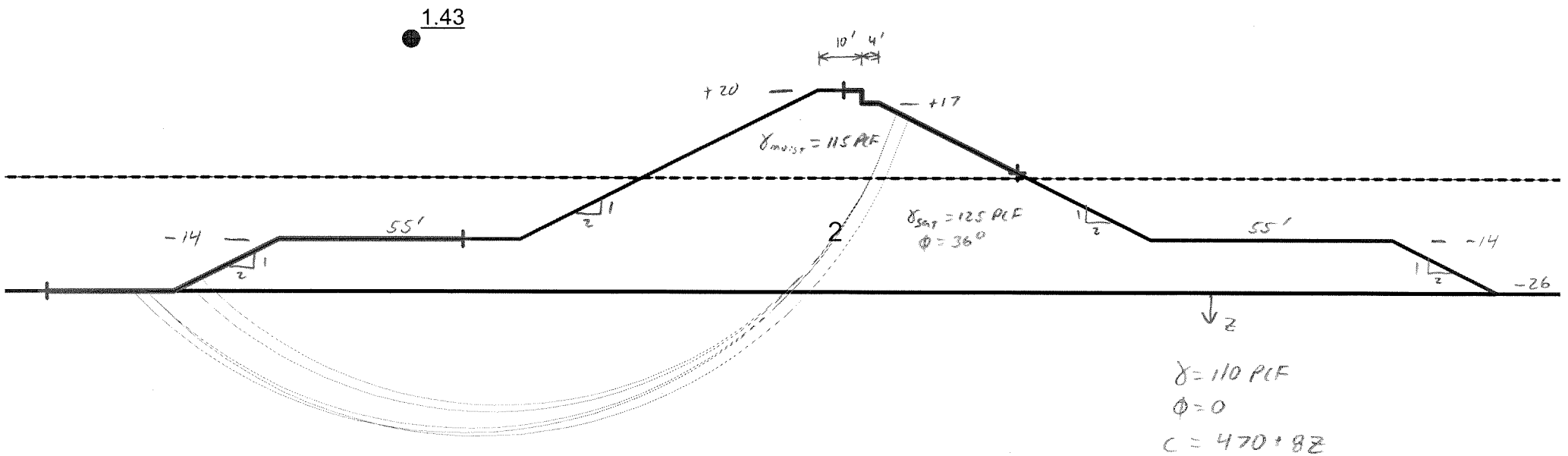
Material	Size Specification	Physical Properties Specification	In-place volume per lineal foot (CF)	Maximum volume (in-place) to weight (shipping) conversion factor (PCF)	Minimum volume (in-place) to weight (shipping) conversion factor (PCF)
H	ODOT 703.19B Type C	ODOT 703.19B	139	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
F	ODOT 703.01 Size No. 68	ODOT 703.16C	97	135 (stone with $G_s = 2.72$, n = 26%, w = 7%)	70 (dry slag)
E	ODOT 703.19B Type D	ODOT 703.19B	453	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	100 (RPCC with $G_s = 2.32$, n = 31%)
D	ODOT 703.19A Crushed Aggregate	ODOT 703.19A	110	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
C	ODOT 703.19B Type D Or ODOT 703.01 Sizes No. 1 through 5 inclusive	ODOT 703.19B Or ODOT 703.19A	1154	130 (stone with $G_s = 2.72$, n = 26%, w = 3%)	70 (dry slag)
A	5 to 10 ton	Similar to past USACE specifications	324	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)
B	600 lb. to 2000 lb.	Similar to past USACE specifications	693	124 (stone with $G_s = 2.72$, n = 27%)	107 (stone with $G_s = 2.58$, n = 33%)

G_s = Specific gravity
n = Porosity of in-place material
w = Moisture content of material as shipped
RPCC = Recycled Portland Cement Concrete

Table 3 – Site 3 Containment Dike Materials, Typical Arwhd. Brkwtr. Section

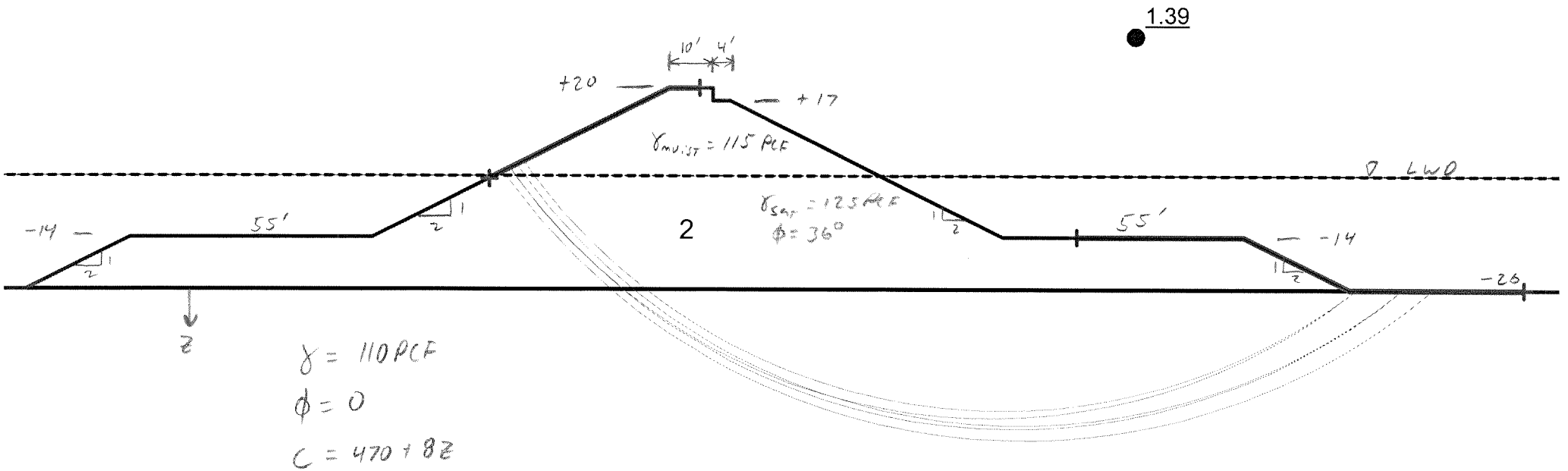
APPENDIX A

File : Site 3


1.43
10' 4'
+20
+17
$\gamma_{moist} = 115$ PCF
$\gamma_{sat} = 125$ PCF
$\phi = 36°$
55'
55'
-14
-14
-26
2
1
z
$\gamma = 110$ PCF
$\phi = 0$
$c = 470 + 8z$

1

File : Site 3 reverse



1

US Army Corps of Engineers - Buffalo District

Originator: _____ Page _____ of _____

Date: _____

Project: _____

Subject: Site 3 open Volume Calcs

Depth (ft)	Avg. Elev.	Offset from sheetpile: Open	E. Brk.	Arrow Brk.	Area (ft²)	Height (ft)
-22 to -14	-18	129'	80'	129'	4,583,277	8'
-14 to +17	+1.5	35'	41'	35'	5,260,000	31'
+17 to +20	+18.5	0'	7'	0'	5,582,273	3'

$$\text{Volume} = 4.58 \times 10^6\ ft^2 \times 8'$$

$$+$$

$$5.26 \times 10^6\ ft^2 \times 31'$$

$$+$$

$$5.58 \times 10^6\ ft^2 \times 3'$$

$$= 8.0 \times 10^6\ CY$$

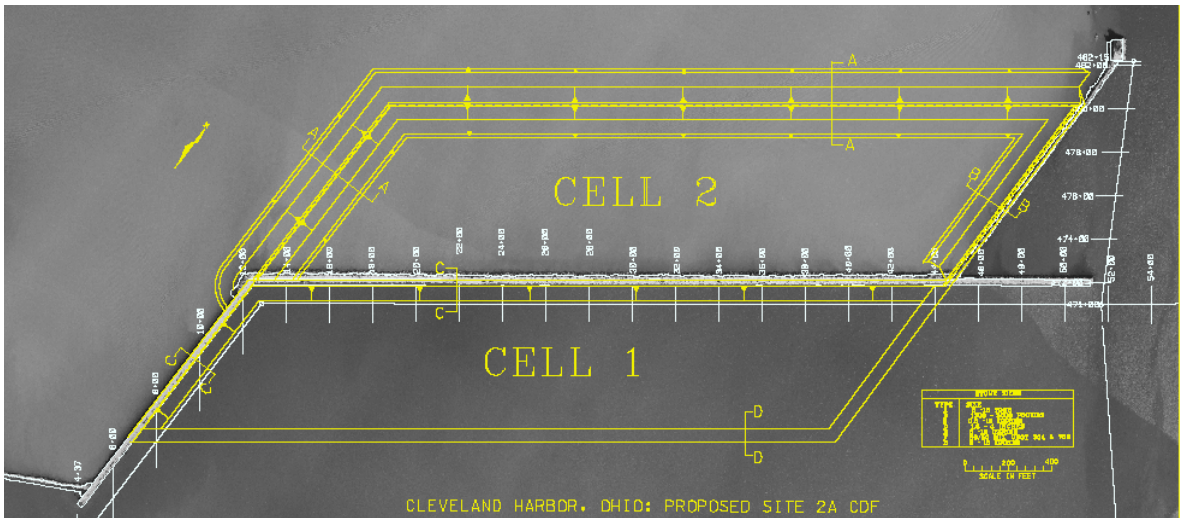
Checked By:

Tab C
Preliminary Design Alternative Site 2a

Cleveland Site 2A CDF
Preliminary Volume Computations
August 2008

A. Introduction

The purpose of this report is to determine the preliminary capacity for the proposed Confined Disposal Facility (CDF) adjacent to the main entrance to Cleveland Harbor along the West Arrowhead Breakwater (see Insert 1). The outer cell would be bounded by rubble mound breakwaters, with the west and south sides overlaying existing structures. The inner cell is bounded by steel sheet pile cells, with that area planned to be used for port facilities once the CDF is filled.



Insert 1. Location of Proposed CDF

The stone for the outer CDF would be have a crest elevation of about +20 ft Low Water Datum (LWD) and have steel sheet pile driven along its crest with a crest elevation of +25 ft LWD to minimize wave overtopping. The crest elevation of the port facilities was set at +10 ft LWD. The plan and typical cross-sections are presented in Figures 1 through 5.

B. Volume Computations

1. **General Area** – The potential interior volume of the CDF was determined by estimating the volume bounded by the steel sheetpile and subsequently subtracting the volume occupied by the stone structures. The gross volume was determined by generating a digital terrain model (DTM) for the existing bottom, as depicted by a current NOAA chart and channel sounding within the harbor obtained in 2007, and the top elevation of the CDF at +10 ft LWD for Cell 1 or +20 ft LWD for Cell 2. Subtracting these two DTMs resulted in the gross

volume within that area. The volume was also determined with the top of the dredged material at one-foot and two-feet below these elevations.

2. **Deductions for Stone Breakwaters -** The volume occupied by the stone structures was based upon the typical section outlines presented on Figures 2-5. The area inward of the sheetpile multiplied by its respective length resulted in the volume.

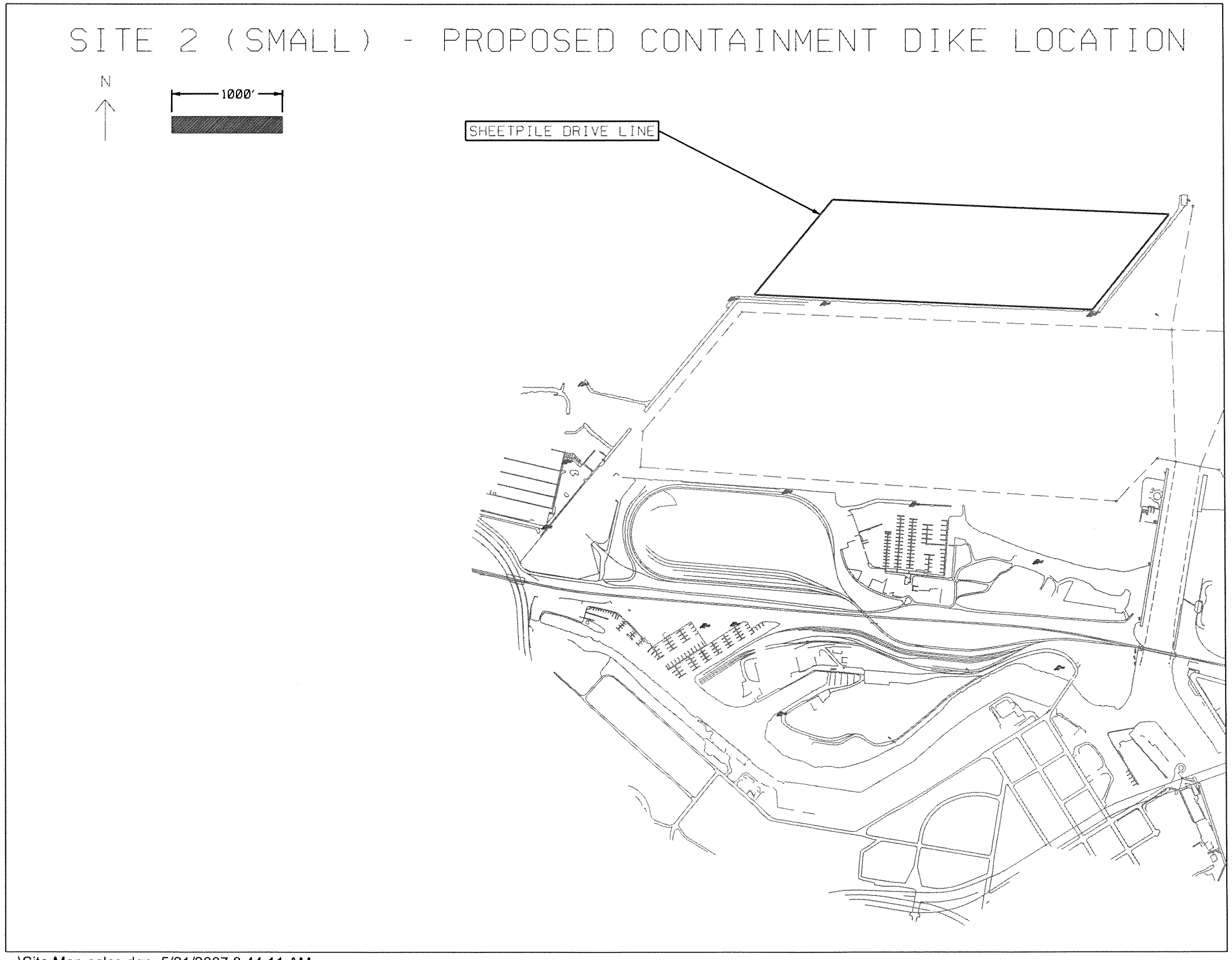
3. **Total –** Table 1 presents the gross volume within the sheetpile boundary and the reductions due to the stone dikes. Volumes were determined for the top of the dredge material at 0-, 1-, and 2-feet below the CDF crest elevation of the top elevation of the CDF at +10 ft LWD for Cell 1 or +20 ft LWD for Cell 2. The time to reach that capacity was determined by assuming a fill rate of 338,220 cubic yards per year.

Table 1. Cleveland Site 2A CDF Capacity

CELL	FILL ELEVATION – FEET LWD	CAPACITY – CUBIC YARDS	CAPACITY - YEARS
1	+10	2,620,000	7.7
	+9	2,520,000	7.5
	+8	2,430,000	7.2
2	+20	4,490,000	13.3
	+19	4,390,000	13.0
	+18	4,290,000	12.7

C. Conclusion

Based upon the aforementioned analysis which used preliminary cross-sections and bottom elevations obtained from a nautical chart and inner harbor channel soundings obtained in 2007, it is estimated that the proposed cells would have a capacity of approximately 7.2 – 7.7 and 12.7 to 13.3 years for Cells 1 and 2, respectively. The maximum capacity of the entire project would be approximately 21.0 years.



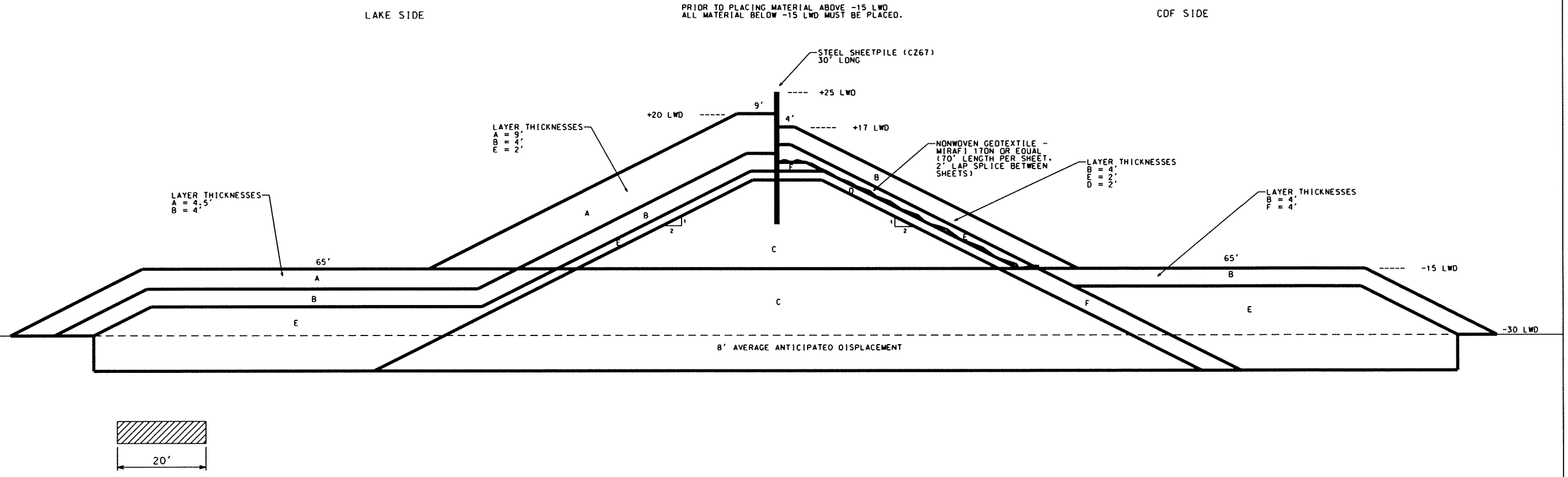
...\Site Map calcs.dgn 5/21/2007 8:44:11 AM

Figure 1

SITE 2 (SMALL) - TYPICAL OPEN-WATER SECTION

NOT SUPPORTED BY DETAILED ENGINEERING ANALYSES.
FOR PRELIMINARY COST ESTIMATING PURPOSES ONLY.

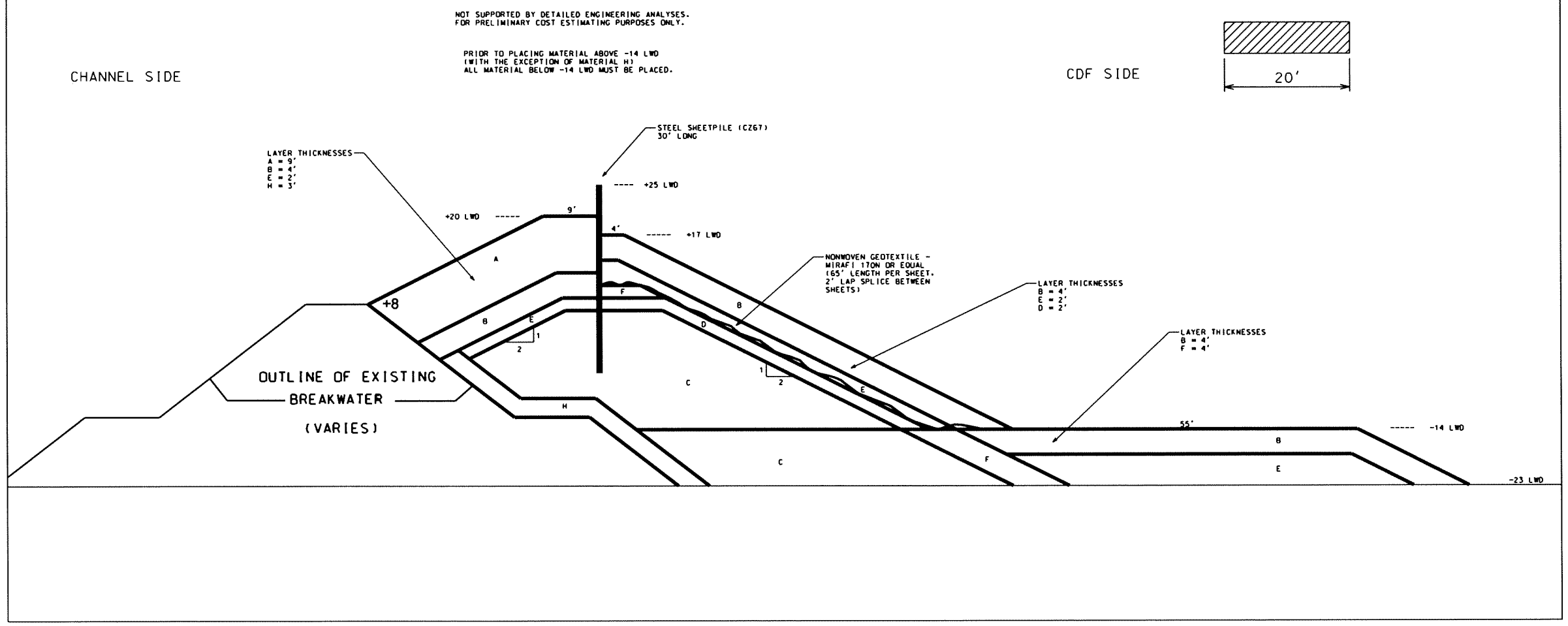
PRIOR TO PLACING MATERIAL ABOVE -15 LWD
ALL MATERIAL BELOW -15 LWD MUST BE PLACED.



...\Site 2 small.dgn 5/21/2007 9:25:10 AM

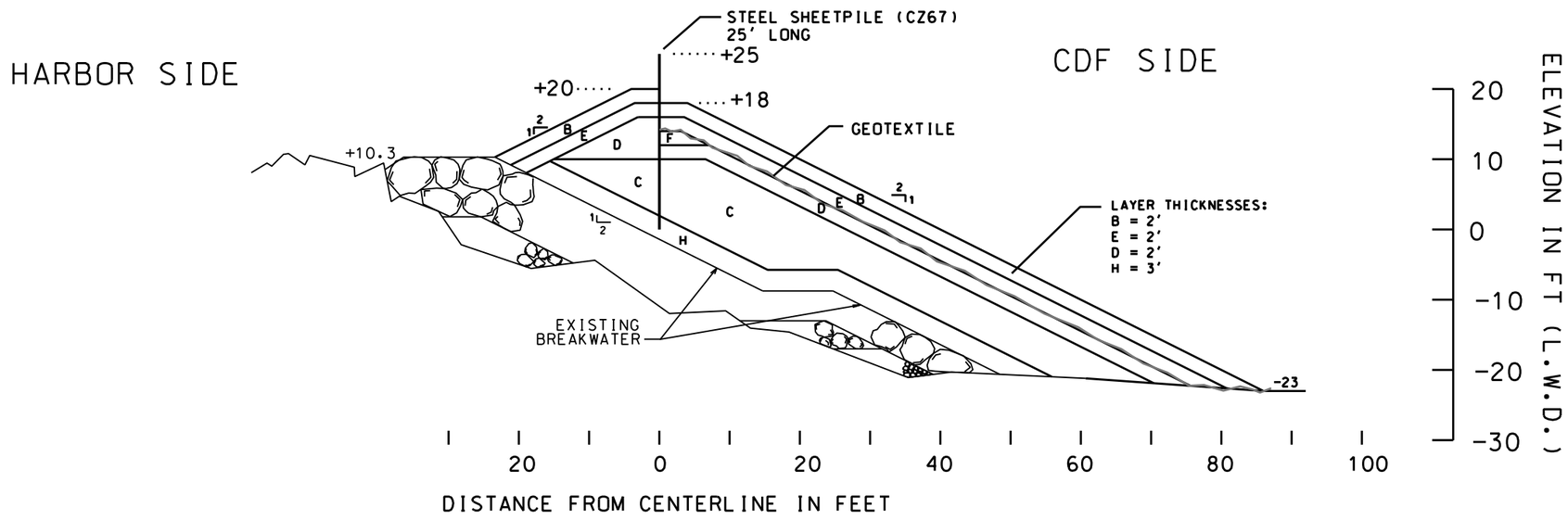
Figure 2

SITE 2 (SMALL) - TYPICAL SECTION ALONG ARROWHEAD BREAKWATER

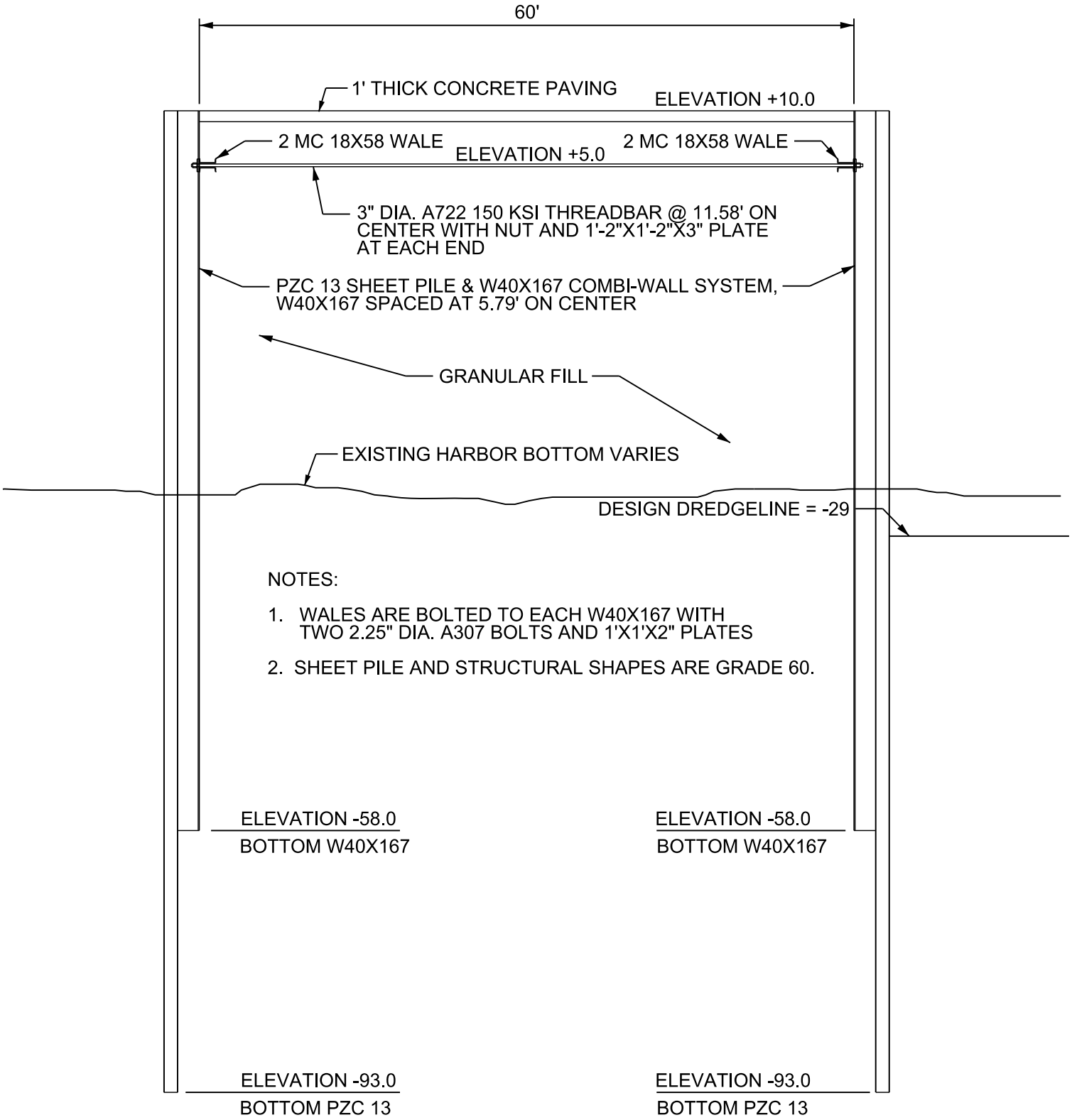


...\Site 2 small arrowhead.dgn 5/21/2007 9:27:55 AM

Figure 4



SITE 3A, CELL 2, TYPICAL SECTION ALONG EAST BREAKWATER
SECTION C-C



NOTES:

1. WALES ARE BOLTED TO EACH W40X167 WITH TWO 2.25" DIA. A307 BOLTS AND 1'X1'X2" PLATES
2. SHEET PILE AND STRUCTURAL SHAPES ARE GRADE 60.

SECTION D-D

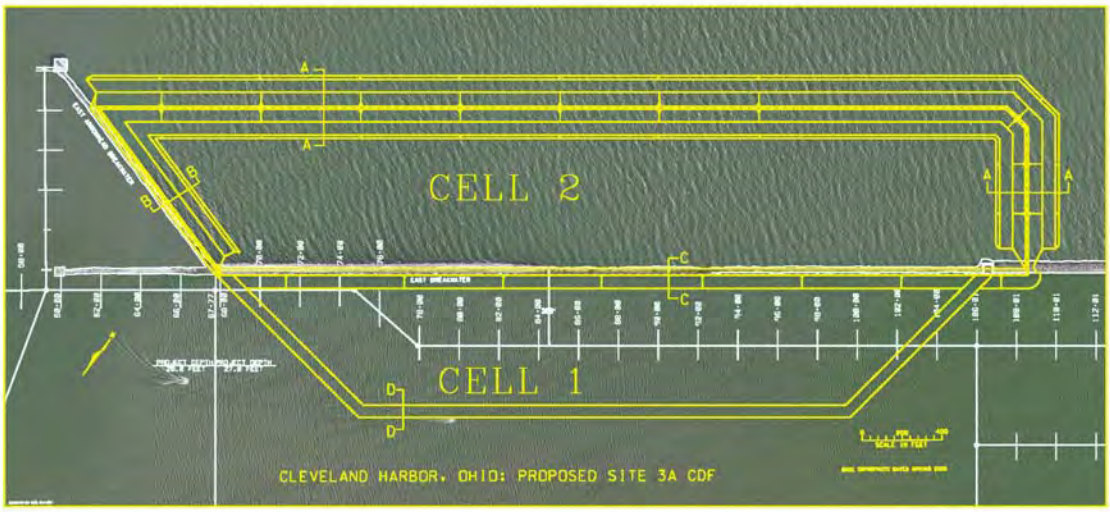
CLEVELAND CDF 2A & 3A (CELL 1)
PROPOSED TYPICAL SECTION
JULY 2008

Tab D
Preliminary Design Alternative Site 2a

Cleveland Site 3A CDF
Preliminary Volume Computations
August 2008

A. Introduction

The purpose of this report is to determine the preliminary capacity for the proposed Confined Disposal Facility (CDF) adjacent to the main entrance to Cleveland Harbor along the East Arrowhead Breakwater (see Insert 1). The outer cell would be bounded by rubble mound breakwaters, with the west and south sides overlaying existing structures. The inner cell is bounded by steel sheet pile cells, with that area planned to be used for port facilities once the CDF is filled.



Insert 1. Location of Proposed CDF

The stone for the outer CDF would be have a crest elevation of about +20 ft Low Water Datum (LWD) and have steel sheet pile driven along its crest with a crest elevation of +25 ft LWD to minimize wave overtopping. The crest elevation of the port facilities was set at +10 ft LWD. The plan and typical cross-sections are presented in Figures 1 through 5.

B. Volume Computations

1. **General Area** – The potential interior volume of the CDF was determined by estimating the volume bounded by the steel sheetpile and subsequently subtracting the volume occupied by the stone structures. The gross volume was determined by generating a digital terrain model (DTM) for the existing bottom, as depicted by a current NOAA chart and channel sounding within the harbor obtained in 2007, and the top elevation of the CDF at +10 ft LWD for Cell 1 or +20 ft LWD for Cell 2. Subtracting these two DTMs resulted in the gross volume within that area. The volume was also determined with the top of the dredged material at one-foot and two-feet below these elevations.

2. **Deductions for Stone Breakwaters -** The volume occupied by the stone structures was based upon the typical section outlines presented on Figures 2-5. The area inward of the sheetpile multiplied by its respective length resulted in the volume.
3. **Total –** Table 1 presents the gross volume within the sheetpile boundary and the reductions due to the stone dikes. Volumes were determined for the top of the dredge material at 0-, 1-, and 2-feet below the CDF crest elevation of the top elevation of the CDF at +10 ft LWD for Cell 1 or +20 ft LWD for Cell 2. The time to reach that capacity was determined by assuming a fill rate of 338,220 cubic yards per year.
4.

Table 1. Cleveland Site 3A CDF Capacity

CELL	FILL ELEVATION – FEET LWD	CAPACITY – CUBIC YARDS	CAPACITY - YEARS
1	+10	1,799,540	5.3
	+9	1,728,822	5.1
	+8	1,658,622	4.9
2	+20	4,654,111	13.8
	+19	4,529,846	13.4
	+18	4,406,020	13.0

C. Conclusion

Based upon the aforementioned analysis which used preliminary cross-sections and bottom elevations obtained from a nautical chart and inner harbor channel soundings obtained in 2007, it is estimated that the proposed cells would have a capacity of approximately 4.9 - 5.3 and 13.0 to 13.8 years for Cells 1 and 2, respectively. The maximum capacity of the entire project would be approximately 19.1 years.

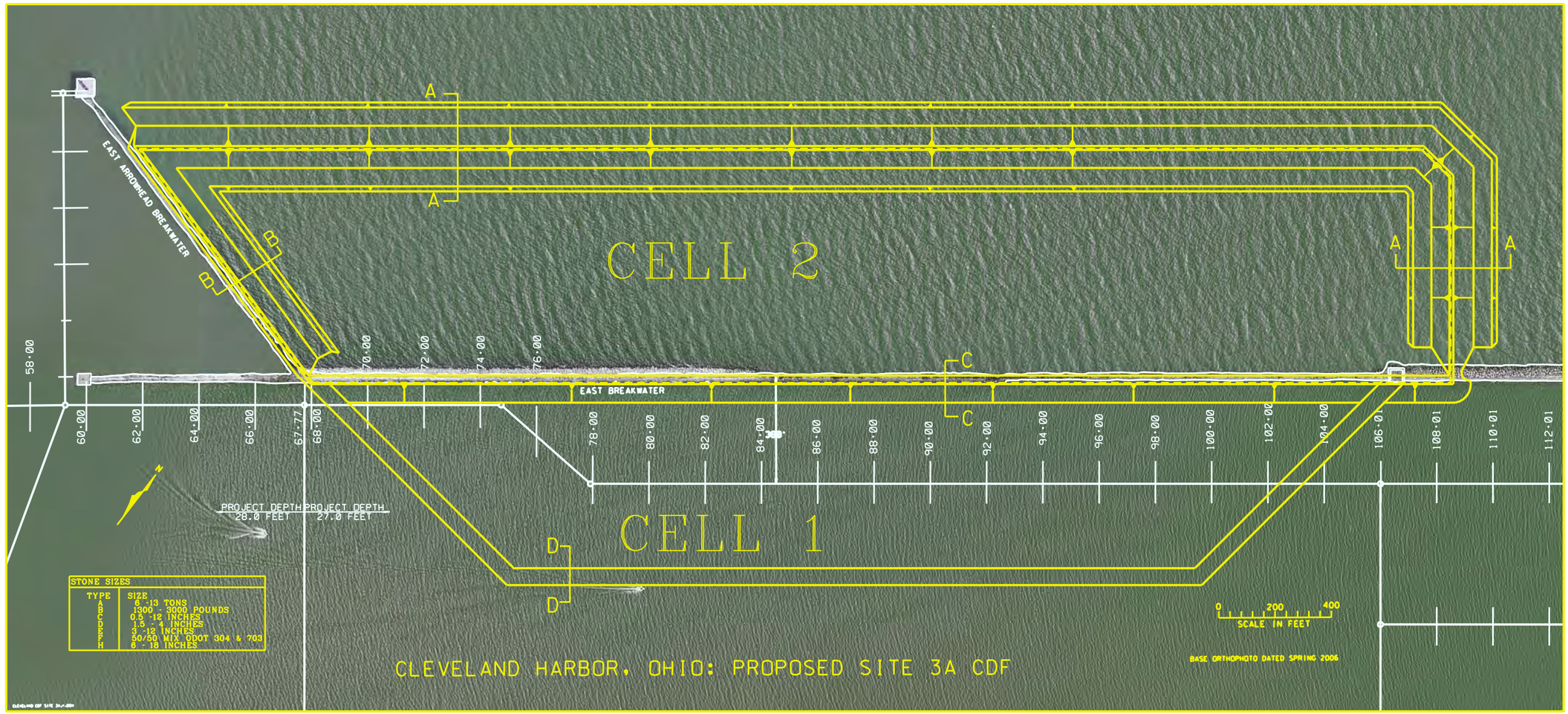
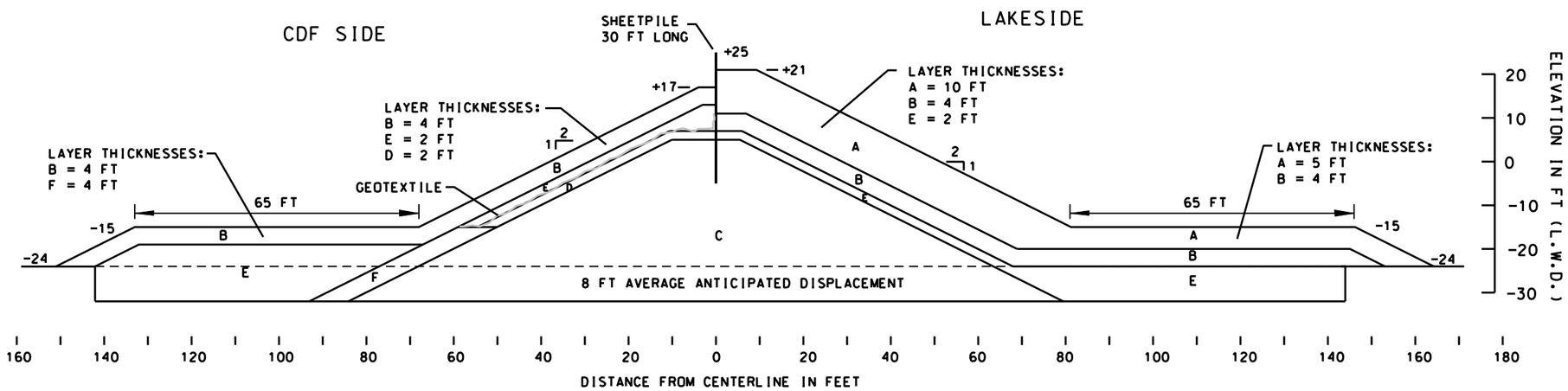

CELL 2
CELL 1
EAST ARROWHEAD BREAKWATER
EAST BREAKWATER
A
B
C
D
58·00
60·00
62·00
64·00
66·00
67·77
68·00
70·00
72·00
74·00
76·00
78·00
80·00
82·00
84·00
86·00
88·00
90·00
92·00
94·00
96·00
98·00
100·00
102·00
104·00
106·01
108·01
110·01
112·01
PROJECT DEPTH 28.0 FEET
PROJECT DEPTH 27.0 FEET
STONE SIZES
TYPE SIZE
A 6-13 TONS
B 1300 - 3000 POUNDS
C 0.5 -12 INCHES
D 1.5 - 4 INCHES
E 3 -12 INCHES
F 50/50 MIX ODOT 304 & 703
H 6 - 18 INCHES
0 200 400
SCALE IN FEET
BASE ORTHOPHOTO DATED SPRING 2006
CLEVELAND HARBOR, OHIO: PROPOSED SITE 3A CDF

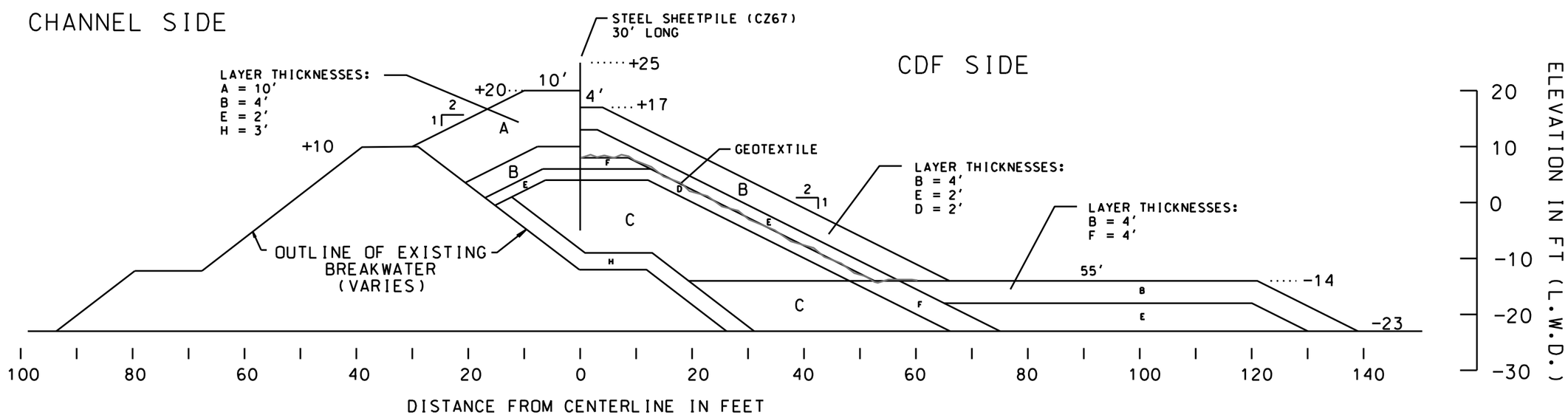
FIGURE 1



SITE 3A, CELL 2, NORTH AND EAST LEG: TYPICAL SECTION AT -24 FT LWD BOTTOM ELEVATION

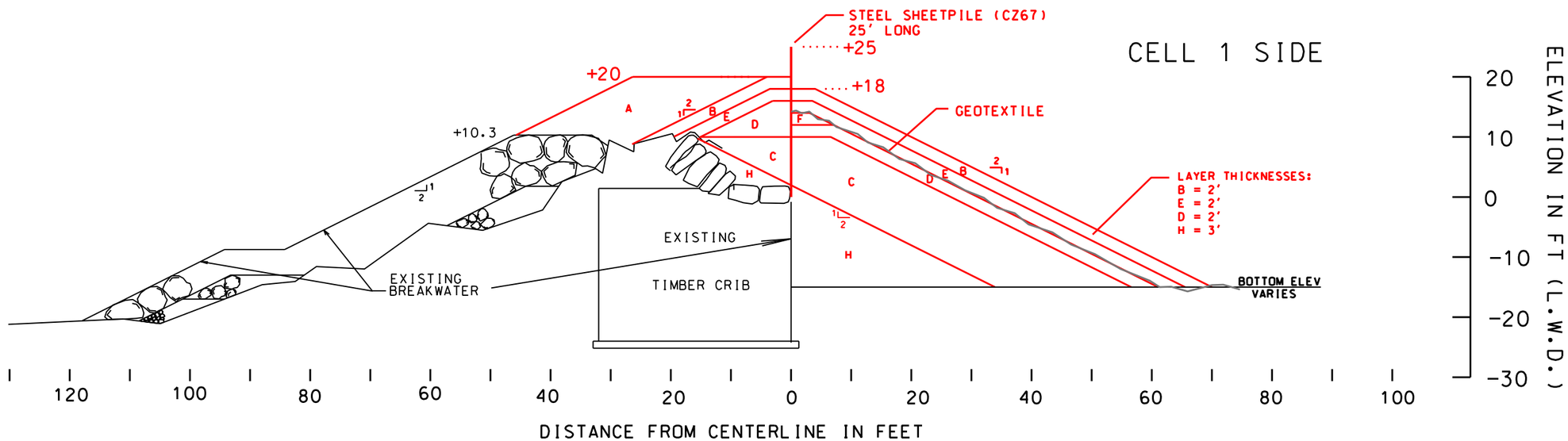
SECTION A-A

FIGURE 2



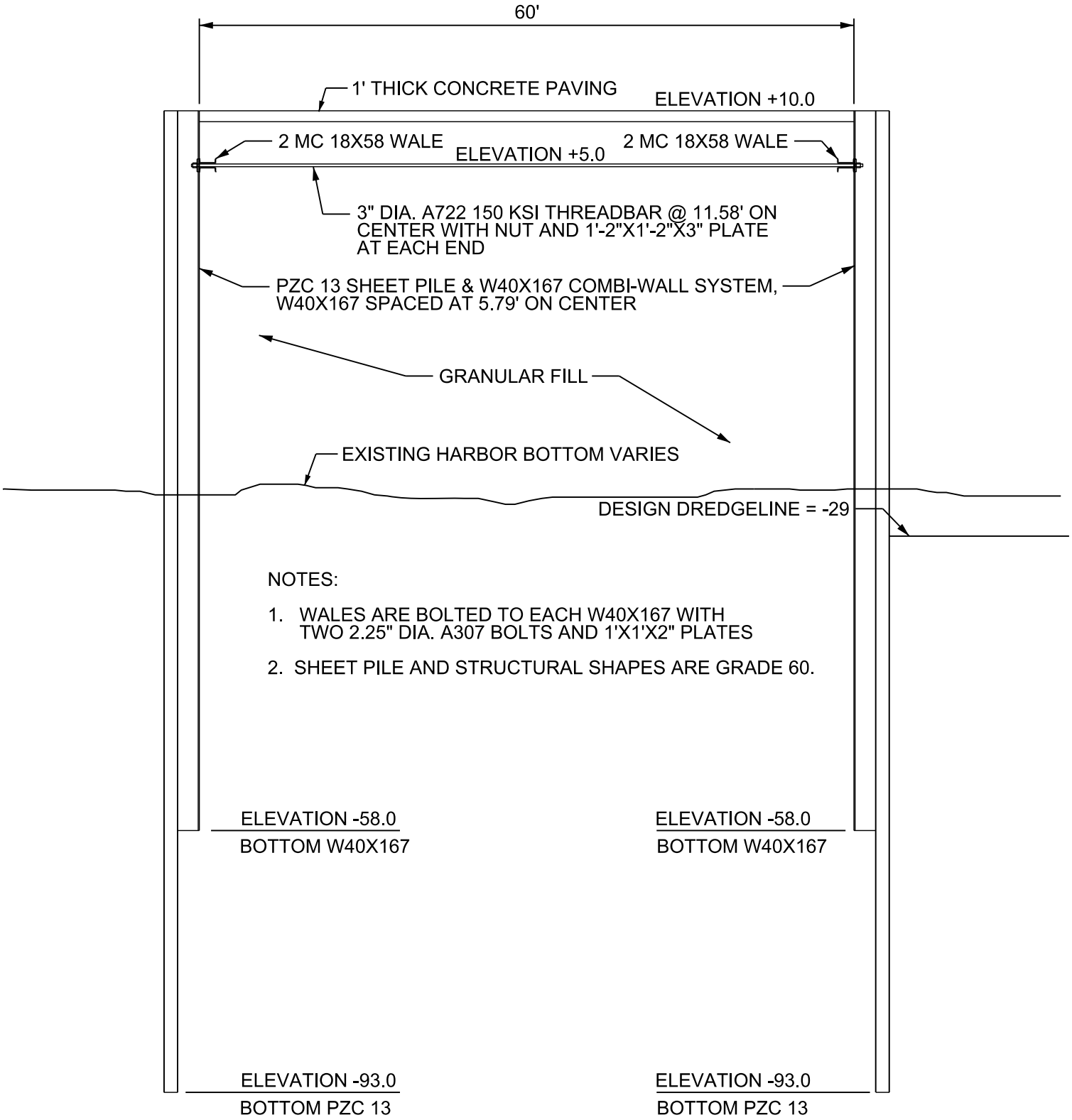
SITE 3A, CELL 2, TYPICAL SECTION ALONG EAST ARROWHEAD BREAKWATER
SECTION B-B

FIGURE 3



SITE 3A, CELL 1, TYPICAL SECTION ALONG EAST BREAKWATER
SECTION C-C

FIGURE 4



SECTION D-D

FIGURE 5

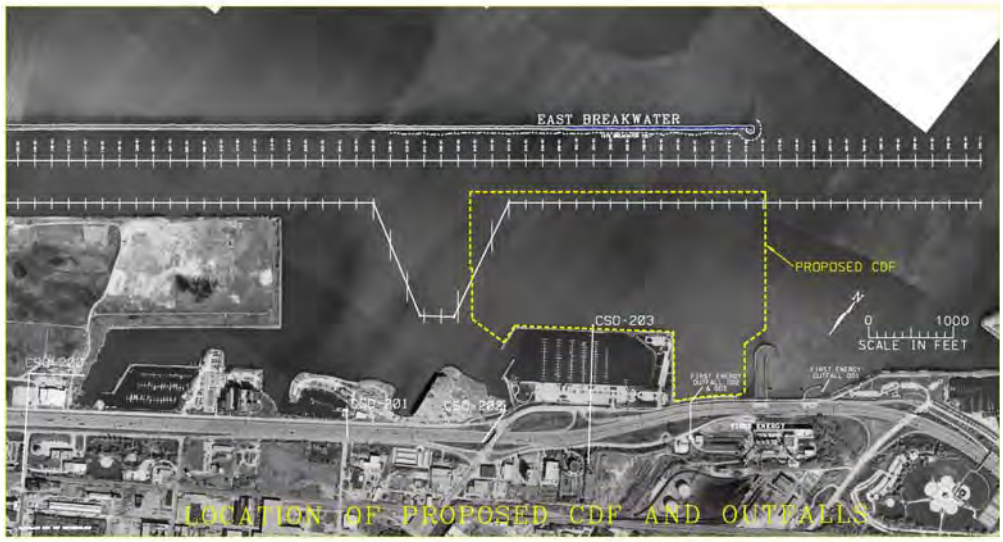
CLEVELAND CDF 2A & 3A (CELL 1)
PROPOSED TYPICAL SECTION
JULY 2008

Tab E
Preliminary Design Alternative Site East 55th Street

Cleveland East 55th Street CDF
Preliminary Volume Computations

A. Introduction

The purpose of this report is to determine the preliminary capacity for the proposed Confined Disposal Facility (CDF) within Cleveland Harbor at East 55th Street (see Insert 1). Cost constraints require that the CDF be constructed in three phases, with the area is planned to be used for port facilities once the CDF is filled.



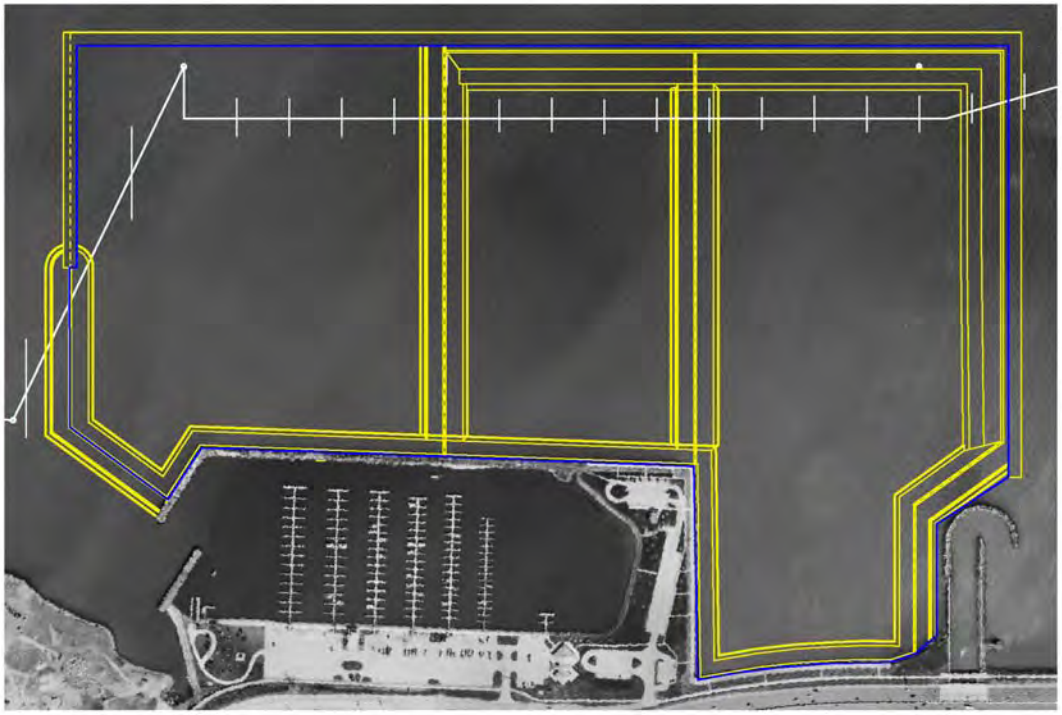
Insert 1. Location of Proposed CDF

The CDF would be bounded along the north, the majority of the east and a portion of the west side by vertical steel sheet pile cells, with the remaining sides composed of sloping stone. While it is expected that the East Breakwater will be extended in the future to provide wave protection for the port facilities, the present harbor configuration will be used for this investigation. The required crest elevation of the port facilities is 580 ft International Great Lakes Datum (IGLD 1985), which is equivalent to +10.8 ft Low Water Datum (LWD). This will be the assumed elevation for the steel cells and west side. However, to minimize overtopping, stone will be placed along the interior, adjacent to the steel cells along a portion of the north and east side at +20 ft LWD. Typical stone cross-sections for the existing CDF at Dike 10b and the proposed Site 2 were assumed applicable to this site. It is assumed the phased construction would progress east to west. The plan and typical cross-sections are presented in Figures 1 and 2.

B. Volume Computations

1. **General Area** – The potential interior volume of the CDF was determined by estimating the volume within the blue outline and subsequently subtracting the volume occupied by the stone structures. The gross volume was determined by generating a digital terrain model (DTM) for the existing bottom, as depicted by a current NOAA chart and the top elevation of the CDF at 580 feet International

Great Lakes Datum (IGLD 1985). Subtracting these two DTMs resulted in the gross volume within the blue area. The volume was also determined with the top of the dredged material at one-foot and two-feet below the dike crest.



Insert 2. Outline of "Blue Area"

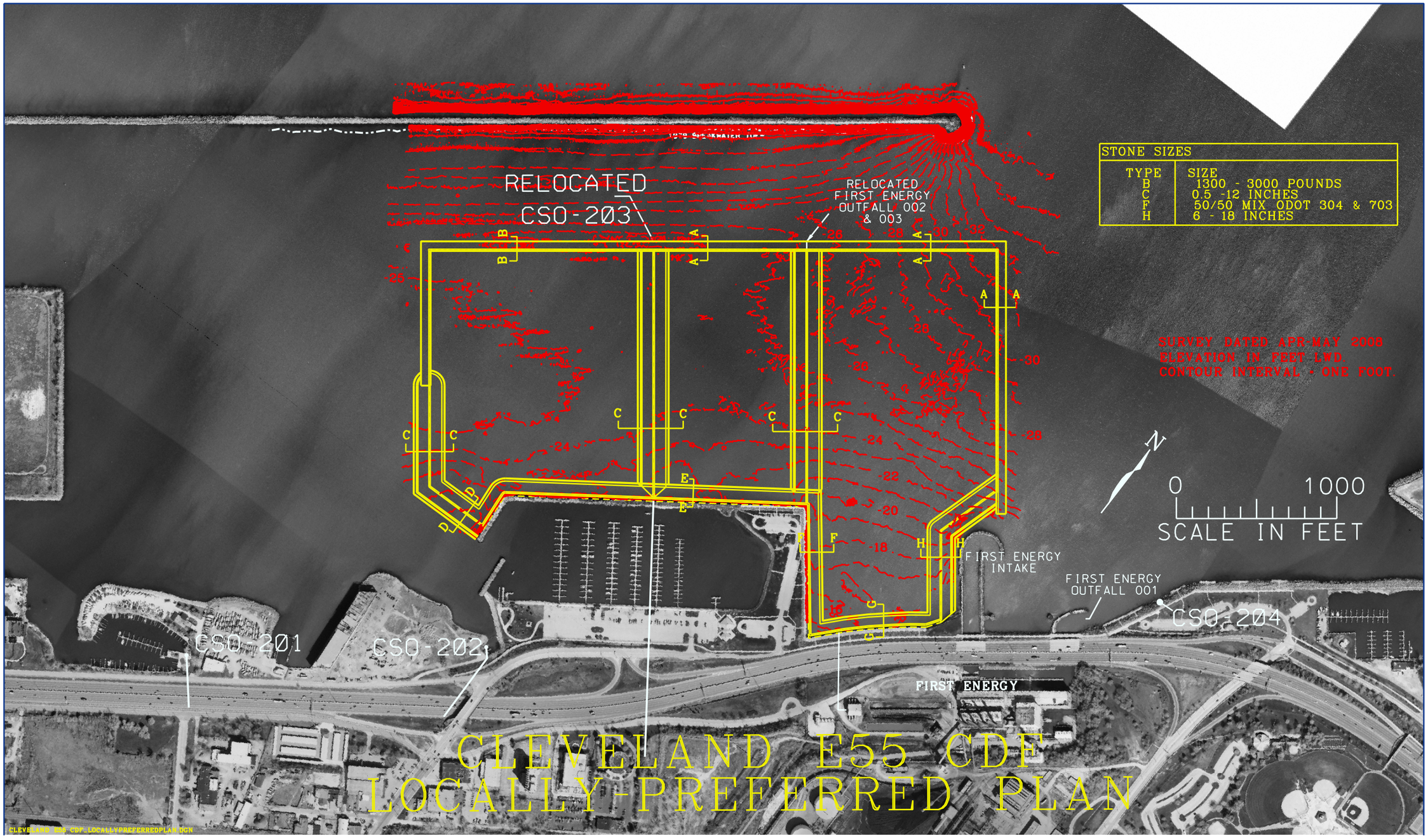
2. **Deductions for Stone Breakwaters -** The volume occupied by the stone structures was based upon the typical section outlines presented on Figure 2. The area inward of the blue box multiplied by its respective length resulted in the volume.
3. **Total –** Table 1 presents the gross volume within the blue outline and the reductions due to the stone dikes. Volumes were determined for the top of the dredge material at 0-, 1-, and 2-feet below the CDF crest elevation of 580 feet IGLD (1985). The time to reach that capacity was determined by assuming a fill rate of 338,220 cubic yards per year.

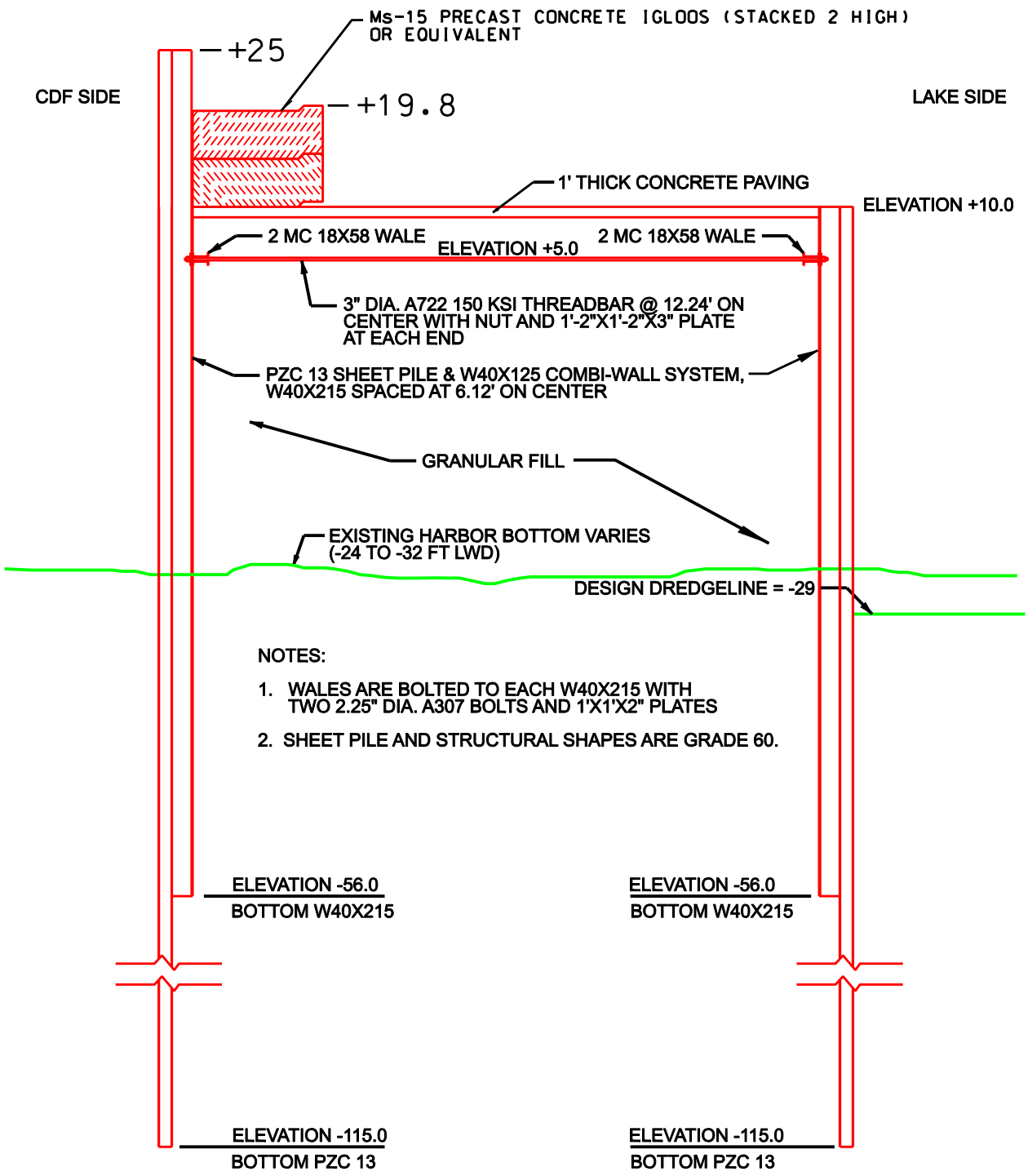
C. Conclusion

Based upon the aforementioned analysis which used preliminary cross-sections and bottom elevations obtained from a nautical chart, it is estimated that the proposed CDF will have a capacity of approximately 20 years.

Table 1. Cleveland E55th Street CDF Capacity (Configuration 2)

Fill Elevation in Feet IGLD '85	580	579	578
Volume in Blue Box – Cubic Yards	7997142	7760750	7524358
Less West BKW stone @-24'LWD – Cubic Yards	31420	31296	31128
Less West BKW stone @-18'LWD – Cubic Yards	16703	16610	16484
Less Stone along marina & Highway – Cubic Yards	155820	155451	152809
Less East BKW stone @ -18 ft LWD – Cubic Yards	71468	69778	68265
Less East BKW stone Transition – Cubic Yards	70564	68771	67037
Less East Side	212006	209372	206624
Less North BKW stone – Cubic Yards	277561	274111	270515
Single CDF Volume CY (1) – Cubic Yards	7161600	6935361	6711496
Cross Dikes	306778	305467	303719
Final Volume (2) Cubic Yards – Cubic Yards	6854822	6629894	6407777
Capacity in Number of Years (3)	20.3	19.6	18.9


RELOCATED
CSO-203
RELOCATED
FIRST ENERGY
OUTFALL 002
& 003
STONE SIZES
TYPE SIZE
B 1300 - 3000 POUNDS
C 0.5 -12 INCHES
F 50/50 MIX ODOT 304 & 703
H 6 - 18 INCHES
SURVEY DATED APR-MAY 2008
ELEVATION IN FEET LWD
CONTOUR INTERVAL - ONE FOOT
N
0 1000
SCALE IN FEET
FIRST ENERGY
INTAKE
FIRST ENERGY
OUTFALL 001
CSO-204
CSO-201
CSO-202
FIRST ENERGY
CLEVELAND E55 CDF
LOCALLY-PREFERRED PLAN
CLEVELAND E55 CDF_LOCALLYPREFERREDPLAN.DGN



NOTES:

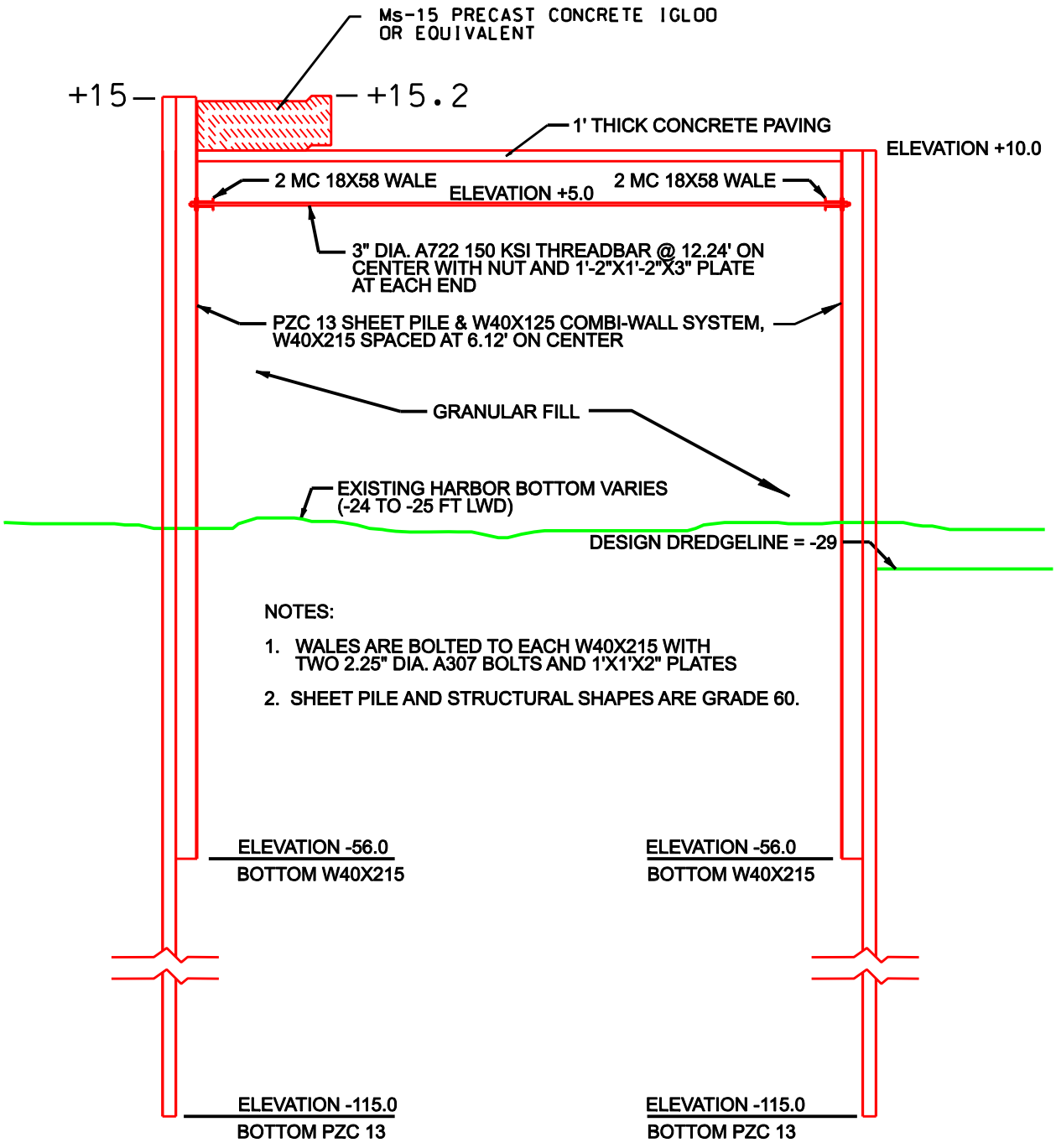
1. WALES ARE BOLTED TO EACH W40X215 WITH TWO 2.25" DIA. A307 BOLTS AND 1'X1'X2" PLATES
2. SHEET PILE AND STRUCTURAL SHAPES ARE GRADE 60.

CLEVELAND E55TH STREET CDF, LOCALLY-PREFERRED PLAN

TYPICAL SECTION A-A

0 10
SCALE - FT

JULY 2008



NOTES:

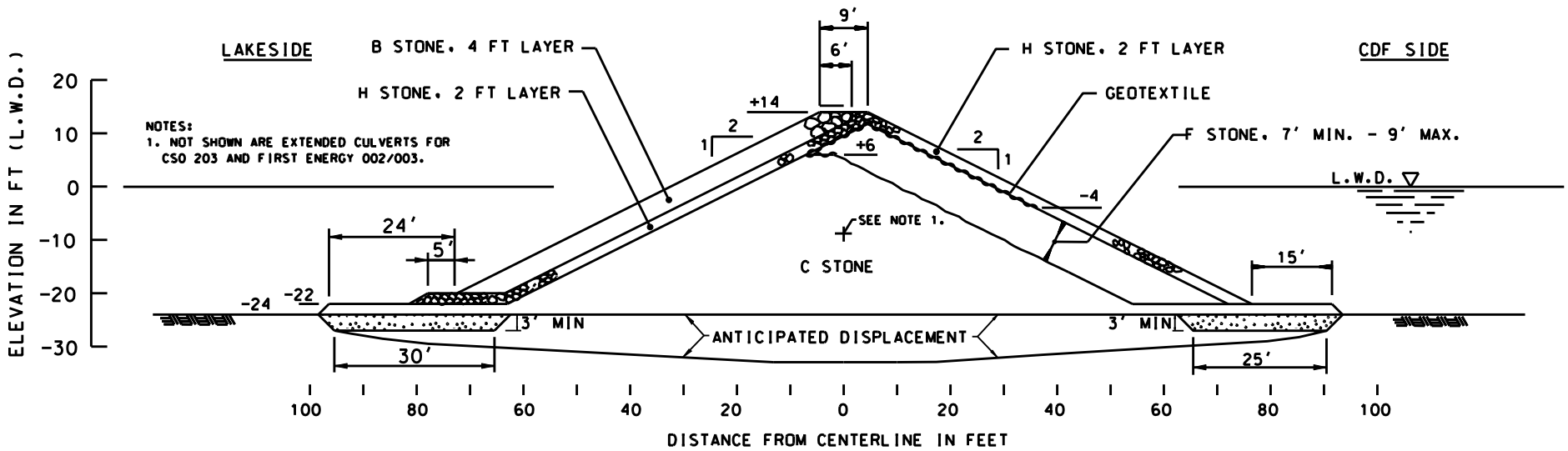
1. WALES ARE BOLTED TO EACH W40X215 WITH TWO 2.25" DIA. A307 BOLTS AND 1'X1'X2" PLATES
2. SHEET PILE AND STRUCTURAL SHAPES ARE GRADE 60.

CLEVELAND E55TH STREET CDF, LOCALLY-PREFERRED PLAN

TYPICAL SECTION B-B

0 10
SCALE - FT

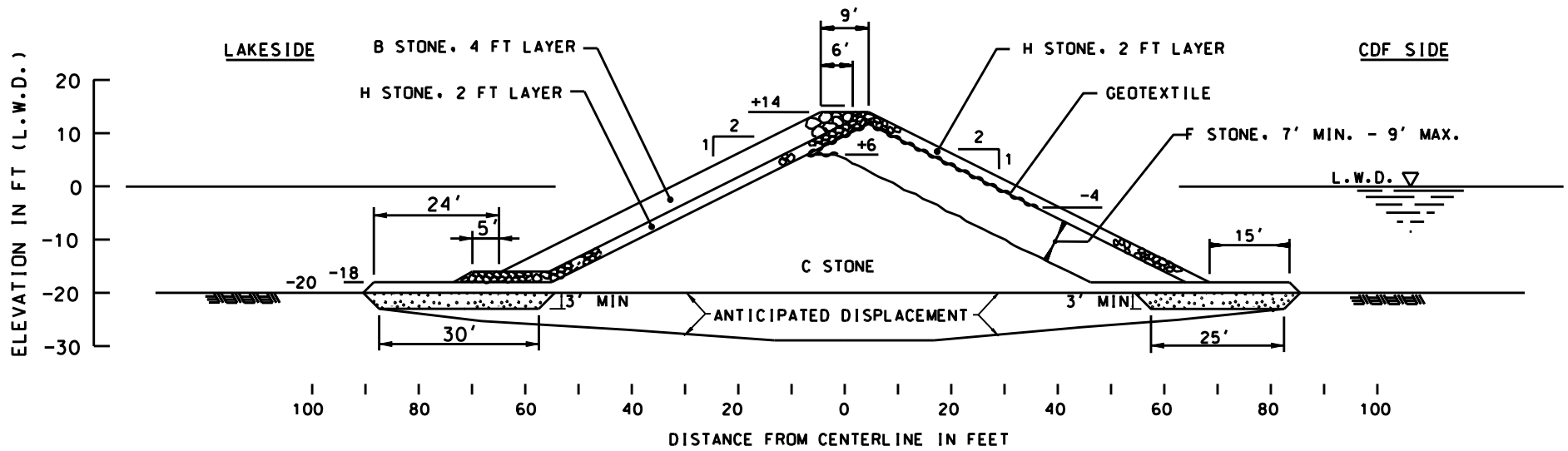
JULY 2008



CLEVELAND E55TH STREET CDF, LOCALLY-PREFERRED PLAN

SECTION C-C

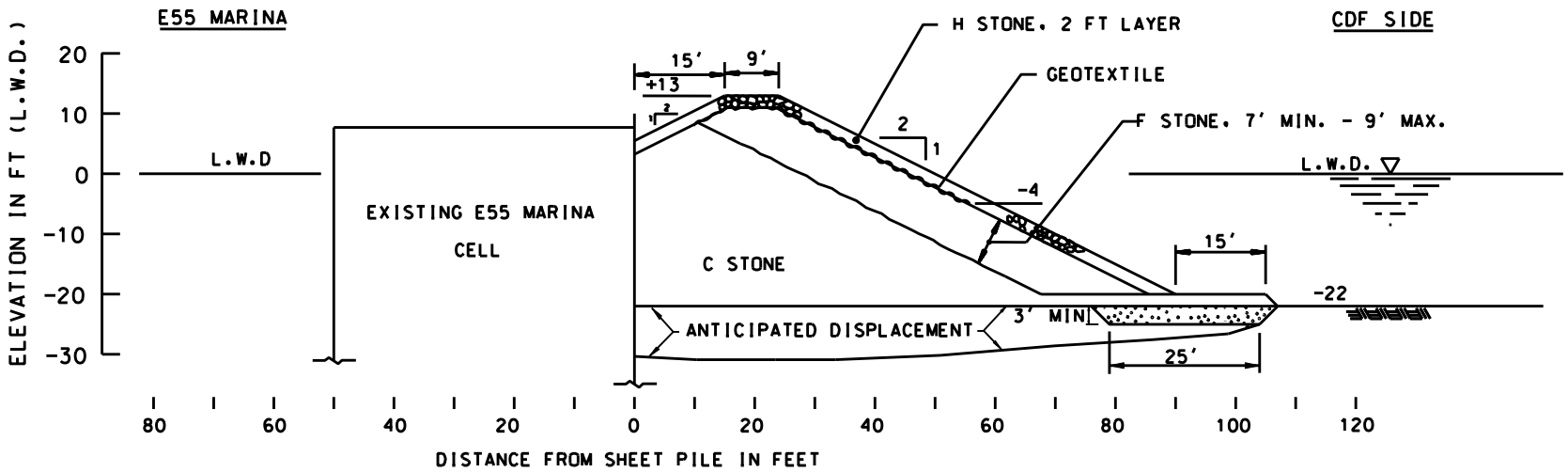
JULY 2008



CLEVELAND E55TH STREET CDF, LOCALLY-PREFERRED PLAN

SECTION D-D

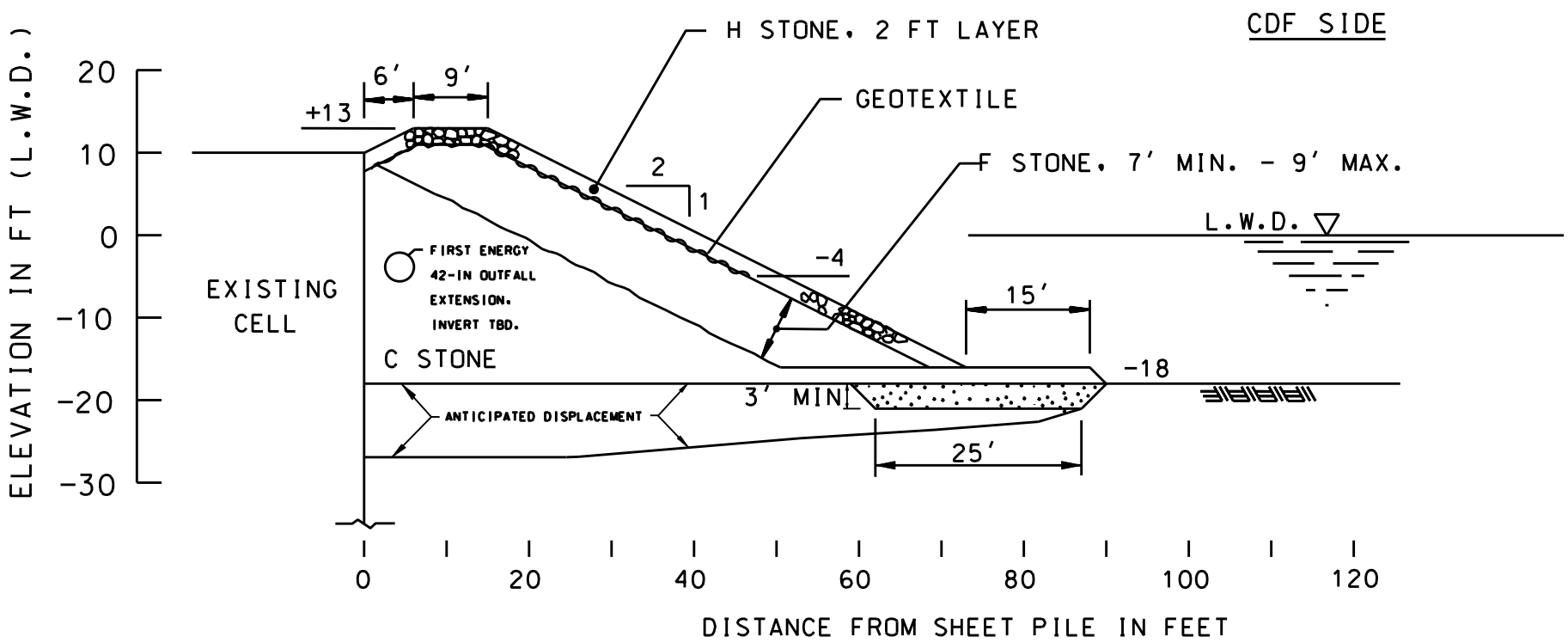
JULY 2008



CLEVELAND E55TH STREET CDF, LOCALLY-PREFERRED PLAN

SECTION E-E

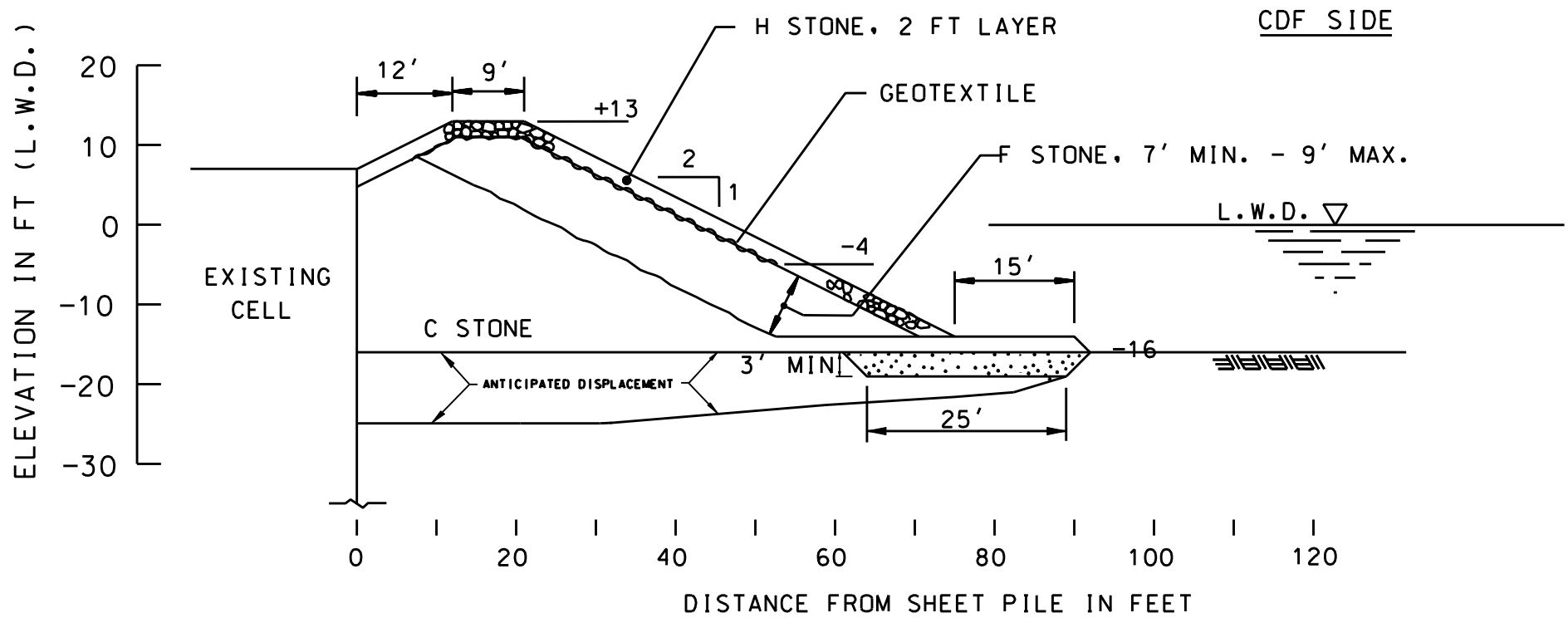
JULY 2008



CLEVELAND E55TH STREET CDF, LOCALLY-PREFERRED PLAN

SECTION F-F

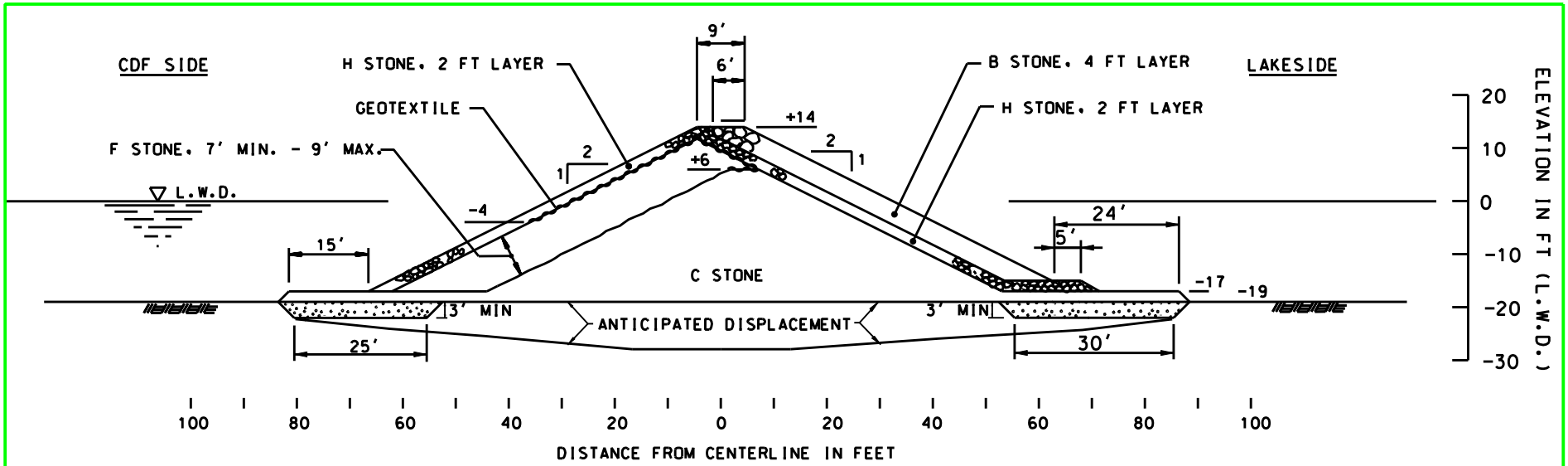
JULY 2008



CLEVELAND E55TH STREET CDF, LOCALLY-PREFERRED PLAN

SECTION G-G

JULY 2008



CLEVELAND E55TH STREET CDF, LOCALLY-PREFERRED PLAN

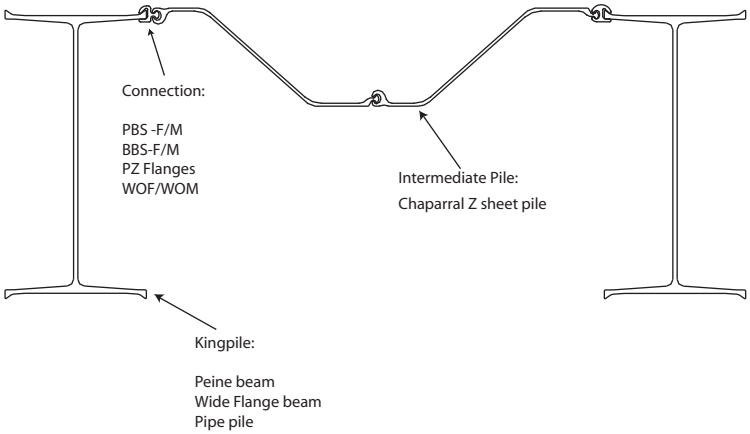
SECTION H-H

JULY 2008

LBFoster Piling

Combi-wall Systems

L.B. Foster is dedicated to offering the most efficient combi-wall system for your needs through utilizing a variety of systems. Using specialized beams from Peine or domestic wide flange beams, extruded connectors from Pile Pro, and PZC sheet pile from Chaparral, L.B. Foster is able to put together the right package. Systems using the Wide Flange Beams and PZC sheet pile are 100% melted and manufactured in U.S.A.



The systems shown represent only a portion of the variations possible. Intermediate sheet pile function as earth retention and for load transfer. The sheet pile is only required to resist active earth pressures down to the zero earth pressure level and may extend below this level as a safety measure. Shortening the lengths of the intermediate sheet pile will reduce the cost of the job and facilitate installation.

Peine system properties shown are with the connectors being supplied loose. Moment of inertia and section modulus can be improved if the connectors are welded on to the beams. This is possible in a variety of combinations. The wide flange beams will have either the connectors or flanges welded on with a full length fillet weld as standard. Please contact us with your project requirements so we can offer a custom solution.

Port of Oakland, Phase 1

Port of Oakland, Phase 2

Conneaut, OH

(800) 848-6249
www.fosterpiling.com

Combi-walls are piling walls that are comprised of high modulus structural components interspaced by lighter sheet piles. The high modulus components - known as king piles - can be tubular, box, bearing or other types of fabricated piles.

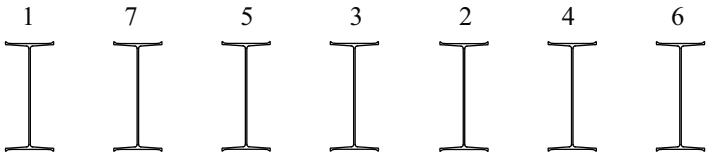
It is essential that a stable, heavy, adequately rigid and straight pile-driving template frame, adapted to suit the length and weight of the pilings, be provided.

The king piles are fixed into position within the template using welded bracket guides which take into account width tolerances.

Driving of the king piles must be carried out with extreme care in order to ensure that they are embedded straight and vertical, or at a prescribed batter, thereby guaranteeing that they are parallel to each other and at the required spacing.

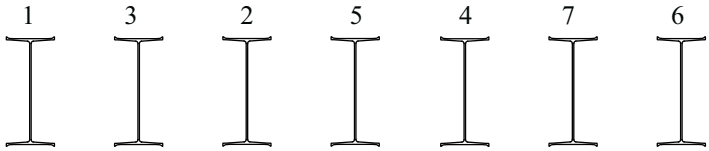
The driving sequence of the king piles must ensure that the pile toe encounters soil uniformly on its total circumference and not just on one side.

This is achieved by driving in the following sequence



(large driving step)

At least, however, the following sequence should be observed:



(small driving step)

In general, all of the king piles should be driven in sequence to full penetration without interruption. Following successful completion of this, the intermediate light piling sections can be set and driven. During the setting and driving operations of the king piles, a constant check (using theodolites) should be made of their alignment in relation to the wall.

When the guide frames have been removed, a final survey should be made to ensure that the deviations in the distance between the king piles are within the acceptable tolerances in order to allow the proper installation of the sheet pile. However, if the deviations are outside the specified or practical tolerances, then either the intermediate piles have to be adjusted or the king piles must be extracted and re-driven.

To overcome difficult driving conditions, it may be possible to use: jetting; excavating inside the king piles; or any other the ground pre-treatment methods normally adopted for sheet piling.

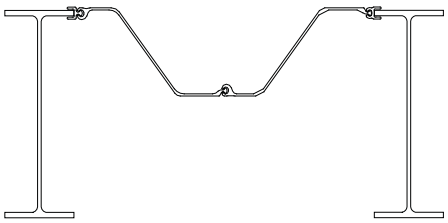
Above text taken from the "NASSPA Best Practices Sheet Piling Installation Guide"

Combi-wall Solution Variations

L.B. Foster is dedicated to offering the most efficient combi-wall system for your needs through utilizing our vast array of systems

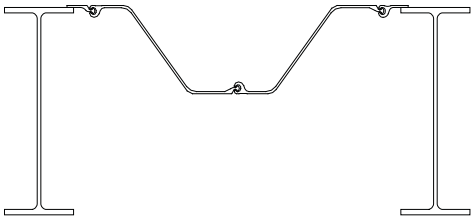
100% Domestic Solutions:

Wide Flange with Extruded Connectors



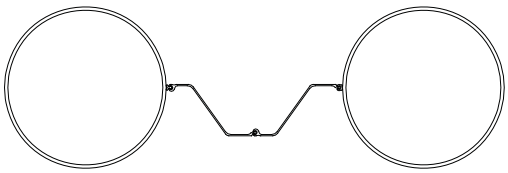
Width Range: 48” - 74”
Section Modulus Range (in^3 / ft): 40-335
Moment of Inertia Range (in^4 / ft): 700-7070

Wide Flange with Z-Profile Flanges



Width Range: 50” - 80”
Section Modulus Range (in^3 / ft): 40-320
Moment of Inertia Range (in^4 / ft): 700-6800

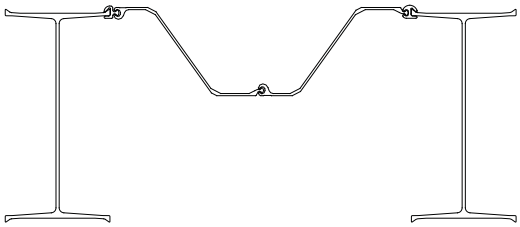
Pipe Pile with Extruded Connectors



The properties are only limited to jobsite and manufacturing restrictions.

Foreign Solutions:

Single Peine Beam System

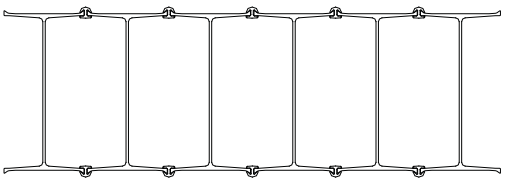


Width Range: 54” - 77”
Section Modulus Range (in^3 / ft): 30-280
Moment of Inertia Range (in^4 / ft): 500 - 6200

Double Peine Beam System

Width Range: 70” - 95”
Section Modulus Range (in^3 / ft): 40 - 435
Moment of Inertia Range (in^4 / ft): 500 - 8800

Box Peine Beam System



Width Range: 16” - 19”
Section Modulus Range (in^3 / ft): 130 - 700
Moment of Inertia Range (in^4 / ft): 1000 - 14600

LBFoster Piling

(800) 848-6249
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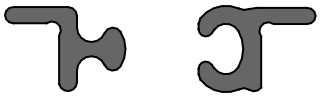
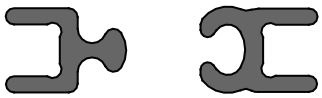
L.B. Foster Combi-wall systems can be supplied with a range of connections. Each connector series offers distinct advantages to assure you have the best system for your project.



One Leg BBS Connectors:

Universal & in stock - ready for quick orders
Field or shop weld full length to beam

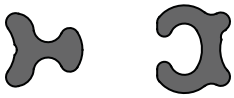


BBS Connectors:

Produced to your job requirements
Field or shop weld full length to beam

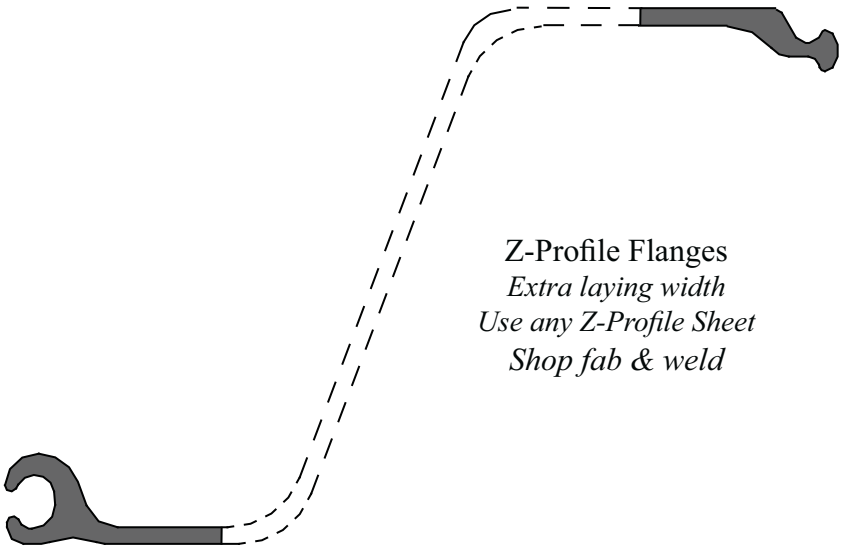
PBS Connectors:

Most flexible system on the market
Simply tack weld to sheet pile in field

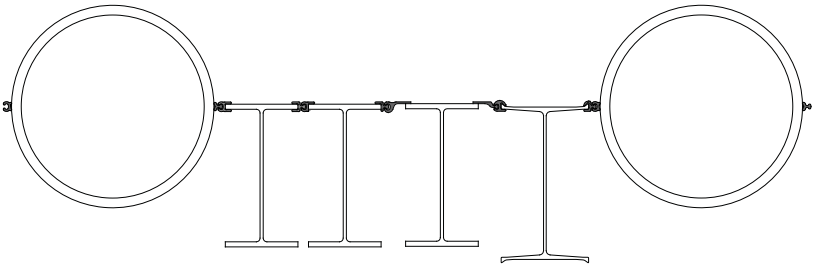


WOM / WOF Connectors:

Used in weight efficient pipe combi-walls
Field or shop weld full length to pipe



Z-Profile Flanges
Extra laying width
Use any Z-Profile Sheet
Shop fab & weld



LBFoster
Piling

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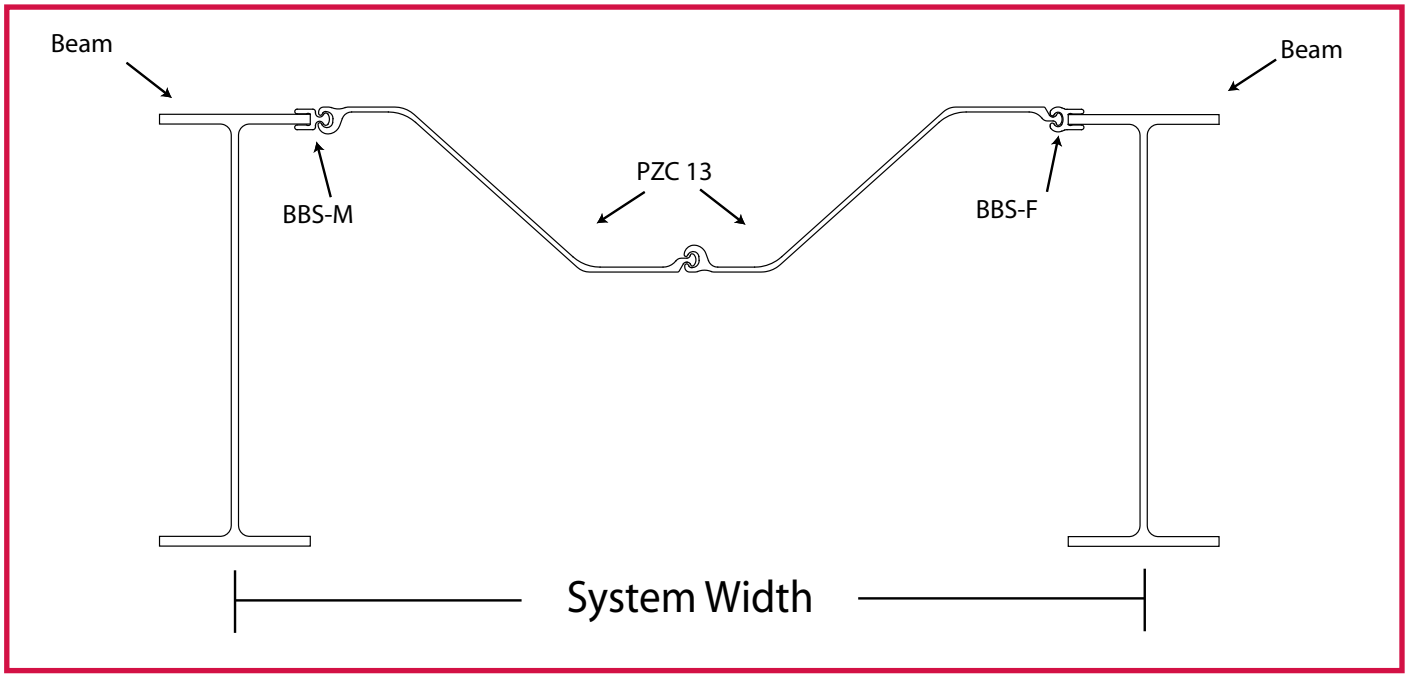
LBFoster Piling

PZC™ 13 Combi-wall Solution



Dimensions and Properties

Beam	System Width	Section Modulus	Moment of Inertia	Weight in Pounds lb / ft²		
	in.	in³ / ft	in⁴ / ft	100%	80%	60%
W33 x 118	69.18	72.5	1330	40.7	36.7	32.6
W33 x 130	69.21	80.5	1474	42.8	38.7	34.7
W36 x 135	69.65	85.9	1683	43.4	39.4	35.3
W40 x 149	69.51	98.8	2065	45.9	41.8	37.8
W40 x 167	69.51	113.9	2385	49.0	45.0	40.9
W40 x 183	69.51	127.7	2683	51.7	47.7	43.7
W40 x 199	73.45	135.1	2800	51.6	47.8	44.0
W40 x 215	73.45	149.0	3098	54.2	50.4	46.6
W40 x 249	73.45	170.9	3560	59.8	55.9	52.1
W40 x 277	73.53	189.2	3952	64.3	60.4	56.6
W40 x 297	73.53	199.4	4167	67.5	63.7	59.9
W40 x 321	73.61	213.6	4474	71.4	67.6	63.7
W40 x 372	73.76	246.4	5202	79.5	75.7	71.9

% of sheet pile length to beam length

(800) 848-6249
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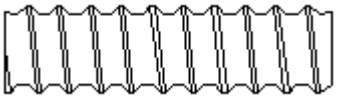
150 KSI All-Thread-Bar

Threaded Bar Types | 150 KSI Information | 150 KSI Accessories | Case Histories | Corrosion Protection

Structural Properties	
Yield Stress	**Ultimate Stress**
127.7 KSI (880.5 Mpa)	150 KSI (1034.3 Mpa)
Elongation in 20 bar diameters	**Reduction of Area**
4%	20%



Unique Thread Form

R71 150 KSI All-Thread-Bar - ASTM A722

Nominal Bar Diameter	Minimum Net Area Thru Threads	Minimum Ultimate Strength	Minimum Yield Strength	Nominal Weight	Approx. Thread Major Dia.	Part Number
1" (25 mm)	0.85 in^2 (549 mm^2)	128 kips (567 kN)	102 kips (454 kN)	3.09 lbs./ft. (4.6 Kg/M)	1-1/8" (28.6 mm)	R71-08
1-1/4" (32 mm)	1.25 in^2 (807 mm^2)	188 kips (834 kN)	150 kips (667 kN)	4.51 lbs./ft. (6.71 Kg/M)	1-7/16" (36.5 mm)	R71-10
1-3/8" (36 mm)	1.58 in^2 (1019 mm^2)	237 kips (1054 kN)	190 kips (843 kN)	5.71 lbs./ft. (8.50 Kg/M)	1-9/16" (39.7 mm)	R71-11
1-3/4" (45 mm)	2.60 in^2 (1664 mm^2)	400 kips (1779 kN)	320 kips (1423 kN)	9.06 lbs./ft. (13.5 Kg/M)	2" (50.8 mm)	R71-14
2-1/2" (65 mm)	5.19 in^2 (3350 mm^2)	778 kips (3457 kN)	622 kips (2766 kN)	18.2 lbs./ft. (27.1 Kg/M)	2-3/4" (69.9 mm)	R71-20
** 3" (75 mm)	6.46 in^2 (4169 mm^2)	969 kips (4311 kN)	775 kips (3448 kN)	22.3 lbs./ft. (32.7 Kg/M)	3-3/64" (78.2 mm)	R71-24

Effective cross sectional areas shown are as required by ASTM A-722-98. Actual areas may exceed these values.
ACI 355.1R section 3.2.5.1 indicates an ultimate strength in shear has a range of .6 to .7 of the ultimate tensile strength.
Designers should provide adequate safety factors for safe shear strengths based on the condition of use.
Per PTI Recommendations for Prestressed Rock and Soil Anchors section 6.6, anchors should be designed so that:
- The design load is not more than 60% of the specified minimum tensile strength of the prestressing steel.
- The lock-off load should not exceed 70% of the specified minimum tensile strength of the prestressing steel.
- The maximum test load should not exceed 80% of the specified minimum tensile strength of the prestressing steel.
** The 3" diameter bar is not covered under ASTM A722.

Properties

Williams 150 KSI All-Thread-Bars are manufactured in strict compliance with ASTM A-722-98 and AASHTO M275 Highway Specifications. The prestressing steel is high in strength yet ductile enough to exceed the specified elongation and reduction of area requirement. Selected heats can also pass the 135° supplemental bend test when required. Testing has

shown Williams 150 KSI All-Thread-Bars to meet or exceed post tensioning bar and rock anchoring criteria as set by the Post Tensioning Institute including dynamic test requirements beyond 500,000 cycles of loading.

Williams 360° continuous thread deformation pattern has the ideal relative rib area configuration to provide excellent bond strength capability to grout or concrete, far better than traditional reinforcing deformation patterns.

Threads

All-Thread-Bars are cold rolled to close tolerances under continuous monitoring procedures for quality control. Threads for Williams All-Thread Bar are specially designed with a rugged thread pitch wide enough to be fast under job site conditions and easy to assemble. They also have a smooth, wide, concentric, surface ideal for torque tensioning. This combination offers tremendous savings over inefficient hot rolled non-concentric thread-forms.

Williams All-Thread-Bars are threaded around the full circumference enabling the load transfer from the bar to the fasteners to occur efficiently without eccentric point loading. Williams fasteners easily meet the allowable load transfer limitations set forth by the Post Tensioning Institute (of the United States). Unlike competing hot rolled threaded bars and cast fasteners, Williams 150 KSI All-Thread-Bars and fasteners are machined to tight tolerances for superior performance and mechanical lock. Precision machining greatly reduces concern of fastener loosening or detensioning. 150 KSI All-Thread-Bars meet or exceed the deformation requirements under ASTM A-615 for concrete reinforcing bars.

Steel Quality

Williams 1", 1-1/4", and 1-3/8" 150 KSI All-Thread-Bars are hot-rolled, high strength steel. The bars are cold stressed and stress relieved to produce specific properties. All bars are produced to ASTM A-722-98 physical standards. The 1-3/4", 2-1/2" and 3" All-Thread-Bars are cold drawn through a series of tenisle and compressive stresses to produce a cold-stressed bar. They are then stressed relieved.

Thorough inspection and traceability are carried out during all phases of manufacturing to assure the highest standards of quality. Mill certifications and certificates of conformance can be provided with each shipment as an assurance that the mechanical properties of Williams All-Thread-Bar are as shown..

Welding

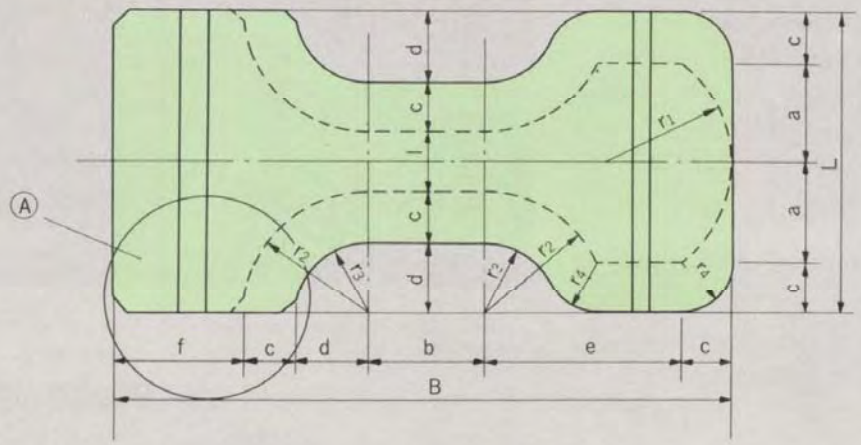
Williams 150 KSI All-Thread-Bar should not be subjected to the heat of a torch, welding or used as a ground. Field cutting should be done with an abrasive wheel or band saw.

Tensile Strength & Working Loads

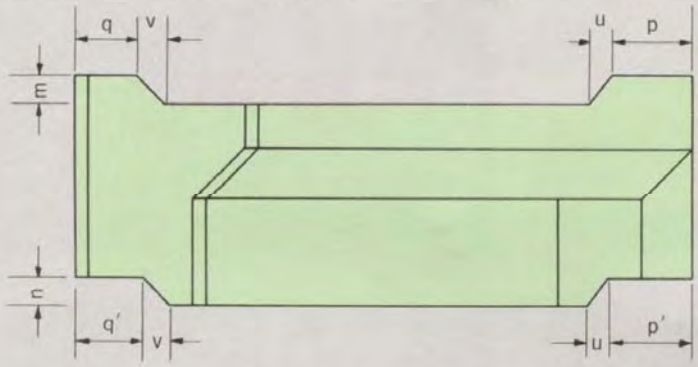
Williams 150 KSI All-Thread-Bars are available with ultimate tensile strengths and working loads as displayed above. Safety factors and functional working loads are at the discretion of the project design engineer, however test loads should never exceed 80% of the published ultimate bar strength.

Threaded Bar Types | 150 KSI Information | 150 KSI Accessories | Case Histories | Corrosion Protection

DIMENSIONS OF IGLOO UNITS



APPROXIMATE WEIGHT OF Ms-15 UNIT IS 17.1 TONS



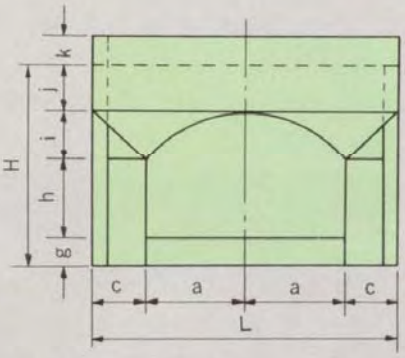


TABLE OF DIMENSIONS

(unit: mm)

Type	Weight (γ=2.3t/m^3)	Volume (m^3)	Mold Area (m^2)	Reinforcement (kg)	L	B	H	r_1	r_2	r_3	r_4	a	b	c	d	e
Ms-15	14.862	6.462	22.454	112.13	2,100	3,800	1,400	875	800	490	350	700	800	350	490	1,350
MM-26	25.930	11.274	31.095	237.88	3,000	4,500	1,400	1,250	1,200	700	500	1,000	600	500	700	1,700
MM-30	30.194	13.128	35.600	254.53	3,000	4,500	1,700	1,250	1,200	700	500	1,000	600	500	700	1,700
ML-34	34.173	14.858	39.019	324.91	3,000	6,000	1,400	1,250	1,200	700	500	1,000	1,550	500	700	1,700
ML-40	39.969	17.378	44.424	357.35	3,000	6,000	1,700	1,250	1,200	700	500	1,000	1,550	500	700	1,700

(per one unit)

	f	g	h	i	j	k	l	m	n	p	p'	q	q'	u	v	w	x
Ms-15	460	200	550	350	300	195	420	–	–	550	570	–	–	150	–	100	50
MM-26	500	200	450	450	300	195	600	–	–	580	600	–	–	200	–	100	100
MM-30	500	200	750	450	300	195	600	–	–	580	600	–	–	200	–	100	100
ML-34	1,050	200	450	450	300	195	600	195	200	580	600	480	500	200	200	100	100
ML-40	1,050	200	750	450	300	195	600	195	200	580	600	480	500	200	200	100	100

PRECAST CONCRETE UNIT, IGLOO, SHAPE AND DIMENSIONS

Tab F
Preliminary Cost Estimates

Feasibility Study CDF#2 March 2009 Revision
REVISED New CDF Alternatives 2
Revised estimate include new labor rates and escalated stone price quotes to current (4th Qtr FY08) dollars.
Estimate NOT escalated to Future $$.
March 2009 - Add Mitigation measures to estimate

Estimated by	James Dean
Designed by	Reed Vetovitz
Prepared by	James Wryk
Preparation Date	8/19/2008
Effective Date of Pricing	8/19/2008
Estimated Construction Time	Days

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Date	Author	Note
8/24/2006	JSD	Quotes for stone materials received from Marblehead Quarries, LaFarge Corporation on August 24, 2006. Allen Boros, Territory Manager. 419-290-5076. All prices are FOB Contractor's barge. Does not include any transportation charges.
8/24/2006	JSD	According to Mr. Boros the reason for the high unit price for Armor Stone for Alternatives #2 and #3 are because the quarry will have to set-up of a new production area so as not to interfere with normal quarry production operations. Mr. Boros estimated that annual production of Type A stone would be between 80,000 tons and 100,000 tons.
8/25/2006	JSD	Quantities of materials were based on design documents provided by designer. Designer provided the in-place volumes and conversion factors for determining quantities of stone.
8/28/2006	jsd	15% contingency has been added to this estimate. In addition the price quote from the quarry is on the conservative side not only because of the opening of a new section of quarry but for the uncertainties in the design at the time of the price quote.
7/18/2008	JRW	This file contain revisions to bring the estimate up to current prices. Material price quotes have been escalated to current pricing, labor and equipment rates have been checked.
9/8/2008	jw	Revised estimate include new labor rates and escalated stone price quotes to current (4th Qtr FY08) dollars. Estimate NOT escalated to Future $$.
9/9/2008	jw	Estimate broken into 2 cells. Because the cells may be completed by different contracts, Mob/Demob, Wier Structure and fish removal is added to both cells of the estimate.
12/29/2008	jw	Contingencies updated based on Cost Risk Analysis worked up by Walla Walla District. Equipment Rates updated to latest database Labor Rates updated to latest labor rates

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Project Cost Summary Report			**196,793,898**	**51,154,190**	**247,948,088**
			27.33		*34.44*
CDF #2 - 108 acres	**7,200,000.00**	**CY**	**196,793,898**	**51,154,190**	**247,948,088**
			1,353,639.54		*1,706,398.01*
General Conditions	**1.00**	**EA**	**1,353,640**	**352,758**	**1,706,398**
			67,869.73		*85,556.58*
Temporary Office	**1.00**	**EA**	**67,870**	**17,687**	**85,557**
Submittals	**1.00**	**LS**	**49,555**	**12,914**	**62,469**
Mob and Demob	**1.00**	**LS**	**182,756**	**47,626**	**230,382**
			1,053,459.23		*1,327,990.71*
Quality Control On-Site	**1.00**	**EA**	**1,053,459**	**274,531**	**1,327,991**
			84.12		*106.04*
Type A	**382,000.00**	**TON**	**32,133,197**	**8,373,911**	**40,507,108**
			76.79		*96.81*
Type B	**508,000.00**	**TON**	**39,011,337**	**10,166,354**	**49,177,692**
			43.70		*55.08*
Type C	**1,700,000.00**	**TON**	**74,284,952**	**19,358,659**	**93,643,611**
			19.80		*24.96*
Type D	**89,000.00**	**TON**	**1,762,035**	**459,186**	**2,221,221**
			43.70		*55.08*
Type E	**891,000.00**	**TON**	**38,934,054**	**10,146,215**	**49,080,269**
			19.67		*24.80*
Type F	**84,000.00**	**TON**	**1,652,371**	**430,608**	**2,082,979**
			52.44		*66.10*
Type H	**52,000.00**	**TON**	**2,726,798**	**710,603**	**3,437,401**
			52,680.23		*66,408.69*
Weir and Walkway	**1.00**	**EA**	**52,680**	**13,728**	**66,409**
			46,757.03		*58,941.91*
Wier	**1.00**	**EA**	**46,757**	**12,185**	**58,942**
			5,923.19		*7,466.78*
Walkway, Railing and Ladder	**1.00**	**EA**	**5,923**	**1,544**	**7,467**
			479.78		*604.82*
Steel Sheet Pile Wall	**9,135.00**	**LF**	**4,382,835**	**1,142,167**	**5,525,002**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			2,504.48		*3,157.14*
CZ67	**1,750.00**	**TON**	**4,382,835**	**1,142,167**	**5,525,002**
Mitagation	**1.00**	**LS**	**500,000**	**0**	**500,000**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
Contract Cost Summary Report			**159,199,200**	**0**	**37,594,698**	**196,793,898**
			22.11			*27.33*
CDF #2 - 108 acres	**7,200,000.00**	**CY**	**159,199,200**	**0**	**37,594,698**	**196,793,898**
			1,094,387.11			*1,353,639.54*
General Conditions	**1.00**	**EA**	**1,094,387**	**0**	**259,252**	**1,353,640**
			54,871.15			*67,869.73*
Temporary Office	**1.00**	**EA**	**54,871**	**0**	**12,999**	**67,870**
Submittals	**1.00**	**LS**	**40,064**	**0**	**9,491**	**49,555**
Mob and Demob	**1.00**	**LS**	**147,754**	**0**	**35,002**	**182,756**
			851,698.09			*1,053,459.23*
Quality Control On-Site	**1.00**	**EA**	**851,698**	**0**	**201,761**	**1,053,459**
			68.01			*84.12*
Type A	**382,000.00**	**TON**	**25,978,966**	**0**	**6,154,230**	**32,133,197**
			62.09			*76.79*
Type B	**508,000.00**	**TON**	**31,539,788**	**0**	**7,471,549**	**39,011,337**
			35.33			*43.70*
Type C	**1,700,000.00**	**TON**	**60,057,713**	**0**	**14,227,240**	**74,284,952**
			16.01			*19.80*
Type D	**89,000.00**	**TON**	**1,424,566**	**0**	**337,469**	**1,762,035**
			35.33			*43.70*
Type E	**891,000.00**	**TON**	**31,477,307**	**0**	**7,456,747**	**38,934,054**
			15.90			*19.67*
Type F	**84,000.00**	**TON**	**1,335,905**	**0**	**316,466**	**1,652,371**
			42.40			*52.44*
Type H	**52,000.00**	**TON**	**2,204,554**	**0**	**522,243**	**2,726,798**
			42,590.78			*52,680.23*
Weir and Walkway	**1.00**	**EA**	**42,591**	**0**	**10,089**	**52,680**
			37,802.01			*46,757.03*
Wier	**1.00**	**EA**	**37,802**	**0**	**8,955**	**46,757**
			4,788.77			*5,923.19*
Walkway, Railing and Ladder	**1.00**	**EA**	**4,789**	**0**	**1,134**	**5,923**
			387.90			*479.78*
Steel Sheet Pile Wall	**9,135.00**	**LF**	**3,543,423**	**0**	**839,411**	**4,382,835**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			2,024.81			*2,504.48*
CZ67	**1,750.00**	**TON**	**3,543,423**	**0**	**839,411**	**4,382,835**
Mitagation	**1.00**	**LS**	**500,000**	**0**	**0**	**500,000**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
Project Direct Costs Report			**10,056,514**	**19,810,182**	**123,803,497**	**15,600**	**500,000**	**5,013,407**	**159,199,200**
			1.40	*2.75*	*17.19*	*0.00*		*0.70*	*22.11*
CDF #2 - 108 acres	**7,200,000.00**	**CY**	**10,056,514**	**19,810,182**	**123,803,497**	**15,600**	**500,000**	**5,013,407**	**159,199,200**
			525,275.40	*270,502.80*	*31,600.00*	*15,600.00*		*251,408.92*	*1,094,387.11*
General Conditions	**1.00**	**EA**	**525,275**	**270,503**	**31,600**	**15,600**	**0**	**251,409**	**1,094,387**
			16,773.12	*0.00*	*14,400.00*	*15,600.00*		*8,098.03*	*54,871.15*
Temporary Office	**1.00**	**EA**	**16,773**	**0**	**14,400**	**15,600**	**0**	**8,098**	**54,871**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)									
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*224.95*	*790.87*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	8,098	28,471
Submittals	**1.00**	**LS**	**20,003**	**0**	**10,000**	**0**	**0**	**10,061**	**40,064**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	10,000
			666.76	*0.00*	*0.00*	*0.00*	*0.00*	*335.37*	*1,002.13*
USR Initial Project Submittals	30.00	DAY	20,003	0	0	0	0	10,061	30,064
Mob and Demob	**1.00**	**LS**	**45,671**	**82,240**	**0**	**0**	**0**	**19,844**	**147,754**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))									
			144.48	*360.68*	*0.00*	*0.00*	*0.00*	*61.65*	*566.82*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	47,610	0	0	0	8,138	74,820
			201.51	*262.35*	*0.00*	*0.00*	*0.00*	*88.68*	*552.53*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,599	34,630	0	0	0	11,705	72,934
			442,828.80	*188,263.19*	*7,200.00*	*0.00*		*213,406.10*	*851,698.09*
Quality Control On-Site	**1.00**	**EA**	**442,829**	**188,263**	**7,200**	**0**	**0**	**213,406**	**851,698**
			12,300.80	*5,229.53*	*200.00*	*0.00*	*0.00*	*5,927.95*	*23,658.28*
USR Quality Control	36.00	MO	442,829	188,263	7,200	0	0	213,406	851,698
			3.13	*6.00*	*57.25*	*0.00*		*1.63*	*68.01*
Type A	**382,000.00**	**TON**	**1,196,395**	**2,290,106**	**21,869,500**	**0**	**0**	**622,965**	**25,978,966**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
			1.53	*1.99*	*57.25*	*0.00*	*0.00*	*0.92*	*61.69*
USR Type A Armor Stone (5 ton to 10 ton)	382,000.00	TON	583,158	759,212	21,869,500	0	0	352,168	23,564,038
			1.61	*4.01*	*0.00*	*0.00*	*0.00*	*0.71*	*6.32*
USR Haul from Sandusky	382,000.00	TON	613,237	1,530,894	0	0	0	270,797	2,414,929
(Note: 2400 tons per cycle, 24 hrs per cycle)									
			2.79	*5.55*	*52.32*	*0.00*		*1.42*	*62.09*
Type B	**508,000.00**	**TON**	**1,417,669**	**2,819,799**	**26,578,560**	**0**	**0**	**723,761**	**31,539,788**
			1.19	*1.54*	*52.32*	*0.00*	*0.00*	*0.72*	*55.76*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	508,000.00	TON	602,159	783,950	26,578,560	0	0	363,643	28,328,312
			1.61	*4.01*	*0.00*	*0.00*	*0.00*	*0.71*	*6.32*
USR Haul from Sandusky	508,000.00	TON	815,509	2,035,849	0	0	0	360,118	3,211,476
(Note: 2400 tons per cycle, 24 hrs per cycle)									
			2.40	*5.04*	*26.71*	*0.00*		*1.19*	*35.33*
Type C	**1,700,000.00**	**TON**	**4,072,467**	**8,561,850**	**45,407,000**	**0**	**0**	**2,016,396**	**60,057,713**
			0.79	*1.03*	*26.71*	*0.00*	*0.00*	*0.48*	*29.01*
USR Type C Stone	1,700,000.00	TON	1,343,400	1,748,970	45,407,000	0	0	811,277	49,310,647
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)									
			1.61	*4.01*	*0.00*	*0.00*	*0.00*	*0.71*	*6.32*
USR Haul from Sandusky	1,700,000.00	TON	2,729,067	6,812,881	0	0	0	1,205,118	10,747,066
(Note: 2400 tons per trip, 24 hrs per trip)									
			2.31	*4.93*	*7.63*	*0.00*		*1.14*	*16.01*
Type D	**89,000.00**	**TON**	**205,802**	**438,600**	**679,070**	**0**	**0**	**101,093**	**1,424,566**
			0.71	*0.92*	*7.63*	*0.00*	*0.00*	*0.43*	*9.68*
USR Type D Stone	89,000.00	TON	62,928	81,925	679,070	0	0	38,002	861,925
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)									
			1.61	*4.01*	*0.00*	*0.00*	*0.00*	*0.71*	*6.32*
USR Haul from Sandusky	89,000.00	TON	142,875	356,674	0	0	0	63,091	562,641
(Note: 2400 tons per trip, 24 hrs per trip)									
			2.40	*5.04*	*26.71*	*0.00*		*1.19*	*35.33*
Type E	**891,000.00**	**TON**	**2,134,452**	**4,487,417**	**23,798,610**	**0**	**0**	**1,056,829**	**31,477,307**
			0.79	*1.03*	*26.71*	*0.00*	*0.00*	*0.48*	*29.01*
USR Type C and E Stone	891,000.00	TON	704,100	916,666	23,798,610	0	0	425,205	25,844,580
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)									

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
			1.61	*4.01*	*0.00*	*0.00*	*0.00*	*0.71*	*6.32*
USR Haul from Sandusky	891,000.00	TON	1,430,352	3,570,751	0	0	0	631,624	5,632,727
(Note: 2400 tons per trip, 24 hrs per trip)									
			2.28	*4.88*	*7.63*	*0.00*		*1.11*	*15.90*
Type F	**84,000.00**	**TON**	**191,271**	**410,093**	**640,920**	**0**	**0**	**93,621**	**1,335,905**
			0.67	*0.87*	*7.63*	*0.00*	*0.00*	*0.41*	*9.58*
USR Type F Stone	84,000.00	TON	56,423	73,457	640,920	0	0	34,074	804,873
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)									
			1.61	*4.01*	*0.00*	*0.00*	*0.00*	*0.71*	*6.32*
USR Haul from Sandusky	84,000.00	TON	134,848	336,636	0	0	0	59,547	531,031
(Note: 2400 tons per trip, 24 hrs per trip)									
			2.54	*5.23*	*33.35*	*0.00*		*1.27*	*42.40*
Type H	**52,000.00**	**TON**	**132,215**	**271,845**	**1,734,200**	**0**	**0**	**66,295**	**2,204,554**
			0.94	*1.22*	*33.35*	*0.00*	*0.00*	*0.57*	*36.07*
USR Type H Stone	52,000.00	TON	48,737	63,451	1,734,200	0	0	29,432	1,875,821
(Note: (6" - 18") ODOT 703.19B Type C)									
			1.61	*4.01*	*0.00*	*0.00*	*0.00*	*0.71*	*6.32*
USR Haul from Sandusky	52,000.00	TON	83,477	208,394	0	0	0	36,862	328,734
(Note: 2400 tons per trip, 24 hrs per trip)									
			16,530.73	*14,806.19*	*4,036.50*	*0.00*		*7,217.36*	*42,590.78*
Weir and Walkway	**1.00**	**EA**	**16,531**	**14,806**	**4,037**	**0**	**0**	**7,217**	**42,591**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)									
			15,072.96	*14,718.70*	*1,420.50*	*0.00*		*6,589.84*	*37,802.01*
Wier	**1.00**	**EA**	**15,073**	**14,719**	**1,421**	**0**	**0**	**6,590**	**37,802**
			16.75	*16.35*	*0.70*	*0.00*	*0.00*	*7.32*	*41.12*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	5,024	4,906	210	0	0	2,197	12,337
			2,512.16	*2,453.12*	*541.50*	*0.00*	*0.00*	*1,098.31*	*6,605.08*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,512	2,453	542	0	0	1,098	6,605
			418.69	*408.85*	*0.00*	*0.00*	*0.00*	*183.05*	*1,010.60*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,512	2,453	0	0	0	1,098	6,064

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	660
			16.75	*16.35*	*0.03*	*0.00*	*0.00*	*7.32*	*40.45*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	5,024	4,906	9	0	0	2,197	12,136
			1,457.77	*87.49*	*2,616.00*	*0.00*		*627.51*	*4,788.77*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,458**	**87**	**2,616**	**0**	**0**	**628**	**4,789**
			9.02	*0.48*	*19.75*	*0.00*	*0.00*	*3.88*	*33.13*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	180	10	395	0	0	78	663
			2.41	*0.13*	*10.70*	*0.00*	*0.00*	*1.04*	*14.27*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	241	13	1,070	0	0	104	1,427
			30.18	*2.12*	*6.55*	*0.00*	*0.00*	*13.00*	*51.86*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	604	42	131	0	0	260	1,037
			28.87	*1.53*	*68.00*	*0.00*	*0.00*	*12.42*	*110.82*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	433	23	1,020	0	0	186	1,662
			18.00	*26.84*	*334.98*	*0.00*		*8.08*	*387.90*
Steel Sheet Pile Wall	**9,135.00**	**LF**	**164,438**	**245,164**	**3,060,000**	**0**	**0**	**73,821**	**3,543,423**
			93.96	*140.09*	*1,748.57*	*0.00*		*42.18*	*2,024.81*
CZ67	**1,750.00**	**TON**	**164,438**	**245,164**	**3,060,000**	**0**	**0**	**73,821**	**3,543,423**
			91.35	*136.20*	*1,700.00*	*0.00*	*0.00*	*41.01*	*1,968.57*
USR Marine Sheet piling, steel, 38 psf, 40' excavation, left in place, excludes wales	1,800.00	TON	164,438	245,164	3,060,000	0	0	73,821	3,543,423

(Note: Modified for Marine Plant Sttel Sheet Pile price adjusted from $816.21 ton to more current prices of $1700/ton)

Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**500,000**	**0**	**500,000**
USR Mitagation	1.00	LS	0	0	0	0	500,000	0	500,000

(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)

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REVISED New CDF Alternatives 3,
Revised estimate include new labor rates and esculated stone price quotes to current (4th Qtr FY08) dollars.
Estimate NOT escaluated to Future $$.
THIS ESTIMATE CONTAINS A SMALLER FOOTPRINT, REDUCING THE OPEN WATER SECTION FROM 5430 LF TO 5180 LF. ACREAGE IS REDUCED FROM 129 TO 117 ACRES.
Mitagation measures added March 2009

Estimated by	James Dean
Designed by	Reed Vetovitz
Prepared by	James Wryk
Preparation Date	7/18/2008
Effective Date of Pricing	7/18/2008
Estimated Construction Time	Days

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Date	Author	Note
8/24/2006	JSD	Quotes for stone materials received from Marblehead Quarries, LaFarge Corporation on August 24, 2006. Allen Boros, Territory Manager. 419-290-5076. All prices are FOB Contractor's barge. Does not include any transportation charges.
8/24/2006	JSD	According to Mr. Boros the reason for the high unit price for Armor Stone for Alternatives #2 and #3 are because the quarry will have to set-up of a new production area so as not to interfere with normal quarry production operations. Mr. Boros estimated that annual production of Type A stone would be between 80,000 tons and 100,000 tons.
8/25/2006	JSD	Quantities of materials were based on design documents provided by designer. Designer provided the in-place volumes and conversion factors for determining quantities of stone.
8/28/2006	jsd	15% contingency has been added to this estimate. In addition the price quote from the quarry is on the conservative side not only because of the opening of a new section of quarry but for the uncertainties in the design at the time of the price quote.
7/18/2008	jw	This file contain revisions to bring the estimate up to current prices. Material price quotes have been escalated to current pricing, labor and equipment rates have been checked.
9/8/2008	jw	Revised estimate include new labor rates and esculated stone price quotes to current (4th Qtr FY08) dollars. Estimate NOT escaluated to Future $$.
9/30/2008	jw	Revision to CDF #3 - includes adjusted layout - The open water containment dike is shortened to 5180 lf while the rest of the wall lengths remain the same. Total area and volume of cdf is reduced 129 acres and 8 million cy capacity to 117 acres and 7.2 million cy. Estimate is same as previous but the quantities have been changed to reflect the new design.

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Project Cost Summary Report			**163,011,952**	**43,179,426**	**206,191,378**
			20.38		*25.77*
CDF #3 - 117 acres	**8,000,000.00**	**CY**	**163,011,952**	**43,179,426**	**206,191,378**
			1,323,874.94		*1,675,628.51*
General Conditions	**1.00**	**EA**	**1,323,875**	**351,754**	**1,675,629**
			67,721.97		*85,715.70*
Temporary Office	**1.00**	**EA**	**67,722**	**17,994**	**85,716**
Submittals	**1.00**	**LS**	**49,447**	**13,138**	**62,585**
Mob and Demob	**1.00**	**LS**	**183,442**	**48,741**	**232,183**
			1,023,263.73		*1,295,144.90*
Quality Control On-Site	**1.00**	**EA**	**1,023,264**	**271,881**	**1,295,145**
			83.79		*106.05*
Type A	**367,000.00**	**TON**	**30,749,848**	**8,170,235**	**38,920,083**
			76.48		*96.80*
Type B	**474,000.00**	**TON**	**36,252,386**	**9,632,259**	**45,884,645**
			43.46		*55.01*
Type C	**1,001,000.00**	**TON**	**43,504,076**	**11,559,033**	**55,063,109**
			19.61		*24.83*
Type D	**770,000.00**	**TON**	**15,103,190**	**4,012,918**	**19,116,108**
			43.46		*55.01*
Type E	**620,000.00**	**TON**	**26,945,582**	**7,159,441**	**34,105,023**
			19.49		*24.67*
Type F	**71,000.00**	**TON**	**1,383,653**	**367,637**	**1,751,290**
			52.18		*66.05*
Type H	**60,000.00**	**TON**	**3,130,896**	**831,879**	**3,962,775**
			52,921.12		*66,982.26*
Weir and Walkway	**1.00**	**EA**	**52,921**	**14,061**	**66,982**
			47,023.40		*59,517.52*
Wier	**1.00**	**EA**	**47,023**	**12,494**	**59,518**
			5,897.71		*7,464.74*
Walkway, Railing and Ladder	**1.00**	**EA**	**5,898**	**1,567**	**7,465**
			442.87		*560.54*
Steel Sheet Pile Wall	**9,180.00**	**LF**	**4,065,525**	**1,080,210**	**5,145,735**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			2,427.18		*3,072.08*
CZ67	**1,675.00**	**TON**	**4,065,525**	**1,080,210**	**5,145,735**
Mitagation	**1.00**	**LS**	**500,000**	**0**	**500,000**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
Contract Cost Summary Report			**132,173,920**	**4,893,674**	**25,944,358**	**163,011,952**
			16.52			*20.38*
CDF #3 - 117 acres	**8,000,000.00**	**CY**	**132,173,920**	**4,893,674**	**25,944,358**	**163,011,952**
			1,072,658.35			*1,323,874.94*
General Conditions	**1.00**	**EA**	**1,072,658**	**0**	**251,217**	**1,323,875**
			54,871.15			*67,721.97*
Temporary Office	**1.00**	**EA**	**54,871**	**0**	**12,851**	**67,722**
Submittals	**1.00**	**LS**	**40,064**	**0**	**9,383**	**49,447**
Mob and Demob	**1.00**	**LS**	**148,633**	**0**	**34,810**	**183,442**
			829,090.69			*1,023,263.73*
Quality Control On-Site	**1.00**	**EA**	**829,091**	**0**	**194,173**	**1,023,264**
			67.89			*83.79*
Type A	**367,000.00**	**TON**	**24,914,801**	**534,041**	**5,301,006**	**30,749,848**
			61.97			*76.48*
Type B	**474,000.00**	**TON**	**29,373,186**	**689,742**	**6,189,458**	**36,252,386**
			35.21			*43.46*
Type C	**1,001,000.00**	**TON**	**35,248,806**	**1,456,606**	**6,798,664**	**43,504,076**
			15.89			*19.61*
Type D	**770,000.00**	**TON**	**12,237,231**	**1,120,467**	**1,745,493**	**15,103,190**
			35.21			*43.46*
Type E	**620,000.00**	**TON**	**21,832,427**	**902,194**	**4,210,961**	**26,945,582**
			15.79			*19.49*
Type F	**71,000.00**	**TON**	**1,121,093**	**103,316**	**159,244**	**1,383,653**
			42.28			*52.18*
Type H	**60,000.00**	**TON**	**2,536,782**	**87,309**	**506,805**	**3,130,896**
			42,878.88			*52,921.12*
Weir and Walkway	**1.00**	**EA**	**42,879**	**0**	**10,042**	**52,921**
			38,100.31			*47,023.40*
Wier	**1.00**	**EA**	**38,100**	**0**	**8,923**	**47,023**
			4,778.57			*5,897.71*
Walkway, Railing and Ladder	**1.00**	**EA**	**4,779**	**0**	**1,119**	**5,898**
			358.83			*442.87*
Steel Sheet Pile Wall	**9,180.00**	**LF**	**3,294,057**	**0**	**771,468**	**4,065,525**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			1,966.60			*2,427.18*
CZ67	**1,675.00**	**TON**	**3,294,057**	**0**	**771,468**	**4,065,525**
Mitagation	**1.00**	**LS**	**500,000**	**0**	**0**	**500,000**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
Project Direct Costs Report			**9,371,759**	**17,839,454**	**100,408,307**	**15,600**	**500,000**	**4,038,801**	**132,173,920**
			1.17	*2.23*	*12.55*	*0.00*		*0.50*	*16.52*
CDF #3 - 117 acres	**8,000,000.00**	**CY**	**9,371,759**	**17,839,454**	**100,408,307**	**15,600**	**500,000**	**4,038,801**	**132,173,920**
(Note: w/ no escalation)									
			526,463.40	*247,586.04*	*31,600.00*	*15,600.00*		*251,408.92*	*1,072,658.35*
General Conditions	**1.00**	**EA**	**526,463**	**247,586**	**31,600**	**15,600**	**0**	**251,409**	**1,072,658**
			16,773.12	*0.00*	*14,400.00*	*15,600.00*		*8,098.03*	*54,871.15*
Temporary Office	**1.00**	**EA**	**16,773**	**0**	**14,400**	**15,600**	**0**	**8,098**	**54,871**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)									
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*224.95*	*790.87*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	8,098	28,471
Submittals	**1.00**	**LS**	**20,003**	**0**	**10,000**	**0**	**0**	**10,061**	**40,064**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	10,000
			666.76	*0.00*	*0.00*	*0.00*	*0.00*	*335.37*	*1,002.13*
USR Initial Project Submittals	30.00	DAY	20,003	0	0	0	0	10,061	30,064
Mob and Demob	**1.00**	**LS**	**46,859**	**81,930**	**0**	**0**	**0**	**19,844**	**148,633**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))									
			148.48	*357.88*	*0.00*	*0.00*	*0.00*	*61.65*	*568.01*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,599	47,240	0	0	0	8,138	74,977
			206.51	*262.81*	*0.00*	*0.00*	*0.00*	*88.68*	*557.99*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	27,259	34,691	0	0	0	11,705	73,655
			442,828.80	*165,655.79*	*7,200.00*	*0.00*		*213,406.10*	*829,090.69*
Quality Control On-Site	**1.00**	**EA**	**442,829**	**165,656**	**7,200**	**0**	**0**	**213,406**	**829,091**
			12,300.80	*4,601.55*	*200.00*	*0.00*	*0.00*	*5,927.95*	*23,030.30*
USR Quality Control	36.00	MO	442,829	165,656	7,200	0	0	213,406	829,091

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
			3.21	*5.97*	*57.25*	*0.00*		*1.46*	*67.89*
Type A	**367,000.00**	**TON**	**1,179,629**	**2,190,025**	**21,010,750**	**0**	**0**	**534,398**	**24,914,801**
			1.56	*1.99*	*57.25*	*0.00*	*0.00*	*0.87*	*61.67*
USR Type A Armor Stone (5 ton to 10 ton)	367,000.00	TON	574,160	730,683	21,010,750	0	0	318,932	22,634,526
			1.65	*3.98*	*0.00*	*0.00*	*0.00*	*0.59*	*6.21*
USR Haul from Sandusky	367,000.00	TON	605,468	1,459,341	0	0	0	215,466	2,280,276
(Note: 2400 tons per cycle, 24 hrs per cycle)									
			2.86	*5.52*	*52.32*	*0.00*		*1.26*	*61.97*
Type B	**474,000.00**	**TON**	**1,357,793**	**2,617,585**	**24,799,680**	**0**	**0**	**598,128**	**29,373,186**
			1.21	*1.55*	*52.32*	*0.00*	*0.00*	*0.67*	*55.76*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	474,000.00	TON	575,798	732,768	24,799,680	0	0	319,842	26,428,089
			1.65	*3.98*	*0.00*	*0.00*	*0.00*	*0.59*	*6.21*
USR Haul from Sandusky	474,000.00	TON	781,995	1,884,817	0	0	0	278,285	2,945,097
(Note: 2400 tons per cycle, 24 hrs per cycle)									
			2.46	*5.01*	*26.71*	*0.00*		*1.04*	*35.21*
Type C	**1,001,000.00**	**TON**	**2,462,081**	**5,012,030**	**26,736,710**	**0**	**0**	**1,037,986**	**35,248,806**
			0.81	*1.03*	*26.71*	*0.00*	*0.00*	*0.45*	*29.00*
USR Type C Stone	1,001,000.00	TON	810,653	1,031,646	26,736,710	0	0	450,298	29,029,308
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)									
			1.65	*3.98*	*0.00*	*0.00*	*0.00*	*0.59*	*6.21*
USR Haul from Sandusky	1,001,000.00	TON	1,651,428	3,980,383	0	0	0	587,687	6,219,498
(Note: 2400 tons per trip, 24 hrs per trip)									
			2.37	*4.90*	*7.63*	*0.00*		*0.99*	*15.89*
Type D	**770,000.00**	**TON**	**1,828,268**	**3,771,873**	**5,875,100**	**0**	**0**	**761,989**	**12,237,231**
			0.72	*0.92*	*7.63*	*0.00*	*0.00*	*0.40*	*9.68*
USR Type D Stone	770,000.00	TON	557,939	710,040	5,875,100	0	0	309,922	7,453,001
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)									
			1.65	*3.98*	*0.00*	*0.00*	*0.00*	*0.59*	*6.21*
USR Haul from Sandusky	770,000.00	TON	1,270,329	3,061,833	0	0	0	452,067	4,784,229
(Note: 2400 tons per trip, 24 hrs per trip)									
			2.46	*5.01*	*26.71*	*0.00*		*1.04*	*35.21*
Type E	**620,000.00**	**TON**	**1,524,965**	**3,104,354**	**16,560,200**	**0**	**0**	**642,908**	**21,832,427**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
			0.81	*1.03*	*26.71*	*0.00*	*0.00*	*0.45*	*29.00*
USR Type C and E Stone	620,000.00	TON	502,103	638,982	16,560,200	0	0	278,906	17,980,191
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)									
			1.65	*3.98*	*0.00*	*0.00*	*0.00*	*0.59*	*6.21*
USR Haul from Sandusky	620,000.00	TON	1,022,862	2,465,372	0	0	0	364,002	3,852,237
(Note: 2400 tons per trip, 24 hrs per trip)									
			2.34	*4.85*	*7.63*	*0.00*		*0.97*	*15.79*
Type F	**71,000.00**	**TON**	**166,008**	**344,523**	**541,730**	**0**	**0**	**68,832**	**1,121,093**
			0.69	*0.88*	*7.63*	*0.00*	*0.00*	*0.38*	*9.58*
USR Type F Stone	71,000.00	TON	48,874	62,198	541,730	0	0	27,148	679,950
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)									
			1.65	*3.98*	*0.00*	*0.00*	*0.00*	*0.59*	*6.21*
USR Haul from Sandusky	71,000.00	TON	117,134	282,325	0	0	0	41,684	441,143
(Note: 2400 tons per trip, 24 hrs per trip)									
			2.61	*5.20*	*33.35*	*0.00*		*1.12*	*42.28*
Type H	**60,000.00**	**TON**	**156,617**	**311,926**	**2,001,000**	**0**	**0**	**67,238**	**2,536,782**
			0.96	*1.22*	*33.35*	*0.00*	*0.00*	*0.53*	*36.07*
USR Type H Stone	60,000.00	TON	57,631	73,342	2,001,000	0	0	32,012	2,163,985
(Note: (6" - 18") ODOT 703.19B Type C)									
			1.65	*3.98*	*0.00*	*0.00*	*0.00*	*0.59*	*6.21*
USR Haul from Sandusky	60,000.00	TON	98,987	238,584	0	0	0	35,226	372,797
(Note: 2400 tons per trip, 24 hrs per trip)									
			16,914.73	*14,710.29*	*4,036.50*	*0.00*		*7,217.36*	*42,878.88*
Weir and Walkway	**1.00**	**EA**	**16,915**	**14,710**	**4,037**	**0**	**0**	**7,217**	**42,879**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)									
			15,456.96	*14,633.01*	*1,420.50*	*0.00*		*6,589.84*	*38,100.31*
Wier	**1.00**	**EA**	**15,457**	**14,633**	**1,421**	**0**	**0**	**6,590**	**38,100**
			17.17	*16.26*	*0.70*	*0.00*	*0.00*	*7.32*	*41.46*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	5,152	4,878	210	0	0	2,197	12,437
			2,576.16	*2,438.83*	*541.50*	*0.00*	*0.00*	*1,098.31*	*6,654.80*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,576	2,439	542	0	0	1,098	6,655

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
			429.36	*406.47*	*0.00*	*0.00*	*0.00*	*183.05*	*1,018.88*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,576	2,439	0	0	0	1,098	6,113
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	660
			17.17	*16.26*	*0.03*	*0.00*	*0.00*	*7.32*	*40.79*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	5,152	4,878	9	0	0	2,197	12,236
			1,457.77	*77.29*	*2,616.00*	*0.00*		*627.51*	*4,778.57*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,458**	**77**	**2,616**	**0**	**0**	**628**	**4,779**
			9.02	*0.42*	*19.75*	*0.00*	*0.00*	*3.88*	*33.07*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	180	8	395	0	0	78	661
			2.41	*0.11*	*10.70*	*0.00*	*0.00*	*1.04*	*14.25*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	241	11	1,070	0	0	104	1,425
			30.18	*1.87*	*6.55*	*0.00*	*0.00*	*13.00*	*51.61*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	604	37	131	0	0	260	1,032
			28.87	*1.35*	*68.00*	*0.00*	*0.00*	*12.42*	*110.64*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	433	20	1,020	0	0	186	1,660
			16.67	*24.49*	*310.19*	*0.00*		*7.48*	*358.83*
Steel Sheet Pile Wall	**9,180.00**	**LF**	**153,019**	**224,843**	**2,847,500**	**0**	**0**	**68,695**	**3,294,057**
			91.35	*134.23*	*1,700.00*	*0.00*		*41.01*	*1,966.60*
CZ67	**1,675.00**	**TON**	**153,019**	**224,843**	**2,847,500**	**0**	**0**	**68,695**	**3,294,057**
			91.35	*134.23*	*1,700.00*	*0.00*	*0.00*	*41.01*	*1,966.60*
USR Marine Sheet piling, steel, 38 psf, 40' excavation, left in place, excludes wales	1,675.00	TON	153,019	224,843	2,847,500	0	0	68,695	3,294,057
(Note: Modified for Marine Plant.)									
Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**500,000**	**0**	**500,000**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Estimators Jud	DirectMU	DirectCost
USR Mitagation	1.00	LS	0	0	0	0	500,000	0	500,000

(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)

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Site 2A - 22 year Capacity
Site 2A - 22 Year Capacity
2 Cell structure similar to Site 3a. Inner cell to be constructed first is a steel cell structure and and cell 2 is a stone structure. Site is along the Cleveland Breakwater West side along the arrowhead breakwater
.

Estimated by	JW
Designed by	Mike Mohr
Prepared by	James Wryk
Preparation Date	8/20/2008
Effective Date of Pricing	8/20/2008
Estimated Construction Time	Days

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Date	Author	Note
8/24/2006	JSD	Quotes for stone materials received from Marblehead Quarries, LaFarge Corporation on August 24, 2006. Allen Boros, Territory Manager. 419-290-5076. All prices are FOB Contractor's barge. Does not include any transportation charges.
8/24/2006	JSD	According to Mr. Boros the reason for the high unit price for Armor Stone for Alternatives #2 and #3 are because the quarry will have to set-up of a new production area so as not to interfere with normal quarry production operations. Mr. Boros estimated that annual production of Type A stone would be between 80,000 tons and 100,000 tons.
8/25/2006	JSD	Quantities of materials were based on design documents provided by designer. Designer provided the in-place volumes and conversion factors for determining quantities of stone.
8/28/2006	jsd	15% contingency has been added to this estimate. In addition the price quote from the quarry is on the conservative side not only because of the opening of a new section of quarry but for the uncertainties in the design at the time of the price quote.
7/18/2008	jw	This file contain revisions to bring the estimate up to current prices. Material price quotes have been escalated to current pricing, labor and equipment rates have been checked.
8/26/2008	jw	Site 2A is on the Western edge of the breakwater from the arrowhead west. Site 2A is straddling both sides of the breakwater with Cell 1(Harbor Side) constructed of SSP wall with King Piles and Cell 2 on the Lake side being constructed outr of Stone.
9/8/2008	jw	Revised estimate include new labor rates and esculated stone price quotes to current (4th Qtr FY08) dollars. Estimate NOT escaluated to Future $$.
9/9/2008	jw	Estimate broken into 2 cells. Because the cells may be completed by different contracts, Mob/Demob, Wier Structure and fish removal is added to both cells of the estimate.
12/29/2008	jw	Contingencies updated based on Cost Risk Analysis worked up by Walla Walla District. Equipment Rates updated to latest database Labor Rates updated to latest labor rates

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Project Cost Summary Report			**214,369,491**	**51,841,965**	**266,211,456**
Cell 1	**1.00**	**LS**	**96,766,878**	**23,395,691**	**120,162,569**
			1,322,597.73		*1,643,195.42*
General Conditions	**1.00**	**EA**	**1,322,598**	**320,598**	**1,643,195**
			67,869.73		*84,321.35*
Temporary Office	**1.00**	**EA**	**67,870**	**16,452**	**84,321**
Submittals	**1.00**	**LS**	**47,135**	**11,425**	**58,560**
Mob and Demob	**1.00**	**LS**	**181,470**	**43,988**	**225,459**
			1,026,123.13		*1,274,855.37*
Quality Control On-Site	**1.00**	**EA**	**1,026,123**	**248,732**	**1,274,855**
			17,313.99		*21,510.90*
PZC 13 Combi-wall	**4,400.00**	**LF**	**76,181,534**	**18,466,404**	**94,647,938**
			267.51		*332.35*
C King Pile (Beam)	**103,350.60**	**LF**	**27,646,899**	**6,701,608**	**34,348,508**
			2,998.03		*3,724.75*
C PZC 13	**7,891.00**	**TON**	**23,657,446**	**5,734,565**	**29,392,011**
			12,001.57		*14,910.75*
C Tie Rods	**380.00**	**EA**	**4,560,596**	**1,105,489**	**5,666,085**
			4.91		*6.10*
C Wales	**1,152,801.52**	**LB**	**5,662,325**	**1,372,548**	**7,034,873**
			535.08		*664.78*
C Concrete Cap	**10,592.31**	**CY**	**5,667,732**	**1,373,858**	**7,041,590**
			19.61		*24.36*
Granular Fill	**458,300.00**	**TON**	**8,986,535**	**2,178,336**	**11,164,872**
Wier Structure & Walkway	**1.00**	**LS**	**142,243**	**34,480**	**176,722**
			43,291.25		*53,785.05*
Fish Removal	**1.00**	**EA**	**43,291**	**10,494**	**53,785**
			83.79		*104.10*
Type A	**42,780.00**	**TON**	**3,584,500**	**868,883**	**4,453,383**
			76.55		*95.11*
Type B	**39,060.00**	**TON**	**2,990,211**	**724,827**	**3,715,038**
			43.56		*54.12*
Type C	**111,345.00**	**TON**	**4,850,295**	**1,175,711**	**6,026,006**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			19.68		*24.46*
Type D	**37,050.00**	**TON**	**729,288**	**176,779**	**906,067**
			99.21		*123.26*
Type E	**34,600.00**	**TON**	**3,432,755**	**832,100**	**4,264,855**
			19.61		*24.36*
Type D	**98,200.00**	**TON**	**1,925,546**	**466,752**	**2,392,298**
			19.57		*24.31*
Type F	**1,860.00**	**TON**	**36,393**	**8,822**	**45,215**
			52.26		*64.93*
Type H	**61,300.00**	**TON**	**3,203,770**	**776,594**	**3,980,364**
Mitagation	**1.00**	**LS**	**250,000**	**0**	**250,000**
Cell 2	**1.00**	**LS**	**117,602,614**	**28,446,274**	**146,048,887**
			1,322,597.73		*1,643,195.42*
General Conditions	**1.00**	**EA**	**1,322,598**	**320,598**	**1,643,195**
			67,869.73		*84,321.35*
Temporary Office	**1.00**	**EA**	**67,870**	**16,452**	**84,321**
Submittals	**1.00**	**LS**	**47,135**	**11,425**	**58,560**
Mob and Demob	**1.00**	**LS**	**181,470**	**43,988**	**225,459**
			1,026,123.13		*1,274,855.37*
Quality Control On-Site	**1.00**	**EA**	**1,026,123**	**248,732**	**1,274,855**
			84.60		*105.11*
Type A	**336,310.00**	**TON**	**28,453,074**	**6,897,025**	**35,350,099**
			77.37		*96.12*
Type B	**336,400.00**	**TON**	**26,026,880**	**6,308,916**	**32,335,795**
			44.38		*55.13*
Type C	**938,800.00**	**TON**	**41,659,733**	**10,098,319**	**51,758,052**
			20.50		*25.47*
Type D	**37,100.00**	**TON**	**760,492**	**184,343**	**944,835**
			52.16		*64.81*
Type E	**247,200.00**	**TON**	**12,895,173**	**3,125,790**	**16,020,963**
			19.61		*24.36*
Type D	**98,200.00**	**TON**	**1,925,546**	**466,752**	**2,392,298**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			20.38		*25.32*
Type F	**43,700.00**	**TON**	**890,634**	**215,890**	**1,106,524**
			53.08		*65.94*
Type H	**7,700.00**	**TON**	**408,703**	**99,070**	**507,773**
			51,923.10		*64,509.26*
Weir and Walkway	**1.00**	**EA**	**51,923**	**12,586**	**64,509**
			46,006.51		*57,158.48*
Wier	**1.00**	**EA**	**46,007**	**11,152**	**57,158**
			5,916.60		*7,350.78*
Walkway, Railing and Ladder	**1.00**	**EA**	**5,917**	**1,434**	**7,351**
			2,429.55		*3,018.48*
Steel Sheet Pile Wall	**2,010.00**	**TON**	**4,883,404**	**1,183,737**	**6,067,141**
			2,429.55		*3,018.48*
CZ67	**2,010.00**	**TON**	**4,883,404**	**1,183,737**	**6,067,141**
Mitagation	**1.00**	**LS**	**250,000**	**0**	**250,000**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
Contract Cost Summary Report			**172,126,337**	**2,942,654**	**39,300,501**	**214,369,491**
Cell 1	**1.00**	**LS**	**78,281,724**	**0**	**18,485,154**	**96,766,878**
General Conditions	**1.00**	**EA**	*1,069,290.51* **1,069,291**	**0**	**253,307**	*1,322,597.73* **1,322,598**
Temporary Office	**1.00**	**EA**	*54,871.15* **54,871**	**0**	**12,999**	*67,869.73* **67,870**
Submittals	**1.00**	**LS**	**38,107**	**0**	**9,027**	**47,135**
Mob and Demob	**1.00**	**LS**	**146,715**	**0**	**34,756**	**181,470**
Quality Control On-Site	**1.00**	**EA**	*829,597.46* **829,597**	**0**	**196,526**	*1,026,123.13* **1,026,123**
PZC 13 Combi-wall	**4,400.00**	**LF**	*13,997.97* **61,591,056**	**0**	**14,590,478**	*17,313.99* **76,181,534**
C King Pile (Beam)	**103,350.60**	**LF**	*216.27* **22,351,896**	**0**	**5,295,003**	*267.51* **27,646,899**
C PZC 13	**7,891.00**	**TON**	*2,423.84* **19,126,513**	**0**	**4,530,933**	*2,998.03* **23,657,446**
C Tie Rods	**380.00**	**EA**	*9,703.00* **3,687,140**	**0**	**873,457**	*12,001.57* **4,560,596**
C Wales	**1,152,801.52**	**LB**	*3.97* **4,577,863**	**0**	**1,084,463**	*4.91* **5,662,325**
C Concrete Cap	**10,592.31**	**CY**	*432.60* **4,582,233**	**0**	**1,085,498**	*535.08* **5,667,732**
Granular Fill	**458,300.00**	**TON**	*15.85* **7,265,412**	**0**	**1,721,124**	*19.61* **8,986,535**
Wier Structure & Walkway	**1.00**	**LS**	**115,000**	**0**	**27,243**	**142,243**
Fish Removal	**1.00**	**EA**	*35,000.00* **35,000**	**0**	**8,291**	*43,291.25* **43,291**
Type A	**42,780.00**	**TON**	*67.74* **2,897,988**	**0**	**686,512**	*83.79* **3,584,500**
Type B	**39,060.00**	**TON**	*61.89* **2,417,518**	**0**	**572,693**	*76.55* **2,990,211**
Type C	**111,345.00**	**TON**	*35.22* **3,921,354**	**0**	**928,941**	*43.56* **4,850,295**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			15.91			*19.68*
Type D	**37,050.00**	**TON**	**589,613**	**0**	**139,675**	**729,288**
			80.21			*99.21*
Type E	**34,600.00**	**TON**	**2,775,305**	**0**	**657,450**	**3,432,755**
			15.85			*19.61*
Type D	**98,200.00**	**TON**	**1,556,761**	**0**	**368,785**	**1,925,546**
			15.82			*19.57*
Type F	**1,860.00**	**TON**	**29,423**	**0**	**6,970**	**36,393**
			42.25			*52.26*
Type H	**61,300.00**	**TON**	**2,590,176**	**0**	**613,594**	**3,203,770**
Mitagation	**1.00**	**LS**	**250,000**	**0**	**0**	**250,000**
Cell 2	**1.00**	**LS**	**93,844,612**	**2,942,654**	**20,815,347**	**117,602,614**
			1,069,290.51			*1,322,597.73*
General Conditions	**1.00**	**EA**	**1,069,291**	**0**	**253,307**	**1,322,598**
			54,871.15			*67,869.73*
Temporary Office	**1.00**	**EA**	**54,871**	**0**	**12,999**	**67,870**
Submittals	**1.00**	**LS**	**38,107**	**0**	**9,027**	**47,135**
Mob and Demob	**1.00**	**LS**	**146,715**	**0**	**34,756**	**181,470**
			829,597.46			*1,026,123.13*
Quality Control On-Site	**1.00**	**EA**	**829,597**	**0**	**196,526**	**1,026,123**
			67.74			*84.60*
Type A	**336,310.00**	**TON**	**22,782,193**	**508,237**	**5,162,644**	**28,453,074**
			61.89			*77.37*
Type B	**336,400.00**	**TON**	**20,820,610**	**508,373**	**4,697,896**	**26,026,880**
			35.22			*44.38*
Type C	**938,800.00**	**TON**	**33,062,710**	**1,418,729**	**7,178,294**	**41,659,733**
			15.91			*20.50*
Type D	**37,100.00**	**TON**	**590,409**	**56,066**	**114,017**	**760,492**
			41.52			*52.16*
Type E	**247,200.00**	**TON**	**10,262,664**	**373,572**	**2,258,937**	**12,895,173**
			15.85			*19.61*
Type D	**98,200.00**	**TON**	**1,556,761**	**0**	**368,785**	**1,925,546**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			15.82			*20.38*
Type F	**43,700.00**	**TON**	**691,279**	**66,040**	**133,315**	**890,634**
			42.25			*53.08*
Type H	**7,700.00**	**TON**	**325,357**	**11,636**	**71,710**	**408,703**
			41,978.66			*51,923.10*
Weir and Walkway	**1.00**	**EA**	**41,979**	**0**	**9,944**	**51,923**
			37,195.22			*46,006.51*
Wier	**1.00**	**EA**	**37,195**	**0**	**8,811**	**46,007**
			4,783.44			*5,916.60*
Walkway, Railing and Ladder	**1.00**	**EA**	**4,783**	**0**	**1,133**	**5,917**
			1,964.24			*2,429.55*
Steel Sheet Pile Wall	**2,010.00**	**TON**	**3,948,122**	**0**	**935,282**	**4,883,404**
			1,964.24			*2,429.55*
CZ67	**2,010.00**	**TON**	**3,948,122**	**0**	**935,282**	**4,883,404**
Mitagation	**1.00**	**LS**	**250,000**	**0**	**0**	**250,000**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
Project Direct Costs Report			**12,609,622**	**18,203,290**	**130,372,148**	**31,200**	**4,732,233**	**500,000**	**5,677,843**	**172,126,337**
Cell 1	**1.00**	**LS**	**6,315,646**	**7,384,503**	**56,764,691**	**15,600**	**4,732,233**	**250,000**	**2,819,051**	**78,281,724**
			525,695.76	*244,873.95*	*31,600.00*	*15,600.00*			*251,520.80*	*1,069,290.51*
General Conditions	**1.00**	**EA**	**525,696**	**244,874**	**31,600**	**15,600**	**0**	**0**	**251,521**	**1,069,291**
			16,773.12	*0.00*	*14,400.00*	*15,600.00*			*8,098.03*	*54,871.15*
Temporary Office	**1.00**	**EA**	**16,773**	**0**	**14,400**	**15,600**	**0**	**0**	**8,098**	**54,871**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*224.95*	*790.87*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	0	8,098	28,471
Submittals	**1.00**	**LS**	**18,664**	**0**	**10,000**	**0**	**0**	**0**	**9,444**	**38,107**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.12	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*314.79*	*936.91*
USR Initial Project Submittals	30.00	DAY	18,664	0	0	0	0	0	9,444	28,107
Mob and Demob	**1.00**	**LS**	**47,430**	**78,711**	**0**	**0**	**0**	**0**	**20,573**	**146,715**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			157.81	*343.66*	*0.00*	*0.00*	*0.00*	*0.00*	*67.18*	*568.65*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	20,831	45,363	0	0	0	0	8,868	75,061
			201.51	*252.64*	*0.00*	*0.00*	*0.00*	*0.00*	*88.68*	*542.83*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,599	33,349	0	0	0	0	11,705	71,653
			442,828.80	*166,162.56*	*7,200.00*	*0.00*			*213,406.10*	*829,597.46*
Quality Control On-Site	**1.00**	**EA**	**442,829**	**166,163**	**7,200**	**0**	**0**	**0**	**213,406**	**829,597**
			12,300.80	*4,615.63*	*200.00*	*0.00*	*0.00*	*0.00*	*5,927.95*	*23,044.37*
USR Quality Control	36.00	MO	442,829	166,163	7,200	0	0	0	213,406	829,597

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			1,059.40	*1,144.14*	*10,284.46*	*0.00*			*468.55*	*13,997.97*
PZC 13 Combi-wall	**4,400.00**	**LF**	**4,661,371**	**5,034,226**	**45,251,622**	**0**	**4,582,233**	**0**	**2,061,605**	**61,591,056**
(Note: Beam - W40 x 167 @ 5.79 centers @ 68 feet long. Attached to the beams are connnectors welded to the beam for the PZC13 to insert into. PZC 13 @ 103 foot lengths.)										
			6.15	*4.96*	*202.43*	*0.00*			*2.74*	*216.27*
C King Pile (Beam)	**103,350.60**	**LF**	**635,716**	**512,365**	**20,921,004**	**0**	**0**	**0**	**282,811**	**22,351,896**
(Note: Includes BBS-M and BBS-F King piles are 68 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)										
			0.00	*0.00*	*2,165.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,165.00*
USR Material Price King Pile & connectors	9,663.28	TON	0	0	20,921,004	0	0	0	0	20,921,004
(Note: Connectors welded to pile.)										
			6.15	*4.96*	*0.00*	*0.00*	*0.00*	*0.00*	*2.74*	*13.85*
USR King pile installation	103,350.60	LF	635,716	512,365	0	0	0	0	282,811	1,430,892
(Note: Say 1 pile at 66 ft per hour due to tolerances.)										
			172.75	*139.23*	*2,035.00*	*0.00*			*76.85*	*2,423.84*
C PZC 13	**7,891.00**	**TON**	**1,363,195**	**1,098,688**	**16,058,185**	**0**	**0**	**0**	**606,445**	**19,126,513**
(Note: SSP piles are 103 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)										
			172.75	*139.23*	*0.00*	*0.00*	*0.00*	*0.00*	*76.85*	*388.84*
USR Steel Sheet Pile Installation	7,891.00	TON	1,363,195	1,098,688	0	0	0	0	606,445	3,068,328
			0.00	*0.00*	*2,035.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,035.00*
USR Material Price SSP	7,891.00	TON	0	0	16,058,185	0	0	0	0	16,058,185
			1,408.84	*1,162.94*	*6,500.00*	*0.00*			*631.22*	*9,703.00*
C Tie Rods	**380.00**	**EA**	**535,359**	**441,918**	**2,470,000**	**0**	**0**	**0**	**239,862**	**3,687,140**
			0.87	*0.72*	*4.00*	*0.00*	*0.00*	*0.00*	*0.39*	*5.97*
USR Wale & Tie Rod installation	617,500.00	LB	535,359	441,918	2,470,000	0	0	0	239,862	3,687,140
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb ADJUST PRICE OF TIE RODS (DOUBLE THAT OF WALES).)										
			0.87	*0.72*	*2.00*	*0.00*			*0.39*	*3.97*
C Wales	**1,152,801.52**	**LB**	**999,454**	**825,010**	**2,305,603**	**0**	**0**	**0**	**447,795**	**4,577,863**
			0.87	*0.72*	*2.00*	*0.00*	*0.00*	*0.00*	*0.39*	*3.97*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
USR Wale & Tie Rod installation	1,152,801.52	LB	999,454	825,010	2,305,603	0	0	0	447,795	4,577,863
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*432.60*
C Concrete Cap	**10,592.31**	**CY**	**0**	**0**	**0**	**0**	**4,582,233**	**0**	**0**	**4,582,233**
			0.00	*0.00*	*0.00*	*0.00*	*412.00*	*0.00*	*0.00*	*412.00*
USR Concrete Cap	11,121.93	CY	0	0	0	0	4,582,233	0	0	4,582,233
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy Updated using ENR June 08 - June 07 = 1.03 = $412/cy (includes reinforcing and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH & Profit.)										
			2.46	*4.70*	*7.63*	*0.00*			*1.06*	*15.85*
Granular Fill	**458,300.00**	**TON**	**1,127,646**	**2,156,245**	**3,496,829**	**0**	**0**	**0**	**484,692**	**7,265,412**
(Note: Use Type D material.)										
			0.71	*0.89*	*7.63*	*0.00*	*0.00*	*0.00*	*0.31*	*9.53*
USR Type D Stone	458,300.00	TON	324,042	406,264	3,496,829	0	0	0	142,597	4,369,733
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.75*	*6.32*
USR Haul from Sandusky	458,300.00	TON	803,604	1,749,980	0	0	0	0	342,095	2,895,679
(Note: 2400 tons per trip, 24 hrs per trip)										
Wier Structure & Walkway	**1.00**	**LS**	**0**	**0**	**0**	**0**	**115,000**	**0**	**0**	**115,000**
USR Wier Structure & Walkway	1.00	LS	0	0	0	0	115,000	0	0	115,000
(Note: Assume this wier to be constructed to handle future expansion of the CDF. From Cleveland 10b adjusted to current price levels. Leave contractor unassigned as bid abstract contains OH & P)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			3.28	*5.73*	*57.25*	*0.00*			*1.48*	*67.74*
Type A	**42,780.00**	**TON**	**140,320**	**245,230**	**2,449,155**	**0**	**0**	**0**	**63,282**	**2,897,988**
			1.53	*1.91*	*57.25*	*0.00*	*0.00*	*0.00*	*0.67*	*61.36*
USR Type A Armor Stone (5 ton to 10 ton)	42,780.00	TON	65,308	81,879	2,449,155	0	0	0	28,739	2,625,080
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	42,780.00	TON	75,012	163,352	0	0	0	0	34,543	272,907

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.94	*5.30*	*52.32*	*0.00*			*1.33*	*61.89*
Type B	**39,060.00**	**TON**	**114,789**	**207,195**	**2,043,619**	**0**	**0**	**0**	**51,914**	**2,417,518**
			1.19	*1.49*	*52.32*	*0.00*	*0.00*	*0.00*	*0.52*	*55.51*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	39,060.00	TON	46,300	58,048	2,043,619	0	0	0	20,375	2,168,342
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	39,060.00	TON	68,490	149,147	0	0	0	0	31,539	249,176
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.54	*4.81*	*26.71*	*0.00*			*1.16*	*35.22*
Type C	**111,345.00**	**TON**	**283,226**	**535,477**	**2,974,025**	**0**	**0**	**0**	**128,627**	**3,921,354**
			0.79	*0.99*	*26.71*	*0.00*	*0.00*	*0.00*	*0.35*	*28.84*
USR Type C Stone	111,345.00	TON	87,989	110,315	2,974,025	0	0	0	38,720	3,211,049
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	111,345.00	TON	195,237	425,162	0	0	0	0	89,907	710,306
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.46	*4.70*	*7.63*	*0.00*			*1.12*	*15.91*
Type D	**37,050.00**	**TON**	**91,161**	**174,316**	**282,692**	**0**	**0**	**0**	**41,444**	**589,613**
			0.71	*0.89*	*7.63*	*0.00*	*0.00*	*0.00*	*0.31*	*9.53*
USR Type D Stone	37,050.00	TON	26,196	32,843	282,692	0	0	0	11,528	353,259
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	37,050.00	TON	64,965	141,472	0	0	0	0	29,916	236,354
(Note: 2400 tons per trip, 24 hrs per trip)										
			9.53	*18.16*	*48.37*	*0.00*			*4.16*	*80.21*
Type E	**34,600.00**	**TON**	**329,632**	**628,416**	**1,673,432**	**0**	**0**	**0**	**143,825**	**2,775,305**
			0.79	*0.99*	*26.71*	*0.00*	*0.00*	*0.00*	*0.35*	*28.84*
USR Type C and E Stone	34,600.00	TON	27,342	34,280	924,166	0	0	0	12,032	997,820
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	34,600.00	TON	60,669	132,117	0	0	0	0	27,938	220,725
(Note: 2400 tons per trip, 24 hrs per trip)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			2.46	*4.70*	*7.63*	*0.00*			*1.06*	*15.85*
Type D	**98,200.00**	**TON**	**241,621**	**462,019**	**749,266**	**0**	**0**	**0**	**103,855**	**1,556,761**
			0.71	*0.89*	*7.63*	*0.00*	*0.00*	*0.00*	*0.31*	*9.53*
USR Type D Stone	98,200.00	TON	69,433	87,050	749,266	0	0	0	30,554	936,303
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.75*	*6.32*
USR Haul from Sandusky	98,200.00	TON	172,188	374,969	0	0	0	0	73,301	620,458
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.43	*4.66*	*7.63*	*0.00*			*1.10*	*15.82*
Type F	**1,860.00**	**TON**	**4,511**	**8,669**	**14,192**	**0**	**0**	**0**	**2,052**	**29,423**
			0.67	*0.84*	*7.63*	*0.00*	*0.00*	*0.00*	*0.30*	*9.44*
USR Type F Stone	1,860.00	TON	1,249	1,566	14,192	0	0	0	550	17,557
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	1,860.00	TON	3,261	7,102	0	0	0	0	1,502	11,866
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.69	*4.99*	*33.35*	*0.00*			*1.22*	*42.25*
Type H	**61,300.00**	**TON**	**164,940**	**306,101**	**2,044,355**	**0**	**0**	**0**	**74,780**	**2,590,176**
			0.94	*1.18*	*33.35*	*0.00*	*0.00*	*0.00*	*0.41*	*35.87*
USR Type H Stone	61,300.00	TON	57,454	72,032	2,044,355	0	0	0	25,283	2,199,124
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	61,300.00	TON	107,486	234,069	0	0	0	0	49,497	391,052
(Note: 2400 tons per trip, 24 hrs per trip)										
Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**0**	**250,000**	**0**	**250,000**
USR Mitagation	1.00	LS	0	0	0	0	0	250,000	0	250,000
(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)										
Cell 2	**1.00**	**LS**	**6,293,976**	**10,818,787**	**73,607,457**	**15,600**	**0**	**250,000**	**2,858,792**	**93,844,612**
			525,695.76	*244,873.95*	*31,600.00*	*15,600.00*			*251,520.80*	*1,069,290.51*
General Conditions	**1.00**	**EA**	**525,696**	**244,874**	**31,600**	**15,600**	**0**	**0**	**251,521**	**1,069,291**
			16,773.12	*0.00*	*14,400.00*	*15,600.00*			*8,098.03*	*54,871.15*
Temporary Office	**1.00**	**EA**	**16,773**	**0**	**14,400**	**15,600**	**0**	**0**	**8,098**	**54,871**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*224.95*	*790.87*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	0	8,098	28,471
Submittals	**1.00**	**LS**	**18,664**	**0**	**10,000**	**0**	**0**	**0**	**9,444**	**38,107**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.12	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*314.79*	*936.91*
USR Initial Project Submittals	30.00	DAY	18,664	0	0	0	0	0	9,444	28,107
Mob and Demob	**1.00**	**LS**	**47,430**	**78,711**	**0**	**0**	**0**	**0**	**20,573**	**146,715**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			157.81	*343.66*	*0.00*	*0.00*	*0.00*	*0.00*	*67.18*	*568.65*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	20,831	45,363	0	0	0	0	8,868	75,061
			201.51	*252.64*	*0.00*	*0.00*	*0.00*	*0.00*	*88.68*	*542.83*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,599	33,349	0	0	0	0	11,705	71,653
			442,828.80	*166,162.56*	*7,200.00*	*0.00*			*213,406.10*	*829,597.46*
Quality Control On-Site	**1.00**	**EA**	**442,829**	**166,163**	**7,200**	**0**	**0**	**0**	**213,406**	**829,597**
			12,300.80	*4,615.63*	*200.00*	*0.00*	*0.00*	*0.00*	*5,927.95*	*23,044.37*
USR Quality Control	36.00	MO	442,829	166,163	7,200	0	0	0	213,406	829,597
			3.28	*5.73*	*57.25*	*0.00*			*1.48*	*67.74*
Type A	**336,310.00**	**TON**	**1,103,109**	**1,927,851**	**19,253,748**	**0**	**0**	**0**	**497,486**	**22,782,193**
			1.53	*1.91*	*57.25*	*0.00*	*0.00*	*0.00*	*0.67*	*61.36*
USR Type A Armor Stone (5 ton to 10 ton)	336,310.00	TON	513,408	643,679	19,253,748	0	0	0	225,929	20,636,763
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	336,310.00	TON	589,701	1,284,172	0	0	0	0	271,557	2,145,430
(Note: 2400 tons per cycle, 24 hrs per cycle)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			2.94	*5.30*	*52.32*	*0.00*			*1.33*	*61.89*
Type B	**336,400.00**	**TON**	**988,611**	**1,784,447**	**17,600,448**	**0**	**0**	**0**	**447,104**	**20,820,610**
			1.19	*1.49*	*52.32*	*0.00*	*0.00*	*0.00*	*0.52*	*55.51*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	336,400.00	TON	398,753	499,932	17,600,448	0	0	0	175,474	18,674,606
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	336,400.00	TON	589,859	1,284,515	0	0	0	0	271,630	2,146,004
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.54	*4.81*	*26.71*	*0.00*			*1.16*	*35.22*
Type C	**938,800.00**	**TON**	**2,388,007**	**4,514,844**	**25,075,348**	**0**	**0**	**0**	**1,084,511**	**33,062,710**
			0.79	*0.99*	*26.71*	*0.00*	*0.00*	*0.00*	*0.35*	*28.84*
USR Type C Stone	938,800.00	TON	741,873	930,115	25,075,348	0	0	0	326,467	27,073,802
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	938,800.00	TON	1,646,134	3,584,730	0	0	0	0	758,044	5,988,908
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.46	*4.70*	*7.63*	*0.00*			*1.12*	*15.91*
Type D	**37,100.00**	**TON**	**91,284**	**174,551**	**283,073**	**0**	**0**	**0**	**41,500**	**590,409**
			0.71	*0.89*	*7.63*	*0.00*	*0.00*	*0.00*	*0.31*	*9.53*
USR Type D Stone	37,100.00	TON	26,232	32,888	283,073	0	0	0	11,543	353,736
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	37,100.00	TON	65,053	141,663	0	0	0	0	29,957	236,673
(Note: 2400 tons per trip, 24 hrs per trip)										
			3.52	*6.68*	*29.74*	*0.00*			*1.58*	*41.52*
Type E	**247,200.00**	**TON**	**870,418**	**1,650,844**	**7,351,978**	**0**	**0**	**0**	**389,423**	**10,262,664**
			0.79	*0.99*	*26.71*	*0.00*	*0.00*	*0.00*	*0.35*	*28.84*
USR Type C and E Stone	247,200.00	TON	195,346	244,913	6,602,712	0	0	0	85,964	7,128,935
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	247,200.00	TON	433,451	943,913	0	0	0	0	199,604	1,576,968
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.46	*4.70*	*7.63*	*0.00*			*1.06*	*15.85*
Type D	**98,200.00**	**TON**	**241,621**	**462,019**	**749,266**	**0**	**0**	**0**	**103,855**	**1,556,761**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.71	*0.89*	*7.63*	*0.00*	*0.00*	*0.00*	*0.31*	*9.53*
USR Type D Stone	98,200.00	TON	69,433	87,050	749,266	0	0	0	30,554	936,303
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.75*	*6.32*
USR Haul from Sandusky	98,200.00	TON	172,188	374,969	0	0	0	0	73,301	620,458
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.43	*4.66*	*7.63*	*0.00*			*1.10*	*15.82*
Type F	**43,700.00**	**TON**	**105,979**	**203,666**	**333,431**	**0**	**0**	**0**	**48,203**	**691,279**
			0.67	*0.84*	*7.63*	*0.00*	*0.00*	*0.00*	*0.30*	*9.44*
USR Type F Stone	43,700.00	TON	29,353	36,801	333,431	0	0	0	12,917	412,503
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	43,700.00	TON	76,626	166,865	0	0	0	0	35,286	278,776
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.69	*4.99*	*33.35*	*0.00*			*1.22*	*42.25*
Type H	**7,700.00**	**TON**	**20,718**	**38,450**	**256,795**	**0**	**0**	**0**	**9,393**	**325,357**
			0.94	*1.18*	*33.35*	*0.00*	*0.00*	*0.00*	*0.41*	*35.87*
USR Type H Stone	7,700.00	TON	7,217	9,048	256,795	0	0	0	3,176	276,236
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.75	*3.82*	*0.00*	*0.00*	*0.00*	*0.00*	*0.81*	*6.38*
USR Haul from Sandusky	7,700.00	TON	13,502	29,402	0	0	0	0	6,217	49,121
(Note: 2400 tons per trip, 24 hrs per trip)										
			16,530.73	*14,194.07*	*4,036.50*	*0.00*			*7,217.36*	*41,978.66*
Weir and Walkway	**1.00**	**EA**	**16,531**	**14,194**	**4,037**	**0**	**0**	**0**	**7,217**	**41,979**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			15,072.96	*14,111.92*	*1,420.50*	*0.00*			*6,589.84*	*37,195.22*
Wier	**1.00**	**EA**	**15,073**	**14,112**	**1,421**	**0**	**0**	**0**	**6,590**	**37,195**
			16.75	*15.68*	*0.70*	*0.00*	*0.00*	*0.00*	*7.32*	*40.45*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	5,024	4,704	210	0	0	0	2,197	12,135
			2,512.16	*2,351.99*	*541.50*	*0.00*	*0.00*	*0.00*	*1,098.31*	*6,503.95*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,512	2,352	542	0	0	0	1,098	6,504
			418.69	*392.00*	*0.00*	*0.00*	*0.00*	*0.00*	*183.05*	*993.74*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,512	2,352	0	0	0	0	1,098	5,962
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			16.75	*15.68*	*0.03*	*0.00*	*0.00*	*0.00*	*7.32*	*39.78*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	5,024	4,704	9	0	0	0	2,197	11,934
			1,457.77	*82.15*	*2,616.00*	*0.00*			*627.51*	*4,783.44*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,458**	**82**	**2,616**	**0**	**0**	**0**	**628**	**4,783**
			9.02	*0.45*	*19.75*	*0.00*	*0.00*	*0.00*	*3.88*	*33.10*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	180	9	395	0	0	0	78	662
			2.41	*0.12*	*10.70*	*0.00*	*0.00*	*0.00*	*1.04*	*14.26*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	241	12	1,070	0	0	0	104	1,426
			30.18	*1.99*	*6.55*	*0.00*	*0.00*	*0.00*	*13.00*	*51.73*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	604	40	131	0	0	0	260	1,035
			28.87	*1.43*	*68.00*	*0.00*	*0.00*	*0.00*	*12.42*	*110.72*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	433	21	1,020	0	0	0	186	1,661

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			91.35	*131.87*	*1,700.00*	*0.00*			*41.01*	*1,964.24*
Steel Sheet Pile Wall	**2,010.00**	**TON**	**183,623**	**265,065**	**3,417,000**	**0**	**0**	**0**	**82,434**	**3,948,122**
			91.35	*131.87*	*1,700.00*	*0.00*			*41.01*	*1,964.24*
CZ67	**2,010.00**	**TON**	**183,623**	**265,065**	**3,417,000**	**0**	**0**	**0**	**82,434**	**3,948,122**
			91.35	*131.87*	*1,700.00*	*0.00*	*0.00*	*0.00*	*41.01*	*1,964.24*
USR Marine Sheet piling, steel, 38 psf, 40' excavation, left in place, excludes wales	2,010.00	TON	183,623	265,065	3,417,000	0	0	0	82,434	3,948,122

(Note: Modified for Marine Plant. Sttel Sheet Pile price adjusted from $816.21 ton to more current prices of $1700/ton)

Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**0**	**250,000**	**0**	**250,000**
USR Mitagation	1.00	LS	0	0	0	0	0	250,000	0	250,000

(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)

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Site 3A - 20 year Capacity
Site 3A - 20 Year Capacity
Revised estimate include new labor rates and esculated stone price quotes to current (4th Qtr FY08) dollars.
Estimate NOT escaluated to Future $$.
March 2009 Mitagation measures added

Estimated by	JW
Designed by	Reed Vetovitz
Prepared by	James Wryk
Preparation Date	8/20/2008
Effective Date of Pricing	8/20/2008
Estimated Construction Time	Days

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Date	Author	Note
8/24/2006	JSD	Quotes for stone materials received from Marblehead Quarries, LaFarge Corporation on August 24, 2006. Allen Boros, Territory Manager. 419-290-5076. All prices are FOB Contractor's barge. Does not include any transportation charges.
8/24/2006	JSD	According to Mr. Boros the reason for the high unit price for Armor Stone for Alternatives #2 and #3 are because the quarry will have to set-up of a new production area so as not to interfere with normal quarry production operations. Mr. Boros estimated that annual production of Type A stone would be between 80,000 tons and 100,000 tons.
8/25/2006	JSD	Quantities of materials were based on design documents provided by designer. Designer provided the in-place volumes and conversion factors for determining quantities of stone.
8/28/2006	jsd	15% contingency has been added to this estimate. In addition the price quote from the quarry is on the conservative side not only because of the opening of a new section of quarry but for the uncertainties in the design at the time of the price quote.
7/18/2008	jw	This file contain revisions to bring the estimate up to current prices. Material price quotes have been escalated to current pricing, labor and equipment rates have been checked.
8/26/2008	jw	Site 3A is on the Western edge of the breakwater from the arrowhead going east.. Site 3A is straddling both sides of the breakwater with Cell 1(Harbor Side) constructed of SSP wall with King Piles and Cell 2 on the Lake side being constructed out of Stone.
9/8/2008	jw	Revised estimate include new labor rates and escalated stone price quotes to current (4th Qtr FY08) dollars. Estimate NOT escaluated to Future $$.
9/9/2008	jw	Estimate broken into 2 cells. Because the cells may be completed by different contracts, Mob/Demob, Wier Structure and fish removal is added to both cells of the estimate.
12/29/2008	jw	Contingencies updated based on Cost Risk Analysis worked up by Walla Walla District. Equipment Rates updated to latest database Labor Rates updated to latest labor rates

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Project Cost Summary Report			**274,436,766**	**66,402,272**	**340,839,038**
Cell 1	**1.00**	**LS**	**111,960,023**	**27,078,509**	**139,038,532**
General Conditions	**1.00**	**LS**	**1,328,373**	**321,997**	**1,650,370**
Temporary Office	**1.00**	**LS**	**67,870**	**16,452**	**84,321**
Submittals	**1.00**	**LS**	**49,555**	**12,012**	**61,567**
Mob and Demob	**1.00**	**LS**	**185,452**	**44,953**	**230,405**
Quality Control On-Site	**1.00**	**LS**	**1,025,496**	**248,580**	**1,274,077**
CZ67	**703.00**	**TON**	*2,556.16* **1,796,983**	**435,589**	*3,175.78* **2,232,572**
Wier Structure & Walkway	**1.00**	**LS**	**142,243**	**34,480**	**176,722**
Fish Removal	**1.00**	**LS**	**43,291**	**10,494**	**53,785**
Type A	**78,430.00**	**TON**	*83.93* **6,582,566**	**1,595,614**	*104.27* **8,178,180**
Type B	**53,382.00**	**TON**	*76.67* **4,092,960**	**992,133**	*95.26* **5,085,093**
Type C	**152,172.00**	**TON**	*43.66* **6,643,075**	**1,610,281**	*54.24* **8,253,356**
Type D	**50,635.00**	**TON**	*19.77* **1,001,195**	**242,690**	*24.57* **1,243,884**
Type E	**47,281.00**	**TON**	*43.66* **2,064,054**	**500,327**	*54.24* **2,564,381**
Type F	**2,542.00**	**TON**	*19.65* **49,957**	**12,110**	*24.42* **62,067**
Type H	**83,886.00**	**TON**	*52.37* **4,392,862**	**1,064,830**	*65.06* **5,457,692**
PZC 13 Combi-wall	**4,500.00**	**LF**	*18,571.66* **83,572,464**	**20,257,965**	*23,073.43* **103,830,429**
C King Pile (Beam)	**105,672.00**	**LF**	*267.70* **28,288,215**	**6,857,063**	*332.59* **35,145,278**
C PZC 13	**9,880.00**	**TON**	*3,003.67* **29,676,240**	**7,193,521**	*3,731.76* **36,869,760**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
C Tie Rods	389.00	EA	*12,045.27* 4,685,611	1,135,792	*14,965.05* 5,821,403
C Wales	1,179,001.56	LB	*4.94* 5,822,723	1,411,428	*6.14* 7,234,152
Granular Fill	468,720.00	TON	*19.85* 9,303,131	2,255,079	*24.66* 11,558,210
C Concrete Cap	10,833.04	CY	*535.08* 5,796,544	1,405,082	*664.78* 7,201,626
Mitagation	1.00	LS	250,000	0	250,000
Cell 2	1.00	LS	162,476,744	39,323,763	201,800,506
General Conditions	1.00	LS	1,328,373	321,997	1,650,370
Temporary Office	1.00	LS	67,870	16,452	84,321
Submittals	1.00	LS	49,555	12,012	61,567
Mob and Demob	1.00	LS	185,452	44,953	230,405
Quality Control On-Site	1.00	LS	1,025,496	248,580	1,274,077
Type A	446,199.00	TON	*84.75* 37,814,636	9,166,268	*105.29* 46,980,904
Type B	479,241.00	TON	*77.49* 37,137,443	9,002,116	*96.28* 46,139,559
Type C	1,243,648.00	TON	*44.47* 55,310,274	13,407,210	*55.25* 68,717,485
Type D	47,522.00	TON	*20.59* 978,571	237,206	*25.58* 1,215,776
Type E	323,144.00	TON	*44.47* 14,371,577	3,483,670	*55.25* 17,855,248
Type F	566,840.00	TON	*20.47* 11,604,324	2,812,888	*25.43* 14,417,212
Type H	7,642.00	TON	*53.19* 406,449	98,523	*66.08* 504,972
Weir and Walkway	1.00	LS	52,562	12,741	65,303
Wier	1.00	EA	*46,651.03* 46,651	11,308	*57,959.24* 57,959

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			5,910.58		*7,343.31*
Walkway, Railing and Ladder	**1.00**	**EA**	**5,911**	**1,433**	**7,343**
			2,432.47		*3,022.11*
CZ67	**1,307.00**	**TON**	**3,179,244**	**770,649**	**3,949,893**
Fish Removal	**1.00**	**LS**	**43,291**	**10,494**	**53,785**
Mitagation	**1.00**	**LS**	**250,000**	**0**	**250,000**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
Contract Cost Summary Report			**219,909,195**	**4,732,986**	**49,794,586**	**274,436,766**
Cell 1	**1.00**	**LS**	**90,565,040**	**0**	**21,394,983**	**111,960,023**
General Conditions	**1.00**	**LS**	**1,073,959**	**0**	**254,413**	**1,328,373**
Temporary Office	**1.00**	**LS**	**54,871**	**0**	**12,999**	**67,870**
Submittals	**1.00**	**LS**	**40,064**	**0**	**9,491**	**49,555**
Mob and Demob	**1.00**	**LS**	**149,933**	**0**	**35,518**	**185,452**
Quality Control On-Site	**1.00**	**LS**	**829,091**	**0**	**196,406**	**1,025,496**
CZ67	**703.00**	**TON**	*2,066.60* **1,452,821**	**0**	**344,163**	*2,556.16* **1,796,983**
Wier Structure & Walkway	**1.00**	**LS**	**115,000**	**0**	**27,243**	**142,243**
Fish Removal	**1.00**	**LS**	**35,000**	**0**	**8,291**	**43,291**
Type A	**78,430.00**	**TON**	*67.85* **5,321,857**	**0**	**1,260,710**	*83.93* **6,582,566**
Type B	**53,382.00**	**TON**	*61.99* **3,309,066**	**0**	**783,894**	*76.67* **4,092,960**
Type C	**152,172.00**	**TON**	*35.29* **5,370,777**	**0**	**1,272,298**	*43.66* **6,643,075**
Type D	**50,635.00**	**TON**	*15.99* **809,443**	**0**	**191,751**	*19.77* **1,001,195**
Type E	**47,281.00**	**TON**	*35.29* **1,668,741**	**0**	**395,313**	*43.66* **2,064,054**
Type F	**2,542.00**	**TON**	*15.89* **40,389**	**0**	**9,568**	*19.65* **49,957**
Type H	**83,886.00**	**TON**	*42.34* **3,551,530**	**0**	**841,332**	*52.37* **4,392,862**
PZC 13 Combi-wall	**4,500.00**	**LF**	*15,014.77* **67,566,457**	**0**	**16,006,007**	*18,571.66* **83,572,464**
C King Pile (Beam)	**105,672.00**	**LF**	*216.43* **22,870,385**	**0**	**5,417,830**	*267.70* **28,288,215**
C PZC 13	**9,880.00**	**TON**	*2,428.40* **23,992,572**	**0**	**5,683,668**	*3,003.67* **29,676,240**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
C Tie Rods	389.00	EA	*9,738.33* 3,788,211	0	897,400	*12,045.27* 4,685,611
C Wales	1,179,001.56	LB	*3.99* 4,707,541	0	1,115,183	*4.94* 5,822,723
Granular Fill	468,720.00	TON	*16.05* 7,521,372	0	1,781,759	*19.85* 9,303,131
C Concrete Cap	10,833.04	CY	*432.60* 4,686,375	0	1,110,169	*535.08* 5,796,544
Mitagation	1.00	LS	250,000	0	0	250,000
Cell 2	1.00	LS	129,344,155	4,732,986	28,399,603	162,476,744
General Conditions	1.00	LS	1,073,959	0	254,413	1,328,373
Temporary Office	1.00	LS	54,871	0	12,999	67,870
Submittals	1.00	LS	40,064	0	9,491	49,555
Mob and Demob	1.00	LS	149,933	0	35,518	185,452
Quality Control On-Site	1.00	LS	829,091	0	196,406	1,025,496
Type A	446,199.00	TON	*67.85* 30,276,771	678,129	6,859,736	*84.75* 37,814,636
Type B	479,241.00	TON	*61.99* 29,707,392	728,346	6,701,705	*77.49* 37,137,443
Type C	1,243,648.00	TON	*35.29* 43,893,461	1,890,084	9,526,730	*44.47* 55,310,274
Type D	47,522.00	TON	*15.99* 759,679	72,223	146,668	*20.59* 978,571
Type E	323,144.00	TON	*35.29* 11,405,083	491,111	2,475,383	*44.47* 14,371,577
Type F	566,840.00	TON	*15.89* 9,006,424	861,478	1,736,422	*20.47* 11,604,324
Type H	7,642.00	TON	*42.34* 323,544	11,614	71,291	*53.19* 406,449
Weir and Walkway	1.00	LS	42,495	0	10,067	52,562
Wier	1.00	EA	*37,716.31* 37,716	0	8,935	*46,651.03* 46,651

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			4,778.57			*5,910.58*
Walkway, Railing and Ladder	**1.00**	**EA**	**4,779**	**0**	**1,132**	**5,911**
			1,966.60			*2,432.47*
CZ67	**1,307.00**	**TON**	**2,570,348**	**0**	**608,897**	**3,179,244**
Fish Removal	**1.00**	**LS**	**35,000**	**0**	**8,291**	**43,291**
Mitagation	**1.00**	**LS**	**250,000**	**0**	**0**	**250,000**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
Project Direct Costs Report			**15,981,970**	**25,008,104**	**166,737,404**	**31,200**	**4,871,375**	**500,000**	**6,779,142**	**219,909,195**
Cell 1	**1.00**	**LS**	**6,949,487**	**8,393,169**	**67,069,629**	**15,600**	**4,836,375**	**250,000**	**3,050,780**	**90,565,040**
(Note: Inside of the current breakwall. Will contain a combi-wall system with a refurbished breakwater.)										
General Conditions	**1.00**	**LS**	**527,035**	**247,586**	**31,600**	**15,600**	**0**	**0**	**252,138**	**1,073,959**
Temporary Office	**1.00**	**LS**	**16,773**	**0**	**14,400**	**15,600**	**0**	**0**	**8,098**	**54,871**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*224.95*	*790.87*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	0	8,098	28,471
Submittals	**1.00**	**LS**	**20,003**	**0**	**10,000**	**0**	**0**	**0**	**10,061**	**40,064**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			666.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*335.37*	*1,002.13*
USR Initial Project Submittals	30.00	DAY	20,003	0	0	0	0	0	10,061	30,064
Mob and Demob	**1.00**	**LS**	**47,430**	**81,930**	**0**	**0**	**0**	**0**	**20,573**	**149,933**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			157.81	*357.88*	*0.00*	*0.00*	*0.00*	*0.00*	*67.18*	*582.87*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	20,831	47,240	0	0	0	0	8,868	76,938
			201.51	*262.81*	*0.00*	*0.00*	*0.00*	*0.00*	*88.68*	*552.99*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,599	34,691	0	0	0	0	11,705	72,995
Quality Control On-Site	**1.00**	**LS**	**442,829**	**165,656**	**7,200**	**0**	**0**	**0**	**213,406**	**829,091**
			12,300.80	*4,601.55*	*200.00*	*0.00*	*0.00*	*0.00*	*5,927.95*	*23,030.30*
USR Quality Control	36.00	MO	442,829	165,656	7,200	0	0	0	213,406	829,091
			91.35	*134.23*	*1,800.00*	*0.00*			*41.01*	*2,066.60*
CZ67	**703.00**	**TON**	**64,222**	**94,367**	**1,265,400**	**0**	**0**	**0**	**28,831**	**1,452,821**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			91.35	*134.23*	*1,800.00*	*0.00*	*0.00*	*0.00*	*41.01*	*2,066.60*
USR Marine Sheet piling, steel, 38 psf, 40' excavation, left in place, excludes wales	703.00	TON	64,222	94,367	1,265,400	0	0	0	28,831	1,452,821
(Note: Modified for Marine Plant)										
Wier Structure & Walkway	**1.00**	**LS**	**0**	**0**	**0**	**0**	**115,000**	**0**	**0**	**115,000**
USR Wier Structure & Walkway	1.00	LS	0	0	0	0	115,000	0	0	115,000
(Note: Assume this wier to be constructed to handle future expansion of the CDF. From Cleveland 10b adjusted to current price levels. Leave contractor unassigned as bid abstract contains OH & P)										
Fish Removal	**1.00**	**LS**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			3.28	*5.97*	*57.25*	*0.00*			*1.36*	*67.85*
Type A	**78,430.00**	**TON**	**257,253**	**468,021**	**4,490,118**	**0**	**0**	**0**	**106,465**	**5,321,857**
			1.53	*1.99*	*57.25*	*0.00*	*0.00*	*0.00*	*0.67*	*61.44*
USR Type A Armor Stone (5 ton to 10 ton)	78,430.00	TON	119,731	156,151	4,490,118	0	0	0	52,688	4,818,688
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	78,430.00	TON	137,523	311,870	0	0	0	0	53,777	503,169
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.94	*5.52*	*52.32*	*0.00*			*1.21*	*61.99*
Type B	**53,382.00**	**TON**	**156,879**	**294,793**	**2,792,946**	**0**	**0**	**0**	**64,448**	**3,309,066**
			1.19	*1.55*	*52.32*	*0.00*	*0.00*	*0.00*	*0.52*	*55.57*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	53,382.00	TON	63,277	82,525	2,792,946	0	0	0	27,845	2,966,593
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	53,382.00	TON	93,602	212,269	0	0	0	0	36,602	342,473
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.54	*5.01*	*26.71*	*0.00*			*1.03*	*35.29*
Type C	**152,172.00**	**TON**	**387,077**	**761,929**	**4,064,514**	**0**	**0**	**0**	**157,257**	**5,370,777**
			0.79	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.35*	*28.88*
USR Type C Stone	152,172.00	TON	120,252	156,831	4,064,514	0	0	0	52,918	4,394,514
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	152,172.00	TON	266,825	605,098	0	0	0	0	104,339	976,262
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.46	*4.90*	*7.63*	*0.00*			*1.00*	*15.99*
Type D	**50,635.00**	**TON**	**124,587**	**248,037**	**386,345**	**0**	**0**	**0**	**50,474**	**809,443**
			0.71	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.31*	*9.57*
USR Type D Stone	50,635.00	TON	35,802	46,692	386,345	0	0	0	15,755	484,593
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	50,635.00	TON	88,786	201,345	0	0	0	0	34,719	324,850
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.54	*5.01*	*26.71*	*0.00*			*1.03*	*35.29*
Type E	**47,281.00**	**TON**	**120,268**	**236,737**	**1,262,876**	**0**	**0**	**0**	**48,861**	**1,668,741**
			0.79	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.35*	*28.88*
USR Type C and E Stone	47,281.00	TON	37,363	48,729	1,262,876	0	0	0	16,442	1,365,409
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	47,281.00	TON	82,905	188,008	0	0	0	0	32,419	303,332
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.43	*4.85*	*7.63*	*0.00*			*0.98*	*15.89*
Type F	**2,542.00**	**TON**	**6,165**	**12,335**	**19,395**	**0**	**0**	**0**	**2,494**	**40,389**
			0.67	*0.88*	*7.63*	*0.00*	*0.00*	*0.00*	*0.30*	*9.47*
USR Type F Stone	2,542.00	TON	1,707	2,227	19,395	0	0	0	751	24,081
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	2,542.00	TON	4,457	10,108	0	0	0	0	1,743	16,308
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.69	*5.20*	*33.35*	*0.00*			*1.10*	*42.34*
Type H	**83,886.00**	**TON**	**225,712**	**436,104**	**2,797,598**	**0**	**0**	**0**	**92,116**	**3,551,530**
			0.94	*1.22*	*33.35*	*0.00*	*0.00*	*0.00*	*0.41*	*35.92*
USR Type H Stone	83,886.00	TON	78,623	102,539	2,797,598	0	0	0	34,598	3,013,358
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
USR Haul from Sandusky	83,886.00	TON	147,089	333,565	0	0	0	0	57,518	538,172
(Note: 2400 tons per trip, 24 hrs per trip)										
			1,128.95	*1,242.95*	*11,101.96*	*0.00*			*499.49*	*15,014.77*
PZC 13 Combi-wall	**4,500.00**	**LF**	**5,080,289**	**5,593,261**	**49,958,837**	**0**	**4,686,375**	**0**	**2,247,696**	**67,566,457**
(Note:)										
			6.15	*5.12*	*202.42*	*0.00*			*2.74*	*216.43*
C King Pile (Beam)	**105,672.00**	**LF**	**649,995**	**541,027**	**21,390,200**	**0**	**0**	**0**	**289,163**	**22,870,385**
(Note: Includes BBS-M and BBS-F King piles are 66 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)										
			0.00	*0.00*	*2,165.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,165.00*
USR Material Price King Pile & connectors	9,880.00	TON	0	0	21,390,200	0	0	0	0	21,390,200
(Note: Connectors welded to pile.)										
			6.15	*5.12*	*0.00*	*0.00*	*0.00*	*0.00*	*2.74*	*14.01*
USR King pile installation	105,672.00	LF	649,995	541,027	0	0	0	0	289,163	1,480,185
(Note: Say 1 pile at 66 ft per hour due to tolerances.)										
			172.75	*143.79*	*2,035.00*	*0.00*			*76.85*	*2,428.40*
C PZC 13	**9,880.00**	**TON**	**1,706,802**	**1,420,666**	**20,105,800**	**0**	**0**	**0**	**759,305**	**23,992,572**
(Note: SSP piles are 125-140 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)										
			172.75	*143.79*	*0.00*	*0.00*	*0.00*	*0.00*	*76.85*	*393.40*
USR Steel Sheet Pile Installation	9,880.00	TON	1,706,802	1,420,666	0	0	0	0	759,305	3,886,772
(Note: 125 -140 foot sheets approx 2 ft wide @ say 2.0 sheets per hour = 250-280 sf/hr Reduce crew output due to need to thread in SSP at both sides and tight tolerances.)										
			0.00	*0.00*	*2,035.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,035.00*
USR Material Price SSP	9,880.00	TON	0	0	20,105,800	0	0	0	0	20,105,800
			1,408.84	*1,198.28*	*6,500.00*	*0.00*			*631.22*	*9,738.33*
C Tie Rods	**389.00**	**EA**	**548,039**	**466,129**	**2,528,500**	**0**	**0**	**0**	**245,543**	**3,788,211**
			0.87	*0.74*	*4.00*	*0.00*	*0.00*	*0.00*	*0.39*	*5.99*
USR Wale & Tie Rod installation	632,125.00	LB	548,039	466,129	2,528,500	0	0	0	245,543	3,788,211
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb ADJUST PRICE OF TIE RODS (DOUBLE THAT OF WALES).)										
			0.87	*0.74*	*2.00*	*0.00*			*0.39*	*3.99*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
C Wales	**1,179,001.56**	**LB**	**1,022,169**	**869,396**	**2,358,003**	**0**	**0**	**0**	**457,972**	**4,707,541**
			0.87	*0.74*	*2.00*	*0.00*	*0.00*	*0.00*	*0.39*	*3.99*
USR Wale & Tie Rod installation	1,179,001.56	LB	1,022,169	869,396	2,358,003	0	0	0	457,972	4,707,541
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb)										
			2.46	*4.90*	*7.63*	*0.00*			*1.06*	*16.05*
Granular Fill	**468,720.00**	**TON**	**1,153,284**	**2,296,042**	**3,576,334**	**0**	**0**	**0**	**495,712**	**7,521,372**
(Note: Use Type D material.)										
			0.71	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.31*	*9.57*
USR Type D Stone	468,720.00	TON	331,410	432,221	3,576,334	0	0	0	145,839	4,485,803
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.75*	*6.48*
USR Haul from Sandusky	468,720.00	TON	821,874	1,863,821	0	0	0	0	349,873	3,035,569
(Note: 2400 tons per trip, 24 hrs per trip)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*432.60*
C Concrete Cap	**10,833.04**	**CY**	**0**	**0**	**0**	**0**	**4,686,375**	**0**	**0**	**4,686,375**
			0.00	*0.00*	*0.00*	*0.00*	*412.00*	*0.00*	*0.00*	*412.00*
USR Concrete Cap	11,374.70	CY	0	0	0	0	4,686,375	0	0	4,686,375
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy Updated using ENR June 08 - June 07 = 1.03 = $412/cy (includes reinforcing and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH & Profit.)										
Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**0**	**250,000**	**0**	**250,000**
USR Mitagation	1.00	LS	0	0	0	0	0	250,000	0	250,000
(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)										
Cell 2	**1.00**	**LS**	**9,032,483**	**16,614,935**	**99,667,775**	**15,600**	**35,000**	**250,000**	**3,728,362**	**129,344,155**
(Note: Stone breakwater CDF.)										
General Conditions	**1.00**	**LS**	**527,035**	**247,586**	**31,600**	**15,600**	**0**	**0**	**252,138**	**1,073,959**
Temporary Office	**1.00**	**LS**	**16,773**	**0**	**14,400**	**15,600**	**0**	**0**	**8,098**	**54,871**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*224.95*	*790.87*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	0	8,098	28,471
Submittals	**1.00**	**LS**	**20,003**	**0**	**10,000**	**0**	**0**	**0**	**10,061**	**40,064**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			666.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*335.37*	*1,002.13*
USR Initial Project Submittals	30.00	DAY	20,003	0	0	0	0	0	10,061	30,064
Mob and Demob	**1.00**	**LS**	**47,430**	**81,930**	**0**	**0**	**0**	**0**	**20,573**	**149,933**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			157.81	*357.88*	*0.00*	*0.00*	*0.00*	*0.00*	*67.18*	*582.87*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	20,831	47,240	0	0	0	0	8,868	76,938
			201.51	*262.81*	*0.00*	*0.00*	*0.00*	*0.00*	*88.68*	*552.99*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,599	34,691	0	0	0	0	11,705	72,995
Quality Control On-Site	**1.00**	**LS**	**442,829**	**165,656**	**7,200**	**0**	**0**	**0**	**213,406**	**829,091**
			12,300.80	*4,601.55*	*200.00*	*0.00*	*0.00*	*0.00*	*5,927.95*	*23,030.30*
USR Quality Control	36.00	MO	442,829	165,656	7,200	0	0	0	213,406	829,091
			3.28	*5.97*	*57.25*	*0.00*			*1.36*	*67.85*
Type A	**446,199.00**	**TON**	**1,463,548**	**2,662,634**	**25,544,893**	**0**	**0**	**0**	**605,695**	**30,276,771**
			1.53	*1.99*	*57.25*	*0.00*	*0.00*	*0.00*	*0.67*	*61.44*
USR Type A Armor Stone (5 ton to 10 ton)	446,199.00	TON	681,163	888,365	25,544,893	0	0	0	299,751	27,414,173
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	446,199.00	TON	782,385	1,774,269	0	0	0	0	305,944	2,862,598
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.94	*5.52*	*52.32*	*0.00*			*1.21*	*61.99*
Type B	**479,241.00**	**TON**	**1,408,392**	**2,646,527**	**25,073,889**	**0**	**0**	**0**	**578,583**	**29,707,392**
			1.19	*1.55*	*52.32*	*0.00*	*0.00*	*0.00*	*0.52*	*55.57*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	479,241.00	TON	568,070	740,870	25,073,889	0	0	0	249,983	26,632,812

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	479,241.00	TON	840,322	1,905,657	0	0	0	0	328,600	3,074,580
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.54	*5.01*	*26.71*	*0.00*			*1.03*	*35.29*
Type C	**1,243,648.00**	**TON**	**3,163,442**	**6,226,974**	**33,217,838**	**0**	**0**	**0**	**1,285,206**	**43,893,461**
			0.79	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.35*	*28.88*
USR Type C Stone	1,243,648.00	TON	982,775	1,281,723	33,217,838	0	0	0	432,477	35,914,813
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	1,243,648.00	TON	2,180,668	4,945,251	0	0	0	0	852,729	7,978,647
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.46	*4.90*	*7.63*	*0.00*			*1.00*	*15.99*
Type D	**47,522.00**	**TON**	**116,928**	**232,788**	**362,593**	**0**	**0**	**0**	**47,370**	**759,679**
			0.71	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.31*	*9.57*
USR Type D Stone	47,522.00	TON	33,601	43,821	362,593	0	0	0	14,786	454,801
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	47,522.00	TON	83,327	188,967	0	0	0	0	32,584	304,878
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.54	*5.01*	*26.71*	*0.00*			*1.03*	*35.29*
Type E	**323,144.00**	**TON**	**821,975**	**1,617,989**	**8,631,176**	**0**	**0**	**0**	**333,942**	**11,405,083**
			0.79	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.35*	*28.88*
USR Type C and E Stone	323,144.00	TON	255,360	333,037	8,631,176	0	0	0	112,373	9,331,946
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	323,144.00	TON	566,615	1,284,952	0	0	0	0	221,569	2,073,136
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.43	*4.85*	*7.63*	*0.00*			*0.98*	*15.89*
Type F	**566,840.00**	**TON**	**1,374,669**	**2,750,552**	**4,324,989**	**0**	**0**	**0**	**556,214**	**9,006,424**
			0.67	*0.88*	*7.63*	*0.00*	*0.00*	*0.00*	*0.30*	*9.47*
USR Type F Stone	566,840.00	TON	380,746	496,565	4,324,989	0	0	0	167,550	5,369,851
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
USR Haul from Sandusky	566,840.00	TON	993,922	2,253,987	0	0	0	0	388,664	3,636,573
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.69	*5.20*	*33.35*	*0.00*			*1.10*	*42.34*
Type H	**7,642.00**	**TON**	**20,562**	**39,729**	**254,861**	**0**	**0**	**0**	**8,392**	**323,544**
			0.94	*1.22*	*33.35*	*0.00*	*0.00*	*0.00*	*0.41*	*35.92*
USR Type H Stone	7,642.00	TON	7,163	9,341	254,861	0	0	0	3,152	274,516
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.69*	*6.42*
USR Haul from Sandusky	7,642.00	TON	13,400	30,388	0	0	0	0	5,240	49,027
(Note: 2400 tons per trip, 24 hrs per trip)										
Weir and Walkway	**1.00**	**LS**	**16,531**	**14,710**	**4,037**	**0**	**0**	**0**	**7,217**	**42,495**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			15,072.96	*14,633.01*	*1,420.50*	*0.00*			*6,589.84*	*37,716.31*
Wier	**1.00**	**EA**	**15,073**	**14,633**	**1,421**	**0**	**0**	**0**	**6,590**	**37,716**
			16.75	*16.26*	*0.70*	*0.00*	*0.00*	*0.00*	*7.32*	*41.03*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	5,024	4,878	210	0	0	0	2,197	12,309
			2,512.16	*2,438.83*	*541.50*	*0.00*	*0.00*	*0.00*	*1,098.31*	*6,590.80*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,512	2,439	542	0	0	0	1,098	6,591
			418.69	*406.47*	*0.00*	*0.00*	*0.00*	*0.00*	*183.05*	*1,008.22*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,512	2,439	0	0	0	0	1,098	6,049
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			16.75	*16.26*	*0.03*	*0.00*	*0.00*	*0.00*	*7.32*	*40.36*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	5,024	4,878	9	0	0	0	2,197	12,108
			1,457.77	*77.29*	*2,616.00*	*0.00*			*627.51*	*4,778.57*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,458**	**77**	**2,616**	**0**	**0**	**0**	**628**	**4,779**
			9.02	*0.42*	*19.75*	*0.00*	*0.00*	*0.00*	*3.88*	*33.07*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	180	8	395	0	0	0	78	661
			2.41	*0.11*	*10.70*	*0.00*	*0.00*	*0.00*	*1.04*	*14.25*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	241	11	1,070	0	0	0	104	1,425
			30.18	*1.87*	*6.55*	*0.00*	*0.00*	*0.00*	*13.00*	*51.61*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	604	37	131	0	0	0	260	1,032
			28.87	*1.35*	*68.00*	*0.00*	*0.00*	*0.00*	*12.42*	*110.64*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	433	20	1,020	0	0	0	186	1,660
			91.35	*134.23*	*1,700.00*	*0.00*			*41.01*	*1,966.60*
CZ67	**1,307.00**	**TON**	**119,401**	**175,445**	**2,221,900**	**0**	**0**	**0**	**53,603**	**2,570,348**
			91.35	*134.23*	*1,700.00*	*0.00*	*0.00*	*0.00*	*41.01*	*1,966.60*
USR Marine Sheet piling, steel, 38 psf, 40' excavation, left in place, excludes wales	1,307.00	TON	119,401	175,445	2,221,900	0	0	0	53,603	2,570,348
(Note: Modified for Marine Plant. Sttel Sheet Pile price adjusted from $816.21 ton to more current prices of $1700/ton)										
Fish Removal	**1.00**	**LS**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**0**	**250,000**	**0**	**250,000**
USR Mitagation	1.00	LS	0	0	0	0	0	250,000	0	250,000

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost

(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)

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E55 CDF Back to Back Open Cell Plan4

This estimate is from sketches / drawings supplied by Mike Mohr. It is a revision to the 062008 local preferred plan. Due to the amount and lengths of steel LB Foster was contactred for a price quote on the steel. Stone prices are from J. Deans 2006 cost estimate and have been escaulated to acurrent price levels.

March 2009 Added Mitagation measures to each phase.

Estimated by	LRB jw
Designed by	LRB- ftl, mm
Prepared by	James Wryk
Preparation Date	8/29/2008
Effective Date of Pricing	8/29/2008
Estimated Construction Time	Days

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Date	Author	Note
6/18/2008	jw	It is anticipated that this CDF loction can be built almost entirly using land plant. Self unloaders hauling smaller core and granular fill may be utilized when possible.
6/24/2008	jw	Design from F. Lewandowski (SSP System) and stone cross section from M. Mohr. SSP system is a combi-wall system constinting of King Piles with SSP in between. King Piles @ approx. 66 feet and the SSP at approx 90 feet in length. It is questionable if the piles and the SSP can be purchased and transported in the lengths indicated. From Civil Structural- anticipate that these lengths can be purchased and transported to the job site either by truck, rail or barge. Stone Cross Section is the anticipated overall cross section of each section. The different types, sizes and layer thickness have not been developed as of the date of this estimate 6/24/2008. See next note on development of cost for the stone.
6/24/2008	jw	Stone Cost - Because only an overall cross section was developed at this stage of study for the stone portion (not the different types layer thickness and sizes, Estimating has attempted to develop one unit cost for the cost of stone by using Cleveland 10 B and the Cleveland DMMP Site 2 estimate and prorating the different stone amounts vs. the stone total and using that percentage multiplied by the cost of the stone. Adding up the percentage of the cost ves the total tonnage placed gives one overall cost of stone. LOW End Cost - Stone Costs from the Cleveland 10B CDF escalated to current price levels. A contingency cost is added to the stone cost as these costs seem on the low side as compared to current costs that are being received for various jobs due to the size of the job as well as fuel cost. High End Cost – Stone costs from Cleveland DMMP study developed in 2006. Price Quotes received for this study. Due to the amount of stone and the uncertinties to the design these cost from the suppliers contain contingencies. After reviewing the costs and how they were developed a composite cost for all stone was developed as described above. This was then inserted into the estimate. Contingencies were not added to the stone costs as was not in the earlier DMMP estimates because stone supply costs already contain contingencies. The rest of the estimate does contain contingencies to cover unknowns. Development of the estimate in this manner gives a range of costs that the project could fall between.
6/24/2008	jw	Estimate boken into 3 phases starting from the East and working to the west. Because the phases may be completed by different contracts, Mob/Demob, Wier Structure and fih removal is added to all phases of the estimate.
6/24/2008	jw	After the first estimate was developed a Direct Link method was used for the remaning estimate to speed up the development of the estimate. This however produces some unusual quantities such as a phase of construction with tie rods that are to the tenths of a tie rod. For this stage of study estimating did not go back in to address this issue.
6/24/2008	jw	Most of this cost estimate is taken from previous work such as the Cleveland 10B CDF estimate and the Cleveland DMMP Site #2 estimate. Therefore not a lot of detailed work has been completed. Most of estimate is previous wotk escluated to current price levels and for the stone a single cost developed as described in notes above.
6/24/2008	jw	Estimates DO NOT INCLUDE any dredging that may be required for realignment of the navigation channel that may become necessary due to this alternative.
12/30/2008	jw	This estimate is a modification of the original Back to Back estimate completed in August 2008. The original estimate could not be found and this was recreated from a copy of the combiwall estimate and the paper copy of the estimate in cost engineering files. Items have been reviewed and reestimated to better represent the design. Items also have been addressed to answer the Dr. Checks comments.

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Project Cost Summary Report			**190,842,871**	**47,585,718**	**238,428,589**
Plan4 Back to Back Cell Design	**1.00**	**LS**	**190,842,871**	**47,585,718**	**238,428,589**
Phase 1	**1.00**	**LS**	**88,526,229**	**22,089,891**	**110,616,120**
General Conditions	**1.00**	**EA**	*1,121,894.49* **1,121,894**	**280,474**	*1,402,368.11* **1,402,368**
Stone	**1.00**	**EA**	*37,214,094.22* **37,214,094**	**9,303,524**	*46,517,617.78* **46,517,618**
Wier Structure & Walkway	**1.00**	**LS**	**115,000**	**28,750**	**143,750**
Fish Removal	**1.00**	**EA**	*35,000.00* **35,000**	**8,750**	*43,750.00* **43,750**
Outfall Relocation	**2,670.00**	**LF**	*1,525.54* **4,073,192**	**1,018,298**	*1,906.93* **5,091,491**
Geotextile	**25,000.00**	**SY**	*6.10* **152,554**	**38,139**	*7.63* **190,693**
Open Cell Design	**2,887.00**	**LF**	*15,811.51* **45,647,827**	**11,411,957**	*19,764.39* **57,059,784**
Mitagation	**1.00**	**LS**	**166,667**	**0**	**166,667**
Phase 2	**1.00**	**LS**	**43,439,360**	**10,818,173**	**54,257,533**
General Conditions	**1.00**	**EA**	*1,121,894.49* **1,121,894**	**280,474**	*1,402,368.11* **1,402,368**
Outfall Relocation	**1,600.00**	**LF**	*1,250.00* **2,000,000**	**500,000**	*1,562.50* **2,500,000**
Stone	**1.00**	**EA**	*24,220,740.91* **24,220,741**	**6,055,185**	*30,275,926.14* **30,275,926**
Wier Structure & Walkway	**1.00**	**LS**	**140,350**	**35,087**	**175,437**
Fish Removal	**1.00**	**EA**	*42,715.13* **42,715**	**10,679**	*53,393.91* **53,394**
Open Cell Design	**955.00**	**LF**	*16,489.00* **15,746,993**	**3,936,748**	*20,611.25* **19,683,742**
Mitagation	**1.00**	**LS**	**166,666**	**0**	**166,666**
Phase 3	**1.00**	**LS**	**58,877,283**	**14,677,654**	**73,554,937**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			1,121,894.49		*1,402,368.11*
General Conditions	**1.00**	**EA**	**1,121,894**	**280,474**	**1,402,368**
			20,981,493.10		*26,226,866.38*
Stone	**1.00**	**EA**	**20,981,493**	**5,245,373**	**26,226,866**
Wier Structure & Walkway	**1.00**	**LS**	**140,350**	**35,087**	**175,437**
			42,715.13		*53,393.91*
Fish Removal	**1.00**	**EA**	**42,715**	**10,679**	**53,394**
			15,740.78		*19,675.97*
Open Cell Design	**2,314.00**	**LF**	**36,424,163**	**9,106,041**	**45,530,204**
Mitagation	**1.00**	**LS**	**166,667**	**0**	**166,667**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
Contract Cost Summary Report			**157,354,844**	**0**	**33,488,028**	**190,842,871**
Plan4 Back to Back Cell Design	**1.00**	**LS**	**157,354,844**	**0**	**33,488,028**	**190,842,871**
Phase 1	**1.00**	**LS**	**73,097,002**	**0**	**15,429,227**	**88,526,229**
General Conditions	**1.00**	**EA**	*919,259.98* **919,260**	**0**	**202,635**	*1,121,894.49* **1,121,894**
Stone	**1.00**	**EA**	*30,492,553.41* **30,492,553**	**0**	**6,721,541**	*37,214,094.22* **37,214,094**
Wier Structure & Walkway	**1.00**	**LS**	**115,000**	**0**	**0**	**115,000**
Fish Removal	**1.00**	**EA**	*35,000.00* **35,000**	**0**	**0**	*35,000.00* **35,000**
Outfall Relocation	**2,670.00**	**LF**	*1,250.00* **3,337,500**	**0**	**735,692**	*1,525.54* **4,073,192**
Geotextile	**25,000.00**	**SY**	*5.00* **125,000**	**0**	**27,554**	*6.10* **152,554**
Open Cell Design	**2,887.00**	**LF**	*13,129.90* **37,906,021**	**0**	**7,741,806**	*15,811.51* **45,647,827**
Mitagation	**1.00**	**LS**	**166,667**	**0**	**0**	**166,667**
Phase 2	**1.00**	**LS**	**35,984,762**	**0**	**7,454,598**	**43,439,360**
General Conditions	**1.00**	**EA**	*919,259.98* **919,260**	**0**	**202,635**	*1,121,894.49* **1,121,894**
Outfall Relocation	**1,600.00**	**LF**	*1,250.00* **2,000,000**	**0**	**0**	*1,250.00* **2,000,000**
Stone	**1.00**	**EA**	*19,846,035.53* **19,846,036**	**0**	**4,374,705**	*24,220,740.91* **24,220,741**
Wier Structure & Walkway	**1.00**	**LS**	**115,000**	**0**	**25,350**	**140,350**
Fish Removal	**1.00**	**EA**	*35,000.00* **35,000**	**0**	**7,715**	*42,715.13* **42,715**
Open Cell Design	**955.00**	**LF**	*13,510.79* **12,902,801**	**0**	**2,844,193**	*16,489.00* **15,746,993**
Mitagation	**1.00**	**LS**	**166,666**	**0**	**0**	**166,666**
Phase 3	**1.00**	**LS**	**48,273,080**	**0**	**10,604,203**	**58,877,283**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			919,259.98			*1,121,894.49*
General Conditions	**1.00**	**EA**	**919,260**	**0**	**202,635**	**1,121,894**
			17,191,854.66			*20,981,493.10*
Stone	**1.00**	**EA**	**17,191,855**	**0**	**3,789,638**	**20,981,493**
Wier Structure & Walkway	**1.00**	**LS**	**115,000**	**0**	**25,350**	**140,350**
			35,000.00			*42,715.13*
Fish Removal	**1.00**	**EA**	**35,000**	**0**	**7,715**	**42,715**
			12,897.71			*15,740.78*
Open Cell Design	**2,314.00**	**LF**	**29,845,298**	**0**	**6,578,865**	**36,424,163**
Mitagation	**1.00**	**LS**	**166,667**	**0**	**0**	**166,667**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
Project Direct Costs Report			**12,901,599**	**18,893,627**	**110,821,079**	**46,800**	**11,712,444**	**625,000**	**2,354,294**	**157,354,844**
Plan4 Back to Back Cell Design	**1.00**	**LS**	**12,901,599**	**18,893,627**	**110,821,079**	**46,800**	**11,712,444**	**625,000**	**2,354,294**	**157,354,844**
Phase 1	**1.00**	**LS**	**5,742,326**	**8,555,420**	**51,172,771**	**15,600**	**6,272,494**	**291,667**	**1,046,724**	**73,097,002**
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			525,539.40	*247,586.04*	*31,600.00*	*15,600.00*			*98,934.54*	*919,259.98*
General Conditions	**1.00**	**EA**	**525,539**	**247,586**	**31,600**	**15,600**	**0**	**0**	**98,935**	**919,260**
			16,773.12	*0.00*	*14,400.00*	*15,600.00*			*3,191.63*	*49,964.75*
Temporary Office	**1.00**	**EA**	**16,773**	**0**	**14,400**	**15,600**	**0**	**0**	**3,192**	**49,965**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*88.66*	*654.58*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	0	3,192	23,565
Submittals	**1.00**	**LS**	**20,003**	**0**	**10,000**	**0**	**0**	**0**	**3,857**	**33,860**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			666.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*128.56*	*795.32*
USR Initial Project Submittals	30.00	DAY	20,003	0	0	0	0	0	3,857	23,860
Mob and Demob	**1.00**	**LS**	**45,935**	**81,930**	**0**	**0**	**0**	**0**	**8,339**	**136,204**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			144.48	*357.88*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*528.56*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	47,240	0	0	0	0	3,459	69,770
			203.51	*262.81*	*0.00*	*0.00*	*0.00*	*0.00*	*36.97*	*503.29*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,863	34,691	0	0	0	0	4,881	66,434
			442,828.80	*165,655.79*	*7,200.00*	*0.00*			*83,546.66*	*699,231.25*
Quality Control On-Site	**1.00**	**EA**	**442,829**	**165,656**	**7,200**	**0**	**0**	**0**	**83,547**	**699,231**
			12,300.80	*4,601.55*	*200.00*	*0.00*	*0.00*	*0.00*	*2,320.74*	*19,423.09*
USR Quality Control	36.00	MO	442,829	165,656	7,200	0	0	0	83,547	699,231
			2,195,380.67	*4,546,487.40*	*23,352,207.26*	*0.00*			*398,478.07*	*30,492,553.41*
Stone	**1.00**	**EA**	**2,195,381**	**4,546,487**	**23,352,207**	**0**	**0**	**0**	**398,478**	**30,492,553**
			2.81	*5.52*	*52.32*	*0.00*			*0.51*	*61.17*
Type B	**42,545.00**	**TON**	**119,683**	**234,948**	**2,225,954**	**0**	**0**	**0**	**21,726**	**2,602,311**
			1.21	*1.55*	*52.32*	*0.00*	*0.00*	*0.00*	*0.22*	*55.29*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	42,545.00	TON	51,384	65,771	2,225,954	0	0	0	9,339	2,352,449
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	42,545.00	TON	68,299	169,176	0	0	0	0	12,387	249,862
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.41	*5.01*	*26.71*	*0.00*			*0.44*	*34.57*
Type C	**650,166.00**	**TON**	**1,567,232**	**3,255,396**	**17,365,934**	**0**	**0**	**0**	**284,443**	**22,473,004**
			0.81	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.15*	*28.69*
USR Type C Stone	650,166.00	TON	523,498	670,071	17,365,934	0	0	0	95,145	18,654,649
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	650,166.00	TON	1,043,733	2,585,325	0	0	0	0	189,297	3,818,355
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.30	*4.85*	*7.63*	*0.00*			*0.42*	*15.20*
Type F	**128,300.00**	**TON**	**294,936**	**622,567**	**978,929**	**0**	**0**	**0**	**53,552**	**1,949,984**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.69	*0.88*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.33*
USR Type F Stone	128,300.00	TON	88,972	112,394	978,929	0	0	0	16,197	1,196,491
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	128,300.00	TON	205,964	510,173	0	0	0	0	37,355	753,492
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.56	*5.20*	*33.35*	*0.00*			*0.46*	*41.57*
Type H	**83,400.00**	**TON**	**213,530**	**433,577**	**2,781,390**	**0**	**0**	**0**	**38,758**	**3,467,254**
			0.95	*1.22*	*33.35*	*0.00*	*0.00*	*0.00*	*0.17*	*35.70*
USR Type H Stone	83,400.00	TON	79,645	101,945	2,781,390	0	0	0	14,475	2,977,455
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	83,400.00	TON	133,885	331,632	0	0	0	0	24,282	489,799
(Note: 2400 tons per trip, 24 hrs per trip)										
Wier Structure & Walkway	**1.00**	**LS**	**0**	**0**	**0**	**0**	**115,000**	**0**	**0**	**115,000**
USR Wier Structure & Walkway	1.00	LS	0	0	0	0	115,000	0	0	115,000
(Note: Assume this wier to be constructed to handle future expansion of the CDF. From Cleveland 10b adjusted to current price levels. Leave contractor unassigned as bid abstract contains OH & P)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**2,670.00**	**LF**	**0**	**0**	**0**	**0**	**3,337,500**	**0**	**0**	**3,337,500**
(Note: Relocated First Energy Outfall 002 & 003. Outfalls to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	2,670.00	LF	0	0	0	0	3,337,500	0	0	3,337,500
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date.)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*5.00*
Geotextile	**25,000.00**	**SY**	**0**	**0**	**0**	**0**	**0**	**125,000**	**0**	**125,000**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*	*5.00*	*0.00*	*5.00*
USR Geotextile	25,000.00	SY	0	0	0	0	0	125,000	0	125,000
			1,046.56	*1,302.86*	*9,625.55*	*0.00*			*190.27*	*13,129.90*
Open Cell Design	**2,887.00**	**LF**	**3,021,406**	**3,761,346**	**27,788,964**	**0**	**2,784,994**	**0**	**549,312**	**37,906,021**
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*433.13*
Concrete	**6,430.00**	**CY**	**0**	**0**	**0**	**0**	**2,784,994**	**0**	**0**	**2,784,994**
			0.00	*0.00*	*0.00*	*0.00*	*412.50*	*0.00*	*0.00*	*412.50*
USR Concrete Cap	6,751.50	CY	0	0	0	0	2,784,994	0	0	2,784,994
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy updated using ENR June 08 - June 07 = 1.03 =$412/cy (includes reinforcement and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH&P.)										
			2,072,497.92	*1,762,743.38*	*24,675,924.00*	*0.00*			*377,099.52*	*28,888,264.82*
Steel	**1.00**	**EA**	**2,072,498**	**1,762,743**	**24,675,924**	**0**	**0**	**0**	**377,100**	**28,888,265**
			0.00	*0.00*	*2,298.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,298.00*
USR Material Price Open Cell	10,738.00	TON	0	0	24,675,924	0	0	0	0	24,675,924
			193.01	*164.16*	*0.00*	*0.00*	*0.00*	*0.00*	*35.12*	*392.28*
USR Steel Sheet Pile Installation	10,738.00	TON	2,072,498	1,762,743	0	0	0	0	377,100	4,212,341
			2.33	*4.90*	*7.63*	*0.00*			*0.42*	*15.28*
Granular Fill	**408,000.00**	**TON**	**948,908**	**1,998,603**	**3,113,040**	**0**	**0**	**0**	**172,212**	**6,232,763**
			0.72	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.40*
USR Type D Stone	408,000.00	TON	293,932	376,229	3,113,040	0	0	0	53,422	3,836,623
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	408,000.00	TON	654,976	1,622,374	0	0	0	0	118,790	2,396,140
(Note: 2400 tons per trip, 24 hrs per trip)										
Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**0**	**166,667**	**0**	**166,667**
USR Mitagation	1.00	LS	0	0	0	0	0	166,667	0	166,667
(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)										
Phase 2	**1.00**	**LS**	**2,995,448**	**4,516,608**	**24,644,967**	**15,600**	**3,097,925**	**166,666**	**547,548**	**35,984,762**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			525,539.40	*247,586.04*	*31,600.00*	*15,600.00*			*98,934.54*	*919,259.98*
General Conditions	**1.00**	**EA**	**525,539**	**247,586**	**31,600**	**15,600**	**0**	**0**	**98,935**	**919,260**
			16,773.12	*0.00*	*14,400.00*	*15,600.00*			*3,191.63*	*49,964.75*
Temporary Office	**1.00**	**EA**	**16,773**	**0**	**14,400**	**15,600**	**0**	**0**	**3,192**	**49,965**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*88.66*	*654.58*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	0	3,192	23,565
Submittals	**1.00**	**LS**	**20,003**	**0**	**10,000**	**0**	**0**	**0**	**3,857**	**33,860**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			666.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*128.56*	*795.32*
USR Initial Project Submittals	30.00	DAY	20,003	0	0	0	0	0	3,857	23,860
Mob and Demob	**1.00**	**LS**	**45,935**	**81,930**	**0**	**0**	**0**	**0**	**8,339**	**136,204**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			144.48	*357.88*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*528.56*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	47,240	0	0	0	0	3,459	69,770
			203.51	*262.81*	*0.00*	*0.00*	*0.00*	*0.00*	*36.97*	*503.29*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,863	34,691	0	0	0	0	4,881	66,434
			442,828.80	*165,655.79*	*7,200.00*	*0.00*			*83,546.66*	*699,231.25*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
Quality Control On-Site	**1.00**	**EA**	**442,829**	**165,656**	**7,200**	**0**	**0**	**0**	**83,547**	**699,231**
			12,300.80	*4,601.55*	*200.00*	*0.00*	*0.00*	*0.00*	*2,320.74*	*19,423.09*
USR Quality Control	36.00	MO	442,829	165,656	7,200	0	0	0	83,547	699,231
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**1,600.00**	**LF**	**0**	**0**	**0**	**0**	**2,000,000**	**0**	**0**	**2,000,000**
(Note: Relocated First Energy Outfall 203. Outfall to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	1,600.00	LF	0	0	0	0	2,000,000	0	0	2,000,000
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date.)										
			1,441,424.68	*2,988,612.28*	*15,154,370.00*	*0.00*			*261,628.57*	*19,846,035.53*
Stone	**1.00**	**EA**	**1,441,425**	**2,988,612**	**15,154,370**	**0**	**0**	**0**	**261,629**	**19,846,036**
			2.81	*5.52*	*52.32*	*0.00*			*0.51*	*61.17*
Type B	**26,650.00**	**TON**	**74,969**	**147,170**	**1,394,328**	**0**	**0**	**0**	**13,609**	**1,630,076**
			1.21	*1.55*	*52.32*	*0.00*	*0.00*	*0.00*	*0.22*	*55.29*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	26,650.00	TON	32,187	41,199	1,394,328	0	0	0	5,850	1,473,564
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	26,650.00	TON	42,782	105,971	0	0	0	0	7,759	156,513
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.41	*5.01*	*26.71*	*0.00*			*0.44*	*34.57*
Type C	**453,600.00**	**TON**	**1,093,407**	**2,271,186**	**12,115,656**	**0**	**0**	**0**	**198,447**	**15,678,695**
			0.81	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.15*	*28.69*
USR Type C Stone	453,600.00	TON	365,228	467,487	12,115,656	0	0	0	66,380	13,014,751
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	453,600.00	TON	728,179	1,803,698	0	0	0	0	132,067	2,663,944
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.30	*4.85*	*7.63*	*0.00*			*0.42*	*15.20*
Type F	**85,700.00**	**TON**	**197,007**	**415,853**	**653,891**	**0**	**0**	**0**	**35,771**	**1,302,522**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.69	*0.88*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.33*
USR Type F Stone	85,700.00	TON	59,430	75,075	653,891	0	0	0	10,819	799,215
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	85,700.00	TON	137,577	340,778	0	0	0	0	24,952	503,307
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.56	*5.20*	*33.35*	*0.00*			*0.46*	*41.57*
Type H	**29,700.00**	**TON**	**76,041**	**154,403**	**990,495**	**0**	**0**	**0**	**13,802**	**1,234,742**
			0.95	*1.22*	*33.35*	*0.00*	*0.00*	*0.00*	*0.17*	*35.70*
USR Type H Stone	29,700.00	TON	28,363	36,304	990,495	0	0	0	5,155	1,060,317
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	29,700.00	TON	47,678	118,099	0	0	0	0	8,647	174,425
(Note: 2400 tons per trip, 24 hrs per trip)										
Wier Structure & Walkway	**1.00**	**LS**	**0**	**0**	**0**	**0**	**115,000**	**0**	**0**	**115,000**
USR Wier Structure & Walkway	1.00	LS	0	0	0	0	115,000	0	0	115,000
(Note: Assume this wier to be constructed to handle future expansion of the CDF. From Cleveland 10b adjusted to current price levels. Leave contractor unassigned as bid abstract contains OH & P)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			1,076.95	*1,340.74*	*9,904.71*	*0.00*			*195.80*	*13,510.79*
Open Cell Design	**955.00**	**LF**	**1,028,484**	**1,280,409**	**9,458,997**	**0**	**947,925**	**0**	**186,985**	**12,902,801**
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*433.04*
Concrete	**2,189.00**	**CY**	**0**	**0**	**0**	**0**	**947,925**	**0**	**0**	**947,925**
			0.00	*0.00*	*0.00*	*0.00*	*412.50*	*0.00*	*0.00*	*412.50*
USR Concrete Cap	2,298.00	CY	0	0	0	0	947,925	0	0	947,925
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy updated using ENR June 08 - June 07 = 1.03 =$412/cy (includes reinforcement and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH&P.)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			193.01	*164.16*	*2,298.00*	*0.00*			*35.12*	*2,690.28*
Steel	**3,655.00**	**TON**	**705,437**	**600,003**	**8,399,190**	**0**	**0**	**0**	**128,357**	**9,832,986**
			0.00	*0.00*	*2,298.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,298.00*
USR Material Price Open Cell	3,655.00	TON	0	0	8,399,190	0	0	0	0	8,399,190
			193.01	*164.16*	*0.00*	*0.00*	*0.00*	*0.00*	*35.12*	*392.28*
USR Steel Sheet Pile Installation	3,655.00	TON	705,437	600,003	0	0	0	0	128,357	1,433,796
			2.33	*4.90*	*7.63*	*0.00*			*0.42*	*15.28*
Granular Fill	**138,900.00**	**TON**	**323,047**	**680,407**	**1,059,807**	**0**	**0**	**0**	**58,628**	**2,121,889**
			0.72	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.40*
USR Type D Stone	138,900.00	TON	100,066	128,084	1,059,807	0	0	0	18,187	1,306,144
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	138,900.00	TON	222,981	552,323	0	0	0	0	40,441	815,745
(Note: 2400 tons per trip, 24 hrs per trip)										
Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**0**	**166,666**	**0**	**166,666**
USR Mitagation	1.00	LS	0	0	0	0	0	166,666	0	166,666
(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)										
Phase 3	**1.00**	**LS**	**4,163,826**	**5,821,600**	**35,003,340**	**15,600**	**2,342,025**	**166,667**	**760,022**	**48,273,080**
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			525,539.40	*247,586.04*	*31,600.00*	*15,600.00*			*98,934.54*	*919,259.98*
General Conditions	**1.00**	**EA**	**525,539**	**247,586**	**31,600**	**15,600**	**0**	**0**	**98,935**	**919,260**
			16,773.12	*0.00*	*14,400.00*	*15,600.00*			*3,191.63*	*49,964.75*
Temporary Office	**1.00**	**EA**	**16,773**	**0**	**14,400**	**15,600**	**0**	**0**	**3,192**	**49,965**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			465.92	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*88.66*	*654.58*
USR Janitorial	36.00	MO	16,773	0	3,600	0	0	0	3,192	23,565
Submittals	**1.00**	**LS**	**20,003**	**0**	**10,000**	**0**	**0**	**0**	**3,857**	**33,860**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			666.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*128.56*	*795.32*
USR Initial Project Submittals	30.00	DAY	20,003	0	0	0	0	0	3,857	23,860
Mob and Demob	**1.00**	**LS**	**45,935**	**81,930**	**0**	**0**	**0**	**0**	**8,339**	**136,204**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			144.48	*357.88*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*528.56*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	47,240	0	0	0	0	3,459	69,770
			203.51	*262.81*	*0.00*	*0.00*	*0.00*	*0.00*	*36.97*	*503.29*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,863	34,691	0	0	0	0	4,881	66,434
			442,828.80	*165,655.79*	*7,200.00*	*0.00*			*83,546.66*	*699,231.25*
Quality Control On-Site	**1.00**	**EA**	**442,829**	**165,656**	**7,200**	**0**	**0**	**0**	**83,547**	**699,231**
			12,300.80	*4,601.55*	*200.00*	*0.00*	*0.00*	*0.00*	*2,320.74*	*19,423.09*
USR Quality Control	36.00	MO	442,829	165,656	7,200	0	0	0	83,547	699,231
			1,259,365.30	*2,612,587.36*	*13,091,318.00*	*0.00*			*228,584.00*	*17,191,854.66*
Stone	**1.00**	**EA**	**1,259,365**	**2,612,587**	**13,091,318**	**0**	**0**	**0**	**228,584**	**17,191,855**
			2.81	*5.52*	*52.32*	*0.00*			*0.51*	*61.17*
Type B	**20,600.00**	**TON**	**57,950**	**113,760**	**1,077,792**	**0**	**0**	**0**	**10,520**	**1,260,021**
			1.21	*1.55*	*52.32*	*0.00*	*0.00*	*0.00*	*0.22*	*55.29*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	20,600.00	TON	24,880	31,846	1,077,792	0	0	0	4,522	1,139,040
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
USR Haul from Sandusky	20,600.00	TON	33,070	81,914	0	0	0	0	5,998	120,982
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.41	*5.01*	*26.71*	*0.00*			*0.44*	*34.57*
Type C	**397,100.00**	**TON**	**957,213**	**1,988,289**	**10,606,541**	**0**	**0**	**0**	**173,728**	**13,725,771**
			0.81	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.15*	*28.69*
USR Type C Stone	397,100.00	TON	319,736	409,258	10,606,541	0	0	0	58,112	11,393,646
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	397,100.00	TON	637,478	1,579,031	0	0	0	0	115,617	2,332,126
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.30	*4.85*	*7.63*	*0.00*			*0.42*	*15.20*
Type F	**79,500.00**	**TON**	**182,755**	**385,768**	**606,585**	**0**	**0**	**0**	**33,183**	**1,208,291**
			0.69	*0.88*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.33*
USR Type F Stone	79,500.00	TON	55,131	69,644	606,585	0	0	0	10,036	741,396
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	79,500.00	TON	127,624	316,124	0	0	0	0	23,147	466,895
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.56	*5.20*	*33.35*	*0.00*			*0.46*	*41.57*
Type H	**24,000.00**	**TON**	**61,447**	**124,770**	**800,400**	**0**	**0**	**0**	**11,153**	**997,771**
			0.95	*1.22*	*33.35*	*0.00*	*0.00*	*0.00*	*0.17*	*35.70*
USR Type H Stone	24,000.00	TON	22,919	29,337	800,400	0	0	0	4,166	856,822
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	24,000.00	TON	38,528	95,434	0	0	0	0	6,988	140,949
(Note: 2400 tons per trip, 24 hrs per trip)										
Wier Structure & Walkway	**1.00**	**LS**	**0**	**0**	**0**	**0**	**115,000**	**0**	**0**	**115,000**
USR Wier Structure & Walkway	1.00	LS	0	0	0	0	115,000	0	0	115,000

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: Assume this wier to be constructed to handle future expansion of the CDF. From Cleveland 10b adjusted to current price levels. Leave contractor unassigned as bid abstract contains OH & P)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			1,028.06	*1,279.79*	*9,455.67*	*0.00*			*186.91*	*12,897.71*
Open Cell Design	**2,314.00**	**LF**	**2,378,921**	**2,961,427**	**21,880,422**	**0**	**2,192,025**	**0**	**432,504**	**29,845,298**
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*433.12*
Concrete	**5,061.00**	**CY**	**0**	**0**	**0**	**0**	**2,192,025**	**0**	**0**	**2,192,025**
			0.00	*0.00*	*0.00*	*0.00*	*412.50*	*0.00*	*0.00*	*412.50*
USR Concrete Cap	5,314.00	CY	0	0	0	0	2,192,025	0	0	2,192,025
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy updated using ENR June 08 - June 07 = 1.03 =$412/cy (includes reinforcement and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH&P.)										
			193.01	*164.16*	*2,298.00*	*0.00*			*35.12*	*2,690.28*
Steel	**8,455.00**	**TON**	**1,631,865**	**1,387,968**	**19,429,590**	**0**	**0**	**0**	**296,925**	**22,746,347**
			0.00	*0.00*	*2,298.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,298.00*
USR Material Price Open Cell	8,455.00	TON	0	0	19,429,590	0	0	0	0	19,429,590
			193.01	*164.16*	*0.00*	*0.00*	*0.00*	*0.00*	*35.12*	*392.28*
USR Steel Sheet Pile Installation	8,455.00	TON	1,631,865	1,387,968	0	0	0	0	296,925	3,316,757
			2.33	*4.90*	*7.63*	*0.00*			*0.42*	*15.28*
Granular Fill	**321,210.00**	**TON**	**747,056**	**1,573,459**	**2,450,832**	**0**	**0**	**0**	**135,579**	**4,906,926**
			0.72	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.40*
USR Type D Stone	321,210.00	TON	231,406	296,197	2,450,832	0	0	0	42,058	3,020,494
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*5.87*
USR Haul from Sandusky	321,210.00	TON	515,649	1,277,262	0	0	0	0	93,521	1,886,432
(Note: 2400 tons per trip, 24 hrs per trip)										
Mitagation	**1.00**	**LS**	**0**	**0**	**0**	**0**	**0**	**166,667**	**0**	**166,667**
USR Mitagation	1.00	LS	0	0	0	0	0	166,667	0	166,667
(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)										

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E55 CDF local prefered alternative(Plan4a)REVISED March 2009

This estimate is from sketches / drawings supplied by Mike Mohr. It is a revision to the 062008 local preferred plan. Due to the amount and lengths of steel LB Foster was contacted for a price quote on the steel. Stone prices are from J. Deans 2006 cost estimate and have been escalated to current price levels.

Estimated by	LRB jw
Designed by	LRB- ftl, mm
Prepared by	James Wryk
Preparation Date	8/19/2008
Effective Date of Pricing	8/19/2008
Estimated Construction Time	Days

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Date	Author	Note
6/18/2008	jw	It is anticipated that this CDF loction will be built using marine equipment due to the size of the structure. (Due not want equipment on wall if a storm comes up). Self unloaders hauling smaller core and granular fill may be utilized when possible. Larger stone will be hauled from Sandusky OH.
6/24/2008	jw	Design from F. Lewandowski (SSP System) and stone cross section from M. Mohr. SSP system is a combi-wall system constinting of King Piles with SSP in between. King Piles @ approx. 66 feet and the SSP at approx 125 feet in lengthon the lake side and 140 feet on the CDF side. It is questionable if the piles and the SSP can be purchased and transported in the lengths indicated. From Civil Structural- anticipate that these lengths can be purchased and transported to the job site either by truck, rail or barge for this stae of study.
6/24/2008	jw	Stone costs from Cleveland DMMP study developed in 2006. Price Quotes received for this study.
6/24/2008	jw	Estimate broken into 3 phases starting from the East and working to the west. Because the phases may be completed by different contracts, Mob/Demob, Wier Structure and fish removal is added to all phases of the estimate.
6/24/2008	jw	Most of this cost estimate is taken from previous work such as the Cleveland 10B CDF estimate and the Cleveland DMMP Site #2 estimate. Therefore not a lot of detailed work has been completed. Most of estimate is previous wotk escalated to current price levels and for the stone a single cost developed as described in notes above.
6/24/2008	jw	Estimates DO NOT INCLUDE any dredging that may be required for realignment of the navigation channel that may become necessary due to this alternative.
9/8/2008	jw	Revised estimate include new labor rates and esculated stone price quotes to current (4th Qtr FY08) dollars. Estimate NOT escaluated to Future $$.
9/9/2008	jw	15% contingency has been added to this estimate. In addition the price quote from the quarry is on the conservative side not only because of the opening of a new section of quarry but for the uncertainties in the design at the time of the price quote.
12/29/2008	jw	Contingencies updated based on Cost Risk Analysis worked up by Walla Walla District. Equipment Rates updated to latest database Labor Rates updated to latest labor rates

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
Project Cost Summary Report			**227,241,455**	**50,245,906**	**277,487,361**
Phase 1	**1.00**	**LS**	**106,312,188**	**23,521,847**	**129,834,035**
			995,767.57		*1,216,429.67*
General Conditions	**1.00**	**EA**	**995,768**	**220,662**	**1,216,430**
			57,378.45		*70,093.51*
Temporary Office	**1.00**	**EA**	**57,378**	**12,715**	**70,094**
Submittals	**1.00**	**LS**	**39,178**	**8,682**	**47,859**
Mob and Demob	**1.00**	**LS**	**168,327**	**37,301**	**205,628**
			730,884.75		*892,848.81*
Quality Control On-Site	**1.00**	**EA**	**730,885**	**161,964**	**892,849**
			20,719.22		*25,310.60*
PZC 13 Combi-wall	**2,887.00**	**LF**	**59,816,384**	**13,255,311**	**73,071,695**
			325.64		*397.80*
C King Pile (Beam)	**69,384.00**	**LF**	**22,594,070**	**5,006,846**	**27,600,916**
			2,909.45		*3,554.19*
C PZC 13	**6,304.00**	**TON**	**18,341,200**	**4,064,410**	**22,405,610**
			11,427.32		*13,959.62*
C Tie Rods	**236.00**	**EA**	**2,696,848**	**597,621**	**3,294,469**
			4.59		*5.61*
C Wales	**756,395.00**	**LB**	**3,472,885**	**769,591**	**4,242,477**
			432.60		*528.46*
C Concrete Cap	**6,950.00**	**CY**	**3,006,570**	**666,256**	**3,672,826**
			18.84		*23.02*
Granular Fill	**515,000.00**	**TON**	**9,704,811**	**2,150,586**	**11,855,397**
Stone	**1.00**	**LS**	**34,668,296**	**7,682,494**	**42,350,790**
			74.86		*91.45*
Type B	**42,545.00**	**TON**	**3,184,839**	**705,760**	**3,890,599**
			42.39		*51.79*
Type C	**650,166.00**	**TON**	**27,562,972**	**6,107,955**	**33,670,926**
			18.76		*22.92*
Type F	**128,300.00**	**TON**	**2,406,737**	**533,333**	**2,940,070**
			50.95		*62.24*
Type H	**29,712.00**	**TON**	**1,513,748**	**335,447**	**1,849,195**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			45,077.32		*55,066.46*
Weir and Walkway	**1.00**	**EA**	**45,077**	**9,989**	**55,066**
			40,756.60		*49,788.26*
Wier	**1.00**	**EA**	**40,757**	**9,032**	**49,788**
			4,320.73		*5,278.20*
Walkway, Railing and Ladder	**1.00**	**EA**	**4,321**	**957**	**5,278**
			35,000.00		*42,756.00*
Fish Removal	**1.00**	**EA**	**35,000**	**7,756**	**42,756**
			1,250.00		*1,527.00*
Outfall Relocation	**2,670.00**	**LF**	**3,337,500**	**739,590**	**4,077,090**
			8,476.63		*10,355.06*
Precast Igloo Units	**837.00**	**EA**	**7,094,943**	**1,572,239**	**8,667,183**
			8,183.56		*9,997.03*
Precast	**837.00**	**EA**	**6,849,637**	**1,517,880**	**8,367,517**
			293.08		*358.02*
Setting in place	**837.00**	**EA**	**245,306**	**54,360**	**299,666**
			6.10		*7.45*
Geotextile	**25,000.00**	**SY**	**152,552**	**33,806**	**186,358**
			166,667.00		*166,667.00*
Mitagation	**1.00**	**EA**	**166,667**	**0**	**166,667**
Phase 2	**1.00**	**LS**	**49,702,434**	**10,977,126**	**60,679,560**
			996,159.93		*1,216,908.97*
General Conditions	**1.00**	**EA**	**996,160**	**220,749**	**1,216,909**
			57,378.45		*70,093.51*
Temporary Office	**1.00**	**EA**	**57,378**	**12,715**	**70,094**
Submittals	**1.00**	**LS**	**39,178**	**8,682**	**47,859**
Mob and Demob	**1.00**	**LS**	**168,719**	**37,388**	**206,107**
			730,884.75		*892,848.81*
Quality Control On-Site	**1.00**	**EA**	**730,885**	**161,964**	**892,849**
			1,250.00		*1,527.00*
Outfall Relocation	**1,600.00**	**LF**	**2,000,000**	**443,200**	**2,443,200**
Stone	**1.00**	**LS**	**24,304,300**	**5,385,833**	**29,690,133**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			74.79		*91.36*
Type B	**26,650.00**	**TON**	**1,993,125**	**441,676**	**2,434,801**
			42.32		*51.70*
Type C	**453,600.00**	**TON**	**19,198,408**	**4,254,367**	**23,452,775**
			18.69		*22.83*
Type F	**85,700.00**	**TON**	**1,601,687**	**354,934**	**1,956,620**
			50.88		*62.15*
Type H	**29,700.00**	**TON**	**1,511,081**	**334,856**	**1,845,937**
			45,077.32		*55,066.46*
Weir and Walkway	**1.00**	**EA**	**45,077**	**9,989**	**55,066**
			40,756.60		*49,788.26*
Wier	**1.00**	**EA**	**40,757**	**9,032**	**49,788**
			4,320.73		*5,278.20*
Walkway, Railing and Ladder	**1.00**	**EA**	**4,321**	**957**	**5,278**
			35,000.00		*42,756.00*
Fish Removal	**1.00**	**EA**	**35,000**	**7,756**	**42,756**
			8,476.63		*10,355.06*
Precast Igloo Units	**288.00**	**EA**	**2,441,271**	**540,986**	**2,982,257**
			8,183.56		*9,997.03*
Precast	**288.00**	**EA**	**2,356,864**	**522,281**	**2,879,146**
			293.08		*358.02*
Setting in place	**288.00**	**EA**	**84,406**	**18,704**	**103,111**
			20,547.05		*25,100.27*
PZC 13 Combi-wall	**955.00**	**LF**	**19,622,428**	**4,348,330**	**23,970,758**
			325.64		*397.80*
C King Pile (Beam)	**22,951.76**	**LF**	**7,473,965**	**1,656,231**	**9,130,195**
			2,909.45		*3,554.19*
C PZC 13	**2,085.32**	**TON**	**6,067,144**	**1,344,479**	**7,411,624**
			11,427.32		*13,959.62*
C Tie Rods	**78.07**	**EA**	**892,099**	**197,689**	**1,089,788**
			4.59		*5.61*
C Wales	**250,210.33**	**LB**	**1,148,807**	**254,576**	**1,403,383**
			527.95		*644.95*
C Concrete Cap	**2,299.01**	**CY**	**1,213,769**	**268,971**	**1,482,740**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			18.84		*23.02*
Granular Fill	**150,000.00**	**TON**	**2,826,644**	**626,384**	**3,453,028**
			0.61		*0.75*
Geotextile	**150,000.00**	**SY**	**91,531**	**20,283**	**111,815**
			166,666.00		*166,666.00*
Mitagation	**1.00**	**EA**	**166,666**	**0**	**166,666**
Phase 3	**1.00**	**LS**	**71,226,834**	**15,746,933**	**86,973,766**
			996,159.93		*1,216,908.97*
General Conditions	**1.00**	**EA**	**996,160**	**220,749**	**1,216,909**
			57,378.45		*70,093.51*
Temporary Office	**1.00**	**EA**	**57,378**	**12,715**	**70,094**
Submittals	**1.00**	**LS**	**39,178**	**8,682**	**47,859**
Mob and Demob	**1.00**	**LS**	**168,719**	**37,388**	**206,107**
			730,884.75		*892,848.81*
Quality Control On-Site	**1.00**	**EA**	**730,885**	**161,964**	**892,849**
			21,054,611.14		*25,720,312.97*
Stone	**1.00**	**EA**	**21,054,611**	**4,665,702**	**25,720,313**
			74.79		*91.36*
Type B	**20,600.00**	**TON**	**1,540,652**	**341,408**	**1,882,060**
			42.32		*51.70*
Type C	**397,100.00**	**TON**	**16,807,072**	**3,724,447**	**20,531,519**
			18.69		*22.83*
Type F	**79,500.00**	**TON**	**1,485,812**	**329,256**	**1,815,068**
			50.88		*62.15*
Type H	**24,000.00**	**TON**	**1,221,076**	**270,590**	**1,491,666**
			35,000.00		*42,756.00*
Fish Removal	**1.00**	**EA**	**35,000**	**7,756**	**42,756**
			45,077.32		*55,066.46*
Weir and Walkway	**1.00**	**EA**	**45,077**	**9,989**	**55,066**
			40,756.60		*49,788.26*
Wier	**1.00**	**EA**	**40,757**	**9,032**	**49,788**
			4,320.73		*5,278.20*
Walkway, Railing and Ladder	**1.00**	**EA**	**4,321**	**957**	**5,278**

Description	Quantity	UOM	ContractCost	Contingency	ProjectCost
			8,476.63		*10,355.06*
Precast Igloo Units	**336.00**	**EA**	**2,848,149**	**631,150**	**3,479,299**
			8,183.56		*9,997.03*
Precast	**336.00**	**EA**	**2,749,675**	**609,328**	**3,359,003**
			293.08		*358.02*
Setting in place	**336.00**	**EA**	**98,474**	**21,822**	**120,296**
			19,518.52		*23,843.82*
PZC 13 Combi-wall	**2,314.00**	**LF**	**45,165,856**	**10,008,754**	**55,174,610**
			325.64		*397.80*
C King Pile (Beam)	**51,786.00**	**LF**	**16,863,492**	**3,736,950**	**20,600,441**
			2,893.03		*3,534.13*
C PZC 13	**5,052.81**	**TON**	**14,617,943**	**3,239,336**	**17,857,280**
			11,427.32		*13,959.62*
C Tie Rods	**189.16**	**EA**	**2,161,589**	**479,008**	**2,640,597**
			4.59		*5.61*
C Wales	**607,054.00**	**LB**	**2,787,206**	**617,645**	**3,404,851**
			527.95		*644.95*
C Concrete Cap	**5,570.59**	**CY**	**2,941,006**	**651,727**	**3,592,733**
			18.84		*23.02*
Granular Fill	**307,500.00**	**TON**	**5,794,620**	**1,284,088**	**7,078,708**
			61.02		*74.54*
Geotextile	**15,000.00**	**SY**	**915,312**	**202,833**	**1,118,146**
			166,667.00		*166,667.00*
Mitagation	**1.00**	**EA**	**166,667**	**0**	**166,667**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
Contract Cost Summary Report			**187,816,186**	**0**	**39,425,269**	**227,241,455**
Phase 1	**1.00**	**LS**	**88,293,606**	**0**	**18,018,581**	**106,312,188**
			815,924.36			*995,767.57*
General Conditions	**1.00**	**EA**	**815,924**	**0**	**179,843**	**995,768**
			47,015.46			*57,378.45*
Temporary Office	**1.00**	**EA**	**47,015**	**0**	**10,363**	**57,378**
Submittals	**1.00**	**LS**	**32,102**	**0**	**7,076**	**39,178**
Mob and Demob	**1.00**	**LS**	**137,926**	**0**	**30,401**	**168,327**
			598,881.40			*730,884.75*
Quality Control On-Site	**1.00**	**EA**	**598,881**	**0**	**132,003**	**730,885**
			17,165.26			*20,719.22*
PZC 13 Combi-wall	**2,887.00**	**LF**	**49,556,099**	**0**	**10,260,285**	**59,816,384**
			266.83			*325.64*
C King Pile (Beam)	**69,384.00**	**LF**	**18,513,409**	**0**	**4,080,661**	**22,594,070**
			2,383.98			*2,909.45*
C PZC 13	**6,304.00**	**TON**	**15,028,640**	**0**	**3,312,561**	**18,341,200**
			9,363.46			*11,427.32*
C Tie Rods	**236.00**	**EA**	**2,209,777**	**0**	**487,071**	**2,696,848**
			3.76			*4.59*
C Wales	**756,395.00**	**LB**	**2,845,656**	**0**	**627,230**	**3,472,885**
			432.60			*432.60*
C Concrete Cap	**6,950.00**	**CY**	**3,006,570**	**0**	**0**	**3,006,570**
			15.44			*18.84*
Granular Fill	**515,000.00**	**TON**	**7,952,048**	**0**	**1,752,763**	**9,704,811**
Stone	**1.00**	**LS**	**28,406,937**	**0**	**6,261,359**	**34,668,296**
			61.34			*74.86*
Type B	**42,545.00**	**TON**	**2,609,633**	**0**	**575,206**	**3,184,839**
			34.74			*42.39*
Type C	**650,166.00**	**TON**	**22,584,889**	**0**	**4,978,083**	**27,562,972**
			15.37			*18.76*
Type F	**128,300.00**	**TON**	**1,972,062**	**0**	**434,675**	**2,406,737**
			41.75			*50.95*
Type H	**29,712.00**	**TON**	**1,240,354**	**0**	**273,394**	**1,513,748**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			36,936.02			*45,077.32*
Weir and Walkway	**1.00**	**EA**	**36,936**	**0**	**8,141**	**45,077**
			33,395.64			*40,756.60*
Wier	**1.00**	**EA**	**33,396**	**0**	**7,361**	**40,757**
			3,540.37			*4,320.73*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,540**	**0**	**780**	**4,321**
			35,000.00			*35,000.00*
Fish Removal	**1.00**	**EA**	**35,000**	**0**	**0**	**35,000**
			1,250.00			*1,250.00*
Outfall Relocation	**2,670.00**	**LF**	**3,337,500**	**0**	**0**	**3,337,500**
			6,945.69			*8,476.63*
Precast Igloo Units	**837.00**	**EA**	**5,813,543**	**0**	**1,281,401**	**7,094,943**
			6,705.54			*8,183.56*
Precast	**837.00**	**EA**	**5,612,541**	**0**	**1,237,097**	**6,849,637**
			240.15			*293.08*
Setting in place	**837.00**	**EA**	**201,002**	**0**	**44,304**	**245,306**
			5.00			*6.10*
Geotextile	**25,000.00**	**SY**	**125,000**	**0**	**27,552**	**152,552**
			166,667.00			*166,667.00*
Mitagation	**1.00**	**EA**	**166,667**	**0**	**0**	**166,667**
Phase 2	**1.00**	**LS**	**41,123,433**	**0**	**8,579,001**	**49,702,434**
			816,245.85			*996,159.93*
General Conditions	**1.00**	**EA**	**816,246**	**0**	**179,914**	**996,160**
			47,015.46			*57,378.45*
Temporary Office	**1.00**	**EA**	**47,015**	**0**	**10,363**	**57,378**
Submittals	**1.00**	**LS**	**32,102**	**0**	**7,076**	**39,178**
Mob and Demob	**1.00**	**LS**	**138,247**	**0**	**30,472**	**168,719**
			598,881.40			*730,884.75*
Quality Control On-Site	**1.00**	**EA**	**598,881**	**0**	**132,003**	**730,885**
			1,250.00			*1,250.00*
Outfall Relocation	**1,600.00**	**LF**	**2,000,000**	**0**	**0**	**2,000,000**
Stone	**1.00**	**LS**	**19,914,758**	**0**	**4,389,542**	**24,304,300**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			61.28			*74.79*
Type B	**26,650.00**	**TON**	**1,633,151**	**0**	**359,973**	**1,993,125**
			34.68			*42.32*
Type C	**453,600.00**	**TON**	**15,731,029**	**0**	**3,467,379**	**19,198,408**
			15.31			*18.69*
Type F	**85,700.00**	**TON**	**1,312,410**	**0**	**289,277**	**1,601,687**
			41.69			*50.88*
Type H	**29,700.00**	**TON**	**1,238,168**	**0**	**272,913**	**1,511,081**
			36,936.02			*45,077.32*
Weir and Walkway	**1.00**	**EA**	**36,936**	**0**	**8,141**	**45,077**
			33,395.64			*40,756.60*
Wier	**1.00**	**EA**	**33,396**	**0**	**7,361**	**40,757**
			3,540.37			*4,320.73*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,540**	**0**	**780**	**4,321**
			35,000.00			*35,000.00*
Fish Removal	**1.00**	**EA**	**35,000**	**0**	**0**	**35,000**
			6,945.69			*8,476.63*
Precast Igloo Units	**288.00**	**EA**	**2,000,359**	**0**	**440,912**	**2,441,271**
			6,705.54			*8,183.56*
Precast	**288.00**	**EA**	**1,931,197**	**0**	**425,668**	**2,356,864**
			240.15			*293.08*
Setting in place	**288.00**	**EA**	**69,162**	**0**	**15,244**	**84,406**
			16,836.09			*20,547.05*
PZC 13 Combi-wall	**955.00**	**LF**	**16,078,468**	**0**	**3,543,960**	**19,622,428**
			266.83			*325.64*
C King Pile (Beam)	**22,951.76**	**LF**	**6,124,110**	**0**	**1,349,855**	**7,473,965**
			2,383.98			*2,909.45*
C PZC 13	**2,085.32**	**TON**	**4,971,372**	**0**	**1,095,773**	**6,067,144**
			9,363.46			*11,427.32*
C Tie Rods	**78.07**	**EA**	**730,979**	**0**	**161,120**	**892,099**
			3.76			*4.59*
C Wales	**250,210.33**	**LB**	**941,324**	**0**	**207,483**	**1,148,807**
			432.60			*527.95*
C Concrete Cap	**2,299.01**	**CY**	**994,553**	**0**	**219,216**	**1,213,769**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			15.44			*18.84*
Granular Fill	**150,000.00**	**TON**	**2,316,131**	**0**	**510,513**	**2,826,644**
			0.50			*0.61*
Geotextile	**150,000.00**	**SY**	**75,000**	**0**	**16,531**	**91,531**
			166,666.00			*166,666.00*
Mitagation	**1.00**	**EA**	**166,666**	**0**	**0**	**166,666**
Phase 3	**1.00**	**LS**	**58,399,147**	**0**	**12,827,686**	**71,226,834**
			816,245.85			*996,159.93*
General Conditions	**1.00**	**EA**	**816,246**	**0**	**179,914**	**996,160**
			47,015.46			*57,378.45*
Temporary Office	**1.00**	**EA**	**47,015**	**0**	**10,363**	**57,378**
Submittals	**1.00**	**LS**	**32,102**	**0**	**7,076**	**39,178**
Mob and Demob	**1.00**	**LS**	**138,247**	**0**	**30,472**	**168,719**
			598,881.40			*730,884.75*
Quality Control On-Site	**1.00**	**EA**	**598,881**	**0**	**132,003**	**730,885**
			17,251,987.88			*21,054,611.14*
Stone	**1.00**	**EA**	**17,251,988**	**0**	**3,802,623**	**21,054,611**
			61.28			*74.79*
Type B	**20,600.00**	**TON**	**1,262,398**	**0**	**278,253**	**1,540,652**
			34.68			*42.32*
Type C	**397,100.00**	**TON**	**13,771,587**	**0**	**3,035,485**	**16,807,072**
			15.31			*18.69*
Type F	**79,500.00**	**TON**	**1,217,463**	**0**	**268,349**	**1,485,812**
			41.69			*50.88*
Type H	**24,000.00**	**TON**	**1,000,540**	**0**	**220,536**	**1,221,076**
			35,000.00			*35,000.00*
Fish Removal	**1.00**	**EA**	**35,000**	**0**	**0**	**35,000**
			36,936.02			*45,077.32*
Weir and Walkway	**1.00**	**EA**	**36,936**	**0**	**8,141**	**45,077**
			33,395.64			*40,756.60*
Wier	**1.00**	**EA**	**33,396**	**0**	**7,361**	**40,757**
			3,540.37			*4,320.73*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,540**	**0**	**780**	**4,321**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			6,945.69			*8,476.63*
Precast Igloo Units	**336.00**	**EA**	**2,333,752**	**0**	**514,397**	**2,848,149**
			6,705.54			*8,183.56*
Precast	**336.00**	**EA**	**2,253,063**	**0**	**496,612**	**2,749,675**
			240.15			*293.08*
Setting in place	**336.00**	**EA**	**80,689**	**0**	**17,785**	**98,474**
			15,993.33			*19,518.52*
PZC 13 Combi-wall	**2,314.00**	**LF**	**37,008,558**	**0**	**8,157,298**	**45,165,856**
			266.83			*325.64*
C King Pile (Beam)	**51,786.00**	**LF**	**13,817,816**	**0**	**3,045,675**	**16,863,492**
			2,370.53			*2,893.03*
C PZC 13	**5,052.81**	**TON**	**11,977,831**	**0**	**2,640,112**	**14,617,943**
			9,363.46			*11,427.32*
C Tie Rods	**189.16**	**EA**	**1,771,189**	**0**	**390,399**	**2,161,589**
			3.76			*4.59*
C Wales	**607,054.00**	**LB**	**2,283,816**	**0**	**503,391**	**2,787,206**
			432.60			*527.95*
C Concrete Cap	**5,570.59**	**CY**	**2,409,838**	**0**	**531,168**	**2,941,006**
			15.44			*18.84*
Granular Fill	**307,500.00**	**TON**	**4,748,068**	**0**	**1,046,553**	**5,794,620**
			50.00			*61.02*
Geotextile	**15,000.00**	**SY**	**750,000**	**0**	**165,312**	**915,312**
			166,667.00			*166,667.00*
Mitagation	**1.00**	**EA**	**166,667**	**0**	**0**	**166,667**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
Project Direct Costs Report			**18,407,592**	**20,034,879**	**132,758,944**	**46,800**	**11,853,461**	**1,450,000**	**3,264,509**	**187,816,186**
Phase 1	**1.00**	**LS**	**8,878,520**	**9,257,751**	**61,865,018**	**15,600**	**6,379,070**	**291,667**	**1,605,980**	**88,293,606**
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			443,111.04	*247,586.04*	*31,600.00*	*15,600.00*			*78,027.28*	*815,924.36*
General Conditions	**1.00**	**EA**	**443,111**	**247,586**	**31,600**	**15,600**	**0**	**0**	**78,027**	**815,924**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**47,396**	**81,930**	**0**	**0**	**0**	**0**	**8,600**	**137,926**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			157.71	*357.88*	*0.00*	*0.00*	*0.00*	*0.00*	*28.46*	*544.05*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	20,818	47,240	0	0	0	0	3,757	71,814
			201.35	*262.81*	*0.00*	*0.00*	*0.00*	*0.00*	*36.69*	*500.84*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,578	34,691	0	0	0	0	4,843	66,111
			362,505.60	*165,655.79*	*7,200.00*	*0.00*			*63,520.00*	*598,881.40*
Quality Control On-Site	**1.00**	**EA**	**362,506**	**165,656**	**7,200**	**0**	**0**	**0**	**63,520**	**598,881**
			10,069.60	*4,601.55*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*16,635.59*
USR Quality Control	36.00	MO	362,506	165,656	7,200	0	0	0	63,520	598,881
			1,309.92	*1,602.01*	*12,974.06*	*0.00*			*237.85*	*17,165.26*
PZC 13 Combi-wall	**2,887.00**	**LF**	**3,781,733**	**4,625,008**	**37,456,125**	**0**	**3,006,570**	**0**	**686,662**	**49,556,099**

(Note: First phase Combi-Wall approx.2887 lf Beam - W40 x 215 @ 73.45" (6.12') centers @ 66 feet long. Attached to the beams are connnectors welded to the beam for the PZC13 to insert into. PZC 13 @ 125-140 foot lengths. Anticipate that the sheet pile wall will be constructed after the west end of the breakwater is out of the water. Fill material should be available to be placed out to the location and as the wall is built the equipment should be able to be driven out onto the pier similar to the Chicago Shoreline Beach Piers.)

			6.18	*5.12*	*254.40*	*0.00*			*1.12*	*266.83*
C King Pile (Beam)	**69,384.00**	**LF**	**428,888**	**355,237**	**17,651,245**	**0**	**0**	**0**	**78,039**	**18,513,409**

(Note: Includes BBS-M and BBS-F King piles are 66 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

			0.00	*0.00*	*2,165.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,165.00*
USR Material Price King Pile & connectors	8,153.00	TON	0	0	17,651,245	0	0	0	0	17,651,245

(Note: Connectors welded to pile.)

			6.18	*5.12*	*0.00*	*0.00*	*0.00*	*0.00*	*1.12*	*12.43*
USR King pile installation	69,384.00	LF	428,888	355,237	0	0	0	0	78,039	862,164

(Note: Say 1 pile at 66 ft per hour due to tolerances.)

			173.60	*143.79*	*2,035.00*	*0.00*			*31.59*	*2,383.98*
C PZC 13	**6,304.00**	**TON**	**1,094,401**	**906,465**	**12,828,640**	**0**	**0**	**0**	**199,133**	**15,028,640**

(Note: SSP piles are 125-140 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

			173.60	*143.79*	*0.00*	*0.00*	*0.00*	*0.00*	*31.59*	*348.98*
USR Steel Sheet Pile Installation	6,304.00	TON	1,094,401	906,465	0	0	0	0	199,133	2,200,000

(Note: 125 -140 foot sheets approx 2 ft wide @ say 2.0 sheets per hour = 250-280 sf/hr Reduce crew output due to need to thread in SSP at both sides and tight tolerances.)

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*2,035.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,035.00*
USR Material Price SSP	6,304.00	TON	0	0	12,828,640	0	0	0	0	12,828,640
			1,408.84	*1,198.28*	*6,500.00*	*0.00*			*256.34*	*9,363.46*
C Tie Rods	**236.00**	**EA**	**332,486**	**282,793**	**1,534,000**	**0**	**0**	**0**	**60,497**	**2,209,777**
			0.87	*0.74*	*4.00*	*0.00*	*0.00*	*0.00*	*0.16*	*5.76*
USR Wale & Tie Rod installation	383,500.00	LB	332,486	282,793	1,534,000	0	0	0	60,497	2,209,777
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb ADJUST PRICE OF TIE RODS (DOUBLE THAT OF WALES).)										
			0.87	*0.74*	*2.00*	*0.00*			*0.16*	*3.76*
C Wales	**756,395.00**	**LB**	**655,778**	**557,766**	**1,512,790**	**0**	**0**	**0**	**119,322**	**2,845,656**
			0.87	*0.74*	*2.00*	*0.00*	*0.00*	*0.00*	*0.16*	*3.76*
USR Wale & Tie Rod installation	756,395.00	LB	655,778	557,766	1,512,790	0	0	0	119,322	2,845,656
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*432.60*
C Concrete Cap	**6,950.00**	**CY**	**0**	**0**	**0**	**0**	**3,006,570**	**0**	**0**	**3,006,570**
			0.00	*0.00*	*0.00*	*0.00*	*412.00*	*0.00*	*0.00*	*412.00*
USR Concrete Cap	7,297.50	CY	0	0	0	0	3,006,570	0	0	3,006,570
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy Updated using ENR June 08 - June 07 = 1.03 = $412/cy (includes reinforcing and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH & Profit.)										
			2.47	*4.90*	*7.63*	*0.00*			*0.45*	*15.44*
Granular Fill	**515,000.00**	**TON**	**1,270,180**	**2,522,747**	**3,929,450**	**0**	**0**	**0**	**229,672**	**7,952,048**
(Note: Use Type D material.)										
			0.71	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.40*
USR Type D Stone	515,000.00	TON	367,728	474,897	3,929,450	0	0	0	66,809	4,838,884
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.32*	*6.04*
USR Haul from Sandusky	515,000.00	TON	902,452	2,047,850	0	0	0	0	162,863	3,113,164
(Note: 2400 tons per trip, 24 hrs per trip)										
Stone	**1.00**	**LS**	**2,182,979**	**4,267,376**	**21,561,712**	**0**	**0**	**0**	**394,870**	**28,406,937**
			2.96	*5.52*	*52.32*	*0.00*			*0.54*	*61.34*
Type B	**42,545.00**	**TON**	**125,937**	**234,948**	**2,225,954**	**0**	**0**	**0**	**22,793**	**2,609,633**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			1.21	*1.55*	*52.32*	*0.00*	*0.00*	*0.00*	*0.22*	*55.29*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	42,545.00	TON	51,384	65,771	2,225,954	0	0	0	9,339	2,352,449
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.32*	*6.04*
USR Haul from Sandusky	42,545.00	TON	74,553	169,176	0	0	0	0	13,454	257,184
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.56	*5.01*	*26.71*	*0.00*			*0.46*	*34.74*
Type C	**650,166.00**	**TON**	**1,662,806**	**3,255,396**	**17,365,934**	**0**	**0**	**0**	**300,753**	**22,584,889**
			0.81	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.15*	*28.69*
USR Type C Stone	650,166.00	TON	523,498	670,071	17,365,934	0	0	0	95,145	18,654,649
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.32*	*6.04*
USR Haul from Sandusky	650,166.00	TON	1,139,308	2,585,325	0	0	0	0	205,608	3,930,240
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.45	*4.85*	*7.63*	*0.00*			*0.44*	*15.37*
Type F	**128,300.00**	**TON**	**313,796**	**622,567**	**978,929**	**0**	**0**	**0**	**56,770**	**1,972,062**
			0.69	*0.88*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.33*
USR Type F Stone	128,300.00	TON	88,972	112,394	978,929	0	0	0	16,197	1,196,491
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.32*	*6.04*
USR Haul from Sandusky	128,300.00	TON	224,824	510,173	0	0	0	0	40,573	775,571
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.71	*5.20*	*33.35*	*0.00*			*0.49*	*41.75*
Type H	**29,712.00**	**TON**	**80,440**	**154,466**	**990,895**	**0**	**0**	**0**	**14,553**	**1,240,354**
			0.95	*1.22*	*33.35*	*0.00*	*0.00*	*0.00*	*0.17*	*35.70*
USR Type H Stone	29,712.00	TON	28,374	36,319	990,895	0	0	0	5,157	1,060,745
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.32*	*6.04*
USR Haul from Sandusky	29,712.00	TON	52,065	118,147	0	0	0	0	9,396	179,608
(Note: 2400 tons per trip, 24 hrs per trip)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			15,877.16	*14,720.56*	*3,516.80*	*0.00*			*2,821.50*	*36,936.02*
Weir and Walkway	**1.00**	**EA**	**15,877**	**14,721**	**3,517**	**0**	**0**	**0**	**2,821**	**36,936**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,682.72	*14,633.01*	*1,420.50*	*0.00*			*2,659.42*	*33,395.64*
Wier	**1.00**	**EA**	**14,683**	**14,633**	**1,421**	**0**	**0**	**0**	**2,659**	**33,396**
			16.31	*16.26*	*0.70*	*0.00*	*0.00*	*0.00*	*2.95*	*36.23*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,894	4,878	210	0	0	0	886	10,868
			2,447.12	*2,438.83*	*541.50*	*0.00*	*0.00*	*0.00*	*443.24*	*5,870.69*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,447	2,439	542	0	0	0	443	5,871
			407.85	*406.47*	*0.00*	*0.00*	*0.00*	*0.00*	*73.87*	*888.20*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,447	2,439	0	0	0	0	443	5,329
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			16.31	*16.26*	*0.03*	*0.00*	*0.00*	*0.00*	*2.95*	*35.56*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,894	4,878	9	0	0	0	886	10,667
			1,194.44	*87.55*	*2,096.30*	*0.00*			*162.08*	*3,540.37*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**88**	**2,096**	**0**	**0**	**0**	**162**	**3,540**
			7.40	*0.42*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*22.74*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	8	278	0	0	0	20	455
			1.97	*0.11*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.21*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	11	886	0	0	0	27	1,121
			24.70	*2.38*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*34.84*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	48	88	0	0	0	67	697
			23.68	*1.35*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*84.50*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	20	844	0	0	0	48	1,267
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**2,670.00**	**LF**	**0**	**0**	**0**	**0**	**3,337,500**	**0**	**0**	**3,337,500**
(Note: Relocated First Energy Outfall 002 & 003. Outfalls to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	2,670.00	LF	0	0	0	0	3,337,500	0	0	3,337,500
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date. Unit price include OH & Profit. Leave assigned contractor as - (Unassigned).)										
			2,932.88	*123.13*	*3,359.69*	*0.00*			*529.99*	*6,945.69*
Precast Igloo Units	**837.00**	**EA**	**2,454,820**	**103,061**	**2,812,063**	**0**	**0**	**0**	**443,599**	**5,813,543**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			2,830.64	*3.90*	*3,359.69*	*0.00*			*511.31*	*6,705.54*
Precast	**837.00**	**EA**	**2,369,246**	**3,263**	**2,812,063**	**0**	**0**	**0**	**427,968**	**5,612,541**
(Note: Assume that this will be precast in a plant or on the dock where thecontractor will be setup. The data book does not have any units such as this in its database. Construct a single unit as it is on site in this folder. Next folder will deliver and place units. (Engineer not available to find out a manufacture and a internet surch found nothing, will talk with engineer when he becomes available.))										
			5.38	*0.00*	*0.59*	*0.00*	*0.00*	*0.00*	*0.98*	*6.94*
RSM 031104400120 C.I.P. concrete forms, mat foundation, plywood, 4 use, includes erecting, bracing, stripping and cleaning	187,655.40	SFC	1,008,664	0	110,717	0	0	0	183,832	1,303,213
			0.48	*0.00*	*0.44*	*0.00*	*0.00*	*0.00*	*0.09*	*1.00*
RSM 032106000210 Reinforcing steel, in place, columns, alternate method, #3 to #7, A615, grade 60, incl access. Labor	2,577,960.00	LB	1,226,696	0	1,134,302	0	0	0	219,736	2,580,735
			0.00	*0.00*	*91.00*	*0.00*	*0.00*	*0.00*	*0.00*	*91.00*
RSM 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	17,158.50	CY	0	0	1,561,424	0	0	0	0	1,561,424
			4.79	*0.19*	*0.00*	*0.00*	*0.00*	*0.00*	*0.88*	*5.86*
RSM 033107002900 Structural concrete, placing, foundation mat, direct chute, over 20 C.Y., includes vibrating, excludes material	17,158.50	CY	82,227	3,263	0	0	0	0	15,049	100,539
			0.45	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.08*	*0.54*
RSM 033503000100 Concrete finishing, floors, monolithic, screed and bull float(darby) finish	101,277.00	SF	45,942	0	0	0	0	0	8,303	54,245
			5.64	*0.00*	*5.55*	*0.00*	*0.00*	*0.00*	*1.04*	*12.23*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
HNC 033902000305 Curing, sprayed membrane compound	1,012.77	CSF	5,716	0	5,621	0	0	0	1,049	12,385
			102.24	*119.23*	*0.00*	*0.00*			*18.67*	*240.15*
Setting in place	**837.00**	**EA**	**85,574**	**99,798**	**0**	**0**	**0**	**0**	**15,631**	**201,002**
(Note: It is assumed that most of this alternative will be built by land plant. Due to tha amount of units (including weight of units) that will be required to transport over the top of the new structure, it is envisioned taht the units will be loadedonto barges transported to the site and the units placed by a crane on a barge.)										
			26.62	*26.22*	*0.00*	*0.00*	*0.00*	*0.00*	*4.88*	*57.72*
USR Unload from trucks	837.00	EA	22,278	21,942	0	0	0	0	4,088	48,308
(Note: Say 5 units/per hour (One every 10 min.- 50 min Hr) =.2 hr)										
			26.62	*26.22*	*0.00*	*0.00*	*0.00*	*0.00*	*4.88*	*57.72*
USR Loading onto barges	837.00	EA	22,278	21,942	0	0	0	0	4,088	48,308
(Note: land crane loading barges Say 5 units/per hour (One every 10 min. 50 min Hr)=.2 hr)										
			4.68	*10.07*	*0.00*	*0.00*	*0.00*	*0.00*	*0.85*	*15.60*
USR Yard Crane	837.00	HR	3,921	8,428	0	0	0	0	712	13,060
(Note: Yard Crane to move igloos around. Will be used on an as need basis. For purpose fo estimate Say will move 10 unts per hour. 1452/10 = 145 hrs)										
			3.26	*4.17*	*0.00*	*0.00*	*0.00*	*0.00*	*0.59*	*8.02*
USR Travel to site	837.00	HR	2,728	3,492	0	0	0	0	496	6,715
(Note: Say staging area to be in the marina area Say .5 hrs to travel to placement site. 1100 ton barge/17.5 ton each unit = 63 units each 1152 total units / 63 units each =18 trips x .5 hrs each = 9 hrs x 2 (return) = 18 hrs Use ~ 20 hrs. (24 hrs calculated))										
			41.06	*52.56*	*0.00*	*0.00*	*0.00*	*0.00*	*7.46*	*101.09*
USR Place units on site	837.00	EA	34,371	43,994	0	0	0	0	6,247	84,611
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*5.00*
Geotextile	**25,000.00**	**SY**	**0**	**0**	**0**	**0**	**0**	**125,000**	**0**	**125,000**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*	*5.00*	*0.00*	*5.00*
USR Geotextile	25,000.00	SY	0	0	0	0	0	125,000	0	125,000
(Note: Estimaors judgement from past projects.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*166,667.00*
Mitagation	**1.00**	**EA**	**0**	**0**	**0**	**0**	**0**	**166,667**	**0**	**166,667**
USR Mitagation	1.00	LS	0	0	0	0	0	166,667	0	166,667
(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)										
Phase 2	**1.00**	**LS**	**4,033,687**	**4,716,575**	**28,391,975**	**15,600**	**3,029,553**	**241,666**	**694,378**	**41,123,433**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			443,394.84	*247,586.04*	*31,600.00*	*15,600.00*			*78,064.98*	*816,245.85*
General Conditions	**1.00**	**EA**	**443,395**	**247,586**	**31,600**	**15,600**	**0**	**0**	**78,065**	**816,246**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**47,680**	**81,930**	**0**	**0**	**0**	**0**	**8,637**	**138,247**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			157.71	*357.88*	*0.00*	*0.00*	*0.00*	*0.00*	*28.46*	*544.05*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	20,818	47,240	0	0	0	0	3,757	71,814
			203.50	*262.81*	*0.00*	*0.00*	*0.00*	*0.00*	*36.97*	*503.28*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,862	34,691	0	0	0	0	4,880	66,433
			362,505.60	*165,655.79*	*7,200.00*	*0.00*			*63,520.00*	*598,881.40*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
Quality Control On-Site	**1.00**	**EA**	**362,506**	**165,656**	**7,200**	**0**	**0**	**0**	**63,520**	**598,881**
			10,069.60	*4,601.55*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*16,635.59*
USR Quality Control	36.00	MO	362,506	165,656	7,200	0	0	0	63,520	598,881
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**1,600.00**	**LF**	**0**	**0**	**0**	**0**	**2,000,000**	**0**	**0**	**2,000,000**
(Note: Relocated First Energy Outfall 203. Outfall to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	1,600.00	LF	0	0	0	0	2,000,000	0	0	2,000,000
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date. Unit price include OH & Profit. Leave assigned contractor as - (Unassigned).)										
Stone	**1.00**	**LS**	**1,528,985**	**2,988,612**	**15,154,370**	**0**	**0**	**0**	**242,791**	**19,914,758**
			2.96	*5.52*	*52.32*	*0.00*			*0.48*	*61.28*
Type B	**26,650.00**	**TON**	**78,887**	**147,170**	**1,394,328**	**0**	**0**	**0**	**12,766**	**1,633,151**
			1.21	*1.55*	*52.32*	*0.00*	*0.00*	*0.00*	*0.22*	*55.29*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	26,650.00	TON	32,187	41,199	1,394,328	0	0	0	5,850	1,473,564
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.26*	*5.99*
USR Haul from Sandusky	26,650.00	TON	46,700	105,971	0	0	0	0	6,916	159,587
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.56	*5.01*	*26.71*	*0.00*			*0.41*	*34.68*
Type C	**453,600.00**	**TON**	**1,160,086**	**2,271,186**	**12,115,656**	**0**	**0**	**0**	**184,101**	**15,731,029**
			0.81	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.15*	*28.69*
USR Type C Stone	453,600.00	TON	365,228	467,487	12,115,656	0	0	0	66,380	13,014,751
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.26*	*5.99*
USR Haul from Sandusky	453,600.00	TON	794,858	1,803,698	0	0	0	0	117,721	2,716,278
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.45	*4.85*	*7.63*	*0.00*			*0.39*	*15.31*
Type F	**85,700.00**	**TON**	**209,605**	**415,853**	**653,891**	**0**	**0**	**0**	**33,060**	**1,312,410**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.69	*0.88*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.33*
USR Type F Stone	85,700.00	TON	59,430	75,075	653,891	0	0	0	10,819	799,215
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.26*	*5.99*
USR Haul from Sandusky	85,700.00	TON	150,175	340,778	0	0	0	0	22,241	513,194
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.71	*5.20*	*33.35*	*0.00*			*0.43*	*41.69*
Type H	**29,700.00**	**TON**	**80,407**	**154,403**	**990,495**	**0**	**0**	**0**	**12,863**	**1,238,168**
			0.95	*1.22*	*33.35*	*0.00*	*0.00*	*0.00*	*0.17*	*35.70*
USR Type H Stone	29,700.00	TON	28,363	36,304	990,495	0	0	0	5,155	1,060,317
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.26*	*5.99*
USR Haul from Sandusky	29,700.00	TON	52,044	118,099	0	0	0	0	7,708	177,852
(Note: 2400 tons per trip, 24 hrs per trip)										
			15,877.16	*14,720.56*	*3,516.80*	*0.00*			*2,821.50*	*36,936.02*
Weir and Walkway	**1.00**	**EA**	**15,877**	**14,721**	**3,517**	**0**	**0**	**0**	**2,821**	**36,936**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,682.72	*14,633.01*	*1,420.50*	*0.00*			*2,659.42*	*33,395.64*
Wier	**1.00**	**EA**	**14,683**	**14,633**	**1,421**	**0**	**0**	**0**	**2,659**	**33,396**
			16.31	*16.26*	*0.70*	*0.00*	*0.00*	*0.00*	*2.95*	*36.23*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,894	4,878	210	0	0	0	886	10,868
			2,447.12	*2,438.83*	*541.50*	*0.00*	*0.00*	*0.00*	*443.24*	*5,870.69*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,447	2,439	542	0	0	0	443	5,871
			407.85	*406.47*	*0.00*	*0.00*	*0.00*	*0.00*	*73.87*	*888.20*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,447	2,439	0	0	0	0	443	5,329
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			16.31	*16.26*	*0.03*	*0.00*	*0.00*	*0.00*	*2.95*	*35.56*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,894	4,878	9	0	0	0	886	10,667
			1,194.44	*87.55*	*2,096.30*	*0.00*			*162.08*	*3,540.37*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**88**	**2,096**	**0**	**0**	**0**	**162**	**3,540**
			7.40	*0.42*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*22.74*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	8	278	0	0	0	20	455
			1.97	*0.11*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.21*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	11	886	0	0	0	27	1,121
			24.70	*2.38*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*34.84*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	48	88	0	0	0	67	697
			23.68	*1.35*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*84.50*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	20	844	0	0	0	48	1,267
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			2,932.88	*123.13*	*3,359.69*	*0.00*			*529.99*	*6,945.69*
Precast Igloo Units	**288.00**	**EA**	**844,669**	**35,462**	**967,592**	**0**	**0**	**0**	**152,636**	**2,000,359**
			2,830.64	*3.90*	*3,359.69*	*0.00*			*511.31*	*6,705.54*
Precast	**288.00**	**EA**	**815,224**	**1,123**	**967,592**	**0**	**0**	**0**	**147,258**	**1,931,197**
(Note: Assume that this will be precast in a plant or on the dock where thecontractor will be setup. The data book does not have any units such as this in its database. Construct a single unit as it is on site in this folder. Next folder will deliver and place units. (Engineer not available to find out a manufacture and a internet surch found nothing, will talk with engineer when he becomes available.))										
			5.38	*0.00*	*0.59*	*0.00*	*0.00*	*0.00*	*0.98*	*6.94*
RSM 031104400120 C.I.P. concrete forms, mat foundation, plywood, 4 use, includes erecting, bracing, stripping and cleaning	64,569.60	SFC	347,067	0	38,096	0	0	0	63,254	448,417
			0.48	*0.00*	*0.44*	*0.00*	*0.00*	*0.00*	*0.09*	*1.00*
RSM 032106000210 Reinforcing steel, in place, columns, alternate method, #3 to #7, A615, grade 60, incl access. Labor	887,040.00	LB	422,089	0	390,298	0	0	0	75,608	887,995
			0.00	*0.00*	*91.00*	*0.00*	*0.00*	*0.00*	*0.00*	*91.00*
RSM 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	5,904.00	CY	0	0	537,264	0	0	0	0	537,264
			4.79	*0.19*	*0.00*	*0.00*	*0.00*	*0.00*	*0.88*	*5.86*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
RSM 033107002900 Structural concrete, placing, foundation mat, direct chute, over 20 C.Y., includes vibrating, excludes material	5,904.00	CY	28,293	1,123	0	0	0	0	5,178	34,594
			0.45	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.08*	*0.54*
RSM 033503000100 Concrete finishing, floors, monolithic, screed and bull float(darby) finish	34,848.00	SF	15,808	0	0	0	0	0	2,857	18,665
			5.64	*0.00*	*5.55*	*0.00*	*0.00*	*0.00*	*1.04*	*12.23*
HNC 033902000305 Curing, sprayed membrane compound	348.48	CSF	1,967	0	1,934	0	0	0	361	4,262
			102.24	*119.23*	*0.00*	*0.00*			*18.67*	*240.15*
Setting in place	**288.00**	**EA**	**29,445**	**34,339**	**0**	**0**	**0**	**0**	**5,378**	**69,162**

(Note: It is assumed that most of this alternative will be built by land plant. Due to tha amount of units (including weight of units) that will be required to transport over the top of the new structure, it is envisioned taht the units will be loadedonto barges transported to the site and the units placed by a crane on a barge.)

			26.62	*26.22*	*0.00*	*0.00*	*0.00*	*0.00*	*4.88*	*57.72*
USR Unload from trucks	288.00	EA	7,665	7,550	0	0	0	0	1,407	16,622

(Note: Say 5 units/per hour (One every 10 min.- 50 min Hr) =.2 hr)

			26.62	*26.22*	*0.00*	*0.00*	*0.00*	*0.00*	*4.88*	*57.72*
USR Loading onto barges	288.00	EA	7,665	7,550	0	0	0	0	1,407	16,622

(Note: land crane loading barges Say 5 units/per hour (One every 10 min. 50 min Hr)=.2 hr)

			4.68	*10.07*	*0.00*	*0.00*	*0.00*	*0.00*	*0.85*	*15.60*
USR Yard Crane	288.00	HR	1,349	2,900	0	0	0	0	245	4,494

(Note: Yard Crane to move igloos around. Will be used on an as need basis. For purpose fo estimate Say will move 10 unts per hour. 1452/10 = 145 hrs)

			3.26	*4.17*	*0.00*	*0.00*	*0.00*	*0.00*	*0.59*	*8.02*
USR Travel to site	288.00	HR	939	1,201	0	0	0	0	171	2,311

(Note: Say staging area to be in the marina area Say .5 hrs to travel to placement site. 1100 ton barge/17.5 ton each unit = 63 units each 1152 total units / 63 units each =18 trips x .5 hrs each = 9 hrs x 2 (return) = 18 hrs Use ~ 20 hrs. (24 hrs calculated))

			41.06	*52.56*	*0.00*	*0.00*	*0.00*	*0.00*	*7.46*	*101.09*
USR Place units on site	288.00	EA	11,826	15,138	0	0	0	0	2,149	29,114

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			1,257.34	*1,497.59*	*12,811.41*	*0.00*			*228.34*	*16,836.09*
PZC 13 Combi-wall	**955.00**	**LF**	**1,200,760**	**1,430,194**	**12,234,896**	**0**	**994,553**	**0**	**218,064**	**16,078,468**

(Note: First phase Combi-Wall approx.2887 lf Beam - W40 x 215 @ 73.45" (6.12') centers @ 66 feet long. Attached to the beams are connnectors welded to the beam for the PZC13 to insert into. PZC 13 @ 125-140 foot lengths. Anticipate that the sheet pile wall will be constructed after the west end of the breakwater is out of the water. Fill material should be available to be placed out to the location and as the wall is built the equipment should be able to be driven out onto the pier similar to the Chicago Shoreline Beach Piers.)

			6.18	*5.12*	*254.40*	*0.00*			*1.12*	*266.83*
C King Pile (Beam)	**22,951.76**	**LF**	**141,873**	**117,510**	**5,838,912**	**0**	**0**	**0**	**25,815**	**6,124,110**

(Note: Includes BBS-M and BBS-F King piles are 66 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

			0.00	*0.00*	*2,165.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,165.00*
USR Material Price King Pile & connectors	2,696.96	TON	0	0	5,838,912	0	0	0	0	5,838,912

(Note: Connectors welded to pile.)

			6.18	*5.12*	*0.00*	*0.00*	*0.00*	*0.00*	*1.12*	*12.43*
USR King pile installation	22,951.76	LF	141,873	117,510	0	0	0	0	25,815	285,198

(Note: Say 1 pile at 66 ft per hour due to tolerances.)

			173.60	*143.79*	*2,035.00*	*0.00*			*31.59*	*2,383.98*
C PZC 13	**2,085.32**	**TON**	**362,020**	**299,853**	**4,243,627**	**0**	**0**	**0**	**65,872**	**4,971,372**

(Note: SSP piles are 125-140 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

			173.60	*143.79*	*0.00*	*0.00*	*0.00*	*0.00*	*31.59*	*348.98*
USR Steel Sheet Pile Installation	2,085.32	TON	362,020	299,853	0	0	0	0	65,872	727,745

(Note: 125 -140 foot sheets approx 2 ft wide @ say 2.0 sheets per hour = 250-280 sf/hr Reduce crew output due to need to thread in SSP at both sides and tight tolerances.)

			0.00	*0.00*	*2,035.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,035.00*
USR Material Price SSP	2,085.32	TON	0	0	4,243,627	0	0	0	0	4,243,627
			1,408.84	*1,198.28*	*6,500.00*	*0.00*			*256.34*	*9,363.46*
C Tie Rods	**78.07**	**EA**	**109,984**	**93,546**	**507,437**	**0**	**0**	**0**	**20,012**	**730,979**
			0.87	*0.74*	*4.00*	*0.00*	*0.00*	*0.00*	*0.16*	*5.76*
USR Wale & Tie Rod installation	126,859.20	LB	109,984	93,546	507,437	0	0	0	20,012	730,979

(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb ADJUST PRICE OF TIE RODS (DOUBLE THAT OF WALES).)

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.87	*0.74*	*2.00*	*0.00*			*0.16*	*3.76*
C Wales	**250,210.33**	**LB**	**216,927**	**184,505**	**500,421**	**0**	**0**	**0**	**39,471**	**941,324**
			0.87	*0.74*	*2.00*	*0.00*	*0.00*	*0.00*	*0.16*	*3.76*
USR Wale & Tie Rod installation	250,210.33	LB	216,927	184,505	500,421	0	0	0	39,471	941,324
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*432.60*
C Concrete Cap	**2,299.01**	**CY**	**0**	**0**	**0**	**0**	**994,553**	**0**	**0**	**994,553**
			0.00	*0.00*	*0.00*	*0.00*	*412.00*	*0.00*	*0.00*	*412.00*
USR Concrete Cap	2,413.96	CY	0	0	0	0	994,553	0	0	994,553
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy Updated using ENR June 08 - June 07 = 1.03 = $412/cy (includes reinforcing and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH & Profit.)										
			2.47	*4.90*	*7.63*	*0.00*			*0.45*	*15.44*
Granular Fill	**150,000.00**	**TON**	**369,955**	**734,781**	**1,144,500**	**0**	**0**	**0**	**66,895**	**2,316,131**
(Note: Use Type D material.)										
			0.71	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.40*
USR Type D Stone	150,000.00	TON	107,105	138,319	1,144,500	0	0	0	19,459	1,409,384
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.32*	*6.04*
USR Haul from Sandusky	150,000.00	TON	262,850	596,461	0	0	0	0	47,436	906,747
(Note: 2400 tons per trip, 24 hrs per trip)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*0.50*
Geotextile	**150,000.00**	**SY**	**0**	**0**	**0**	**0**	**0**	**75,000**	**0**	**75,000**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*	*5.00*	*0.00*	*5.00*
USR Geotextile	15,000.00	SY	0	0	0	0	0	75,000	0	75,000
(Note: Estimaors judgement from past projects.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*166,666.00*
Mitagation	**1.00**	**EA**	**0**	**0**	**0**	**0**	**0**	**166,666**	**0**	**166,666**
USR Mitagation	1.00	LS	0	0	0	0	0	166,666	0	166,666
(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)										
Phase 3	**1.00**	**LS**	**5,495,386**	**6,060,553**	**42,501,952**	**15,600**	**2,444,838**	**916,667**	**964,152**	**58,399,147**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			443,394.84	*247,586.04*	*31,600.00*	*15,600.00*			*78,064.98*	*816,245.85*
General Conditions	**1.00**	**EA**	**443,395**	**247,586**	**31,600**	**15,600**	**0**	**0**	**78,065**	**816,246**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**47,680**	**81,930**	**0**	**0**	**0**	**0**	**8,637**	**138,247**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			157.71	*357.88*	*0.00*	*0.00*	*0.00*	*0.00*	*28.46*	*544.05*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	20,818	47,240	0	0	0	0	3,757	71,814
			203.50	*262.81*	*0.00*	*0.00*	*0.00*	*0.00*	*36.97*	*503.28*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	26,862	34,691	0	0	0	0	4,880	66,433
			362,505.60	*165,655.79*	*7,200.00*	*0.00*			*63,520.00*	*598,881.40*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
Quality Control On-Site	**1.00**	**EA**	**362,506**	**165,656**	**7,200**	**0**	**0**	**0**	**63,520**	**598,881**
			10,069.60	*4,601.55*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*16,635.59*
USR Quality Control	36.00	MO	362,506	165,656	7,200	0	0	0	63,520	598,881
			1,335,981.70	*2,612,587.36*	*13,091,318.00*	*0.00*			*212,100.82*	*17,251,987.88*
Stone	**1.00**	**EA**	**1,335,982**	**2,612,587**	**13,091,318**	**0**	**0**	**0**	**212,101**	**17,251,988**
			2.96	*5.52*	*52.32*	*0.00*			*0.48*	*61.28*
Type B	**20,600.00**	**TON**	**60,978**	**113,760**	**1,077,792**	**0**	**0**	**0**	**9,868**	**1,262,398**
			1.21	*1.55*	*52.32*	*0.00*	*0.00*	*0.00*	*0.22*	*55.29*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	20,600.00	TON	24,880	31,846	1,077,792	0	0	0	4,522	1,139,040
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.26*	*5.99*
USR Haul from Sandusky	20,600.00	TON	36,098	81,914	0	0	0	0	5,346	123,358
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.56	*5.01*	*26.71*	*0.00*			*0.41*	*34.68*
Type C	**397,100.00**	**TON**	**1,015,587**	**1,988,289**	**10,606,541**	**0**	**0**	**0**	**161,170**	**13,771,587**
			0.81	*1.03*	*26.71*	*0.00*	*0.00*	*0.00*	*0.15*	*28.69*
USR Type C Stone	397,100.00	TON	319,736	409,258	10,606,541	0	0	0	58,112	11,393,646
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.26*	*5.99*
USR Haul from Sandusky	397,100.00	TON	695,852	1,579,031	0	0	0	0	103,058	2,377,941
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.45	*4.85*	*7.63*	*0.00*			*0.39*	*15.31*
Type F	**79,500.00**	**TON**	**194,441**	**385,768**	**606,585**	**0**	**0**	**0**	**30,669**	**1,217,463**
			0.69	*0.88*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.33*
USR Type F Stone	79,500.00	TON	55,131	69,644	606,585	0	0	0	10,036	741,396
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.26*	*5.99*
USR Haul from Sandusky	79,500.00	TON	139,310	316,124	0	0	0	0	20,632	476,067
(Note: 2400 tons per trip, 24 hrs per trip)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			2.71	*5.20*	*33.35*	*0.00*			*0.43*	*41.69*
Type H	**24,000.00**	**TON**	**64,975**	**124,770**	**800,400**	**0**	**0**	**0**	**10,394**	**1,000,540**
			0.95	*1.22*	*33.35*	*0.00*	*0.00*	*0.00*	*0.17*	*35.70*
USR Type H Stone	24,000.00	TON	22,919	29,337	800,400	0	0	0	4,166	856,822
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.26*	*5.99*
USR Haul from Sandusky	24,000.00	TON	42,056	95,434	0	0	0	0	6,229	143,718
(Note: 2400 tons per trip, 24 hrs per trip)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			15,877.16	*14,720.56*	*3,516.80*	*0.00*			*2,821.50*	*36,936.02*
Weir and Walkway	**1.00**	**EA**	**15,877**	**14,721**	**3,517**	**0**	**0**	**0**	**2,821**	**36,936**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,682.72	*14,633.01*	*1,420.50*	*0.00*			*2,659.42*	*33,395.64*
Wier	**1.00**	**EA**	**14,683**	**14,633**	**1,421**	**0**	**0**	**0**	**2,659**	**33,396**
			16.31	*16.26*	*0.70*	*0.00*	*0.00*	*0.00*	*2.95*	*36.23*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,894	4,878	210	0	0	0	886	10,868
			2,447.12	*2,438.83*	*541.50*	*0.00*	*0.00*	*0.00*	*443.24*	*5,870.69*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,447	2,439	542	0	0	0	443	5,871
			407.85	*406.47*	*0.00*	*0.00*	*0.00*	*0.00*	*73.87*	*888.20*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,447	2,439	0	0	0	0	443	5,329

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			16.31	*16.26*	*0.03*	*0.00*	*0.00*	*0.00*	*2.95*	*35.56*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,894	4,878	9	0	0	0	886	10,667
			1,194.44	*87.55*	*2,096.30*	*0.00*			*162.08*	*3,540.37*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**88**	**2,096**	**0**	**0**	**0**	**162**	**3,540**
			7.40	*0.42*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*22.74*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	8	278	0	0	0	20	455
			1.97	*0.11*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.21*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	11	886	0	0	0	27	1,121
			24.70	*2.38*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*34.84*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	48	88	0	0	0	67	697
			23.68	*1.35*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*84.50*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	20	844	0	0	0	48	1,267
			2,932.88	*123.13*	*3,359.69*	*0.00*			*529.99*	*6,945.69*
Precast Igloo Units	**336.00**	**EA**	**985,447**	**41,372**	**1,128,857**	**0**	**0**	**0**	**178,076**	**2,333,752**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			2,830.64	*3.90*	*3,359.69*	*0.00*			*511.31*	*6,705.54*
Precast	**336.00**	**EA**	**951,095**	**1,310**	**1,128,857**	**0**	**0**	**0**	**171,801**	**2,253,063**
(Note: Assume that this will be precast in a plant or on the dock where thecontractor will be setup. The data book does not have any units such as this in its database. Construct a single unit as it is on site in this folder. Next folder will deliver and place units. (Engineer not available to find out a manufacture and a internet surch found nothing, will talk with engineer when he becomes available.))										
			5.38	*0.00*	*0.59*	*0.00*	*0.00*	*0.00*	*0.98*	*6.94*
RSM 031104400120 C.I.P. concrete forms, mat foundation, plywood, 4 use, includes erecting, bracing, stripping and cleaning	75,331.20	SFC	404,912	0	44,445	0	0	0	73,797	523,154
			0.48	*0.00*	*0.44*	*0.00*	*0.00*	*0.00*	*0.09*	*1.00*
RSM 032106000210 Reinforcing steel, in place, columns, alternate method, #3 to #7, A615, grade 60, incl access. Labor	1,034,880.00	LB	492,437	0	455,347	0	0	0	88,209	1,035,994
			0.00	*0.00*	*91.00*	*0.00*	*0.00*	*0.00*	*0.00*	*91.00*
RSM 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6,888.00	CY	0	0	626,808	0	0	0	0	626,808
			4.79	*0.19*	*0.00*	*0.00*	*0.00*	*0.00*	*0.88*	*5.86*
RSM 033107002900 Structural concrete, placing, foundation mat, direct chute, over 20 C.Y., includes vibrating, excludes material	6,888.00	CY	33,009	1,310	0	0	0	0	6,041	40,360
			0.45	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.08*	*0.54*
RSM 033503000100 Concrete finishing, floors, monolithic, screed and bull float(darby) finish	40,656.00	SF	18,443	0	0	0	0	0	3,333	21,776
			5.64	*0.00*	*5.55*	*0.00*	*0.00*	*0.00*	*1.04*	*12.23*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
HNC 033902000305 Curing, sprayed membrane compound	406.56	CSF	2,295	0	2,256	0	0	0	421	4,972
			102.24	*119.23*	*0.00*	*0.00*			*18.67*	*240.15*
Setting in place	**336.00**	**EA**	**34,352**	**40,062**	**0**	**0**	**0**	**0**	**6,275**	**80,689**

(Note: It is assumed that most of this alternative will be built by land plant. Due to tha amount of units (including weight of units) that will be required to transport over the top of the new structure, it is envisioned taht the units will be loadedonto barges transported to the site and the units placed by a crane on a barge.)

			26.62	*26.22*	*0.00*	*0.00*	*0.00*	*0.00*	*4.88*	*57.72*
USR Unload from trucks	336.00	EA	8,943	8,808	0	0	0	0	1,641	19,392

(Note: Say 5 units/per hour (One every 10 min.- 50 min Hr) =.2 hr)

			26.62	*26.22*	*0.00*	*0.00*	*0.00*	*0.00*	*4.88*	*57.72*
USR Loading onto barges	336.00	EA	8,943	8,808	0	0	0	0	1,641	19,392

(Note: land crane loading barges Say 5 units/per hour (One every 10 min. 50 min Hr)=.2 hr)

			4.68	*10.07*	*0.00*	*0.00*	*0.00*	*0.00*	*0.85*	*15.60*
USR Yard Crane	336.00	HR	1,574	3,383	0	0	0	0	286	5,243

(Note: Yard Crane to move igloos around. Will be used on an as need basis. For purpose fo estimate Say will move 10 unts per hour. 1452/10 = 145 hrs)

			3.26	*4.17*	*0.00*	*0.00*	*0.00*	*0.00*	*0.59*	*8.02*
USR Travel to site	336.00	HR	1,095	1,402	0	0	0	0	199	2,696

(Note: Say staging area to be in the marina area Say .5 hrs to travel to placement site. 1100 ton barge/17.5 ton each unit = 63 units each 1152 total units / 63 units each =18 trips x .5 hrs each = 9 hrs x 2 (return) = 18 hrs Use ~ 20 hrs. (24 hrs calculated))

			41.06	*52.56*	*0.00*	*0.00*	*0.00*	*0.00*	*7.46*	*101.09*
USR Place units on site	336.00	EA	13,798	17,661	0	0	0	0	2,508	33,966
			1,173.16	*1,358.81*	*12,206.85*	*0.00*			*213.09*	*15,993.33*
PZC 13 Combi-wall	**2,314.00**	**LF**	**2,714,684**	**3,144,287**	**28,246,660**	**0**	**2,409,838**	**0**	**493,089**	**37,008,558**

(Note: Beam - W40 x 215 @ 73.45" (6.12') centers @ 66 feet long. Attached to the beams are connnectors welded to the beam for the PZC13 to insert into. PZC 13 @ 125-140 foot lengths. Anticipate that the sheet pile wall will be constructed after the west end of the breakwater is out of the water. Fill material should be available to be placed out to the location and as the wall is built the equipment should be able to be driven out onto the pier similar to the Chicago Shoreline Beach Piers.)

			6.18	*5.12*	*254.40*	*0.00*			*1.12*	*266.83*
C King Pile (Beam)	**51,786.00**	**LF**	**320,108**	**265,138**	**13,174,325**	**0**	**0**	**0**	**58,246**	**13,817,816**

(Note: Includes BBS-M and BBS-F King piles are 66 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*2,165.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,165.00*
USR Material Price King Pile & connectors	6,085.14	TON	0	0	13,174,325	0	0	0	0	13,174,325
(Note: Connectors welded to pile.)										
			6.18	*5.12*	*0.00*	*0.00*	*0.00*	*0.00*	*1.12*	*12.43*
USR King pile installation	51,786.00	LF	320,108	265,138	0	0	0	0	58,246	643,491
(Note: Say 1 pile at 66 ft per hour due to tolerances.)										
			166.91	*138.25*	*2,035.00*	*0.00*			*30.37*	*2,370.53*
C PZC 13	**5,052.81**	**TON**	**843,369**	**698,542**	**10,282,464**	**0**	**0**	**0**	**153,456**	**11,977,831**
(Note: SSP piles are 125-140 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)										
			173.60	*143.79*	*0.00*	*0.00*	*0.00*	*0.00*	*31.59*	*348.98*
USR Steel Sheet Pile Installation	4,858.00	TON	843,369	698,542	0	0	0	0	153,456	1,695,368
(Note: 125 -140 foot sheets approx 2 ft wide @ say 2.0 sheets per hour = 250-280 sf/hr Reduce crew output due to need to thread in SSP at both sides and tight tolerances.)										
			0.00	*0.00*	*2,035.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,035.00*
USR Material Price SSP	5,052.81	TON	0	0	10,282,464	0	0	0	0	10,282,464
			1,408.84	*1,198.28*	*6,500.00*	*0.00*			*256.34*	*9,363.46*
C Tie Rods	**189.16**	**EA**	**266,496**	**226,665**	**1,229,538**	**0**	**0**	**0**	**48,490**	**1,771,189**
			0.87	*0.74*	*4.00*	*0.00*	*0.00*	*0.00*	*0.16*	*5.76*
USR Wale & Tie Rod installation	307,384.48	LB	266,496	226,665	1,229,538	0	0	0	48,490	1,771,189
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb ADJUST PRICE OF TIE RODS (DOUBLE THAT OF WALES).)										
			0.87	*0.74*	*2.00*	*0.00*			*0.16*	*3.76*
C Wales	**607,054.00**	**LB**	**526,303**	**447,642**	**1,214,108**	**0**	**0**	**0**	**95,763**	**2,283,816**
			0.87	*0.74*	*2.00*	*0.00*	*0.00*	*0.00*	*0.16*	*3.76*
USR Wale & Tie Rod installation	607,054.00	LB	526,303	447,642	1,214,108	0	0	0	95,763	2,283,816
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*432.60*
C Concrete Cap	**5,570.59**	**CY**	**0**	**0**	**0**	**0**	**2,409,838**	**0**	**0**	**2,409,838**
			0.00	*0.00*	*0.00*	*0.00*	*412.00*	*0.00*	*0.00*	*412.00*
USR Concrete Cap	5,849.12	CY	0	0	0	0	2,409,838	0	0	2,409,838

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy Updated using ENR June 08 - June 07 = 1.03 = $412/cy (includes reinforcing and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH & Profit.)										
			2.47	*4.90*	*7.63*	*0.00*			*0.45*	*15.44*
Granular Fill	**307,500.00**	**TON**	**758,408**	**1,506,300**	**2,346,225**	**0**	**0**	**0**	**137,134**	**4,748,068**
(Note: Use Type D material.)										
			0.71	*0.92*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.40*
USR Type D Stone	307,500.00	TON	219,566	283,555	2,346,225	0	0	0	39,891	2,889,237
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.75	*3.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.32*	*6.04*
USR Haul from Sandusky	307,500.00	TON	538,842	1,222,745	0	0	0	0	97,243	1,858,831
(Note: 2400 tons per trip, 24 hrs per trip)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*50.00*
Geotextile	**15,000.00**	**SY**	**0**	**0**	**0**	**0**	**0**	**750,000**	**0**	**750,000**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*	*5.00*	*0.00*	*5.00*
USR Geotextile	150,000.00	SY	0	0	0	0	0	750,000	0	750,000
(Note: Estimaors judgement from past projects.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*166,667.00*
Mitagation	**1.00**	**EA**	**0**	**0**	**0**	**0**	**0**	**166,667**	**0**	**166,667**
USR Mitagation	1.00	LS	0	0	0	0	0	166,667	0	166,667
(Note: Per PM Mitagation costs from Friends of Chicago River project escalated to the scope of this project. Leave contractor unassigned.)										

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Tab G
Supplemental analysis of the National Economic Development Plan

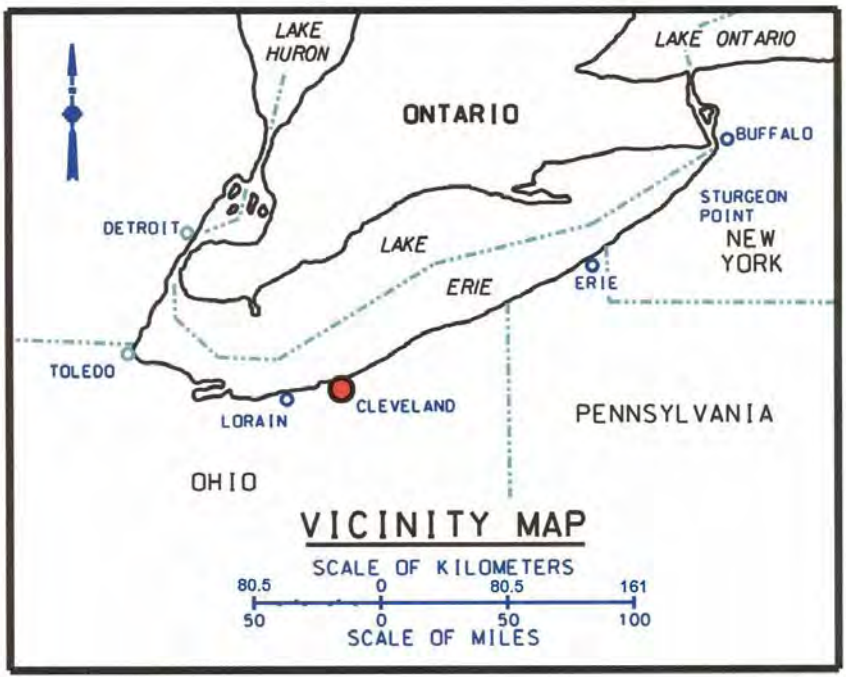
CLEVELAND E55th STREET CONFINED DISPOSAL FACILITY

FEDERAL STANDARD PLAN DEVELOPMENT

SUMMARY

1. INTRODUCTION

Cleveland Harbor, Cuyahoga County, Ohio, is located on the south shore of Lake Erie at the mouth of the Cuyahoga River. The port is 28 miles east of Lorain, Ohio and 33 miles west of Fairport, Ohio (Insert 1). Cleveland Harbor is a major commercial port on Lake Erie, but suffers the lack of dredged material disposal capacity which is needed to continue the operation and economic viability of Cleveland as a commercial navigation port on the Great Lakes. Based on 2006 data of total tonnage handled, Cleveland Harbor is the 5th busiest port on the Great Lakes and 44th busiest port in the nation (USACE-IWR, 2008)[1]. Inherent in the operations and maintenance of any port is maintenance dredging and disposal of dredged materials from the commercial navigation channels and dredging and disposal 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 are considered 'contaminated' and generally have to be confined in some environmentally acceptable manner.



Insert 1 – Location of Cleveland Harbor, Ohio

[1] USACE-IWR, Cubic Yard Tonnage Statistics for Selected U.S. Ports by Port Name. Institute of Water Resources, U.S. Army Corps of Engineers, Washington D.C. 2006. http://www.iwr.usace.army.mil/ndc/wcsc/portton03.htm.

Past and current practice for dredged sediment disposal in Cleveland has been to dispose of materials in stone dike enclosures called confined disposal facilities (CDFs) constructed along the Cleveland waterfront. Once filled or in some instances partially filled, the dikes are turned over to the owner for future disposition. At the conclusion of the 2008 dredging season, it is expected that all existing CDFs at Cleveland, barring the implementation of CDF management measures, will be filled to capacity. From 2008 through 2014, it is expected that sufficient additional capacity can be obtained at the existing Cleveland CDFs using fill management plans (FMP) internal to the CDFs (e.g. dewatering, consolidation of dredged material, construction of internal berms). By the year 2015, a new disposal facility or method will have to be in place in order to continue dredging Cleveland Harbor.[2]

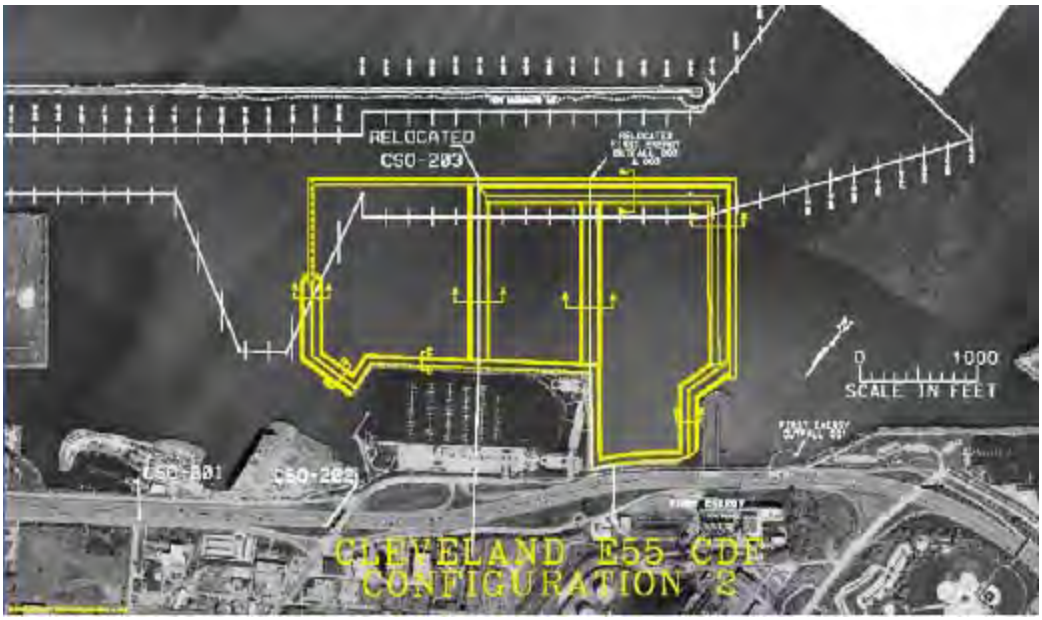
As described in USACE (2008)[3], an analysis of potential CDF sites was investigated. The analysis followed the USACE six-step planning process and started with identifying problems and opportunities, establishing study objectives (both national and local), and identifying planning constraints. Fourteen individual measures were identified including beneficial use, best management practices, and construction of a new CDF. The measures were assessed and, if viable, carried forward into detailed planning and analysis. The analysis included potential social, economic, and environmental benefits and impacts that would result from each alternative plan. A total of six alternative plans were developed.

The tentatively selected plan was Alternative Plan 4a (FMP and East 55th Street site, Insert 2). Alternative 4a is the locally preferred plan because the more robust perimeter bulkheads make the site more suitable for relocating maritime port facilities once the CDF is filled and transferred to the sponsor. The non-Federal sponsor understands that all costs above that of the NED are borne entirely by the non-Federal sponsor and indicate as such in their Letter of Intent. Therefore, the tentatively selected plan is the locally preferred plan.

Construction costs for Plan 4a are $275,800,800. Construction of Cell 1 would take place in approximately 25 feet of water, be constructed over a three year period (2012, 2013, 2014), and cost $128,900,000. Construction of Cell 2 would take place in approximately 28 feet of water, be constructed over a three year period (2019, 2020, 2021), and cost $60,700,000. Construction of Cell 3 would take place in approximately 28 feet of water, be constructed over a three year period (2024, 2025, 2026), and cost $86,200,000.[4]

---

[2] USACE. 2008. Cleveland Harbor Draft Dredged Material Management Plan, Chapter 1, Introduction, U.S. Army Corps of Engineers, Buffalo, NY.
[3] USACE. 2008. Cleveland Harbor Draft Dredged Material Management Plan, Executive Summary, U.S. Army Corps of Engineers, Buffalo, NY.
[4] USACE. 2008. Cleveland Harbor Draft Dredged Material Management Plan, Appendix A, Base Plan, U.S. Army Corps of Engineers, Buffalo, NY.



Insert 2. Proposed CDF

It is noted that the proposed footprint of the East 55th Street site encroaches on the existing Federal approach channel in the east basin and eastern flared portion of the 25-foot deep dock approach channel to the former Nicholson Cleveland Terminal Company pier. These portions of the existing project were authorized but never constructed. These portions of the channel must be de-authorized in order to implement the proposed East 55th Street CDF alternative.

As a result of the Plan 4a encroaching into the Federal channel, USACE Washington requested that USACE Buffalo redesign the selected plan to minimize encroachment into the Federal channel.[5] It was specifically stated, "As a facet of the plan formulation process, the footprint, volume, height, and other general design features of the proposed confined disposal facility (CDF) at the East 55th Street site should be reanalyzed without constraints by future land-use desires/requirements of the non-Federal sponsor." This report summarizes those efforts.

2. **ALTERNATIVES**

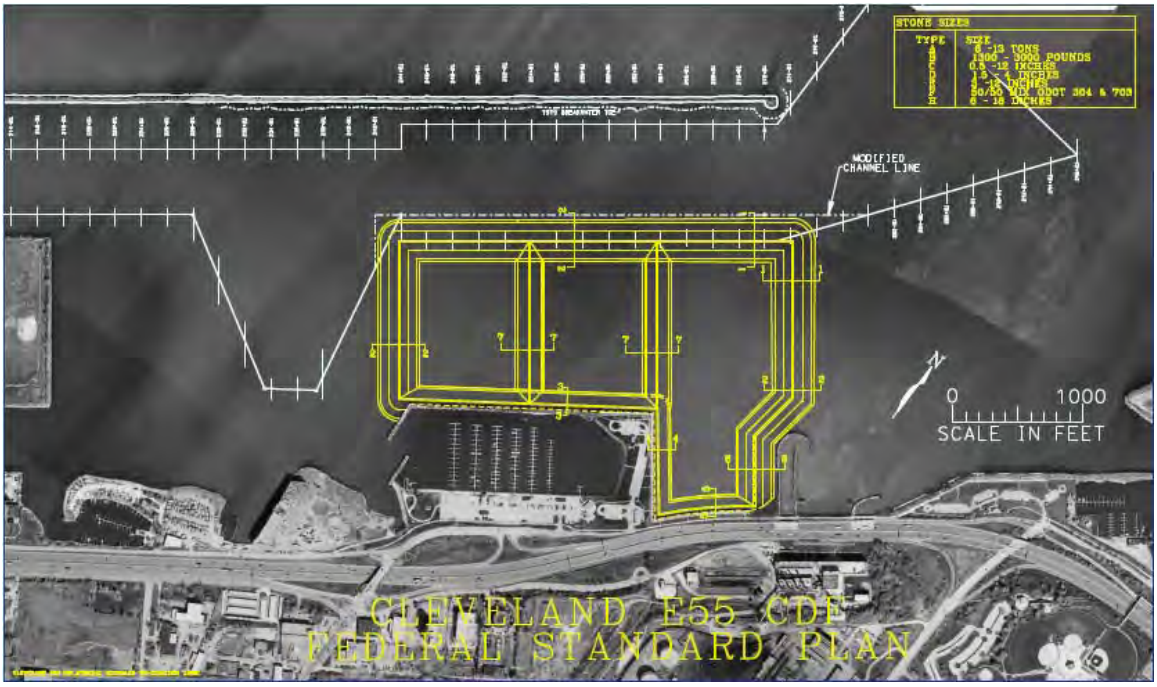
Plan 4a was redesigned based upon the following criteria:

- Minimize encroachment into the Federal navigation channel,
- Set the proposed fill elevation at +20 ft LWD, and
- Achieve a 20-year capacity assuming a fill rate of 330,000 cubic yards per year.

Two alternatives were developed, using stone and steel sheet pile as the primary construction materials.

[5] CECW-LRD. 2009. Memorandum through Commander Great Lakes and Ohio River Division, Subject: Cleveland Harbor Dredged Material Management Plan, Cuyahoga County, OH, dated 29-APR-2009.

A. Rubble Mound Alternative - For the rubble mound alternative, typical stone cross-sections for the existing CDF at Dike 14 and the proposed Site 2 were assumed applicable to this site. Due to the presence of very weak soils, wide stability berms will be required and up to 8 feet of average settlement is expected. It is assumed that the facility will be constructed in three phases, with the construction progressing east to west. In order to achieve approximately a 20-year capacity, two iterations of the footprint were required. The first iteration assumed minimal encroachment into the eastern flared portion of the 25-foot deep dock approach channel to the former Nicholson Cleveland Terminal Company pier and the Federal channel line was modified as shown in Insert 3. The stone toe was placed at 25 feet from the modified channel line.

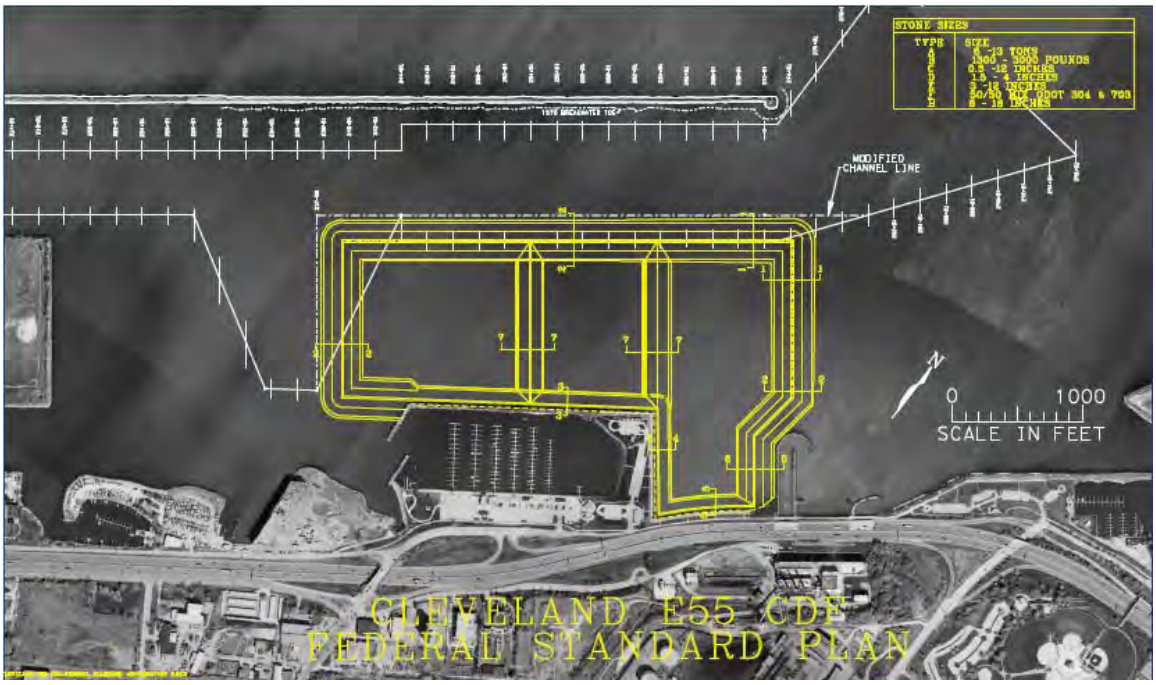


Insert 3. E55th CDF, Rubble Mound Alternative, Iteration 1

The potential interior volume of the CDF was determined by estimating the volume occupied by area delineated by the sheet pile line or the back of the structure crest defined by existing structures and subsequently subtracting the volume occupied by the stone structures. The gross volume was determined by generating a digital terrain model (DTM) for the existing bottom, based upon surveys obtained in 2008 and the top elevation of the CDF at 20 feet LWD. Subtracting these two DTMs resulted in the gross volume within the CDF. Further subtraction of the volume occupied by the stone structures resulted in a net volume of 6,181,000 cubic yards. At an average fill rate of 330,000 cubic yards annually, the facility would reach capacity at 18.7 years.

In order to achieve a 20-year capacity, the layout was modified by moving the west leg westward, further encroaching into the eastern flared portion of the

25-foot deep dock approach channel to the former Nicholson Cleveland Terminal Company pier as shown in Insert 4. The potential volume was determined in the same manner as iteration 1 and is summarized in Table 1. It is estimated that this configuration would result in a potential volume of 6,532,000 cubic yards and a capacity of 19.8 years. This is the selected rubble mound configuration. Figures 1 – 5 present the plan and typical cross-sections.

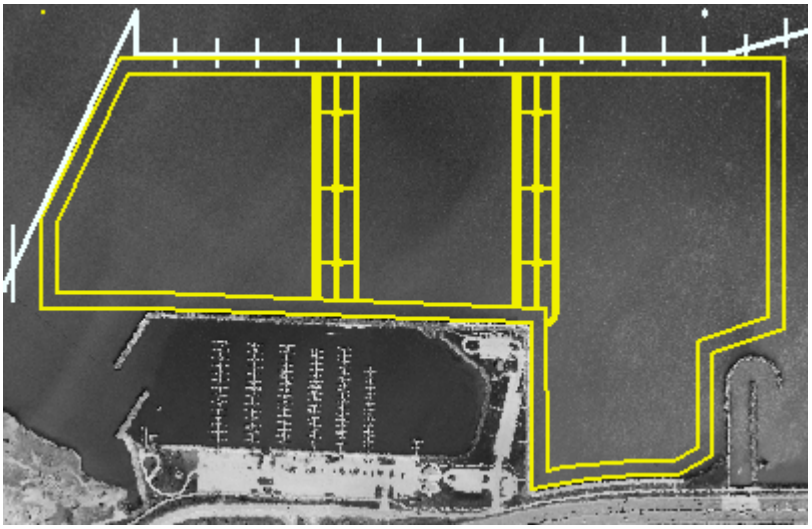


Insert 4. E55th CDF, Rubble Mound Alternative, Iteration 2

Table 1. Net Volume for Iteration 2, Rubble Mound Alternative

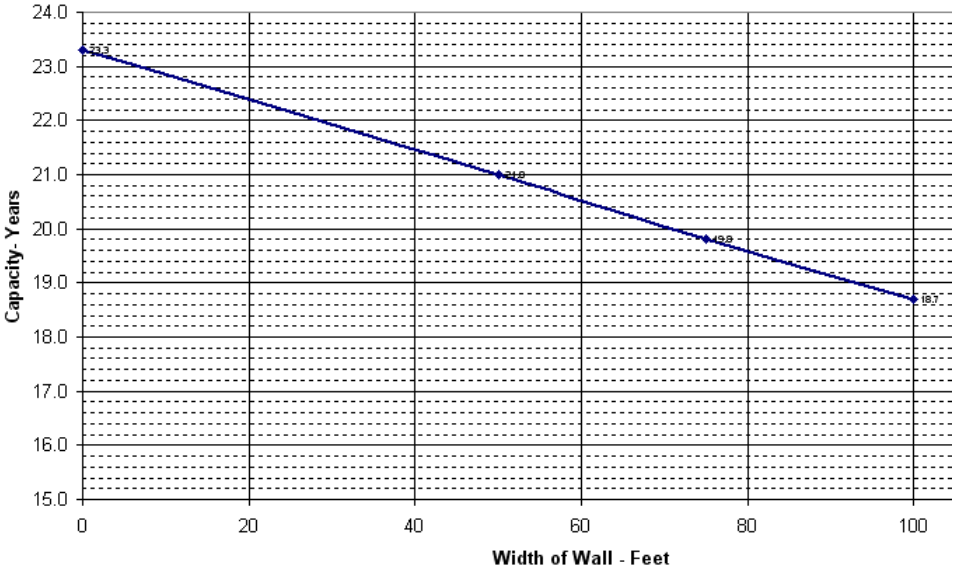
Item	Volume - CY
Volume delineated by sheet pile or backline of crest along existing structures	7924173
Deductions of stone from	
North Leg	344858
West Leg	105205
Marina Leg	262673
Bikepath Leg	57760
East Leg	201535
Cross dikes	420311
TOTAL Deductions	1392342
NET CDF Volume	**6,531,831**
Capacity (Years)	**19.8**

B. Steel Combi-wall Alternative – For this alternative, a combi-wall configuration was selected. Combi-walls are piling walls comprised of high modulus structural components interspaced by lighter sheet piles. It was initially assumed that the crest elevation would be +22 ft LWD and the wall would be placed 25-feet from the existing Federal navigation line as shown in Insert 5.



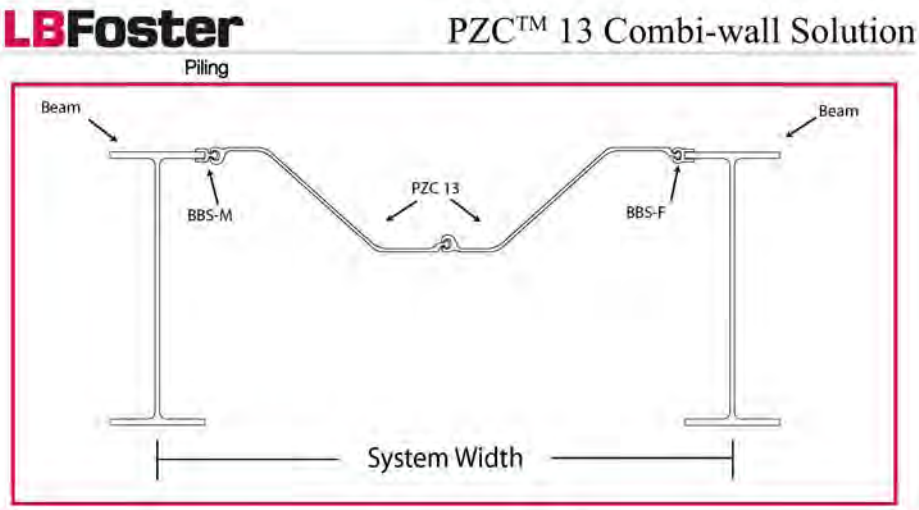
Insert 5. E55th CDF, Combi-wall Alternative, Iteration 1

The volume of the CDF filled to +20 ft LWD was determined by subtracting the volume occupied by the stone cross dikes from the volume contained within the combiwall system. Insert 6 presents a graph of the net CDF volume for varying combi-wall system widths and suggests that the basic footprint will support the placement of about 20 years of dredge material.



Insert 6. CDF Capacity versus Combi-wall width

Due to the very weak soils at the proposed site, stability considerations will limit the combi-wall crest elevation to 10 feet above Low Water Datum (LWD) despite the sheet pile being driven to 80 feet below LWD. To form the combi-walls, two parallel rows of wide flange 40x215 sections interspaced with PZC 13 steel sheet pile will be driven and tied together near the top using a wale system. The interior distance between the walls will be 60 feet and the area between the walls will be filled with a granular material and capped with a one-foot concrete paving. A schematic of the PZC™ 13 combi-wall system is presented in Insert 7[6].



Insert 7. Schematic of the PZC™ 13 Combi-wall System

In order to achieve a final fill elevation of 20 feet above LWD, as the CDF is filled, interior berms using the existing material will be constructed. Waves overtopping the combi-wall system will require that the berm be protected with stone. Two layers of 6 – 13 ton armor will overlay 1300-3000 pound underlayer stone, 3-12 inch bedding stone and a layer of geotextile fabric.

The potential interior volume of the CDF was determined by estimating the volume occupied by area delineated by the interior combi-wall line and subsequently subtracting the volume occupied by the stone structures. The outer combi-wall was located 25-feet from the existing Federal channel. The gross volume was determined by generating a digital terrain model (DTM) for the existing bottom, based upon surveys obtained in 2008 and the top elevation of the CDF at 20 feet LWD. Subtracting these two DTMs resulted in the gross volume within the CDF. Further subtraction of the volume occupied by the stone structures, loss of space by sloping the stone between +10 and +20 ft LWD and the minor addition of the berm above +20 ft LWD resulted in a net volume of 6,487,000 cubic yards. At an average fill rate of 330,000 cubic yards annually, the facility would reach capacity at 19.7 years as summarized in Table 2.

[6] LBFoster. 2009. Dimensions and Properties of PZC™ 13 Combi-wall System, www.fosterpiling.com

Table 2. Net Volume for Combi-wall System Alternative

Item	Volume - CY
Volume delineated by interior combi-wall line	7054504
Deductions of stone from	
Section 1-1	
South Leg	9502
West Leg	25139
North Leg	71323
East Leg	48765
Total Section 1-1	154728
Section 2-2	
Marina Leg	9770
Bikepath Leg	2088
Total Section 2-2	11858
Cross dikes	400469
TOTAL Deductions	567055
NET CDF Volume	**6,487,449**
Capacity (Years)	**19.7**

Figures 6-9 present the plan and typical cross-sections.

3. COST ESTIMATES

4. SELECTION OF ALTERNATIVE

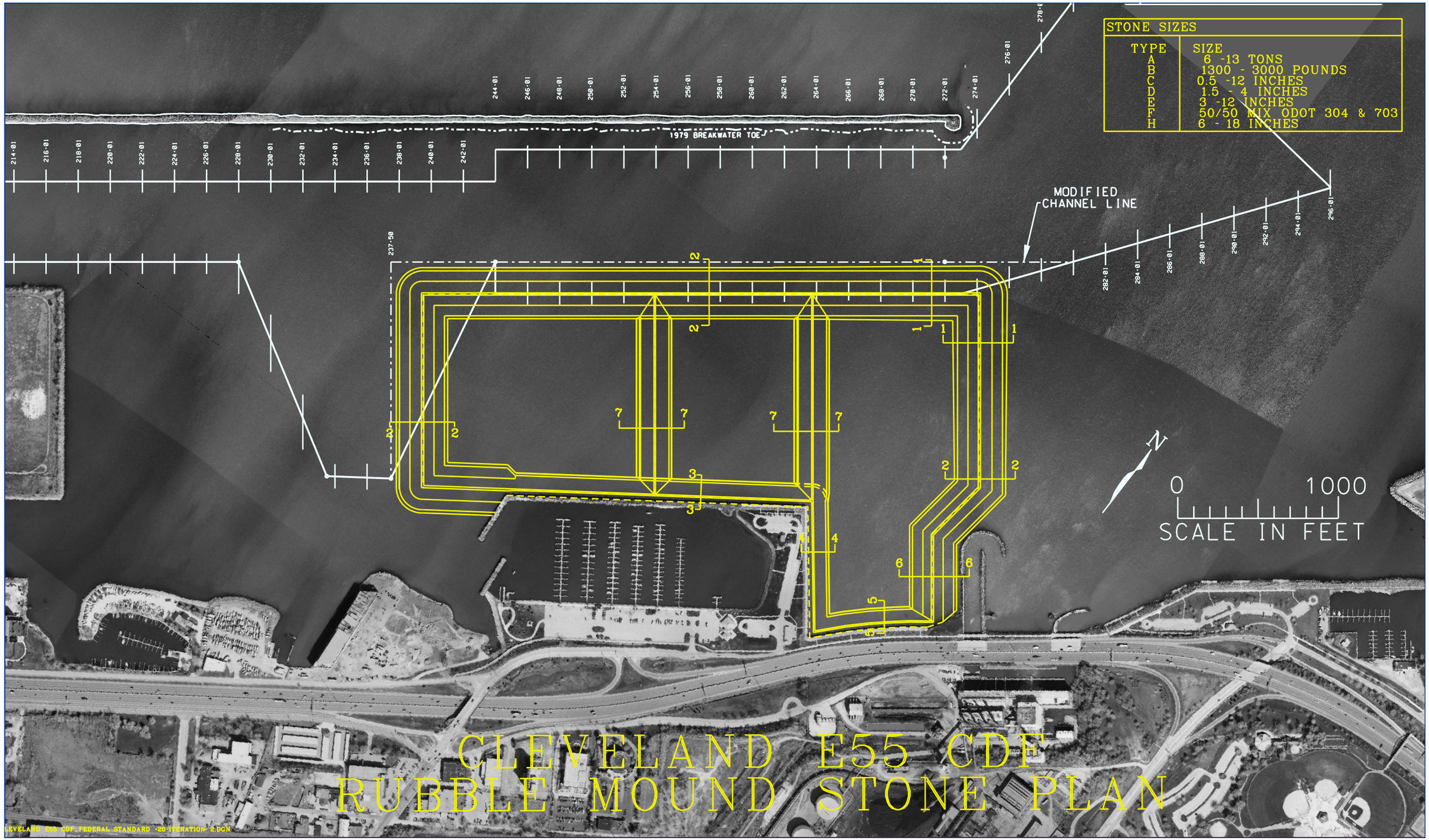
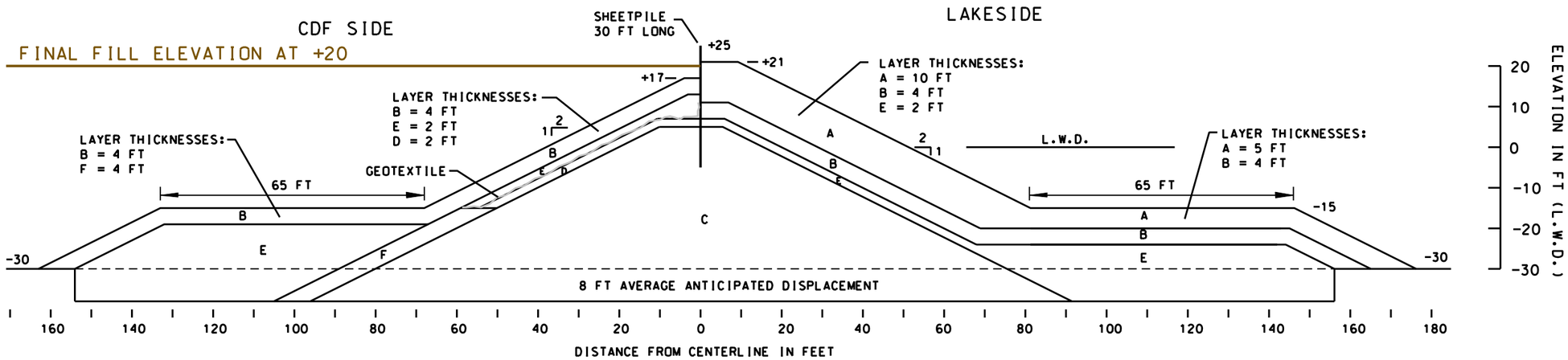
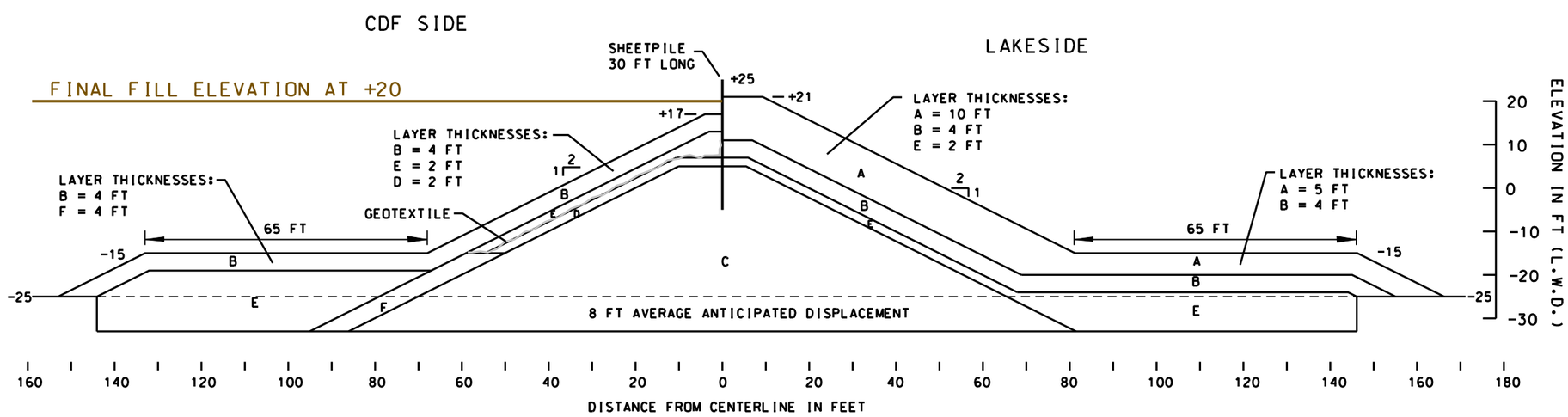

STONE SIZES
TYPE SIZE
A 6 -13 TONS
B 1300 - 3000 POUNDS
C 0.5 -12 INCHES
D 1.5 - 4 INCHES
E 3 -12 INCHES
F 50/50 MIX ODOT 304 & 703
H 6 - 18 INCHES
1979 BREAKWATER TOE
MODIFIED CHANNEL LINE
0 1000
SCALE IN FEET
CLEVELAND E55 CDF
RUBBLE MOUND STONE PLAN

FIGURE 1



NORTH LEG: TYPICAL SECTION AT -30 FT LWD BOTTOM ELEVATION

SECTION 1-1



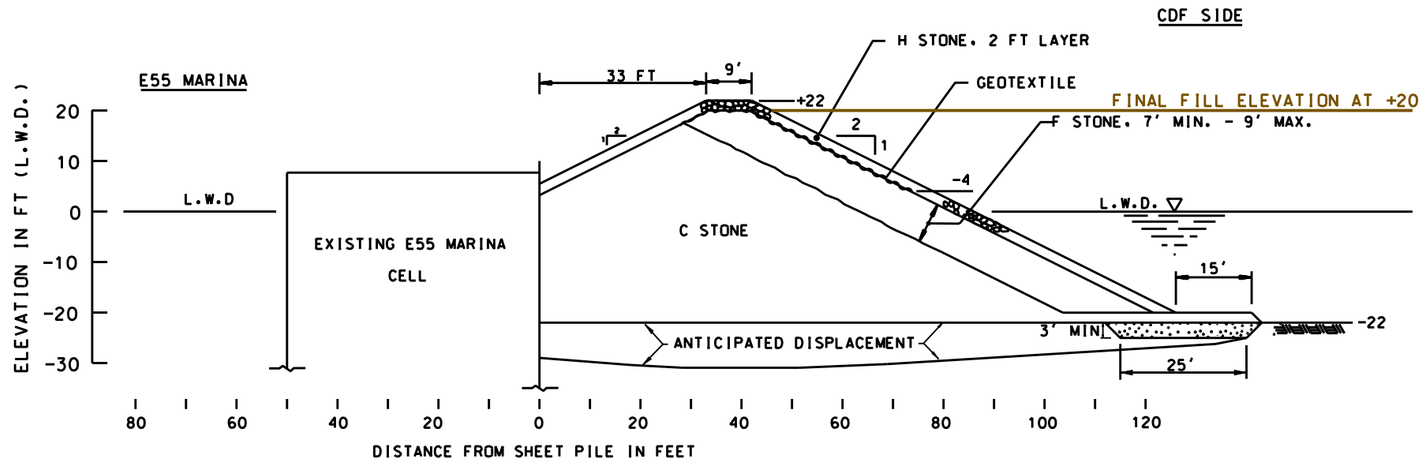
NORTH LEG: TYPICAL SECTION AT -25 FT LWD BOTTOM ELEVATION

SECTION 2-2

CLEV E55 CDF_FEDERAL STANDARD +20 SECTIONS.DGN

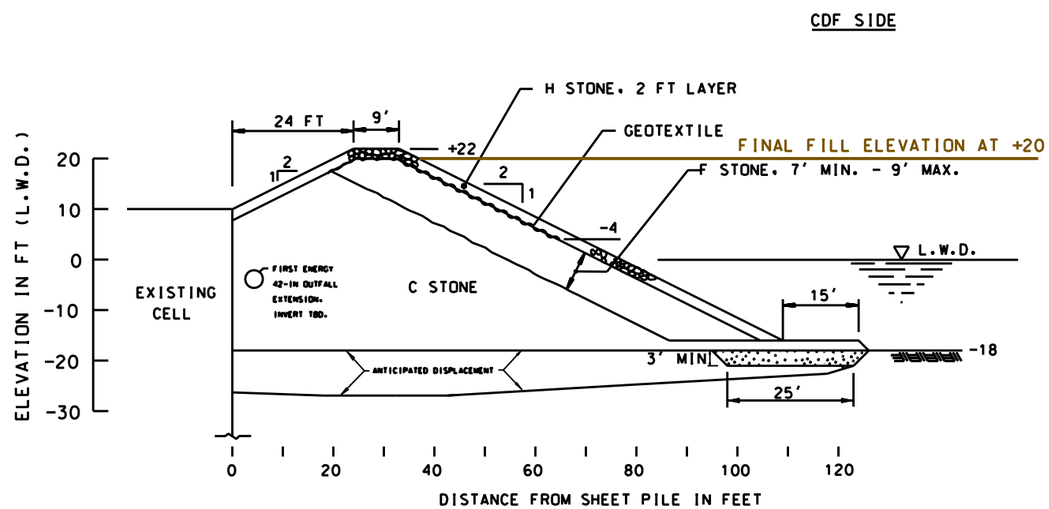
CLEVELAND EAST 55TH STREET CDF: RUBBLEMOUND ALTERNATIVE, SECTIONS 1-1 & 2-2

FIGURE 2



TYPICAL SECTION ALONG NORTH SIDE E55 MARINA AT -22 FT LWD BOTTOM ELEVATION

SECTION 3-3



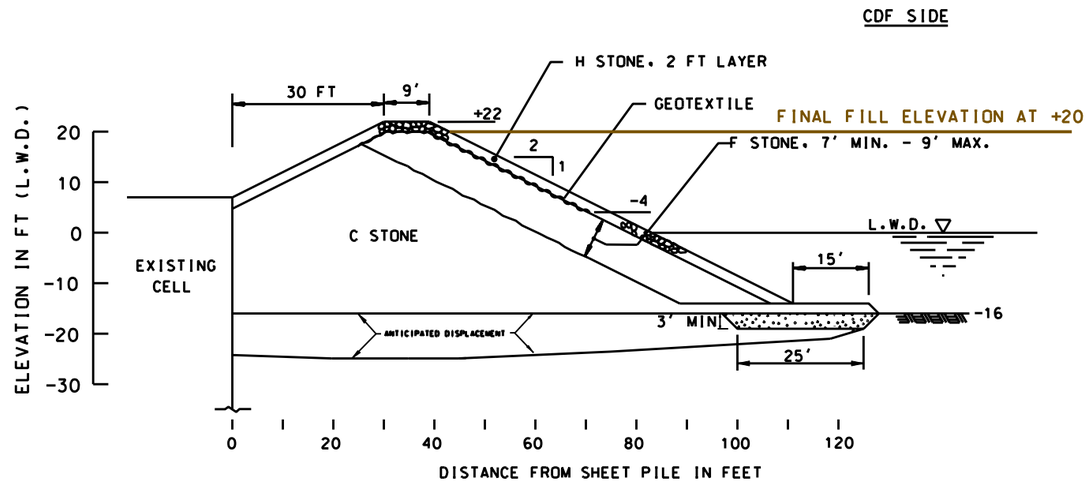
TYPICAL SECTION ALONG EAST SIDE E55 MARINA
AT -18 FT LWD BOTTOM ELEVATION

SECTION 4-4

CLEV E55 CDF_FEDERAL STANDARD +20 SECTIONS.DGN

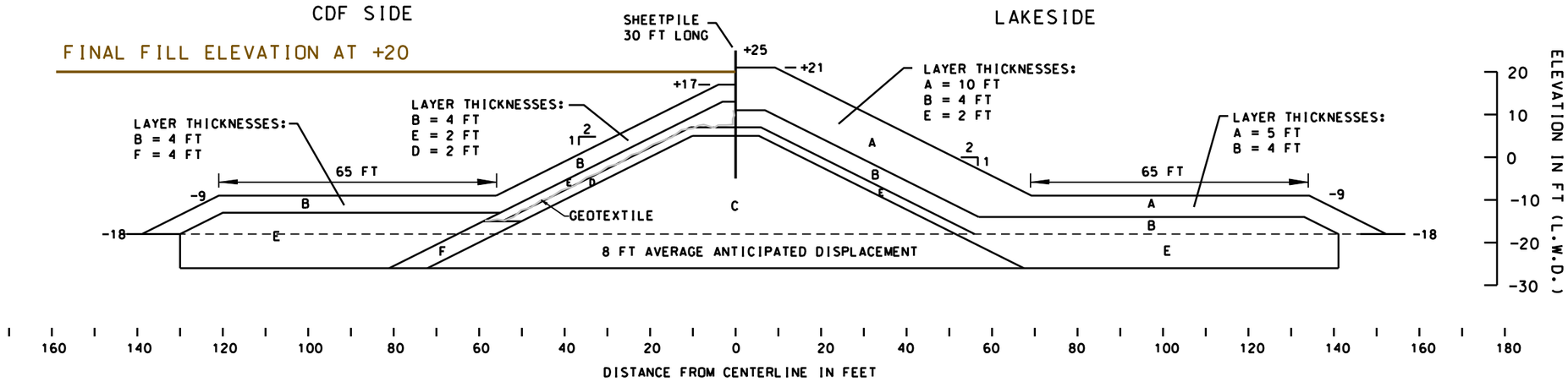
CLEVELAND EAST 55TH STREET CDF: RUBBLEMOUND ALTERNATIVE, SECTIONS 3-3 & 4-4

FIGURE 3



TYPICAL SECTION ALONG BIKEPATH
AT -16 FT LWD BOTTOM ELEVATION

SECTION 5-5



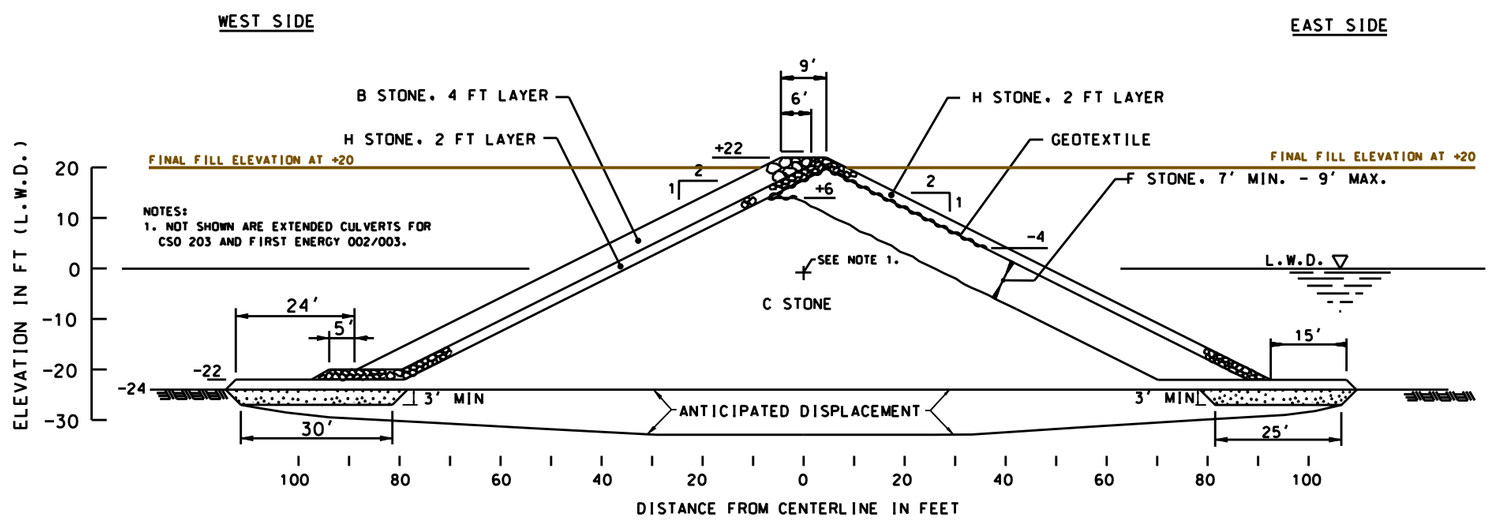
WEST LEG: TYPICAL SECTION AT -18 FT LWD BOTTOM ELEVATION

SECTION 6-6

CLEV E55 CDF_FEDERAL STANDARD +20 SECTIONS.DGN

CLEVELAND EAST 55TH STREET CDF: RUBBLEMOUND ALTERNATIVE, SECTIONS 5-5 & 6-6

FIGURE 4



CROSS DIKES: TYPICAL SECTION AT -24 FT LWD BOTTOM ELEVATION
SECTION 7-7

CLEV E55 CDF_FEDERAL STANDARD +20 SECTIONS.DGN

CLEVELAND EAST 55TH STREET CDF: RUBBLEMOUND ALTERNATIVE, SECTION 7-7

FIGURE 5

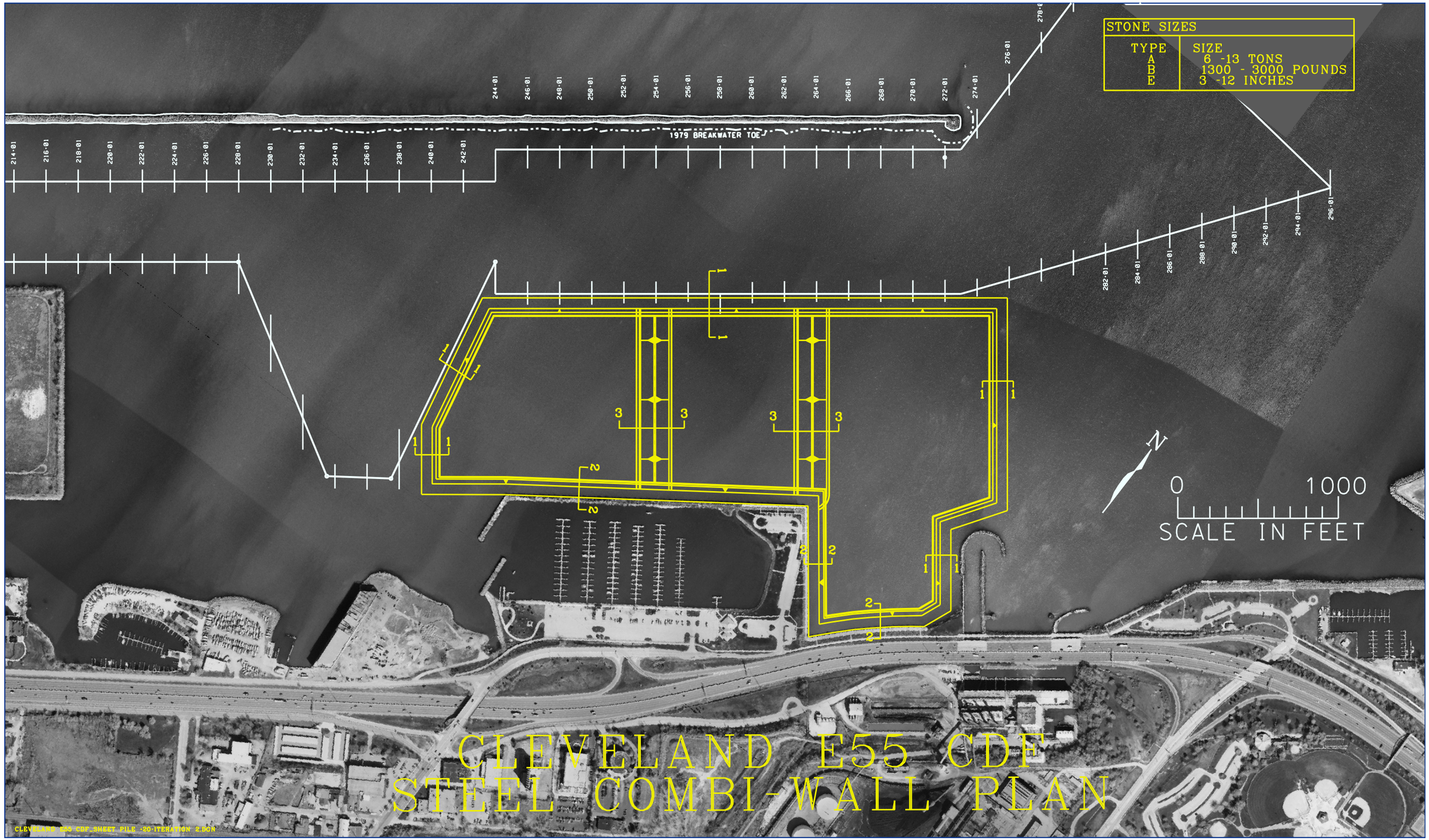

STONE SIZES
TYPE SIZE
A 6 -13 TONS
B 1300 - 3000 POUNDS
E 3 -12 INCHES
1979 BREAKWATER TOE
0 1000
SCALE IN FEET
N
CLEVELAND E55 CDF
STEEL COMBI-WALL PLAN

FIGURE 6

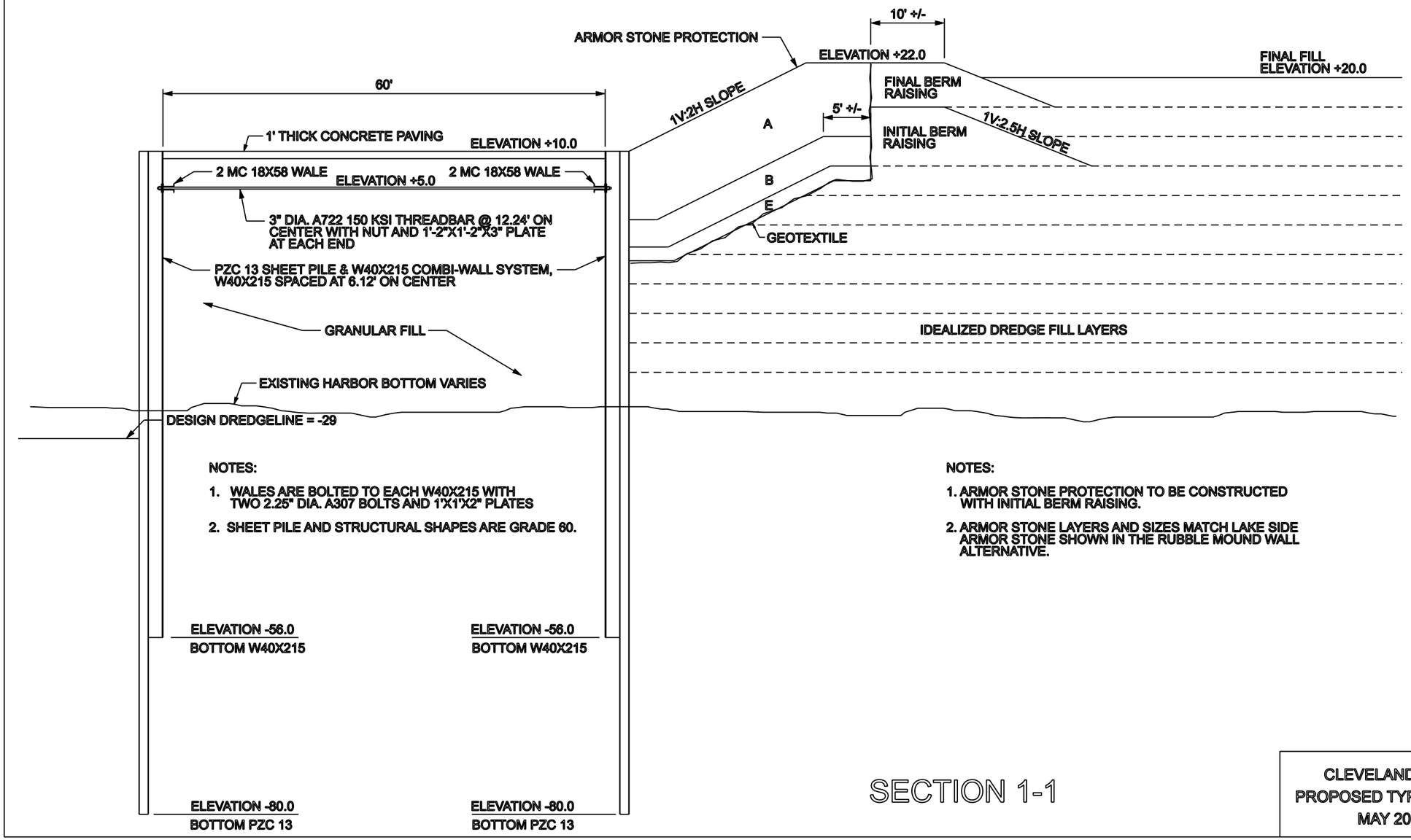

ARMOR STONE PROTECTION
10' +/-
ELEVATION +22.0
FINAL FILL
ELEVATION +20.0
60'
1V:2H SLOPE
FINAL BERM
RAISING
5' +/-
A
INITIAL BERM
RAISING
1V:2.5H SLOPE
1' THICK CONCRETE PAVING
ELEVATION +10.0
2 MC 18X58 WALE
ELEVATION +5.0
2 MC 18X58 WALE
B
E
3" DIA. A722 150 KSI THREADBAR @ 12.24' ON
CENTER WITH NUT AND 1'-2"X1'-2"X3" PLATE
AT EACH END
GEOTEXTILE
PZC 13 SHEET PILE & W40X215 COMBI-WALL SYSTEM,
W40X215 SPACED AT 6.12' ON CENTER
GRANULAR FILL
IDEALIZED DREDGE FILL LAYERS
EXISTING HARBOR BOTTOM VARIES
DESIGN DREDGELINE = -29
NOTES:
1. WALES ARE BOLTED TO EACH W40X215 WITH
TWO 2.25" DIA. A307 BOLTS AND 1"X1"X2" PLATES
2. SHEET PILE AND STRUCTURAL SHAPES ARE GRADE 60.
NOTES:
1. ARMOR STONE PROTECTION TO BE CONSTRUCTED
WITH INITIAL BERM RAISING.
2. ARMOR STONE LAYERS AND SIZES MATCH LAKE SIDE
ARMOR STONE SHOWN IN THE RUBBLE MOUND WALL
ALTERNATIVE.
ELEVATION -56.0
BOTTOM W40X215
ELEVATION -56.0
BOTTOM W40X215
ELEVATION -80.0
BOTTOM PZC 13
ELEVATION -80.0
BOTTOM PZC 13
SECTION 1-1
CLEVELAND E55 CDF
PROPOSED TYPICAL SECTION
MAY 2009

FIGURE 7

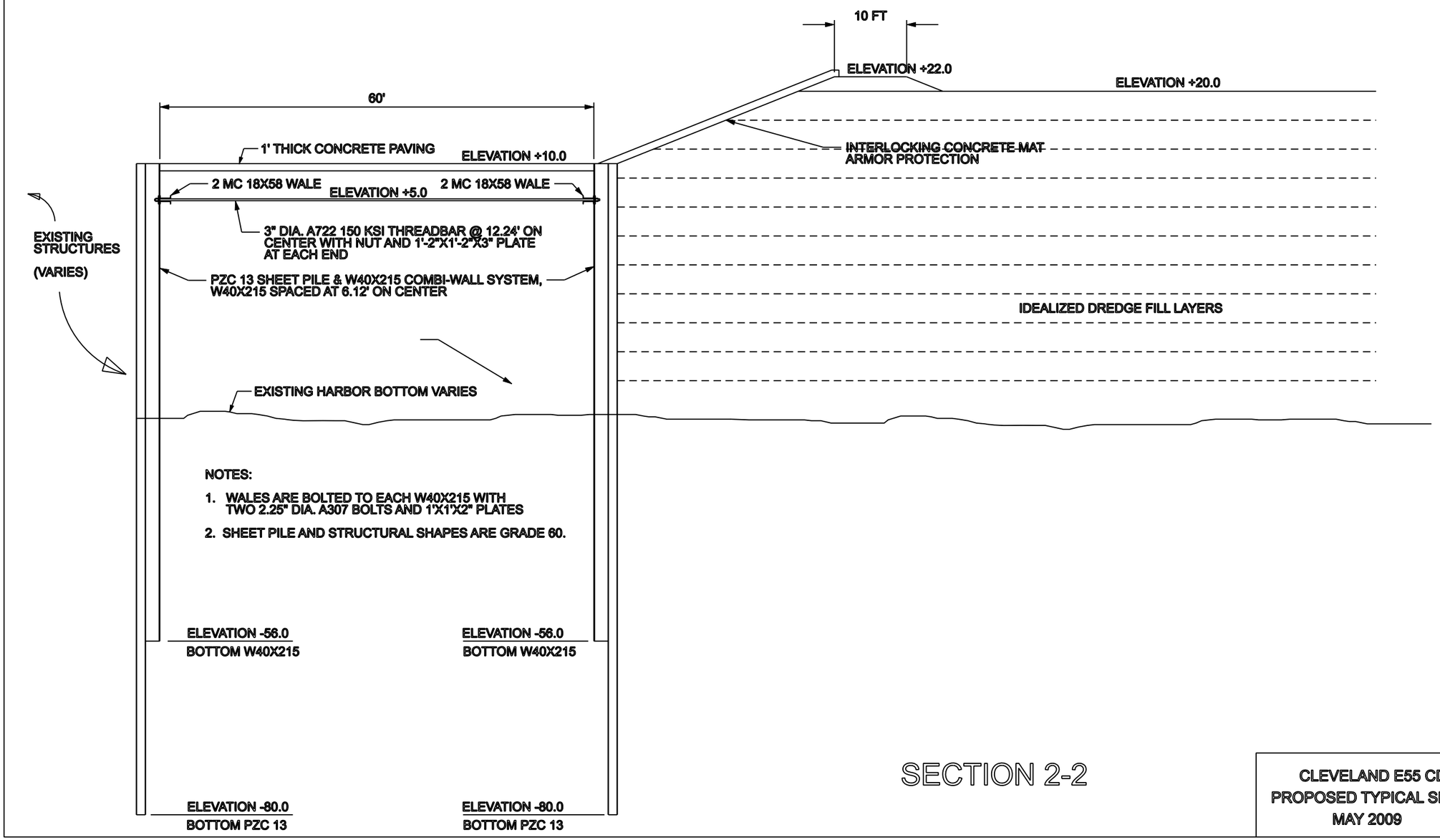
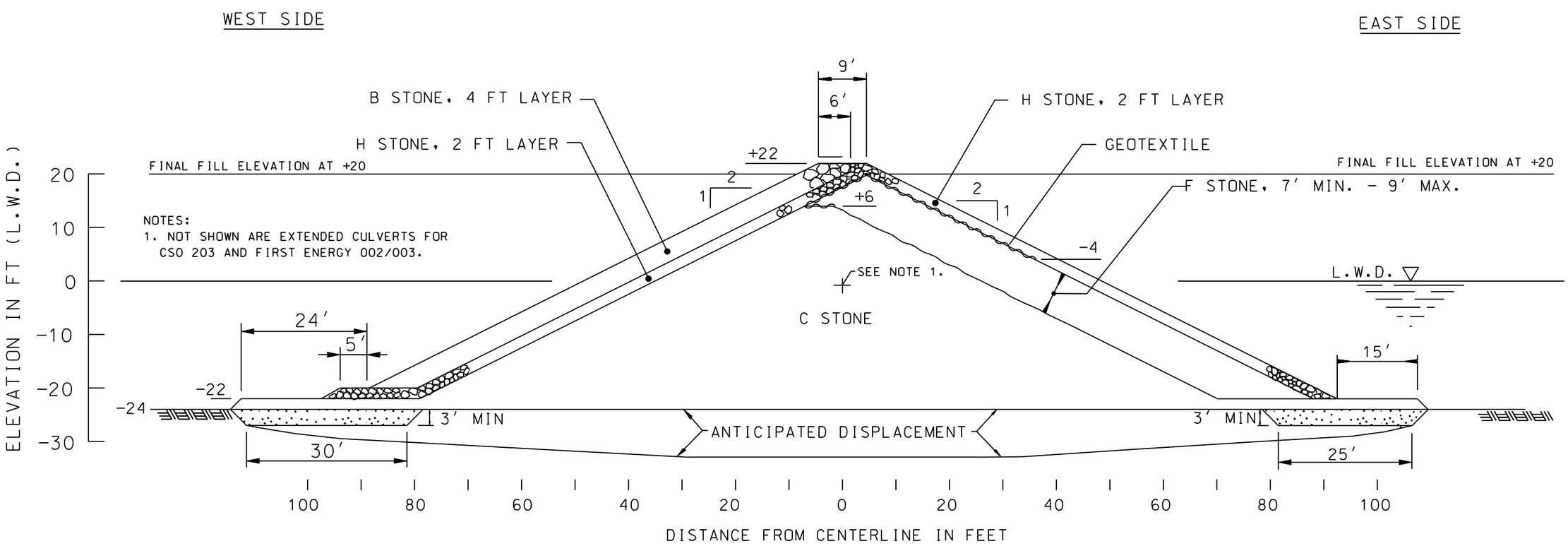

10 FT
ELEVATION +22.0
ELEVATION +20.0
60'
1' THICK CONCRETE PAVING
ELEVATION +10.0
INTERLOCKING CONCRETE MAT ARMOR PROTECTION
2 MC 18X58 WALE
ELEVATION +5.0
2 MC 18X58 WALE
EXISTING STRUCTURES
(VARIES)
3" DIA. A722 150 KSI THREADBAR @ 12.24' ON CENTER WITH NUT AND 1'-2"X1'-2"X3" PLATE AT EACH END
PZC 13 SHEET PILE & W40X215 COMBI-WALL SYSTEM, W40X215 SPACED AT 6.12' ON CENTER
IDEALIZED DREDGE FILL LAYERS
EXISTING HARBOR BOTTOM VARIES
NOTES:
1. WALES ARE BOLTED TO EACH W40X215 WITH TWO 2.25" DIA. A307 BOLTS AND 1"X1"X2" PLATES
2. SHEET PILE AND STRUCTURAL SHAPES ARE GRADE 60.
ELEVATION -56.0
BOTTOM W40X215
ELEVATION -56.0
BOTTOM W40X215
ELEVATION -80.0
BOTTOM PZC 13
ELEVATION -80.0
BOTTOM PZC 13
SECTION 2-2
CLEVELAND E55 CDF
PROPOSED TYPICAL SECTION
MAY 2009

FIGURE 8



CROSS DIKES: TYPICAL SECTION AT -24 FT LWD BOTTOM ELEVATION

SECTION 3-3

VERTICAL WALL SECTION.DGN

CLEVELAND E55 CDF
PROPOSED TYPICAL SECTION
3-3
MAY 2009

FIGURE 9

E55 CDF NEW Federal Alternative
Rubblemound stone alternative at E55 St location

Estimated by	JW
Designed by	M Mohr
Prepared by	James Wryk
Preparation Date	6/1/2009
Effective Date of Pricing	6/1/2009
Estimated Construction Time	Days

This report is not copyrighted, but the information contained herein is For Official Use Only.

Date	Author	Note
7/30/2008	jw	Anticipate this project will be built in 3 phases. Therfeore each phase has a mob/demob action under the General Conditions.
7/30/2008	jw	Pricing used is from the 2006 estimates esculated to 4th Qtr 08 Price Levels.
		10% contingencies added to the estimate across all work..
		This estimate does not take into account any sewer relocations.
6/5/2009	jw	This estimate developed from a 21 May 2009 memo by Mike Mohr for a new layout for the proosed CDF at E55th street location. See memo that is within the folder containing this estimate.

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Project Cost Summary Report			**300,310,204**	**26,787,670**	**32,709,787**	**359,807,661**
Phase 1	**1.00**	**LS**	**133,718,719**	**11,927,710**	**14,564,643**	**160,211,071**
Phase 2	**1.00**	**LS**	**64,062,914**	**5,714,412**	**6,977,733**	**76,755,058**
Phase 3	**1.00**	**LS**	**102,528,571**	**9,145,549**	**11,167,412**	**122,841,532**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
Contract Cost Summary Report			**249,738,647**	**0**	**50,571,557**	**300,310,204**
Phase 1	**1.00**	**LS**	**111,200,790**	**0**	**22,517,929**	**133,718,719**
			1,006,480.44			*1,210,290.64*
General Conditions	**1.00**	**EA**	**1,006,480**	**0**	**203,810**	**1,210,291**
			47,015.46			*56,536.00*
Temporary Office	**1.00**	**EA**	**47,015**	**0**	**9,521**	**56,536**
Submittals	**1.00**	**LS**	**32,102**	**0**	**6,501**	**38,602**
Mob and Demob	**1.00**	**LS**	**177,952**	**0**	**36,035**	**213,987**
			749,411.32			*901,165.56*
Quality Control On-Site	**1.00**	**EA**	**749,411**	**0**	**151,754**	**901,166**
			65.35			*78.58*
Type A	**245,700.00**	**TON**	**16,056,742**	**0**	**3,251,457**	**19,308,199**
			59.83			*71.95*
Type B	**281,300.00**	**TON**	**16,830,647**	**0**	**3,408,171**	**20,238,817**
			35.15			*42.27*
Type C	**1,450,000.00**	**TON**	**50,969,484**	**0**	**10,321,215**	**61,290,699**
			17.40			*20.93*
Type D	**23,300.00**	**TON**	**405,487**	**0**	**82,110**	**487,598**
			35.15			*42.27*
Type E	**446,100.00**	**TON**	**15,681,025**	**0**	**3,175,375**	**18,856,400**
			17.30			*20.80*
Type F	**162,300.00**	**TON**	**2,807,349**	**0**	**568,482**	**3,375,831**
			41.69			*50.13*
Type H	**59,400.00**	**TON**	**2,476,419**	**0**	**501,470**	**2,977,888**
			43,695.19			*52,543.38*
Weir and Walkway	**1.00**	**EA**	**43,695**	**0**	**8,848**	**52,543**
			40,098.76			*48,218.68*
Wier	**1.00**	**EA**	**40,099**	**0**	**8,120**	**48,219**
			3,596.43			*4,324.70*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,596**	**0**	**728**	**4,325**
			14.28			*17.17*
Steel Sheet Pile Wall	**94,200.00**	**SF**	**1,344,896**	**0**	**272,339**	**1,617,234**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			2,081.24			*2,502.68*
CZ67	**646.20**	**TON**	**1,344,896**	**0**	**272,339**	**1,617,234**
			4.81			*5.79*
Geotextile	**50,100.00**	**SY**	**241,066**	**0**	**48,815**	**289,881**
			1,250.00			*1,503.12*
Outfall Relocation	**2,670.00**	**LF**	**3,337,500**	**0**	**675,837**	**4,013,337**
Phase 2	**1.00**	**LS**	**53,274,865**	**0**	**10,788,049**	**64,062,914**
			1,006,480.44			*1,210,290.64*
General Conditions	**1.00**	**EA**	**1,006,480**	**0**	**203,810**	**1,210,291**
			47,015.46			*56,536.00*
Temporary Office	**1.00**	**EA**	**47,015**	**0**	**9,521**	**56,536**
Submittals	**1.00**	**LS**	**32,102**	**0**	**6,501**	**38,602**
Mob and Demob	**1.00**	**LS**	**177,952**	**0**	**36,035**	**213,987**
			749,411.32			*901,165.56*
Quality Control On-Site	**1.00**	**EA**	**749,411**	**0**	**151,754**	**901,166**
			65.35			*78.58*
Type A	**78,000.00**	**TON**	**5,097,379**	**0**	**1,032,209**	**6,129,587**
			59.83			*71.95*
Type B	**109,300.00**	**TON**	**6,539,601**	**0**	**1,324,256**	**7,863,856**
			35.15			*42.27*
Type C	**845,400.00**	**TON**	**29,716,967**	**0**	**6,017,624**	**35,734,591**
			17.40			*20.93*
Type D	**7,400.00**	**TON**	**128,781**	**0**	**26,078**	**154,859**
			35.15			*42.27*
Type E	**116,800.00**	**TON**	**4,105,680**	**0**	**831,392**	**4,937,071**
			17.30			*20.80*
Type F	**114,800.00**	**TON**	**1,985,728**	**0**	**402,106**	**2,387,834**
			41.69			*50.13*
Type H	**50,900.00**	**TON**	**2,122,049**	**0**	**429,710**	**2,551,759**
			43,695.19			*52,543.38*
Weir and Walkway	**1.00**	**EA**	**43,695**	**0**	**8,848**	**52,543**
			40,098.76			*48,218.68*
Wier	**1.00**	**EA**	**40,099**	**0**	**8,120**	**48,219**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			3,596.43			*4,324.70*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,596**	**0**	**728**	**4,325**
			14.25			*17.13*
Steel Sheet Pile Wall	**29,800.00**	**SF**	**424,572**	**0**	**85,975**	**510,547**
			2,081.24			*2,502.68*
CZ67	**204.00**	**TON**	**424,572**	**0**	**85,975**	**510,547**
			4.81			*5.79*
Geotextile	**21,600.00**	**SY**	**103,933**	**0**	**21,046**	**124,979**
			1,250.00			*1,503.12*
Outfall Relocation	**1,600.00**	**LF**	**2,000,000**	**0**	**404,996**	**2,404,996**
Phase 3	**1.00**	**LS**	**85,262,993**	**0**	**17,265,579**	**102,528,571**
			1,006,480.44			*1,210,290.64*
General Conditions	**1.00**	**EA**	**1,006,480**	**0**	**203,810**	**1,210,291**
			47,015.46			*56,536.00*
Temporary Office	**1.00**	**EA**	**47,015**	**0**	**9,521**	**56,536**
Submittals	**1.00**	**LS**	**32,102**	**0**	**6,501**	**38,602**
Mob and Demob	**1.00**	**LS**	**177,952**	**0**	**36,035**	**213,987**
			749,411.32			*901,165.56*
Quality Control On-Site	**1.00**	**EA**	**749,411**	**0**	**151,754**	**901,166**
			65.35			*78.58*
Type A	**259,800.00**	**TON**	**16,978,191**	**0**	**3,438,048**	**20,416,240**
			59.83			*71.95*
Type B	**266,800.00**	**TON**	**15,963,087**	**0**	**3,232,492**	**19,195,579**
			35.15			*42.27*
Type C	**956,300.00**	**TON**	**33,615,254**	**0**	**6,807,019**	**40,422,272**
			17.40			*20.93*
Type D	**24,500.00**	**TON**	**426,371**	**0**	**86,339**	**512,710**
			35.15			*42.27*
Type E	**389,200.00**	**TON**	**13,680,913**	**0**	**2,770,356**	**16,451,269**
			17.30			*20.80*
Type F	**77,200.00**	**TON**	**1,335,350**	**0**	**270,406**	**1,605,756**
			41.69			*50.13*
Type H	**15,500.00**	**TON**	**646,203**	**0**	**130,855**	**777,058**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			43,695.19			*52,543.38*
Weir and Walkway	**1.00**	**EA**	**43,695**	**0**	**8,848**	**52,543**
			40,098.76			*48,218.68*
Wier	**1.00**	**EA**	**40,099**	**0**	**8,120**	**48,219**
			3,596.43			*4,324.70*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,596**	**0**	**728**	**4,325**
			14.27			*17.16*
Steel Sheet Pile Wall	**99,300.00**	**SF**	**1,417,323**	**0**	**287,005**	**1,704,328**
			2,081.24			*2,502.68*
CZ67	**681.00**	**TON**	**1,417,323**	**0**	**287,005**	**1,704,328**
			4.81			*5.79*
Geotextile	**31,200.00**	**SY**	**150,125**	**0**	**30,400**	**180,525**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
Project Direct Costs Report			**16,429,565**	**50,052,808**	**174,883,020**	**46,800**	**5,337,500**	**0**	**2,988,954**	**249,738,647**
Phase 1	**1.00**	**LS**	**7,162,724**	**22,149,714**	**77,231,337**	**15,600**	**3,337,500**	**0**	**1,303,916**	**111,200,790**
			440,486.88	*441,169.45*	*31,600.00*	*15,600.00*			*77,624.11*	*1,006,480.44*
General Conditions	**1.00**	**EA**	**440,487**	**441,169**	**31,600**	**15,600**	**0**	**0**	**77,624**	**1,006,480**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**44,772**	**124,984**	**0**	**0**	**0**	**0**	**8,196**	**177,952**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			144.48	*575.49*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*746.17*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	75,964	0	0	0	0	3,459	98,494
			194.70	*371.36*	*0.00*	*0.00*	*0.00*	*0.00*	*35.89*	*601.95*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	25,700	49,020	0	0	0	0	4,737	79,457
			362,505.60	*316,185.72*	*7,200.00*	*0.00*			*63,520.00*	*749,411.32*
Quality Control On-Site	**1.00**	**EA**	**362,506**	**316,186**	**7,200**	**0**	**0**	**0**	**63,520**	**749,411**
			10,069.60	*8,782.94*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*20,816.98*
USR Quality Control	36.00	MO	362,506	316,186	7,200	0	0	0	63,520	749,411
			3.08	*9.21*	*52.50*	*0.00*			*0.56*	*65.35*
Type A	**245,700.00**	**TON**	**756,838**	**2,262,314**	**12,899,250**	**0**	**0**	**0**	**138,340**	**16,056,742**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
			1.48	*2.81*	*52.50*	*0.00*	*0.00*	*0.00*	*0.27*	*57.06*
USR Type A Armor Stone (5 ton to 10 ton)	245,700.00	TON	362,408	691,236	12,899,250	0	0	0	66,804	14,019,697
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	245,700.00	TON	394,430	1,571,078	0	0	0	0	71,536	2,037,045
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.75	*8.58*	*48.00*	*0.00*			*0.50*	*59.83*
Type B	**281,300.00**	**TON**	**773,752**	**2,413,207**	**13,502,400**	**0**	**0**	**0**	**141,288**	**16,830,647**
			1.15	*2.18*	*48.00*	*0.00*	*0.00*	*0.00*	*0.21*	*51.54*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	281,300.00	TON	322,171	614,491	13,502,400	0	0	0	59,387	14,498,450
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	281,300.00	TON	451,580	1,798,715	0	0	0	0	81,901	2,332,197
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.37	*7.85*	*24.50*	*0.00*			*0.43*	*35.15*
Type C	**1,450,000.00**	**TON**	**3,434,851**	**11,383,383**	**35,525,000**	**0**	**0**	**0**	**626,250**	**50,969,484**
			0.76	*1.46*	*24.50*	*0.00*	*0.00*	*0.00*	*0.14*	*26.86*
USR Type C Stone	1,450,000.00	TON	1,107,118	2,111,654	35,525,000	0	0	0	204,080	38,947,851
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	1,450,000.00	TON	2,327,733	9,271,729	0	0	0	0	422,171	12,021,633
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.29	*7.70*	*7.00*	*0.00*			*0.42*	*17.40*
Type D	**23,300.00**	**TON**	**53,322**	**179,347**	**163,100**	**0**	**0**	**0**	**9,718**	**405,487**
			0.68	*1.30*	*7.00*	*0.00*	*0.00*	*0.00*	*0.13*	*9.11*
USR Type D Stone	23,300.00	TON	15,918	30,360	163,100	0	0	0	2,934	212,312
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	23,300.00	TON	37,404	148,987	0	0	0	0	6,784	193,175
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.37	*7.85*	*24.50*	*0.00*			*0.43*	*35.15*
Type E	**446,100.00**	**TON**	**1,056,750**	**3,502,157**	**10,929,450**	**0**	**0**	**0**	**192,669**	**15,681,025**
			0.76	*1.46*	*24.50*	*0.00*	*0.00*	*0.00*	*0.14*	*26.86*
USR Type C and E Stone	446,100.00	TON	340,610	649,661	10,929,450	0	0	0	62,786	11,982,508

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	446,100.00	TON	716,139	2,852,495	0	0	0	0	129,883	3,698,517
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.25	*7.63*	*7.00*	*0.00*			*0.41*	*17.30*
Type F	**162,300.00**	**TON**	**365,878**	**1,238,700**	**1,136,100**	**0**	**0**	**0**	**66,670**	**2,807,349**
			0.65	*1.24*	*7.00*	*0.00*	*0.00*	*0.00*	*0.12*	*9.01*
USR Type F Stone	162,300.00	TON	105,333	200,906	1,136,100	0	0	0	19,416	1,461,755
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	162,300.00	TON	260,546	1,037,794	0	0	0	0	47,254	1,345,594
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.51	*8.12*	*30.60*	*0.00*			*0.46*	*41.69*
Type H	**59,400.00**	**TON**	**149,148**	**482,420**	**1,817,640**	**0**	**0**	**0**	**27,210**	**2,476,419**
			0.91	*1.73*	*30.60*	*0.00*	*0.00*	*0.00*	*0.17*	*33.40*
USR Type H Stone	59,400.00	TON	53,792	102,599	1,817,640	0	0	0	9,916	1,983,946
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	59,400.00	TON	95,357	379,821	0	0	0	0	17,294	492,472
(Note: 2400 tons per trip, 24 hrs per trip)										
			15,454.76	*21,954.08*	*3,516.80*	*0.00*			*2,769.56*	*43,695.19*
Weir and Walkway	**1.00**	**EA**	**15,455**	**21,954**	**3,517**	**0**	**0**	**0**	**2,770**	**43,695**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,260.32	*21,810.47*	*1,420.50*	*0.00*			*2,607.48*	*40,098.76*
Wier	**1.00**	**EA**	**14,260**	**21,810**	**1,421**	**0**	**0**	**0**	**2,607**	**40,099**
			15.84	*24.23*	*0.70*	*0.00*	*0.00*	*0.00*	*2.90*	*43.68*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,753	7,270	210	0	0	0	869	13,103
			2,376.72	*3,635.08*	*541.50*	*0.00*	*0.00*	*0.00*	*434.58*	*6,987.88*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,377	3,635	542	0	0	0	435	6,988
			396.12	*605.85*	*0.00*	*0.00*	*0.00*	*0.00*	*72.43*	*1,074.40*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,377	3,635	0	0	0	0	435	6,446
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			15.84	*24.23*	*0.03*	*0.00*	*0.00*	*0.00*	*2.90*	*43.01*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,753	7,270	9	0	0	0	869	12,902
			1,194.44	*143.61*	*2,096.30*	*0.00*			*162.08*	*3,596.43*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**144**	**2,096**	**0**	**0**	**0**	**162**	**3,596**
			7.40	*0.75*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*23.07*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	15	278	0	0	0	20	461
			1.97	*0.20*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.30*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	20	886	0	0	0	27	1,130
			24.70	*3.65*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*36.10*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	73	88	0	0	0	67	722
			23.68	*2.39*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*85.54*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	36	844	0	0	0	48	1,283
			0.61	*1.20*	*12.35*	*0.00*			*0.11*	*14.28*
Steel Sheet Pile Wall	**94,200.00**	**SF**	**57,717**	**113,432**	**1,163,160**	**0**	**0**	**0**	**10,588**	**1,344,896**
			89.32	*175.54*	*1,800.00*	*0.00*			*16.38*	*2,081.24*
CZ67	**646.20**	**TON**	**57,717**	**113,432**	**1,163,160**	**0**	**0**	**0**	**10,588**	**1,344,896**
			89.32	*175.54*	*1,800.00*	*0.00*	*0.00*	*0.00*	*16.38*	*2,081.24*
USR Marine Sheet piling, steel, 38 psf, 40' excavation, left in place, excludes wales	646.20	TON	57,717	113,432	1,163,160	0	0	0	10,588	1,344,896

(Note: Modified for Marine Plant)

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
			1.17	*2.23*	*1.20*	*0.00*			*0.22*	*4.81*
Geotextile	**50,100.00**	**SY**	**58,527**	**111,631**	**60,120**	**0**	**0**	**0**	**10,788**	**241,066**
			0.97	*1.86*	*1.00*	*0.00*	*0.00*	*0.00*	*0.18*	*4.01*
USR Geotextile	60,120.00	SY	58,527	111,631	60,120	0	0	0	10,788	241,066
(Note: 50 ft x 15 ft / 9 sf/sy = 83 sy Section. Say 1/2 hr to place a section. 83 sy x 2 = 164 sy hr. Use 200 sy/hr. Includes overlap)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**2,670.00**	**LF**	**0**	**0**	**0**	**0**	**3,337,500**	**0**	**0**	**3,337,500**
(Note: Relocated First Energy Outfall 002 & 003. Outfalls to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	2,670.00	LF	0	0	0	0	3,337,500	0	0	3,337,500
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date.)										
Phase 2	**1.00**	**LS**	**3,723,163**	**11,103,290**	**35,756,477**	**15,600**	**2,000,000**	**0**	**676,335**	**53,274,865**
			440,486.88	*441,169.45*	*31,600.00*	*15,600.00*			*77,624.11*	*1,006,480.44*
General Conditions	**1.00**	**EA**	**440,487**	**441,169**	**31,600**	**15,600**	**0**	**0**	**77,624**	**1,006,480**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**44,772**	**124,984**	**0**	**0**	**0**	**0**	**8,196**	**177,952**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
			144.48	*575.49*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*746.17*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	75,964	0	0	0	0	3,459	98,494
			194.70	*371.36*	*0.00*	*0.00*	*0.00*	*0.00*	*35.89*	*601.95*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	25,700	49,020	0	0	0	0	4,737	79,457
			362,505.60	*316,185.72*	*7,200.00*	*0.00*			*63,520.00*	*749,411.32*
Quality Control On-Site	**1.00**	**EA**	**362,506**	**316,186**	**7,200**	**0**	**0**	**0**	**63,520**	**749,411**
			10,069.60	*8,782.94*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*20,816.98*
USR Quality Control	36.00	MO	362,506	316,186	7,200	0	0	0	63,520	749,411
			3.08	*9.21*	*52.50*	*0.00*			*0.56*	*65.35*
Type A	**78,000.00**	**TON**	**240,266**	**718,195**	**4,095,000**	**0**	**0**	**0**	**43,918**	**5,097,379**
			1.48	*2.81*	*52.50*	*0.00*	*0.00*	*0.00*	*0.27*	*57.06*
USR Type A Armor Stone (5 ton to 10 ton)	78,000.00	TON	115,050	219,440	4,095,000	0	0	0	21,208	4,450,698
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	78,000.00	TON	125,216	498,755	0	0	0	0	22,710	646,681
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.75	*8.58*	*48.00*	*0.00*			*0.50*	*59.83*
Type B	**109,300.00**	**TON**	**300,644**	**937,659**	**5,246,400**	**0**	**0**	**0**	**54,898**	**6,539,601**
			1.15	*2.18*	*48.00*	*0.00*	*0.00*	*0.00*	*0.21*	*51.54*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	109,300.00	TON	125,181	238,763	5,246,400	0	0	0	23,075	5,633,418
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	109,300.00	TON	175,463	698,897	0	0	0	0	31,823	906,182
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.37	*7.85*	*24.50*	*0.00*			*0.43*	*35.15*
Type C	**845,400.00**	**TON**	**2,002,637**	**6,636,905**	**20,712,300**	**0**	**0**	**0**	**365,126**	**29,716,967**
			0.76	*1.46*	*24.50*	*0.00*	*0.00*	*0.00*	*0.14*	*26.86*
USR Type C Stone	845,400.00	TON	645,488	1,231,167	20,712,300	0	0	0	118,985	22,707,940
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	845,400.00	TON	1,357,149	5,405,738	0	0	0	0	246,140	7,009,026
(Note: 2400 tons per trip, 24 hrs per trip)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
			2.29	*7.70*	*7.00*	*0.00*			*0.42*	*17.40*
Type D	**7,400.00**	**TON**	**16,935**	**56,960**	**51,800**	**0**	**0**	**0**	**3,086**	**128,781**
			0.68	*1.30*	*7.00*	*0.00*	*0.00*	*0.00*	*0.13*	*9.11*
USR Type D Stone	7,400.00	TON	5,055	9,642	51,800	0	0	0	932	67,430
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	7,400.00	TON	11,879	47,318	0	0	0	0	2,155	61,352
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.37	*7.85*	*24.50*	*0.00*			*0.43*	*35.15*
Type E	**116,800.00**	**TON**	**276,683**	**916,951**	**2,861,600**	**0**	**0**	**0**	**50,446**	**4,105,680**
			0.76	*1.46*	*24.50*	*0.00*	*0.00*	*0.00*	*0.14*	*26.86*
USR Type C and E Stone	116,800.00	TON	89,180	170,097	2,861,600	0	0	0	16,439	3,137,317
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	116,800.00	TON	187,503	746,854	0	0	0	0	34,007	968,363
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.25	*7.63*	*7.00*	*0.00*			*0.41*	*17.30*
Type F	**114,800.00**	**TON**	**258,797**	**876,172**	**803,600**	**0**	**0**	**0**	**47,158**	**1,985,728**
			0.65	*1.24*	*7.00*	*0.00*	*0.00*	*0.00*	*0.12*	*9.01*
USR Type F Stone	114,800.00	TON	74,505	142,107	803,600	0	0	0	13,734	1,033,946
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	114,800.00	TON	184,292	734,065	0	0	0	0	33,424	951,782
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.51	*8.12*	*30.60*	*0.00*			*0.46*	*41.69*
Type H	**50,900.00**	**TON**	**127,806**	**413,387**	**1,557,540**	**0**	**0**	**0**	**23,316**	**2,122,049**
			0.91	*1.73*	*30.60*	*0.00*	*0.00*	*0.00*	*0.17*	*33.40*
USR Type H Stone	50,900.00	TON	46,094	87,917	1,557,540	0	0	0	8,497	1,700,048
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	50,900.00	TON	81,711	325,470	0	0	0	0	14,820	422,001
(Note: 2400 tons per trip, 24 hrs per trip)										
			15,454.76	*21,954.08*	*3,516.80*	*0.00*			*2,769.56*	*43,695.19*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
Weir and Walkway	**1.00**	**EA**	**15,455**	**21,954**	**3,517**	**0**	**0**	**0**	**2,770**	**43,695**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,260.32	*21,810.47*	*1,420.50*	*0.00*			*2,607.48*	*40,098.76*
Wier	**1.00**	**EA**	**14,260**	**21,810**	**1,421**	**0**	**0**	**0**	**2,607**	**40,099**
			15.84	*24.23*	*0.70*	*0.00*	*0.00*	*0.00*	*2.90*	*43.68*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,753	7,270	210	0	0	0	869	13,103
			2,376.72	*3,635.08*	*541.50*	*0.00*	*0.00*	*0.00*	*434.58*	*6,987.88*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,377	3,635	542	0	0	0	435	6,988
			396.12	*605.85*	*0.00*	*0.00*	*0.00*	*0.00*	*72.43*	*1,074.40*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,377	3,635	0	0	0	0	435	6,446
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			15.84	*24.23*	*0.03*	*0.00*	*0.00*	*0.00*	*2.90*	*43.01*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,753	7,270	9	0	0	0	869	12,902
			1,194.44	*143.61*	*2,096.30*	*0.00*			*162.08*	*3,596.43*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**144**	**2,096**	**0**	**0**	**0**	**162**	**3,596**
			7.40	*0.75*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*23.07*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	15	278	0	0	0	20	461
			1.97	*0.20*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.30*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	20	886	0	0	0	27	1,130
			24.70	*3.65*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*36.10*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	73	88	0	0	0	67	722
			23.68	*2.39*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*85.54*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	36	844	0	0	0	48	1,283
			0.61	*1.20*	*12.32*	*0.00*			*0.11*	*14.25*
Steel Sheet Pile Wall	**29,800.00**	**SF**	**18,221**	**35,809**	**367,200**	**0**	**0**	**0**	**3,342**	**424,572**
			89.32	*175.54*	*1,800.00*	*0.00*			*16.38*	*2,081.24*
CZ67	**204.00**	**TON**	**18,221**	**35,809**	**367,200**	**0**	**0**	**0**	**3,342**	**424,572**
			89.32	*175.54*	*1,800.00*	*0.00*	*0.00*	*0.00*	*16.38*	*2,081.24*
USR Marine Sheet piling, steel, 38 psf, 40' excavation, left in place, excludes wales	204.00	TON	18,221	35,809	367,200	0	0	0	3,342	424,572
(Note: Modified for Marine Plant)										
			1.17	*2.23*	*1.20*	*0.00*			*0.22*	*4.81*
Geotextile	**21,600.00**	**SY**	**25,233**	**48,128**	**25,920**	**0**	**0**	**0**	**4,651**	**103,933**
			0.97	*1.86*	*1.00*	*0.00*	*0.00*	*0.00*	*0.18*	*4.01*
USR Geotextile	25,920.00	SY	25,233	48,128	25,920	0	0	0	4,651	103,933
(Note: 50 ft x 15 ft / 9 sf/sy = 83 sy Section. Say 1/2 hr to place a section. 83 sy x 2 = 164 sy hr. Use 200 sy/hr. Includes overlap)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**1,600.00**	**LF**	**0**	**0**	**0**	**0**	**2,000,000**	**0**	**0**	**2,000,000**
(Note: Relocated First Energy Outfall 203. Outfall to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	1,600.00	LF	0	0	0	0	2,000,000	0	0	2,000,000
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date.)										
Phase 3	**1.00**	**LS**	**5,543,679**	**16,799,804**	**61,895,207**	**15,600**	**0**	**0**	**1,008,703**	**85,262,993**
			440,486.88	*441,169.45*	*31,600.00*	*15,600.00*			*77,624.11*	*1,006,480.44*
General Conditions	**1.00**	**EA**	**440,487**	**441,169**	**31,600**	**15,600**	**0**	**0**	**77,624**	**1,006,480**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**44,772**	**124,984**	**0**	**0**	**0**	**0**	**8,196**	**177,952**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			144.48	*575.49*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*746.17*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	75,964	0	0	0	0	3,459	98,494
			194.70	*371.36*	*0.00*	*0.00*	*0.00*	*0.00*	*35.89*	*601.95*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	25,700	49,020	0	0	0	0	4,737	79,457
			362,505.60	*316,185.72*	*7,200.00*	*0.00*			*63,520.00*	*749,411.32*
Quality Control On-Site	**1.00**	**EA**	**362,506**	**316,186**	**7,200**	**0**	**0**	**0**	**63,520**	**749,411**
			10,069.60	*8,782.94*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*20,816.98*
USR Quality Control	36.00	MO	362,506	316,186	7,200	0	0	0	63,520	749,411
			3.08	*9.21*	*52.50*	*0.00*			*0.56*	*65.35*
Type A	**259,800.00**	**TON**	**800,271**	**2,392,142**	**13,639,500**	**0**	**0**	**0**	**146,279**	**16,978,191**
			1.48	*2.81*	*52.50*	*0.00*	*0.00*	*0.00*	*0.27*	*57.06*
USR Type A Armor Stone (5 ton to 10 ton)	259,800.00	TON	383,205	730,904	13,639,500	0	0	0	70,638	14,824,247
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	259,800.00	TON	417,066	1,661,238	0	0	0	0	75,641	2,153,945
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.75	*8.58*	*48.00*	*0.00*			*0.50*	*59.83*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
Type B	**266,800.00**	**TON**	**733,867**	**2,288,815**	**12,806,400**	**0**	**0**	**0**	**134,005**	**15,963,087**
			1.15	*2.18*	*48.00*	*0.00*	*0.00*	*0.00*	*0.21*	*51.54*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	266,800.00	TON	305,564	582,817	12,806,400	0	0	0	56,326	13,751,107
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	266,800.00	TON	428,303	1,705,998	0	0	0	0	77,679	2,211,980
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.37	*7.85*	*24.50*	*0.00*			*0.43*	*35.15*
Type C	**956,300.00**	**TON**	**2,265,343**	**7,507,537**	**23,429,350**	**0**	**0**	**0**	**413,023**	**33,615,254**
			0.76	*1.46*	*24.50*	*0.00*	*0.00*	*0.00*	*0.14*	*26.86*
USR Type C Stone	956,300.00	TON	730,163	1,392,672	23,429,350	0	0	0	134,594	25,686,780
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	956,300.00	TON	1,535,180	6,114,865	0	0	0	0	278,429	7,928,474
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.29	*7.70*	*7.00*	*0.00*			*0.42*	*17.40*
Type D	**24,500.00**	**TON**	**56,068**	**188,584**	**171,500**	**0**	**0**	**0**	**10,218**	**426,371**
			0.68	*1.30*	*7.00*	*0.00*	*0.00*	*0.00*	*0.13*	*9.11*
USR Type D Stone	24,500.00	TON	16,737	31,924	171,500	0	0	0	3,085	223,247
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	24,500.00	TON	39,331	156,660	0	0	0	0	7,133	203,124
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.37	*7.85*	*24.50*	*0.00*			*0.43*	*35.15*
Type E	**389,200.00**	**TON**	**921,961**	**3,055,457**	**9,535,400**	**0**	**0**	**0**	**168,094**	**13,680,913**
			0.76	*1.46*	*24.50*	*0.00*	*0.00*	*0.00*	*0.14*	*26.86*
USR Type C and E Stone	389,200.00	TON	297,166	566,797	9,535,400	0	0	0	54,778	10,454,141
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	389,200.00	TON	624,796	2,488,660	0	0	0	0	113,316	3,226,772
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.25	*7.63*	*7.00*	*0.00*			*0.41*	*17.30*
Type F	**77,200.00**	**TON**	**174,035**	**589,203**	**540,400**	**0**	**0**	**0**	**31,713**	**1,335,350**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
			0.65	*1.24*	*7.00*	*0.00*	*0.00*	*0.00*	*0.12*	*9.01*
USR Type F Stone	77,200.00	TON	50,103	95,563	540,400	0	0	0	9,236	695,302
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	77,200.00	TON	123,932	493,640	0	0	0	0	22,477	640,048
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.51	*8.12*	*30.60*	*0.00*			*0.46*	*41.69*
Type H	**15,500.00**	**TON**	**38,919**	**125,884**	**474,300**	**0**	**0**	**0**	**7,100**	**646,203**
			0.91	*1.73*	*30.60*	*0.00*	*0.00*	*0.00*	*0.17*	*33.40*
USR Type H Stone	15,500.00	TON	14,037	26,772	474,300	0	0	0	2,587	517,696
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.61	*6.39*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.29*
USR Haul from Sandusky	15,500.00	TON	24,883	99,112	0	0	0	0	4,513	128,507
(Note: 2400 tons per trip, 24 hrs per trip)										
			15,454.76	*21,954.08*	*3,516.80*	*0.00*			*2,769.56*	*43,695.19*
Weir and Walkway	**1.00**	**EA**	**15,455**	**21,954**	**3,517**	**0**	**0**	**0**	**2,770**	**43,695**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,260.32	*21,810.47*	*1,420.50*	*0.00*			*2,607.48*	*40,098.76*
Wier	**1.00**	**EA**	**14,260**	**21,810**	**1,421**	**0**	**0**	**0**	**2,607**	**40,099**
			15.84	*24.23*	*0.70*	*0.00*	*0.00*	*0.00*	*2.90*	*43.68*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,753	7,270	210	0	0	0	869	13,103
			2,376.72	*3,635.08*	*541.50*	*0.00*	*0.00*	*0.00*	*434.58*	*6,987.88*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,377	3,635	542	0	0	0	435	6,988
			396.12	*605.85*	*0.00*	*0.00*	*0.00*	*0.00*	*72.43*	*1,074.40*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,377	3,635	0	0	0	0	435	6,446
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost1	UserCost2	DirectMU	DirectCost
			15.84	*24.23*	*0.03*	*0.00*	*0.00*	*0.00*	*2.90*	*43.01*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,753	7,270	9	0	0	0	869	12,902
			1,194.44	*143.61*	*2,096.30*	*0.00*			*162.08*	*3,596.43*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**144**	**2,096**	**0**	**0**	**0**	**162**	**3,596**
			7.40	*0.75*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*23.07*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	15	278	0	0	0	20	461
			1.97	*0.20*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.30*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	20	886	0	0	0	27	1,130
			24.70	*3.65*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*36.10*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	73	88	0	0	0	67	722
			23.68	*2.39*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*85.54*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	36	844	0	0	0	48	1,283
			0.61	*1.20*	*12.34*	*0.00*			*0.11*	*14.27*
Steel Sheet Pile Wall	**99,300.00**	**SF**	**60,825**	**119,540**	**1,225,800**	**0**	**0**	**0**	**11,158**	**1,417,323**
			89.32	*175.54*	*1,800.00*	*0.00*			*16.38*	*2,081.24*
CZ67	**681.00**	**TON**	**60,825**	**119,540**	**1,225,800**	**0**	**0**	**0**	**11,158**	**1,417,323**
			89.32	*175.54*	*1,800.00*	*0.00*	*0.00*	*0.00*	*16.38*	*2,081.24*
USR Marine Sheet piling, steel, 38 psf, 40' excavation, left in place, excludes wales	681.00	TON	60,825	119,540	1,225,800	0	0	0	11,158	1,417,323
(Note: Modified for Marine Plant)										
			1.17	*2.23*	*1.20*	*0.00*			*0.22*	*4.81*
Geotextile	**31,200.00**	**SY**	**36,448**	**69,519**	**37,440**	**0**	**0**	**0**	**6,719**	**150,125**
			0.97	*1.86*	*1.00*	*0.00*	*0.00*	*0.00*	*0.18*	*4.01*
USR Geotextile	37,440.00	SY	36,448	69,519	37,440	0	0	0	6,719	150,125

(Note: 50 ft x 15 ft / 9 sf/sy = 83 sy Section. Say 1/2 hr to place a section. 83 sy x 2 = 164 sy hr. Use 200 sy/hr. Includes overlap.)

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Local Alternative New Layout June 2009 - COMBIWALL

This estimate is from sketches / drawings supplied by Mike Mohr. It is a revision to the 062008 local preferred plan. Due to the amount and lengths of steel LB Foster was contacted for a price quote on the steel. Stone prices are from J. Deans 2006 cost estimate and have been escalated to current price levels.

Estimated by	LRB jw
Designed by	LRB- ftl, mm
Prepared by	James Wryk
Preparation Date	6/5/2009
Effective Date of Pricing	6/5/2009
Estimated Construction Time	Days

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Date	Author	Note
6/18/2008	jw	It is anticipated that this CDF loction will be built using marine equipment due to the size of the structure. (Due not want equipment on wall if a storm comes up). Self unloaders hauling smaller core and granular fill may be utilized when possible. Larger stone will be hauled from Sandusky OH.
6/24/2008	jw	Design from F. Lewandowski (SSP System) and stone cross section from M. Mohr. SSP system is a combi-wall system constinting of King Piles with SSP in between. King Piles @ approx. 66 feet and the SSP at approx 125 feet in lengthon the lake side and 140 feet on the CDF side. It is questionable if the piles and the SSP can be purchased and transported in the lengths indicated. From Civil Structural- anticipate that these lengths can be purchased and transported to the job site either by truck, rail or barge for this stae of study.
6/24/2008	jw	Stone costs from Cleveland DMMP study developed in 2006. Price Quotes received for this study.
6/24/2008	jw	Estimate broken into 3 phases starting from the East and working to the west. Because the phases may be completed by different contracts, Mob/Demob, Wier Structure and fish removal is added to all phases of the estimate.
6/24/2008	jw	Most of this cost estimate is taken from previous work such as the Cleveland 10B CDF estimate and the Cleveland DMMP Site #2 estimate. Therefore not a lot of detailed work has been completed. Most of estimate is previous wotk escalated to current price levels and for the stone a single cost developed as described in notes above.
6/24/2008	jw	Estimates DO NOT INCLUDE any dredging that may be required for realignment of the navigation channel that may become necessary due to this alternative.
9/8/2008	jw	Revised estimate include new labor rates and esculated stone price quotes to current (4th Qtr FY08) dollars. Estimate NOT escaluated to Future $$.
9/9/2008	jw	15% contingency has been added to this estimate. In addition the price quote from the quarry is on the conservative side not only because of the opening of a new section of quarry but for the uncertainties in the design at the time of the price quote.
6/10/2009	jw	This combi wall alternative includes a Phase 4 for protection of wave overtopping and berm construction. This estimate was initially copied from earlier estimates math checked for links and adjusted quantities input into the estimate.

Description	Quantity	UOM	ContractCost	Escalation	Contingency	ProjectCost
Project Cost Summary Report			**296,716,406**	**26,467,103**	**32,318,351**	**355,501,860**
Phase 1	**1.00**	**LS**	**123,689,375**	**11,033,092**	**13,472,247**	**148,194,714**
Phase 2	**1.00**	**LS**	**66,488,599**	**5,930,783**	**7,241,938**	**79,661,321**
Phase 3	**1.00**	**LS**	**85,069,125**	**7,588,166**	**9,265,729**	**101,923,020**
Phase 4	**1.00**	**LS**	**21,469,307**	**1,915,062**	**2,338,437**	**25,722,806**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
Contract Cost Summary Report			**244,777,149**	**0**	**51,939,257**	**296,716,406**
Phase 1	**1.00**	**LS**	**102,807,822**	**0**	**20,881,552**	**123,689,375**
General Conditions	**1.00**	**EA**	*1,012,140.09* **1,012,140**	**0**	**223,071**	*1,235,210.93* **1,235,211**
Temporary Office	**1.00**	**EA**	*47,015.46* **47,015**	**0**	**10,362**	*57,377.45* **57,377**
Submittals	**1.00**	**LS**	**32,102**	**0**	**7,075**	**39,177**
Mob and Demob	**1.00**	**LS**	**181,361**	**0**	**39,971**	**221,332**
Quality Control On-Site	**1.00**	**EA**	*751,662.19* **751,662**	**0**	**165,663**	*917,324.94* **917,325**
PZC 13 Combi-wall	**4,878.00**	**LF**	*16,109.91* **78,584,135**	**0**	**16,286,050**	*19,448.58* **94,870,185**
C King Pile (Beam)	**108,400.00**	**LF**	*268.54* **29,109,314**	**0**	**6,415,554**	*327.72* **35,524,868**
C PZC 13	**9,527.00**	**TON**	*2,432.03* **23,169,970**	**0**	**5,106,551**	*2,968.04* **28,276,521**
C Tie Rods	**398.76**	**EA**	*9,732.87* **3,881,039**	**0**	**855,362**	*11,877.95* **4,736,401**
C Wales	**1,131,696.00**	**LB**	*3.99* **4,514,854**	**0**	**995,052**	*4.87* **5,509,907**
C Concrete Cap	**10,840.00**	**CY**	*432.60* **4,689,384**	**0**	**0**	*432.60* **4,689,384**
Granular Fill	**722,920.00**	**TON**	*18.29* **13,219,573**	**0**	**2,913,531**	*22.32* **16,133,104**
Stone	**1.00**	**LS**	**19,669,828**	**0**	**4,335,136**	**24,004,965**
Type B	**30,200.00**	**TON**	*64.46* **1,946,560**	**0**	**429,013**	*78.66* **2,375,573**
Type C	**401,000.00**	**TON**	*37.63* **15,089,575**	**0**	**3,325,670**	*45.92* **18,415,245**
Type F	**59,700.00**	**TON**	*18.20* **1,086,304**	**0**	**239,416**	*22.21* **1,325,721**
Type H	**34,600.00**	**TON**	*44.72* **1,547,390**	**0**	**341,037**	*54.58* **1,888,427**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			44,219.23			*53,964.94*
Weir and Walkway	**1.00**	**EA**	**44,219**	**0**	**9,746**	**53,965**
			40,617.92			*49,569.92*
Wier	**1.00**	**EA**	**40,618**	**0**	**8,952**	**49,570**
			3,601.30			*4,395.01*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,601**	**0**	**794**	**4,395**
			35,000.00			*35,000.00*
Fish Removal	**1.00**	**EA**	**35,000**	**0**	**0**	**35,000**
			1,250.00			*1,250.00*
Outfall Relocation	**2,670.00**	**LF**	**3,337,500**	**0**	**0**	**3,337,500**
			15.63			*19.07*
Geotextile	**8,000.00**	**SY**	**125,000**	**0**	**27,549**	**152,549**
Phase 2	**1.00**	**LS**	**54,481,203**	**0**	**12,007,397**	**66,488,599**
			1,012,140.09			*1,235,210.93*
General Conditions	**1.00**	**EA**	**1,012,140**	**0**	**223,071**	**1,235,211**
			47,015.46			*57,377.45*
Temporary Office	**1.00**	**EA**	**47,015**	**0**	**10,362**	**57,377**
Submittals	**1.00**	**LS**	**32,102**	**0**	**7,075**	**39,177**
Mob and Demob	**1.00**	**LS**	**181,361**	**0**	**39,971**	**221,332**
			751,662.19			*917,324.94*
Quality Control On-Site	**1.00**	**EA**	**751,662**	**0**	**165,663**	**917,325**
			16,175.35			*19,740.32*
PZC 13 Combi-wall	**1,910.00**	**LF**	**30,894,926**	**0**	**6,809,094**	**37,704,020**
			268.54			*327.72*
C King Pile (Beam)	**42,444.44**	**LF**	**11,397,866**	**0**	**2,512,035**	**13,909,901**
			2,432.03			*2,968.04*
C PZC 13	**3,730.33**	**TON**	**9,072,293**	**0**	**1,999,490**	**11,071,782**
			9,732.87			*11,877.95*
C Tie Rods	**156.13**	**EA**	**1,519,636**	**0**	**334,920**	**1,854,556**
			3.99			*4.87*
C Wales	**443,120.00**	**LB**	**1,767,809**	**0**	**389,617**	**2,157,426**
			432.60			*527.94*
C Concrete Cap	**4,244.44**	**CY**	**1,836,147**	**0**	**404,678**	**2,240,825**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			18.29			*22.32*
Granular Fill	**283,062.16**	**TON**	**5,176,176**	**0**	**1,140,804**	**6,316,980**
			15.63			*19.07*
Geotextile	**8,000.00**	**SY**	**125,000**	**0**	**27,549**	**152,549**
Stone	**1.00**	**LS**	**19,032,418**	**0**	**4,194,654**	**23,227,072**
			64.46			*78.66*
Type B	**29,200.00**	**TON**	**1,882,104**	**0**	**414,807**	**2,296,911**
			37.63			*45.92*
Type C	**388,000.00**	**TON**	**14,600,386**	**0**	**3,217,855**	**17,818,242**
			18.20			*22.21*
Type F	**57,800.00**	**TON**	**1,051,732**	**0**	**231,797**	**1,283,528**
			44.72			*54.58*
Type H	**33,500.00**	**TON**	**1,498,195**	**0**	**330,195**	**1,828,390**
			44,219.23			*53,964.94*
Weir and Walkway	**1.00**	**EA**	**44,219**	**0**	**9,746**	**53,965**
			40,617.92			*49,569.92*
Wier	**1.00**	**EA**	**40,618**	**0**	**8,952**	**49,570**
			3,601.30			*4,395.01*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,601**	**0**	**794**	**4,395**
			35,000.00			*42,713.83*
Fish Removal	**1.00**	**EA**	**35,000**	**0**	**7,714**	**42,714**
			1,250.00			*1,525.49*
Outfall Relocation	**2,670.00**	**LF**	**3,337,500**	**0**	**735,569**	**4,073,069**
			16.45			*20.07*
Geotextile	**7,600.00**	**SY**	**125,000**	**0**	**27,549**	**152,549**
Phase 3	**1.00**	**LS**	**69,706,209**	**0**	**15,362,916**	**85,069,125**
			1,012,140.09			*1,235,210.93*
General Conditions	**1.00**	**EA**	**1,012,140**	**0**	**223,071**	**1,235,211**
			47,015.46			*57,377.45*
Temporary Office	**1.00**	**EA**	**47,015**	**0**	**10,362**	**57,377**
Submittals	**1.00**	**LS**	**32,102**	**0**	**7,075**	**39,177**
Mob and Demob	**1.00**	**LS**	**181,361**	**0**	**39,971**	**221,332**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			751,662.19			*917,324.94*
Quality Control On-Site	**1.00**	**EA**	**751,662**	**0**	**165,663**	**917,325**
			16,109.91			*19,660.46*
PZC 13 Combi-wall	**4,052.00**	**LF**	**65,277,350**	**0**	**14,386,816**	**79,664,166**
			268.54			*327.72*
C King Pile (Beam)	**90,044.44**	**LF**	**24,180,185**	**0**	**5,329,197**	**29,509,382**
			2,432.03			*2,968.04*
C PZC 13	**7,913.78**	**TON**	**19,246,560**	**0**	**4,241,850**	**23,488,410**
			9,732.87			*11,877.95*
C Tie Rods	**331.23**	**EA**	**3,223,856**	**0**	**710,522**	**3,934,378**
			3.99			*4.87*
C Wales	**940,064.00**	**LB**	**3,750,347**	**0**	**826,558**	**4,576,905**
			432.60			*527.94*
C Concrete Cap	**9,004.44**	**CY**	**3,895,323**	**0**	**858,511**	**4,753,833**
			18.29			*22.32*
Granular Fill	**600,506.73**	**TON**	**10,981,081**	**0**	**2,420,178**	**13,401,258**
			44,219.23			*53,964.94*
Weir and Walkway	**1.00**	**EA**	**44,219**	**0**	**9,746**	**53,965**
			40,617.92			*49,569.92*
Wier	**1.00**	**EA**	**40,618**	**0**	**8,952**	**49,570**
			3,601.30			*4,395.01*
Walkway, Railing and Ladder	**1.00**	**EA**	**3,601**	**0**	**794**	**4,395**
			35,000.00			*42,713.83*
Fish Removal	**1.00**	**EA**	**35,000**	**0**	**7,714**	**42,714**
			1,250.00			*1,525.49*
Outfall Relocation	**2,670.00**	**LF**	**3,337,500**	**0**	**735,569**	**4,073,069**
Phase 4	**1.00**	**LS**	**17,781,915**	**0**	**3,687,392**	**21,469,307**
			15.61			*15.66*
Berms	**68,300.00**	**CY**	**1,066,486**	**0**	**3,391**	**1,069,877**
			11.50			*11.50*
Initial Raising	**52,300.00**	**CY**	**601,450**	**0**	**0**	**601,450**
			11.50			*11.50*
Final Raising	**39,100.00**	**CY**	**449,650**	**0**	**0**	**449,650**

Description	Quantity	UOM	DirectCost	SubCMU	PrimeCMU	ContractCost
			0.96			*1.17*
Berm Removal	**16,000.00**	**CY**	**15,386**	**0**	**3,391**	**18,777**
			65.61			*80.07*
Type A	**166,700.00**	**TON**	**10,937,103**	**0**	**2,410,485**	**13,347,589**
			60.08			*73.32*
Type B	**62,500.00**	**TON**	**3,754,783**	**0**	**827,536**	**4,582,319**
			35.38			*43.18*
Type E	**30,600.00**	**TON**	**1,082,642**	**0**	**238,609**	**1,321,251**
			4.86			*5.93*
Geotextile	**27,000.00**	**SY**	**131,219**	**0**	**28,920**	**160,139**
			65.30			*79.69*
Concrete Mat	**12,400.00**	**SY**	**809,681**	**0**	**178,450**	**988,131**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
Project Direct Costs Report			**17,183,270**	**34,523,148**	**167,934,644**	**46,800**	**21,589,453**	**375,000**	**3,124,834**	**244,777,149**
Phase 1	**1.00**	**LS**	**7,256,321**	**14,758,064**	**71,270,831**	**15,600**	**8,061,884**	**125,000**	**1,320,122**	**102,807,822**
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			440,486.88	*446,829.10*	*31,600.00*	*15,600.00*			*77,624.11*	*1,012,140.09*
General Conditions	**1.00**	**EA**	**440,487**	**446,829**	**31,600**	**15,600**	**0**	**0**	**77,624**	**1,012,140**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**44,772**	**128,393**	**0**	**0**	**0**	**0**	**8,196**	**181,361**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			144.48	*593.27*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*763.95*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	78,311	0	0	0	0	3,459	100,841
			194.70	*379.40*	*0.00*	*0.00*	*0.00*	*0.00*	*35.89*	*609.99*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	25,700	50,081	0	0	0	0	4,737	80,519
			362,505.60	*318,436.58*	*7,200.00*	*0.00*			*63,520.00*	*751,662.19*
Quality Control On-Site	**1.00**	**EA**	**362,506**	**318,437**	**7,200**	**0**	**0**	**0**	**63,520**	**751,662**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			10,069.60	*8,845.46*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*20,879.51*
USR Quality Control	36.00	MO	362,506	318,437	7,200	0	0	0	63,520	751,662
			1,133.09	*2,054.97*	*11,753.90*	*0.00*			*206.62*	*16,109.91*
PZC 13 Combi-wall	**4,878.00**	**LF**	**5,527,204**	**10,024,153**	**57,335,520**	**0**	**4,689,384**	**0**	**1,007,874**	**78,584,135**

(Note: First phase Combi-Wall approx.2887 lf Beam - W40 x 215 @ 73.45" (6.12') centers @ 68 feet long. Attached to the beams are connnectors welded to the beam for the PZC13 to insert into. PZC 13 @ 90 foot lengths. Anticipate that the sheet pile wall will be constructed after the west end of the breakwater is out of the water. Fill material should be available to be placed out to the location and as the wall is built the equipment should be able to be driven out onto the pier similar to the Chicago Shoreline Beach Piers.)

			6.15	*6.86*	*254.40*	*0.00*			*1.12*	*268.54*
C King Pile (Beam)	**108,400.00**	**LF**	**666,775**	**743,727**	**27,576,890**	**0**	**0**	**0**	**121,921**	**29,109,314**

(Note: Includes BBS-M and BBS-F King piles are 68 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

			0.00	*0.00*	*2,165.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,165.00*
USR Material Price King Pile & connectors	12,737.59	TON	0	0	27,576,890	0	0	0	0	27,576,890

(Note: Connectors welded to pile.)

			6.15	*6.86*	*0.00*	*0.00*	*0.00*	*0.00*	*1.12*	*14.14*
USR King pile installation	108,400.00	LF	666,775	743,727	0	0	0	0	121,921	1,532,424

(Note: Say 1 pile at 66 ft per hour due to tolerances.)

			172.75	*192.69*	*2,035.00*	*0.00*			*31.59*	*2,432.03*
C PZC 13	**9,527.00**	**TON**	**1,645,820**	**1,835,764**	**19,387,445**	**0**	**0**	**0**	**300,942**	**23,169,970**

(Note: SSP piles are 125-140 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

			172.75	*192.69*	*0.00*	*0.00*	*0.00*	*0.00*	*31.59*	*397.03*
USR Steel Sheet Pile Installation	9,527.00	TON	1,645,820	1,835,764	0	0	0	0	300,942	3,782,525

(Note: 125 -140 foot sheets approx 2 ft wide @ say 2.0 sheets per hour = 250-280 sf/hr Reduce crew output due to need to thread in SSP at both sides and tight tolerances.)

			0.00	*0.00*	*2,035.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,035.00*
USR Material Price SSP	9,527.00	TON	0	0	19,387,445	0	0	0	0	19,387,445
			1,408.84	*1,567.69*	*6,500.00*	*0.00*			*256.34*	*9,732.87*
C Tie Rods	**398.76**	**EA**	**561,783**	**625,124**	**2,591,913**	**0**	**0**	**0**	**102,219**	**3,881,039**
			0.87	*0.96*	*4.00*	*0.00*	*0.00*	*0.00*	*0.16*	*5.99*
USR Wale & Tie Rod installation	647,978.18	LB	561,783	625,124	2,591,913	0	0	0	102,219	3,881,039

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb ADJUST PRICE OF TIE RODS (DOUBLE THAT OF WALES).)										
			0.87	*0.96*	*2.00*	*0.00*			*0.16*	*3.99*
C Wales	**1,131,696.00**	**LB**	**981,156**	**1,091,781**	**2,263,392**	**0**	**0**	**0**	**178,525**	**4,514,854**
			0.87	*0.96*	*2.00*	*0.00*	*0.00*	*0.00*	*0.16*	*3.99*
USR Wale & Tie Rod installation	1,131,696.00	LB	981,156	1,091,781	2,263,392	0	0	0	178,525	4,514,854
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*432.60*
C Concrete Cap	**10,840.00**	**CY**	**0**	**0**	**0**	**0**	**4,689,384**	**0**	**0**	**4,689,384**
			0.00	*0.00*	*0.00*	*0.00*	*412.00*	*0.00*	*0.00*	*412.00*
USR Concrete Cap	11,382.00	CY	0	0	0	0	4,689,384	0	0	4,689,384
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy Updated using ENR June 08 - June 07 = 1.03 = $412/cy (includes reinforcing and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH & Profit.)										
			2.31	*7.92*	*7.63*	*0.00*			*0.42*	*18.29*
Granular Fill	**722,920.00**	**TON**	**1,671,670**	**5,727,757**	**5,515,880**	**0**	**0**	**0**	**304,267**	**13,219,573**
(Note: Use Type D material.)										
			0.71	*1.33*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.80*
USR Type D Stone	722,920.00	TON	511,142	962,384	5,515,880	0	0	0	93,787	7,083,193
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	722,920.00	TON	1,160,528	4,765,373	0	0	0	0	210,480	6,136,381
(Note: 2400 tons per trip, 24 hrs per trip)										
Stone	**1.00**	**LS**	**1,273,175**	**4,264,604**	**13,900,195**	**0**	**0**	**0**	**231,854**	**19,669,828**
			2.80	*8.82*	*52.32*	*0.00*			*0.51*	*64.46*
Type B	**30,200.00**	**TON**	**84,600**	**266,474**	**1,580,064**	**0**	**0**	**0**	**15,422**	**1,946,560**
			1.20	*2.23*	*52.32*	*0.00*	*0.00*	*0.00*	*0.22*	*55.97*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	30,200.00	TON	36,119	67,400	1,580,064	0	0	0	6,629	1,690,213
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	30,200.00	TON	48,481	199,074	0	0	0	0	8,793	256,347
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.40	*8.08*	*26.71*	*0.00*			*0.44*	*37.63*
Type C	**401,000.00**	**TON**	**963,469**	**3,239,961**	**10,710,710**	**0**	**0**	**0**	**175,434**	**15,089,575**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.80	*1.49*	*26.71*	*0.00*	*0.00*	*0.00*	*0.15*	*29.14*
USR Type C Stone	401,000.00	TON	319,731	596,633	10,710,710	0	0	0	58,682	11,685,756
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	401,000.00	TON	643,739	2,643,328	0	0	0	0	116,752	3,403,819
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.29	*7.86*	*7.63*	*0.00*			*0.42*	*18.20*
Type F	**59,700.00**	**TON**	**136,840**	**469,034**	**455,511**	**0**	**0**	**0**	**24,918**	**1,086,304**
			0.69	*1.26*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.71*
USR Type F Stone	59,700.00	TON	41,002	75,502	455,511	0	0	0	7,537	579,551
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	59,700.00	TON	95,838	393,533	0	0	0	0	17,382	506,753
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.55	*8.36*	*33.35*	*0.00*			*0.46*	*44.72*
Type H	**34,600.00**	**TON**	**88,265**	**289,135**	**1,153,910**	**0**	**0**	**0**	**16,079**	**1,547,390**
			0.95	*1.76*	*33.35*	*0.00*	*0.00*	*0.00*	*0.17*	*36.23*
USR Type H Stone	34,600.00	TON	32,720	61,058	1,153,910	0	0	0	6,005	1,253,693
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	34,600.00	TON	55,545	228,078	0	0	0	0	10,074	293,696
(Note: 2400 tons per trip, 24 hrs per trip)										
			15,454.76	*22,478.11*	*3,516.80*	*0.00*			*2,769.56*	*44,219.23*
Weir and Walkway	**1.00**	**EA**	**15,455**	**22,478**	**3,517**	**0**	**0**	**0**	**2,770**	**44,219**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,260.32	*22,329.63*	*1,420.50*	*0.00*			*2,607.48*	*40,617.92*
Wier	**1.00**	**EA**	**14,260**	**22,330**	**1,421**	**0**	**0**	**0**	**2,607**	**40,618**
			15.84	*24.81*	*0.70*	*0.00*	*0.00*	*0.00*	*2.90*	*44.25*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,753	7,443	210	0	0	0	869	13,276
			2,376.72	*3,721.60*	*541.50*	*0.00*	*0.00*	*0.00*	*434.58*	*7,074.40*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,377	3,722	542	0	0	0	435	7,074
			396.12	*620.27*	*0.00*	*0.00*	*0.00*	*0.00*	*72.43*	*1,088.82*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,377	3,722	0	0	0	0	435	6,533
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			15.84	*24.81*	*0.03*	*0.00*	*0.00*	*0.00*	*2.90*	*43.58*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,753	7,443	9	0	0	0	869	13,075
			1,194.44	*148.49*	*2,096.30*	*0.00*			*162.08*	*3,601.30*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**148**	**2,096**	**0**	**0**	**0**	**162**	**3,601**
			7.40	*0.77*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*23.10*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	15	278	0	0	0	20	462
			1.97	*0.21*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.31*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	21	886	0	0	0	27	1,131
			24.70	*3.77*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*36.22*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	75	88	0	0	0	67	724
			23.68	*2.47*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*85.62*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	37	844	0	0	0	48	1,284

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**2,670.00**	**LF**	**0**	**0**	**0**	**0**	**3,337,500**	**0**	**0**	**3,337,500**
(Note: Relocated First Energy Outfall 002 & 003. Outfalls to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	2,670.00	LF	0	0	0	0	3,337,500	0	0	3,337,500
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date. Unit price include OH & Profit. Leave assigned contractor as - (Unassigned).)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*15.63*
Geotextile	**8,000.00**	**SY**	**0**	**0**	**0**	**0**	**0**	**125,000**	**0**	**125,000**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*	*5.00*	*0.00*	*5.00*
USR Geotextile	25,000.00	SY	0	0	0	0	0	125,000	0	125,000
(Note: Estimaors judgement from past projects.)										
Phase 2	**1.00**	**LS**	**3,852,118**	**8,520,929**	**35,934,527**	**15,600**	**5,208,647**	**250,000**	**699,383**	**54,481,203**
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			440,486.88	*446,829.10*	*31,600.00*	*15,600.00*			*77,624.11*	*1,012,140.09*
General Conditions	**1.00**	**EA**	**440,487**	**446,829**	**31,600**	**15,600**	**0**	**0**	**77,624**	**1,012,140**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**44,772**	**128,393**	**0**	**0**	**0**	**0**	**8,196**	**181,361**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			144.48	*593.27*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*763.95*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	78,311	0	0	0	0	3,459	100,841
			194.70	*379.40*	*0.00*	*0.00*	*0.00*	*0.00*	*35.89*	*609.99*
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	25,700	50,081	0	0	0	0	4,737	80,519
			362,505.60	*318,436.58*	*7,200.00*	*0.00*			*63,520.00*	*751,662.19*
Quality Control On-Site	**1.00**	**EA**	**362,506**	**318,437**	**7,200**	**0**	**0**	**0**	**63,520**	**751,662**
			10,069.60	*8,845.46*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*20,879.51*
USR Quality Control	36.00	MO	362,506	318,437	7,200	0	0	0	63,520	751,662
			1,133.09	*2,054.97*	*11,753.90*	*0.00*			*206.62*	*16,175.35*
PZC 13 Combi-wall	**1,910.00**	**LF**	**2,164,198**	**3,924,996**	**22,449,947**	**0**	**1,836,147**	**125,000**	**394,637**	**30,894,926**
(Note: First phase Combi-Wall approx.2887 lf Beam - W40 x 215 @ 73.45" (6.12') centers @ 68 feet long. Attached to the beams are connnectors welded to the beam for the PZC13 to insert into. PZC 13 @ 90 foot lengths. Anticipate that the sheet pile wall will be constructed after the west end of the breakwater is out of the water. Fill material should be available to be placed out to the location and as the wall is built the equipment should be able to be driven out onto the pier similar to the Chicago Shoreline Beach Piers.)										
			6.15	*6.86*	*254.40*	*0.00*			*1.12*	*268.54*
C King Pile (Beam)	**42,444.44**	**LF**	**261,078**	**291,209**	**10,797,839**	**0**	**0**	**0**	**47,739**	**11,397,866**
(Note: Includes BBS-M and BBS-F King piles are 68 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)										
			0.00	*0.00*	*2,165.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,165.00*
USR Material Price King Pile & connectors	4,987.45	TON	0	0	10,797,839	0	0	0	0	10,797,839
(Note: Connectors welded to pile.)										
			6.15	*6.86*	*0.00*	*0.00*	*0.00*	*0.00*	*1.12*	*14.14*
USR King pile installation	42,444.44	LF	261,078	291,209	0	0	0	0	47,739	600,027

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: Say 1 pile at 66 ft per hour due to tolerances.)										
			172.75	*192.69*	*2,035.00*	*0.00*			*31.59*	*2,432.03*
C PZC 13	**3,730.33**	**TON**	**644,427**	**718,800**	**7,591,230**	**0**	**0**	**0**	**117,835**	**9,072,293**
(Note: SSP piles are 125-140 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)										
			172.75	*192.69*	*0.00*	*0.00*	*0.00*	*0.00*	*31.59*	*397.03*
USR Steel Sheet Pile Installation	3,730.33	TON	644,427	718,800	0	0	0	0	117,835	1,481,063
(Note: 125 -140 foot sheets approx 2 ft wide @ say 2.0 sheets per hour = 250-280 sf/hr Reduce crew output due to need to thread in SSP at both sides and tight tolerances.)										
			0.00	*0.00*	*2,035.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,035.00*
USR Material Price SSP	3,730.33	TON	0	0	7,591,230	0	0	0	0	7,591,230
			1,408.84	*1,567.69*	*6,500.00*	*0.00*			*256.34*	*9,732.87*
C Tie Rods	**156.13**	**EA**	**219,968**	**244,770**	**1,014,874**	**0**	**0**	**0**	**40,024**	**1,519,636**
			0.87	*0.96*	*4.00*	*0.00*	*0.00*	*0.00*	*0.16*	*5.99*
USR Wale & Tie Rod installation	253,718.39	LB	219,968	244,770	1,014,874	0	0	0	40,024	1,519,636
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb ADJUST PRICE OF TIE RODS (DOUBLE THAT OF WALES).)										
			0.87	*0.96*	*2.00*	*0.00*			*0.16*	*3.99*
C Wales	**443,120.00**	**LB**	**384,176**	**427,491**	**886,240**	**0**	**0**	**0**	**69,902**	**1,767,809**
			0.87	*0.96*	*2.00*	*0.00*	*0.00*	*0.00*	*0.16*	*3.99*
USR Wale & Tie Rod installation	443,120.00	LB	384,176	427,491	886,240	0	0	0	69,902	1,767,809
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*432.60*
C Concrete Cap	**4,244.44**	**CY**	**0**	**0**	**0**	**0**	**1,836,147**	**0**	**0**	**1,836,147**
			0.00	*0.00*	*0.00*	*0.00*	*412.00*	*0.00*	*0.00*	*412.00*
USR Concrete Cap	4,456.67	CY	0	0	0	0	1,836,147	0	0	1,836,147
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy Updated using ENR June 08 - June 07 = 1.03 = $412/cy (includes reinforcing and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH & Profit.)										
			2.31	*7.92*	*7.63*	*0.00*			*0.42*	*18.29*
Granular Fill	**283,062.16**	**TON**	**654,549**	**2,242,726**	**2,159,764**	**0**	**0**	**0**	**119,137**	**5,176,176**
(Note: Use Type D material.)										
			0.71	*1.33*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.80*
USR Type D Stone	283,062.16	TON	200,140	376,825	2,159,764	0	0	0	36,723	2,773,452

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	283,062.16	TON	454,409	1,865,901	0	0	0	0	82,414	2,402,724
(Note: 2400 tons per trip, 24 hrs per trip)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*15.63*
Geotextile	**8,000.00**	**SY**	**0**	**0**	**0**	**0**	**0**	**125,000**	**0**	**125,000**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*	*5.00*	*0.00*	*5.00*
USR Geotextile	25,000.00	SY	0	0	0	0	0	125,000	0	125,000
(Note: Estimaors judgement from past projects.)										
Stone	**1.00**	**LS**	**1,231,978**	**4,126,625**	**13,449,463**	**0**	**0**	**0**	**224,352**	**19,032,418**
			2.80	*8.82*	*52.32*	*0.00*			*0.51*	*64.46*
Type B	**29,200.00**	**TON**	**81,799**	**257,650**	**1,527,744**	**0**	**0**	**0**	**14,911**	**1,882,104**
			1.20	*2.23*	*52.32*	*0.00*	*0.00*	*0.00*	*0.22*	*55.97*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	29,200.00	TON	34,923	65,168	1,527,744	0	0	0	6,410	1,634,245
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	29,200.00	TON	46,876	192,482	0	0	0	0	8,502	247,859
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.40	*8.08*	*26.71*	*0.00*			*0.44*	*37.63*
Type C	**388,000.00**	**TON**	**932,235**	**3,134,925**	**10,363,480**	**0**	**0**	**0**	**169,747**	**14,600,386**
			0.80	*1.49*	*26.71*	*0.00*	*0.00*	*0.00*	*0.15*	*29.14*
USR Type C Stone	388,000.00	TON	309,365	577,291	10,363,480	0	0	0	56,780	11,306,916
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	388,000.00	TON	622,869	2,557,634	0	0	0	0	112,967	3,293,470
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.29	*7.86*	*7.63*	*0.00*			*0.42*	*18.20*
Type F	**57,800.00**	**TON**	**132,485**	**454,107**	**441,014**	**0**	**0**	**0**	**24,125**	**1,051,732**
			0.69	*1.26*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.71*
USR Type F Stone	57,800.00	TON	39,697	73,099	441,014	0	0	0	7,297	561,107
(Note: (3/4" to 1") ODOT 703.01 Size No. 68 clev e brkwtr 20/ton)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	57,800.00	TON	92,788	381,008	0	0	0	0	16,829	490,625

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
(Note: 2400 tons per trip, 24 hrs per trip)										
			2.55	*8.36*	*33.35*	*0.00*			*0.46*	*44.72*
Type H	**33,500.00**	**TON**	**85,459**	**279,943**	**1,117,225**	**0**	**0**	**0**	**15,568**	**1,498,195**
			0.95	*1.76*	*33.35*	*0.00*	*0.00*	*0.00*	*0.17*	*36.23*
USR Type H Stone	33,500.00	TON	31,680	59,117	1,117,225	0	0	0	5,814	1,213,836
(Note: (6" - 18") ODOT 703.19B Type C)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	33,500.00	TON	53,779	220,827	0	0	0	0	9,754	284,359
(Note: 2400 tons per trip, 24 hrs per trip)										
			15,454.76	*22,478.11*	*3,516.80*	*0.00*			*2,769.56*	*44,219.23*
Weir and Walkway	**1.00**	**EA**	**15,455**	**22,478**	**3,517**	**0**	**0**	**0**	**2,770**	**44,219**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,260.32	*22,329.63*	*1,420.50*	*0.00*			*2,607.48*	*40,617.92*
Wier	**1.00**	**EA**	**14,260**	**22,330**	**1,421**	**0**	**0**	**0**	**2,607**	**40,618**
			15.84	*24.81*	*0.70*	*0.00*	*0.00*	*0.00*	*2.90*	*44.25*
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,753	7,443	210	0	0	0	869	13,276
			2,376.72	*3,721.60*	*541.50*	*0.00*	*0.00*	*0.00*	*434.58*	*7,074.40*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,377	3,722	542	0	0	0	435	7,074
			396.12	*620.27*	*0.00*	*0.00*	*0.00*	*0.00*	*72.43*	*1,088.82*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,377	3,722	0	0	0	0	435	6,533
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			15.84	*24.81*	*0.03*	*0.00*	*0.00*	*0.00*	*2.90*	*43.58*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,753	7,443	9	0	0	0	869	13,075
			1,194.44	*148.49*	*2,096.30*	*0.00*			*162.08*	*3,601.30*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**148**	**2,096**	**0**	**0**	**0**	**162**	**3,601**
			7.40	*0.77*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*23.10*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	15	278	0	0	0	20	462
			1.97	*0.21*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.31*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	21	886	0	0	0	27	1,131
			24.70	*3.77*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*36.22*
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	75	88	0	0	0	67	724
			23.68	*2.47*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*85.62*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	37	844	0	0	0	48	1,284
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**2,670.00**	**LF**	**0**	**0**	**0**	**0**	**3,337,500**	**0**	**0**	**3,337,500**
(Note: Relocated First Energy Outfall 002 & 003. Outfalls to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	2,670.00	LF	0	0	0	0	3,337,500	0	0	3,337,500
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date. Unit price include OH & Profit. Leave assigned contractor as - (Unassigned).)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*16.45*
Geotextile	**7,600.00**	**SY**	**0**	**0**	**0**	**0**	**0**	**125,000**	**0**	**125,000**
			0.00	*0.00*	*0.00*	*0.00*	*0.00*	*5.00*	*0.00*	*5.00*
USR Geotextile	25,000.00	SY	0	0	0	0	0	125,000	0	125,000
(Note: Estimaors judgement from past projects.)										
Phase 3	**1.00**	**LS**	**5,047,215**	**8,796,053**	**47,661,916**	**15,600**	**7,267,823**	**0**	**917,603**	**69,706,209**
(Note: Eastern section of entire CDF area from the West end of the Marina to the First Energy Outfall. Stone prices from Cleveland DMMP 2006 Estimates from Jim Dean.)										
			440,486.88	*446,829.10*	*31,600.00*	*15,600.00*			*77,624.11*	*1,012,140.09*
General Conditions	**1.00**	**EA**	**440,487**	**446,829**	**31,600**	**15,600**	**0**	**0**	**77,624**	**1,012,140**
			14,526.72	*0.00*	*14,400.00*	*15,600.00*			*2,488.74*	*47,015.46*
Temporary Office	**1.00**	**EA**	**14,527**	**0**	**14,400**	**15,600**	**0**	**0**	**2,489**	**47,015**
			0.00	*0.00*	*300.00*	*0.00*	*0.00*	*0.00*	*0.00*	*300.00*
AF 015205000550 Office Trailer, furnished, rent per month, 50' x 12', excl. hookups	36.00	MO	0	0	10,800	0	0	0	0	10,800
			0.00	*0.00*	*0.00*	*400.00*	*0.00*	*0.00*	*0.00*	*400.00*
USR Utility Costs	36.00	MO	0	0	0	14,400	0	0	0	14,400
(Note: Include Electric, Phone, Fax and Supplies)										
USR Mob and Demob Office Trailer	1.00	LS	0	0	0	1,200	0	0	0	1,200
			403.52	*0.00*	*100.00*	*0.00*	*0.00*	*0.00*	*69.13*	*572.65*
USR Janitorial	36.00	MO	14,527	0	3,600	0	0	0	2,489	20,615
Submittals	**1.00**	**LS**	**18,683**	**0**	**10,000**	**0**	**0**	**0**	**3,419**	**32,102**
USR Reproduction and Mail	1.00	LS	0	0	10,000	0	0	0	0	10,000
			622.76	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*113.97*	*736.73*
USR Initial Project Submittals	30.00	DAY	18,683	0	0	0	0	0	3,419	22,102
Mob and Demob	**1.00**	**LS**	**44,772**	**128,393**	**0**	**0**	**0**	**0**	**8,196**	**181,361**
(Note: Assume 3 days initial mob + 2 days demob year 1 + 2 days mob year 2 + 2 days demob year 2 + year 3 (11 days @ 12 hrs/day))										
			144.48	*593.27*	*0.00*	*0.00*	*0.00*	*0.00*	*26.20*	*763.95*
USR 1 tug + 4 barges + 1 Eng + 1 Oper + 2 Tug Workers	132.00	HR	19,071	78,311	0	0	0	0	3,459	100,841
			194.70	*379.40*	*0.00*	*0.00*	*0.00*	*0.00*	*35.89*	*609.99*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
USR 1 Spud Barge + 1 Crane + 1 tug + 2 Oper + 2 Deck	132.00	HR	25,700	50,081	0	0	0	0	4,737	80,519
			362,505.60	*318,436.58*	*7,200.00*	*0.00*			*63,520.00*	*751,662.19*
Quality Control On-Site	**1.00**	**EA**	**362,506**	**318,437**	**7,200**	**0**	**0**	**0**	**63,520**	**751,662**
			10,069.60	*8,845.46*	*200.00*	*0.00*	*0.00*	*0.00*	*1,764.44*	*20,879.51*
USR Quality Control	36.00	MO	362,506	318,437	7,200	0	0	0	63,520	751,662
			1,133.09	*2,054.97*	*11,753.90*	*0.00*			*206.62*	*16,109.91*
PZC 13 Combi-wall	**4,052.00**	**LF**	**4,591,273**	**8,326,746**	**47,626,799**	**0**	**3,895,323**	**0**	**837,209**	**65,277,350**

(Note: First phase Combi-Wall approx.2887 lf Beam - W40 x 215 @ 73.45" (6.12') centers @ 68 feet long. Attached to the beams are connnectors welded to the beam for the PZC13 to insert into. PZC 13 @ 90 foot lengths. Anticipate that the sheet pile wall will be constructed after the west end of the breakwater is out of the water. Fill material should be available to be placed out to the location and as the wall is built the equipment should be able to be driven out onto the pier similar to the Chicago Shoreline Beach Piers.)

			6.15	*6.86*	*254.40*	*0.00*			*1.12*	*268.54*
C King Pile (Beam)	**90,044.44**	**LF**	**553,869**	**617,791**	**22,907,249**	**0**	**0**	**0**	**101,276**	**24,180,185**

(Note: Includes BBS-M and BBS-F King piles are 68 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

			0.00	*0.00*	*2,165.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,165.00*
USR Material Price King Pile & connectors	10,580.72	TON	0	0	22,907,249	0	0	0	0	22,907,249

(Note: Connectors welded to pile.)

			6.15	*6.86*	*0.00*	*0.00*	*0.00*	*0.00*	*1.12*	*14.14*
USR King pile installation	90,044.44	LF	553,869	617,791	0	0	0	0	101,276	1,272,936

(Note: Say 1 pile at 66 ft per hour due to tolerances.)

			172.75	*192.69*	*2,035.00*	*0.00*			*31.59*	*2,432.03*
C PZC 13	**7,913.78**	**TON**	**1,367,130**	**1,524,911**	**16,104,536**	**0**	**0**	**0**	**249,983**	**19,246,560**

(Note: SSP piles are 125-140 feet in length. Lengths are on the high end for transportation purposes. From Civil/Structural Design assume that the lengths can be made and delivered without any splicing required at this point in the study.)

			172.75	*192.69*	*0.00*	*0.00*	*0.00*	*0.00*	*31.59*	*397.03*
USR Steel Sheet Pile Installation	7,913.78	TON	1,367,130	1,524,911	0	0	0	0	249,983	3,142,024

(Note: 125 -140 foot sheets approx 2 ft wide @ say 2.0 sheets per hour = 250-280 sf/hr Reduce crew output due to need to thread in SSP at both sides and tight tolerances.)

			0.00	*0.00*	*2,035.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2,035.00*
USR Material Price SSP	7,913.78	TON	0	0	16,104,536	0	0	0	0	16,104,536
			1,408.84	*1,567.69*	*6,500.00*	*0.00*			*256.34*	*9,732.87*
C Tie Rods	**331.23**	**EA**	**466,656**	**519,271**	**2,153,020**	**0**	**0**	**0**	**84,910**	**3,223,856**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.87	*0.96*	*4.00*	*0.00*	*0.00*	*0.00*	*0.16*	*5.99*
USR Wale & Tie Rod installation	538,254.94	LB	466,656	519,271	2,153,020	0	0	0	84,910	3,223,856
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb ADJUST PRICE OF TIE RODS (DOUBLE THAT OF WALES).)										
			0.87	*0.96*	*2.00*	*0.00*			*0.16*	*3.99*
C Wales	**940,064.00**	**LB**	**815,015**	**906,908**	**1,880,128**	**0**	**0**	**0**	**148,295**	**3,750,347**
			0.87	*0.96*	*2.00*	*0.00*	*0.00*	*0.00*	*0.16*	*3.99*
USR Wale & Tie Rod installation	940,064.00	LB	815,015	906,908	1,880,128	0	0	0	148,295	3,750,347
(Note: Reviewed the Chicago Shoreline beach job and price quote for wales @ $1.38/lb. Update due to current rates Use $2.00/lb)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*432.60*
C Concrete Cap	**9,004.44**	**CY**	**0**	**0**	**0**	**0**	**3,895,323**	**0**	**0**	**3,895,323**
			0.00	*0.00*	*0.00*	*0.00*	*412.00*	*0.00*	*0.00*	*412.00*
USR Concrete Cap	9,454.67	CY	0	0	0	0	3,895,323	0	0	3,895,323
(Note: From Chicago Shoreline 40-41 beach estimate approx. $400/cy Updated using ENR June 08 - June 07 = 1.03 = $412/cy (includes reinforcing and formwork). Add 5% to Qty for waste. Leave contractor unassigned as bid abstract price includes OH & Profit.)										
			2.31	*7.92*	*7.63*	*0.00*			*0.42*	*18.29*
Granular Fill	**600,506.73**	**TON**	**1,388,603**	**4,757,866**	**4,581,866**	**0**	**0**	**0**	**252,745**	**10,981,081**
(Note: Use Type D material.)										
			0.71	*1.33*	*7.63*	*0.00*	*0.00*	*0.00*	*0.13*	*9.80*
USR Type D Stone	600,506.73	TON	424,590	799,422	4,581,866	0	0	0	77,906	5,883,784
(Note: (4" Minus) ODOT 703.19A Crushed Ag clev e brkwtr 30/ton)										
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	600,506.73	TON	964,013	3,958,445	0	0	0	0	174,839	5,097,297
(Note: 2400 tons per trip, 24 hrs per trip)										
			15,454.76	*22,478.11*	*3,516.80*	*0.00*			*2,769.56*	*44,219.23*
Weir and Walkway	**1.00**	**EA**	**15,455**	**22,478**	**3,517**	**0**	**0**	**0**	**2,770**	**44,219**
(Note: Quantities obtained from Dike 10b IGE dated June 1996)										
			14,260.32	*22,329.63*	*1,420.50*	*0.00*			*2,607.48*	*40,617.92*
Wier	**1.00**	**EA**	**14,260**	**22,330**	**1,421**	**0**	**0**	**0**	**2,607**	**40,618**
			15.84	*24.81*	*0.70*	*0.00*	*0.00*	*0.00*	*2.90*	*44.25*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
MIL 031104300150 C.I.P. concrete forms, footing, continuous wall, plywood, 4 use, includes erecting, bracing, stripping and cleaning	300.00	SFC	4,753	7,443	210	0	0	0	869	13,276
			2,376.72	*3,721.60*	*541.50*	*0.00*	*0.00*	*0.00*	*434.58*	*7,074.40*
MIL 032106000700 Reinforcing steel, in place, walls, #3 to #7, A615, grade 60	1.00	TON	2,377	3,722	542	0	0	0	435	7,074
			396.12	*620.27*	*0.00*	*0.00*	*0.00*	*0.00*	*72.43*	*1,088.82*
USR 033107005400 Structural concrete, placing, walls, with crane and bucket, 15" thick, includes vibrating, excludes material	6.00	CY	2,377	3,722	0	0	0	0	435	6,533
			0.00	*0.00*	*110.00*	*0.00*	*0.00*	*0.00*	*0.00*	*110.00*
MIL 033102200300 Structural concrete, ready mix, normal weight, 4000 PSI, includes material only	6.00	CY	0	0	660	0	0	0	0	660
			15.84	*24.81*	*0.03*	*0.00*	*0.00*	*0.00*	*2.90*	*43.58*
MIL 033503500010 Concrete finishing, walls, includes breaking ties and patching voids	300.00	SF	4,753	7,443	9	0	0	0	869	13,075
			1,194.44	*148.49*	*2,096.30*	*0.00*			*162.08*	*3,601.30*
Walkway, Railing and Ladder	**1.00**	**EA**	**1,194**	**148**	**2,096**	**0**	**0**	**0**	**162**	**3,601**
			7.40	*0.77*	*13.92*	*0.00*	*0.00*	*0.00*	*1.00*	*23.10*
RSM 055207000020 Railing, pipe, aluminum, satin finish, 2 rails, 1-1/4" dia	20.00	LF	148	15	278	0	0	0	20	462
			1.97	*0.21*	*8.86*	*0.00*	*0.00*	*0.00*	*0.27*	*11.31*
MIL 055303400694 Floor grating, steel, galvanized, 1-1/4" x 3/16" bearing bars @ 15/16" O.C., cross bars @ 4" O.C., 9.1 #/S.F., up to 300 S.F.	100.00	SF	197	21	886	0	0	0	27	1,131
			24.70	*3.77*	*4.40*	*0.00*	*0.00*	*0.00*	*3.35*	*36.22*

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
MIL 051204400672 Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	20.00	LF	494	75	88	0	0	0	67	724
			23.68	*2.47*	*56.26*	*0.00*	*0.00*	*0.00*	*3.21*	*85.62*
MIL 055145000020 Ladder, steel, 20" W, bolted to concrete, incl cage	15.00	VLF	355	37	844	0	0	0	48	1,284
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*35,000.00*
Fish Removal	**1.00**	**EA**	**0**	**0**	**0**	**0**	**35,000**	**0**	**0**	**35,000**
USR Fish Removal	1.00	LS	0	0	0	0	35,000	0	0	35,000
(Note: From Cleveland 10 B.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*1,250.00*
Outfall Relocation	**2,670.00**	**LF**	**0**	**0**	**0**	**0**	**3,337,500**	**0**	**0**	**3,337,500**
(Note: Relocated First Energy Outfall 002 & 003. Outfalls to be relocated through the west arm of the first phase of the CDF. No sizes given. Assume the East 20 th street design from Cleveland 10b CDF.)										
			0.00	*0.00*	*0.00*	*0.00*	*1,250.00*	*0.00*	*0.00*	*1,250.00*
USR Outfall Relocation	2,670.00	LF	0	0	0	0	3,337,500	0	0	3,337,500
(Note: From Cleveland CDF 10B E20th Street outfall -171" x 110" Corr Steel Pipe Arch. Low Bidders unit Cost updated by ENR to current date. Unit price include OH & Profit. Leave assigned contractor as - (Unassigned).)										
Phase 4	**1.00**	**LS**	**1,027,617**	**2,448,102**	**13,067,370**	**0**	**1,051,100**	**0**	**187,726**	**17,781,915**
(Note: Phase 4 is placing stone and or onterlocking concrete mat and building berms out of dredge material. Stone items taken from CDFconstruction projects.)										
			0.07	*0.15*	*0.00*	*0.00*			*0.01*	*15.61*
Berms	**68,300.00**	**CY**	**4,622**	**9,920**	**0**	**0**	**1,051,100**	**0**	**845**	**1,066,486**
(Note: It is assumed by the time that the dredge material is at the level that the stone protection (phase 4) that equipment will be able to go onto the deposited dredge material and build the berms from deposited material onstite. This item also include removal of berm material for construction of stone protection.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*11.50*
Initial Raising	**52,300.00**	**CY**	**0**	**0**	**0**	**0**	**601,450**	**0**	**0**	**601,450**
			0.00	*0.00*	*0.00*	*0.00*	*11.50*	*0.00*	*0.00*	*11.50*
USR Borrow area Excavation & Berm Construction	52,300.00	CY	0	0	0	0	601,450	0	0	601,450
(Note: Leave contractor unassigned as this is from a bid abstract - TAB Construction Dike 12 Berm Raising.)										
			0.00	*0.00*	*0.00*	*0.00*			*0.00*	*11.50*
Final Raising	**39,100.00**	**CY**	**0**	**0**	**0**	**0**	**449,650**	**0**	**0**	**449,650**

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			0.00	*0.00*	*0.00*	*0.00*	*11.50*	*0.00*	*0.00*	*11.50*
USR Borrow area Excavation & Berm Construction	39,100.00	CY	0	0	0	0	449,650	0	0	449,650
(Note: Leave contractor unassigned as this is from a bid abstract - TAB Construction Dike 12 Berm Raising.)										
			0.29	*0.62*	*0.00*	*0.00*			*0.05*	*0.96*
Berm Removal	**16,000.00**	**CY**	**4,622**	**9,920**	**0**	**0**	**0**	**0**	**845**	**15,386**
(Note: Berm raising will have to be overbuilt and then some material will be removed to place the stone protection. This item is for removing the berm on the lakeward side for construction of the stone protection. Assume material to be side cast toward the center of the dike. Detail Item from cost book - add contractor to item)										
			0.29	*0.62*	*0.00*	*0.00*	*0.00*	*0.00*	*0.05*	*0.96*
RSM 312316420300 Excavating, bulk bank measure, 3 C.Y. capacity = 160 C.Y./hour, backhoe, hydraulic, crawler mounted, excluding truck loading	16,000.00	BCY	4,622	9,920	0	0	0	0	845	15,386
			3.08	*9.47*	*52.50*	*0.00*			*0.56*	*65.61*
Type A	**166,700.00**	**TON**	**513,492**	**1,578,002**	**8,751,750**	**0**	**0**	**0**	**93,860**	**10,937,103**
			1.48	*2.87*	*52.50*	*0.00*	*0.00*	*0.00*	*0.27*	*57.12*
USR Type A Armor Stone (5 ton to 10 ton)	166,700.00	TON	245,883	479,142	8,751,750	0	0	0	45,325	9,522,099
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	166,700.00	TON	267,609	1,098,860	0	0	0	0	48,535	1,415,004
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.75	*8.82*	*48.00*	*0.00*			*0.50*	*60.08*
Type B	**62,500.00**	**TON**	**171,914**	**551,477**	**3,000,000**	**0**	**0**	**0**	**31,392**	**3,754,783**
			1.15	*2.23*	*48.00*	*0.00*	*0.00*	*0.00*	*0.21*	*51.59*
USR Type B Stone (600 lb to 2000 lb) Placed for CDF	62,500.00	TON	71,581	139,487	3,000,000	0	0	0	13,195	3,224,263
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	62,500.00	TON	100,333	411,990	0	0	0	0	18,197	530,520
(Note: 2400 tons per cycle, 24 hrs per cycle)										
			2.37	*8.08*	*24.50*	*0.00*			*0.43*	*35.38*
Type E	**30,600.00**	**TON**	**72,487**	**247,239**	**749,700**	**0**	**0**	**0**	**13,216**	**1,082,642**
			0.76	*1.49*	*24.50*	*0.00*	*0.00*	*0.00*	*0.14*	*26.89*
USR Type C and E Stone	30,600.00	TON	23,364	45,529	749,700	0	0	0	4,307	822,899
(Note: (3 in to 6 in) ODOT 703.19B Type D clev e brkwtr 32/ton)										

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	Bid Abstract	Estimators Jud	DirectMU	DirectCost
			1.61	*6.59*	*0.00*	*0.00*	*0.00*	*0.00*	*0.29*	*8.49*
USR Haul from Sandusky	30,600.00	TON	49,123	201,710	0	0	0	0	8,909	259,743
(Note: 2400 tons per trip, 24 hrs per trip)										
			1.17	*2.28*	*1.20*	*0.00*			*0.22*	*4.86*
Geotextile	**27,000.00**	**SY**	**31,541**	**61,464**	**32,400**	**0**	**0**	**0**	**5,814**	**131,219**
			0.97	*1.90*	*1.00*	*0.00*	*0.00*	*0.00*	*0.18*	*4.05*
USR Geotextile	32,400.00	SY	31,541	61,464	32,400	0	0	0	5,814	131,219
(Note: 50 ft x 15 ft / 9 sf/sy = 83 sy Section. Say 1/2 hr to place a section. 83 sy x 2 = 164 sy hr. Use 200 sy/hr. Includes overlap)										
			18.84	*0.00*	*43.03*	*0.00*			*3.44*	*65.30*
Concrete Mat	**12,400.00**	**SY**	**233,561**	**0**	**533,520**	**0**	**0**	**0**	**42,600**	**809,681**
			3.41	*0.00*	*7.80*	*0.00*	*0.00*	*0.00*	*0.62*	*11.84*
RSM 321413130020 Interlocking precast concrete unit paving, "V" blocks for retaining soil	68,400.00	SF	233,561	0	533,520	0	0	0	42,600	809,681

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Tab H
Summary Geotechnical Narrative for Preliminary Cellular Wall Design

CLEVELAND NEW CDF
E55 AALTERNATIVE SITE
CLEVELAND, OHIO

GEOTECHNICAL NARRATIVE OF
PRELIMINARY CELLULAR WALL DESIGN

OCTOBER 2008

A. EXISTING SUBSURFACE INFORMATION

The CDF Alternative Site referenced in this narrative is referred to as the E55 Site (Figure 1).

Existing subsurface explorations near this site are from the Cleveland East Breakwater Rehabilitation Project which were drilled in 1978 and the Burke East proposed disposal site drilled in 1991. Figure 1 shows the location of these explorations with respect to the proposed CDF location.

B. SUBSURFACE CONDITIONS

Figure 2 shows a Geologic Profile which is composed from the borings from the eastern edge of the Burke East proposed disposal site which is adjacent to the western proposed CDF cell wall and along the Cleveland East Breakwater which is north of the proposed CDF cell wall. These explorations show that the lake bottom consists of very soft Organic Clay (OH) and Silt (OL) which has a thickness of about 10 to 15 feet and extends to about elevation 531 (IGLD, 1985). Below these very soft deposits are soft to medium stiff clay deposits (CL) which extends down to Elevation 475 (IGLD, 1985). The existing borings does not reveal the depth of bedrock or very hard bearing material. In order to find the depth of bearing material and subsurface material characteristics within the proposed CDF location a subsurface exploration program will be completed in the spring of 2009.

C. PRELIMINARY GEOTECHNICAL SOIL PARAMETERS

Using existing subsurface information preliminary soil parameters were developed for use in performing a preliminary structural design analysis of the cellular containment walls and bearing capacity analysis. Table 1 below summarizes these soil design parameters. Final soil design parameters will be developed after the Spring 2009 drilling and testing program is completed.

Table 1 - Cleveland New CDF Preliminary Soil Design Parameters

Material Type	Elevation Range	Saturated Unit Weight	Undrained Strength		Drained Strength	
			C	ϕ	C’	ϕ’
Organic Silt (OH)	Lake Bottom to El.531.0	100	40	0	0	28
Soft to Medium Stiff Clay (CL)	El 531.0 to El 475.0	122	200+ 44z	0	0	26

Z = Depth below stratum

D. GEOTECHNICAL BEARING CAPACITY ANALYSIS

Using the above preliminary soil design parameters a bearing capacity analysis was performed on the proposed cellular sheet pile structure to check the factor of safety (overturning) against bearing failure of the cellar structure. The analysis was performed in accordance with the guidance contained in EM 1110-2-2503. The referenced guidance recommends a minimum factor of safety of 3.0 against bearing failure. The bearing capacity computations are presented on the following calculation pages. Results of this analysis indicate that the cellular sheet pile would have to extend to a depth 115 feet below low water datum (El. 454.2) to obtain a suitable factor of safety against bearing failure.

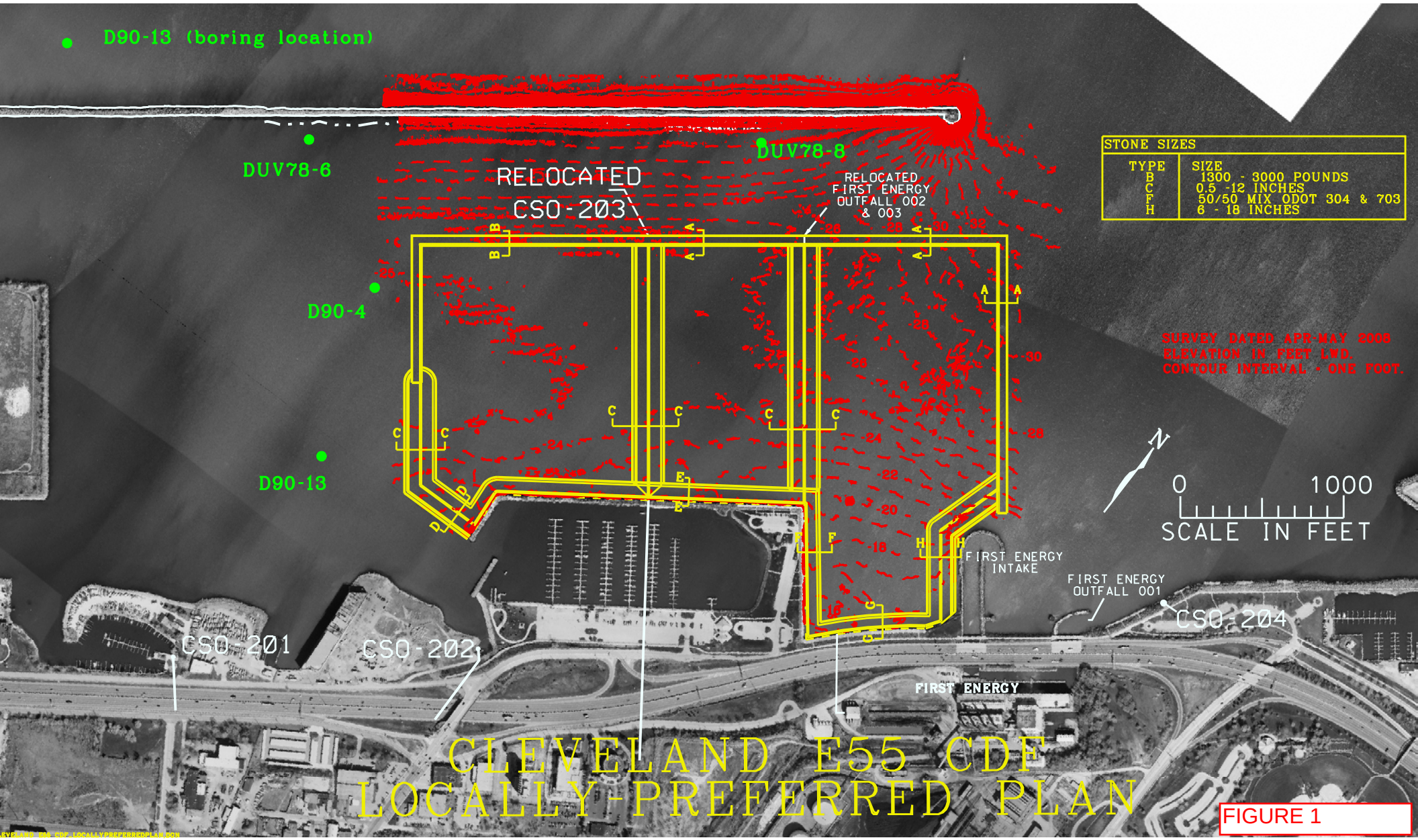

D90-13 (boring location)
DUV78-6
DUV78-8
D90-4
D90-13
RELOCATED
CSO-203
RELOCATED
FIRST ENERGY
OUTFALL 002
& 003
STONE SIZES
TYPE SIZE
B 1300 - 3000 POUNDS
C 0.5 -12 INCHES
F 50/50 MIX ODOT 304 & 703
H 6 - 18 INCHES
SURVEY DATED APR-MAY 2008
ELEVATION IN FEET LWD.
CONTOUR INTERVAL = ONE FOOT.
N
0 1000
SCALE IN FEET
FIRST ENERGY
INTAKE
FIRST ENERGY
OUTFALL 001
CSO-204
CSO-201
CSO-202
FIRST ENERGY
CLEVELAND E55 CDF
LOCALLY-PREFERRED PLAN

FIGURE 1

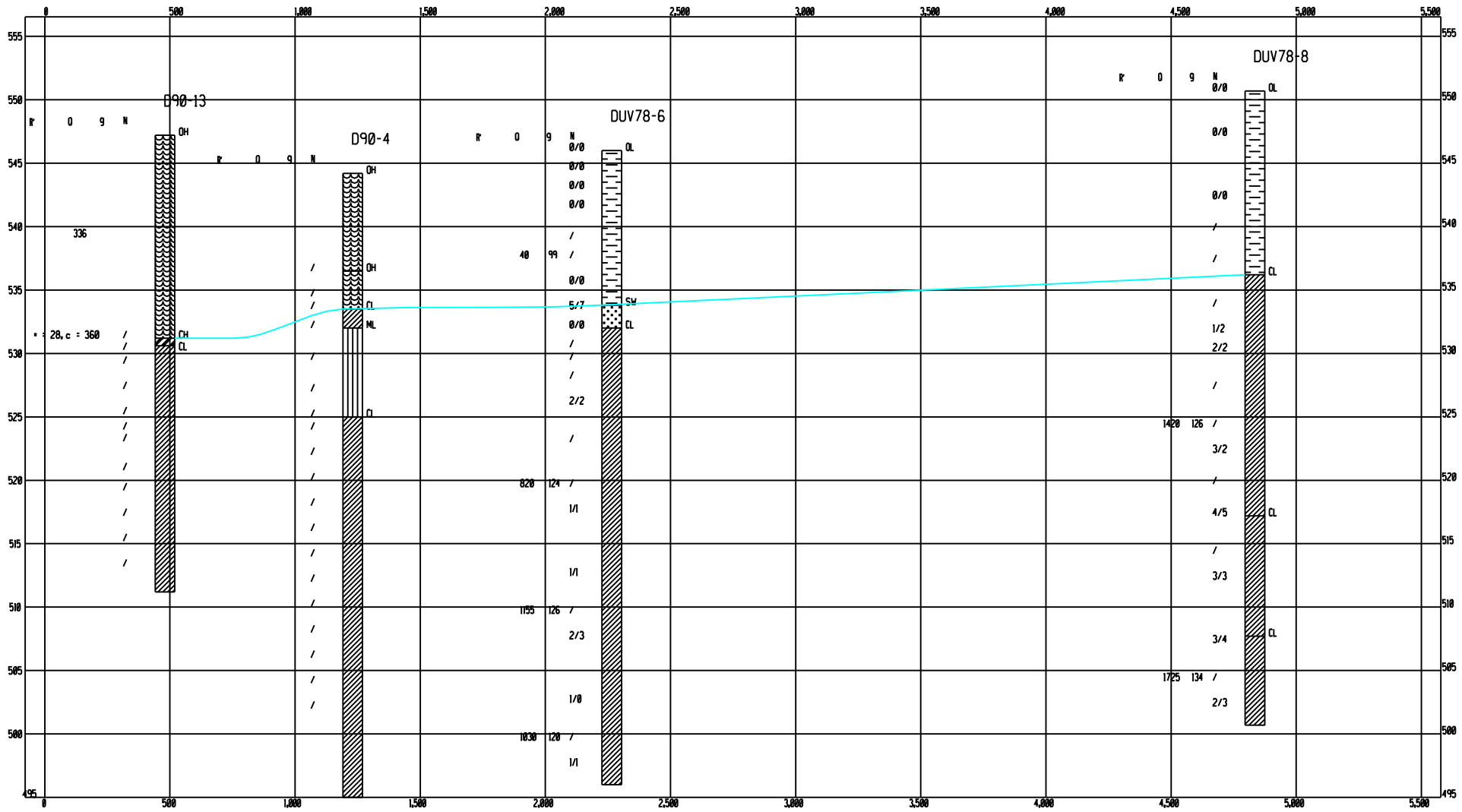
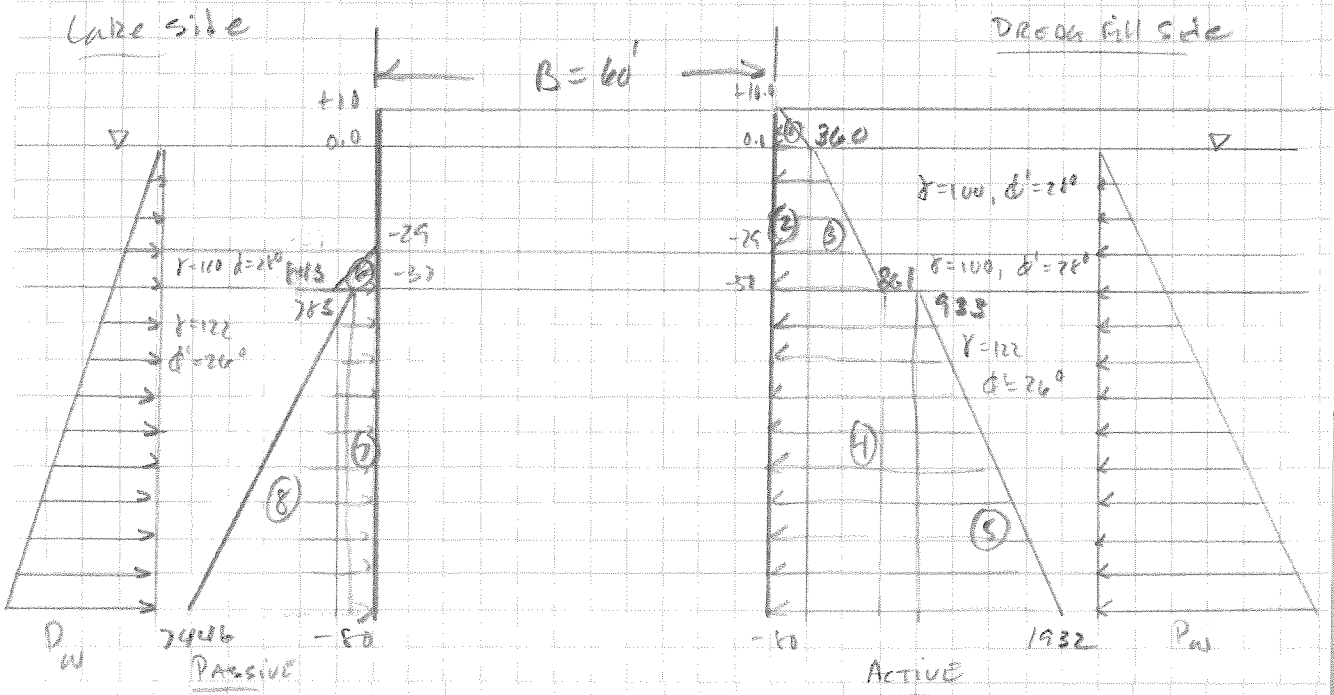

D90-13
D90-4
DUV78-6
DUV78-8
OH
CH
CL
ML
OL
SW
336
φ = 28, c = 360
40 99
820 124
1155 126
1030 120
1420 126
1725 134

FIGURE 2

Subject: CLEVELAND COF
Computation of: BEARING CAPACITY CELL WALL
Computed by: GL Checked by: _____ Date: AUG 2008



(1.) Find net overturning moment

(2.) Moment from water pressure cancels as pressure is the same on both active & passive sides.

A.) Active Pressures (Dredge fill side)

+10 to 0.0' | $\phi' = 28°$, $K_a = \tan^2(45 - \phi'/2) = 0.36$, $\gamma = 100\ lb/ft^3$

$\sigma_v = 100 \times 10' = 1{,}000\ lb/ft^2$

$\sigma_A = K_a \sigma_v = 0.36(1{,}000) = \underline{360\ lb/ft^2}$

0.0' to -37.0' | From muck lake bottom @ -29.0' to -37.0' assume same soil properties as dredge fill

$\sigma_v = 1{,}000 + (100 - 62.4) \times 37 = 2{,}391\ lb/ft^2$

$\sigma_A = K_a \sigma_v = 0.36(2{,}391\ lb/ft^2) = \underline{861\ lb/ft^2}$

Subject: CLEELAND COF
Computation of: BEARING CAPACITY COLUMN
Computed by: [illegible] Checked by: _____ Date: [illegible] 2008

A.) ACTIVE PRESSURES (Con't)

-37.0' to -80.0' | $\gamma' = 122\ lb/ft^3$, $\phi' = 26°$ (more clay)

$K_a = \tan^2(45 - \phi'/2) = \tan^2(45 - 26/2) = 0.39$

$\sigma_{v(-37)} = 2{,}391\ lb/ft^2$

$\sigma_{A_{-37}} = 0.39(2{,}391) = \underline{933}\ lb/ft^2$

$\sigma_{v_{-80}} = 2{,}391\ lb/ft^2 + (122 - 62.4)\,43\,ft = 4{,}954\ lb/ft^2$

$\sigma_{A_{-80}} = 0.39(4{,}954) = \underline{1{,}932\ lb/ft^2}$

B. PASSIVE PRESSURES (LAKE SIDE)

-29.0' to -37.0' | muck lake bottom to top of medium to stiff lacustrine clay @ -37.0'

$\sigma_{v_{-37}} = (100 - 62.4) \times 8.0' = 301\ lb/ft^2$ $K_p = \tan^2(45 + \phi'/2)$

$K_p = \tan^2(45 + \frac{26}{2}) = 2.8$

$\sigma_{p_{-37}} = K_p\,\sigma_v = 2.8(301) = \underline{843\ lb/ft^2}$

-37.0' to -80.0' | $\phi' = 26°$ $K_p = \tan^2(45 + \frac{26}{2}) = 2.6$

$\sigma_{v_{-80}} = 301 + (122 - 62.4) \times 43\,ft = 2{,}864\ lb/ft^2$

$\sigma_{p_{-80}} = K_p\,\sigma_v = 2.6(2{,}864) = 7{,}446\ lb/ft^2$

Subject: CLEVELAND CDF
Computation of: BEARING CAPACITY COLL WALL
Computed by: [illegible] Checked by: _____ Date: AUG 2008

B.) PASSIVE PRESSURE (Cont)

AT -37.0 TOP OF MEDIUM STIFF CLAY

$K_p = 2.6$

$\sigma_v = 301 \text{ lb/ft}^2$

$\sigma_p = K_p \sigma_v = 2.6(301) = 783 \text{ lb/ft}^2$

C.) MOMENTS ACTIVE SIDE

AREA NO	FORCE	MOMENT ARM	MOMENT
1	$(360 \times 10)/2 = 1,800 \text{ lbs}$	$80 + 10/3 = 83.3 \text{ ft}$	149,940 ft-lbs
2	$360 \times 80 = 28,800 \text{ lbs}$	$80/2 = 40 \text{ ft}$	1,152,000 ft-lbs
3	$\frac{(861-360)}{2} \times 37 \text{ ft} = 9,269 \text{ lbs}$	$43 \text{ ft} + \frac{37}{3} = 55.3 \text{ ft}$	512,885 ft-lbs
4	$933 \times 43 = 40,119 \text{ lbs}$	$43/2 = 21.5 \text{ ft}$	862,559 ft-lbs
5	$\frac{(1932-933)}{2} \times 43 = 21,479 \text{ lbs}$	$43/3 = 14.3 \text{ ft}$	307,150 ft-lbs
		TOTAL ACTIVE MOMENT	= 2,984,534 ft-lbs

Subject: CLEVELAND COF
Computation of: BEARING CAPACITY CALCULATION
Computed by: [illegible] Checked by: Date:

D.) MOMENTS PASSIVE SIDE

AREA	FORCE	MOMENT ARM	MOMENT
(6)	$(643 \times 8)/2 = 3,372$ lbs	$43 + 8/3 = 45.7$ ft	153,966 ft-lbs
(7)	$783 \times 43 = 33,669$ lbs	$43/2 = 21.5$ ft	723,884 ft-lbs
(8)	$\frac{(2446 + 783) \times 43}{2} = 143,255$ lbs	$43/3 = 14.3$ ft	2,053,322 ft-lb

TOTAL PASSIVE MOMENT = 2,931,154 ft-lbs

M, NET MOMENT $= M_A - M_P = 2,984,534 - 2,931,154$

$M = 53,340$ ft-lbs

E) BEARING CAPACITY FOS

$$FS = \frac{q_{ult}}{\frac{W_{col}}{B} + \frac{6M}{B^2}}$$

Subject: CLEVELAND CDF
Computation of: BEARING CAPACITY CELL WALL
Computed by: [illegible] Checked by: _____ Date: Oct. 2001

E) Bearing Capacity (Cont)

$Q_{ULT} = CN_c + \gamma D_f N_q$

$C = 320 + 17.5Z$ (MEDIUM STIFF CLAY)

$D_f = 80' - 29.0 = 51.0'$

$\gamma = 122\ lb/ft^3$

For Strip Load $\phi = 0°$, $N_c = 5.7$, $N_q = 1.0$

$C = 320 + 17.5(80-37) = 1073\ lb/ft^2$
DEPTH = 80

$Q_{ULT} = \overset{6116}{1073 \times 5.7} + \overset{3040}{(122-62.4)\,51.0'}$

$Q_{ULT} = 9{,}156\ lb/ft^2$

$W_{CELL} = (\gamma_{MSF\ FILL} \times 10ft) \times 60ft + (\gamma_{SOFT\ FILL} - 62.4)\,29.0ft \times 60ft$
$+ (\gamma_{INVERT} - 62.4)\,8.0ft \times 60ft + (\gamma_{SOFT\ CLAY} - 62.4) \times 43ft \times 60ft$

$W_{CELL} = (120)(10)(60) + (132-62.4) \times 29 \times 60$
$+ (100-62.4) \times 8.0 \times 60.0 + (122-62.4) \times 43.0 \times 60$

$W_{CELL} = 72{,}000\ lbs + 121{,}104\ lbs = 193{,}104$
$+ 18{,}048 + 153{,}768 = 364{,}920\ lbs$

Subject: CIGELAN CDF
Computation of: BEARING CAPACITY CELL WALLS
Computed by: GL Checked by: _____ Date: AUG 2007

E.) BEARING CAPACITY (CONT)

$$FS = \frac{Q_{ULT}}{\frac{W}{B} + \frac{6M}{B^2}} = \frac{9,156 \text{ lb/ft}^2}{\frac{364,520 \text{ lb}}{60 \text{ ft} \times \text{ft}} + \frac{6(53,340)}{60 \text{ ft}^2}}$$

$$FS = \frac{9156}{6082 + 89} = \frac{9,156}{7,312} = 1.48 < 3.0$$

Clay No Good!

$$q_{ALLOW} = \frac{q_{net}}{FS}$$

$$q_{net} = q_{ULT} - \gamma D_f = C N_C = 1073 \times 5.7 = 6,116 \text{ lb/ft}^2$$

$$q_{ALLOW} = \frac{6,116}{3} = 2039 \text{ lb/ft}^2$$

$H = ?$ $B = 60$ ft.

$$q_{mobilized} = \frac{(132 - 62.4)}{60} \times H \times 60 = 2039 \text{ lb/ft}^2$$

$$H = \frac{2039}{(132 - 62.4)} = 29.3 \text{ ft.}$$

Subject CLEVELAND COF
Computation of BEARING CAPACITY CELL WALL
Computed by [illegible] Checked by _____ Date [illegible]

Deepen Cell:

$W_{Applied} = 72{,}000\,lbs + 121{,}104\,lbs = 193{,}104\,lbs$

$q_{Applied} = \frac{W_{applied}}{B} = \frac{193{,}104\,lbs}{60\,ft} = 3{,}218\,lb/ft^2$

$q_{net} = 3.0\,q_{Applied} = 3.0(3{,}218\,lb/ft^2)$

$q_{net} = 9{,}654\,lb/ft^2 = CN_c$

$C = \frac{q_{net}}{N_c} = \frac{9{,}654}{5.7} = 1{,}694\,lb/ft^2$

What Depth to get This Strength?

$C = 320 + 17.5z = 1{,}694\,lb/ft^2$

$17.5z = 1{,}654 - 320$

$z = \frac{1654 - 320}{17.5} = 78.5\,ft$

Required Depth cell $= 78.5\,ft + 37\,ft = \underline{115\,ft}$